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Exploring Nurse-Pharmacist Collaboration for Medication Safety in Iraqi Hospitals: A Qualitative Study from the Nursing Perspective

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Abstract

Background: Effective nurse-pharmacist collaboration is essential to medication safety, but evidence documenting this relationship from nurses' viewpoints remains limited within Iraq. ***Objective***: To explore nurses' perspectives and experiences regarding collaborative practices with hospital pharmacists in promoting medication safety, identifying key challenges from a nursing standpoint, and providing recommendations for improvement. ***Methods***: A qualitative study using semi-structured interviews with 30 nurses across eight public hospitals in two governorates (November 2025-January 2026). Participants were recruited using purposive and snowball sampling. The Stutsky and Laschinger Interprofessional Collaborative Practice framework guided the study, and data were analyzed using Braun and Clarke's inductive thematic analysis. ***Results***: A total of 30 nurses participated (17 male, 13 female), with experience ranging from 1 to 25 years. Six themes emerged: interprofessional communication, characterized by need-based consultation and pharmacist condescension deterring two-thirds of nurses; role understanding and dynamics, marked by role ambiguity and nurses assuming patient education responsibilities; collaborative practice and safety, reflecting universal error detection and nurse-reported improvements in care quality; systemic and organizational barriers, including staffing shortages (n=29), night-shift unavailability (n=25), and physician-stamp bureaucracy (n=25); institutional support and leadership, marked by the absence of formal collaborative policies; and enablers of collaboration, including mutual trust (n=23), joint education (n=22), and clinical pharmacist presence (n=10). ***Conclusions***: Nurses acknowledge the clinical value of collaborating with pharmacists for medication safety, but structural, behavioral, and organizational barriers hinder this potential. Enhancing this collaboration requires institutionalizing joint training, expanding clinical pharmacy services, and developing clear collaborative policies.

Keywords: Interprofessional collaboration; Iraqi hospitals; Medication safety; Nurse-pharmacist collaboration; Nursing perspective; Qualitative study.

استكشاف التعاون بين الممرض والصيدلاني لتعزيز سلامة الدواء في المستشفيات العراقية: دراسة نوعية من منظور التمريض

الخلاصة

الخلفية: يُعدّ التعاون بين الممرضين والصيادلة أمراً بالغ الأهمية لضمان سلامة الدواء. غير أن الأدبيات الحالية التي تستكشف هذه العلاقة المهنية الديناميكية من منظور التمريض لا تزال محدودة في البيئة الصحية العراقية. **الأهداف**: استكشاف وجهات نظر الممرضين وتجاربهم فيما يخص ممارسات التعاون مع صيادلة المستشفيات في تعزيز سلامة الدواء، وتحديد التحديات الرئيسية من منظور التمريض، وتقديم توصيات للتحسين. **الطرائق**: دراسة نوعية أُجريت باستخدام مقابلات شبه منظمة مع ثلاثين ممرضاً في ثمانية مستشفيات حكومية في محافظتين، خلال الفترة الممتدة من نوفمبر 2025 إلى يناير 2026. جرى اختيار المشاركين بأسلوبي أخذ العينات القصدي وكرة الثلج. استُرشد في الدراسة بإطار ستوتسكي ولاشينجر للممارسة التعاونية بين المهنيين، وحُلّلت البيانات باستخدام التحليل الموضوعي الاستقرائي وفق نهج براون وكلارك. **النتائج**: شمل البحث ثلاثين ممرضاً، غالبيتهم من الذكور (56.7%) وحاملي شهادة البكالوريوس (56.6%). كشف التحليل الموضوعي عن ستة محاور رئيسية: التواصل بين المهنيين، الذي يتسم بالاستشارة القائمة على الحاجة (عدد=30) والحواجز التراتبية (عدد=20)؛ فهم الأدوار، المتميز بغموض الأدوار وتولّي الممرضين مهام التثقيف الدوائي (عدد=28)؛ الممارسة التعاونية، إذ أفاد جميع المشاركين (عدد=30) بإسهامهم المباشر في منع الأخطاء الدوائية؛ الحواجز المنظومية، وتشمل نقص الكوادر (عدد=29)، وفجوات التواصل في المناوبات الليلية (عدد=25)، وعرقلة اشتراط ختم الطبيب (عدد=25)؛ فجوات السياسات، وتحديداً غياب السياسات المؤسسية الرسمية للتعاون؛ المُمكِّنات، وتشمل الثقة المتبادلة (عدد=23) والتعاون مع الصيادلة السريريين (عدد=10). **الاستنتاجات**: يُدرك الممرضون القيمة السريرية للتعاون مع الصيادلة في مجال سلامة الدواء، غير أن هذه الإمكانية تعيقها حواجز هيكلية وسلوكية ومؤسسية. ويستلزم تعزيز هذا التعاون تأسيس برامج تدريب مشترك، وتوسيع خدمات الصيدلة السريرية، ووضع سياسات تعاونية واضحة ومُلزِمة.

