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Awareness and Barriers to Guideline Adherence: Slovenian Family Physicians Survey and Qualitative Feedback

Conhecimento e Barreiras na Adesão às Normas de Orientação Clínica: Questionário a Médicos de Família Eslovenos e *Feedback* Qualitativo

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ABSTRACT

Introduction: Clinical practice guidelines are essential for standardizing care, yet adherence in primary care remains inconsistent globally. The aim of this study was to assess the use of clinical guidelines by family physicians in Slovenia for diagnosing and managing common conditions, to explore factors influencing guideline awareness and decision-making, and to identify barriers to adherence.

Methods: A nationwide cross-sectional study surveyed family medicine specialists and trainees across public and private practices in rural and urban Slovenia. Participants completed an online questionnaire to evaluate their awareness of professional guidelines (27 guidelines made by Slovenian healthcare professionals). Furthermore, they were tested on guideline-aligned decisions (five clinical vignettes). The last question in the survey was an open-ended question on the main obstacles associated with the use of clinical guidelines.

Results: Out of 660 physicians surveyed, only 57 respondents completed the questionnaire in full (8.6% response rate). Guideline awareness varied significantly (average 60.8%), with higher knowledge of guidelines for relatively common conditions (e.g., 96% for arterial hypertension *versus* 12% for polycythemia *vera*). Correct clinical decisions according to guidelines were made in 65.2% of cases (lowest average scores for osteoporosis, 57.9%, highest for dyspepsia, 69.7%). Minimal statistically significant differences emerged between family medicine specialists and trainees (decisions regarding peripheral arterial occlusive disease, $p = 0.024$), public or private practice types (decisions regarding low urinary tract symptoms, $p = 0.037$), and urban or rural practice settings (decisions regarding chronic obstructive pulmonary disease, $p = 0.008$ and $p = 0.016$). Answers to the open-ended question were divided into six categories according to the content: organizational limitations (lack of time and availability of guidelines), limitations related to the characteristics and quality of guidelines, team members' lack of knowledge or work based on experience, complex patients, non-cooperative patients, and financial limitations.

Conclusion: On average, family physicians in Slovenia make clinical decisions according to guidelines in 65.2% of cases. Organizational constraints, notably workload and time pressures, are the leading obstacles to guideline adherence. Interventions such as extended consultation times, centralized digital guideline repositories, and annual update seminars are recommended. Our study highlights the need for broader research to validate strategies for enhancing guideline implementation and adherence in primary care.

Keywords: Clinical Decision-Making; Family Practice; Guideline Adherence; Slovenia; Surveys and Questionnaires

RESUMO

Introdução: Apesar de as normas de orientação clínica serem essenciais para harmonizar os cuidados, a adesão nas unidades de cuidados de saúde primários permanece inconsistente a nível global. Este estudo teve como objetivo a avaliação da utilização de normas de orientação clínica por médicos de família na Eslovénia para o diagnóstico e tratamento de patologias comuns, e a identificação dos fatores que influenciam o conhecimento das normas de orientação clínica, a tomada de decisões e das barreiras à adesão.

Métodos: Estudo transversal de âmbito nacional junto de especialistas em Medicina Geral e Familiar e de médicos internos de Medicina Geral e Familiar a trabalhar em centros de saúde públicos e privados em áreas rurais e urbanas da Eslovénia. Os participantes completaram um questionário *online* para avaliar o seu conhecimento sobre normas de orientação clínica (27 normas de orientação clínica elaboradas por profissionais de saúde eslovenos). Posteriormente, avaliaram-se as decisões tomadas em relação à sua conformidade com as normas de orientação clínica em vigor (cinco casos clínicos). O último item do questionário foi uma pergunta de resposta aberta sobre os principais obstáculos associados ao uso das normas de orientação clínica.

