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Partnership for Implementation, Cooperation for Promotion: How Collaboration Dimensions Shape Innovation in Anesthesia Practice

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ABSTRACT

Interprofessional team collaboration (ITC) and innovative work behavior (IWB) are complementary competencies that enhance patient safety in perioperative care. However, evidence on whether specific dimensions of collaboration differentially predict specific stages of innovation among anesthesia professionals remains limited, particularly in resource-constrained settings. This cross-sectional study included 202 anesthesia professionals from seven public hospitals in Southern Iraq. Data were collected using the AITCS-II and Janssen's IWB scale. Three separate multiple linear regression models examined the predictive role of partnership, cooperation, and coordination on idea generation, idea promotion, and idea realization. Participants reported high levels of ITC and IWB. Idea generation scored highest, followed by idea realization and idea promotion, with the difference between idea generation and idea promotion reaching statistical significance ($p = 0.002$). Coordination was the only dimension that significantly predicted all three IWB sub-dimensions ($\beta = 0.224$–0.455). Cooperation significantly predicted idea promotion ($\beta = 0.213$, $p = 0.045$) but not idea generation or idea realization. Partnership significantly predicted idea realization ($\beta = 0.224$, $p = 0.015$) but not idea generation or idea promotion. In conclusion, interprofessional collaboration dimensions differentially predict innovation stages among anesthesia professionals. Coordination was identified as the foundational mechanism across all stages, while cooperation was specifically associated with idea promotion and partnership with idea realization. Strengthening structured coordination mechanisms offers a feasible and low-cost approach that may support innovation in resource-constrained healthcare settings.

Keywords: Interprofessional Collaboration; Innovative Work Behavior; Anesthesia; Coordination; Iraq

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Introduction

Adverse events resulting from unsafe patient care remain a major global healthcare challenge and are estimated to be among the top ten causes of death and disability worldwide [1]. The burden of poor-quality care is disproportionately greater in low- and middle-income countries (LMICs), where deaths attributable to inadequate healthcare quality account for a substantial proportion of amenable mortality [2]. This

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challenge is particularly evident in perioperative and anesthetic care settings, which represent dynamic, complex, and high-stakes clinical environments. Evidence indicates that 41% of adverse events occur in operating theatres, compared with 26% on hospital wards [3], with the majority considered potentially preventable [4].

Research consistently demonstrates that human error remains the leading cause of surgical adverse events, with non-technical skill (NTS) failures affecting surgical team performance more profoundly than technical expertise deficits [5]. This is especially prominent among anesthesia professionals, with surveys showing that up to 80% of anesthetic incidents are linked to gaps in NTS [6]. Among non-technical skills, interprofessional team collaboration (ITC) and innovative work behavior (IWB) represent two important and complementary competencies for improving patient safety [7, 8].

Interprofessional team collaboration occurs when healthcare professionals from different disciplines work together to provide comprehensive services to patients, families, and communities [9]. ITC comprises several interconnected dimensions, including partnership (shared decision-making with patients and families), cooperation (mutual respect, trust, and recognition of contributions), and coordination (regular communication and organization of care activities) [10]. In the present study, partnership was interpreted as shared decision-making and collective involvement in clinical processes among team members, consistent with its application in interprofessional team research. Within surgical settings, ITC is shaped by team-level conditions such as effective communication, preoperative discussions, and information sharing related to patient safety incidents [11]. Implementation of ITC has been associated with improved staff and patient satisfaction, lower rates of medical errors, and better perioperative outcomes [12, 13].

Alongside collaboration, healthcare organizations require employees who can respond to clinical challenges through novel approaches [14]. Innovative work behavior refers to employees' deliberate generation, promotion, and implementation of novel ideas aimed at improving organizational performance [15]. In anesthesia practice, IWB can be reflected in clinical improvements such as adopting advanced monitoring techniques, introducing novel anesthetic agents, and utilizing technologies that enhance the precision and safety of anesthetic delivery [16]. These innovations contribute to enhanced quality of anesthesia services and improved patient outcomes [9]. Existing literature suggests that IWB is influenced by individual characteristics and work environment factors, including psychological capital, organizational culture, and collaborative leadership style [17-19].