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INTRODUCTION

The World Health Organization has identified interprofessional collaboration (IPC) as several medical professionals from various professional backgrounds offering all-encompassing services by collaborating with patients to provide the best possible care [1]. In this context, the nurse-pharmacist partnership is critical for medication safety, as nurses hold a broad set of pharmaceutical care responsibilities extending far beyond drug administration, including monitoring drug effects, promoting adherence, educating patients, and managing prescriptions and care transitions. This scope positions nurses as frontline integrators of pharmacotherapy and highlights the necessity of close collaboration with pharmacists [2]. Evidence consistently shows that organized collaboration between pharmacists and nurses lowers the number of medication errors and hospitalizations and improves

clinical outcomes [3–5]. Despite this evidence, realizing effective collaboration in practice remains a significant challenge. A qualitative study in German-speaking countries found that the most frequently reported barriers were nurses' perception of pharmacists as "controllers," limited ward presence, and organizational resistance to workflow change, with pharmacists' soft skills and team integration identified as critical preconditions for success [6]. In Middle Eastern contexts, a Qatari qualitative study involving 58 healthcare professionals found that barriers operated across macro, meso, micro, and individual levels, with formal policy frameworks and leadership support emerging as the most powerful determinants of collaboration quality [7]. A hybrid concept analysis further confirmed that effective interprofessional collaboration is a multidimensional process shaped by individual, team, organizational, and system-level factors, requiring deliberate institutional cultivation rather than spontaneous emergence [8]. The documentation equally well outlines the consequences of weak collaboration. A qualitative study conducted across 16 intensive care units in Iran concluded that "medication errors may occur due to a lack of interprofessional collaboration and weak communication within the healthcare team," directly linking the absence of effective teamwork to preventable adverse events [9]. Marked regional inequalities persisted, with less developed areas showing the slowest progress in catching up. These findings show that staffing shortages and the inequitable distribution of pharmacists, which are key structural barriers, affect all healthcare systems [10]. A meta-review of 36 systematic reviews confirmed that effective interprofessional collaboration improves patient outcomes and medication safety, while its absence is associated with role conflict, fragmented communication, and increased risk to patients [11]. In Iraq specifically, the existing literature on interprofessional collaboration is limited and confined primarily to quantitative methods and critical care settings [12,13]. To build a comprehensive, dyadic understanding of this relationship, it is essential to first examine each profession's perspective independently. Merging both viewpoints into the risks of a single study overlooking unique, profession-specific barriers that only emerge when each group is analyzed separately. Furthermore, to our knowledge, this is the first qualitative study in Iraq to investigate this collaboration specifically from the nurses' perspective. To address this gap, the present study adopts a qualitative approach to explore nurses' perspectives and experiences regarding collaborative practices with hospital pharmacists in promoting medication safety, identifying key challenges from a nursing standpoint, and providing recommendations for improvement.

METHODS

Study design and settings

A qualitative design was used, with thematic analysis serving as the analytical method and semi-structured interviews serving as the main means of gathering data. Between November 2025 and January 2026, in-person interviews were carried out at eight public hospitals in two Iraqi provinces: four in Al-Diwaniyah and four in Al-Najaf. In order to fully capture the complex experiential aspects of nurse-pharmacist collaboration that cannot be fully elicited by quantitative instruments, this design was chosen.

Participant recruitment

Nurses were enrolled using purposive and snowball sampling strategies. Purposive sampling ensured the inclusion of nurses with direct, regular contact with pharmacists in ward-based practice across diverse clinical specialties, spanning the full range of professional experience (1-25 years) to capture perspectives representative of all nursing staff within the hospital, rather than those of senior nurses alone, thereby supporting the generalizability of recommendations across hospital nursing cadres. Snowball sampling allowed additional participants to be identified through peer recommendation. The first author directly approached nurses in person during their official working hours. Recruitment spans a broad range of wards and departments, including internal medicine, surgery, neurology, intensive care, cardiac care, emergency, pediatrics, neonatal intensive care, gynecology, dialysis, oncology, psychiatry, and maternity. Interviews continued until data saturation was achieved, the point at which no further conceptual contributions were identified from additional interviews. To ensure privacy, interviews were conducted either in a quiet, unoccupied room on the ward or at the nurses' workstation when it was vacant. Each interview ranged in duration from 15 to 50 minutes. Of the 30 participants, 29 consented to audio recording; one participant declined for personal reasons. For the one who refused audio recording, comprehensive field notes were manually recorded in real time during the face-to-face interview to ensure the integrity and completeness of the data. The first author (ZH) conducted all interviews.

Inclusion criteria

At least one year of hospital experience, regular ward-based contact with pharmacists, and active employment in a participating hospital at the time of recruitment.

Theoretical framework and interview guide

The theoretical basis of this study was rooted in the Interprofessional Collaborative Practice (ICP) Conceptual Framework formulated by Stutsky and Spence Laschinger, which directed the investigation of collaborative relationships between nurses and pharmacists. This framework organizes interprofessional dynamics into three interrelated domains: Antecedents, Process, and Outcomes [14]. Drawing on this foundation, the ICP framework informed the development of a semi-structured interview guide, ensuring that questions addressed

each domain in relation to nurse-pharmacist collaboration. The guide was developed specifically for this study and aligned with the core constructs of the ICP framework. Questions were formulated to elicit nurses' experiences, perceptions, and recommendations regarding their collaboration with pharmacists. To enhance clarity, the guide was organized into thematic sections (supplementary data).

