Epidemiology & Health Data Insights
(eISSN 3080-8111)

Original Article

Multiregional Assessment of the Implementation of Standards for the Organization of Medical Care in Kazakhstan: Results of the Physician Survey

Gulzhan Mukhanova[1], Aigerim Biniyazova[1], Assel Umirzakova[1], Mara Bitenova[1], Gyulnara Meyremkhanova[1], Adlet Tabarov[1]

[1]*Department of Rational Clinical Practice and Medical Care Organization Improvement, Salidat Kairbekova National Research Center for Health Development, Astana, Kazakhstan*

Received: Aug 27, 2026
Accepted: Nov 03, 2026

Corresponding author's email:
a.tabarov@nrchd.kz

Citation: Mukhanova G, Biniyazova A, Umirzakova A, Bitenova M, Meiremkhanova G, Tabarov A. Multiregional Assessment of the Implementation of Standards for the Organization of Medical Care in Kazakhstan: Results of the Physician Survey. Epidemiology and Health Data Insights. 2026;2(5):ehdi065. https://doi.org/10.63946/ehdi/19920

Copyright: By the author(s).

License: A non-exclusive license by the publisher. Published by Australasia Publishing Group LLP.

Open Access: This article is an open access article distributed under the terms and conditions of the CC-BY Creative Commons Attribution license https://creativecommons.org/licenses/by/4.0

ABSTRACT

Introduction: Improving the quality and accessibility of medical care is a key priority for the healthcare system of the Republic of Kazakhstan. Standards for the organization of specialized medical care are important tools for unifying clinical approaches and optimizing patient routing. The purpose of this study is to assess the knowledge, practical application and barriers to the implementation of these standards of medical care organization among practicing healthcare professionals in five priority clinical profiles.

Methods: Using an anonymous online platform (Google Forms), a cross-sectional survey was conducted among doctors in 46 medical organizations in 13 regions of Kazakhstan. The study was conducted in five clinical profiles: cardiology and cardiac surgery, rheumatology, gastroenterology/hepatology, nephrology and traumatology and orthopedics. The questionnaires assessed the level of knowledge about standards, estimated the perceived importance of patient satisfaction and equipment compliance. Statistical analysis was performed using STATA v.18.

Results: A total of 323 out of 400 invited specialists participated in the survey (a response rate of 80.8%). In total, 267 of the 323 respondents (82.7%) reported that they use these standards in their daily work. Knowledge levels were assessed separately for each clinical profile, as the questionnaires varied in terms of the number and content of the questions. Overall, 300 out of 323 respondents (92.9%) indicated that patient satisfaction is one of the top priorities in their organization.

Conclusion: Most of the physicians surveyed reported that they follow the Standards on a daily basis; however, the survey results revealed variations in the knowledge level of the Standards specific to individual medical specialties. Because the questionnaires differed in content and scope, the data obtained do not allow for the ranking of clinical specialties based on their overall level of knowledge. These findings underscore the need for further research into how well physicians understand the relevant regulatory requirements, as well as the need for an objective assessment of the implementation of these standards. When interpreting the results, it should be noted that the sample was selected purposively, and several indicators were based on the respondents' own subjective assessments.

Keywords: Standards of Medical Care Organization; Organization of Healthcare; Quality of Medical Care; Survey of Doctors; Implementation of Standards; Patient Satisfaction

Introduction

Improving the quality and accessibility of medical care is regarded as one of the key priorities in the healthcare system development of the Republic of Kazakhstan. An essential tool for ensuring unified approaches to the organization of medical care is provided by standards that regulate the structure, processes, and conditions for delivering medical services, as well as requirements for staffing, organizational support, and material-technical infrastructure of medical organizations.

The implementation of these standards is aimed at improving the efficiency of the healthcare system, ensuring continuity between levels of medical care delivery, and proper patient routing. In addition, the standards make it possible to unify approaches to the diagnosis, treatment, and follow-up of patients, which contributes to improved clinical outcomes and the rational use of healthcare resources.

However, the practical implementation of standards in medical organizations may be accompanied by a number of organizational, staffing, and resource constraints. In this regard, systematic monitoring of the implementation of medical care organization standards becomes particularly important, as it makes it possible to assess the level of their application in the practical work of healthcare professionals and to identify existing barriers.

One of the effective methods for assessing the implementation of regulatory documents is surveying physicians who are directly involved in providing medical care. The opinions of practicing healthcare workers make it possible to identify the level of knowledge of the current standards, assess their applicability in clinical practice, and determine the main barriers hindering their implementation.

The aim of this study is to assess the implementation of medical care organization standards (hereinafter referred to as the Standards) in medical organizations based on a survey of healthcare workers, as part of monitoring the standards for organizing specialized medical care in five priority clinical profiles across 13 regions of the Republic of Kazakhstan.

Materials and Methods

A cross-sectional study was conducted involving a survey of healthcare workers on their knowledge and application of medical care organization standards. This approach made it possible to obtain a comprehensive assessment of the level of implementation of profile-specific standards and to identify key factors influencing their implementation.

Study subjects

A purposive administrative sample was used. Invitations to participate were extended to medical organizations providing specialized care in the 13 regions where the activities took place, as well as to all available physicians of the relevant specialties who were practicing during the monitoring period. The study covered 46 medical organizations providing specialized medical care in outpatient, day-hospital (or day-care), and inpatient settings. The main target group of the study consisted of physicians from the following clinical profiles: cardiology and cardiac surgery, rheumatology, gastroenterology and hepatology, nephrology, and traumatology with orthopedics. An additional group of respondents consisted of primary healthcare physicians (general practitioners and internists), given their role in the initial detection, diagnosis, and routing of patients. They were included in the five specialty-specific samples according to the clinical profile for which they completed the questionnaire. They were not analyzed as a separate group.

Survey of healthcare workers

The survey was conducted among physicians and heads of medical organizations, individually and in person. The data were collected electronically using the Google Forms platform. Each physician completed the questionnaire for the corresponding profile independently, in the presence of the researchers. The questionnaire consisted of general questions about the physician's region of residence, place of work (type of medical organization), medical specialty, and length of work experience. The questionnaire further included questions aimed at assessing: the level of knowledge of the content of the Standards; the perceived importance of patient satisfaction and the equipment of medical organizations.

Specialty-specific questions were developed by expert groups in accordance with current Standards from the Ministry of Health. Content validity was established through expert consensus, and correct answers were based on the relevant Standards. Thus, 8 questions were developed for the "Cardiology and cardiac surgery" profile, 11 questions for "Rheumatology", 8 questions for "Gastroenterology and hepatology", 12 questions for "Nephrology", and 10 questions for "Traumatology and orthopedics". A scoring system awarding one point for each correct answer was used. A pilot test involving 10 physicians was conducted to assess the clarity of the questions' wording. As the pilot test was not intended to determine psychometric reliability, no formal reliability coefficient was calculated. Consequently, these

questionnaires should be viewed as assessment tools developed specifically for this study, and their measurement properties warrant further investigation.