Resultados: De um total de 660 médicos, apenas 57 completaram o questionário na íntegra (taxa de resposta de 8,6%). O conhecimento sobre as normas de orientação clínica variou significativamente (média de 60,8%), com maior conhecimento das normas sobre patologias relativamente comuns (por exemplo, 96% para hipertensão arterial *versus* 12% para policitemia *vera*). Em 65,2% dos casos foram tomadas decisões clínicas corretas e de acordo com as normas (pontuações médias mais baixas para osteoporose, 57,9%, mais altas para dispepsia, 69,7%). Diferenças mínimas estatisticamente significativas emergiram entre especialistas em medicina geral e familiar e internos (decisões sobre doença arterial periférica, $p = 0,024$), contextos de prática pública ou privada (decisões sobre sintomas do trato urinário inferior, $p = 0,037$), e contextos de prática urbana ou rural (decisões sobre doença pulmonar obstrutiva crónica, $p = 0,008$ e $p = 0,016$). As respostas à pergunta aberta foram divididas em seis categorias: limitações organizacionais (falta de tempo e disponibilidade de diretrizes), limitações relacionadas com as características e qualidade das normas, falta de conhecimento dos membros da equipa ou trabalho baseado na experiência, doentes complexos, doentes não colaborantes e limitações financeiras.

Conclusão: Em média, os médicos de família na Eslovénia tomam decisões clínicas de acordo com as normas de orientação clínica em 65,2% dos casos. Os principais obstáculos à adesão às normas são as restrições organizacionais, principalmente a carga de trabalho e pressões de tempo. São recomendadas intervenções, tais como tempo de consulta prolongado, repositórios digitais centralizados de normas de orientação clínica e seminários anuais de atualização. O nosso estudo destaca a necessidade de mais investigação para validar as estratégias de melhoria da implementação e adesão às normas de orientação clínica nos cuidados de saúde primários.

Palavras-chave: Adesão às Diretrizes; Eslovênia; Inquéritos e Questionários; Medicina Geral e Familiar; Tomada de Decisão Clínica

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KEY MESSAGES

- A nationwide survey of Slovenian family physicians provides insights into clinical guideline awareness and decision-making.
- A mixed-methods design using clinical vignettes and open-ended feedback enriches quantitative and qualitative findings.
- Organizational challenges, including excessive workload and limited consultation time emerged as major barriers.
- The small sample size (57 respondents, 8.6% response rate) and use of only five vignettes may limit the study's generalizability.
- The findings underscore the need for targeted interventions, such as extended consultation times and centralized digital guideline repositories.

INTRODUCTION

Clinical practice guidelines represent evidence-based recommendations often derived from the highest available levels of high-quality evidence regarding procedural efficacy. These guidelines are developed through multidisciplinary collaboration among leading specialists across medical disciplines and often incorporate input from patient advocacy organizations.[1] A report from the American College of Cardiology/American Heart Association Task Force identified a gap in the literature in terms of guideline use improving patient outcomes.[2]

National clinical guidelines comprise a comprehensive framework of healthcare services and procedural recommendations designed to ensure equitable access to essential and clinically justified medical services without discrimination. They also encompass economic evaluations of workforce requirements, logistical and organizational implementation strategies, and risk management protocols. Slovenian national guidelines form the foundation of national healthcare programs and require formal approval from the Health Council of the Slovenian Ministry of Health.[3]

Global research has consistently demonstrated suboptimal adherence to clinical guidelines among physicians, with European adherence rates not exceeding 70%.[1] A notable German study revealed significant variations in guideline awareness across medical specialties, with cardiologists showing the highest awareness of hypertension guidelines (37.1%), followed by internists (25.6%) and family physicians (18%).[1] Awareness was found to correlate primarily with the duration of private practice experience rather than the urban or rural location of practice. Adherence rates also varied by condition, with 63% of German physicians reporting adherence to hypertension guidelines and only 32% following hyperlipidemia treatment guidelines.[1] Another study found that at least 20% of clinical cases encountered in clinical practice were not covered by clinical guidelines.[4] While 100% adherence is unrealistic, the optimal adherence rate for a primary care system remains undetermined.

Adherence to evidence-based clinical guidelines in primary care remains a significant challenge in modern medical practice. The aim of this study was to assess the awareness and knowledge of clinical guidelines among family physicians in Slovenia, specifically regarding their use of guidelines to inform diagnostic and treatment decisions for common conditions in daily practice. It also sought to evaluate physicians' awareness of the existence and content of disease-specific guidelines. Furthermore, the study analyzed whether factors such as family medicine traineeship (FMTs) or family medicine specialist (FMSs) status, practice location (urban *versus* rural), and ownership type (public *versus* private) affect guideline awareness and knowledge of their content.