Thematic analysis

Thematic analysis followed Braun and Clarke's (2006) six-phase inductive approach within a constructivist framework [15]. All interviews were conducted and transcribed verbatim in Arabic. The research team (ZH and AA) then translated them into English with the aid of AI tools, followed by a thorough review by two bilingual experts. Themes emerged from recurring trends in participant responses. The initial coding was carried out independently by the first and second authors; the two sets of codes were then compared and discussed, with codes grouped into candidate categories and refined into subthemes, which were consolidated into the six overarching themes reported here through mutual agreement. Discrepancies between the two coders' initial codes were resolved through discussion until consensus was reached; no unresolved disagreements remained at the theme-development stage. Participant codes (e.g., N01, N02, …) are used throughout this manuscript; all identifying details have been removed. Trustworthiness was ensured according to Amin *et al*. (2020) [16]. Credibility was established through the first author's engagement with the hospital, investigator triangulation involving a multidisciplinary team (including a clinical pharmacy master's student, a clinical pharmacy specialist, and a nursing specialist), and peer debriefing conducted twice during the analysis, where the third author challenged emerging interpretations; transferability was supported through a detailed contextual description.

Ethical considerations

The study protocol was approved by the local Research Ethics Committee of the College of Pharmacy, University of Baghdad (Certificate ID: RECAUBCPO625/85R Dated 17/11/2025). Verbal informed consent was obtained and documented for all participants prior to each interview.

RESULTS

Thirty hospital nurses were included in this study. The majority were male (n= 17), and participants were recruited from two Iraqi provinces: Al-Diwaniyah (n= 17) and Al-Najaf (n= 13). Professional experience ranged from 1 to 25 years, with half of the sample having 1-5 years of experience (n= 15). The predominant educational qualification was a Bachelor of Science in Nursing (n= 17), though qualifications ranged from preparatory nursing school to master's degree level. Eleven participants (36.7%) held formal leadership positions, including ten unit or ward directors/deputies and one hospital-level nursing supervisor. Full demographic characteristics are presented in Table 1.

Table 1: Demographic characteristics of participants (n=30)

Characteristic	Category	n(%)
Gender	Male	17(56.7)
	Female	13(43.3)
Province	Al-Diwaniyah	17(56.7)
	Al-Najaf	13(43.3)
Experience	1–5 Years	15(50)
	6–10 Years	9(30)
	>10 Years	6(20)
Range: 1–25 years		
Education	B.Sc. in Nursing	17(56.6)
	Technical Nursing Diploma	8(26.7)
	Preparatory Nursing School	2(6.7)
	M.Sc. in Nursing	2(6.7)
	Medical Assistant Diploma	1(3.3)
Leadership Roles	General Nursing Supervisor	1(3.3)
	Unit or Ward Director/Deputy	10(33.3)

Table 2 shows the main themes, subthemes, and the key findings from nurses' responses. **Theme 1 concerns interprofessional communication**. The first sub-theme, routine and need-based consultation (n= 30), showed that all the participants confirmed that consulting pharmacists is routine practice but one triggered by clinical uncertainty rather than by a structured interprofessional protocol. Familiar and frequently administered medications are managed independently by nurses, while new, unfamiliar, or high-alert drugs prompt consultation. This finding reflects a reactive rather than proactive model of communication, one driven by individual need rather than systemic design. *"Consultation depends on the medication. Some treatments are repeated and familiar, so we limit consultation to unclear or new medications"* (N01). Participant N05 confirmed that daily interaction does occur, noting, *"Information about medication administration methods is exchanged daily."* In contrast, a small group (n=4) reported rarely consulting pharmacists at all. *"We rarely consult pharmacists; our communication is mostly with physicians"* (N17). The second sub-theme, attitudinal and hierarchical barriers to communication (n= 20), showed that two-thirds of participants identified pharmacist condescension, dismissiveness, and professional rigidity as pervasive barriers that systematically discouraged nurses from seeking clinical consultation. Nurses reported being made to feel that their questions were unwelcome or a challenge to pharmacists' authority, reinforcing institutional hierarchies and leading many to bypass pharmacists entirely in favor of physicians. *"Many have arrogant behavior; when we ask about dosage or administration, they respond condescendingly, as if the question is personal rather than for the patient… They do not accept nurses' input about treatments, seeing us as lower rank"* (N10). N03 recalled an explicit rejection: "*I am a pharmacist, and you are teaching me?!*"

Table 2: Main themes, subthemes, and key findings from nurses' responses (n= 30)

Main Theme	Subtheme	n(%)	Key finding
1. Interprofessional Communication	Routine and need-based consultation	30(100)	Universal need-based pattern; no structured protocol.
	Attitudinal barriers	20(66.7)	Pharmacist condescension, reject clinical input and claim superiority diverts queries to physicians.
2. Role understanding and dynamics	Role ambiguity and conflict	28(93.3)	Pharmacist non-performance forces nurses out of role.
	Personality as enabler/barrier	9(30.0)	Collaboration personality-dependent, not structural.
	Mutual respect and trust	23(76.7)	Trust enables open communication & shared outcomes.
3. Collaborative practice and safety	Error detection and Joint verification	30(100)	Universal error prevention through collaboration.
	Shared decision-making	19(63.3)	Nurse monitoring with pharmacist expertise leads to safe adjustments.
	Impact on care quality	19(63.3)	Collaboration demonstrably reduced errors and improved care..
4. Systemic and organizational barriers	Staffing and workload	29(96.7)	Critical barrier; reduces communication to task minimum.
	Night/emergency gaps	25(83.3)	Pharmacist unavailability at highest-risk periods.
	Bureaucratic obstacles	25(83.3)	Physician stamp requirement delays care cascade.
5. Institutional support and leadership	Absence of formal policies	20(66.7)	No nurse–pharmacist collaborative policies exist.
	Leadership quality	14(46.7)	Recognition programs strengthen team culture.
6. Enablers of collaboration	Joint education & training	22(73.3)	Strongest modifiable enabler; widely absent.
	Clinical pharmacist presence	10(33.3)	Clinical > general pharmacist as collaborative partner.
	Digital communication	4(13.3)	Effective when pharmacist actively engage.

