

RESEARCH ARTICLE / ARASTIRMA MAKALESİ

Physicians' Knowledge, Attitudes, and Behaviors Regarding Physical Activity Recommendations

Hekimlerin Fiziksel Aktivite Önerileri Konusundaki Bilgi, Tutum ve Davranışları

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ABSTRACT

Objective: Physical inactivity is a major modifiable risk factor for non-communicable diseases in developing countries. With over 70% of adults in Türkiye remaining inactive, this study aimed to assess physicians' knowledge, attitudes, and practices regarding physical activity counseling to identify gaps and support clinical improvement efforts.

Materials and Methods: A cross-sectional online survey was conducted among 1,099 practicing physicians across Türkiye using a 24-item questionnaire developed through literature review, expert evaluation, and pilot testing. The questionnaire covered demographics, training background, PA knowledge, attitudes, and counseling behaviors. Descriptive statistics and ordinal logistic regression were used to identify factors associated with self-perceived competence.

Results: A substantial proportion of physicians had not received training on physical activity counseling during their undergraduate (77.8%) or postgraduate (88.3%) education. While 97.6% recommended basic exercises such as walking or cycling, 70.5% were unaware of national physical activity guidelines, and 58.6% reported not engaging in regular physical activity themselves. Most physicians spent less than three minutes per patient on counseling and provided no written exercise prescriptions. Ordinal logistic regression revealed that younger age, male gender, lack of training, and physical inactivity were paradoxically associated with higher self-perceived competence.

Conclusion: The findings highlight critical gaps in physician education and clinical practice regarding physical activity promotion. Integrating structured, evidence-based PA training and standardized counseling methods into medical education is essential to enhance physicians' competency and to effectively support public health goals.

Keywords: Physical activity, exercise prescription, physician counseling, medical education, health promotion

ÖZ

Amaç: Fiziksel inaktivite, gelişmekte olan ülkelerde, bulaşıcı olmayan hastalıklar için önemli ve değiştirilebilir bir risk faktörüdür. Türkiye'de yetişkin nüfusun %70'inden fazlasının fiziksel olarak aktif olmadığı dikkate alındığında, bu çalışma, hekimlerin fiziksel aktivite (FA) danışmanlığı konusundaki bilgi, tutum ve uygulamalarını değerlendirerek mevcut eksiklikleri belirlemeyi ve bu alandaki eğitim stratejilerinin geliştirilmesine rehberlik etmeyi amaçlamaktadır.

Gereç ve Yöntem: Türkiye genelinde aktif olarak görev yapan 1.099 hekim ile çevrim içi, kesitsel bir anket çalışması gerçekleştirilmiştir. Literatür taraması, uzman görüşleri ve pilot uygulama ile geliştirilen 24 maddelik anket; demografik veriler, eğitim geçmişi, FA bilgisi, tutumlar ve danışmanlık davranışlarını kapsamaktadır. Tanımlayıcı istatistikler ve sıralı lojistik regresyon analizi ile hekimlerin öz-yeterlik algısını etkileyen faktörler belirlenmiştir.

Bulgular: Hekimlerin önemli bir kısmı, lisans (%77,8) veya lisansüstü (%88,3) eğitimleri sırasında fiziksel aktivite danışmanlığı eğitimi almamıştır. Hekimlerin %97,6'sı yürüyüş veya bisiklet gibi temel egzersizleri önermekte, ancak %70,5'i ulusal FA kılavuzlarını bilmemekte ve

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%58,6'sı düzenli fiziksel aktivite yapmamaktadır. Çoğu hekim, hasta başına üç dakikadan az süre ayırmakta ve yazılı egzersiz reçetesi vermemektedir. Sıralı lojistik regresyon analizine göre, daha genç yaş, erkek cinsiyet, eğitim eksikliği ve fiziksel inaktivite, paradoksal olarak daha yüksek öz-yeterlik algısı ile ilişkili bulunmuştur.