Ethical considerations

The survey was conducted between June and September 2025 as part of a recurring study carried out in accordance with the state assignment of the Ministry of Healthcare of the Republic of Kazakhstan. The survey questions had previously been reviewed and approved by the local bioethics commission of the Salidat Kairbekova National Scientific Center for Health Development in 2023 (Protocol No. 2, dated June 5, 2023). The 2025 survey was conducted independently of the earlier data collection. Participation was voluntary, and verbal informed consent was obtained from the participants. Survey data were collected and analyzed on an anonymous basis.

Statistical analysis

Survey data were exported in Excel format and then analyzed using the STATA v.18 statistical software (STATA Corporation, College Station, TX, USA). The data obtained were processed using descriptive statistics methods; results are presented as medians (Me) with interquartile range (IQR) for continuous variables, and as frequencies and percentages for categorical variables. The Kruskal-Wallis test was used to compare total scores within a profile by work experience and place of work. Since some categories related to workplace or work experience included only a small number of participants, a sensitivity analysis was conducted: categories representing conceptually similar working conditions were combined. The results of this analysis were compared with those of the primary analysis to assess whether the overall pattern in the data remained consistent. Because combining categories can lead to a loss of information–and the analysis itself may have limited statistical power–the results of the sensitivity analysis were not considered as evidence of equivalence between the groups. Visualization was performed using a web-based visualization tool (Datawrapper GmbH, Berlin, Germany).

Results

A total of 323 physicians out of 400 invited participated, corresponding to a response rate of 80.8%. The general characteristics of the participants and their total scores for knowledge of the Standards are presented in Table 1. The largest number of participants was observed in the "Traumatology and orthopedics" profile (N=71, 22%), and the smallest in the "Rheumatology" profile (N=56, 17.3%). The cardiology and gastroenterology groups were identical in size, each comprising 20.4% of the sample (N=66). The proportion of nephrology specialists was 19.8% (N=64).

Table 1. General characteristics of the participants.

Total number, N=323 (100%)	Cardiology and cardiac surgery, N=66 (20.4%)	Rheumatology, N=56 (17.3%)	Gastroenterology and hepatology, N=66 (20.4%)	Nephrology, N=64 (19.8%)	Traumatology and orthopedics, N=71 (22%)
Region of residence, n (%)	Karaganda 35 (53%) Abay 20 (30.3%) Mangystau 11 (16.7%)	North Kazakhstan 27 (48.2%) Shymkent city 20 (35.7%) Abay 9 (16.1%)	Astana city 32 (48.5%) North Kazakhstan 26 (39.4%) Kostanay 8 (12.1%)	Almaty city 25 (39.1%) Zhambyl 20 (31.3%) Akmola 16 (25%) Zhetysu 2 (3.1%) Mangystau 1 (1.6%)	Zhetysu 33 (46.5%) Pavlodar 21 (29.6%) East Kazakhstan 17 (23.9%)
Place of work, n (%)	Regional hospital 34 (51.5%) City polyclinic 16 (24.2%) Cardiology Center 10 (15.2%) University clinic 6 (9.1%)	City polyclinic 28 (50%) City hospital 13 (23.2%) Regional multidisciplinary hospital 12 (21.4%) University clinic 3 (5.4%)	City polyclinic 37 (56%) City hospital 12 (18.2%) Regional hospital 12 (18.2%) Hepatology center 5 (7.6%)	City polyclinic 23 (35.9%) City hospital 22 (34.4%) Dialysis center 17 (26.6%) Regional multidisciplinary hospital 2 (3.1%)	City polyclinic 31 (43.7%) Regional hospital 28 (39.4%) Medical center 8 (11.3%) City hospital 4 (5.6%)
Medical specialty, n (%)	Cardiology 35 (53%) Internal medicine 13 (19.7%) General practice 7	General practice 19 (33.9%) Internal medicine 15 (26.8%) Rheumatology 13	Internal medicine 29 (43.9%) General practice 22 (33.3%)	Nephrology 31 (48.4%) General practice 16 (25%)	Traumatology/orthopedics 61 (85.9%) Family medicine 5 (7%) General practice 4 (5.6%)

	(10.6%) Cardiac surgery 6 (9.1%) General surgery 2 (3%) Family medicine 1 (1.5%) Interventional cardiology 1 (1.5%) Anesthesiologist-intensivist 1 (1.5%)	(23.2%) Cardiology 6 (10.7%) Hematologist 1 (1.8%) Family medicine 1 (1.8%) Pulmonology 1 (1.8%)	Adult gastroenterology 13 (19.7%) Family medicine 2 (3%)	Internal medicine 11 (17.2%) Family medicine 5 (7.8%) Other 1 (1.6%)	General surgery 1 (1.4%)
Length of work experience, n (%)					
<5 years	21 (31.8%)	17 (30.4%)	15 (22.7%)	14 (21.9%)	20 (28.2%)
5-9 years	18 (27.3%)	17 (30.4%)	19 (28.8%)	11 (17.2%)	20 (28.2%)
10-14 years	6 (9.1%)	6 (10.7%)	10 (15.1%)	13 (20.3%)	13 (18.3%)
15-19 years	5 (7.6%)	4 (7.1%)	4 (6.1%)	7 (10.9%)	7 (9.9%)
≥20 years	16 (24%)	12 (21.4%)	18 (27.3%)	19 (29.7%)	11 (15.5%)
Total score, Me (IQR)/Number of questions	4 (2-6)/8	3 (1-6)/11	2 (1-4)/8	6 (4-9)/12	7 (3-9)/10

Table 2. Effect of work experience on knowledge of the Standards.

Profile	Factor	n, %	Me (IQR)	Test statistic	*p*-value
Cardiology and cardiac surgery	<5 years	21 (31.8%)	4 (2-6)	3.513 (df=4)	0.4758
	5-9 years	18 (27.3%)	2 (2-5)		
	10-14 years	6 (9.1%)	4 (4-5)		
	15-19 years	5 (7.6%)	5 (3-5)		
	≥20 years	16 (24%)	4 (2-7)		
Rheumatology	<5 years	17 (30.4%)	4 (2-6)	3.600 (df=4)	0.4628
	5-9 years	17 (30.4%)	3 (1-6)		
	10-14 years	6 (10.7%)	3.5 (2-6)		
	15-19 years	4 (7.1%)	5.5 (4.5-8.5)		
	≥20 years	12 (21.4%)	2 (1-5)		
Gastroenterology and hepatology	<5 years	15 (22.7%)	2 (1-3)	2.426 (df=4)	0.6579
	5-9 years	19 (28.8%)	3 (1-5)		
	10-14 years	10 (15.1%)	2 (1-3)		
	15-19 years	4 (6.1%)	2 (1.5-3.5)		
	≥20 years	18 (27.3%)	2.5 (1-4)		

Nephrology	<5 years	14 (21.9%)	4.5 (3-7)	7.698 (df=4)	0.1033
	5-9 years	11 (17.2%)	9 (5-10)		
	10-14 years	13 (20.3%)	6 (3-8)		
	15-19 years	7 (10.9%)	5 (3-6)		
	≥20 years	19 (29.7%)	8 (4-10)		
Traumatology and orthopedics	<5 years	20 (28.2%)	6.5 (4-8.5)	2.130 (df=4)	0.7119
	5-9 years	20 (28.2%)	4 (2-10)		
	10-14 years	13 (18.3%)	8 (5-10)		
	15-19 years	7 (9.9%)	6 (3-10)		
	≥20 years	11 (15.5%)	7 (5-9)		

Note. Df, degrees of freedom.