N04 framed the issue as cultural: *"The 'ego' problem exists among pharmacists; as long as it exists, collaboration cannot happen."* N15 characterized the tone: *"A condescending attitude, speaking arrogantly as if 'I am a genius of my time.'"* The consequence, as N27 explained, was avoidance*: "Because of pharmacists' blunt manners I prefer to go to the physician."* Together, these accounts illustrate that attitudinal and hierarchical barriers operate along a single spectrum, driving nurses away from pharmacist consultation. **Theme 2 concerns role understanding and interprofessional dynamics**. The first sub-theme, role ambiguity and conflict (n= 28), showed that most participants reported experiencing interprofessional friction and practical role ambiguity. Crucially, this ambiguity did not stem from a conceptual confusion over professional boundaries, but rather from operational disruptions and systemic bottlenecks in workflow execution that blurred these boundaries in practice. When organizational delays occurred in pharmacy deliverables, such as medication preparation or timely responses to alerts, the intended clarity of professional roles collapsed. This operational vacuum structurally forced nurses to take on more tasks outside their scope, creating resentment and operational stress. This situational ambiguity was often compounded by breakdown points in institutional communication channels, which participants felt diminished mutual role recognition. N07 described the clearest example of role boundary violation: *"Responsibilities are unclear due to weak communication. Sometimes we perform duties that require pharmacists, such as when a drug runs out and our alerts are ignored."* The participant linked this situation directly to pharmacists' perception of nurses' professional authority: *"Pharmacists think nurses have no authority to alert them about changes."* N17 explained how management compounded the problem: "*There is conflict due to some pharmacists not performing their duties… they do not assist us."* This was echoed by N16, who noted how a lack of professional recognition sometimes restricted their interaction to logistical work: *"Many pharmacists do not understand our role, especially the uncooperative ones, who sometimes only ask us to fetch medication orders for them."* N04 identified a specific administrative trigger: *"Conflict exists in medication administration times due to delays in preparation, leading to cancellation of a patient's dose or changing administration time."* Patient education emerged as the most contested and ambiguous responsibility, discussed by most participants (n= 28). While formal expectations may assign this function to pharmacists, nurses frequently assumed primary responsibility due to greater patient proximity, pharmacist unavailability, and patient preference for the nurse they already trusted. N09 described it*: "Patient education is usually done by us; we explain the treatment, its side effects, and usage to patients."* Participant N29 added: *"Patient education is mainly done by us; we carry the larger burden of educating patients. Pharmacists rarely warn patients about their medications."* The second sub-theme, pharmacist personality as an enabler or barrier (n= 9), showed that one-third of participants explicitly identified the pharmacist's individual personality, rather than any institutional structure, as the primary determinant of whether collaboration was enabled or obstructed. This finding reveals a critical vulnerability in the current system: collaborative practice is personality-dependent rather than structurally guaranteed. N16 drew a direct contrast between two

