BRIDGING THE GAP: PHYSICIANS' AND NURSES' PERSPECTIVES ON HEALTH TECHNOLOGY IMPLEMENTATION IN ALMATY CITY HOSPITALS

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Abstract

A cross-sectional study was conducted from January to March 2025 using a structured, expert-validated questionnaire, pilot tested in Kazakh and Russian. The survey was distributed anonymously via Google Forms to all doctors and nurses in a medical organization, with 136 doctors and 225 nurses participating. Consent was obtained electronically. The questionnaire covered demographics, innovation, collaboration, and reflective practices. Data analysis was performed using SPSS and Excel, applying chi-square tests to compare responses between doctors and nurses, with significance set at $p < 0.05$.

Doctors were generally younger and had slightly less experience than nurses, though only age differences were statistically significant. Nurses reported higher engagement in innovation, including introducing new ideas, using alternative methods, and promoting team creativity. In contrast, doctors more often described strong collaboration, knowledge sharing, and reflective team practices. They reported more frequent discussions on effectiveness, problem-solving, and peer feedback. Doctors also more often recognized platforms for interdepartmental and patient interactions.

This study revealed key differences between doctors and nurses in innovation, collaboration, and team reflection. Doctors were more engaged in critical discussion and reflection, while nurses showed stronger tendencies toward innovation. Future strategies should focus on fostering interdisciplinary collaboration, expanding innovation opportunities for nurses, and promoting team-based learning to enhance overall healthcare quality.

Keywords: Healthcare professionals, interdisciplinary collaboration, team reflection, knowledge sharing, organizational culture.

Introduction. Universal Health Coverage (UHC) is a global health priority, aiming to ensure that everyone, everywhere has access to quality health services without facing financial hardship. UHC is one of the central components of the United Nations' Sustainable Development Goals (SDGs), particularly Goal 3, which focuses on ensuring healthy lives and promoting well-being for all, at all ages. Achieving UHC requires a healthcare system that is accessible, efficient, and capable of delivering high-quality care to all individuals [1].

A critical factor in achieving UHC is the effective collaboration between healthcare professionals, especially doctors and nurses, as this directly impacts the quality and accessibility of services provided to patients [2].

Effective collaboration between doctors and nurses is essential for delivering patient-centered care. Doctors and nurses bring unique perspectives and expertise to the table, with doctors focusing on diagnosis and medical treatment, and nurses providing continuous, hands-on patient care. Their collaboration fosters an environment of shared knowledge, skills, and decision-making, which is crucial for improving patient outcomes [3].

Team-based care allows for a more holistic approach to treatment, where both medical and supportive needs of patients are addressed [4].

Moreover, effective collaboration leads to improved communication, reduced medical errors, and more efficient care delivery, all of which are vital for achieving UHC. In a collaborative setting, doctors and nurses can work together to make informed decisions, leading to better resource allocation, reduced costs, and more effective health interventions [5].

For healthcare managers, addressing the dynamics of collaboration between doctors and nurses is of paramount importance. Strong teamwork is directly tied to improved organizational performance, which has implications for both clinical outcomes and financial sustainability [6].

Managers need to ensure that healthcare teams function smoothly and that effective communication channels are in place. This is not only critical for im-

proving patient safety and care quality but also for optimizing the use of resources, reducing waste, and improving the efficiency of healthcare delivery. From an economic perspective, better collaboration leads to fewer medical errors, reduced duplication of effort, and more efficient workflows, all of which contribute to cost savings. Furthermore, effective collaboration enhances employee satisfaction and retention, which can further reduce turnover costs and promote a more stable and effective workforce.

Almaty is the largest city in Kazakhstan, and its medical facilities are often at the forefront of the country's healthcare delivery. The hospital in question plays a vital role in serving a diverse population with varying health needs. By improving collaboration within the hospital, we can ensure that both doctors and nurses are aligned in their efforts to provide comprehensive, efficient, and compassionate care. Effective collaboration in this context will not only improve patient satisfaction but also contribute to the hospital's reputation, operational efficiency, and overall quality of care. As Almaty continues to grow and its healthcare system evolves, fostering a culture of teamwork will be essential for meeting the healthcare demands of the city's residents while working towards UHC and the SDGs. The aim of the article is to compare doctors and nurses perceptions of innovation, collaboration, and reflective practices in healthcare teams, and to identify differences that may influence organizational performance and patient safety improvement in medical organization "X" of the Almaty city.

