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Exploring Physiatrists' Views on Barriers to Scientific Research: A Multi-center Study

Fiziyatristlerin Bilimsel Araştırmaların Önündeki Engellere İlişkin Görüşlerinin Araştırılması: Çok Merkezli Bir Çalışma

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ABSTRACT Objective: This study aimed to investigate the obstacles and motivations encountered by physiatrists regarding scientific research (SR). **Material and Methods:** A survey designed using Google Forms was distributed to physiatrists via email and social media channels. The survey collected participants' demographic information and included the "Research Barriers Scale." Participants were also asked an open-ended question to identify three factors that motivated and demotivated them during the process of conduct scientific research. **Results:** Two hundred and forty five valid questionnaires were included in the analysis. The sample included 123 female participants and 122 male participants. Regarding their professional roles, 33.1% were resident physicians, 45.3% were specialist physicians, and 21.6% were academicians.Demotivating factors included clinical workload, limited resources, and challenges in the research process. Female participants reported significantly more time constraints than males. Married participants demonstrated greater competence than their single counterparts. **Conclusion:** The findings indicate that physiatrists show a strong interest in engaging in SR, but they face challenges related to limited time availability and insufficient research support. Other barriers include time constraints, lack of research support and resources, and challenges in the research and publishing process. Motivations for research include the desire to contribute to scientific progress, knowledge acquisition, and academic recognition. Understanding these barriers and motivations can help inform strategies to enhance research productivity and support physiatrists in conduct research in physical medicine and rehabilitation.

Keywords: Physical medicine and rehabilitation; scientific research; scientific productivity; academic motivation; academic demotivation

ÖZET Amaç: Bu çalışmanın amacı, fiziyatri uzmanlarının bilimsel araştırmalara yönelik karşılaştıkları engelleri ve motivasyon kaynaklarını değerlendirmekti. **Gereç ve Yöntemler:** Google Forms üzerinden tasarlanan anket, fiziyatri uzmanlarına e-posta ve sosyal medya platformları aracılığıyla iletildi. Anket katılımcıların demografik bilgilerine yönelik sorularla birlikte "Bilimsel Çalışma Engelleri Anketi"ni içermekteydi. Katılımcılara ayrıca kendilerini bilimsel çalışma yürütme sürecinde motive ve demotive eden 3 faktörü belirtmelerini isteyen açık uçlu bir soru da yöneltildi. **Bulgular:** Çalışmaya toplamda 245 anket sonucu dâhil edildi. Katılımcıların 123'ü kadın, 122'si erkekti. Katılımcıların %33,1'i asistan doktor, %45,3'ü uzman doktor ve %21,6'sı akademisyendi. Başlıca motive edici faktörler, bilimsel ilerlemeye katkıda bulunma isteği, bilgi edinme ve akademik camiada tanınma olarak belirlendi. Demotive edici faktörler arasında ise en sık klinik iş yükü, sınırlı kaynaklar ve araştırma sürecindeki zorluklar yer aldı. Kadın katılımcıların erkek katılımcılara göre daha sık zaman kısıtlılığından şikâyetçi olduğu görüldü. Evli katılımcılar, bekâr katılımcılara göre daha fazla yetkinliğe sahip olduklarını bildirdiler. **Sonuç:** Fiziyatristlerin bilimsel araştırmalar hakkında karşılaştıkları en büyük zorluklar zaman kısıtlamaları, araştırma desteği ve kaynakların eksikliği ile araştırma ve yayınlama sürecindeki zorluklar bulunmaktadır. Motivasyon faktörleriyse bilimsel ilerlemeye katkıda bulunma isteği, bilgi edinme ve akademik tanınma şeklinde sıralanabilir. Bu engelleri ve motivasyonları anlamak, fizik tedavi ve rehabilitasyon alanındaki araştırma üretkenliğini artırmak ve fiziyatri uzmanlarını bilimsel araştırmalar yapmalarında desteklemek için yeni ve etkili stratejiler geliştirmeye yardımcı olabilir.

Anahtar Kelimeler: Fiziksel tıp ve rehabilitasyon; bilimsel araştırma; bilimsel üretkenlik; akademik motivasyon; akademik demotivasyon

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Physical medicine and rehabilitation (PM&R) is an essential medical specialty that focuses on addressing functional impairments resulting from injuries, diseases, or congenital disorders. In the healthcare industry, PM&R is gaining increasing importance due to the high prevalence of musculoskeletal and neurological conditions, which can significantly impact the quality of life for individuals. According to the World Health Organization, musculoskeletal disorders rank as the second leading cause of disability worldwide, affecting approximately 20% of the population.[1] Moreover, neurological disorders like stroke and traumatic brain injury contribute significantly to long-term disabilities.[2] Effective PM&R interventions, such as physical therapy, exercise, and the use of assistive devices, play a crucial role in managing these conditions and improving patients' functional status. Consequently, there is a pressing need for ongoing research and academic endeavors in the field of PM&R to enhance patient outcomes and alleviate the burden on the healthcare system.