Theoretical and empirical evidence suggests a synergistic relationship between collaboration and innovation. Innovation requires a psychological climate in which employees feel safe to take risks. Team collaboration promotes cooperative interactions and creates an environment in which individuals feel understood and accepted by their colleagues, thereby acting as a catalyst for innovative thinking [20]. Furthermore, in collaborative environments, information sharing occurs across the entire team rather than being restricted to individuals, facilitating knowledge flow and creative inspiration [20]. Collaborative leadership has been positively associated with innovative behavior by fostering trust, shared decision-making, and participation in clinical practice [19]. These underlying mechanisms suggest that ITC may serve as an important predictor of IWB within healthcare teams.

Despite these theoretical arguments, the empirical evidence examining the relationship between ITC dimensions and IWB sub-dimensions remains limited. Previous research has largely investigated innovative behavior in relation to leadership styles, organizational climate, and psychological characteristics, with ITC receiving considerably less attention as an explanatory factor for IWB [21]. Moreover, most existing research has focused on nurses and physicians, leaving anesthesia professionals relatively understudied [22]. This gap is particularly evident in resource-constrained settings such as Iraq, where healthcare organizations face workforce pressures, limited resources, and hierarchical professional structures that may restrict open communication and implementation of innovative ideas [23, 24].

A critical gap in the literature is the lack of studies examining which specific dimensions of ITC predict which specific dimensions of IWB. Most studies treat IWB as a unidimensional construct, potentially masking important differential relationships [25]. For instance, it is plausible that coordination (structural mechanisms for organizing work) may be more relevant for idea implementation, while cooperation (relational trust and support) may be more relevant for idea promotion. Understanding these differential effects could inform more targeted interventions to enhance innovation in healthcare teams. Furthermore, the hierarchical and resource-constrained context of Iraqi hospitals provides a unique setting to examine these relationships, as structured coordination mechanisms may offer a feasible pathway to foster innovation without requiring fundamental cultural transformation [26]. Therefore, this study aimed to: (1) assess the levels of the three IWB sub-dimensions

(idea generation, idea promotion, and idea realization) among anesthesia professionals in Iraqi hospitals, (2) examine the bivariate relationships between ITC dimensions and IWB sub-dimensions, and (3) determine the extent to which ITC dimensions (partnership, cooperation, and coordination) predict each IWB sub-dimension. Based on the existing heoretical and empirical evidence, the following hypotheses were formulated: H1: Coordination will significantly predict all three IWB sub-dimensions. H2: Cooperation will significantly predict idea promotion. H3: Partnership will significantly predict idea realization.

Materials and Methods

Study Design and Setting

This study is a secondary analysis of data from a larger cross-sectional study conducted between December 2025 and March 2026. The parent study examined the overall relationship between interprofessional team collaboration (ITC) and innovative work behavior (IWB) using total scale scores and has been reported elsewhere. The present analysis uses the same dataset and instruments but addresses a distinct research question by disaggregating ITC into its three dimensions (partnership, cooperation, coordination) and IWB into its three sub dimensions (idea generation, idea promotion, idea realization) to investigate whether specific dimensions of collaboration differentially predict specific stages of innovation. This secondary aim was developed during the thesis write up based on theoretical interest and has not been previously reported. The sample size (n = 202) was originally calculated for multiple regression with 10 predictors, which is adequate for the three separate regression models used here. This study was conducted as part of a Master of Science thesis in Anesthesia Education at Tehran University of Medical Sciences, Iran.

Participants and Sampling

Participants were recruited from seven public hospitals across Southern Iraq, including Souq Al-Shuyukh Hospital, Al-Nasiriyah Hospital, Imam-Hussein Hospital, Nasiriyah Hospital, Al-Shatrah Hospital, Al-Hassan Al-Mujtaba Hospital, and Al-Haboubi Hospital. Eligibility criteria included: (a) current employment in the anesthesia department of a participating hospital, (b) formal educational qualifications in anesthesia (associate, bachelor's, master's, or board-certified specialist), and (c) a minimum of six months of professional experience in the current role. Individuals with incomplete responses or those who refused participation were excluded.

Using convenience sampling, a total of 202 anesthesia professionals participated in the study. A total of 267 eligible professionals were approached; 202 completed the survey (overall response rate: 75.7%). Response rates ranged from 68.2% to 82.1% across the seven hospitals. As data were collected through self-administered questionnaires without any hospital-level intervention or randomization, clustering was not applicable. The sample was pooled across hospitals for analysis, as the study aimed to examine individual-level associations between ITC dimensions and IWB sub-dimensions. Sample size was determined based on multiple linear regression requirements, with the final sample exceeding the minimum requirement of 118 participants for detecting a medium effect size ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.80) [27].

