Original Research

Workforce and Employment Status of Sleep Medicine Graduates in Iran

Shahram Samadi[1], Khosro Sadeghniiat Haghighi[2], Arezu Najafi[3], Ania Rahimi-Golkhandan[3], Farid Moradian[4], Hamed Amirifard[5], Zahra Banfesheh Alemohammad[3], Zahra Nikeghbalian[5*]

[1.] *Sleep Breathing Disorders Research Center, Tehran University of Medical Sciences, Tehran, Iran; Pain Research Center, Neurosciences Institue, Tehran University of Medical Sciences, Tehran, Iran*
[2.] *Sleep Breathing Disorders Research Center, Tehran University of Medical Sciences, Tehran, Iran; Occupational Sleep Research Center, Baharloo Hospital, Tehran University of Medical Sciences, Tehran, Iran*
[3.] *Occupational Sleep Research Center, Baharloo Hospital, Tehran University of Medical Sciences, Tehran, Iran*
[4.] *Depatment of Surgery, Alborz University of Medical Sciences, Karaj, Iran*
[5.] *Sleep Breathing Disorders Research Center, Tehran University of Medical Sciences, Tehran, Iran*

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Abstract

Background and Objective: Sleep medicine is a multidisciplinary specialty that focuses on diagnosing and treating sleep disorders. Sleep medicine fellowship programs in Iran commenced in 2012 at Tehran University of Medical Sciences, Tehran, Iran. This study aimed to investigate the human resources and employment status of sleep medicine fellowship graduates in Iran.

Materials and Methods: This study was a descriptive cross-sectional study conducted in Iran in 2022 using convenience sampling and included 41 sleep medicine fellows in Iran. Data collection tools included a demographic questionnaire and a researcher-made survey. Data were analyzed using the SPSS software.

Results: Out of 57 sleep medicine fellows, 41 individuals with an average age of 44.95 ± 7.57 years participated in the study. Only 12% of the fellows were satisfied with their income, and all participants expressed dissatisfaction with their insurance coverage. 92% considered the existence of a national guideline for sleep medicine to be crucial, while 66.7% felt the curriculum of medical sleep medicine had some deficiencies.

Conclusion: Lack of a suitable national guideline for treating and preventing sleep disorders, lack of insurance coverage for tests and respiratory assist devices, and high costs of establishing and equipping specialized sleep clinics are major challenges recognized by sleep medicine fellows. Additionally, due to the low priority given to these diseases by authorities and the inappropriate distribution of sleep medicine specialists in the country, access to appropriate treatment for sleep disorders is only feasible in giant cities.

Keywords: Sleep; Medicine; Fellowships; Sleep disorders

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Introduction

Sleep is one of the most crucial circadian cycles, occurring based on a biological rhythm and having a complex biopsychological pattern. Sleep is a natural bodily function that plays a crucial role in maintaining individuals' mental and physical health, and any sleep disruption can affect one's well-being (1). For centuries, information about sleep and its disorders was based on personal experience and observation of individuals' behavior during sleep. According to historical evidence, the first experiments in the field of sleep were conducted by Kohlschütter in 1862 (2). Modern sleep medicine developed with the discovery of brain electrical activity. The recording of the electrical activity of animal brains was first performed in 1875 by Caton (3), and later, in

***Corresponding author**: Z. Nikeghbalian, Sleep Breathing Disorder Research Center, Tehran University of Medical Sciences, Tehran, Iran*
Tel: +98 21 61192053, Fax: +98 21 42933261
Email: znikeghbalian@gmail.com

1929, Berger recorded human brain electrical activity using an electroencephalogram (EEG) (4). Recently, devices such as polysomnography (PSG), EEG, electromyogram (EMG), and electrooculogram (EOG) have been used to examine sleep stages (5).

In recent years, clinical studies in the field of sleep medicine have resulted in the developing of a system for diagnosing sleep disorders (6). According to the International Classification of Sleep Disorders-Third Edition (ICSD-3), sleep disorders include six main groups: insomnia, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm disorders, parasomnias, and sleep-related movement disorders (7). Sleep disorders are among the most common complaints in all age groups, and in recent years, there has been an increasing trend in the incidence of these disorders (8). Epidemiological studies on sleep disorders in Iran have found a 41.6% prevalence among elementary school children in Tehran (9), 1.86% prevalence among elderly residents in nursing homes in Ahvaz (10), 100% prevalence among pregnant women attending health centers in Mashhad (11), 3.23% prevalence among general population of adults living in Hamedan, Iran (12), 7.87% prevalence among nurses at Imam Khomeini Hospital in Tehran (13), and 21.55% prevalence among medical students at Zabol University, Zabol (14).

