

Inter-professional Collaboration in Critical Care Units: Highlighting the Professional Qualities

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Abstract

Background: Inter-professional collaboration (IPC) is the best way to provide high-quality and safe health care for the patient, reduce cost and length of stay, and increase job satisfaction. However, there are many factors that may hinder the achievement of inter-professional collaboration that need to be determined.

Objectives: Determining the status of inter-professional team collaboration among critical care teams involving physicians, pharmacists, and nurses in Critical Care Units in Al-Najaf governorate, and examining the statistical difference between subjects' professional qualities and their level of inter-professional team collaboration.

Methods: This descriptive cross-sectional study was conducted in the Intensive Care Units and Cardiac Care Units of eight hospitals in Al-Najaf Governorate, Iraq, from December 23rd, 2023, to June 30th, 2024. The 364 recruited participants were critical care team members. The instrument used in the study is the "Assessment of Inter-professional Team Collaboration Scale-II".

Results: The level of interprofessional collaboration was moderate among physicians and pharmacists, while it was poor among nurses. There were significant mean differences between the overall scores of Interprofessional team collaboration among critical care staff based on their sex, number of physicians, academic preparation, profession, work shift, and educational level.

Conclusion: Inter-professional team collaboration among critical care team members was not up to the expected level, ranging from weak to moderate. It was related to several variables, such as gender and profession.

Keywords: Critical Care Unit; Inter-professional Collaboration; Multidisciplinary Care Team; Partnership Practice; Teamwork.

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Introduction

Intensive Care Units (ICUs) and Cardiac Care Units (CCUs) are highly technical places with great challenges. Good inter-professional collaboration (IPC) is vital for providing high-quality patient care in these units (1). Achieving success in terms of the targeted patient outcomes in these units relies heavily on the partnership, cooperation, coordination, and shared decision-making abilities of diverse healthcare team members, including physicians, nurses, therapists, and other professions (2). Although the importance of IPC is widely recognized, a number of obstacles may prevent the team members from collaborating effectively, which could result in less-than-ideal patient care and poor outcomes. (3,4). Therefore, cooperative practices among health disciplines play an important role in the functioning of a Critical Care Team (CCT) (5). Critically ill patients are vulnerable clinically, where small errors in care can produce significant mortality (6). The issue of insufficient IPC in critical care units could be caused by a variety of factors. Different professional perspectives, communication impediments, and hierarchical structures can all obstruct the free flow of information and the process of collaborative

decision-making (7). Besides, reinforcing strategies that support IPC, fostering an atmosphere of mutual respect, shared responsibility, and open communication are essential for addressing these challenges (8).

Inter-professional collaboration is a term that encompasses various health care professions from different backgrounds of knowledge providing thorough health care services, engaging with patients, their families, caregivers and societies to deliver maximum quality of care across health settings (9). Every member of the inter-professional team is expected to contribute his/her unique experience to the other members. This leads to and contributes towards a comprehensive and integrated approach to patient care (10). When significant healthcare decisions need to be made, a multidisciplinary team engages in shared decision-making, where a variety of viewpoints are taken into consideration (11). By working simultaneously as a team, the healthcare group focuses on the physical, emotional, spiritual, and psychological interests of the patient (12). In addition, to focus on the health problems, this comprehensive approach also considers the patient's overall well-being and quality of life (13). Members of the healthcare team learn from each other, expanding their knowledge base and enhancing their

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professionalism via expertise sharing (14). This is advantageous to patient care and may stimulate professional growth (15). This approach indicates no health professional working alone in isolation from other professions can provide patient-centered care, particularly critical care patients who often suffer from complex conditions (16, 17). Patient harm and mortality have been observed to reduce significantly in hospitals that implement collaboration in patient care (18). Thus, IPC among the members of the healthcare team has an important impact on lowering the failure-to-rescue margin and the death rate to up to 95% (19).