Data Collection Instruments

Demographic Questionnaire: A structured questionnaire was used to collect participants' demographic and professional characteristics, including age, gender, marital status, educational level, and years of work experience.

Interprofessional Team Collaboration Scale: Interprofessional team collaboration was measured using the Assessment of Interprofessional Team Collaboration Scale II (AITCS-II), a 23-item validated instrument developed by Orchard et al. [10]. The scale assesses three sub-dimensions: Partnership (8 items), Cooperation (8 items), and Coordination (7 items). Items are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always), with higher scores indicating higher levels of collaboration. The Arabic version of the AITCS-II was validated by Al-Twigey et al. demonstrating excellent reliability (Cronbach's α = 0.975) [24]. In the present study, Cronbach's alpha was 0.947 for the overall scale.

Innovative Work Behavior Scale: Innovative work behavior was measured using the validated 9-item scale developed by Janssen (2000) [28]. The scale comprises three sub-dimensions: Idea Generation (3 items), Idea Promotion (3 items), and Idea Realization (3 items). Each item is rated on a 7-point Likert scale ranging from 1 (never) to 7 (always). For consistency with the ITC scale and to facilitate comparison, scores were transformed to a 5-point metric. Scores were transformed to a 5-point metric using the formula: (raw score - 1) / 6 × 4 + 1, to maintain consistency with the ITC scale. Consequently, the minimum possible transformed score for the 3-item subscale with a 7-point Likert response is 1.67 (i.e., all items scored 1), explaining the minimum values reported in

Table 1. The Arabic version was validated by Elamin et al. (2024), who reported excellent reliability (Cronbach's α = 0.961) [29]. In the present study, Cronbach's alpha was 0.898 for the overall scale, with subscale alphas ranging from 0.718 to 0.846.

Data Collection Procedure

Data were collected using a secure online platform (Porsline) over a three-month period. Department heads at participating hospitals facilitated recruitment by distributing the survey link through professional channels, without access to respondent identities or responses. All participants provided electronic informed consent after being fully informed of the study's objectives, the voluntary nature of participation, and the anonymity and confidentiality of their responses. Participants could withdraw at any time without consequence.

Statistical Analysis

All analyses were performed using IBM SPSS Statistics (version 25.0). Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarize participants' demographic characteristics and study variable scores. Internal consistency was assessed using Cronbach's alpha, with values ≥ 0.70 considered acceptable. Paired t-tests were conducted to compare mean scores across the three IWB sub-dimensions. Pearson correlation coefficients examined bivariate relationships between the IWB sub-dimensions and ITC dimensions. Three separate multiple linear regression models were constructed to examine the predictive role of ITC dimensions (Partnership, Cooperation, and Coordination) on each IWB sub-dimension (Idea Generation, Idea Promotion, and Idea Realization). All regression assumptions were verified prior to analysis: multicollinearity was assessed using Variance Inflation Factor (VIF) and tolerance values (VIF < 10, tolerance > 0.1 considered acceptable), independence of errors was confirmed using the Durbin-Watson statistic (values between 1.5 and 2.5 considered acceptable), and normality and homoscedasticity of residuals were assessed through visual inspection of histograms, P-P plots, and scatterplots. Statistical significance was set at α = 0.05 (two-tailed). For each regression model, standardized coefficients (β), 95% confidence intervals, and p-values were reported. The regression models were unadjusted for demographic characteristics, as our primary aim was to examine the predictive role of ITC dimensions on IWB sub-dimensions. We acknowledge the possibility of confounding by unmeasured variables, which should be considered when interpreting the results

Results

A total of 202 anesthesia professionals participated in this study. The majority were male (n = 146, 72.3%), held a bachelor's degree (n = 155, 76.7%), and had five years or less of work experience (n = 161, 79.7%). The mean age of participants was 27.80 years (SD = 4.28). The sample included board-certified anesthesiologists (n = 3, 1.5%), anesthesia technicians with associate degrees (n = 34, 16.8%), bachelor's degree holders (n = 155, 76.7%), and master's degree holders (n = 10, 5.0%). Internal consistency was excellent for all scales, with Cronbach's alpha values of 0.947 for the AITCS-II, 0.898 for the overall IWB scale, and subscale alphas ranging from 0.718 to 0.846.