An open-ended question was included to move beyond predefined categories of commonly cited barriers and instead capture authentic, practice-based reflections from experienced clinicians. Additionally, another aim of this study was to identify potential barriers to guideline adherence and propose practical solutions to improve consistency in their application. Understanding these patterns and challenges is crucial for developing targeted interventions that enhance guideline adherence and, consequently, improve the quality of primary healthcare delivery.

METHODS

This cross-sectional study was conducted among FMSs and FMTs in Slovenia. The manuscript was elaborated in agreement with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines.[5] The target population included FMSs and FMTs working in various regions of Slovenia and employed in both public and privately owned healthcare institutions. Ethics committee approval was obtained from the Slovenian National Medical Review Board (0120-470/2020/6). Informed consent was obtained on the survey landing page, where participants were provided with information about the number of questions, the nature and storage of collected data, the study's investigators, and its purpose. Data were securely collected and stored using 1ka, an open-source online survey platform.[6]

The survey instrument was developed internally by the

research team without external templates. It comprised demographic questions, clinical vignettes, and a single open-ended question addressing the main obstacles to the use of clinical guidelines. The vignettes were elaborated based on Slovenian national guidelines (detailed in the 'Methods' section below) and recommendations for the most common conditions encountered by FMSs. No validated questionnaires addressing this specific topic were available.

Usability and technical functionality were pre-tested using the 1ka platform. The electronic questionnaire underwent internal testing among research group members before field deployment.

The survey was not open to the public. Access was restricted to invited participants via a shared URL, which was not individually personalized for each respondent. The survey was not password-protected.

Initial recruitment was conducted via email invitations sent directly by the research group to a random selection of FMTs and FMSs, and email addresses were obtained through internet search. Additionally, the Medical Chamber of Slovenia (MCS) distributed the survey invitation to all FMTs registered in their database.

Study recruitment was carried out in two phases using a convenience sampling strategy. This strategy was employed as it offers easier operational logistics, readily available study participants and faster data collection. The main drawback of such sampling is the potential introduction of bias, as those who are more readily available could misrepresent actual subgroups in the target population. As this study aimed to set the basis for further research, the aforementioned risk of bias was acceptable. In the first phase (March 31st, 2021), the MCS distributed the questionnaire link to 632 FMTs and FMSs listed in its email database. To further extend reach within the target population, the questionnaire was also shared in a Facebook group for FMTs (396 members) and the closed Facebook group of the 30th modular training program (32 members), part of the formal family medicine traineeship.[7] The second recruitment phase (October 6th, 2021) targeted healthcare institutions. Twenty-six public healthcare centers (PHCs) were randomly selected from 58 PHCs across Slovenia (representing a 45% sampling rate). The management teams at these centers were asked to distribute the questionnaire to their employed FMTs and FMSs. Twenty-three out of 26 PHCs agreed to participate. Additionally, recruitment was extended to private contractors working within the public primary care system. Survey invitations were sent to 42 randomly selected privately owned practices across various Slovenian regions, identified via the Professional Association of Private Doctors and Dentists of Slovenia's online registry.

Participation in the survey was voluntary, and no incentives were offered. URL links sent out to participants were not unique. Additionally, we did not ask participants for their name or identifiable information. Data collection occurred during two intervals: from February 25th, 2021, to June 25th, 2021, and from October 6th, 2021, to January 6th, 2022. The survey did not employ randomization of question order or adaptive questioning techniques.

The first page of the survey presented the study invitation and informed consent statement, followed by the survey questions, which were organized across nine pages. No completeness checks were enforced before submission; participants could return to previous pages to review or amend their responses.

The respondents' IP addresses were logged during the survey to reduce the likelihood of multiple submissions by the same individual. However, no additional measures, such as log file analysis or response-block tracking, were implemented to identify or prevent duplicate entries. Respondents were not required to register for survey participation.

Incomplete responses were excluded from the final analysis. Timestamps were not used to track response duration, and no statistical adjustments or corrections were applied to the dataset.