Adverse effects of sleep disorders in children include nocturnal enuresis, hyperactivity, and decline in academic performance, while in adults, they encompass ischemic heart disease and stroke, resistant epilepsy, heart failure, hypertension (HTN), insomnia, sleepiness, and nightmares (15-17). Consequently, the importance of healthy sleep is widely recognized, increasing the demand for specialists in this field. Sleep medicine was established as an independent specialty with its specific diagnostic and therapeutic methods in the late 20th century (18, 19). The Iranian Sleep Medicine Society was founded in 2005-2006, and a specialized fellowship program in sleep medicine was initiated at Tehran University of Medical Sciences, followed by Shahid Beheshti University of Medical Sciences and Iran University of Medical Sciences. According to the decisions of the scientific committees of the Ministry of Health and Medical Education in Iran, specialists in neurology, pulmonary medicine, psychiatry, otolaryngology, pediatrics, occupational medicine, internal medicine, and anesthesiology can join the one-year sleep medicine training program (20). However, the field of sleep medicine currently lacks sufficient specialists to meet the unique needs of patients with sleep disorders in Iran. There is an estimated one sleep medicine specialist for every 500000 people in Iran (20).

In Iran, general and specialized sleep clinics with a maximum capacity of 2-6 active beds operate in major cities (Imam Khomeini Hospital Sleep Clinic has six active beds). Due to the complexity of sleep, sleep disorders cannot be diagnosed solely or with a series of tests. Lifestyle, occupational schedule, and underlying diseases should be considered for an accurate diagnosis of sleep disorders. Currently, sleep tests (PSG), actigraphy, multiple sleep latency test (MSLT), and maintenance of wakefulness test (MWT) are not covered by insurance and are only included in the treatment plans of a limited number of private insurances, whose regulations change annually due to their high costs (20). After completing specialized or subspecialized medical courses, fellowship programs focus on advanced academic or clinical skills. Fellowship programs are expanding, but the career prospects after graduation are unclear. There are, however, specific limitations in this regard, including the absence of specific guidelines for diagnosing and treating sleep disorders based on population needs, restrictive laws and regulations for establishing sleep clinics, minimal insurance coverage for diagnosing and treating sleep disorders, and economic and financial challenges faced by sleep clinics in procuring necessary materials and equipment (20).

Therefore, the present study aimed to investigate the workforce and employment status of sleep medicine fellowship graduates. In particular, we evaluated the perception of sleep medicine fellows regarding sleep medicine education, income, insurance, and other related aspects.

Materials and Methods

The present study was conducted to describe and analyze the status of the sleep medicine fellowship workforce in 2022 in Iran. In other words, the main research focus of this study is the comprehensive assessment of the status of sleep medicine specialists in Iran from the perspective of fellows in this field. The study sample consisted of sleep medicine fellowship graduates (57 individuals) who were recruited using convenience sampling. The inclusion criteria were com-

pleting the sleep medicine fellowship program and the willingness to participate in the study. Initially, the research objectives were fully explained to the participants, followed by obtaining written consent. A demographic questionnaire and a researcher-made questionnaire were utilized for data collection, and the questions were based on the opinions of experts in the field of sleep medicine and a review of relevant literature. Finally, the collected data were cleaned and then analyzed. The questionnaires were distributed anonymously among the participants. Participation in the study was voluntary, and participants could withdraw at any stage. We used SPSS software (version 16, SPSS Inc., Chicago, IL, USA) for data analayis, and ArcGIS software was employed for mapping Iran. We used numbers and percentages to describe the categorical variables and mean and standard deviation (SD) to describe the continuous ones. The study protocol was approved by the Ethics Committee of the National Strategic Research Center for Medical Education with the ethics code IR.NASRME.REC.1400.181.