While leadership, organizational culture, and digital tools are acknowledged contributors to resilience, multiple recent studies underscore the role of resilience and innovation across industries [7]. However, in healthcare, more research is needed to fully understand the mechanisms through which resilience supports innovation and improves outcomes.

2. Literature review. Innovation in service organizations such as hospitals is a multifaceted and evolving process. It extends beyond individual adoption to encompass an organization's capacity to assimilate new practices, processes, or technologies. Successful adoption depends on factors including the perceived relative advantage of an innovation, its compatibility with existing workflows, complexity, trialability, and observability. Psychological readiness, supportive context, and opportunities for adaptation further influence the innovation process. Continuous support, system readiness, and well-managed stages of implementation and feedback are essential for healthcare organizations to effectively embed innovation. According to Greenhalgh *et al*, for example, diffusion of innovations in service organizations can be facilitated by ensuring these factors align with organizational needs. Nonetheless, healthcare innovation initiatives often remain complex; one recent study even questioned whether certain HTA processes help or hinder innovation in practice.

Innovation readiness – an organization's ability to adopt and implement impactful changes – is particularly crucial in healthcare. Greenhalgh *et al.* described innovation as coordinated actions intentionally departing from established routines to drive improvement. Yet despite growing attention to healthcare innovation, comprehensive research on what constitutes innovation readiness remains limited. Recent research has highlighted four key factors contributing to innovation readiness in healthcare organizations: strategic direction, organizational climate, leadership, and individual commitment, with *climate for innovation* receiving the most attention [8]. However, many studies overlook the interplay between these factors and tend to focus narrowly on the implementation phase, neglecting the broader innovation lifecycle. Other studies in various contexts similarly emphasize structured pathways and supportive environments as determinants of successful innovation [9].

Professional roles also influence innovation dynamics. Physicians often play a pivotal role in the innovation lifecycle by identifying unmet clinical needs, shaping device design through user input, ensuring safety and performance via assessment, and contributing to the economic and ethical evaluation of new technologies. Their clinical insight and contextual understanding are essential in early stages of innovation, making them indispensable for aligning health innovations with real-world patient care. For instance, a systematic review by Smith *et al.* showed how clinicians drive early health technology assessment in medical device innovation. Process frameworks such as stage-gate models and discussions on value-based decision making in HTA further contextualize how leadership and clinical input contribute to successful healthcare innovation.

In Kazakhstan, Health Technology Assessment (HTA) was introduced in 2009 as a tool to support evidence-based healthcare decision-making. Overseen by the National Scientific Center for Health Development and the Joint Commission on Quality under the Ministry of Health, HTA is used to assess the safety, clinical effectiveness, and cost-effectiveness of medical technologies. For example, Kulembekova *et al.* document how Kazakhstan's HTA framework involves stakeholders in evaluating new interventions. Between 2015 and 2017, HTA efforts in one Kazakhstani hospital led to the rejection of 17 ineffective technologies – saving over $1 million – and supported the adoption of 24 effective interventions. Kazakhstan has also adopted evidence-informed deliberative processes and multi-criteria decision analysis to improve transparency and stakeholder involvement in prioritizing health technologies as part of its push toward Universal Health Coverage [10].

3. Research methods. To carry out this study, we developed a comprehensive questionnaire tailored to assess perceptions of innovation, collaboration, and reflective team practices among healthcare professionals. The questionnaire was constructed based on relevant literature and validated by experts in healthcare management and medical education to ensure content validity.

It comprised three main components: (1) Perceptions of Innovation and Idea Generation, focusing on the extent to which individuals and teams propose and implement new ideas; (2) Collaboration, Knowledge Sharing, and Patient Engagement Structures, assessing

communication across departments and with patients; and (3) Team-Based Reflective Practices and Problem-Solving Approaches, exploring teamwork dynamics, critical reflection, and performance evaluation. A demographic (passport) section included age, experience, and leadership training.

The instrument was pilot tested with 10 staff members from a medical organization, using both Kazakh and Russian versions to ensure clarity and linguistic appropriateness. Based on feedback, wording and layout adjustments were made.