Sonuç: Bulgular, hekimlerin fiziksel aktiviteyi teşvik etme konusundaki eğitim ve klinik uygulamalarında önemli boşluklar bulunduğunu ortaya koymaktadır. Hekimlerin yetkinliğini artırmak ve halk sağlığı hedeflerini desteklemek amacıyla tıp eğitimine yapılandırılmış, kanıta dayalı FA eğitimi ve standart danışmanlık yöntemlerinin entegre edilmesi gerekmektedir.

Anahtar Sözcükler: Fiziksel aktivite, egzersiz reçetesi, doktor danışmanlığı, tıp eğitimi, sağlıklı yaşam teşviki

INTRODUCTION

Physical inactivity has become one of the most pressing public health crises of the 21st century, contributing significantly to the global burden of chronic diseases and premature mortality. Approximately 3.2 million deaths annually are attributable to this modifiable risk factor, with over 80% occurring in low- and middle-income countries [1]. This trend is mirrored in Türkiye, where more than 70% of adults fail to meet the recommended physical activity (PA) guidelines [2]. Despite national health policies aimed at improving PA levels, effective implementation remains a challenge within the Turkish healthcare system.

Primary care physicians are uniquely positioned to promote PA due to their frequent and trusted contact with patients. Many countries have responded to rising sedentary behaviors by introducing national PA guidelines and provider training programs. Nevertheless, PA levels remain suboptimal, and clinical integration of these recommendations continues to lag behind [3-6]. Studies have consistently shown that physicians often lack adequate knowledge of PA guidelines and feel unprepared to provide effective counseling [7-10] largely due to gaps in medical education. For instance, only 56% of UK medical schools include structured content on PA.

The World Health Organization's Global Action Plan for Physical Activity (2018-2030) underscores the need to integrate PA counseling into routine care, led by well-trained health professionals [11]. Furthermore, physicians' personal lifestyle behaviors may influence their clinical counseling practices. Evidence from Malaysia suggests that physically active doctors are more likely to recommend exercise to their patients [6]. However,

knowledge, attitudes, and behaviors are not always aligned; some physicians report high confidence in counseling despite lacking formal training, potentially overestimating their competence.

Additional personal and professional factors such as self-rated health, perceived barriers, and self-efficacy, can shape whether and how physicians engage in PA promotion [12]. To enhance PA integration into health-care, it is essential to understand physicians' knowledge, attitudes, and behaviors regarding exercise prescription, including the type, intensity, frequency, and duration of activity. Despite growing global and national awareness, significant knowledge and practice gaps remain, particularly in Türkiye.

To address these challenges, this study investigates the knowledge, attitudes, and behaviors of physicians from multiple specialties across Türkiye concerning PA counseling. It further seeks to identify predictors of physicians' self-perceived competence using an ordinal logistic regression model. Unlike prior studies focused primarily on family physicians or limited samples, this nationwide, multi-specialty approach offers a broader understanding of current challenges and opportunities. The findings from this study have the potential to directly inform medical education curricula, continuing professional development programs, and national health policy initiatives aimed at integrating PA promotion into routine clinical care across Türkiye's healthcare system.

MATERIAL AND METHODS

Participants and procedure

This research is a cross-sectional study that involves practicing physicians from different specialties. We collected data from 1099 physicians across Türkiye.

Physicians who work outside of Türkiye, retired, or had no clinical contact with patients were excluded from the study. The Non-Interventional Clinical Research Ethics Board of Hacettepe University approved the study procedures. Permission ID is 35853172/4331409. Informed written consent was obtained from the participants via an online form.

The online survey was conducted using LimeSurvey, with the survey link accessed a total of 2,256 times. Among these, 1,099 responses were deemed suitable for analysis. Additionally, 805 individuals exited the survey before initiating it, while 352 participants did not complete the survey. After excluding incomplete and invalid questionnaires, we performed the final analysis on 1,099 valid responses (479 females, 620 males). Sample size ($N=1,099$) exceeded minimum requirements for population representativeness ($n=384$) [13] and ordinal regression adequacy ($n=888$ with 8 predictors; 10-20 cases per variable). The participants' mean age was 40.0 years (± 12.1). Almost all participating physicians (90.4%) are actively practicing, with an average of 47 (± 30) patients seen per day. The distribution of the physicians participating in the study according to their fields of expertise is given in Table 1.