Slovenian primary healthcare system

The Slovenian primary healthcare system has served as a model for many other countries.[6] It is organized and administered by local municipalities.[7] The system offers a comprehensive range of preventive, diagnostic, curative, rehabilitative, palliative, and health promotion services.[7] Definitions of key terms relevant to the Slovenian healthcare system and this study are provided in Table 1. Each patient in Slovenia has a family medicine specialist, typically located near the patient's residence. The FMSs function as gatekeepers to the healthcare system, referring patients to specialist services when necessary. Before 2001, the system was primarily staffed by general medicine practitioners. Between 2000 and 2001, it was restructured into an FMS-based model.[8] Under the previous system, general practitioners did not complete internships. A one-year residency was followed by a 'state professional' examination.[8] The current program, in place since 2001, requires four years of postgraduate training: two years in secondary or tertiary care settings, and two years in general practice under the supervision of an experienced mentor.[8] As of 2024, there were 1096 active family medicine specialists and 272 family medicine trainees in Slovenia.[9]

Clinical vignettes

The first section of the survey listed 27 national guidelines, recommendations, and care proposals developed in Slovenia. Participants were asked to indicate which of these

Table 1 – Term definitions: Slovenian primary healthcare system

Family medicine trainee	Medical doctor doing residency in Family Medicine, after doing an internship.
Family medicine specialist	Specialist medical doctor who has done four-year residency in Family Medicine and passed state professional exam.
General medicine specialists	Title of a physician before 2000 and new residency program, who has done one-year family medicine residency and passed the state professional exam.
Public sector	Community public health centers whose ownership structure is by the local municipalities.
Private contractor	Medical practices which are owned by a private company (mostly owned by the FMSs themselves) and hold a concession from local municipalities for public service.
Concession	A contract with the National public health insurance institute that allows the concessionaires to charge their service to the public health insurance scheme. The medical practices are privately owned, but healthcare is publicly funded.
Primary healthcare level	Health care at a pre-hospital level.
Secondary healthcare level	Health care at a hospital level.
Tertiary healthcare level	Health care at a university hospital level.

they were familiar with, without requiring in-depth knowledge of their contents.

Clinical vignette cases were elaborated using the following Slovenian guidelines: guidelines for men with lower urinary tract symptoms due to benign prostatic hyperplasia,[10] osteoporosis,[11] peripheral arterial disease,[12] dyspepsia,[13] helicobacter pylori infection,[14] and chronic obstructive pulmonary disease (COPD).[15]

Each case consisted of a brief clinical scenario followed by several potential management actions. Participants were asked to indicate whether the action was recommended by the corresponding guideline and whether it reflected their actual clinical practice. Guideline adherence was defined as correctly identifying the guideline-recommended management actions within each vignette.

Statistical analysis

The quantitative data were categorical and are presented as frequencies with corresponding percentages. Statistical analyses were conducted using IBM® SPSS Statistics for Windows®, version 28.0.[16] Statistical significance was defined as $p < 0.05$.

Chi-square tests were performed to evaluate whether family physicians adhered to clinical guidelines at expected rates. Additional chi-square analyses were used to compare adherence rates between FMTs and FMSs to determine whether trainees adhered to guidelines more consistently than specialists in clinical practice.

Qualitative analysis

The final survey item was an open-ended question, analyzed through descriptive qualitative content analysis using a deductive approach. A categorization matrix was developed based on a review of existing literature, professional experience, and the collected dataset. Responses were manually coded into six distinct thematic categories related to guideline adherence. This process enabled the identification of the most cited factors contributing to guideline non-adherence in daily family medicine practice.

RESULTS

Study characteristics

Among the total number of survey accesses (n = 660), 277 respondents (42.0%) initiated the questionnaire, and 57 participants completed it (8.6% of total accesses; 20.6% of surveys initiated). The sample characteristics are summarized in Table 2. The majority of respondents were women, with FMS comprising the largest professional group. Most participants were aged between 31 and 40 years.

Participants were geographically distributed across all Slovenian regions, with the highest representation from the Podravska, Gorenjska, and Osrednjeslovenska regions.

Guideline recognition

Considerable variability in guideline awareness was observed, depending on the specific guidelines in question (Table 3). Physicians reported the highest levels of familiarity with guidelines for the management of diabetes, arterial hypertension, anaphylaxis, and osteoporosis. In contrast, the least recognized guidelines were those related to tear film disorders, dry eye syndrome, and polycythemia vera. On average, 60.8% of physicians reported awareness of the listed guidelines.