Conduct scientific research and publishing papers represent formidable tasks for physicians, demanding considerable time, effort, and resources. To produce valuable and impactful research, physicians must possess not only the necessary expertise and experience in their field but also access institutional support in the form of financial incentives, technical resources, and trained personnel.[3] In fact, scientific research can be regarded as an art form, as it requires a systematic approach to investigate scientific inquiries, analyze data, and arrive at accurate conclusions.[4]

Engaging in PM&R research presents unique challenges. PM&R specialists must consider numerous factors when establishing treatments, including medications, therapeutic exercises, injections, physical modalities, orthotics, and education. Moreover, they must account for the significant human factor that can interfere with interventions, rendering randomization and blinding difficult, if not impossible, within the field. Additionally, PM&R research encounters various methodological obstacles associated with patient populations characterized by diverse clinical presentations and functional limitations. Rehabilitation interventions often involve individualized, person-centered elements that challenge standardization, while target outcomes ideally focus on complex, personalized endpoints related to social participation.[5]

In recent years, the scientific community has increasingly acknowledged the significance of diversity, equity, and inclusion in scientific research. However, despite these efforts, studies have demonstrated that gender and other characteristics such as race, ethnicity, and sexual orientation can still influence the quality and outcomes of scientific research. For instance, research has revealed that women are less likely to receive research grants, be invited to speak at conferences, and have their work published in high-impact journals compared to their male counterparts.[6,7]

Although bibliometric studies are commonly employed to evaluate the current state of scientific performance, these studies may not offer sufficient information to enhance research productivity. Research is an ongoing process that necessitates continual efforts to improve productivity. Survey studies represent an effective approach to identify the obstacles faced by researchers and enhance their performance. Therefore, these surveys serve as crucial tools for addressing the issues encountered by researchers.[8] While survey studies have been conducted in various fields, only a limited number of such studies have been published in the realm of PM&R. Our literature review has revealed no existing study conducted among physiatrists.

The aim of this current investigation is to evaluate the barriers and motivators for scientific research as perceived by physiatrists.

MATERIAL AND METHODS

This prospective cross-sectional multi-center study was conducted at the Üsküdar State Hospital from May 2023 to June 2023. The research protocol received ethical approval from the Zeynep Kamil Clinical Research Ethics Committee (date: April 19, 2023 no: 65), and the study was registered in the clinical trials database with the code NCT05820022 to ensure transparency and scientific rigor. The study was con-

ducted in accordance with the principles outlined in the Helsinki Declaration.

To investigate the barriers to conduct scientific research in the field of PM&R, a cross-sectional survey was administered to PM&R residents, specialists, and academicians. The survey was designed using Google Forms (Google LLC, ABD) and distributed to participants via email or social media platforms. The survey forms were shared through active WhatsApp (Meta Platforms Inc., ABD) groups and email groups used by PM&R specialists. A total of 1,400 PM&R specialists residing in Türkiye were contacted with an invitation to take part in the research. The survey was conducted between May 29 and June 30, 2023, resulting in 245 valid questionnaires being collected and included in the analysis. Prior to completing the form, participants were prompted to provide their consent. Individuals who declined to give consent were unable to continue with the form. The survey consisted of two parts: demographic characteristics and a research barriers scale measuring PM&R specialists' perception of research barriers.

The demographic characteristics section of the survey collected personal and institutional information, including age, gender, employment position, marital status, years of experience in PM&R, type of institution, geographic region, and training background.

To assess the barriers encountered by PM&R specialists in conduct scientific research, a research barriers scale was developed based on a thorough review of the relevant literature and adapting existing scales from previous studies.[8] The scale was then shared with a panel of five PM&R specialists to gather their feedback on fulfilling the purpose. The scale consisted of 21 items with Likert-type response options and two open-ended questions. Its purpose was to evaluate the extent to which PM&R specialists face obstacles in their research activities.

Additionally, participants were asked to provide insights into the three motivating and demotivating factors influencing their involvement in scientific studies using an open-ended question format. The responses were then categorized by two independent researchers based on predefined categories. In cases of disagreement, a third researcher acted as a referee to make the final decision and resolve any discrepancies.

STATISTICAL ANALYSIS

The sample size was determined using the formula: , $n = \frac{z_{\frac{\alpha}{2}}^2 x C^2}{kD^2}\{1 + (k-1)\rho\}$, where k was represented as the number of items on the Likert scale, specifically k=5 for the scientific barriers scale. The pairwise correlation coefficient (ρ) was assumed to be 0.5, and the coefficient of variation (C) for each Likert-item scale was assumed to be 1. Additionally, D was set at 0.10, which represented a 10% relative tolerable error, where, $D = \frac{B}{\mu}$, and B was signifying the bound of error, and μ was the sample mean. The value of $Z_{\frac{\alpha}{2}}$ corresponded to the 100 (1-α/2)'th percentile of the standard normal distribution, and for a 95% confidence interval, $Z_{\frac{\alpha}{2}}$ was assumed to be 1.96. Consequently, the required sample size was calculated to be 230.[9]

Descriptive statistics, including measures of central tendency and variability (mean±standard deviation), were used to characterize the quantitative variables in the study. Fisher's exact test and chi-square tests were employed to assess differences in proportions or relationships between categorical variables when the sample size was small. Analysis of variance and T-tests were applied for scenarios involving more than two groups, with the assumptions of normality and equality met. The Kruskal-Wallis H-Test and Mann-Whitney U-Test were utilized when the assumptions were not satisfied. The Bonferroni post hoc correction method was applied to address multiple comparisons between groups. A significance level of p=0.05 was set for all statistical tests. IBM SPSS (Statistical Package for Social Sciences, version 21.0, Armonk, NY, IBM Corp.) was used for all statistical analyses.

RESULTS

In this study, a total of 245 PM&R specialists participated, and their demographic profile is presented in Table 1. The participants consisted of 123 females (50.2%) and 122 males (49.8%). The sample included 33.1% residents, 45.3% specialists, and 21.6% academicians.

TABLE 1: Demographic data of participating physicians.