Table 1. Distribution of the physicians by their field of expertise

Field of expertise	N	%
Family practitioner †	215	19.6
General practitioner	116	10.6
Cardiology	57	5.2
Nephrology	31	2.8
Endocrinology	11	1.0
Internal medicine	542	49.3
Other	127	11.6

† Family practitioners have an extra specialization education in Türkiye compared to general practitioners, who are only medical faculty graduates with no additional education.

Data collection tool

The questionnaire "Questionnaire on Physicians' Knowledge, Attitudes and Behaviors about PA Counseling and Exercise" consists of two parts:

A) Demographic Information (7 items)

B) Opinions on PA and Exercise (17 items): This section consisted of items related to knowledge, attitude, and behavior. The questionnaire was developed through a four-stage process:

1. Problem Identification and Target Group Selection:

The research problem was defined, and the target group was determined based on the use of PA and exercise for therapeutic purposes. Consequently, family physicians, endocrinology specialists, internal medicine specialists, cardiology specialists, and nephrology specialists were identified as the target groups.

2. Literature Review and Item Development:

A comprehensive literature review was conducted to examine previous studies on the topic. Priority was given to Physical Activity Guidelines ([https://hsgm.saglik.gov-tr/tr/dokumanlar-6.html](https://hsgm.saglik.gov.tr/tr/dokumanlar-6.html)) and relevant academic publications. Based on the literature findings, problem-specific questionnaire items were formulated, and an item pool was created. The questionnaire included dichotomous (two-choice), multiple-choice, open-ended, and closed-ended questions. Additionally, control items were incorporated to ensure response validity. For example

Item 17: Are you informed about the daily and weekly PA recommendations for adults in the Türkiye PA Guide?

() Yes

() No * If your answer is "No", could you write the reason for not obtaining information

and

Item 18: How many minutes of moderate and moderate to vigorous aerobic PA per week are recommended for adults aged 18-64?

() 30

() 60

() 75

() 150

() 300

3. Expert Review and Content Validation:

The entire questionnaire was reviewed by two experts: one medical doctor and one sports and exercise specialist. Each item was assessed for its relevance and effectiveness in addressing the research problem. Items that were deemed ambiguous or potentially misleading were removed to enhance clarity and validity.

4. Pilot Study and Refinement:

The finalized version of the questionnaire was administered to 157 physicians from various medical specializations. Following completion, a face-to-face evaluation was conducted with approximately one-third of the pilot study participants, during which an expert medical doctor gathered feedback on the readability, comprehensibility, and relevance of the questionnaire items. Based on this feedback, certain items were either revised, removed, or clarified to improve the overall quality of the questionnaire.

As a result of this iterative process, the final version of the questionnaire consisted of 24 items/questions. Given that the questionnaire was structured around knowledge, behaviors, and attitudes, statistical techniques such as principal component analysis or standard validity and reliability tests were not applied. Instead, the questionnaire was carefully refined based on expert evaluations.

The finalized questionnaire was then converted into an online format and distributed to physicians across Türkiye via e-mail and shared on the researchers' social media addresses.

Data analysis

Descriptive statistics, percentages, and frequencies were used for data analysis. In addition, an ordinal logistic regression was conducted with self-perceived competence as the dependent variable and age, gender, specialty, exercise training, PA knowledge, daily patient load, regular PA, and counseling time as independent variables. The proportional-odds assumption was tested via score tests. Cases with missing data were excluded listwise, resulting in a final sample of N=888 for the

regression analysis. Model fit was assessed by AIC, BIC, and likelihood-ratio tests.

RESULTS

This study examined physicians' knowledge, attitudes, and behaviors related to PA. For clarity, the findings are organized into three subsections: PA Knowledge, PA Attitudes, and PA Behaviors.