Table 2 – Demographic characteristics of survey respondents (n = 57)

Characteristic	n	%
Sex		
Female	37	65
Male	20	35
Professional status		
Family medicine specialists*	34	60
General medicine specialists*	9	16
Family medicine trainees	14	25
Age group (years)		
< 30	7	12
31 - 40	22	39
41 - 50	12	21
51 - 60	10	18
> 61	6	11
Location		
Urban	29	51
Rural	28	49
Employment type		
Public sector	49	86
Concessionaire	8	14
Academic roles		
Student mentor	24	42
Trainee mentor	17	30
University professor	3	5
No academic roles	13	23
Status		
Specialist	43	75
Trainee	14	25

* The Slovenian system recognizes both FMS, a new program from 2000 onward, and general medicine specialists, an old program before 2000; both work on primary care as GPs

Guideline adherence

Correct clinical decision-making in line with guideline recommendations was observed in an average of 65.2% of cases (Table 4). Statistically significant results are shown in Fig. 1.

A statistically significant difference between FMT and FMS was identified in one clinical vignette concerning peripheral arterial disease. Specifically, regarding the statement "Would not prescribe antiplatelet therapy for asymptomatic patients with reduced Ankle Index", 72.0% (n = 31) of FMS responded correctly according to guidelines, compared to 36.0% (n = 5) of FMT (p = 0.024; Fisher's exact test).

Significant differences were also observed in the management of chronic obstructive pulmonary disease. Urban-based physicians demonstrated higher adherence to diagnostic guidelines (72.0%, n = 21) than rural-based physicians (36.0%, n = 10; p = 0.008; Fisher's exact test). Conversely, rural physicians were more likely to prescribe bronchodilators for suspected COPD (75.0%, n = 21) compared to their urban counterparts (41.0%, n = 12; p = 0.016; Fisher's exact test). No other significant differences in management decisions were identified based on geographic location.

A statistically significant difference based on practice ownership was found in the management of lower urinary tract symptoms. Physicians working in privately owned practices were more likely to request bladder diaries (50.0%, n = 4) compared to those in public healthcare institutions (14.3%, n = 7; p = 0.037; Fisher's exact test). No additional significant differences between public and private sector physicians were identified.

Open-ended question responses (qualitative analysis)

A total of 57 completed surveys yielded 177 individual responses to the open-ended question regarding barriers to guideline adherence. These responses were categorized into six thematic categories.

First category: organizational constraints

- Excessive workload, time constraints: Respondents noted that often, "you know what is right, but you don't do what is right, you do what is faster". Working at multiple sites was also identified as a contributing factor to overload. Some comments reflected a desire to return to more traditional, patient-centred care, exemplified by the statement: "Let's give family medicine back to the family doctor!".
- Guideline accessibility: Respondents called for a "duty of regional medical associations for timely information" and "rapid computerized format" for guidelines. While pharmaceutical companies sometimes issue educational materials, respondents said, "It is questionable whether such tools can be considered reliable guidelines and recommendations". Suggestions included "annual refresher courses" focused on primary care and clear guidelines delineating the responsibilities of family physicians versus specialists.
- Dysfunctional healthcare system: Physicians frequently attributed guideline nonadherence to systemic inefficiencies: "Unacceptable waiting times often force shortcuts and deviations from established protocols, which can lead to serious mistakes". Consequently, "you must see a patient multiple times to carry out one guideline-recommended measure".

Table 3 – Guideline recognition (rate of physicians answering they know the guideline)

Guideline for	n	%
Type II diabetes	55	96%
Arterial hypertension	55	96%
Anaphylaxis	54	95%
Osteoporosis	54	95%
Men with lower urinary tract symptoms due to benign prostatic hyperplasia	49	86%
Dyspepsia	48	84%
Guidelines for resuscitation	48	84%
Dementia	47	82%
Chronic obstructive pulmonary disease	46	81%
Community-acquired pneumonia	46	81%
Pain in adult cancer patients	46	81%
Asthma	44	77%
Peripheral arterial disease	40	70%
Migraine	36	63%
Preparation of diabetic patients for colonoscopy	35	61%
Venous thrombosis	35	61%
Chronic venous insufficiency	34	60%
Preventing NSAID and antiplatelet therapy-induced gastrointestinal damage	30	53%
Diabetic retinopathy	30	53%
Painful shoulder	25	44%
Abdominal aortic aneurysm	23	40%
Chronic kidney disease in adults	18	32%
Head injuries	14	25%
Carpal tunnel syndrome	10	18%
Polycythemia vera	7	12%
Dry eye	5	9%
Teary eye disorders	3	5%

Respondents also described challenges in communication with secondary care and difficulties reconciling specialist instructions with existing guidelines.