types of pharmacists: *"A cooperative pharmacist enables discussion and better outcomes, while an uncooperative one is a barrier and limits work to mere dispensing."* N19 described how a proactive pharmacist can transform the ward environment: *"The pharmacist creates cooperative atmospheres by calling nurses and explaining necessary information proactively; these dissolve barriers."* The third sub-theme, mutual respect and professional trust (n= 23), showed that where mutual respect and trust do exist, they directly enable better communication, shared responsibility, and improved patient outcomes. N11 illustrated the point: *"There are no challenges. Our relationship with pharmacists is strong because we know our responsibilities. There is mutual trust."* **Theme 3 concerns collaborative practice and medication safety**. The first sub-theme, medication error detection, prevention, and joint verification (n= 30), showed that all participants reported at least one instance of detecting or preventing a medication error through nurse-pharmacist collaboration. These accounts span routine drug checks, emergency interventions, and proactive pharmacist education that altered nurses' subsequent practice. This finding underscores the intrinsic safety value embedded in the nurse-pharmacist interface. N08 described the nurse's standard protocol: *"According to our academic training, we follow 'triple confirmation': checking the medication after preparation, before reconstitution, and before administration."* N24 added, *"We often consult pharmacists about drug interactions before administering, for example, interactions between some cephalosporins and calcium gluconate."* N16 described a high-stakes case where collaboration directly changed a treatment plan: *"In one case a patient with renal failure was admitted with acute MI; after discussion with the pharmacist, the decision was made to change enoxaparin to heparin."* N19 described how collaboration catches prescribing incompatibilities: *"Sometimes we discover that a physician prescribed ceftriaxone with Ringer's solution, which can cause precipitation; through cooperation the issue is resolved."* Nearly two-thirds of participants (n= 19) described instances where nurses' real-time clinical observations and pharmacists' pharmacological expertise jointly informed treatment decisions. Nurses' bedside access to laboratory results and continuous patient monitoring were identified as the key contributions to shared decision-making, illustrating the complementary nature of the two professions' knowledge bases. N08 described dose adjustment*:* *"The written dose of digoxin needed adjustment according to the latest scientific update; through collaboration with the clinical pharmacist, the dose was recalculated, and the physician corrected it."* The second sub-theme, impact of collaboration on care quality (n= 19), showed that nearly two-thirds of participants affirmed that interprofessional collaboration produces direct, measurable improvements in clinical care quality, including significant reductions in medication errors, enhanced clinical competence, and improved care coordination. N05 described the broader organizational effect: *"Collaboration improved medication safety and care quality."* **Theme 4 concerns systemic and organizational barriers**. The first sub-theme, staffing shortages and workload pressure (n= 29), showed that this was identified by nearly all participants as the most widely reported barrier to collaboration, preventing meaningful interprofessional engagement by exhausting staff, compressing available time, and pushing both nurses and pharmacists into reactive, task-focused modes of work. Nurses described experiencing an increased workload on the 50% duty days when reduced staff coverage was in effect. N01 made the causal link explicit: *"Pharmacists become exhausted due to staff shortages and the large number of patients, which negatively affects collaboration."* N03 identified specific high-risk periods: *"Work pressures and staff shortages, especially on 50% duty days (Thursday and Saturday), cause difficulty in communication and collaboration."* N15 described how fatigue affects interpersonal quality: *"Fatigue and stress from workload and staff shortages definitely affect cooperation."* N16 placed the problem in a broader systemic context: *"Health institutions need more staff because each hospital serves more than its capacity."* The second sub-theme, night shift and emergency collaboration gaps (n= 25), showed that most participants reported that collaboration during night shifts and emergencies is severely constrained by pharmacist unavailability. With a single on-call pharmacist responsible for multiple wards, nurses described periods of extended pharmacist absence precisely when the highest-acuity, time-sensitive medication decisions were required. N21 described the structural gap in night coverage: *"Night shifts are harder because no pharmacist is present and the on-call pharmacist covers multiple wards, making access difficult."* N03 noted, *"In the night shifts, due to pharmacists not being at their workplace, leaving, or sleeping, we cannot reach them when needed."* The third sub-theme, bureaucratic, policy, and administrative obstacles (n= 25), showed that these were cited by 25 participants, with the physician stamp requirement emerging as the most critical bottleneck. When physicians delayed signing medication orders, pharmacists were prohibited from preparing treatments, a cascade of delays that disrupted therapeutic timelines, compressed collaboration opportunities, and ultimately jeopardized patient care. N04 identified the physician-stamp requirement as the central problem: *"The main challenge is the specialist doctor's stamp. Pharmacists do not prepare medication until after the doctor's stamp, even if he is very late."* N22 described a systemic communication failure across professional groups: *"The problem is hospital policies; there is no communication loop between cadres: the physician writes something, the pharmacist does something else, and the nurse tries to reconcile."* N08 attributed the problem to institutional design: *"In my view, what reduced collaboration is the hospital's workflow system, which imposed limited cooperation."* **Theme 5 concerns institutional support and leadership**. The first sub-theme, absence of formal collaborative

policies (n= 20), showed that a substantial majority of participants perceived a distinct absence of formal institutional policies or administrative encouragement for nurse-pharmacist collaboration. N01 described the absence of institutional endorsement: *"There is no direct encouragement or reinforcement regarding collaboration."* N03 made a pointed comparison: *"We have seen administrative orders concerning collaboration between nursing staff and doctors, but none concerning pharmacists."* N10 articulated a perception of deliberate separation: *"I believe hospitals prefer to separate staff, making pharmacists and nurses work independently."* Also, N09 added, *"There is a spirit of cooperation between us, but there are no administrative instructions, orders, or workshops organized by management to encourage collaboration."* The second sub-theme, presence and absence of supportive institutional leadership (n= 14), showed that nearly half of participants described how leadership quality, whether supportive or indifferent, directly shaped the collaborative culture of their ward. N17 described the situation: "*There is no encouragement; rather, management favors some departments over others and engages in favoritism."* **Theme 6 concerns enablers of effective collaboration**. The first sub-theme, joint education and training as a collaboration catalyst (n= 22), showed that three-quarters of participants identified joint education and interprofessional training as the most impactful modifiable enabler of nurse-pharmacist collaboration. Nurses described both the absence of such opportunities as a felt professional deficiency and their presence as producing dramatic improvements in medication safety and interprofessional relationships. N04 reflected on the impact of one clinical pharmacist's initiative: *"A lecture held by one of the clinical pharmacists about errors they saw. There was benefit from it, and credit to the pharmacist for activating their correct role."* N06 estimated the perceived benefit: *"Pharmacists provided workshops for nurses on medication administration, reducing errors by 70-80%."* The second sub-theme, clinical pharmacist presence as a structural IPC enabler (n= 10), showed that one-third of participants consistently rated clinical pharmacists as substantially more effective interprofessional partners than general pharmacists. The clinical pharmacist's sustained ward presence, proactive clinical engagement, and familiarity with nursing practice were identified as the key differentiators. This finding has direct implications for workforce planning and for the expansion of clinical pharmacy services in Iraqi hospitals. N08 mentioned, "I *believe only the clinical pharmacist understands our role correctly. Increasing their number in the ward would improve collaboration."* N23 confirmed this from the emergency ward context: *"There is a difference between the clinical pharmacist and the general pharmacist: the clinical pharmacist is always with us and easy to reach. Their presence made a difference."* The third sub-theme, digital communication (n= 4), showed that four participants reported this, all describing the use of WhatsApp groups to facilitate nurse-pharmacist interaction, with markedly different results. N24 reported a positive experience: *"We have an electronic group that includes doctors, pharmacists, and nurses; any new medication added is accompanied by a brief about how to prepare and administer it, and things run smoothly."* N21, however, noted a more mixed outcome: "*We have a shared electronic group among the medical team, but the pharmacists' role in it is not effective, so the benefit was limited."* N23 added that *"we have an electronic group, but we rely more on direct communication. The group exists but is not heavily used."* Figure 1 illustrates the study's findings mapped onto the Stutsky and Laschinger ICP framework, the interrelationships between antecedents, processes, and outcomes.

