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INFECTION CONTROL IN THE MATERNITY CARE SYSTEM: ASSESSMENT OF RESOURCE AVAILABILITY, HUMAN CAPACITY AND PROFESSIONAL DEVELOPMENT

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Abstract

Background and Objectives. Infection safety in obstetric institutions is a critical component of the medical care quality and safety assurance system. **This study aims** to provide a comprehensive assessment of factors that may influence infection safety in obstetric settings, including the level of technical and pharmaceutical equipment, staff satisfaction with working conditions, interprofessional collaboration, and access to professional development opportunities.

Materials and Methods. A cross-sectional study was conducted from January 20 to February 20, 2025, involving 255 healthcare professionals working in obstetric institutions in Astana, Semey, and Kokshetau. Data was collected using Google Forms online platform. The sample included physicians and nursing personnel, along with professionals in medical rehabilitation, clinical diagnostics, administration, pharmacy, and related specialties.

Results. The study involved 255 health workers from obstetric facilities, including doctors 14.9% (N=38), nurses 73.3% (N=187), as well as medical rehabilitation specialists, clinical diagnostic workers, administrative and management staff, pharmacists and other specialists 11.8% (N=30).Among nursing staff, 78.7% (N=118) positively assessed the facility's equipment, while among physicians this indicator was only 11.3% (N=17)($p = 0.001$).A similar trend was observed in satisfaction with drug availability: 80.4% (N=123) of nurses versus 9.8% (N=15) of doctors ($p = 0.009$). Satisfaction with departmental staffing was reported by 74.2% (N=112) of nursing staff and only 13.2% (N=20) of doctors ($p = 0.07$). Laboratory diagnostics were considered accessible by 78.3% of nurses, compared to 10.2% of doctors ($p = 0.001$). Regarding specialist consultations (e.g., cardiologist, endocrinologist), 76.3% (N=129) of nurses were satisfied versus 14.2% (N=24) of doctors ($p < 0.0001$). While 11.6% (N=5) of doctors reported occasional misunderstandings with nursing staff, no statistically significant differences were observed in interprofessional communication ($p = 0.66$). Access to training and continuing education was satisfactory for 79.9% (N=123) of nursing staff but only 8.4% (N=13) of doctors ($p = 0.001$).

Conclusion. Significant differences were found between physicians and nursing staff in their perceptions of working conditions and infection safety factors. The most critically assessed areas included technical equipment, access to diagnostics, and opportunities for professional growth. The findings underscore the need for management decisions aimed at improving resources and expanding professional development programmes for health workers in obstetric facilities.

Key words: satisfaction, risk, infection safety, maternity care organization.

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Резюме

ИНФЕКЦИОННАЯ БЕЗОПАСНОСТЬ В СИСТЕМЕ РОДОВСПОМОЖЕНИЯ: ОЦЕНКА ОБЕСПЕЧЕННОСТИ РЕСУРСАМИ, КАДРОВОГО ПОТЕНЦИАЛА И ПРОФЕССИОНАЛЬНОГО РАЗВИТИЯ

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Актуальность. Инфекционная безопасность в организациях родовспоможения является важнейшей составляющей системы обеспечения качества и безопасности медицинской помощи. **Целью настоящего исследования** является комплексная оценка факторов, потенциально влияющих на уровень инфекционной безопасности в организациях родовспоможения, включая степень технической и медикаментозной оснащённости, удовлетворённость персонала условиями труда, уровень межпрофессионального взаимодействия и доступность возможностей профессионального развития.

Материалы и методы. Проведено поперечное исследование среди 255 медицинских работников организации включая врачей и медсестер организаций родовспоможения г. Астана, г. Семей, г. Кокшетау посредством программного сервиса Google Forms. Исследование проводилось в период с 20 января по 20 февраля 2025 года.

Результаты. В исследовании приняли участие 255 медицинских работников из организаций родовспоможения, включая врачей 14,9% (N=38), средний медицинский персонал 73,3% (N=187), а также специалистов по медицинской реабилитации, клинико-диагностических работников, административно-управленческий персонал, фармацевтов и прочих специалистов 11,8% (N=30). Средний медицинский персонал положительно оценили оснащённость учреждения 78,7% (N=118), в то время как среди врачей этот показатель составил лишь 11,3% (N=17) (p = 0,001). Аналогичная тенденция прослеживалась в оценке лекарственного обеспечения: удовлетворены наличием необходимых препаратов 80,4% (N=123) среднего персонала и только 9,8% (N=15) врачей (p = 0,009). Удовлетворённость укомплектованностью отделений профильными специалистами (акушер-гинекологами, акушерками, медицинскими сестрами) выразили 74,2% (N=112) среднего персонала и лишь 13,2% (N=20) врачей (p = 0,07). Доступ к лабораторной диагностике был оценён положительно 78,3% среднего медицинского персонала и только 10,2% врачей (p = 0,001). Удовлетворённость доступностью консультаций узких специалистов (кардиолог, эндокринолог и других) отметили 76,3% (N=129) среднего персонала и лишь 14,2% (N=24) врачей (p<0,0001). Наличие эпизодов недопонимания между врачами и средним медицинским персоналом указали 11,6% (N=5) врачей, однако статистически значимых различий между профессиональными группами не выявлено (p = 0,66). Доступ к обучающим мероприятиям и тренингам был удовлетворительным для 79,9% (N=123) среднего медицинского персонала и только 8,4% (N=13) врачей (p = 0,001).