Sorber (20), reported that the application of IPC among professions with different backgrounds shows a significant reduction in the incidence of diabetic foot ulcers (DFU), which in turn reduces the related of amputation to 94%. Similarly, IPC helps in reducing hospital-onset (HO) *C. difficile* infection rate by about 63%, with a sustained 77% decrease after one year (21). IPC among the healthcare team demonstrated a tangible reduction in the mortality rate, achieving up to 82% (CI 0.76–0.91) (22). Mazer and Nabhan reported that deaths in hospitals are usually due to preventable medical errors. According to a CDC report in 2019 about the number of patients who died in hospitals, 34% were attributed to medical errors (23). Also, teamwork can decrease healthcare-related costs by up to 20%, prevent medical errors, and provide high-quality care for patients (24). Teamwork is crucial in ICUs for patients with mechanical ventilation, where it succeeded in reducing its duration and through it the percentage of extubation of endotracheal tubes (ETT rate) to reach 95.3% of critical ill patients (25). In South Korea, the application of IPC in ICU yields noteworthy outcomes, as it reduces the death rate from 37.8 to 14.3% in a year (26). In the USA, the inter-professional health care team collaboration highlighted an important result in reducing mortality rate and increasing survival rate in patients with lung cancer that were treated by teamwork in ICU of 33.6%, compared to those who were treated by traditional care in the ICU, who had survival rate of 23.0% (27). An important study has shown that collaboration between the health professional team members is essential to improving complete compliance with the recommended standard management, reaching 25%-67%. This means a decrease of 61.2% annual reduction. A decrease from 4.2 to 1.8 per 1000 central venous cannulation (CVC) days in the occurrence of central line-associated bloodstream infections (CLABSI) was also seen in the USA, with a median of less than 1 CLABSI per month in the ICU (28). Hospitals that adopt teamwork in patient care were seen to lead to a significant reduction of patient harm and mortality rates (29).

The absolute absence of this information at the national level, despite the extensive publications available on IPC at both the global and regional levels, is surprising. Therefore, this research was designed to explore the hypothesized gap in Iraqi

healthcare settings. Examining the highlighted gap is a critical step to provide the policy-makers of the Iraqi healthcare system with accurate research-based data on which to create successful health policies.

Subjects and Methods

Research design

The study employed a descriptive cross-sectional approach to explore the variables related to IPC in critical care units in the Iraqi governorate of Al-Najaf.

Setting and Samples

The study targeted the healthcare teams composed of physicians, nurses, and pharmacists working in ICUs and CCUs. The study samples were collected in eight hospitals in Al-Najaf Governorate, Iraq, from January 2nd - 30th, 2024. A non-probability purposive sampling survey was employed in the current study. The inclusion criteria covered critical care staff in ICUs and CCUs, specifically nurses, physicians, and pharmacists, who gave their consent to participate and had at least a diploma degree.

The exclusion criteria included nurses with a secondary nursing school certificate. The target population consisted of 500 subjects employed in ICUs and CCUs at the time of the data collection phase. By using Raosoft's (2004) calculation, the minimum sample size required for the study was calculated to be 218. Thirty-six failed to complete the questionnaire. Thus, 364 subjects were considered the accessible population, which included nurses ($n=237$), pharmacists ($n=71$), and physicians ($n=51$). The response rate in the present study was 91%.

Measurement and Data Collection

The research instrument measured the IPC among critical care staff and their professional qualities, the Assessment of Inter-Professional Team Collaboration Scale II (AITCS-II). It includes two parts: Part one covers the demographic and professional data (sex, age, educational preparation, certificate source, profession, workplace, years with current team, participation in specialized workshops on IPC, number of hospitalized patients in the critical unit, number of physicians, pharmacists, and nurses practicing in the critical unit in one shift, introduction during academic preparation to the concept of IPC, self-education on the concept of IPC in a self-reliant capacity. Part two consisted of 23 statements that are considered characteristic of inter-professional collaboration (how the team works and acts). The AITCS-II is composed of three subscales that are considered to be key to the collaborative practice, which are: (1) Partnership— 8 items, (2) Cooperation—8 items, and (3) Coordination—7 items. The 23 items on this scale are self-reported. Based on a five-level Likert rating scale, beginning from 5-1, with 5 representing always, 4 representing most of the time, 3 representing sometimes, 2 representing rarely, and 1 representing never, the study instrument measured and assessed the parameter (31). The rating score based on mean score (MS) was: Good: MS = 3.67- 5; Moderate: MS = 2.34 – 3.66; Poor: MS = 1 – 2.33.

The study instrument (AITCS-II) was translated into Arabic after getting the approval of the owner, and the validity and reliability of the instrument were assessed. The Content Validity Index (CVI) was 94%, according to the relevance ratings on the AITCS-II Arabic version by eight experts. A pilot study was carried out targeting 24 subjects of health care team members (15 nurses, 5 physicians, and 4 pharmacists). the reliability for three domains of the study instrument was 0.975, after being evaluated through IBM-SPSS, by Cronbach's Alpha. The questionnaire forms were distributed to the participants and were filled out through the self-reporting approach. The participants have signed an informed consent form.

Data Analysis

The data were entered on IBM-SPSS, version 19, a software program for storage and analysis.