Physical Activity Knowledge

a. Education and Knowledge Deficiencies

A large majority of the physicians (77.8% in undergraduate and 88.3% in postgraduate training) did not receive adequate education regarding PA counseling and recommendations. Moreover, there is a common lack of awareness about the Turkish Physical Activity Guidelines, with 70.5% of the participants indicating that they are not familiar with these guidelines, and some reporting that they have never heard of them.

b. Knowledge Test Questions and Correct Response Rates

When evaluating their knowledge through test questions, only 58.1% of the participants correctly answered the question about the recommended amount of aerobic activity for adults, and just 30.7% provided the correct answer regarding the percentage of maximum heart rate for vigorous aerobic activity. Similar gaps were observed in questions related to MET values.

c. Specific Areas of Insufficiency

There is a notable insufficiency in the understanding of endurance exercises: 42.4% of the respondents stated "I have no idea," while 21.8% could not provide an example. This indicates a fundamental lack of grasp regarding essential concepts in this area.

d. Contraindication Knowledge

Regarding the circumstances under which PA might be contraindicated, 57% of the physicians indicated that they possess the necessary knowledge, while 37% expressed uncertainty about the contraindications.

Physical Activity Attitudes

a. Perceived Professional Benefit

A significant majority (93.2%) of the physicians believe that training in PA and exercise can positively impact their professional practice. This positive outlook highlights the importance they attribute to incorporating PA recommendations in their clinical routines.

b. Self-Perceived Competence

When asked about their competence in providing exercise recommendations, 64.3% rated themselves as insufficient, 6% as hesitant, 25.2% as competent, and only 4.5% as highly skilled. This distribution reflects varying levels of self-confidence across different areas of expertise.

c. Need for Further Education

Almost all participants (94%) expressed the need for additional education on PA and exercise. This clearly underscores the recognized necessity to address current knowledge gaps through further training and education.

Physical Activity Behaviors

a. Patient Counseling Practices

An overwhelming majority of physicians (97.6%) reported that they recommend PA or exercise to their patients. The types of activities recommended are predominantly basic exercises such as walking, swimming, cycling, and running.

b. Time Allocated for Recommendations and Mode of Delivery

The time dedicated to providing exercise recommendations varies: 44.7% of physicians spend less than 1 minute, 37% spend between 1 to 3 minutes, 14.4% allocate 3 to 5 minutes, and only 3.9% spend more than 5 minutes with their patients. Moreover, 90.4% of the physicians reported that they do not provide written exercise prescriptions, relying solely on verbal advice.

c. Personal Physical Activity Habits

While 58.6% of the physicians stated that they do not engage in regular PA, those who do exercise reported an

average of 4 days per week and 1.5 hours per day of PA.

d. Reasons for Not Recommending Physical Activity

For those who do not provide PA recommendations, the reasons include being too busy, perceiving that it is unrelated to their specialty, lacking sufficient knowledge, or preferring to refer patients to a PA specialist.

Physicians' Self-Perceived Competence

As shown in Table 2, an ordinal logistic regression was conducted to identify predictors of physicians' self-perceived competence (N = 888). The model demonstrated an acceptable fit (AIC = 2095.0; BIC = 2186.0). Significant predictors included age, gender, exercise training, regular activity, and counseling time. Specifically, older physicians were less likely to perceive themselves as competent (OR = 0.97, 95% CI [0.96, 0.99], $p < .001$). Female physicians reported lower perceived competence compared to males (OR = 0.68, 95% CI [0.52, 0.90], $p = .006$). Physicians without prior exercise training were more likely to feel less competent (OR = 1.52, 95% CI [1.09, 2.11], $p = .013$), as were those not engaging in regular PA (OR = 1.80, 95% CI [1.37, 2.37], $p < .001$). Counseling time was also a strong predictor: compared to physicians who spent less than one minute, those who spent 1-3 minutes (OR = 0.57, 95% CI [0.42, 0.76]), 3-5 minutes (OR = 0.38, 95% CI [0.25, 0.57]), or more than 5 minutes (OR = 0.14, 95% CI [0.06, 0.29]) had substantially higher odds of reporting greater competence (all $p < .001$). In contrast, PA knowledge ($p = .348$) and patient load ($p = .724$) were not significant predictors.