Выводы. Установлены значимые различия в оценке условий труда и факторов инфекционной безопасности между врачами и средним медицинским персоналом. Наиболее критично респонденты оценивали оснащённость, доступ к диагностике и возможности профессионального роста. Полученные данные подчеркивают необходимость управленческих решений, направленных на улучшение ресурсного обеспечения и расширение программ повышения квалификации для медицинских работников родовспомогательных учреждений.

Ключевые слова: *удовлетворенность, риск, инфекционная безопасность, организация родовспоможения.*

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Түйіндеме

БОСАНДЫРУ ҰЙЫМДАРЫНДАҒЫ ИНФЕКЦИЯЛЫҚ ҚАУІПСІЗДІК ЖҮЙЕСІ: РЕСУРСТЫҚ ҚАМТАМАСЫЗ ЕТІЛУІ, КАДРЛЫҚ ӘЛЕУЕТІ ЖӘНЕ КӘСІБИ ДАМУ ДЕҢГЕЙІН БАҒАЛАУ

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Кіріспе. Босандыру ұйымдарындағы инфекциялық қауіпсіздік – медициналық көмектің сапасы мен қауіпсіздігін қамтамасыз ету жүйесінің маңызды құрамдас бөлігі болып табылады. **Осы зерттеудің мақсаты** – босандыру ұйымдарындағы инфекциялық қауіпсіздік деңгейіне ықпал етуі мүмкін факторларды кешенді түрде бағалау. Оған техникалық және медикаментоздық жабдықталу деңгейі, персоналдың еңбек жағдайларына қанағаттануы, кәсіби топтар арасындағы өзара әрекеттесу деңгейі және кәсіби дамуға қолжетімділік сияқты аспектілер кіреді.

Материалдар мен әдістері: 2025 жылғы 20 қаңтар мен 20 ақпан аралығында Астана, Семей және Көкшетау қалаларындағы босандыру ұйымдарының дәрігерлері мен медбикелерін қоса алғанда, 255 медицина қызметкерінің қатысуымен көлденең зерттеу жүргізілді. Зерттеу Google Forms бағдарламалық сервисі арқылы жүзеге асырылды.

Нәтижелер: Зерттеуге босандыру ұйымдарының 255 медицина қызметкері қатысты, олардың ішінде дәрігерлер – 14,9% (N=38), орта медициналық персонал – 73,3% (N=187), сондай-ақ медициналық оңалту мамандары, клинико-диагностикалық қызметкерлер, әкімшілік-басқару персоналы, фармацевтер және басқа да мамандар – 11,8% (N=30) құрады.Орта медициналық персоналдың 78,7%-ы (N=118) мекеменің жабдықталуын оң бағаласа, дәрігерлер арасында бұл көрсеткіш тек 11,3% (N=17) болды (p = 0,001).Дәрілік қамтамасыз етуге баға беру де ұқсас үрдісті көрсетті: қажетті дәрілік заттардың жеткіліктілігіне орта медициналық персоналдың 80,4%-ы (N=123) қанағаттанғанын білдірсе, дәрігерлер арасында бұл көрсеткіш небәрі 9,8% (N=15) болды (p = 0,009).Профильді мамандармен (акушер-гинекологтар, акушерлер, мейірбикелер) бөлімшелердің жасақталуына 74,2% (N=112) орта медициналық персонал және 13,2% (N=20) дәрігер қанағаттанғанын көрсетті (p = 0,07).Зертханалық диагностикаға қолжетімділікке орта медициналық қызметкерлердің 78,3%-ы оң баға берсе, дәрігерлер арасында бұл көрсеткіш 10,2%-ды құрады (p = 0,001). Тар бейінді мамандардың (кардиолог, эндокринолог және т.б.) консультацияларына қолжетімділікке 76,3% (N=129) орта медициналық персонал және тек 14,2% (N=24) дәрігер қанағаттанғанын көрсетті (p<0,0001). Дәрігерлер мен орта медициналық қызметкерлер арасындағы өзара түсініспеушілік жағдайларының болуын дәрігерлердің 11,6%-ы (N=5) атап өтті, алайда кәсіби топтар арасында статистикалық тұрғыдан елеулі айырмашылық анықталған жоқ (p = 0,66). Оқу іс-шаралары мен тренингтерге қолжетімділік орта медициналық қызметкерлердің 79,9%-ы (N=123) үшін жеткілікті деп танылса, дәрігерлер арасында бұл көрсеткіш небәрі 8,4% (N=13) болды (p = 0,001).