- Poor digitalization: Participants identified inadequate digital decision-support tools and the absence of integrated guideline resources within electronic patient records as barriers. Suggestions included embedding direct guideline links into patient management software and standardizing health records to facilitate continuity of care across institutions.

Second category: poor guideline quality

Many physicians expressed dissatisfaction with the existing guidelines, describing them as too lengthy, insufficiently adapted to the realities of Slovenian primary care, and inconsistent across specialties. Some respondents felt that certain common conditions lacked appropriate guidelines, while others doubted their clinical relevance, stating: “Guidelines are not medicine” and “guidelines are nonsense”.

Third category: knowledge/education/experience

Respondents highlighted a lack of awareness about available guidelines, insufficient training opportunities for

Table 4 – Correct clinical decisions (rate of physicians answering in accordance with the guidelines)

Clinical vignette case	%
Prostate hyperplasia	68.6
Osteoporosis	57.9
Peripheral artery disease	62.5
Dyspepsia	69.7
Chronic obstructive lung disease	67.3

both physicians and nursing staff, and a general underemphasis on guideline use during medical education and postgraduate specialization. Several physicians noted that "we have too few quality training sessions for family doctors". Some doctors prefer to rely on their established habits, personal beliefs, and "experiences that have taught them why they decide differently" rather than following guidelines.

Fourth category: patient complexity

Several respondents noted that guideline recommendations are often difficult to apply to complex, multimorbid patients, particularly in the absence of guidelines for multimorbidity management. A strong emphasis was placed on a patient-centred approach, the complexity of care, and the need for individualized and holistic treatment rather than strict adherence to guidelines alone.

Fifth category: patient cooperation

Participants observe that constant treatment changes due to guideline updates can lead to a loss of patient trust. Patients often have "different expectations than those promoted by guidelines" and may resist their implementation by refusing diagnostic tests or, conversely, demanding referrals to secondary care. "Following guidelines sometimes requires saying 'no' to a patient, which some doctors are unwilling to do".

Sixth category: financial constraints

Physicians highlighted limited access to diagnostic tests due to insurance restrictions and insufficient funding for laboratory services and medical equipment. This financial gap between clinical recommendations and available resources further contributed to deviations from guidelines.