Parameter	Group	n (%)
Region of residency institution	Eastern Anatolia Region	13 (5.3)
	Aegean Region	16 (6.5)
	Southeastern Anatolia Region	4 (1.6)
	Black Sea Region	40 (16.3)
	Marmara Region	81 (33.1)
	Central Anatolia Region	91 (37.1)
Region of current institution	Eastern Anatolia Region	9 (3.7)
	Aegean Region	12 (4.9)
	Southeastern Anatolia Region	6 (2.4)
	Black Sea Region	56 (22.9)
	Marmara Region	96 (39.2)
	Central Anatolia Region	66 (26.9)
Title	Resident	81 (33.1)
	Associate professor	13 (5.3)
	Assistant professor	29 (11.8)
	Professor	11 (4.5)
	Medical specialist	111 (45.3)
Working year as an physical medicine and rehabilitation specialist	1-5 years	91 (37.1)
	11-15 years	54 (22.0)
	6-10 years	57 (23.3)
	16 years or more	43 (17.6)
Institution	University hospital	69 (28.2)
	State hospital	161 (65.7)
	Private hospital	15 (6.1)
Institution of residency	State hospital	102 (41.6)
	University hospital	143 (58.4)
Gender	Male	122 (49.8)
	Female	123 (50.2)
Marital status	Single	67 (27.3)
	Married	178 (72.7)

Figure 1 illustrates the distribution of participants' interests in different rehabilitation areas. Participants were able to select multiple options. The findings reveal that the majority of participants showed a particular interest in neurological rehabilitation, while interest in pregnancy and rehabilitation was comparatively lower.

To assess the challenges faced by PM&R specialists in conduct scientific research, a five-point Likert scale was used, and the responses were categorized into the previously mentioned factors. Table 2 presents the participants' answers, while Figure 2 provides visual representations in the form of Likert bar graphs to depict the distribution of responses both within and outside the scale following factor analysis.

The results of the scientific barriers scale showed that the most common problems experienced by the participants were not having enough financial support to participate in scientific meetings, not having enough statistical knowledge while conduct scientific studies, and not having enough knowledge about the principles of scientific studies in general and the steps to be followed. Also, it was observed that participants expressed strong agreement that their use of social media has no impact on the time they dedicate to scientific research. Furthermore, they indicated not requiring assistance with writing scientific articles and conveyed satisfaction with the support provided by their institutions for managing and organizing scientific studies.

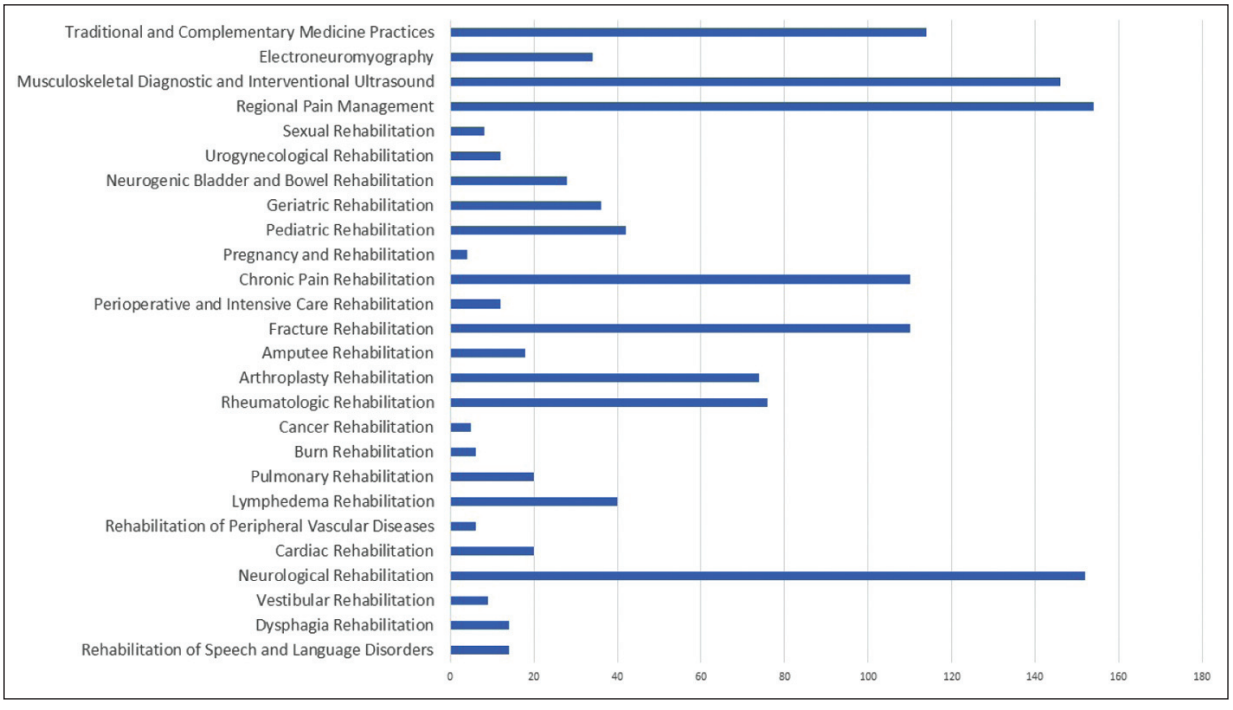

FIGURE 1: The dissemination of rehabilitation domains that captivate participants' interest.

During the study, participants were asked to provide insights into the three most inspiring and demotivating aspects of scientific research. Their responses indicated that the primary sources of motivation were a genuine desire to contribute to scientific progress and make a lasting impact, a thirst for knowledge acquisition and intellectual growth, as well as the pursuit of academic recognition and prestige. Conversely, participants expressed discouragement due to the demanding clinical workload, overwhelming patient caseload, inadequate technical resources, and the various challenges encountered throughout the research and publishing process, including obtaining official approvals and successfully navigating every stage of a project from inception to completion. Figure 3 displays the participants' answers.