Қорытындылар: Дәрігерлер мен орта медициналық персонал арасында еңбек жағдайлары мен инфекциялық қауіпсіздік факторларын бағалауда елеулі айырмашылықтар анықталды. Респонденттер ең көп сын айтқан аспектілер – мекемелердің жабдықталуы, диагностикалық қызметтерге қолжетімділік және кәсіби өсу мүмкіндіктері болды. Алынған деректер босандыру ұйымдарындағы медицина қызметкерлері үшін ресурстық қамтамасыз етуді жақсарту және біліктілікті арттыру бағдарламаларын кеңейтуге бағытталған басқарушылық шешімдердің қажеттілігін айқындайды.

Түйін сөздер: *қанағаттанушылық, қауіп-қатер, инфекциялық қауіпсіздік, босандыру ұйымы.*

Дәйексөз үшін:

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Introduction

Infection control in maternity care facilities is critical to healthcare quality and patient safety systems. The risk of healthcare-associated infections (HAIs) in obstetric and gynecological practice arises from both the heightened vulnerability of pregnant women, newborns, and parturient women, and the inherently invasive nature of numerous diagnostic and therapeutic procedures, including surgical deliveries, catheterization, and injectable therapies. According to estimates by the World Health Organization (WHO), up to 15% of women receiving care in maternity institutions experience some form of infectious complications, the majority of which could be prevented with adequate organizational resources and appropriate staff qualifications [1,2].

Among the most significant factors influencing the risk of HAIs in perinatal settings are the technical and pharmaceutical infrastructure levels, the availability and sufficiency of qualified personnel, adherence to sanitary and epidemiological protocols, and access to educational programs and infection control training.[3-5] Shortages in essential equipment (e.g., ultrasound machines, suction devices, sterile medical instruments), limited availability of antibiotics, and insufficient resources for emergency obstetric care considerably compromise the facility's capacity to respond promptly and effectively to infectious threats [6].

In addition, one of the most critical organizational factors influencing infection control remains the human resource capacity. A shortage of obstetrician-gynecologists, trained midwives, and nursing staff contributes to personnel overload, diminished adherence to infection control protocols, and an increased likelihood of medical errors [7]. Furthermore, low job satisfaction, limited opportunities for professional development, and insufficient interdisciplinary collaboration between physicians and mid-level healthcare personnel may also exacerbate risks associated with breaches in hygiene standards and patient safety regulations [8].

Despite the recognized importance of this issue, there is a lack of empirically grounded evidence in the national scientific literature regarding the relationship between infrastructure, human and educational resources, and infection control risks in maternity care institutions. This highlights the need for a comprehensive assessment of organizational and resource-related factors as perceived by healthcare personnel—factors that directly impact the implementation of infection control standards.

The objective of the present study is to conduct a comprehensive evaluation of factors potentially influencing the level of infection safety in maternity care facilities, including the availability and sufficiency of technical equipment and pharmaceutical supplies, staff satisfaction with working conditions, the degree of interprofessional collaboration, and access to professional development opportunities.

Materials and Methods

The study involved 255 healthcare professionals, including physicians and nurses, working in maternity care institutions in Astana, Semey, and Kokshetau. An observational, descriptive, cross-sectional study was conducted using an anonymous survey administered through Google Forms platform.

The research was carried out from January 20 to February 20, 2025. Participation in the survey was voluntary. Before data collection, informed consent was obtained from all participants. Respondents were assured that their involvement would not entail any negative consequences, that all responses would remain anonymous and be used exclusively for research purposes, and that confidentiality would be strictly maintained.

Incomplete responses were excluded from the analysis. The questionnaire was available in both Kazakh and Russian languages and was culturally and linguistically adapted by international standards. It was validated on a separate group of 25 healthcare professionals who did not take part in the main survey.

During validation, the instrument's reliability, validity, and sensitivity were assessed. Internal consistency was evaluated using Cronbach's alpha coefficient. The questionnaire demonstrated high internal reliability (Cronbach's $\alpha > 0.7$), indicating an acceptable level of consistency across the instrument's scales.

The questionnaire consisted of 23 items divided into two sections. The first section addressed demographic characteristics, including age, gender, work experience, level of education, and participation in relevant training programs. The second section focused on various aspects of medical care delivery.