DISCUSSION

This study examined Turkish physicians' knowledge, behavior, and attitudes toward PA guidelines and their PA behaviors. The findings are discussed under three categories: PA Knowledge, PA Attitudes, and PA Behaviors. This categorization allows comprehensive evaluation of physicians' understanding of PA guidelines, their perceptions regarding its importance, and their actual practices in recommending PA to patients and engaging in it themselves.

Table 2. Ordinal Logistic Regression Predicting Self-Perceived Competence

Predictor	B	SE	z	OR	95% CI	p
Age (years)	-0.0268	0.006	-4.26	0.97	[0.96, 0.99]	< 0.001
Physical activity knowledge	-0.0629	0.067	-0.94	0.94	[0.82, 1.07]	0.348
Patients per day	-0.0008	0.002	-0.35	1.00	[1.00, 1.00]	0.724
Gender (female)	-0.3787	0.139	-2.73	0.68	[0.52, 0.90]	0.006
Exercise training (no)	0.4185	0.168	2.49	1.52	[1.09, 2.11]	0.013
Regular activity (no)	0.5888	0.140	4.22	1.80	[1.37, 2.37]	< 0.001
Explaining PA 1-3min vs <1min	-0.5681	0.151	-3.75	0.57	[0.42, 0.76]	< 0.001
Explaining PA 3-5min vs <1min	-0.9681	0.209	-4.62	0.38	[0.25, 0.57]	< 0.001
Explaining PA >5min vs <1min	-1.9892	0.387	-5.14	0.14	[0.06, 0.29]	< 0.001

Note. N=888; AIC=2095.0; BIC=2186.0. OR=exp(B); CI=95% confidence interval.

Physical Activity Knowledge

All participating physicians were actively practicing clinicians from various specialties and experience levels. The study found that physicians were engaging in counseling activities despite significant deficiencies in their undergraduate and postgraduate training regarding PA counseling. Moreover, awareness of PA guidelines for Türkiye was extremely low, although a vast majority stated that they recommend PA to their patients. Notably, the time allocated for counseling and respondents' self-reported PA levels were also too low. Despite inadequate training and low awareness of PA guidelines, physicians continue to recommend risk-free, safe, and easily accessible activities to help prevent inactivity.

The findings of this study highlight significant deficits in physicians' knowledge about PA counseling in Türkiye. More than 70% of participants were unaware of national guidelines, and 94% expressed a need for further training. This parallels findings from UK medical schools, where the average time allocated to PA education is only 4.2 hours throughout the curriculum [10]. These findings further emphasize the global nature of this educational gap.

The 'Turkish Family Care Physicians' Periodical Health Inspection and Screening Tests Guideline recommends measuring body mass index at least once a year to reduce the risk of a sedentary lifestyle and obesity-related

diseases, and it further advises recommending diet and PA to patients when necessary [14]. Additionally, every individual under the responsibility of a family physician should be followed up regularly and prescribed PA in accordance with their age and physical status. In line with this, the Turkish Physical Activity Guideline, which was prepared in parallel with the World Health Organization Physical Activity and Sedentary Lifestyle Guideline, is recommended for use by family physicians.

According to this survey, a large majority of physicians did not receive adequate education on PA counseling and recommendations, with 77.8% lacking such training during undergraduate studies and 88.3% during postgraduate training. Reflecting this gap, 94% of physicians stated that receiving education on PA and exercise would be beneficial for their professional practice. This finding suggests that many physicians may feel insufficiently confident and underprepared when it comes to recommending PA or writing an appropriate exercise prescription.

In a recent study from Scotland, only 27% of final-year medical students correctly identified PA guidelines, while just 20% felt adequately trained to counsel patients on PA [9]. Similar patterns were observed in our study, where some subgroups, particularly younger, male, inactive, and non-trained physicians, reported higher self-perceived competence. This paradox may reflect a Dunning-Kruger effect, where individuals with lower expertise overestimate their abilities.

Moreover, a majority of physicians (70.5%) lack precise knowledge regarding the recommended weekly and daily PA levels for adults. The most common reasons for this lack of awareness were either not knowing that such guidelines exist or the limited dissemination of the guidelines themselves.