Gender differences were statistically significant, particularly in relation to time constraints, with women facing a more prominent challenge in this regard ($p=0.015$). Additionally, married participants demonstrated significantly greater competence compared to their single counterparts ($p<0.001$).

Table 3 compares barriers to conduct scientific studies across hospitals and academic titles. Residents exhibited lower levels of competence compared to associate professors and assistant professors ($p<0.001$). Similarly, residents displayed lower competence than professors and specialists ($p<0.001$). On the other hand, associate professors demonstrated higher competence than specialists, while assistant professors and professors displayed higher competence than specialists ($p<0.001$). In terms of motivation, residents had lower levels of motivation compared to associate professors, while associate professors showed higher motivation than specialists ($p<0.001$). State university hospitals exhibited a superior level of motivation compared to private hospitals, while private hospitals lagged behind ministry of health hospitals ($p=0.009$). A similar trend was observed for research support, with state university hospitals showing higher levels of research support compared to private hospitals, while private hospitals trailed behind ministry of health hospitals ($p=0.001$).

The primary sources of motivation were a genuine desire to contribute to scientific progress and es-

TABLE 2: Summary of answers of participants.

	Fully disagree	Disagree	Neither	Agree	Fully agree	Mean	Median (minimum-maximum)
Competence						2.51±0.91	2.25 (1-5)
I don't need training on "How is scientific research done?"	75 (30.6%)	87 (35.5%)	39 (15.9%)	29 (11.8%)	15 (6.1%)	2.27±1.19	2 (1-5)
I have sufficient knowledge of English to do scientific research	6 (2.4%)	54 (22.0%)	64 (26.1%)	97 (39.6%)	24 (9.8%)	3.32±1.0	3 (1-5)
I have sufficient knowledge of statistics to do scientific research	75 (30.6%)	86 (35.1%)	43 (17.6%)	37 (15.1%)	4 (1.6%)	2.22±1.09	2 (1-5)
I do not need training on "How is the article written?"	81 (33.1%)	84 (34.3%)	38 (15.5%)	27 (11.0%)	15 (6.1%)	2.23±1.2	2 (1-5)
Motivation						3.53±0.71	3.8 (1-5)
I make serious efforts to do scientific research	35 (14.3%)	54 (22.0%)	55 (22.4%)	66 (26.9%)	35 (14.3%)	3.05±1.28	3 (1-5)
I am enthusiastic to do scientific research	18 (7.3%)	14 (5.7%)	61 (24.9%)	97 (39.6%)	55 (22.4%)	3.64±1.11	4 (1-5)
Scientific research is a professional obligation	27 (11.0%)	54 (22.0%)	59 (24.1%)	81 (33.1%)	24 (9.8%)	3.09±1.18	3 (1-5)
The tiring process of publishing scientific studies reduces my motivation	4 (1.6%)	4 (1.6%)	10 (4.1%)	152 (62.0%)	75 (30.6%)	4.18±0.73	4 (1-5)
Scientific research and publications make an important contribution to my academic career	10 (4.1%)	23 (9.4%)	45 (18.4%)	119 (48.6%)	48 (19.6%)	3.7±1.02	4 (1-5)
Research support						2.58±0.39	2.63 (1.5-3.88)
During the residency training, I was encouraged to do scientific research	41 (16.7%)	76 (31.0%)	35 (14.3%)	69 (28.2%)	24 (9.8%)	2.83±1.28	3 (1-5)
The technical infrastructure of my institution is suitable for scientific research	31 (12.7%)	52 (21.2%)	71 (29.0%)	83 (33.9%)	8 (3.3%)	2.94±1.09	3 (1-5)
Scientific research is sufficiently supported by the institution's management	13 (5.3%)	63 (25.7%)	64 (26.1%)	70 (28.6%)	35 (14.3%)	3.21±1.14	3 (1-5)
I have sufficient financial support to do scientific research	84 (34.3%)	108 (44.1%)	38 (15.5%)	13 (5.3%)	2 (0.8%)	1.94±0.89	2 (1-5)
I have a special time reserved for scientific research during working hours	119 (48.6%)	84 (34.3%)	12 (4.9%)	20 (8.2%)	10 (4.1%)	1.85±1.1	2 (1-5)
The procedures required to do scientific work can be tedious	4 (1.6%)	3 (1.2%)	17 (6.9%)	153 (62.4%)	68 (27.8%)	4.13±0.73	4 (1-5)
I have sufficient financial support to attend academic meetings	103 (42.0%)	91 (37.1%)	35 (14.3%)	16 (6.5%)		1.85±0.9	2 (1-4)
Regulations and financial support to encourage scientific publications are sufficient	87 (35.5%)	110 (44.9%)	39 (15.9%)	9 (3.7%)		1.88±0.81	2 (1-4)
Time constraints						3.72±0.59	3.75 (2-5)
Procedures such as electronic health records reduce my time spent on scientific research	4 (1.6%)	12 (4.9%)	17 (6.9%)	125 (51.0%)	87 (35.5%)	4.14±0.87	4 (1-5)
The excess of patients in the clinic prevents my scientific researches	6 (2.4%)	19 (7.8%)	17 (6.9%)	96 (39.2%)	107 (43.7%)	4.14±1.01	4 (1-5)
My personal works and responsibilities reduce my time devoted to scientific research	2 (0.8%)	27 (11.0%)	41 (16.7%)	109 (44.5%)	66 (26.9%)	3.86±0.97	4 (1-5)
Using social media does not take away from the time I spend doing scientific research	38 (15.5%)	78 (31.8%)	54 (22.0%)	55 (22.4%)	20 (8.2%)	2.76±1.2	3 (1-5)

Stats: n (%); SD: Standard deviation.