Table 3. Effect of place of work on knowledge of the Standards.

Profile	**Factor**	**n, %**	**Median (IQR)**	**Test statistic**	***p*-value**
Cardiology and cardiac surgery	Regional hospital	34 (51.5%)	3.5 (2-6)	3.086 (df=3)	0.3786
	City polyclinic	16 (24.2%)	4.5 (2.5-7)		
	Cardiology Center	10 (15.2%)	3.5 (2-6)		
	University clinic	6 (9.1%)	3 (2-4)		
Rheumatology	City polyclinic	28 (50%)	2.5 (1-6)	2.860 (df=3)	0.4138
	City hospital	13 (23.2%)	3 (2-6)		
	Regional multidisciplinary hospital	12 (21.4%)	4 (1.5-5)		
	University clinic	3 (5.4%)	6 (5-7)		
Gastroenterology and hepatology	City polyclinic	37 (56%)	2 (2-4)	3.073 (df=3)	0.3805
	City hospital	12 (18.2%)	2 (1-3)		
	Regional hospital	12 (18.2%)	2.5 (1.5-3)		
	Hepatology center	5 (7.6%)	6 (1-6)		
Nephrology	Regional multidisciplinary hospital	2 (3.1%)	7 (2-12)	0.368 (df=3)	0.9467
	City polyclinic	23 (35.9%)	6 (4-9)		
	Dialysis center	17 (26.6%)	6 (4-9)		
	City hospital	22 (34.4%)	6 (3-9)		
	City polyclinic	31 (43.7%)	7 (3-10)	7.209 (df=3)	0.0655

Traumatology and orthopedics	Regional hospital	28 (39.4%)	6.5 (4-8)		
	Medical center	8 (11.3%)	9.5 (6.5-10)		
	City hospital	4 (5.6%)	3 (2-5)		

Note. Df, degrees of freedom.

Most physicians in the "Cardiology and cardiac surgery" profile were from the Karaganda region (n=35, 53%), worked in a regional hospital (n=34, 51.5%), had the specialty "Cardiology" (n=35, 53%), and had less than 5 years of work experience (n=21, 31.8%). In the "Rheumatology" profile, most participants were from the North Kazakhstan region (n=27, 48.2%), worked in a city polyclinic (n=28, 50%), had the specialty "General practice" (n=19, 33.9%), and had less than 10 years of work experience (n=34, 60.8%). Most participants in the "Gastroenterology and hepatology" profile were from Astana city (n=32, 48.5%), worked in a city polyclinic (n=37, 56%), had the specialty "Internal medicine" (n=29, 43.9%), and had 5-9 years of work experience (n=19, 28.8%). In the "Nephrology" profile, most participants were from Almaty city (n=25, 39.1%), worked in a city polyclinic (n=23, 35.9%), had the specialty "Nephrology" (n=31, 48.4%), and had 20 or more years of work experience (n=19, 29.7%). Most physicians in the "Traumatology and orthopedics" profile were from the Zhetysu region (n=33, 46.5%), worked in a city polyclinic (n=31, 43.7%), had the specialty "Traumatology/orthopedics" (n=61, 85.9%), and had less than 10 years of work experience (n=40, 56.4%).

Figure 1 illustrates the distribution of participants by region. Thus, the largest number of participants came from the North Kazakhstan region (53, 16.4%), the Karaganda region (35, 10.8%), and the Zhetysu region (35, 10.8%).

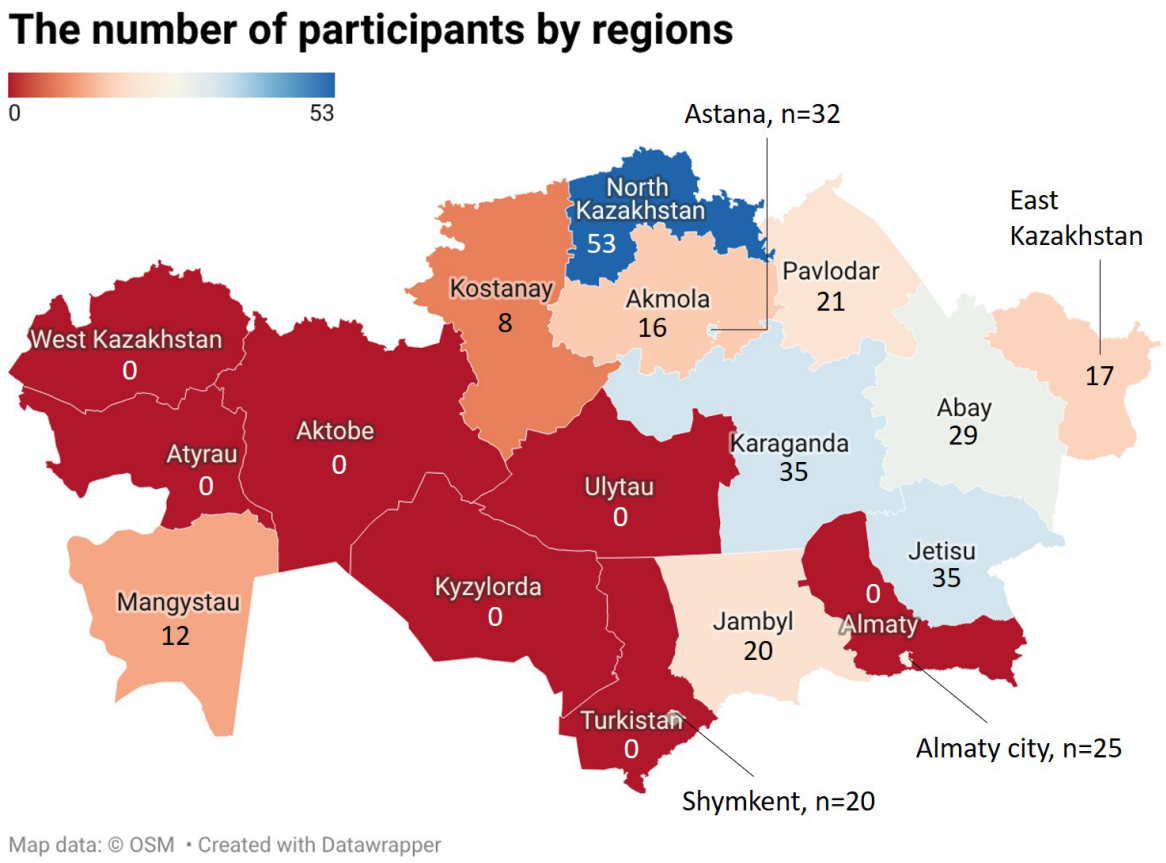


Figure 1. Distribution of study participants by region.