Participants' professional positions were categorized into seven groups: physicians, nursing and mid-level medical staff, rehabilitation specialists, clinical and diagnostic personnel, administrative and managerial staff, pharmaceutical personnel, and specialists from other fields.

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and was approved by the Ethics Committee of Astana Medical University (Protocol No. 10, dated November 26, 2024). Written informed consent was obtained from all participants prior to their inclusion in the study.

Statistical Analysis

Means and standard deviations (SD) were used to describe quantitative variables, while absolute (N) and relative (%) frequencies were used for qualitative variables. Pearson's chi-square (χ^2) test or Fisher's exact test, where applicable, was employed for proportion comparisons. Significance levels were two-tailed, with statistical significance set at $p < 0.05$. Statistical analyses were performed using SPSS version 24.0.

Results

A total of 255 healthcare professionals from maternity care institutions participated in the study. Among them, 14.9% (N=38) were physicians, 73.3% (N=187) were nursing and mid-level medical staff, and 11.8% (N=30) represented other professional groups, including medical rehabilitation specialists, clinical and diagnostic personnel, administrative and managerial staff, pharmaceutical staff, and specialists from other fields. A cross-tabulation table presented data on participants' age, gender, workplace, and professional categories (Table 1).

Women accounted for 93.7% (N=239) of the total sample. The majority of nursing and mid-level medical staff belonged to the 45–60 age group (81.7%), suggesting an aging workforce and a potential need for future

replacement. In contrast, the physician group was predominantly represented by individuals aged 25–44 years, indicating a younger age structure among doctors compared to nursing staff.

The educational background of respondents varied: among nursing and mid-level personnel, secondary specialized education predominated (85.1%), whereas the majority of physicians held higher or postgraduate degrees (34.5%). These differences in educational attainment between professional categories were statistically significant ($p < 0.0001$), highlighting functional differentiation based on qualification levels.

Table 1.

Association between socio-demographic characteristics and professional categories of respondents.

Variables	Professional Category							p
	Physicians abs. (%)	Nursing and mid-level medical staff abs. (%)	Rehabilitation specialists abs. (%)	Clinical and diagnostic personnel abs. (%)	Administrative and managerial staff abs. (%)	Pharmaceutical personnel abs. (%)	Specialists from other fields abs. (%)	
Age								
18-24 years	3 (13%)	14 (60,9%)	3 (13%)	1 (4,3%)	0	1 (4,3%)	1 (4,3%)	0,11
25-34 years	10 (19,2%)	36 (69,2%)	2 (3,8%)	2 (3,8%)	1 (1,9%)	1(1,9%)	0	
34-44 years	15 (21,1%)	48 (67,6%)	1 (1,4%)	1 (1,4%)	5 (7%)	0	1 (1,4%)	
45-60 years	10 (9,2%)	89 (81,7%)	2 (1,8%)	2 (1,8%)	3 (2,8%)	2 (1,8%)	1 (0,9%)	
Gender								
Female	31(13%)	182 (76,2%)	7 (2,9%)	6 (2,5%)	6 (2,5%)	4 (1,7%)	3 (1,3%)	<0,0001
Male	7 (43,8%)	5 (31,3%)	1 (6,3%)	0	3 (18,8%)	0	0	
Education								
Secondary specialized	7 (4,2%)	143 (85,1%)	7 (4,2%)	6 (3,6%)	1 (0,6%)	3 (1,8%)	1 (0,6%)	<0,0001
Higher education	29 (34,5%)	44 (52,4%)	1 (1,2%)	0	8 (9,5%)	1 (1,2%)	1 (1,2%)	
Master's degree	1 (50%)	0	0	0	0	0	1 (50%)	
Doctoral degree	1 (100%)	0	0	0	0	0	0	

The data analysis revealed statistically significant differences in job satisfaction across professional categories. These differences related to several key aspects, including availability of equipment and pharmaceuticals, staffing levels, access to diagnostic and consultative services, and opportunities for professional development (Table 2).

Assessment of satisfaction with the availability of basic medical equipment (such as ultrasound machines, cardiotocographs, etc.) revealed statistically significant differences between professional groups. Among nursing and mid-level staff, 78.7% (N=118) rated the equipment provision positively, whereas only 11.3% (N=17) of physicians shared this view ($p = 0.001$). A similar trend was observed in the evaluation of pharmaceutical supplies: 80.4% (N=123) of mid-level staff expressed satisfaction with the availability of necessary medications, compared to just 9.8% (N=15) of physicians ($p = 0.009$). These findings suggest that physicians adopt a more critical stance toward the adequacy of clinical resources.