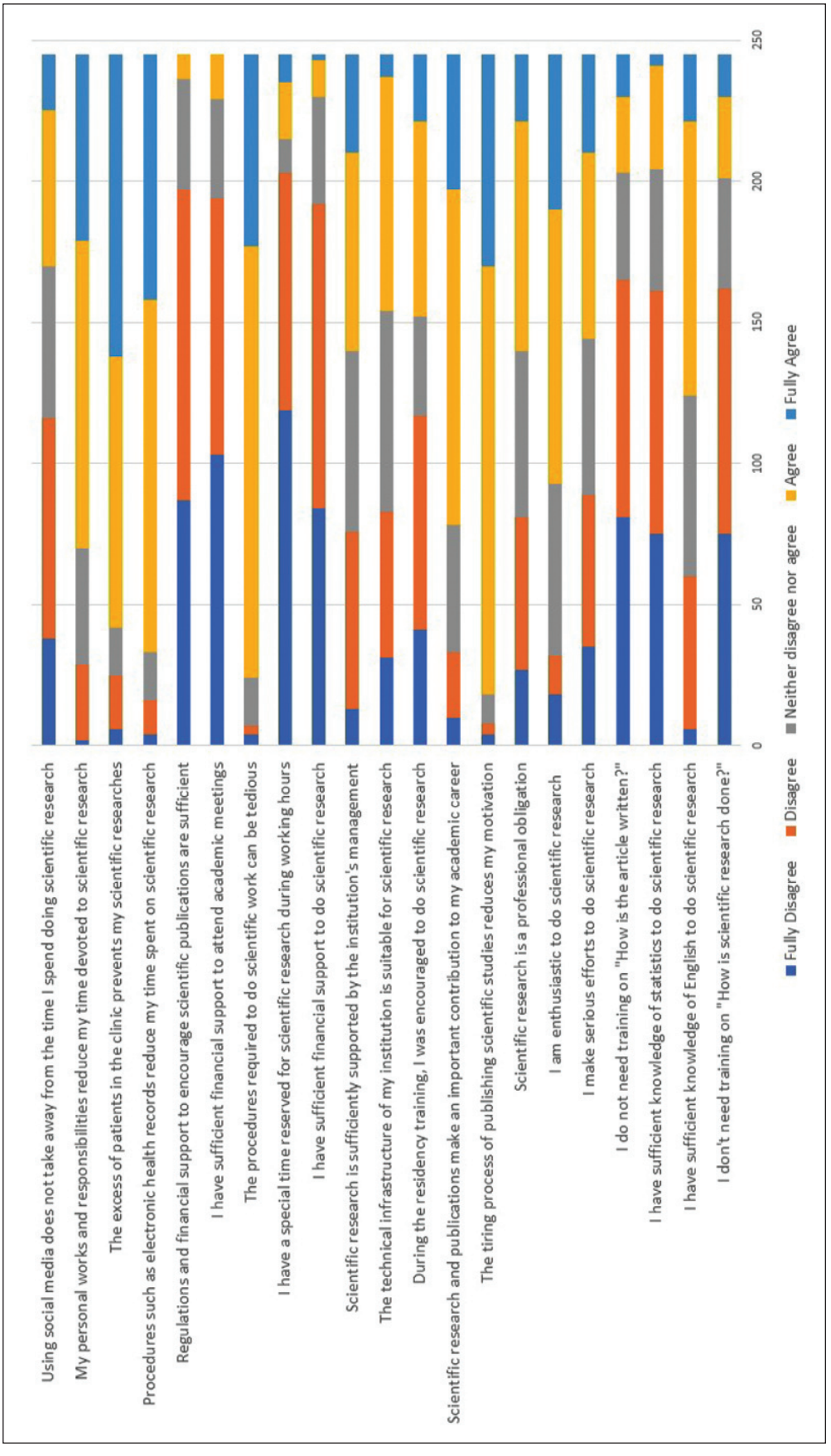

FIGURE 2: Bar graphs based on the scientific barriers scale illustrating the distribution of participants' responses to the questionnaire.

TABLE 3: Comparison of barriers to conduct scientific studies across hospitals and academic titles.

	State university hospital	Ministry of health hospital	Private hospital	p-value	Resident	Associate professor	Assistant professor	Professor	Specialist	p-value
Competence	2.66±1.07	2.47±0.85	2.23±0.55	0.366 (k)	2.0±0.55	3.27±0.81	3.08±0.92	3.93±0.76	2.51±0.85	**<0.001 (k)**
	2.25 (1-5)	2.25 (1-4.75)	2.25 (1.5-3)		2 (1-4)	3.5 (2-4.25)	3.25 (1.5-4.5)	4 (2.75-5)	2.5 (1.25-5)	
Motivation	3.7±0.62	3.5±0.74	3.08±0.62	**0.009 (k)**	3.53±0.64	4.2±0.35	3.77±0.63	3.98±0.44	3.35±0.76	**<0.001 (k)**
	3.8 (2.6-5)	3.8 (1-4.8)	2.8 (2.4-3.8)		3.6 (1-4.6)	4.2 (3.8-4.8)	3.8 (2.6-4.8)	3.8 (3.4-4.6)	3.4 (1.8-5)	
Research support	2.59±0.46	2.6±0.35	2.24±0.27	**0.001 (k)**	2.61±0.4	2.68±0.31	2.64±0.43	2.67±0.53	2.52±0.36	0.512 (k)
	2.63 (1.63-3.88)	2.63 (1.5-3.25)	2.25 (1.88-2.5)		2.63 (1.5-3.25)	2.63 (2.25-3.13)	2.63 (2-3.88)	2.63 (2-3.5)	2.5 (1.63-3.13)	
Time constraints	3.59±0.57	3.76±0.58	3.98±0.69	0.052 (k)	3.65±0.48	3.81±0.46	3.85±0.5	3.43±1.04	3.77±0.64	0.398 (k)
	3.5 (2-4.75)	3.75 (2.25-5)	4 (3-5)		3.75 (2.5-4.75)	3.5 (3.25-4.5)	3.75 (2.75-4.75)	4 (2-4.25)	3.75 (2.25-5)	

Stats: Mean±Standard deviation/Median (Minimum-Maximum); (k) Kruskal-Wallis Test.