The study employed a cross-sectional design. Data were collected anonymously via an online Google Form from January to March 2025. Participation was voluntary, with informed consent obtained electronically at the start of the survey through a dedicated consent button. All doctors and nurses employed at the organization were invited to participate. While the facility employed 50 doctors and 50 nurses, a total of 361 participants responded, including 136 doctors and 225 nurses, reflecting a high level of engagement and ensuring representativeness.

Quantitative data analysis was conducted using SPSS (Statistical Package for the Social Sciences) and Microsoft Excel. Descriptive statistics were used to summarize demographic variables. Group comparisons between doctors and nurses were carried out using the chi-square test to assess statistically significant differences in categorical variables. A p-value of less than 0.05 was considered statistically significant.

4. Results. Doctors were significantly younger than nurses ($p = 0.014$), with more in the 20–30 age group, while nurses were more represented in older age brackets. Although doctors had slightly less experience, the difference was not statistically significant ($p = 0.066$). Leadership training rates were similar between groups, with no significant difference ($p = 0.286$), table 1.

Table 1.

Demographic and Professional Characteristics of Doctors and Nurses

		Doctor n (%)	Nurse n (%)	Total n (%)	p
Age	20-30	52(38.2)	77(34,2%)	129(35,7%)	0,014
	31-45	39(28.7)	71(31,6%)	110(30,5%)	
	46-60	35(25,7%)	74(32,9%)	109(30,2%)	
	over 60	10(7,4%)	3(1,3%)	13(3,6%)	
	Total	136(100,0%)	225(100,0%)	361(100,0%)	
Working experience	up to 5 years	57(41,9%)	76(33,8%)	133(36,8%)	0,066
	6-10	20(14,7%)	46(20,4%)	66(18,3%)	
	11-20	19(14,0%)	50(22,2%)	69(19,1%)	
	over 20	40(29,4%)	53(23,6%)	93(25,8%)	
Leadership training	No	91(66,9%)	138(61,3%)	229(63,4%)	0.286
	Yes	45(33,1%)	87(38,7%)	132(36,6%)	

Source: Compiled by the authors.

Statistically significant differences were observed between doctors and nurses in their responses to questions related to innovation and idea generation in the workplace. Nurses consistently reported higher levels of agreement with statements regarding the introduction of new ideas, the use of alternative methods, and personal and team innovation. A higher percentage of nurses than doctors agreed that team members frequently introduce new ideas to improve quality (31.1% vs. 25.0%, $p = 0.023$), consider alternative procedures ($p = 0.014$), and create new services or methods (31.6% vs. 13.2%, $p < 0.001$). Nurses were also more likely to perceive their teams as innovative ($p = 0.001$) and to generate new ideas ($p = 0.004$). Furthermore, nurses more frequently agreed that they actively seek out new working methods ($p = 0.007$), promote and support innovative thinking among colleagues ($p = 0.012$), and engage in research or fundraising to implement new ideas ($p = 0.033$). They also reported higher agreement in developing plans for implementing innovations ($p = 0.006$) and considered themselves more innovative overall ($p = 0.004$), table 2.

The survey revealed significant differences between doctors and nurses regarding collaboration, communication, and knowledge-sharing practices within the organization. A higher proportion of doctors (69.1%) than nurses (57.3%) reported that their organization has departments where colleagues from different departments can meet and learn from each other ($p = 0.026$). Similarly, 66.2% of doctors and 54.7% of nurses affirmed that there are spaces where patients and their representatives can meet with medical staff to receive necessary information ($p = 0.031$).

Table 2.