Figure 2 illustrates the frequency of application of the Standards by physicians of different profiles in daily practice. In total, 267 out of 323 respondents (82.7%) reported using the Standards on a daily basis. The proportion of those who indicated daily use was 89.4% in cardiology and cardiac surgery, 71.4% in

rheumatology, 74.2% in gastroenterology and hepatology, 79.7% in nephrology, and 95.8% in traumatology and orthopedics. Rheumatologists (23.2%) and gastroenterologists (21.2%) most often turn to the standards as needed. This pattern of use is least common among traumatologists (only 1.4%). The proportion of specialists using the standards once a week is minimal in all groups. Rates range from 1.6% (nephrology) to 3% (cardiology and gastroenterology). In traumatology, this rate is 0%. In four of the five medical fields, no one selected rare use. The exception was found among specialists in traumatology and orthopedics, where 2.8% of respondents reported rarely using the standards.

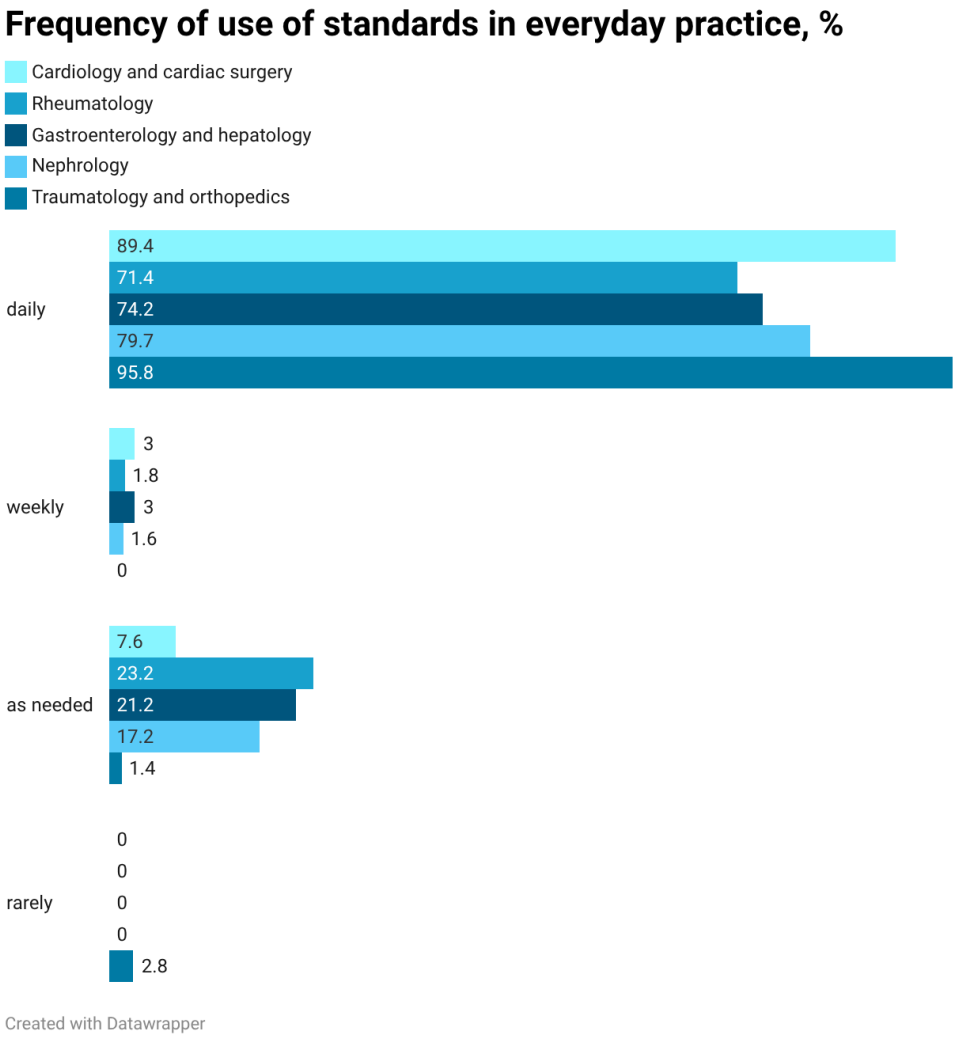


Figure 2. Frequency of application of the Standards in daily practice by profile.

Knowledge level of the standards content

According to the analysis (Table 1), the distribution of knowledge assessment scores varied by clinical profile. In cardiology and cardiac surgery, the median score was 4 out of a possible 8 (interquartile range [IQR]: 2–6). In rheumatology, the median score was 3 out of 11 (IQR: 1–6), with the upper quartile reaching 6. In gastroenterology and hepatology, the median score was 2 out of 8 (IQR: 1–4). In nephrology, the median score was 6 out of 12 (IQR: 4–9). In traumatology and orthopedics, the median score was 7 out of 10 (IQR: 3–9). These results reflect the level of knowledge regarding requirements, as assessed by questionnaires developed specifically for each clinical profile. Because the questionnaires differed in the number and content of their questions, the scores should be interpreted separately for each profile; they should not be used to rank medical specialties.

Supplementary Table 1 presents the results of an analysis of the response pattern for organizational and high-technology questions in the rheumatology and nephrology profiles. In rheumatology, the lowest score was observed for question 17 on patient routing (26.8%). For questions 16 (patient routing) and 18-19 (use of genetically engineered biologic therapy, GEBT), the proportion of correct answers was equally 39.3% for each. In nephrology, aspects of renal replacement therapy (RRT) were mastered relatively better, but a group of questions with a low level of correct answers was also observed. Thus, the minimum proportion of

correct answers was found for question 19 (53.1%). Questions 17 and 18 showed similar results (59.4% and 56.3%, respectively).

Tables 2 and 3 show the distribution of median total scores for knowledge of the Standards within profiles by work experience and place of work. No statistically significant differences were found in the aggregate knowledge level score ($p>0.05$). In the sensitivity analysis performed by combining categories with a small number of participants into conceptually similar groups the results remained statistically non-significant ($p>0.05$). The results of the sensitivity analysis are presented in Supplementary Tables 2 and 3.

Importance of patient satisfaction according to physicians

Figure 3 shows the importance of patient satisfaction in the organization by profile. Overall, 300 out of 323 respondents (92.9%) rated patient satisfaction as a high priority within their organization. The corresponding figures were: 98.5% in cardiology and cardiac surgery, 91.1% in rheumatology, 86.4% in gastroenterology and hepatology, 87.5% in nephrology, and 100% in traumatology and orthopedics. A notable proportion of responses indicating medium priority was seen in nephrology (10.9%) and gastroenterology (7.6%). In cardiology and rheumatology, this rate was minimal (1.5% and 1.8%, respectively). Low priority was selected only by representatives of rheumatology (1.8%) and gastroenterology (1.5%). In the other profiles, this rate was zero. A small percentage of respondents who found it difficult to answer was observed in rheumatology (5.4%), gastroenterology (4.5%), and cardiology (1.6%).