Results

As presented in table 1, the total number of sleep medicine fellowships in Iran was 57 individuals. Forty-one sleep medicine fellowships with an average age of 44.95 ± 7.57 years (range: 31-57 years) participated in this study. The response rate in this study was 71.9%. The majority of participants were women (58.5%). 24.4% of the participants had attended Tehran University of Medical Sciences, and the majority of participants (76.0%) graduated from medical school between the years 1991 and 2011.

The primary specialty field of the participants was occupational medicine (25.0%) and psychiatry (20.0%) (Figure 1).

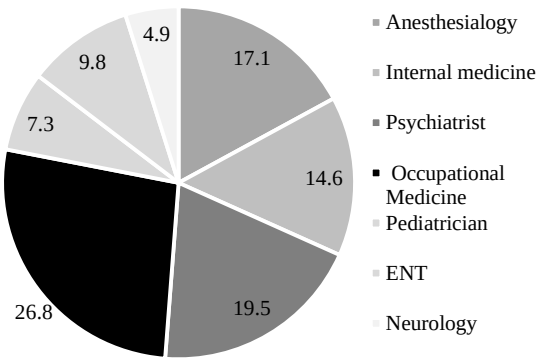

Figure 1. Primary specialty of study participants

Of the participants, 61% completed their specialty training between 2011-2020. Furthermore, 48.8% of the participants completed their sleep medicine fellowship at Tehran University of Medical Sciences between 2011 and 2020. Regarding employment location, 51% of the sleep medicine fellowships were in Tehran Province (Figure 2), and university faculty members held 43.9% of the fellowships. Among the participants, 39.0% and 36.6% were employed in the private and governmental sectors (university-affiliated), respectively.

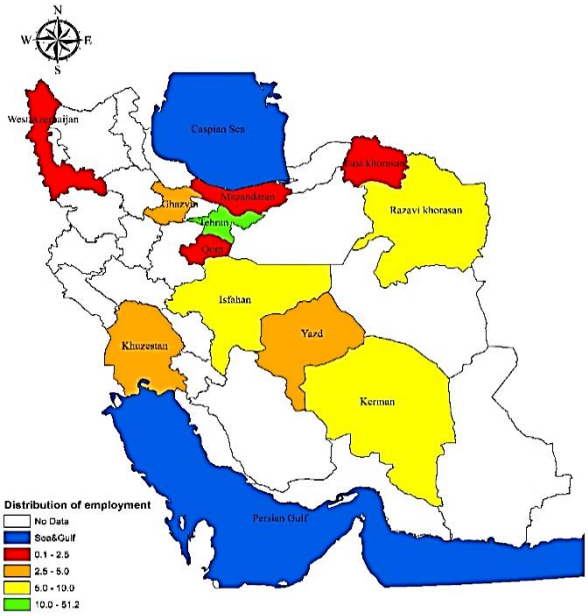

Figure 2. Distribution of sleep medicine fellowships in Iran

Concerning income satisfaction, 12.3% of the participants were satisfied with their income through the sleep medicine fellowship. In terms of insurance-related issues, 100% of the participants were dissatisfied with insurance coverage for sleep tests. Moreover, 29.3% of the participants stated that insurance covered their visit costs as part of the sleep medicine fellowship, and all participants (100%) expressed that the lack of insurance coverage for positive airway pressure (PAP) devices led to a significant number of patients discontinuing treatment.

Regarding guidelines for sleep medicine fellowship programs in universities, 92.7% of the participants felt there was a lack of national guidelines for sleep disorders. Furthermore, 78% believed that the existence of national guidelines could not only improve treatment but also help resolve patients' insurance problems.

Table 1. Basic and demographic characteristics of the sleep medicine fellows who participated in the study (n = 41)