Perceptions of Innovation and Idea Generation Among Doctors and Nurses

		Doctor n (%)	Nurse n (%)	Total n (%)	p
Team members frequently introduce new ideas to improve the quality of our products and services	Disagree	34(25,0%)	34(15,1%)	68(18,8%)	0,023
	Somewhat disagree	14(10,3%)	48(21,3%)	62(17,2%)	
	Neither agree nor disagree	34(25,0%)	49(21,8%)	83(23,0%)	
	Somewhat agree	11(8,1%)	24(10,7%)	35(9,7%)	
	Agree	43(31,6%)	70(31,1%)	113(31,3%)	
The team considers new and alternative methods and procedures for doing their work.	Disagree	35(25,7%)	34(15,1%)	69(19,1%)	0,014
	Somewhat disagree	12(8,8%)	45(20,0%)	57(15,8%)	
	Neither agree nor disagree	35(25,7%)	50(22,2%)	85(23,5%)	
	Somewhat agree	13(9,6%)	26(11,6%)	39(10,8%)	
	Agree	41(30,1%)	70(31,1%)	111(30,7%)	
Team members often create new services, methods or procedures. .	Disagree	49(36,0%)	44(19,6%)	93(25,8%)	<0,001
	Somewhat disagree	24(17,6%)	39(17,3%)	63(17,5%)	
	Neither agree nor disagree	34(25,0%)	49(21,8%)	83(23,0%)	
	Somewhat agree	11(8,1%)	22(9,8%)	33(9,1%)	
	Agree	18(13,2%)	71(31,6%)	89(24,7%)	
Our team is innovative.	Disagree	52(38,2%)	45(20,0%)	97(26,9%)	0,001
	Somewhat disagree	21(15,4%)	38(16,9%)	59(16,3%)	
	Neither agree nor disagree	29(21,3%)	45(20,0%)	74(20,5%)	
	Somewhat agree	11(8,1%)	27(12,0%)	38(10,5%)	
	Agree	23(16,9%)	70(31,1%)	93(25,8%)	
Generate new ideas.	Disagree	43(31,6%)	41(18,2%)	84(23,3%)	0,004
	Somewhat disagree	28(20,6%)	45(20,0%)	73(20,2%)	
	Neither agree nor disagree	33(24,3%)	51(22,7%)	84(23,3%)	
	Somewhat agree	13(9,6%)	21(9,3%)	34(9,4%)	
	Agree	19(14,0%)	67(29,8%)	86(23,8%)	
Seek out new ways of working, techniques and ideas.	Disagree	38(27,9%)	36(16,0%)	74(20,5%)	0.007
	Somewhat disagree	26(19,1%)	42(18,7%)	68(18,8%)	
	Neither agree nor disagree	38(27,9%)	56(24,9%)	94(26,0%)	
	Somewhat agree	12(8,8%)	20(8,9%)	32(8,9%)	
	Agree	22(16,2%)	71(31,6%)	93(25,8%)	
Promote and support ideas, inspiring other hospital staff to come up with new ideas.	Disagree	41(30,1%)	46(20,4%)	87(24,1%)	0,012
	Somewhat disagree	27(19,9%)	39(17,3%)	66(18,3%)	
	Neither agree nor disagree	37(27,2%)	51(22,7%)	88(24,4%)	
	Somewhat agree	11(8,1%)	21(9,3%)	32(8,9%)	
	Agree	20(14,7%)	68(30,2%)	88(24,4%)	
Research and raise funds to implement new ideas.	Disagree	34(25,0%)	37(16,4%)	71(19,7%)	0,033
	Somewhat disagree	31(22,8%)	42(18,7%)	73(20,2%)	
	Neither agree nor disagree	35(25,7%)	51(22,7%)	86(23,8%)	
	Somewhat agree	11(8,1%)	23(10,2%)	34(9,4%)	
	Agree	25(18,4%)	72(32,0%)	97(26,9%)	
Develop adequate plans and schedules for the implementation of new ideas.	Disagree	55(40,4%)	56(24,9%)	111(30,7%)	0,006
	Somewhat disagree	31(22,8%)	51(22,7%)	82(22,7%)	
	Neither agree nor disagree	24(17,6%)	47(20,9%)	71(19,7%)	

	Somewhat agree	3(2,2%)	20(8,9%)	23(6,4%)	
	Agree	23(16,9%)	51(22,7%)	74(20,5%)	
Are innovative employees.	Disagree	54(39,7%)	53(23,6%)	107(29,6%)	0.004
	Somewhat disagree	33(24,3%)	51(22,7%)	84(23,3%)	
	Neither agree nor disagree	25(18,4%)	52(23,1%)	77(21,3%)	
	Somewhat agree	4(2,9%)	21(9,3%)	25(6,9%)	
	Agree	20(14,7%)	48(21,3%)	68(18,8%)	

Source: Compiled by the authors.