Regarding satisfaction with staffing levels of key specialists (including obstetrician-gynecologists, midwives, and nurses), 74.2% (N=112) of nursing and mid-level personnel reported satisfaction, while only 13.2% (N=20) of physicians did so. Although this difference did not reach statistical significance ($p = 0.07$), a clear trend was noted indicating that physicians more frequently perceive staffing shortages as a major issue.

Access to laboratory diagnostics was rated positively by 78.3% of mid-level personnel, compared to only 10.2% of physicians ($p = 0.001$). Similar discrepancies were observed in assessments of instrumental diagnostics (such as ultrasound and radiographic imaging), with 76.9% of nursing and mid-level staff expressing satisfaction, versus just 12.6% of physicians ($p < 0.0001$). These results demonstrate a pronounced divergence in the perception of diagnostic service availability across professional categories.

Satisfaction with access to consultations from specialized medical professionals (e.g., cardiologists, endocrinologists) was reported by 76.3% (N=129) of nursing and mid-level staff, compared to only 14.2% (N=24) of physicians ($p < 0.0001$). Similarly, statistically significant differences were observed regarding the availability of medical devices and supplies: 76.4% (N=120) of mid-level personnel expressed satisfaction, whereas only 13.4% (N=21) of physicians did so ($p = 0.009$). These findings suggest that physicians more frequently report shortages in both human and technical resources required for the provision of comprehensive obstetric care.

Episodes of miscommunication between physicians and mid-level staff were noted by 11.6% (N=5) of physicians; however, no statistically significant differences between professional groups were found ($p = 0.66$). Difficulties encountered during patient consultations were more frequently reported by physicians (18.4%, N=7); nevertheless, the differences between professional categories did not reach statistical significance ($p = 0.8$).

Table 2

Assessment of satisfaction with infrastructure, staffing, diagnostic services, and continuing education by professional category.

Variables	Professional Category							p
	Physicians abs. (%)	Nursing and mid-level medical staff abs. (%)	Rehabilitation specialists abs. (%)	Clinical and diagnostic personnel abs. (%)	Administrative and managerial staff abs. (%)	Pharmaceutical personnel abs. (%)	Specialists from other fields abs. (%)	
1	2	3	4	5	6	7	8	6
How would you assess the medical equipment available in your facility? (e.g., ultrasound machine, fetal CTG monitor, etc.)								
Satisfied	17 (11,3%)	118 (78,7%)	1 (0,7%)	6 (4%)	3 (2%)	3 (2%)	2 (1,3%)	0,001
Somewhat satisfied	16 (28,1%)	35 (61,4%)	1 (1,8%)	0	5 (8,8%)	0	0	
Undecided	4 (11,8%)	23 (67,6%)	5 (14,7%)	0	0	1 (2,9%)	1 (2,9%)	
Not satisfied	1 (7,1%)	11 (78,6%)	1 (7,1%)	0	1 (7,1%)	0	0	
How satisfied are you with the availability of pharmaceutical supplies in your facility? (e.g., antibiotics, oxytocin, misoprostol tablets, PABAL ampoules, etc.)								
Satisfied	15 (9,8%)	123 (80,4%)	2 (1,3%)	3 (2%)	5 (3,3%)	3 (2%)	2 (1,3%)	0,009
Somewhat satisfied	12 (29,3%)	27 (65,9%)	0	1 (2,4%)	1 (2,4%)	0	0	
Undecided	5 (11,1%)	30 (66,7%)	4 (8,9%)	1 (2,2%)	3 (6,7%)	1 (2,2%)	1 (2,2%)	
Not satisfied	6 (37,5%)	7 (43,8%)	2 (12,5%)	1 (6,3%)	0	0	0	
How satisfied are you with the staffing levels in your department? (e.g., obstetricians-gynecologists, midwives, nurses)								
Satisfied	20 (13,2%)	112 (74,2%)	2 (1,3%)	4 (2,6%)	8 (5,3%)	3 (2%)	2 (1,3%)	0,07
Somewhat satisfied	13 (22%)	41 (69,5%)	1 (1,7%)	2 (3,4%)	1 (1,7%)	0	1 (1,7%)	
Undecided	1 (3,1%)	26 (81,3%)	4 (12,5%)	0	0	1(3,1%)	0	
Not satisfied	4 (30,8%)	8 (61,5%)	1 (7,7%)	0	0	0	0	
How satisfied are you with the implementation of laboratory diagnostic procedures?								
Satisfied	17 (10,2%)	130 (78,3%)	2 (1,2%)	6 (3,6%)	6 (3,6%)	3 (1,8%)	2 (1,2%)	0,001
Somewhat satisfied	13 (27,1%)	33 (68,8%)	0	0	1 (2,1%)	0	1 (2,1%)	
Undecided	4 (12,9%)	20 (64,5%)	5 (16,1%)	0	1 (3,2%)	1 (3,2%)	0	
Not satisfied	4 (40%)	4 (40%)	1 (10%)	0	1 (10%)	0	0	
How satisfied are you with the implementation of instrumental diagnostic procedures? (e.g., radiographic, ultrasound)								
Satisfied	23 (12,6%)	140 (76,9%)	2 (1,1%)	5 (2,7%)	7 (3,8%)	3 (1,6%)	2 (1,1%)	<0,0001
Somewhat satisfied	10 (22,2%)	31 (68,9%)	0	1 (2,2%)	2 (4,4%)	0	1 (2,2%)	
Undecided	0	13 (68,4%)	5 (26,3%)	0	0	1 (5,3%)	0	
Not satisfied	5 (55,6%)	3 (33,3%)	1 (11,1%)	0	0	0	0	
How satisfied are you with the availability of consultations by specialized medical professionals?								
Satisfied	24 (14,2%)	129 (76,3%)	2 (1,2%)	4 (2,4%)	5 (3%)	3 (1,8%)	2 (1,2%)	<0,0001
Somewhat satisfied	8 (19%)	27 (64,3%)	0	2 (4,8%)	4 (9,5%)	0	1 (2,4%)	
Undecided	2 (5,4%)	30 (81,1%)	4 (10,8%)	0	0	1 (2,7%)	0	
Not satisfied	4 (57,1%)	1 (14,3%)	2 (28,6%)	0	0	0	0	
How satisfied are you with the availability of medical consumables and devices in the perinatal center? (e.g., endotracheal tubes, laryngoscopes, suction catheters, wipes, etc.)								
Satisfied	21 (13,4%)	120 (76,4%)	2 (1,3%)	4 (2,5%)	4 (2,5%)	4 (2,5%)	2 (1,3%)	0,009
Somewhat satisfied	14 (26,4%)	32 (60,4%)	0	2 (3,8%)	4 (7,5%)	0	1 (1,9%)	
Undecided	2 (5,6%)	28 (77,8%)	5 (13,9%)	0	1 (2,8%)	0	0	
Not satisfied	1 (11,1%)	7 (77,8%)	1 (11,1%)	0	0	0	0	
Have there been cases of miscommunication between physicians and mid-level staff in your department?								
Yes	5 (11,6%)	36 (83,7%)	1 (2,3%)	0	1 (2,3%)	0	0	0,66
No	33 (15,6%)	151 (71,2%)	7 (3,3%)	6 (2,8%)	8 (3,8%)	4 (1,9%)	3 (1,4%)	