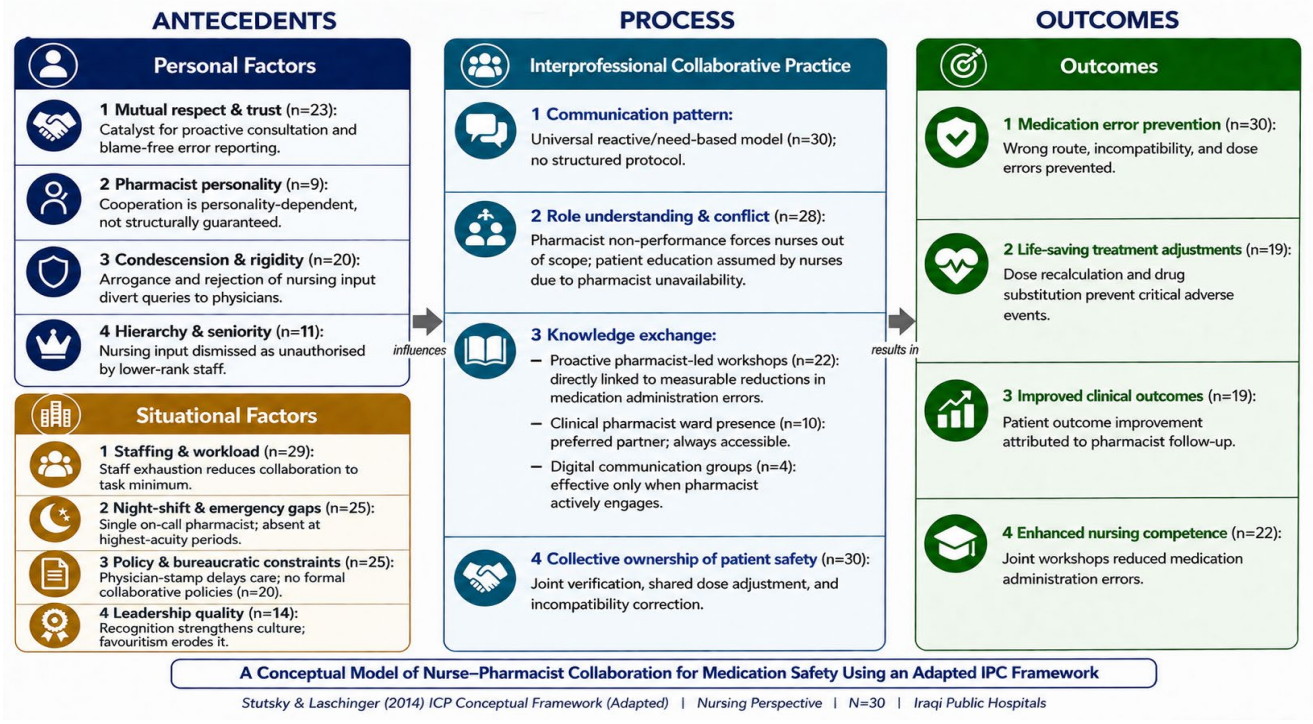

Figure 1: The study findings adapted from Stutsky and Laschinger (2014) ICP Conceptual Frameworks.

Regarding nurses' recommendations of strategies to enhance pharmacist-nurse collaboration, the participants proposed a comprehensive range of recommendations as illustrated in Table 3.

Table 3: Nurses' recommendations to enhance interprofessional collaboration (n=30)

Recommendation Theme	Subthemes	Core Focus	n(%)
Joint education and training	Mandatory joint workshops; case-based training; on-unit in-services	Institutionally mandated, regular pharmacist-led educational sessions for nurses and joint sessions for both professions.	22(73.3)
Structural and workflow reform	Increase ward pharmacist number and presence; stabilize assignments; streamline prescribing workflow	Embedding pharmacists into daily ward practice and reducing bureaucratic barriers to medication preparation.	10(33.3)
Staffing and resources	Increase pharmacy and nursing staff; adequate drug supply; dedicated shared spaces	Addressing the structural root causes of workload-driven collaborative failure.	9(30)
Communication infrastructure	Electronic prescribing; digital ward groups; joint rounds	Formalizing communication channels and removing reliance on individual initiative.	9(30)
Professionalism and culture	Address hierarchical attitudes; recognize collaborative wards; monthly staff incentives	Cultural transformation as a necessary complement to structural reform.	6(20)
Role clarification	Define interprofessional responsibilities; establish ward liaison roles	Eliminating ambiguity in high-risk domains (crash cart, emergencies, patient education).	7(23.3)