More notably, 76.5% of doctors stated that the organization offers patient forums or peer-support spaces where patients can exchange experiences and information, compared to only 53.8% of nurses ($p < 0.001$). Doctors also reported more frequent knowledge sharing with colleagues (69.1% vs. 53.8%, $p = 0.004$) and more consistent discussions with team members about important work-related topics (70.6% vs. 59.1%, $p = 0.028$).

When examining team dynamics, a greater proportion of doctors (79.4%) than nurses (63.6%) reported that their teams discuss criteria for effective functioning ($p = 0.002$). Furthermore, 88.2% of doctors compared to 64.0% of nurses indicated that their teams regularly discuss problems to improve ($p < 0.001$). Discussions about individual developments were also more common among doctors (79.4%) than nurses (59.1%, $p < 0.001$). These findings highlight the need to strengthen interdisciplinary communication and knowledge-sharing culture among nursing staff to foster a more collaborative environment, table 3.

Table 3.

Collaboration, Knowledge Sharing and Patient Engagement Structures in Healthcare Settings: Perceptions by Doctors and Nurses

		Doctor n (%)	Nurse n (%)	Total n (%)	p
Our organization has departments where colleagues from other departments and divisions can meet and learn from each other	Yes	94(69,1%)	129(57,3%)	223(61,8%)	0,026
	No	42(30,9%)	96(42,7%)	138(38,2%)	
Our organization has departments where patients and their representatives can meet and get the necessary information between medical staff	Yes	90(66,2%)	123(54,7%)	213(59,0%)	0.031
	No	46(33,8%)	102(45,3%)	148(41,0%)	
Our organization has departments or patient forums or where patients and their representatives can meet and get the necessary information from other patients (their treatment experience and other)	Yes	104(76,5%)	121(53,8%)	225(62,3%)	<0.001
	No	32(23,5%)	104(46,2%)	136(37,7%)	
I regularly share my knowledge and experience with my team members/colleagues	Yes	94(69,1%)	121(53,8%)	215(59,6%)	0.004
	No	42(30,9%)	104(46,2%)	146(40,4%)	
I discuss with my team members/colleagues what I think is important in my work	Yes	96(70,6%)	133(59,1%)	229(63,4%)	0.028
	No	40(29,4%)	92(40,9%)	132(36,6%)	
As a team, we discuss our criteria for effective functioning.	Yes	108(79,4%)	143(63,6%)	251(69,5%)	0.002
	No	28(20,6%)	82(36,4%)	110(30,5%)	
We discuss problems in our team to learn and improve.	Yes	120(88,2%)	144(64,0%)	264(73,1%)	<0.001
	No	16(11,8%)	81(36,0%)	97(26,9%)	
I discuss my developments with my team members/colleagues	Yes	108(79,4%)	133(59,1%)	241(66,8%)	<0.001
	No	28(20,6%)	92(40,9%)	120(33,2%)	

Source: Compiled by the authors.

The analysis revealed notable differences between doctors and nurses regarding team-based reflective practices and problem-solving behaviors. A significantly higher proportion of doctors (71.3%) compared to nurses (56.9%) reported that their teams consistently seek different interpretations and points of view to solve problems ($p = 0.006$). Likewise, more doctors (75.0%) than nurses (64.0%) indicated that team members regularly critique each other's work to improve performance ($p = 0.030$).

Reflection on team behavior was also more frequently reported by doctors, with 77.9% affirming that their teams are willing to reflect on how they act, compared to 65.3% of nurses ($p = 0.011$). A significant gap was observed in the evaluation of team weaknesses, where 82.4% of doctors and only 56.9% of nurses reported engaging in this practice ($p < 0.001$). Additionally, 84.6% of doctors said that they openly challenge each other's opinions during teamwork, as opposed to 64.9% of nurses ($p < 0.001$). Finally, the tendency to reconsider proposed solutions was more common among doctors (75.7%) than nurses (64.0%), with the difference being statistically significant ($p = 0.020$), table 4.

Table 4.