Continuation of Table 2.

1	2	3	4	5	6	7	8	9
Do you experience difficulties when consulting with patients?								
Yes	7 (18,4%)	28 (73,7%)	1 (2,6%)	0	2 (5,3%)	0	0	0,8
No	31 (14,3%)	159 (73,3%)	7 (3,2%)	6 (2,8%)	7 (3,2%)	4 (1,8%)	3 (1,4%)	
How satisfied are you with opportunities to participate in professional training or seminars?								
Satisfied	13 (8,4%)	123 (79,9%)	3 (1,9%)	6 (3,9%)	3 (1,9%)	4 (2,6%)	2 (1,3%)	0,001
Somewhat satisfied	10 (18,2%)	38 (69,1%)	1 (1,8%)	0	5 (9,1%)	0	1 (1,8%)	
Undecided	6 (26,1%)	15 (65,2%)	1 (4,3%)	0	1 (4,3%)	0	0	
Not satisfied	9 (39,1%)	11 (47,8%)	3 (13%)	0	0	0	0	

Satisfaction with access to educational activities and training was reported by 79.9% (N=123) mid-level personnel, while only 8.4% (N=13) of physicians expressed satisfaction in this regard (p = 0.001). Furthermore, 39.1% (N=9) of physicians explicitly stated dissatisfaction with current opportunities for professional development. These results underscore the need for a systematic approach to clinical staff training, particularly for physicians, as they represent a key resource in ensuring the quality and safety of obstetric care

Discussion

mproving the quality of care in maternity institutions is not possible without a systematic analysis of the factors influencing infection safety. At present, the issues of resource availability, diagnostic capacity, staffing, and opportunities for professional development have become especially critical—particularly in the post-pandemic period, when healthcare systems have faced significant overload and limited operational capacity.

The findings of this study confirmed the presence of substantial differences in the perception of working conditions between physicians and mid-level medical personnel. Physicians reported significantly lower levels of satisfaction with technical equipment, pharmaceutical provision, access to diagnostic services, and opportunities for professional development. These differences were statistically significant and highlight a structural imbalance in the distribution of resources within healthcare facilities. Physicians - who are primarily responsible for clinical decision-making—were the most critical in their assessment of material and human resources. Similar patterns have been observed in European studies, which underscore the importance of aligning internal resource access with clinical responsibility [9].