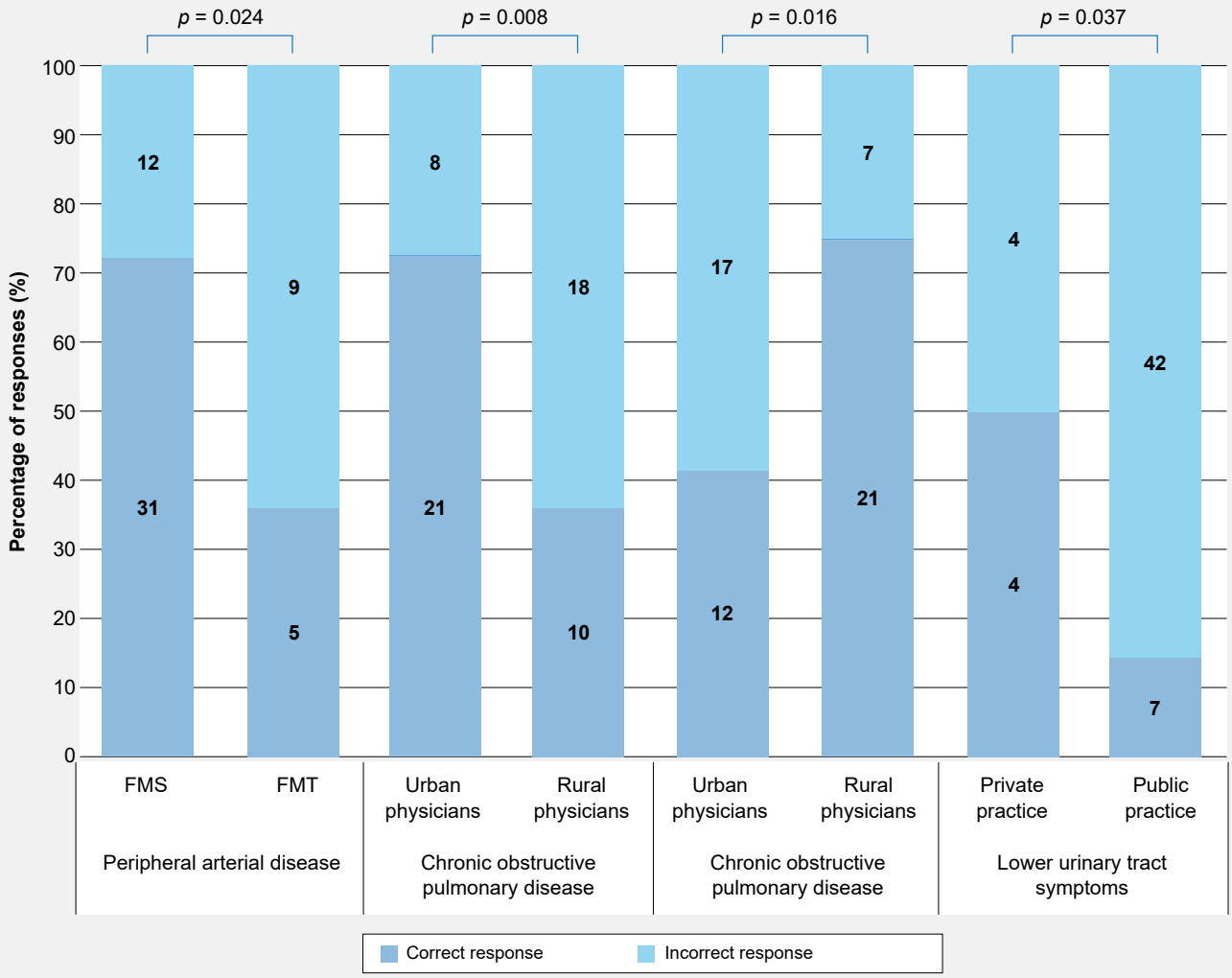

Figure 1 – Statistically different results of subgroup comparison based on guidelines thematic area with significance shown as *p* value

DISCUSSION

This cross-sectional survey study represents the first comprehensive assessment of guideline awareness and adherence across multiple clinical domains within Slovenian primary care. Our findings suggest there is considerable variability in primary care physicians' recognition of clinical guidelines, ranging from 5.0% to 96.0%, with higher recognition rates observed for guidelines addressing common disorders. Using five clinical vignettes, we evaluated both theoretical knowledge and practical application of these guidelines, revealing notable discrepancies between awareness and clinical practice. Barriers to adherence were predominantly organizational, underscoring systemic challenges that require targeted interventions to improve the integration of evidence-based practices in primary care.

In our assessment of 27 selected guidelines, physicians recognized an average of 60.8%, a figure comparable to findings from Sweden (60.0%).[8] Similar recognition rates have been observed in other health professions, such as dentistry, where 68.0% of dentists reported familiarity with clinical guidelines.[9] The range of guideline recognition was substantial, from 5.0% for tear film disorders to 96.0% for arterial hypertension and type 2 diabetes. These results align with Slovenia's documented disease burden, where circulatory diseases and diabetes represent major public health concerns.[17,18] Interestingly, the only study on guideline adherence in Slovenia was conducted in 2007, which showed that only 9.3 % of patients were managed according to guidelines for hypertension. This pattern highlights a recurrent issue identified in the international literature: less prevalent or complex conditions, such as primary aldosteronism, are more likely to be overlooked or inadequately managed due to limited physician familiarity with the corresponding guidelines.[10]

Disease management between FMS and FMT differed only in antiplatelet therapy for asymptomatic patients with reduced Ankle index. As antiplatelet and anticoagulation therapy is complex and requires special education, it is possible that FMT did not yet receive that knowledge and have responded incorrectly.[11] It is also possible that due to selection bias introduced by convenience sampling a larger portion of FMT who are not familiar with guidelines were chosen. This lack of knowledge can be addressed by additional training in antiplatelet and anticoagulant therapy.