Team-Based Reflective Practices and Problem-Solving Approaches Among Doctors and Nurses

		Doctor n (%)	Nurse n (%)		
In a team, we always look for different interpretations and points of view to solve a problem	Yes	97(71,3%)	128(56,9%)	225(62,3%)	0.006
	No	39(28,7%)	97(43,1%)	136(37,7%)	
In a team, we criticize each other's work to improve the team's performance.	Yes	102(75,0%)	144(64,0%)	246(68,1%)	0.030
	No	34(25,0%)	81(36,0%)	115(31,9%)	
In a team, we are willing to reflect on how we act	Yes	106(77,9%)	147(65,3%)	253(70,1%)	0.011
	No	30(22,1%)	78(34,7%)	108(29,9%)	
In a team, we evaluate our weaknesses to achieve effectiveness	Yes	112(82,4%)	128(56,9%)	240(66,5%)	<0.001
	No	24(17,6%)	97(43,1%)	121(33,5%)	
In a team, we openly challenge each other's opinions	Yes	115(84,6%)	146(64,9%)	261(72,3%)	<0.001
	No	21(15,4%)	79(35,1%)	100(27,7%)	
In a team, we reconsider any proposed solution	Yes	103(75,7%)	144(64,0%)	247(68,4%)	0.020
	No	33(24,3%)	81(36,0%)	114(31,6%)	

Source: Compiled by the authors.

5. Discussion. Our findings support existing research on the link between diversity climate, job crafting, and innovation, particularly in healthcare. Nurses exhibited a stronger orientation toward innovation than doctors, potentially due to a more supportive and equitable diversity climate. This aligns with previous studies, which found that nurses are more innovative when they feel valued in a diverse environment [11]. The role of job crafting and knowledge sharing on the effect of transformational leadership on innovative work behavior. Other researches shows that the Integrated Innovation & Entrepreneurship Certificate in Nursing Program aims to empower nurses to lead the design and development of health care innovations by fostering interdisciplinary collaboration, hands-on experience, and a focus on diversity, inclusion, and equity. The Elaine Marieb Center for Nursing and Engineering Innovation plays a pivotal role in supporting this initiative by providing infrastructure for students to collaborate across disciplines, designing and testing new health care products, services, and delivery systems [12].

Overall, our results emphasize that fostering an inclusive work culture can drive innovation, particularly among nursing teams who are closely involved with patient care. A strong positive correlation was found between nurse-physician collaboration and perceived healthcare service quality. Promoting interprofessional collaboration can enhance the overall quality of patient care [13]. Additionally, systematic review synthesizes over 20 years of empirical research on the role of teamwork in implementing new practices in health and human services, examining both qualitative and quantitative studies. The review highlights key factors such as staffing shortages, adaptive team functioning, and effective communication that significantly impact implementation outcomes. Teams with positive affective states, shared cognitive states, and effective behavior processes facilitate successful implementation, while negative team dynamics serve as barriers. It was found that job demands, control, and social support significantly influence physicians' orientation toward lifelong learning, our study similarly found that doctors are

more likely to engage in critical evaluation, open dialogue, and reflective team practices - all essential components of effective team learning and continuous improvement. Doctors in our sample also reported more opportunities for interdepartmental collaboration and knowledge sharing, underscoring their active role in shaping a culture of continuous professional development. In contrast, nurses in our study perceived fewer structured spaces for interdepartmental interaction or avenues for patient feedback, indicating a gap in support for collaborative learning and feedback-based improvement in nursing practice. Three types of interventions were identified in the broader literature to enhance team functioning: Training, including principle-based programs simulation-based methods, and general team training; Tools, such as SBAR protocols, checklists, debriefings, and communication technologies to structure and facilitate teamwork; and Organizational (re)design, involving structural changes that stimulate effective team processes. Comprehensive programs that combine these strategies show the greatest potential, especially in acute care settings, where improving non-technical skills—such as communication, leadership, and coordination - is critical.

These findings align with our study, which highlights the importance of creating systems and supports that promote reflective practices and open dialogue, particularly among physicians. Additionally, while a review of literature on team-based healthcare revealed that critical reflection is rarely labeled as such, many studies exhibit its elements—especially through challenging power hierarchies and questioning practice norms via open dialogue. This kind of reflection enables collaborative practice and innovation, pushing boundaries through shared knowledge and purpose. However, to be truly effective, such practices require a deliberate environment where reflection and dialogue are encouraged and structurally supported.