Mean scores for all study variables are presented in Table 1. Among IWB sub-dimensions, Idea Generation scored highest (M = 4.20), while Idea Promotion scored lowest (M = 4.05). For ITC dimensions, Cooperation demonstrated the highest mean score (M = 4.25), followed by Coordination (M = 4.21) and Partnership (M = 4.12). Scores above the scale midpoint (3.0 on a 5-point scale) were considered indicative of high levels, consistent with previous studies using these instruments.

Table 1. Descriptive Statistics for Innovative Work Behavior and Interprofessional Team Collaboration Dimensions (N = 202)

Variables	Minimum	Maximum	Mean	Std. Deviation
Innovative Work Behavior				
Idea Generation (IG)	1.67	5.00	4.20	0.72
Idea Promotion (IP)	1.00	5.00	4.05	0.82
Idea Realization (IR)	1.00	5.00	4.12	0.82
Interprofessional Team Collaboration				
Partnership (PSD)	1.57	5.00	4.12	0.70
Cooperation (COOP)	1.29	5.00	4.25	0.71
Coordination (COOR)	1.78	5.00	4.21	0.73

Pearson correlation analysis revealed significant positive relationships among all study variables (Table 2). All three IWB sub-dimensions were strongly intercorrelated, with coefficients ranging from r = 0.624 to r = 0.759 (all $p < 0.001$). Among the ITC dimensions, Coordination demonstrated the strongest correlations with all IWB sub-dimensions (r = 0.412–0.446, all $p < 0.001$). Notably, Partnership showed its strongest correlation with Idea Realization (r = 0.417, $p < 0.001$), while its weakest correlation was with Idea Generation (r = 0.247, $p < 0.001$). Cooperation demonstrated moderate to strong correlations with all IWB sub-dimensions (r = 0.310–0.429, all $p < 0.001$), with the strongest relationship observed with Idea Promotion (r = 0.429).

Regression Analyses

Three separate multiple linear regression models were constructed to examine the predictive role of ITC dimensions on each IWB sub-dimension. All regression assumptions were satisfied: multicollinearity was absent (VIF = 2.106–2.939, tolerance = 0.354–0.475), errors were independent (Durbin-Watson = 1.853–1.960), and residual diagnostics confirmed normality and homoscedasticity.

As shown in Table 3, the model predicting Idea Generation was statistically significant, explaining 17.2% of the variance ($R^2 = 0.172$, $F(3, 198) = 13.697$, $p < 0.001$). Among the ITC dimensions, only Coordination emerged as a significant predictor ($\beta = 0.455$, $p < 0.001$). Neither Cooperation ($\beta = 0.002$, $p = 0.984$) nor Partnership ($\beta = -0.065$, $p = 0.487$) contributed significantly to the model.

For Idea Promotion, the model accounted for 21.7% of the variance ($R^2 = 0.217$, $F (3, 198) = 18.251$, $p < 0.001$). Both Coordination ($\beta = 0.287$, $p = 0.007$) and Cooperation ($\beta = 0.213$, $p = 0.045$) were significant predictors, while Partnership was not ($\beta = -0.008$, $p = 0.930$).

For Idea Realization, the model explained 21.0% of the variance ($R^2 = 0.210$, $F (3, 198) = 17.558$, $p < 0.001$). Both Coordination ($\beta = 0.224$, $p = 0.036$) and Partnership ($\beta = 0.224$, $p = 0.015$) were significant predictors, while Cooperation was not ($\beta = 0.058$, $p = 0.585$).

A summary of significant and non-significant predictors for each model is presented in Table 4.

Table 2. Correlation Matrix of Innovative Work Behavior Sub-Dimensions and Interprofessional Team Collaboration Dimensions

Variables	1	2	3	4	5	6
1. Idea Generation (IG)	1					
2. Idea Promotion (IP)	0.643**	1				
3. Idea Realization (IR)	0.624**	0.759**	1			
4. Coordination (COOR)	0.412**	0.446**	0.422**	1		
5. Cooperation (COOP)	0.310**	0.429**	0.384**	0.774**	1	
6. Partnership (PSD)	0.247**	0.333**	0.417**	0.684**	0.681**	1

Table 3. Multiple Regression Models Predicting Sub-Dimensions of Innovative Work Behavior