When comparing disease management by practice location, a significant difference was identified in the management of chronic obstructive pulmonary disease. Urban physicians demonstrated greater adherence to diagnostic guidelines, while rural physicians were more likely to prescribe bronchodilators empirically for suspected COPD. This finding is consistent with studies from the United States, which report that rural primary care physicians face additional barriers to guideline adherence due to factors such as large geographic distances, differing patient epidemiology, and challenges in care coordination.[12] These studies also highlighted disparities in patient expectations and healthcare-seeking behavior between urban and rural populations.[12] This could be addressed by educating rural physician more often on this topic in their local environments, making it easier for them to attend such educational events. While our study did not explore these contextual factors in depth, these international findings suggest relevant avenues for future research to better understand and address these differences in the Slovenian context.

The observed difference in lower urinary tract symptom management between physicians in privately owned and public sector practices was limited and should be interpreted with caution, given the small sample size. In general, differences between private and public primary care practices in Slovenia have been attributed to variations in management structures[13], although overall clinical performance is typically comparable. We believe that this indicates good quality of care for both ownership structures in Slovenia. As healthcare digitalization advances and debates around funding and healthcare service delivery continue, it will be important to evaluate how different organizational models and generational workforce preferences[14] influence patient care quality and guideline implementation.

Previous studies have proposed various strategies to enhance guideline implementation in primary care settings.[15] Our findings emphasize that organizational constraints remain the primary barrier to effective guideline integration, consistent with existing literature.[15,16,19] In the Slovenian context, physicians recommended solutions including establishing working standards that allow for longer patient consultations, improving guideline accessibility through centralized digital repositories, and involving practicing primary care physicians in guideline development to ensure practical applicability. These suggestions parallel recommendations from qualitative research conducted in Canada,[20] Germany,[4] Sweden,[17] and The Netherlands.[18]

This study has several limitations. The modest sample size may have limited the ability to detect certain trends or differences, and the small group sizes could have exaggerated observed effects. The convenience sampling may have introduced bias into our results, warranting further research with better sampling strategies in the future. Additionally, the use of an IP-based system to prevent duplicate responses may have inadvertently restricted participation from clinics sharing workstations, potentially underestimating the response rate. The employed questionnaire was developed for this study, as no validated instrument was available, and its psychometric properties were not formally assessed. Moreover, the length and cognitive demand of

the questionnaire could have led to respondent fatigue, particularly towards the end, with no mechanism to measure this effect. Data collection occurred during the COVID-19 pandemic, which may have influenced guideline awareness and adherence patterns as physicians prioritized emergent care needs. Finally, while clinical vignettes are a well-established research tool, real-time analysis of electronic health records and metadata might offer a more accurate assessment of guideline adherence in clinical practice.

Future research should investigate whether proposed interventions at both the organizational and guideline development levels lead to measurable improvements in guideline recognition and adherence which was also recommended by other authors.[4] Given that much of the existing research on guideline implementation is over a decade old, there is a clear need to revitalize this field with studies reflecting contemporary clinical realities, updated guidelines, and evolving socioeconomic factors. There is also a lack of studies comparing patient outcomes when guidelines are adhered to and where they are not, warranting further exploration.[2] Additionally, few studies have explored differences in guideline knowledge and application across various career stages, which could offer valuable insights into the design of targeted continuing medical education strategies.

CONCLUSION

This study found a variable awareness of clinical guidelines among family physicians in Slovenia, with an average recognition rate of 60.8%. Physicians adhered to guideline-recommended clinical decisions in 65.2% of cases. Organizational constraints emerged as the predominant barrier to guideline adherence. Recommended strategies for improving adherence include extending consultation times, improving access to diagnostic services, developing centralized digital guideline repositories, implementing annual update seminars, and introducing digital tools to facilitate guideline navigation and integration into clinical workflows. These findings underscore the need for broader, high-quality research to evaluate the effectiveness of interventions aimed at enhancing guideline implementation in primary care settings.

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PREVIOUS AWARDS AND PRESENTATIONS

The detailed and complete qualitative analysis of this research was presented at a nursing conference in Novo Mesto, Slovenia, in 2022. The conference was held in the Slovenian language.

AUTHOR CONTRIBUTIONS

LP: Drafting, writing, and critical review of the manuscript.

NKR: Conceptualization, methodology, investigation, data collection, formal analysis, visualization, and project administration.

VI: Conceptualization, methodology, investigation, resources, data curation, validation, supervision, and project administration.

All authors approved the final version to be published.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in October 2024.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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