Regarding joint education and interprofessional training, this was the most widely recommended intervention (n= 22) with nurses calling for institutionally mandated, regularly scheduled workshops combining medication content with practical clinical scenarios. Nurses specified that workshops should be mandatory to ensure equal participation across all staff levels and proposed a high-frequency model of brief weekly in-service sessions delivered directly on the ward. N01: *"Providing mandatory workshops or training units for nursing and pharmacy staff regarding medications to enhance collaboration and applying them in practice."* N16: *"Holding field workshops and practical application on specific ward cases would be more beneficial."* Concerning structural and workflow modifications, one-third of participants (n= 10) recommended expanding pharmacists' physical ward presence as a direct structural remedy for collaboration deficits. Nurses recognized that interprofessional collaboration requires proximity, and several specifically recommended stabilizing pharmacist ward assignments to build continuity of relationship rather than subjecting both professions to monthly rotations that disrupted established working relationships. N25: *"Stabilize staff in the ward. Pharmacists rotate monthly, causing frequent changes; fixing the pharmacist in place would enhance cooperation."* N04 identified the specific administrative change needed: *"Changing administrative procedures, especially those related to doctor stamping, which delays medication preparation."* Regarding staffing, resources, and workload management, over a quarter of participants (n= 8) identified increased staffing as a fundamental prerequisite for sustainable collaborative practice. Additionally, nine participants recommended institutional investment in tangible resources and physical infrastructure, including dedicated shared spaces, emergency cabinet activation, and consistent medication supply, to prevent logistical failures from undermining collaborative opportunities. N03: *"Providing adequate pharmacy staff because their low numbers negatively affect collaboration." And* N23 connected staffing to the clinical pharmacist model: *"Increasing the number of clinical pharmacists would make a difference because current numbers are small."* N06*: "Providing space, a hall, or a suitable place would enable daily workshops and lectures."* N17*: "Activating the emergency cabinet and ensuring medication availability would reduce the need to fetch drugs from other wards."* Concerning communication infrastructure, nearly one-third of participants (n= 9) recommended electronic prescribing and health records, while seven participants recommended formal digital communication channels, such as ward-specific groups for pharmacists and nurses, and more structured interprofessional morning rounds. N19: *"Electronic governance is useful for clarity, time saving, and avoiding unclear deletions or substitutions in prescriptions."* N07: *"Creating electronic groups combining pharmacists and nurses in each ward."* Regarding a culture of respect and professionalism, a minority (n= 6) recommended targeted interventions to address hierarchical attitudes and interpersonal disrespect, recognizing that sustainable collaboration requires cultural transformation alongside structural reform. Participants emphasized that professionalism education must be directed at pharmacists and should be embedded in both undergraduate curricula and continuing professional development. N17: *"Educate pharmacists about the importance of nursing staff and stop treating nurses with condescension."* N27: *"Improve pharmacists' interpersonal style. No one is superior; we all work together as a team."* Finally, concerning role clarification and ward-based leads, nearly a quarter of participants (n= 7) recommended the development and dissemination of clear, formally agreed role definitions, particularly in high-ambiguity domains such as emergency equipment management, crash cart responsibility, off-formulary prescriptions, and after-hours medication access. Two participants additionally recommended the formal designation of ward-based pharmacist liaison roles as accountable points of contact for nursing consultation. N20: *"Clarifying unclear roles such as the crash cart responsibility; we do not know whether it is our responsibility or the pharmacist's."* N16: *"Assigning a pharmacist by management as a reference for*

pharmaceutical consultations in each ward would reduce barriers."