Variable		Value
Demographic characteristics		
Age (year)		45.07 ± 0.60
Educational history		
Medical school attended	Tehran University of Medical Sciences	10 (24.4)
	Shahid Beheshti University of Medical Sciences	3 (7.3)
	Hamedan University of Medical Sciences	3 (7.3)
	Isfahan University of Medical Sciences	4 (9.8)
	Mashhad University of Medical Sciences	5 (12.2)
	Others	16 (39.0)
Year of graduation from medical school	Before 1991	3 (7.3)
	1991-2000	15 (36.6)
	2001-2010	16 (39.0)
	2011-2020	7 (17.0)
Year of completing the residency	1991-2000	5 (12.2)
	2001-2010	11 (26.8)
	2011-2020	25 (61.0)
University attended for sleep medicine fellowship	Tehran University of Medical Sciences	20 (48.8)
	Shahid Beheshti University of Medical Sciences	6 (14.6)
	Iran University of Medical Sciences	5 (12.2)
	Other universities (Mashhad, Qazvin, and Isfahan)	6 (14.6)
	Universities abroad (Sidney, Toronto, Berlin, and Chicago)	4 (9.6)
Occupational status		
Place of work (province)	Tehran	21 (51.2)
	Khorasan	5 (12.2)
	Other	15 (36.6)
Faculty member	Yes	18 (43.9)
	No	23 (56.1)
Type of employment at sleep clinic	Governmental (non-university-affiliated)	3 (7.3)
	Private	16 (39.0)
	Assistant	7 (17.1)
Items related to the sleep clinic		
Having a license for a sleep clinic	Yes	8 (19.5)
	No	33 (80.5)
Establishment of a sleep clinic	Yes	15 (36.6)
	No	26 (63.4)
Sleep tests prescribed per month	< 10	13 (31.7)
	10-19	9 (22.0)
	20-29	9 (22.0)
	≥ 30	10 (24.3)
From a sleep fellow's perspective, should people with sleep disorders only refer to sleep medicine specialists?	Yes	24 (64.9)
	No	13 (35.1)
Statisfied with income	Yes	5 (12.2)
	No	36 (87.8)
Items related to insurance coverage		
Satistfied with insurance coverage for sleep tests	Yes	0 (0)
	No	41 (100)
Does the insurance company cover the visit expenses under the sleep medicine fellowship or under the primary specialty?	Primary specialty	28 (68.3)
	Sleep medicine fellowship	12 (29.3)
Has the lack of insurance coverage for PAP devices or sleep tests led to a significant percentage of patients discontinuing treatment?	Yes	41 (100)
	No	0 (0)
Items related to guidelines and sleep medicine in medical education		
Absence of national guidelines for sleep disorders	Yes	38 (92.7)
	No	3 (7.3)
Can the existence of national guidelines not only improve treatment but also help solve insurance issues?	Yes	32 (78.0)
	No	2 (4.9)
	I don't know	7 (17.1)
Lack in the university curriculum in the field of sleep medicine	Yes	12 (66.7)
	No	6 (33.3)
Opportunities for participation in research projects after graduation	Yes	29 (78.4)
	No	8 (21.6)

Table 1. Basic and demographic characteristics of the sleep medicine fellows who participated in the study (n = 41) (continue)

Variable		Value
Methods to introduce sleep medicine field		
Suggestion for the method to introduce sleep medicine in Iran	Public education	10 (27.0)
	Educating general practitioners	6 (16.2)
	Social media	21 (56.8)
How are patients typically referred to sleep clinics?	By general practitioners	2 (4.9)
	By specialists	19 (46.4)
	By patients themselves	20 (48.8)

Data are presented as mean ± standard deviation (SD) or number and percentage
PAP: Positive airway pressure

66.7% of the respondents (12 out of 18) felt there was a deficiency in the curriculum for sleep medicine in the university, and 78.4% expressed having opportunities for research projects after completing the sleep medicine fellowship. More than half of the participants (56.1%) considered social media the best method for promoting sleep medicine fellowship. Regarding patient referrals to sleep clinics, 48.8% of the patients personally visited sleep clinics without referrals from colleagues or other physicians.

Discussion

To the best of our knowledge, this is the first study that has assessed the workforce and employment status of sleep medicine fellowship graduates in Iran. In this study, we found that there were 57 sleep medicine fellowships in Iran, approximately 0.64 per 1 million Iranians. Considering one sleep specialist for every 500000 people and the population of 84 million in Iran, approximately 170 sleep specialists are needed to prepare appropriate coverage for Iranian people. In other words, due to the multidisciplinary nature of sleep medicine, determining the optimal number of specialists in this field is complex, and population needs and the capacity of service providers should be taken into account (21).