Predictors	Idea Generation (IG) β (95% CI)	Idea Promotion (IP) β (95% CI)	Idea Realization (IR) β (95% CI)
Coordination (COOR)	0.455 (0.237–0.658) *	0.287 (0.088–0.555) *	0.224 (0.017–0.487) *
Cooperation (COOP)	0.002 (-0.215–0.220)	0.213 (0.006–0.488) *	0.058 (-0.176–0.310)
Partnership (PSD)	-0.065 (-0.257–0.123)	-0.008 (-0.220–0.201)	0.224 (0.051–0.476) *
R^2	0.172	0.217	0.210
F (df)	13.697 (3, 198) ***	18.251 (3, 198) ***	17.558 (3, 198) ***

Table 4. Summary of Regression Models for Predicting IWB Sub-Dimensions

IWB Sub-Dimension	Significant Predictors	Non-Significant Predictors	R^2	F
Idea Generation (IG)	Coordination	Cooperation, Partnership	0.172	13.697***
Idea Promotion (IP)	Coordination, Cooperation	Partnership	0.217	18.251***
Idea Realization (IR)	Coordination, Partnership	Cooperation	0.210	17.558***

Discussion

This study examined the differential predictive role of interprofessional collaboration dimensions on innovative work behavior sub-dimensions among anesthesia professionals in Iraqi hospitals. The findings provide empirical support for the theoretical proposition that different dimensions of collaboration are required at different stages of the innovation process, with coordination emerging as the only consistent predictor across all three IWB sub-dimensions.

Among the three IWB sub-dimensions, Idea Promotion scored lowest, with the difference between Idea Generation and Idea Promotion reaching statistical significance. This pattern suggests that anesthesia professionals in Iraqi hospitals are more proficient at generating novel ideas than at actively promoting them to colleagues or supervisors. The lower scores for Idea Promotion may reflect the hierarchical professional structures prevalent in Iraqi healthcare settings, where lower-status professionals may perceive significant barriers to voicing novel ideas or challenging established practices [30]. This interpretation is consistent with studies documenting that power differentials and status hierarchies in operating rooms can suppress open communication and idea advocacy [31].

The finding that Coordination was the only ITC dimension to significantly predict all three IWB sub-dimensions supports the hypothesis that structured coordination mechanisms serve as the foundational infrastructure for innovation at every stage. This aligns with the Job Demands-Resources model, which posits that structural job resources buffer against demands and enable employees to direct cognitive energy toward creative problem-solving rather than managing role ambiguity [32]. In the Iraqi context, where healthcare organizations face workforce pressures, limited resources, and hierarchical structures (26), strengthening coordination mechanisms offers a feasible, low-cost approach that may support innovation without requiring fundamental cultural transformation [33].

The finding that Cooperation significantly predicted Idea Promotion but not Idea Generation or Idea Realization suggests that promoting novel ideas requires relational trust and social support [34]. When team members have positive working relationships and mutual respect, they are more likely to be receptive to new ideas and willing to champion them. The non-significance of Cooperation for Idea Generation and Realization indicates that while relational factors matter for gaining acceptance of ideas, they are less critical for the cognitive process of generating ideas or the technical process of implementing them.

The finding that Partnership significantly predicted Idea Realization but not Idea Generation or Idea Promotion suggests that implementing innovative ideas requires shared decision-making and collective commitment [10]. Implementing new practices often requires resource allocation, protocol changes, and multidisciplinary buy-in, all of which benefit from shared governance structures. This finding is consistent with Kanter's three-stage model of innovation, which emphasizes that the implementation phase requires coalition-building and resource mobilization [35].

The consistent predictive power of Coordination across all three models warrants particular attention. Coordination reduces role ambiguity and creates clear expectations, allowing staff to focus cognitive resources on creative thinking rather than managing uncertainty (14). Structured coordination mechanisms such as preoperative briefings and standardized handoffs create predictable information flow, facilitating the communication of novel ideas [36]. Coordinated teams develop shared mental models that enable members to recognize when existing practices are suboptimal and when new approaches might be beneficial (18). The modest explanatory power of the models indicates that while ITC dimensions are significant predictors of IWB, other factors, such as leadership style, organizational culture, and individual creative self-efficacy, likely contribute substantially to innovative behavior. Thus, coordination should be viewed as an important enabler, not a sufficient explanation for innovation.