Our study supports this need for purposefully designed reflective spaces, as we observed that physicians are more likely than nurses to engage in team-based dialogue and challenge one another's perspectives to improve outcomes. Therefore, to support equitable care and foster high-functioning teams, we recommend intentionally integrating opportunities for critical reflection and interprofessional dialogue across all levels of health care teams, especially by including nurses more actively in these spaces.

6. Implications. For healthcare administrators and policymakers, several practical implications arise from this study. First, there is a clear need to develop inclusive, accessible, and relevant training programs for all healthcare professionals – especially nurses – to ensure equitable access to continuing professional development. Strengthening training will enhance competencies in the use of new medical technologies across the workforce. Second, hospital managers should foster interdisciplinary collaboration and communication. Our findings showed that nurses are open to task-sharing in technology use, indicating that teamwork between physicians, nurses, and mid-level providers can facilitate smoother implementation of innovations. Third, addressing systemic integration challenges is crucial. This includes allocating resources to alleviate equipment shortages and ensuring sufficient technical support and training during technology rollouts. By proactively mitigating these barriers, healthcare organizations can improve the success rate of new technology adoption. Additionally, emphasizing evidence-based practice (EBP) training for nurses and mid-level staff will help standardize patient care and ensure that technological innovations are used optimally and safely across all roles. In summary, investing in human capital (through training and education) and promoting a collaborative culture are key steps to translating technological advancements into improved clinical practice.

7. Limitation and future steps. While this study offers valuable insights into the differences in innovation, collaboration, and reflective team practices between doctors and nurses, several limitations must be acknowledged. First, the cross-sectional design captures perceptions at a single point in time, limiting the ability to infer causality. Longitudinal studies would be better suited to assess how organizational changes or targeted training interventions influence these perceptions over time. Second, although the sample size was large and demonstrated strong engagement, the self-reported nature of the data may introduce social desirability bias—particularly in questions concerning teamwork and reflective behaviors. Future research should consider complementing quantitative methods with cognitive interviews or qualitative approaches to gain deeper insights into how innovation, collaboration, and reflection are understood and enacted across different healthcare roles.

From a policy perspective, the findings highlight the need for targeted support and structural interventions, particularly to enhance innovation and collaboration among nursing teams. Although nurses demonstrated high innovation potential, they reported fewer opportunities for interdepartmental collaboration, patient feedback, and team-based reflection - all of which are essential for fostering sustainable innovation and continuous learning. To address these gaps, healthcare organizations should: Expand cross-disciplinary forums and patient engagement platforms, ensuring equitable access for all professional groups; Implement structured reflective practices, such as regular debriefings and interprofessional team rounds, with particular focus on nursing teams; Provide tailored leadership and innovation training, cultivating a culture of inquiry, experimentation, and shared problem-solving; Adopt validated tools like SBAR, Team STEPPS, and simulation-based training to strengthen non-technical skills and enhance team performance.

Finally, critical reflection should be embedded as a foundational component of collaborative healthcare practice - not just as a learning tool, but as part of routine operations and team performance evaluation. Achieving this will require cultural change, supportive policies, and sustained leadership commitment to ensure psychological safety across all levels of the organization. Only in such an environment can all healthcare professionals—regardless of role or hierarchy - fully engage in open dialogue, challenge assumptions, and innovate together.

8. Conclusion. The significant differences between doctors and nurses in areas of innovation, collaboration, and team dynamics were identifies. Doctors tend to engage more in reflective practices, critical discussions, and problem-solving within their teams, while nurses report higher levels of innovation and idea generation. The findings suggest a need for enhanced interdisciplinary communication and knowledge-sharing, particularly among nursing staff, to foster a more collaborative work environment. Moreover, nurses may benefit from increased opportunities for innovation and critical reflection, as these practices are linked to improved patient safety and service quality. Future efforts should focus on creating more collaborative platforms for all healthcare professionals, encouraging innovation across roles, and strengthening reflective team practices. Training programs aimed at enhancing these skills, alongside strategies for improving interdepartmental interactions, could help bridge the gaps between doctors and nurses, ultimately leading to improved patient care and organizational performance.

In sum, promoting innovation in healthcare through these targeted strategies will not only improve service quality and streamline operations but also foster greater patient satisfaction. In the long run, successfully integrating new health technologies can lead to better healthcare outcomes for patients and more sustainable performance for hospitals in Kazakhstan.

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