Results

Table 1 reveals that 65.1% of the study participants were nurses, 64.3% of the participants had a bachelor's degree with 98.6% received from Iraqi universities. More than half of the participants (52.7%) were males. Nearly two-thirds (63.2%) were between 25-30 years old, and 56.3% worked 12-hour shifts.

Table 1): Distribution of the participants by Sociodemographic Characteristics

Demographic Data	Rating and interval	No. (%)
Sex	Male	192 (52.7)
	Female	172 (47.3)
Age (Years)	≤ 24	59 (16.2)
	25 - 30	230 (63.2)
	31+	75 (20.6)
Work shift	Morning shift 8 hours	110 (30.2)
	Night shift 12 hours	205 (56.3)
	Night shift 18+ hours	49 (13.5)
Educational Level	Diploma	101 (27.7)
	Bachelor Degree	234 (64.3)
	Master's Degree	8 (2.2)
Certificate Source	Board Certified Degree	21 (5.8)
	Inside Iraq	359 (98.6)
Profession	Outside Iraq	5 (1.4)
	Nurse	237 (65.1)
	Pharmacist	71 (19.5)
	Physician	56 (15.4)

Table (3): The mean rank of the study group level of IPC by their sex and professional qualities

Subjects' professional qualities	Ranking and Interval	Mean Rank	Mann-Whitney	P-value
Sex	Male	167.99	13727	0.01*
	Female	198.69		
Certificate Source	Inside Iraq	182.29	823.5	0.75
	Outside Iraq	197.30		
Participation in specialized workshops for IPC	No	178.16	9472.5	0.12
	Yes	199.49		
The number of Physicians practicing present in critical units in subject's shift	≤2	174.96	3430	0.00*
	3+	251.22		
Introduced during academic preparation to the concept of IPC	No	159.00	11286	0.00*
	Yes	214.19		
working on educating self on the concept of IPC in a self-reliant capacity	No	138.01	9426	0.00*
	Yes	207.22		

Table 2 shows that the overall level of IPC assessment for the medical staff was moderate (MS=3.25), for the pharmacists was moderate (MS=2.55), and for the nursing staff was poor (MS=2.06).

Table 2): Distribution of the level of assessment of IPC by the specialty of participants

Profession	IPC Level	No.	%	Mean Score	Overall Assessment
Nurses	Poor	18	77.6	2.0	Poor
		4	6		
	Moderate	34	14.3		
	Good	19	8.0		
Pharmacists	Poor	35	49.3	2.5	Moderate
		25	35.2		
	Good	11	15.5		
	Total	71	100.0		
Physicians	Poor	4	7.1	3.2	Moderate
		38	67.9		
	Good	14	25.0		
	Total	56	100.0		

Table 3 show that there is statistically significant mean difference between overall score of IPC among healthcare providers and their working on self-education on the concept of IPC in a self-reliant capacity: $U=9426, p\text{-value}=0.00$, academic preparation about IPC: $U=11286, p\text{-value}=0.00$, number of physicians present in shift: $U=3430, p\text{-value}=0.00$, and sex: $U=13727, p\text{-value}=0.01$, that discovered by Mann Whitney test.

Table 4 shows that there is a statistically significant mean difference between overall score of IPC among healthcare providers and their profession: (P -value=0.00), number of clinical pharmacists present

in subject's shift of critical units: (p -value=0.00), educational level: (P -value=0.00), and period of work shift: (p -value=0.01), that discovered by the Kruskal-Wallis test, with a p -value < 0.05

Table (4): The Statistical Difference between Subjects' Professional Qualities and their Level of IPC.

Subjects' professional qualities	Ranking and Interval	* Mean Rank	df.	Sig.
Age (Years)	≤ 24	169.58	2	0.47
	25 – 30	182.75		
	31+	191.91		
Work shift	Morning shift 8 hours	205.06	2	0.01*
	Night shift 12 hours	168.17		
	Night shift 18+ hours	191.80		
Educational Level	Diploma	142.27	3	0.00*
	Bachelor Degree	191.64		
	Master's Degree	150.38		
	Board Certified Degree	286.40		
Profession	Nurse	149.05	2	0.00*
	Pharmacist	211.23		
	Physician	287.62		
Workplace	ICU	188.60	2	0.09
	CCU	173.34		
	ICU and CCU	270.88		
Years with your current team	1	199.16	2	0.30
	2	180.18		
	3	176.87		
The number of hospitalized patients in critical unit	≤8	181.05	2	0.94
	9 – 16	185.21		
	17+	185.85		
The number of nurses practicing in the critical unit in the subject's shift	≤ 6	173.06	2	0.09
	7 – 12	200.05		
	13+	186.79		
The number of Pharmacists practicing present in critical units in the subject's shift	≤ 2	167.39	2	0.00*
	3 – 5	225.19		
	6+	215.44		