According to the findings of our study, only 11.3% of physicians expressed satisfaction with the availability of essential equipment (e.g., ultrasound machines, cardiotocographs), compared to 78.7% of mid-level medical staff (p = 0.001). A similar disparity was observed in the assessment of pharmaceutical supply: only 9.8% of physicians were satisfied, in contrast to 80.4% of nursing personnel (p = 0.009). A comparable trend has been reported in European studies. For instance, *Sandall J. et al.* demonstrated that obstetric and gynecological institutions in Germany and Austria face challenges in the equitable distribution of resources among different staff categories, which in turn affects their level of professional satisfaction [9].

Diagnostic support was rated most critically by physicians. Only 10.2% of physicians were satisfied with access to laboratory diagnostics, compared to 78.3% of mid-level staff (p = 0.001). Likewise, satisfaction with access to instrumental diagnostics (e.g., ultrasound and radiographic examinations) was reported by just 12.6% of physicians versus 76.9% of nursing personnel (p < 0.0001). These findings are consistent with the results of a systematic review by *Lawn J.E et al.,* which emphasized that limited access to timely diagnostic services is a risk factor for infectious and obstetric complications in middle-income countries [10].

The issue of staffing adequacy was also perceived more acutely by physicians, only 13.2% of whom expressed satisfaction, compared to 74.2% of mid-level medical personnel. This imbalance reflects a broader human resource challenge commonly observed in the healthcare systems of post-Soviet countries. As noted by *Campbell et al.,* the shortage of obstetricians-gynecologists and neonatologists contributes to increased workloads, reduced clinical vigilance, and a higher likelihood of medical errors [11]. These findings highlight the urgent need to revise current human resource policies and to develop mechanisms for retaining and motivating qualified professionals [12].

One of the most significant findings of this study was the pronounced disparity in access to professional development opportunities. Only 8.4% of physicians reported satisfaction with available training programs, whereas 79.9% of mid-level staff assessed them positively (p = 0.001). This discrepancy may indicate structural barriers within the system of continuing medical education, such as limited program availability, insufficient funding, or a mismatch between educational offerings and the practical needs of physicians. According to the CDC (2022), continuing medical education is a critical component of efforts to reduce the incidence of healthcare-associated infections and to improve the quality of clinical practice [13].

Despite the differences in perceptions of resource availability, the study did not reveal significant disparities in how interprofessional collaboration and communication with patients were perceived. This may indicate the presence of an established culture of teamwork. However, the sustainability of such collaboration is directly dependent on the availability of resources and educational support [14].

Thus, the findings of this study support the need for reforming management approaches in maternity care institutions. Implementing a risk-oriented management model, conducting regular internal audits of staff satisfaction, expanding targeted educational programs - particularly for physicians — and ensuring equitable access

to resources are essential measures for strengthening the resilience of maternity facilities against both infectious and organizational threats.

At the same time, the interpretation of these results should take into account several limitations. First, the study relied on self-reported data, which may reflect subjective perceptions of working conditions influenced by individual experiences and expectations. Second, the cross-sectional study design limits the ability to establish causal relationships between the variables.

Conclusion

The findings of this study revealed significant differences in the perception of working conditions and infection safety between physicians and mid-level medical personnel in maternity care institutions. The most critically assessed areas included the availability of technical equipment, diagnostic resources, and opportunities for professional development. To enhance the resilience of obstetric and gynecological services, management strategies should focus on ensuring equitable access to resources, expanding continuing education programs, and implementing a risk-oriented approach to workforce organization.

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Literature:

1. *Безымянный А.С., Мингазова Э.Н.* .Профессиональное выгорание медицинских работников и факторы, его определяющие // Проблемы социальной гигиены, здравоохранения и истории медицины. 2024. №2. URL: https://cyberleninka.ru/article/n/professionalnoe-vygoranie-meditsinskih-rabotnikov-i-faktory-ego-opredelyayuschie (дата обращения: 16.06.2025).

2. *Герасименко А.В., Чумаков М.Э.* Опыт внедрения системы инфекционной безопасности в Перинатальном центре // Ремедиум Приволжье. 2014. №6 (126). URL: https://cyberleninka.ru/article/n/opyt-vnedreniya-sistemy-infektsionnoy-bezopasnosti-v-perinatalnom-tsentre (дата обращения: 17.06.2025).