These findings have several practical implications. First, strengthening coordination mechanisms, rather than generic team-building or leadership training, may be the most efficient strategy for supporting innovation. Practical interventions could include mandatory preoperative team briefings, structured handoff protocols using tools like SBAR, and systematic debriefing after complex cases [37]. Second, targeted interventions could address specific innovation stages: partnership-oriented initiatives (such as shared governance committees) may be particularly beneficial for implementing new practices, while cooperation-focused initiatives (such as team-building activities) may enhance idea promotion.

Several limitations should be acknowledged. The cross-sectional design precludes causal inference;

while our theoretical framework posits that ITC predicts IWB, reciprocal relationships are plausible.

The convenience sampling from public hospitals in Southern Iraq limits generalizability to other regions or healthcare settings. Self-reported data may be subject to social desirability bias, particularly in hierarchical cultures where admitting innovation might be perceived as boastful. The study focused solely on anesthesia professionals; extending the sample to include surgeons, nurses, and technicians would capture the full spectrum of perioperative team dynamics. Future research using longitudinal or experimental designs, objective measures of innovation, and broader sampling across Iraqi governorates would strengthen the evidence base.

Conclusion

In conclusion, this study demonstrates that interprofessional collaboration dimensions differentially predict innovative work behavior sub-dimensions among anesthesia professionals in Iraqi hospitals. Coordination is identified as the foundational dimension enabling innovation at all stages, while cooperation specifically is associated with idea promotion and partnership specifically is associated with idea realization.

For policymakers and hospital administrators, investing in team coordination offers a practical, low-cost pathway to enhance both collaboration and the capacity for innovation in anesthesia practice.

Authorship contribution statement

All authors have taken ownership of the entire content of this manuscript and have given their approval for its submission.

M. A.: Data Curation, Methodology, Writing - Original Draft, Review& Editing

A.SH.: Conceptualization, Methodology, Writing - Review& Editing

N.J: Writing –Writing - Review& Editing

P.k: Statistical Analysis, Software, Writing –Writing - Review& Editing

E.Sh: Supervision, Conceptualization, Methodology, Writing –Writing - Review& Editing

Ethical Consideration

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and the STROBE guidelines for cross-sectional studies. Ethical approval was obtained from the Ethics Committee of Tehran University of Medical Sciences (Code: IR.TUMS.SPH.REC.1404.144) prior to data collection.

Administrative permission was obtained from the participating Iraqi hospitals prior to data collection. The ethical approval from Tehran University of Medical Sciences covered both the parent study and this secondary analysis. All participants provided electronic informed consent after being fully informed of the study's objectives, the voluntary nature of participation, and the anonymity and confidentiality of their responses. Participants were assured that their responses would remain confidential, that no identifying information would be collected, and that they could withdraw from the study at any time without consequence. Data were stored securely in anonymized form, accessible only to the research team.

Declaration of Competing Interest

The authors have no conflict of interests related to this article.

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Data Availability

This study did not generate any new datasets. However, more information may be obtained from the corresponding author upon reasonable request.

Declaration of Generative AI

The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of tables, or their corresponding captions.

References

1. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Board on Global Health; Committee on Improving the Quality of Health Care Globally. Crossing the Global Quality Chasm: Improving Health Care Worldwide. Washington (DC): National Academies Press (US); 2018 Aug 28.

2. Kruk ME, Gage AD, Joseph NT, Danaei G, García-Saisó S, Salomon JA. Mortality due to low-quality health systems in the universal health coverage era: a systematic analysis of amenable deaths in 137 countries. Lancet. 2018 Nov 17;392(10160):2203-2212. doi: 10.1016/S0140-6736(18)31668-4.

Erratum in: Lancet. 2018 Nov 17;392(10160):2170. https://doi.org/10.1016/S0140-6736(18)32337-7

3. de Vries EN, Ramrattan MA, Smorenburg SM, Gouma DJ, Boermeester MA. The incidence and nature of in-hospital adverse events: a systematic review. Quality & Safety in Health Care. 2008 Jun;17(3):216-23. https://doi.org/10.1136/qshc.2007.023622

4. Duclos A, Frits ML, Iannaccone C, Lipsitz SR, Cooper Z, Weissman JS, Bates DW. Safety of inpatient care in surgical settings: cohort study. BMJ. 2024 Nov 13;387:e080480 https://doi.org/10.1136/bmj-2024-080480