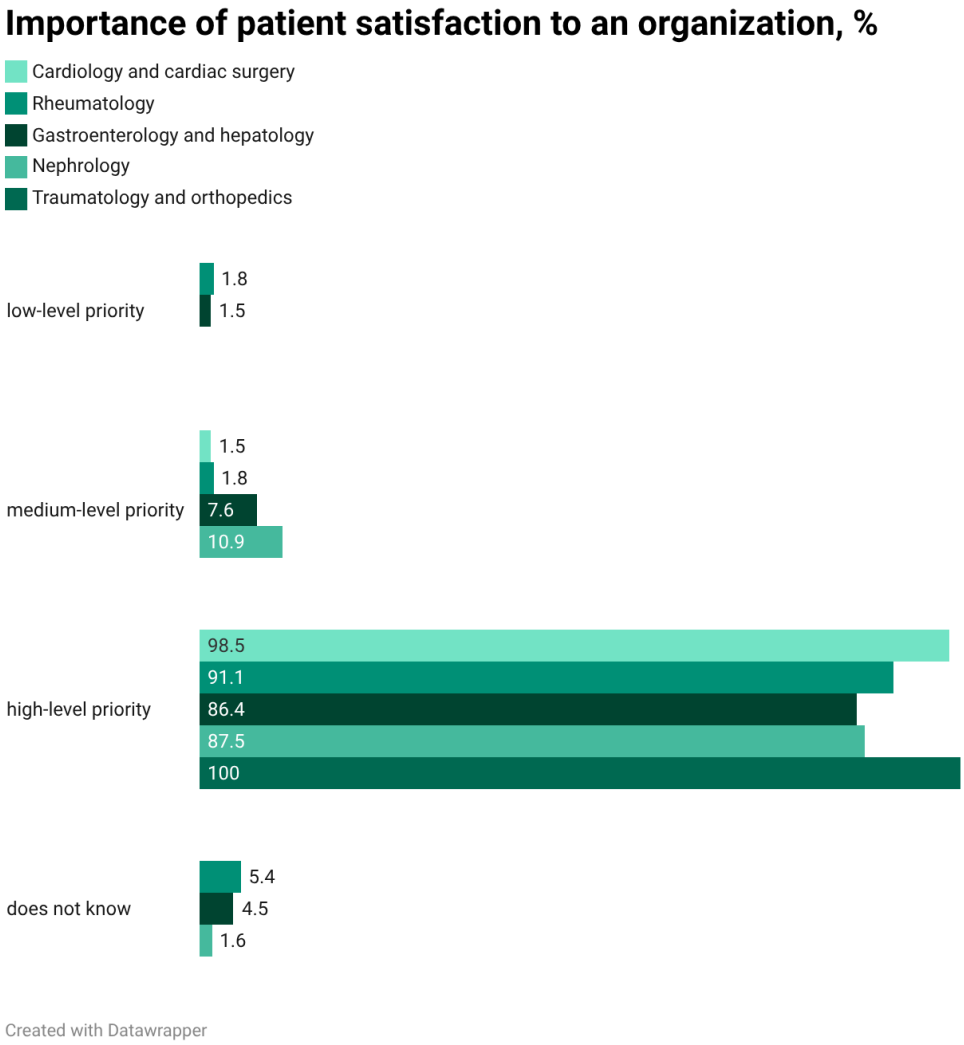


Figure 3. Importance of patient satisfaction in the organization by profile.

The overwhelming majority of participants (89.9%) believe that patient satisfaction directly affects the final outcome of their organization's activities. This view was held by 87.9% of cardiology and cardiac surgery physicians, 87.5% of rheumatology physicians, 83.3% of gastroenterology and hepatology physicians, 92.2% of nephrology physicians, and 98.6% of traumatology and orthopedics physicians. Of all

physicians, 5.68% disagreed with this statement, and 4.4% found it difficult to answer this question.

Figure 4 presents the survey results regarding how often patient satisfaction is assessed in physicians' medical organizations according to the participants' perception. In most profiles, satisfaction assessment is conducted daily (40.3%). The highest rates of daily monitoring are reported in cardiology and cardiac surgery (54.5%) and rheumatology (50%). Monthly and quarterly monitoring are also popular. For example, in gastroenterology and hepatology, assessments peak at both daily (36.4%) and monthly (36.4%) formats. In traumatology and orthopedics, quarterly monitoring predominates (40.8%). Assessments conducted once every six months or once a year are used significantly less often in all departments. The exception is nephrology, where 6.3% of organizations conduct surveys annually. The proportion of organizations that do not track patient satisfaction at all is minimal in all profiles, ranging from 1.4% to 6.3%.

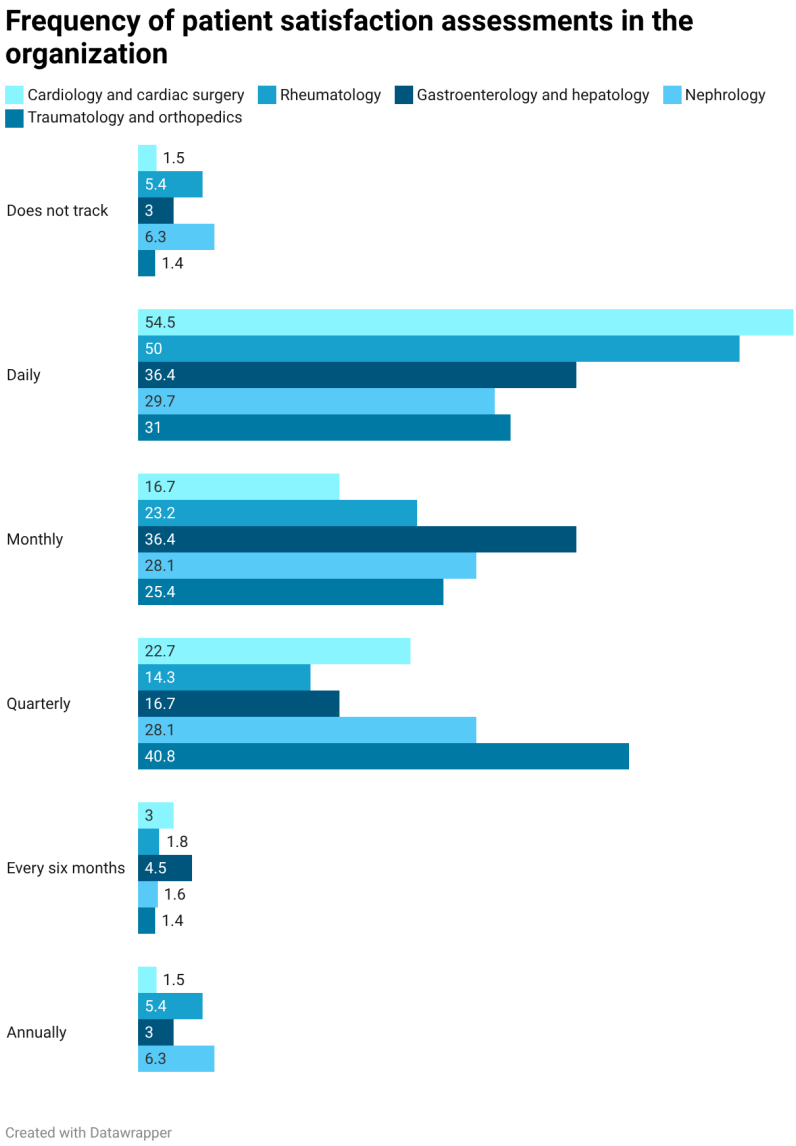


Figure 4. Frequency of assessment of patient satisfaction in organizations according to physicians.