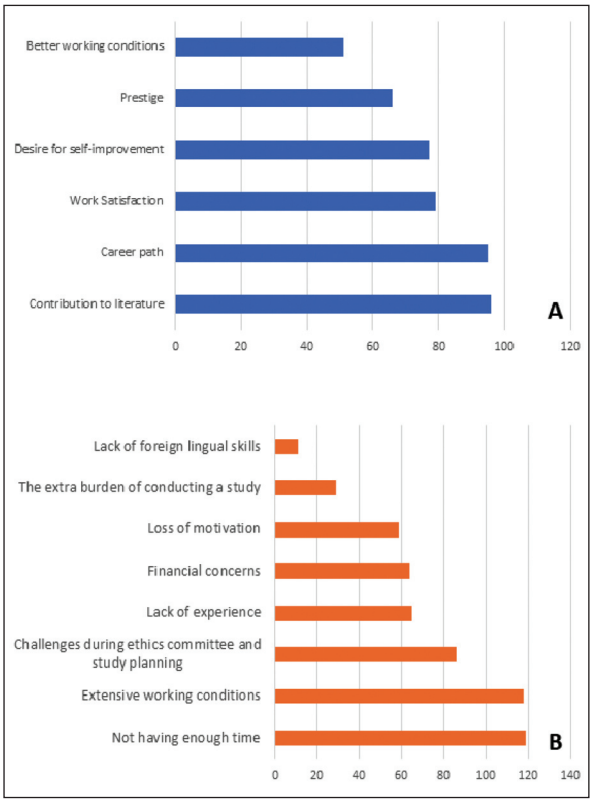

FIGURE 3: Distribution of factors that serve as motivators and demotivators for engaging in scientific research of the participants. **A:** Motivating factors; **B:** Demotivating factors.

tablish a lasting impact, a thirst for knowledge acquisition and intellectual growth, as well as the pursuit of academic recognition and prestige. Conversely, participants expressed discouragement due to the demanding clinical workload, overwhelming patient caseload, inadequate technical resources, and the various challenges encountered throughout the research and publishing process, including obtaining official approvals and successfully navigating every stage of a project from inception to completion.

DISCUSSION

Investigating the challenges faced by PM&R specialists in conduct scientific research was the main objective of this study. Furthermore, this study aimed to explore the factors that motivate and demotivate PM&R specialists in engaging in scientific research, along with potential differences in these factors based on gender, marital status, professional title, and hospital type. To the best of our knowledge, this study is the first of its kind to investigate these aspects within the field of PM&R.

The demographic profile of the participants in this study revealed a relatively balanced distribution between male and female specialists. This distribution signifies a shift towards achieving a more equitable representation of both genders, which is notable considering the historical dominance of male specialists in various medical disciplines.[10-12] However, in the field of PM&R in Türkiye, there already appears to be a relatively balanced distribution between male and female professionals. This balanced representation indicates that PM&R is attracting a diverse group of professionals, which can contribute to a wider range of perspectives and experiences in scientific research.

Disparities in healthcare are prevalent across different medical branches.[13,14] Consistent with existing

literature, the findings of this study indicate a significant concentration of PM&R specialists in the Marmara and Central Anatolia regions of Türkiye. This geographic pattern highlights a potential regional imbalance in access to rehabilitation services. To address this issue, it is crucial to improve working conditions and allocate resources to other regions of Türkiye, thereby facilitating the delivery of rehabilitation services. By enhancing infrastructure and ensuring the availability of necessary resources, individuals in these underserved regions can have easier access to much-needed rehabilitation services.

The high interest in neurological rehabilitation among PM&R specialists can be attributed to several factors. Neurological conditions, such as stroke, traumatic brain injury, and spinal cord injury, affect a significant number of individuals worldwide and can lead to substantial functional impairments and disabilities.[15] Given the burden of these conditions on individuals and society, there is a pressing need for effective rehabilitation strategies to optimize functional outcomes and enhance the quality of life for affected individuals. Additionally, advancements in neuroscience research have provided insights into the potential for neuroplasticity and neural recovery, even in cases of severe neurological damage. This understanding has opened up new possibilities for rehabilitation interventions that focus on harnessing the brain's inherent capacity to reorganize and adapt.[16] The promise of neurological rehabilitation in facilitating functional recovery and promoting neural plasticity has likely contributed to the heightened interest among PM&R specialists in this field.

Although the importance of rehabilitation in preventing and treating musculoskeletal discomfort and pain, gestational diabetes, or hypertensive diseases during pregnancy has been recognized in the literature, a notable lack of interest in this field has been observed among PM&R specialists.[17] To address this limited interest, it is recommended to implement seminars, workshops, and congresses focusing on pregnancy and rehabilitation. Such academic events have the potential to effectively communicate the significance of this field and stimulate PM&R specialists to enhance their practice and engage in scientific research.