Similar results have been reported in other countries. For instance, a study in Brazil revealed that 93.2% of physicians were unaware of global PA recommendations [15]. In the United Kingdom, a nationwide review of medical school curricula revealed that PA education is largely insufficient, with many schools omitting even basic content like the Chief Medical Officer's recommendations. This underlines the urgent need for structured training to equip future physicians with the essential knowledge and skills to effectively promote PA in clinical practice [10]. Collectively, these insights emphasize a global educational gap and reinforce the importance of integrating PA training into medical education to bridge the divide between public health policy and clinical practice.

Additionally, 64.3% of physicians considered themselves unprepared to explain exercise methods, and 42.4% responded "no" or "no idea" when asked to provide an example of an endurance exercise. Among those who did provide examples, some mentioned weightlifting and push-ups alongside swimming, jogging, walking, and brisk walking, although it is important to note that push-ups and weightlifting do not typically qualify as endurance exercises. These observations support the conclusion that while physicians recognize the importance of recommending PA, they lack comprehensive knowledge about the various types of exercises beyond walking, swimming, and cycling.

A Malaysian study showed that physically active physicians not only had higher confidence but also engaged more frequently in exercise counseling [6]. However, our findings reveal that lack of formal training and inactivity may sometimes falsely inflate self-assessed competence. This underscores the need for educational interventions that address both knowledge deficits and overconfidence biases.

Nearly all respondents (94.1%) expressed the need for further training in PA and exercise, underscoring a widespread awareness of deficits in both global and national PA guidelines and recommendations.

In fact, the need for further education about PA and exercise is well demonstrated in this survey, yet it remains unclear why physicians do not seek more information about global and national PA guidelines. There might be many contributing factors, such as the intensity and chaos of their daily routines, limited spare time for professional development, a stronger emphasis on pharmaceutical therapies, the need to stay updated in numerous areas, and a high daily patient load; leading to neglect of PA counseling. Identifying and understanding these barriers in detail could help clarify why physicians remain less engaged in PA guidelines.

To bridge this gap, a multi-disciplinary and practical approach is essential. Programs such as "Exercise is Medicine" advocate the use of FITT (Frequency, Intensity, Time, Type) principles to guide exercise prescriptions. Longitudinal studies assessing the integration of these strategies into clinical routines are also warranted.

Physical Activity Attitudes

Physicians' attitudes toward PA guidelines are multifaceted. Despite limited knowledge of PA, exercise, and the relevant guidelines, physicians overwhelmingly continue to recommend PA to their patients. Indeed, 97.6% of physicians reported providing such recommendations, primarily suggesting activities such as walking, running, cycling, and swimming. These findings mirror similar research from Germany, where 90% of family physicians and 71% of physicians from other specialties recommended physical activity [16]; from Brazil, where over 80% of physicians did so [15]; and from the USA, where approximately 93% of physicians recommended PA regardless of the presence of chronic diseases [17]. A review on this topic further noted that although healthcare professionals recognize the importance and duty of recommending PA, these suggestions alone may not effectively change patients' behaviors [18]. In contrast, a study in Scotland found that although physicians felt

competent in recommending PA, their actual knowledge of the recommendations was low [19]. These findings underscore the need for enhanced education and training in PA counseling worldwide.

Major barriers reported by physicians regarding PA recommendation include lack of time, patients' reluctance to engage in PA, a perceived disconnect with their specialty [20], lack of knowledge or education, no financial incentive, patient noncompliance with the PA program, and insufficient coordination with other physicians following the same patient [16]. These limitations highlight the complexity of incorporating PA counseling into routine clinical practice. Nonetheless, many physicians still recognize the importance of risk-free and low-intensity activities as part of preventing non-communicable diseases. Recommending basic activities is seen as an important step, but most physicians admit they do not feel competent enough to prescribe detailed PA plans adapted to individual patient characteristics, such as frequency, duration, intensity, or exercise type.