5. Suliburk JW, Buck QM, Pirko CJ, Massarweh NN, Barshes NR, Singh H, Rosengart TK. Analysis of Human Performance Deficiencies Associated With Surgical Adverse Events. JAMA Netw Open. 2019 Jul 3;2(7):e198067. https://doi.org/10.1001/jamanetworkopen.2019.8067

6. Radhakrishnan B, Katikar MD, Myatra SN, Gautam PL, Vinayagam S, Saroa R. Importance of non-technical skills in anaesthesia education. Indian Journal of Anaesthesia. 2022 Jan;66(1):64-69. https://doi.org/10.4103/ija.ija_1097_21

7. Levesque MJ, Etherington C, Lalonde M, Moradi N, Sikora L, Stacey D. Interventions to facilitate interprofessional collaboration in the operating theatre: A scoping review. Journal of Perioperative Practice. 2024 Jan-Feb;34(1-2):6-19. https://doi.org/10.1177/17504589221137978

8. Fu G, Xu L, Chen H, Lin J. State-of-the-art anesthesia practices: a comprehensive review on optimizing patient safety and recovery. BMC Surgery. 2025 Jan 20;25(1):32. https://doi.org/10.1186/s12893-025-02763-6

9. Gilbert JH, Yan J, Hoffman SJ. A WHO report: framework for action on interprofessional education and collaborative practice. Journal of Allied Health. 2010 Fall;39 Suppl 1:196-7. PMID: 21174039.

10. Orchard C, Pederson LL, Read E, Mahler C, Laschinger H. Assessment of Interprofessional Team Collaboration Scale (AITCS): Further Testing and Instrument Revision. Journal of Continuing Education in the Health Profession. 2018 Winter;38(1):11-18. https://doi.org/10.1097/CEH.0000000000000193

11. Agustina E, Dradjat RS, Wardhani V, Putra KR. Determinants of interprofessional collaboration in surgery: A scoping review. Journal of Education and Health Promotion. 2025 Aug 29;14:318. https://doi.org/10.4103/jehp.jehp_1541_24

12. Braam A, Buljac-Samardzic M, Hilders CGJM, van Wijngaarden JDH. Collaboration Between Physicians from Different Medical Specialties in Hospital Settings: A Systematic ReviewJournal of Multidisciplinary Healthcare. 2022 Oct 7;15:2277-2300. https://doi.org/10.2147/JMDH.S376927

13. Reeves S, Pelone F, Harrison R, Goldman J, Zwarenstein M. Interprofessional collaboration to improve professional practice and healthcare outcomes. Cochrane Database of Systematic Reviews. 2017 Jun 22;6(6):CD000072. https://doi.org/10.1002/14651858.CD000072.pub3

14. Shahidi Delshad E, Soleimani M, Zareiyan A, Ghods AA. The Nurses' Innovative Behavior Inventory (NIBI): A development and validation study. PLoS One. 2025 Dec 18;20(12):e0338696. https://doi.org/10.1371/journal.pone.0338696

15. Siregar ZM, Suryana EA, Senen SH. Factors influencing innovative work behavior: an individual factors perspective. International Journal of Scientific & Technology Research. 2019;8(9):324-7.

16. Kwon AH, Marshall ZJ, Nabzdyk CS. Why Anesthesiologists Could and Should Become the Next Leaders in Innovative Medical Entrepreneurism. Anesthesia & Analgesia. 2017 Mar;124(3):998-1004. https://doi.org/10.1213/ANE.0000000000001793

17. Mutonyi BR, Slåtten T, Lien G. Fostering innovative behavior in health organizations: a PLS-SEM analysis of Norwegian hospital employees. BMC Health Service Research. 2021 May 18;21(1):470. https://doi.org/10.1186/s12913-021-06505-1

18. Saber Seleem EA, Ahmed GK, El-hameed NA, Abdullah SO. Psychological drivers of innovative work behavior in nursing: the roles of creative self-efficacy, trust in supervisors, uncertainty avoidance, and psychological capital. The Egyptian Journal of Neurology, Psychiatry and Neurosurgery. 2026 Feb 26;62(1):49.