The results of the scientific barriers scale used in this study showed varying levels of agreement among participants regarding different aspects of competence, motivation, research support, and time constraints. Notably, the majority of participants expressed a need for training in scientific research methods and statistics, indicating a potential gap in knowledge and skills in this area. A thorough grasp of statistical methods is vital for developing robust research projects and assessing medical literature. Comprehensive statistical planning, including choosing study endpoints, determining sample size requirements, and selecting suitable statistical tests for data analysis, significantly contributes to the success of a research endeavor.[18]

Research involves methodically acquiring new knowledge through careful planning and interventions aimed at discovering or interpreting new information. The reliability and validity of a study depend on a well-designed approach with objective, reliable, and repeatable methodology encompassing appropriate conduct, data collection, analysis, and logical interpretation. Inadequate or flawed methodology can render a study unacceptable while potentially leading clinicians to receive incorrect information.[19]

Literature suggests that introducing the concept of research during undergraduate studies can increase research interest, self-assurance in conduct research, and research knowledge. This exposure has also been linked to an improvement in students' capacity to critically evaluate literature and produce high-quality research articles.[20] Therefore, proficient training in research methodology and statistics is an indispensable necessity across all domains associated with medical care. Organizing seminars, workshops, and congresses that specifically concentrate on these topics can have a significant impact.

Financial assistance for attending medical conferences is crucial as it correlates directly with the involvement of active participants. A significant number of attendees have recognized the absence of support for conference participation, and this issue can be addressed by backing their involvement in scientific events at both state and institutional levels.[21]

In terms of motivation, participants emphasized their dedication to contributing to scientific progress, acquiring knowledge, and achieving academic recognition. These intrinsic motivators align with the fundamental principles of scientific research and reflect the participants' commitment to advancing the field of PM&R.[22,23] However, participants also identified demotivating factors, such as the demanding clinical workload, inadequate technical resources, and the challenges associated with the research and publishing process. The issue of excessive workload among physicians in Türkiye has been extensively discussed in the literature across various medical disciplines.[24,25] Consistent with these findings, our study revealed that PM&R specialists also expressed challenges in dedicating sufficient time and attention to scientific research due to their demanding clinical workload. The challenges associated with the research and publishing process, such as the time and effort required, potential rejection and criticism, competition and pressure to produce significant results, funding and resource constraints, and the presence of publication bias, can be demotivating for researchers. These challenges can lead to fatigue, feelings of inadequacy, and stress.[26] These findings emphasize the need for organizational support and infrastructure to facilitate and streamline the research endeavors of PM&R specialists.

This study also found that married specialists exhibited greater competence compared to their single counterparts in terms of scientific research. However, the relationship between family and science careers is more complex and individualized than can be captured by these broad variables.[27] Future research should consider more specific factors to gain a better understanding of how family dynamics and science careers intersect.

Residents demonstrated lower levels of competence and motivation compared to associate professors and assistant professors. Conversely, when examining factors leading to demotivation, our analysis demonstrated that residents exhibited a significantly higher level of inexperience compared to individuals in other professional positions. This finding may reflect the transitional phase of residency, where residents are still acquiring knowledge and building their research skills.[28]

The results showed that state university hospitals demonstrated greater levels of motivation and research support compared to private hospitals. This variation may be attributed to disparities in resources, funding, and institutional backing accessible within these contexts. Furthermore, the outcomes may also be attributable to the fact that private hospitals may prioritize profit-making objectives. More studies are needed in this field to make more certain statements on this issue.

The results of this study indicated that female specialists experienced more significant time constraints compared to their male counterparts. Traditional gender roles have historically assigned men the role of full-time workers outside the home, while women have been responsible for domestic and family duties. These roles have been deeply ingrained in collective culture, associating women with caring qualities.[29] Although these roles are outdated, women continue to shoulder a greater burden of family responsibilities. Despite efforts to promote equal opportunities, work-life balance remains far from being gender-neutral, indicating that women still face a closer tie to family care and domestic responsibilities.[30] This gender disparity highlights a potential area for intervention and support to ensure equitable opportunities for women in scientific research.

There are several limitations that should be acknowledged. The study relied on self-reported data, which introduces the possibility of response bias and subjective interpretations of the challenges and motivators. Objective measures or independent assessments could have provided a more comprehensive and unbiased understanding of the factors involved. The fact that only 246 of the 1,400 PM&R specialists who received the questionnaire participated in the study may have negatively affected the generalizability of the results of the study due to the low sample size. Again, the small number of academic staff included in the study may have negatively affected the generalizability of the study results of different academic titles. While the study examined several demographic and professional variables, there may be other factors, such as socioeconomic status or institutional culture, that could influence research engagement and motivation among PM&R specialists.

Future research should consider a more comprehensive set of variables and larger sample sizes to capture the complexity of these factors.

CONCLUSION

In conclusion, it is evident that physiatrists exhibit a significant inclination towards scientific research. However, they encounter various challenges, including limited availability of time and insufficient research support. Furthermore, there exists a pressing need to enhance their proficiency in conduct scientific research. To address the regional disparities in access to rehabilitation services, it is imperative to invest in infrastructure and allocate adequate resources to underserved regions. Overcoming obstacles associated with research methodologies, language proficiency, and statistical knowledge necessitates the active participation of PM&R specialists in comprehensive training programs and targeted events aimed at improving their research skills. Additionally, addressing demotivating factors such as the demanding clinical workload, resource insufficiency, and challenges encountered during the research and publication process requires organizational support and the establishment of a robust research infrastructure. It is of utmost importance to prioritize gender equality in scientific research and implement interventions that promote equal opportunities for women, thereby alleviating the time constraints they face. To augment the research competence and motivation of residents, tailored support and mentoring programs should be implemented during the residency phase. Future research endeavors should encompass a broader range of variables and employ larger sample sizes to ensure comprehensive exploration of the subject matter.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