Equipment of medical organizations according to physicians

Figure 5 presents the results of the physician survey regarding the compliance of their organizations' equipment with the required standards (in percent). The vast majority of surveyed physicians of all specialties noted a high level of equipment in their organization for performing diagnostic and treatment procedures on patients ("71-90%" and "More than 90%"). In the "More than 90%" category, the highest rates are shown by nephrology (70.3%) and cardiology (66.7%). The options "Does not comply", "50% compliant", and "51-70%" received the fewest votes in all medical fields (predominantly below 10%).

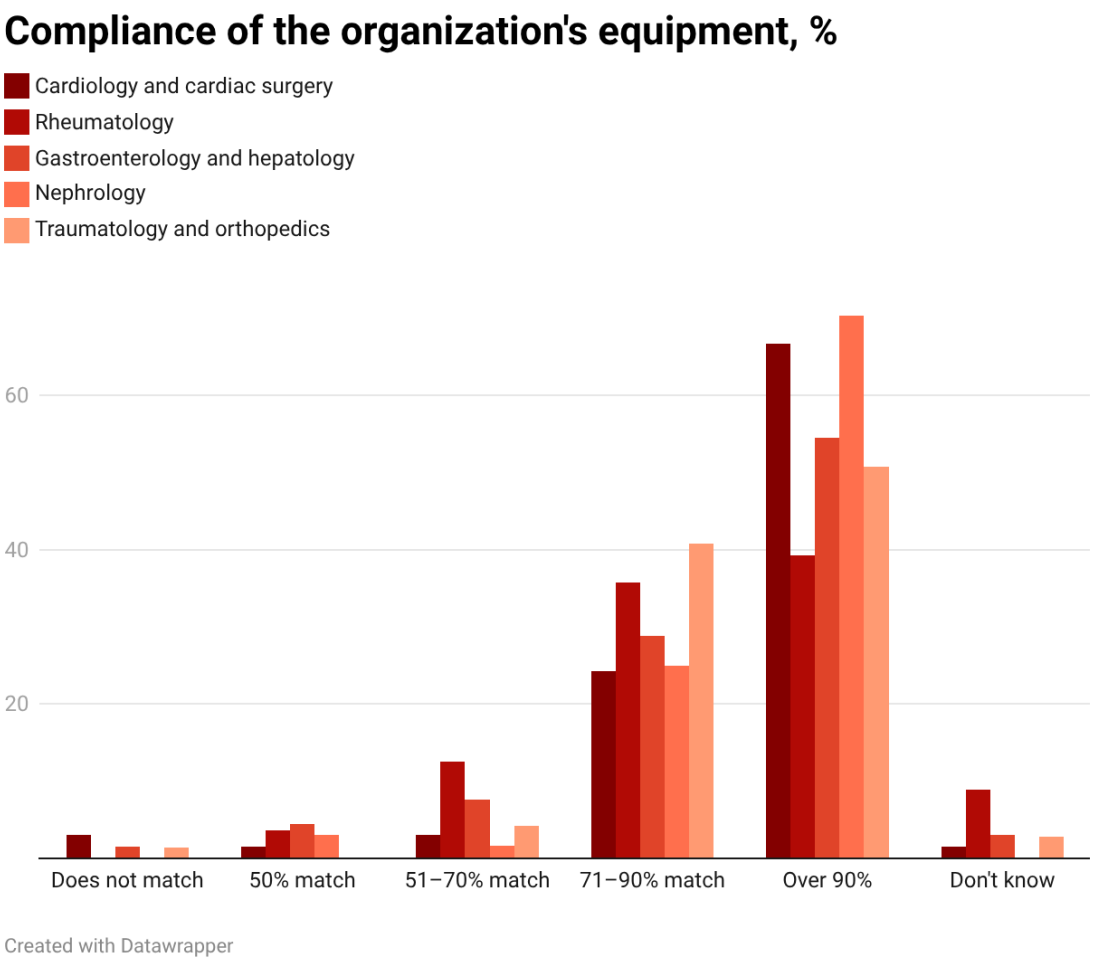


Figure 5. Compliance of the organization's equipment for performing diagnostic and therapeutic procedures on patients with the Standard.

Discussion

This study conducted a multiregional assessment of physicians' knowledge and showed the frequency of application of the Standards in organizations providing specialized medical care across five clinical profiles in Kazakhstan. Three findings are particularly important. First, most physicians reported using the standards in daily practice: 82.7% of participants reported daily application. Secondly, the frequency with which standards were applied (according to reports) did not necessarily correspond to a deep understanding of their content. Metrics regarding knowledge levels and their distribution are presented separately for each clinical profile, as the questionnaires varied in terms of the number and content of the questions. Thirdly, physicians generally considered patient satisfaction and the availability of necessary equipment to be important factors in ensuring high-quality medical care, although the frequency with which patient satisfaction was assessed according to the physicians varied by clinical profile. Taken together, these findings suggest that the regular use of standards (as reported by respondents) does not necessarily indicate a detailed knowledge of their requirements or consistent implementation at the organizational level.

Level of knowledge of the standards and frequency of application

The survey revealed differences in physicians' knowledge regarding the content of standards across five clinical profiles. Median scores ranged from 2 to 7 points, depending on the questionnaire designed for a specific profile. Because the questionnaires varied in both the number and content of the questions, differences in "raw" scores cannot be taken as evidence that physicians in one specialty possess greater overall knowledge than those in another. It is appropriate to interpret the results separately for each profile, paying particular attention to the regulatory requirements for which the fewest correct answers were recorded. While these data can help identify areas for targeted educational initiatives, comparing knowledge levels across different specialties would require further work using a validated and comparable assessment tool.

International studies confirm that physicians' insufficient knowledge of medical care organization standards is directly associated with an increase in

diagnostic errors, reduced timeliness of treatment, and worse outcomes [1–3]. The discrepancy between the reported frequency of application and the level of knowledge may indicate that regular use of the standards does not necessarily reflect detailed awareness of their content. Physicians may use the standards as a general organizational guide, relying on their clinical experience, established routines, inputs from colleagues, or other clinical documents for specific decisions. This applies especially to those clinical profiles that scored low relative to their reported frequent use. Therefore, the mere presence and routine use of a regulatory document should not, by itself, be interpreted as evidence of its effective implementation. The literature discusses potential reasons, including a lack of awareness regarding clinical guidelines, insufficient resources, organizational barriers, and limited support for the implementation process [2, 4, 5]. These factors should be viewed as possible explanations rather than as barriers specifically identified in the present study. Further research utilizing purpose-designed questions, assessments of organizational conditions, or qualitative interviews is required to determine which specific barriers exist and how they influence the implementation process within the participating healthcare organizations.

Differences between clinical profiles may reflect varying degrees of structural complexity in the respective standards. Given that the number of items varied (ranging from 8 to 12), the resulting scores indicate knowledge gaps specific to a given profile – particularly regarding compliance with local regulatory requirements – rather than an absolute ranking that would allow for direct comparison between different specialties. Nevertheless, training and professional development, together with organizational support, are key determinants of the successful implementation of standards [6,4]. While the former can be achieved through regular training sessions and seminars, the latter includes ensuring clear patient routing regulations and the availability of consultative assistance at all levels [6,4]. According to a number of authors, continuous professional development, including study of the regulatory framework, is a fundamental factor in improving the quality of medical care provided [2,3,7].