Physical Activity Behaviors

Despite their own knowledge gaps and other constraints, physicians continue to encourage PA because they acknowledge its preventive and therapeutic value. Yet the time they allocate for recommending PA is limited. A study conducted in the UK found that while physicians understood the benefits of PA and how much was needed to achieve these benefits, they did not devote sufficient time to promote it to patients specialty [20]. Parallel issues are evident in this study, where 44.7% of Turkish physicians spent less than one minute, 37% spent 1-3 minutes, 14.4% spent 3-5 minutes, and only 3.9% spent more than five minutes recommending PA to their patients. Moreover, nearly all physicians (90.4%) stated that they have never prepared a verbal or written exercise prescription.

Physicians' own PA patterns are also indicative of potential gaps. Only 41.4% of Turkish physicians reported engaging in regular PA, while 58.6% did not. Among those who were active, the average exercise frequency was 1.5 hours per day, four days a week. These data suggest that while Turkish physicians are aware of the benefits

of PA, they are not consistently active themselves. Previous research shows that physicians who are personally active are more likely to recommend and prescribe exercise to their patients, and that patients often model their behavior after their healthcare providers [4]. Likewise, a study in Estonia revealed that 92% of the physicians participated in moderate to vigorous PA in the last seven days and recommended PA to their patients [21]. Such findings reinforce the importance of physicians setting an example through their own PA habits, as well as honing their skills to prescribe exercise effectively.

Consequently, being able to recommend and prescribe PA requires not only an awareness of guidelines but also practical knowledge and skills. According to HEPA Europe (European Network for the Promotion of Health-Enhancing Physical Activity), the global shortfall in physicians' PA knowledge stems from the very limited time allocated to PA and health education in medical schools worldwide [22]. The results of this research support HEPA Europe's view, given that a majority of Turkish physicians (77.8%) reported not receiving PA education during their undergraduate studies, and 88.3% indicated they did not receive such education during or after their postgraduate or specialty training.

Ordinal logistic regression results revealed several important insights. Younger physicians were more likely to report higher self-perceived competence, aligning with literature suggesting that more recent graduates receive greater emphasis on lifestyle medicine [23]. Female physicians reported lower competence compared to males ($B=-0.3787$, $p=.006$), a finding that contrasts with some studies and suggests gender-specific educational needs. Paradoxically, physicians without formal exercise training and those not engaging in regular PA rated their competence higher ($B=0.4185$, $p=.013$; $B=0.5888$, $p<.001$), which may reflect overconfidence or self-assessment bias among less experienced or less trained clinicians. Moreover, spending more time on counseling was strongly associated with lower self-perceived competence (1-3min: $OR=0.57$; 3-5min: $OR=0.38$; >5min: $OR=0.14$; all $p<.001$), indicating that physicians who feel

less confident may compensate by allocating more time to patient education.

In conclusion, strengthening both the content and the reflective capacity of PA education is essential. Future research should not only assess the reach of such training but also its depth, examining how quality-driven programs influence physicians' actual competencies and long-term counseling efficacy.

CONCLUSION

The strength of this study lies in its inclusion of approximately 1100 actively practicing physicians from diverse specialties and regions across Türkiye. Unlike previous research focusing primarily on family physicians, this study encompassed specialists working in secondary and tertiary care facilities, an important factor in a country without a strict patient referral system, where chronic patients are often managed by specialists in cardiology, nephrology, endocrinology, and other fields. This broad representation underscores the widespread need for improved PA training and counseling skills among all medical specialties.

It can be concluded that Turkish physicians recognize the benefits of PA and generally recommend simple, low-risk exercises to their patients. Nonetheless, more than half of the physicians who participated in this study reported having no personal PA habit. Even those who do recommend PA often lack the depth of knowl-

edge required to provide comprehensive exercise prescriptions, including guidance on frequency, duration, intensity, and type of activity. Physicians are aware of these knowledge gaps and acknowledge their need for further training in PA counseling and exercise prescription.

Our ordinal logistic regression analysis further identified key predictors of self-perceived competence: younger age, male gender, lack of formal exercise training, absence of regular PA, and shorter counseling time were associated with higher self-rated competence, suggesting a paradoxical overconfidence among certain subgroups.