REFERENCES

1. WHO Scientific Group on the Burden of Musculoskeletal Conditions at the Start of the New Millennium. The burden of musculoskeletal conditions at the start of the new millenium: report of a WHO scientific group. Geneva, Switzerland: World Health Organization; 2003. [Link]
2. Maas AIR, Menon DK, Adelson PD, et al; InTBIR Participants and Investigators. Traumatic brain injury: integrated approaches to improve prevention, clinical care, and research. Lancet Neurol. 2017;16:987-1048. [PubMed]
3. Lloyd T, Phillips BR, Aber RC. Factors that influence doctors' participation in clinical research. Med Educ. 2004;38:848-51. [Crossref] [PubMed]
4. Gelfert A. How to do Science with Models: A Philosophical Primer. 1st ed. Switzerland: Springer; 2016. [Crossref]
5. Giray E, Yağcı İ, Özyemişçi Taşkıran Ö. Publication performance in the field of physical medicine and rehabilitation in Turkey: a missed field in TUBITAK Field Based Competency Analysis Report 2020. Turk J Phys Med Rehabil. 2022;68:311-3. [Crossref] [PubMed] [PMC]
6. Squazzoni F, Bravo G, Grimaldo F, et al. Gender gap in journal submissions and peer review during the first wave of the COVID-19 pandemic. A study on 2329 Elsevier journals. PLoS One. 2021;16:e0257919. [Crossref] [PubMed] [PMC]
7. West JD, Jacquet J, King MM, et al. The role of gender in scholarly authorship. PLoS One. 2013;8:e66212. [Crossref] [PubMed] [PMC]
8. Erdem B, Obut A, Kay M, et al. Evaluating scientific research barriers by gender and other characteristics from the perspective of ophthalmologists in Turkey: a multicenter survey study. PLoS One. 2023;18:e0273181. [Crossref] [PubMed] [PMC]
9. Park JW, Jung MS. A note on determination of sample size for a Likert scale. Communications for Statistical Applications and Methods. 2009;16:669-73. [Crossref]
10. Carpenter AM, Tan SA, Costopoulos K, et al. Gender diversity in general surgery residency leadership. J Surg Educ. 2018;75:e68-e71. [Crossref] [PubMed]
11. Meadows AM, Skinner MM, Faraj MT, et al. Racial, ethnic, and gender diversity in academic orthopaedic surgery leadership. J Bone Joint Surg Am. 2022;104:1157-65. [Crossref] [PubMed]
12. Mattson LM, Rosario-Concepcion RA, Hurdle MFB, et al. Gender diversity in primary care sports medicine leadership. Curr Sports Med Rep. 2022;21:303-8. [Crossref] [PubMed]
13. Lee WR, Koo JH, Jeong JY, et al. Regional health disparities in hypertension-related hospitalization of hypertensive patients: a nationwide population-based nested case-control study. Int J Public Health. 2023;68:1605495. [Crossref] [PubMed] [PMC]
14. Sandhu VK, Hojjati M, Blanco I. Healthcare disparities in rheumatology: the role of education at a global level. Clin Rheumatol. 2020;39:659-66. [Crossref] [PubMed]

15. Feigin VL, Vos T. Global burden of neurological disorders: from global burden of disease estimates to actions. Neuroepidemiology. 2019;52:1-2. [Crossref] [PubMed]
16. Cramer SC. Repairing the human brain after stroke: I. Mechanisms of spontaneous recovery. Ann Neurol. 2008;63:272-87. [Crossref] [PubMed]
17. Shigemi D, Isogai S, Uda K, et al. Association between rehabilitation during hospitalization and perinatal outcomes among pregnant women with threatened preterm birth. J Matern Fetal Neonatal Med. 2021;34:1028-33. [Crossref] [PubMed]
18. Jones JB. Research fundamentals: statistical considerations in research design: a simple person's approach. Acad Emerg Med. 2000;7:194-9. [Crossref] [PubMed]
19. Garg R. Methodology for research I. Indian J Anaesth. 2016;60:640-5. [Crossref] [PubMed] [PMC]
20. Shrivastava M, Shah N, Navaid S. Assessment of change in knowledge about research methods among delegates attending research methodology workshop. Perspect Clin Res. 2018;9:83-90. [Crossref] [PubMed] [PMC]
21. Kane B, Luz S. Information sharing at multidisciplinary medical team meetings. Group Decision and Negotiation. 2011;20:437-64. [Crossref]
22. Ziman J. Real Science: What it is, and What it Means. Cambridge: Cambridge University Press; 2009.
23. National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Research Data and Information; Committee on Toward an Open Science Enterprise. Open Science by Design: Realizing a Vision for 21st Century Research. Washington (DC): National Academies Press (US); 2018. [PubMed]
24. Yavuz E, Yayla ME, Kırımlı E, et al. Daily workload and service profile of family physicians in Turkey: a snapshot of one-day work. Konuralp Medical Journal. 2020;12:175-82. [Crossref]
25. Özkan Ş, Yıldırım T. General dentists staffing requirement based on workload in the public dental health centers in Turkey. International Journal of Healthcare Management. 2022;15:277-86. [Crossref]
26. Hyland K. Academic Publishing: Issues and Challenges in the Construction of Knowledge. 1st ed. Oxford: Oxford University Press; 2016.
27. Sonnert G, Holton G. Career patterns of women and men in the sciences. American Scientist. 1996;84:63-71. [Link]
28. Collins J. Motivation of radiology residents: an interaction between personal and environmental factors. Acad Radiol. 2002;9:451-4. [Crossref] [PubMed]
29. Glick P, Fiske ST. The ambivalent sexism inventory: differentiating hostile and benevolent sexism. Journal of Personality and Social Psychology. 1996;70:491-512. [Crossref]
30. Pace F, Sciotto G. Gender differences in the relationship between work-life balance, career opportunities and general health perception. Sustainability. 2021;14:357. [Crossref]