Discussion

The weak to moderate IPC found in the current study is consistent with the results of Bode et al. (2016) on IPC and IPE in the Tertiary Pediatric University Teaching Hospital, Freiburg, Germany. Most participating physicians reported that IPC was a part of their daily routine and that the vast majority of physicians frequently cooperated with each other. They frequently worked collaboratively with social workers, nurses, and physiotherapists (32). Based on their perception, the IPC level was notably higher among the physicians and midwives than among the other healthcare workers (33). To gauge the way nurses and physicians perceived their experiences with cooperative practice, a survey was distributed to registered nurses and doctors. It was found that the collaboration among nurses was lower than that among doctors (34), which may be explained by nearly 80% of nurses reporting burnout, compared to only 50% of physicians. This burnout was due to the felt discrimination and denial of professional rights leading to weak collaboration with other healthcare providers (35). Of equal importance is the shortage of critical nursing staff and the toxic and unsafe organizational culture (36,37,38). Healthcare professionals who practice under the umbrella of optimum organizational support to collaborative practice show higher levels of IPC than those healthcare professionals with poor organizational support to collaborative practice (38).

Poor IPC level among nurses is attributed to several reasons, one of which is job dissatisfaction which is well supported in the literature, indicating that the level of job satisfaction is weak among Iraqi nurses (39). Jepkosgei et al suggested that the "core" healthcare providers' ability to cope with the work pressures of their daily jobs were enhanced by effective, friendly relationships based on collegial and emotional support between nursing staff and junior physicians, as opposed to the more strained relationships between nurses and senior physicians (40).

Pharmacists, on the other hand, usually focus on the collection of medication histories, discover adherence barriers and make corresponding alterations to the prescription schedules (41). Such tasks may make them solo players, which is another factor that can hinder team dynamics (42). Several studies have shown the significant impact that the physician-pharmacist relationship exerts on collaborative management (43,44,45). The overall level of ICP between physicians and pharmacists was observed to be fairly strong, as physicians reported that collaboration with community pharmacists increased adherence to medications and improved prescriptions; this is a strong indicator of the importance of IPC between them (46). Close collaboration between nurses and pharmacists is also essential because nurses are usually involved at the end of the medication process, for

administration. Pharmacists also have to plan time to adjust to working with the nursing staff and recognize and address their needs.

The finding of the current study that females exhibit a more collaborative attitude than males is concurrent with another study that found healthcare providers who were more prepared to exchange information and collaborate with other professions were females (47). The motivation that drives females in the healthcare team, especially in the early stages of their careers, is their willingness to help, support, and collaborate more than their male counterparts to avoid facing any additional hindrances in achieving their work (48). However, this result may be contrary to the findings of Ndibu Muntu Keba Kebe et al (49), who found no statistical differences between sex and the collaboration of the healthcare team. Habre et al found that the degree of IPC among males is significantly higher than females (34). Similarly, Mäki-Asiala et al found that the perceived level of ICP among female nurses is lower than that of male nurses (33). The differences in sample size and healthcare professionals included in these studies, the cultural variations between the environment in Iraqi hospitals and the professional dynamics here, may account for the discrepancies in the findings of these studies compared to the current study.

The findings of the current study have shown that when health team members try to educate themselves on the principles of IPC, their level of collaboration as healthcare team members will automatically be enhanced. Besides, those who were introduced to the concept of IPC during their academic preparations had a higher level of collaboration. It has been reported that both patients and healthcare professionals benefit from inter-professional education (32). Our results showed significant differences between the staff work shifts and their levels of collaboration, with those working for 8 hours in the day shift exhibiting a higher level of IPC than those who worked in other shifts. Burnout and a stressful work environment that increases during the night hours may be the cause of the poor teamwork among healthcare practitioners during night shifts or long work shifts. A study from the Harvard Medical School supported this explanation, reporting that shift work, long hours, and work overload are stressful aspects of the nursing profession that can lead to burnout and job dissatisfaction as well as negative health effects like sleep disturbances and obesity (50). A recent study reported that shift workers who followed non-standard schedules that include overnight duty, rotational timetables, or permanent night work, which can result in misaligned core circadian physiology along with night shift work, have all been associated with sleep deprivation, burnout, and metabolic syndrome, among healthcare workers. The current study shows that an adequate number of staff physicians and pharmacists working within the shift in critical units has raised the IPC level (51). This can be explained by the development of a nurturing workplace, which could be improved