Several barriers, both institutional and individual, impede physicians from improving their expertise in PA counseling and from dedicating enough time to advise patients on PA or follow their progress. This study has several limitations, including an imbalance in the distribution of participating specialists. Future research should aim for balanced participant groups and employ mixed methods to obtain richer data. Furthermore, offering continuous professional development training on PA guidelines and recommendations and developing standardized counseling tools could allow comparisons between physicians who have received such training and those who have not, providing more objective insights into effective strategies for integrating PA into clinical practice.

Ethics Committee Approval / Etik Komite Onayı

The approval for this study was obtained from Hacettepe University Ethics Committee, Ankara, Türkiye (Decision no: 433-1409, Date: 29/03/2018).

Conflict of Interest / Çıkar Çatışması

The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

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Author Contributions / Yazar Katkıları

Concept: GD,MA; design: EB,GD,MA; supervision: GD,MA; materials: EB,YY; data collection and/or processing: EB,YY,MA,GD; analysis and interpretation: EB,YY; literature review: EB,YY; writing manuscript: EB,YY; critical reviews: GD,MA. All authors contributed to the final version of the manuscript and discussed the results and contributed to the final manuscript.

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SUPPLEMENT. PHYSICIANS' KNOWLEDGE, ATTITUDES, AND BEHAVIORS REGARDING PHYSICAL ACTIVITY AND EXERCISE QUESTIONNAIRE

A. Demographic Information

Gender: ☐ Female ☐ Male Age: _____

Medical School Graduated: _____ Year of Graduation: _____

Specialty: ☐ Family Medicine ☐ Endocrinology ☐ Internal Medicine ☐ Cardiology ☐ Nephrology ☐
Other: _____ ☐ None

Year Specialty Degree Obtained: _____ Institution: _____

B. Views on Physical Activity and Exercise

1. Are you actively seeing patients? ☐ Yes — if yes, average daily patient count: _____ ☐ No
2. Did you receive training on physical activity and exercise during your medical education? ☐ Yes ☐ No
3. Did you receive training on physical activity and exercise during or after your specialty training? ☐ Yes ☐ No
4. Do you think it would be beneficial to receive PA and exercise training for your current professional practice? ☐ Strongly agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly disagree
5. Do you recommend physical activity/exercise to your patients? ☐ Yes — if yes, which type: _____ ☐ No — why not: _____
6. How much time do you spend explaining PA/exercise to a patient during a consultation? ☐ <1 min ☐ 1–3 min ☐ 3–5 min ☐ >5 min
7. Have you ever written a formal “Exercise Prescription”? ☐ Yes ☐ No
8. How competent do you consider yourself in explaining PA/exercise methods? ☐ Very competent ☐ Competent ☐ Incompetent ☐ Very incompetent ☐ Undecided
9. Do you know when PA/exercise is contraindicated for your patients? ☐ Yes ☐ No ☐ Not sure
10. Are you aware of the PA recommendations for adults in the Turkey Physical Activity Guide? ☐ Yes ☐ No — if no, please state reason: _____
11. How many minutes per week of moderate-to-vigorous aerobic PA is recommended for adults aged 18–64? ☐ 30 ☐ 60 ☐ 75 ☐ 150* ☐ 300
12. At what percentage of maximum heart rate is exercise considered vigorous aerobic PA? ☐ 15–30 ☐ 30–55 ☐ 55–70 ☐ 70–85* ☐ 85–100

13. Which of the following has the lowest Metabolic Equivalent (MET)? () Jump rope () Football/basketball/tennis () Brisk walking (6–7 km/h) () Climbing stairs () Carrying objects () Car washing*

14. Which of the following has the highest MET? () Partner dancing () Home exercises () Swimming* () Slow walking () Desk work/writing

15. Do you think you need training on PA and exercise? () Yes () No

16. Do you regularly engage in physical activity/exercise/sport? () Yes — if yes, _____ days/week, _____ hours/day () No

17. Can you give an example of an endurance exercise? () Yes — please write: _____ () No () No idea

* Correct answers. Not indicated in the actual questionnaire.