The rheumatology profile deserves special attention, as gaps were identified regarding patient routing and indications for genetically engineered biologic therapy. Difficulties in understanding routing algorithms can lead to delayed referral of patients to the appropriate stage of care. Insufficient knowledge among practicing physicians regarding the prescribing and monitoring of GEBT reflects broader challenges in implementing high-technology treatment and diagnostic methods under conditions of limited resources [8]. The gaps in knowledge and application of renal replacement therapy identified among physicians are consistent with data from international studies. Similar gaps in knowledge of specialized profile-specific aspects of care have also been observed in a number of countries in Eastern Europe and the United States [9,10].

Role of professional experience and place of work

In our study, no statistically significant difference in knowledge by length of work experience was found in any of the 5 clinical profiles. There was also no statistically significant difference by place of work. These data indicate that experience alone does not guarantee better knowledge of care organization standards. However, the results should be interpreted with caution, as some experience and place-of-work groups had a very small number of participants. Consequently, the analyses may have had insufficient statistical power to detect a significant difference. Thus, these results should be interpreted as an absence of statistically significant evidence within this sample, rather than as proof that the groups are equivalent.

The absence of a clear association with experience has practical significance. If knowledge of the standards depended directly on professional experience, additional training might be of limited value for experienced physicians. If the standards change over time, or if they contain detailed organizational requirements, periodic training and accessible methodological support may be necessary regardless of physicians' length of practical experience. Our findings point to the possibility of the latter scenario, but our study cannot establish the causal mechanisms underlying the different levels of knowledge.

Patient satisfaction as a component of care quality

The majority of respondents identified patient satisfaction as an important organizational priority: 300 out of 323 surveyed (92.9%) rated it as a high-level priority. Furthermore, 89.9% of respondents noted that patient satisfaction directly influences their organization’s performance outcomes. These findings indicate that the concept of patient-centered care has gained broad recognition among the physicians surveyed. This is consistent with the findings of international publications, in which a patient-centered approach is a key factor in improving the quality of medical care and clinical outcomes [11–16]. According to international studies, regular monitoring of patient satisfaction contributes to a reduction in readmission

rates and increased treatment adherence [11,13]. However, recognizing the importance of patient satisfaction does not necessarily mean that it is being assessed systematically or that patient feedback is being used effectively.

However, recognizing the importance of patient satisfaction does not necessarily mean that its assessment is systematic or that patient feedback is used effectively. In our study, the frequency of satisfaction assessment varied by profile. Many respondents reported daily assessment, whereas quarterly assessment was reported by physicians in traumatology and orthopedics. A small proportion of respondents noted that patient satisfaction assessment was not conducted in their organization at all.

This variability is important from a healthcare system perspective, since patient satisfaction is highly useful for improving care quality when it is measured using consistent methods and integrated into organizational decision-making. The lack of a standardized approach limits comparisons between organizations and profiles in terms of the frequency and consistency of satisfaction assessment. This study did not examine the instruments used to assess satisfaction or how the results are applied to improve care quality. This may reduce the comparability and objectivity of the data obtained, limiting their use in management decisions [4,17]. Therefore, further research is needed to determine the extent to which the observed monitoring translates into meaningful organizational change.

Perceived equipment availability

Physicians generally reported an adequate level of equipment availability in their organizations. Most reported an equipment compliance level above 70% relative to requirements. Nevertheless, the distribution of responses showed that perceived equipment compliance varied across organizations and clinical profiles.

Technical equipment is an important prerequisite for implementing standards that require specific diagnostic or therapeutic capabilities [6,4]. International experience confirms that adequate material and technical support is one of the main factors for the successful implementation of standards, especially in profiles requiring the use of modern, technologically advanced medical equipment [11,5,18]. Insufficient equipment limits the possibilities for timely and complete diagnosis and treatment, which also reduces the effectiveness of implementing the requirements of the standards and the quality of the services provided [11,5,18]. However, equipment alone does not guarantee effective implementation. Effective implementation also requires trained personnel, organizational processes, routing algorithms, and the ability to apply available resources in practice. Thus, equipment availability should be considered one component of the implementation environment rather than a standalone indicator of successful implementation [5,19,20].

Implications for practice and health policy

These findings have several implications for the organization of specialized medical care in Kazakhstan. Firstly, monitoring of the standards should go beyond determining whether physicians report using them. Assessment should also include verifying whether physicians understand the specific requirements and whether these requirements are reflected in routine organizational processes. Secondly, the pattern of responses characteristic of each profile makes it possible to identify areas that require targeted educational support. In rheumatology, such areas include patient referral pathways and the indications for prescribing genetically engineered biological therapies; in nephrology, they include specific aspects of renal replacement therapy. The results for each profile should be interpreted within the context of the relevant questionnaire, rather than by creating a ranking of specialties based on "raw" scores. Thirdly, regular methodological support should accompany formal training. Easily accessible electronic formats of the standards, concise implementation algorithms, decision-support materials, and periodic updates can improve the integration of standards into daily practice. Such measures may be particularly useful when the standards are detailed or frequently updated. Finally, monitoring should encompass various aspects of implementation. Physician knowledge, reported frequency of use, organizational readiness, equipment availability, patient experience, and adherence to the standards should be assessed together. Such an approach would provide a more complete picture than physician self-reported use alone.

Future directions

Future research, in addition to surveying physicians, should also include an objective assessment of implementation using methods such as audits of medical organizations, evaluation of documentation and patient routing, and adherence to the requirements of the standard. Longitudinal studies are needed to determine whether educational and organizational interventions lead to sustainable changes in implementation. Further study of the differences in knowledge across clinical profiles is required. Qualitative interviews with physicians and healthcare managers could be conducted to identify barriers not captured by the structured questionnaire. Such mixed-methods studies could provide a stronger basis for

developing interventions to support the implementation of the standards.

Strengths and limitations of the study

The main strength of this study is its broad coverage of regions and organizations. The survey included 323 physicians from 46 medical organizations across 13 regions of Kazakhstan, with a response rate of 80.8%. This provides an important multiregional perspective on the implementation of the standards across a number of priority areas.

The study also has a number of limitations. Data was obtained through self-report and may be subject to recall bias and social desirability bias. Physicians may report more frequent use of the standards and a higher level of equipment than would be found through direct assessment. Additionally, the cross-sectional design of the study does not allow for the examination of causal relationships between organizational factors and implementation. A further limitation is the lack of an assessment of the relationship between standards implementation and quality of care; the effect of implementation on clinical outcomes, patient safety, or other objective indicators was not studied. Another limitation is the small number of participants in the work-experience and place-of-work groups when performing the Kruskal-Wallis test, which reduces the statistical power of the test and requires cautious interpretation of the results. Sensitivity analyses using pooled categories yielded results consistent with the main analyses: no statistically significant associations were found. However, these data should be interpreted with caution, as combining categories may reduce the likelihood of detecting differences between groups. Finally, the profile-specific questionnaires were developed specifically for this study and have not undergone formal psychometric evaluation. Although expert review and pilot testing confirmed the content relevance and clarity of the questionnaire items, the reliability and reproducibility of the resulting measures have not been established. This limitation, combined with variations in the number and content of items across different profiles, complicates the interpretation and comparability of knowledge-level assessments.