3. *Хромова Н.Л., Баринова Е.В., Орлов А.Б., Ликстанов М.И.* Результаты внедрения элементов инфекционного контроля в акушерском стационаре // МиД. 2001. №5–6 (6–7). URL: https://cyberleninka.ru/article/n/rezultaty-vnedreniya-elementov-infektsionnogo-kontrolya-v-akusherskom-statsionare

4. World Health Organization. Global Guidelines for the Prevention of Surgical Site Infection. Geneva: WHO; 2016.

5. Allegranzi B., Pittet D. Role of hand hygiene in healthcare-associated infection prevention. J Hosp Infect. 2009 Dec;73(4):305-15. doi: 10.1016/j.jhin.2009.04.019. Epub 2009 Aug 31. PMID: 19720430.

6. CDC. Infection Control in Healthcare Settings. CDC. https://www.cdc.gov/infection-control/hcp/index.html

7. *Blinov D.V., Hasan P.L., Mnatsakanyan A.N., Korabelnikov D.I., Safarov A.T., Pavlova N.V., Zakharova N.S., Ponomarev D.A., Petrenko D.A.* Early menopause and premature ovarian insufficiency: problems and perspectives. Obstetrics, Gynecology and Reproduction. 2020;14(3):328-345. (In Russ.) https://doi.org/10.17749/2313-7347/ob.gyn.rep.2020.173

8. *Bhutta Z.A., Cabral S., Chan C.W., Keenan W.J.* Reducing maternal, newborn, and infant mortality globally: an integrated action agenda. Int J Gynaecol Obstet. 2012 Oct;119 Suppl 1:S13-7. doi: 10.1016/j.ijgo.2012.04.001. Epub 2012 Aug 9. PMID: 22883919.

9. *Sandall, Jane & Homer, Caroline & Sadler, Euan & Rudisill, C. & Bourgeault, Ivy & Bewley, Susan & Nelson, Pauline & Cowie, L. & CoopeC &. & Curry, Natasha.* (2011). Staffing in maternity units. Getting the right people in the right place at the right time.

10. Lawn J.E., Blencowe H., Oza S., You D., Lee A.C., Waiswa P., Lalli M., Bhutta Z., Barros A.J., Christian P., Mathers C., Cousens S.N., Lancet Every Newborn Study Group. Every Newborn: progress, priorities, and potential beyond survival. Lancet. 2014 Jul 12;384(9938):189-205. doi: 10.1016/S0140-6736(14)60496-7. Epub 2014 May 19. Erratum in: Lancet. 2014 Jul 12;384(9938):132. PMID: 24853593.

11. Campbell J., et al. Maximizing the impact of community-based practitioners in the quest for universal health coverage, 2015.

12. Stones W., Nair A. Metrics for maternity unit staffing in low resource settings: Scoping review and proposed core indicator. Front Glob Womens Health. 2023 Mar 15;4:1028273. doi: 10.3389/fgwh.2023.1028273. PMID: 37009093; PMCID: PMC10050730.

13. Centers for Disease Control and Prevention. The One & Only Campaign injection safety training materials. https://www.cdc.gov/healthcare-associated-infections/index.html.

14. WHO. COVID-19 STRATEGY UPDATE. 14 April 2020. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/covid-strategy-update-14april2020.pdf, accessed 8 June 2020)

References: [1-3]

1. Bezymyannyi A.S., Mingazova E.N. Professional'noe vygoranie meditsinskikh rabotnikov i faktory, ego opredelyayuschiye [Professional burnout of healthcare workers and its determining factors]. *Problemy sotsial'noi gigieny, zdravookhraneniya i istorii meditsiny* [Problems of social hygiene, health care and history of medicine]. 2024. №2. URL: https://cyberleninka.ru/article/n/professionalnoe-vygoranie-meditsinskih-rabotnikov-i-faktory-ego-opredelyayuschie (accessed: 16.12.2024). [in Russian]

2. Gerasimenko A.V., Chumakov M.E. Opyt vnedreniya sistemy infektsionnoi bezopasnosti v Perinatal'nom tsentre [Experience of implementing an infection safety system in a perinatal center]. *Remedium Privolzh'e.* 2014. №6 (126). URL: https://cyberleninka.ru/article/n/opyt-vnedreniya-sistemy-infektsionnoy-bezopasnosti-v-perinatalnom-tsentre (accessed: 17.11.2024). [in Russian]

3. Hromova N.L., Barinova E.V., Orlov A.B., Likstanov M.I. Rezul'taty vnedreniya elementov infektsionnogo kontrolya v akusherskom statsionare [Results of implementing infection control elements in a maternity hospital]. *MiD*. 2001. №5–6 (6–7). URL: [https://cyberleninka.ru/article/n/rezultaty-vnedreniya-elementov-infektsionnogo-kontrolya-v-akusherskomstatsionare](https://cyberleninka.ru/article/n/rezultaty-vnedreniya-elementov-infektsionnogo-kontrolya-v-akusherskom-statsionare). (accessed: 17.11.2024). [in Russian]

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