by having an adequate number of physicians working in the critical care units (44). This finding corresponds with the results of the current study, where physicians exhibited the highest level of collaboration. Finally, in the current study, professionals with bachelor's degrees were the next most collaborative group, after board-certified members. This may be attributed to the specialty, as physicians are currently the only professionals who are certified through the accredited Board of Health Specialties. As for other professionals, the staff with graduate degrees may feel superior to the staff with lower degrees. This interpretation is an agreement with that of Habre et al (34), who found that nurses with diplomas and Bachelor's degrees reported high collaboration in comparison to nurses with higher degrees. Conversely, Mäki-Asiala et al (33) reported that the level of IPC among male staff with higher levels of education was higher than other staff with lower levels of education.

Limitation

This research was conducted in one Iraqi governorate, which could limit the generalizability of the findings to a larger population. Of equal importance, this study limited its targeted scope to three professions of the health care team. Other professions were excluded due to feasibility issues, which could limit the generalizability of the findings to a larger population.

Conclusions

Inter-professional team collaboration among critical care team members was not found to be up to the expected level, ranging from weak to moderate. It was related to several variables including profession, gender, time of the work shift, educational level, academic preparation on the concept of IPC, working on self-education on IPC in a self-reliant capacity, and the number of pharmacists and physicians present in a shift of the critical care units.

Authors' declaration

We hereby confirm that all the Tables in the manuscript are our own. Ethical approval was obtained from the local Research Ethics Committee of the Faculty of Nursing, University of Baghdad, in its second session, dated November 22nd, 2023. Written informed consent was obtained from all the participants before they participated in the study. To ensure the full protection of the rights, welfare, and well-being of all the participants during the entire study, the researchers successfully passed the Human Research Protection Fundamental Training provided by the Office for Human Research Protections (OHRP).

Conflicts of Interest: None

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Author contributions:

Maitham Al-Twigei and Sadeq AL-Fayyadh conceptualized the study and drafted the initial manuscript. Maitham Al-Twigei collected, analysed, and interpreted the data. Sadeq AL-Fayyadh reviewed and revised the manuscript and contributed to the content and design. Sadeq AL-Fayyadh supervised the study. All the authors read and approved the final manuscript for publication.

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التعاون المهني بين وحدات الرعاية الحرجة: تسليط الضوء على الصفات المهنية

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الخلاصة:

الخلفية: التعاون المهني هو أفضل طريقة لتوفير رعاية صحية عالية الجودة وأمنة للمريض، وتقليل التكاليف ومدة البقاء في المستشفى، وزيادة الرضا الوظيفي. ومع ذلك، هناك العديد من العوامل التي قد تعيق تحقيق التعاون بين المهنيين والتي يجب تحديدها.

الأهداف: قياس مستوى التعاون المهني بين أعضاء فريق الرعاية الصحية بما في ذلك الممرضين والأطباء والصيدلانية السريريين في وحدات الرعاية الحرجة، وفحص الفرق الإحصائي بين الصفات المهنية للملاكات الصحية ومستوى التعاون المهني.

المنهجية: أجريت الدراسة الحالية في وحدات العناية المركزة ووحدات الرعاية القلبية في ثمانية مستشفيات في محافظة النجف الاشرف في جمهورية العراق. تم إستهداف 364 مشاركاً في الدراسة من أعضاء فريق الرعاية الحرجة. الأداة البحثية التي تم إستخدامها في الدراسة هي مقياس تقييم التعاون الفرقي المهني – II.

النتائج: كان مستوى التعاون المهني بين الأطباء متوسطاً، وبين الصيدلانية متوسطاً، بينما كان ضعيفاً في شريحة الممرضين. وعلى نفس القدر من الأهمية، كانت هناك فروق معنوية كبيرة بين الدرجات العامة للتعاون الفرقي المهني بين أعضاء فريق الرعاية الصحية وجنسهم، وعدد الأطباء والإعداد الأكاديمي، المهنة، نوبات العمل، مستوى التعليم.

الاستنتاجات: لم يكن التعاون بين أعضاء فريق الرعاية الحرجة بين المهن المختلفة بالمستوى المتوقع، حيث تراوح بين ضعيف الى متوسط وكان مرتبطاً بعدة متغيرات مثل الجنس والمهنة.

الكلمات المفتاحية: التعاون بين المهنيين، العمل الجماعي، وحدة العناية الحرجة، الفريق الرعاية متعدد التخصصات، ممارسة الشراكة.