19. Abdelwahab Ibrahim El-Sayed A, Shaheen RS, Farghaly Abdelaliem SM. Collaborative leadership and productive work performance: The mediating role of nurses' innovative behavior. International Nursing Review. 2024 Dec;71(4):868-878. https://doi.org/10.1111/inr.12934

20. Jin H, Peng Y. The impact of team psychological safety on employee innovative performance a study with communication behavior as a mediator variable. PLoS One. 2024 Oct 30;19(10):e0306629. https://doi.org/10.1371/journal.pone.0306629

21 McGuier EA, Kolko DJ, Aarons GA, Schachter A, Klem ML, Diabes MA, Weingart LR, Salas E, Wolk CB. Teamwork and implementation of innovations in healthcare and human service settings: a systematic review. Implementation Science. 2024 Jul 15;19(1):49. https://doi.org/10.1186/s13012-024-01381-9

22. Verhoeff TL, Janssen JJHM, Hietbrink F, Hoff RG. Team- and task-related knowledge in shared mental models in operating room teams: A survey study. Heliyon. 2023 Jun 3;9(6):e16990. https://doi.org/10.1016/j.heliyon.2023.e16990

23. Mahmood KA, Abdalla AQ, Sadraldeen GS, Hawezy DJ, M-Amin GI, Ahmed SK, Esssa RA, Abdullah AJ. Impact of the prolonged economic crisis on healthcare delivery and workforce resilience in the Kurdistan Region of Iraq: a qualitative study. BMC Health Service Research. 2026 Feb 5;26(1):338. https://doi.org/10.1186/s12913-026-14147-4

24. Al-Twigey MA, AL-Fayyadh SA. Interprofessional Collaboration among Health Care Team Members in Critical Care Units: Highlighting the Professional Qualities. Journal of the Faculty of Medicine Baghdad. 2025 Apr 1;67(1):27-35.

25. De Jong J, Den Hartog D. Measuring innovative work behaviour. Creativity and innovation management. 2010 Mar;19(1):23-36.

26. Ali Y, Abdi A, Yousif E, Mohammed S, Mohammed S, Mohammed M, et al. Iraqi health system: structural challenges and reform recommendations. World Journal of Advanced Research and Reviews. 2025;27:148–52.

27. Cohen J. Statistical power analysis for the behavioral sciences. routledge; 2013 May 13.

28. Janssen O. Job demands, perceptions of effort-reward fairness and innovative work behaviour. Journal of Occupational and organizational psychology. 2000 Sep;73(3):287-302.

29. Elamin AM, Aldabbas H, Ahmed AZ, Abdullah AN. Employee engagement and innovative work behavior: The mediating role of knowledge-sharing behavior in the United Arab Emirates (UAE) service context. Administrative Sciences. 2024 Sep 23;14(9):232.

30. Skyberg H, Jenssen D. What professionals say and do: the tension between egalitarianism and hierarchy in interprofessional teamwork. Journal of Interprofessional Care. 2024 Mar-Apr;38(2):200-208. https://doi.org/10.1080/13561820.2023.2289512

31. Kirschbaum K, McAuliffe MS, Swanson M. Team Communication in the Operating Room: A Measure of Latent Factors From a National Sample of Nurse Anesthetists. The AANA Journal. 2018 Feb;86(1):11-18. PMID: 31573489.

32. Bakker AB, Demerouti E. Job demands-resources theory: Taking stock and looking forward. Journal of Occupational Health Psychology. 2017 Jul;22(3):273-285. https://doi.org/10.1037/ocp0000056

33. Spaulding A, Kash BA, Johnson CE, Gamm L. Organizational capacity for change in health care: Development and validation of a scale. Health care management review. 2017 Apr 1;42(2):151-61.

34. Costa AC, Fulmer CA, Anderson NR. Trust in work teams: An integrative review, multilevel model, and future directions. Journal of organizational behavior. 2018 Feb;39(2):169-84.

35. Tran V, Voyer B. Fostering innovation: An organisational perspective. British Journal of Healthcare Management. 2015 Mar 2;21(3):141-5.

36. Shahidi Delshad E, Soleimani M, Zareiyan A, Ghods AA. Development and psychometric properties evaluation of nurses' innovative behaviours inventory in Iran: protocol for a sequential exploratory mixed-method study. BMJ Open. 2024 Feb 5;14(2):e077056 https://doi.org/10.1136/bmjopen-2023-077056

37. Hunter H, Tara C, Wesley C, Juliane B, Susan H, Paula S, Sara E, Kevin L, Yun KJ, Renaldo B. Assessing SBAR during intraoperative handoff. Perioperative Care and Operating Room Management. 2017 Mar 1;6:7-10.