Conclusion

This study describes physicians' self-reported use of standards for the organization of specialized medical care, as well as their knowledge of regulatory requirements specific to their respective clinical specialties in Kazakhstan. Although most respondents reported using these standards on a daily basis, the survey results identified areas where knowledge may require further assessment and educational support. Given that the questionnaires varied in terms of the number of questions and content, the findings regarding knowledge should be interpreted within the context of each specific clinical specialty rather than used to rank the specialties against one another. Furthermore, the results are limited by the use of a purposive sampling strategy and a reliance on self-reported data. Future research should employ validated assessment tools and objective indicators of implementation to more consistently evaluate knowledge and adherence to standards across different clinical specialties.

Supplementary Materials

Supplementary file available via: https://www.journalehdi.com/suppfile/803/ehdi065_Supplementary-File.pdf

Acknowledgements

Author Contributions: Conceptualization, G. M. (Gulzhan Mukhanova), A.B., A.U. and A. T.; methodology, A.B. and A.U.; formal analysis, G. M. (Gulzhan Mukhanova) and A. B.; investigation, M. B. and G. M. (Gyulnara Meyremkhanova); data curation, A. U.; writing – original draft preparation, G. M. (Gulzhan Mukhanova), A. B. and A. U.; writing – review and editing, M. B., G. M. (Gyulnara Meyremkhanova) and A. T.; visualization, A. B.; supervision, A. T.; project administration, G. M. (Gulzhan Mukhanova); All authors have read and agreed to the published version of the manuscript.

Funding: This study was funded by the Ministry of Health of the Republic of Kazakhstan according to the provision of services for the implementation of a state assignment within the allocated budget funds. The funder had no influence on the study design, data acquisition, analysis, publication, or writing. A. T. served as the project's principal investigator.

Disclosures: The authors declare no conflicts of interest.

Declaration of AI Use: During the preparation of this manuscript, the authors used Claude solely for translation into English and reference formatting. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

References

1. Karbach U, Schubert I, Hagemeister J, Ernstmann N, Pfaff H, Höpp HW. Physicians' knowledge of and compliance with guidelines: an exploratory study in cardiovascular diseases. Dtsch Arztebl Int. 2011;108(5):61–69. doi:10.3238/arztebl.2011.0061
2. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of the effect of continuing medical education strategies. JAMA. 1995;274(9):700–705. doi:10.1001/jama.274.9.700
3. Marinopoulos SS, Dorman T, Ratanawongsa N, Wilson LM, Ashar BH, Magaziner JL, et al. Effectiveness of continuing medical education. Evid Rep Technol Assess (Full Rep). 2007;(149):1–69.
4. Pereira VC, Silva SN, Carvalho VKS, Zanghelini F, Barreto JOM. Strategies for the implementation of clinical practice guidelines in public health: an overview of systematic reviews. Health Res Policy Syst. 2022;20(1):13. doi:10.1186/s12961-022-00815-4
5. Moyimane MB, Matlala SF, Kekana MP. Experiences of nurses on the critical shortage of medical equipment at a rural district hospital in South Africa: a qualitative study. Pan Afr Med J. 2017;28:100. doi:10.11604/pamj.2017.28.100.11641
6. Cohen DJ, Wyte-Lake T, Bonsu P, Albert SL, Kwok L, Paul MM, et al. Organizational factors associated with guideline concordance of chronic disease care and management practices. J Am Board Fam Med. 2022;35(6):1128–1142. doi:10.3122/jabfm.2022.AP.210502
7. Orlewska E, Ancuta I, Anic B, Codrenau C, Damjanov N, Djukic P, et al. Access to biologic treatment for rheumatoid arthritis in Central and Eastern European (CEE) countries. Med Sci Monit. 2011;17(4):SR1–SR13. doi:10.12659/msm.881697
8. Inotai A, Tomek D, Niewada M, Lorenzovici L, Kolek M, Weber J, et al. Identifying patient access barriers for tumor necrosis factor alpha inhibitor treatments in rheumatoid arthritis in five Central Eastern European countries. Front Pharmacol. 2020;11:845. doi:10.3389/fphar.2020.00845
9. Abdel-Kader K, Greer RC, Boulware LE, Unruh ML. Primary care physicians' familiarity, beliefs, and perceived barriers to practice guidelines in non-diabetic CKD: a survey study. BMC Nephrol. 2014;15:64. doi:10.1186/1471-2369-15-64
10. Alparslan C, Malyszko J, Caskey FJ, Aleckovic-Halilovic M, Hrušková Z, Arruebo S, et al. Capacity for the management of kidney failure in the International Society of Nephrology Eastern and Central Europe region: report from the 2023 ISN Global Kidney Health Atlas (ISN-GKHA). Kidney Int Suppl. 2024;13(1):29–42. doi:10.1016/j.kisu.2024.01.006
11. Doyle C, Lennox L, Bell D. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. BMJ Open. 2013;3(1):e001570. doi:10.1136/bmjopen-2012-001570
12. Rahmah U, Yuliani FC. Patient centered care models: a systematic review of implementation and impact on health outcomes. Medical Studies and Health Journal (SEHAT). 2024;1(3):268–295. doi:10.62207/9bxcxy97
13. Ismaila N, Mbuagbaw L, Ma J, Thabane L. Clinical practice guidelines adherence and the impact on health outcomes in oncology: a systematic review and meta-analysis. Clinical and Public Health Guidelines. 2025;2:e70030. doi:10.1002/gin2.70030
14. World Health Organization. Delivering quality health services: a global imperative for universal health coverage. Geneva: World Health Organization; 2019. Available from: https://www.who.int/publications/i/item/9789241513906
15. OECD. Patient-Reported Indicators Survey (PaRIS): measuring patient-reported outcomes internationally. Paris: OECD; 2021. Available from: https://www.oecd.org/en/about/programmes/patient-reported-indicator-surveys-paris.html
16. 2022 National Healthcare Quality and Disparities Report [Internet]. Rockville (MD):

Agency for Healthcare Research and Quality (US); 2022 Oct. Available from: https://www.ncbi.nlm.nih.gov/books/NBK587182/

17. Almazrou SH, Alfaifi SI, Alfaifi SH, Hakami LE, Al-Aqeel SA. Barriers to and facilitators of adherence to clinical practice guidelines in the Middle East and North Africa region: a systematic review. Healthcare (Basel). 2020;8(4):564. doi:10.3390/healthcare8040564
18. Kebede E, Yoseph E, Asaye H, Mulate B. Examining healthcare workers' perspectives concerning medical equipment availability in three Ethiopian hospitals: a qualitative pilot study. Cureus. 2021;13(3):e14134. doi:10.7759/cureus.14134
19. Leslie HH, Sun Z, Kruk ME. Association between infrastructure and observed quality of care in 4 healthcare services: a cross-sectional study of 4,300 facilities in 8 countries. PLoS Med. 2017;14(12):e1002464. doi:10.1371/journal.pmed.1002464
20. Berman P, Pallas S, Smith AL, Curry L, Bradley EH. Improving the Delivery of Health Services: A Guide to Choosing Strategies. Health, Nutrition, and Population (HNP) discussion paper; World Bank; 2011. Available from: http://hdl.handle.net/10986/13594