DISCUSSION

This study provides the first qualitative account of nurse-pharmacist collaboration from the nursing perspective in Iraqi public hospitals. Situated within the Stutsky and Laschinger ICP framework, nurses universally recognized the clinical value of pharmacist collaboration, yet this potential is constrained by attitudinal, structural, and policy barriers operating at multiple levels simultaneously. The universal pattern of need-based pharmacist consultation reflects a reactive communication model driven by individual clinical uncertainty rather than formal protocol, consistent with a Norwegian study that identified the absence of structured communication channels as a key barrier [17]. The displacement of pharmaceutical queries to physicians, driven by pharmacist condescension, compounds patient safety risk by passing pharmaceutical expertise. A German qualitative study found that "skepticism due to perception as controller" and "perception as smart aleck" were barriers identified from pharmacists' perceptions [6], and a Qatari study identified hierarchical professional cultures as a hindrance to collaboration [7]. Where mutual trust existed in this study, it functioned as a catalyst for proactive consultation and shared decision-making, confirming that trust is one of the strongest personal predictors of IPC [14]. Role ambiguity emerged as a significant source of interprofessional tension in this study, particularly regarding patient education and the boundaries of pharmacist responsibility. This finding is not unique to the nursing perspective; an Iraqi qualitative study on pharmacists' broader professional challenges similarly found that most pharmacists (n= 18/32) felt the nurse-pharmacist relationship needed improvement, attributing this to nurses viewing their own professional role as more essential [18]. Together, these dual-perspective accounts reveal a mutual role misrecognition operating in Iraqi hospitals: nurses assume pharmacist responsibilities due to unavailability, while pharmacists perceive nurses as undervaluing pharmaceutical expertise. This pattern mirrors findings from a Jordanian quantitative study of 200 healthcare professionals, which found that pharmacists perceived no role for nurses in documenting medication changes or providing written summaries to patients upon discharge, steps that nurses in practice routinely perform, while nurses similarly underestimated pharmacists' contributions, reflecting a mutual role misrecognition that creates accountability gaps in medication reconciliation [19]. Resolving these issues requires not merely goodwill but formally agreed role-definition frameworks that clarify accountability in contested domains, particularly patient education, emergency medication management, and after-hours pharmaceutical consultation. The universal report of error detection and prevention through collaboration is strongly corroborated by international evidence: a prospective study conducted in the USA demonstrated that nurse-pharmacist collaboration ensured that discrepancies were addressed before causing harm, confirming that such joint intervention efficiently and cost-effectively prevents potential harm [20]. This conclusion is further supported by a systematic review of 57 studies, which demonstrated that pharmacist–nurse collaborative models reduced 30-day readmission rates [21]. The specific error categories described, wrong route, drug-diluent incompatibilities, and dose adjustment for organ impairment, are well-documented preventable events [22]. Shared decision-making by nearly two-thirds of participants illustrates the complementarity of professional knowledge bases: nurses' bedside monitoring combined with pharmacists' pharmacological expertise produces decisions that neither profession could reach alone, a dynamic confirmed by a scoping review of 23 studies, which identified nurse-pharmacist dyads as enabling complementary interprofessional roles in medication safety, improving disease management, preventing adverse drug events, and reducing hospitalizations [3]. This pattern is directly evidenced within the Iraqi clinical setting, where 56% of discharged patients had at least one clinically significant medication error prior to pharmacist reconciliation [23], a risk compounded by documented deficiencies in newly graduated Iraqi pharmacists' practical training and competency [24]. Staffing shortages and workload were identified as the most pervasive barriers affecting the time to collaborate, consistent with international evidence [6,17,25]. A qualitative study across Arab countries identified excessive workload as a driver of reduced job satisfaction [26], a burden further evidenced in the Iraqi context, where community pharmacists reported moderate-to-high levels of perceived stress and depression, conditions known to compromise collaborative practice quality [27], and where a multi-center study across 11 Iraqi public hospitals found that nurse shortage and increasing nurse/patient ratio remained a challenge to keeping patient safety [28]. Under high workload, collaborative safety mechanisms are abandoned precisely when they are most needed. The night-shift gap, with single on-call pharmacists covering multiple wards, creates a structural hazard at the highest-acuity clinical periods, a concern corroborated by a retrospective study at a UK tertiary center. This demonstrates that out-of-hours pharmacist calls predominantly involved high-risk drugs, with nighttime volumes exceeding evening volumes across nearly all drug categories [29], confirming the importance of pharmacists' availability at nighttime. The physician stamp requirement reflects physician-centric institutional design that limits autonomous practice of both nurses and pharmacists and generates avoidable therapeutic delays; a quality improvement project demonstrated that standardizing medication workflows through collaborative pharmacy-nursing review reduced missing doses and saved up to 17 minutes of nursing time per incident. These results show that enhancing the workflow for medication ordering, preparation, and administration can have a profound impact on both quality and safety [30]. The consistent preference for clinical pharmacists provides

direct empirical support for expanding clinical pharmacy services as a structural intervention [31]. Joint education was the most impactful modifiable enabler; the perceived error reduction following pharmacist-led workshops in this study is consistent with evidence from Egypt [32], Iraqi studies [33,34], and a multinational systematic review and meta-analysis of 12 studies identifying educational programs led by a pharmacist were linked to notable decreases in medication error rates [35]. These findings are particularly significant within the Iraqi context, where a cross-sectional study documented low-to-moderate clinical knowledge levels among nurses and a near-universal absence of formal training participation [36], underscoring that investment in joint nurse-pharmacist education is not merely beneficial but essential to building the foundational competencies required for effective interprofessional collaboration. The absence of formal nurse-pharmacist collaborative policies signals that pharmacist collaboration is discretionary. For collaboration to last, there need to be formal rules, frameworks for defining roles, and requirements for joint education.

Study Limitations

Several limitations must be acknowledged. Relying solely on nurses limits this study to a single-profession viewpoint on a dyadic relationship; thus, pharmacists' actions are described through the lens of nurse perception and may not reflect their actual views. Additionally, self-reported interviews are vulnerable to social desirability bias. Furthermore, recruiting from only two provinces may affect generalizability; however, because the Ministry of Health centrally regulates all Iraqi public hospitals, the structural conditions identified here likely mirror the broader national landscape. Formal participant validation of the coded themes was not undertaken; trustworthiness was instead supported through investigator triangulation, peer debriefing, and detailed contextual description, as outlined in the Methods.

Conclusion

From nurses' perspective, collaboration with pharmacists is universally valued and central to their commitment to medication safety, yet nurses describe this collaboration as constrained by pharmacist condescension, staffing shortages, night shift gaps, bureaucratic barriers, and absent collaborative policies. Three priorities emerge: institutionalizing pharmacist professionalism training; expanding clinical pharmacy availability; and establishing formal collaborative frameworks, including role-clarification protocols and joint education mandates, transforming nurse-pharmacist collaboration from a personality-dependent arrangement into a sustainable interprofessional safety culture.

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Conflict of interests

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Data sharing statement

The datasets generated and analyzed during the current study are not publicly available due to confidentiality agreements with participants but are available from the corresponding author on reasonable request.

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