The findings of a study by Yu et al. aimed at evaluating the workforce characteristics of dual-certified sleep and otolaryngology specialists in the United States (US) were consistent with the findings of our study. It showed that despite having 275 active specialists, there was one sleep medicine specialist in otolaryngology for every 1.1 million people, which was insufficient to provide appropriate coverage of the US population (21). In a study conducted in Saudi Arabia in 2013, there were 0.12 sleep medicine specialists for every 1 million people in the country. Considering the country's need for sleep medicine specialists, similar to our study, this number was considered inadequate (22). The American Academy of Sleep Medicine (AASM) has predicted that the demand for sleep physicians will increase in the coming years, and the current rate of scholarships is insufficient to meet this demand (23).

In this study, 45% of fellowships had completed a psychiatry and occupational medicine residency, and 61% had completed their fellowship training in the last decade. The results of this study indicated that three-quarters of the studied fellowships had completed their sleep medicine fellowship training in the past ten years at three main universities in the capital of Iran, Tehran. This suggests that most sleep medicine fellowships have been trained in the major city of Tehran. Furthermore, 50% of the investigated fellowships were employed in Tehran. According to these results, we found that the distribution of active sleep medicine specialists was inappropriate, and sleep medicine specialists were mostly concentrated in major cities, especially Tehran, and subsequently in Mashhad. For example, in many provinces and cities of Iran, there is no specialized sleep clinic or a sleep medicine specialist. In line with the findings of this study, the results of a study by Yu et al. also indicated an imbalance in the distribution of sleep medicine specialists in the US, and similar to our findings, sleep medicine specialists were unevenly distributed in specific geographical regions (21).

In a study that examined the patterns of surgeries related to obstructive sleep apnea (OSA) in the US, rural areas, compared to urban areas, had fewer sleep-related disorders surgeries and higher costs (24). Paying attention to these differences in the distribution of sleep fellowships can identify regional patterns in caring for patients with sleep disorders. This means that the accessibility of a sleep medicine specialist or even the ability to schedule appointments for areas distant from major cities can be challenging.

In the present study, the number of individuals employed in governmental universities and non-university centers showed a slight difference compared to those working in the private sector (18 individuals vs. 16 individuals). In contrast to our findings, the study by Yu et al. demonstrated that three-quarters of sleep specialists were employed in the private sector (21). In Iran, given the economic and financial constraints encountered by sleep clinics in procuring essential devices and the complexities associated with obtaining licenses for establishing such clinics, it appears that physicians are more inclined to engage in government-affiliated centers. This preference is attributed to the government's provision of necessary equipment and devices in these settings, as opposed to the challenges private clinics face in meeting these requirements.

In this study, the majority of sleep fellowship participants expressed dissatisfaction with the income generated from their activities in this field. Since many companies do not provide the necessary equipment for sleep disorders, establishing a specialized sleep laboratory can be expensive and cost-prohibitive. Consequently, considering the cost-effectiveness, engaging in this field does not hold financial appeal for specialized physicians, and in many cases, the return on the initial investment for establishing a clinic may not be achievable for several years.

According to 65% of the sleep fellowship specialists participating in this study, patients with sleep disorders should only seek care from sleep medicine fellowships. The study by Parthasarathy et al. demonstrated that sleep medicine fellowships provided better management for patients with sleep disorders and improved their outcomes (25). Since sleep disorders impose significant costs on the healthcare system, the availability of specialized sleep medicine clinics may significantly save costs and optimize resource utilization due to timely diagnosis, accurate assessment of the patient's sleep status, and subsequent treatment. This may also contribute to a reduction in hospitalization rates (26-28).

In this study, all the participants expressed dissatisfaction with the insurance coverage for sleep tests. Additionally, all these physicians believed that the lack of insurance coverage for sleep tests and PAP devices was a reason for a significant proportion of patients refraining from continuing the treatment of sleep disorders. Moreover, a considerable percentage of fellowships stated that their visit expenses were covered under their primary specialization rather than the sleep medicine fellowship. Individuals lacking sufficient health insurance or access to quality care do not have equal opportunities for accessing healthcare, and their overall health may be adversely affected. Therefore, the discussion of insurance in terms of access to appropriate healthcare for all members of society is highly significant. Consistent with our study, a study conducted by Bahammam et al. in Saudi Arabia highlighted that the lack of insurance coverage from some insurance companies in the diagnostic and therapeutic sections of sleep medicine was among the main challenges in this field in Saudi Arabia (26).

Basic insurance organizations, which cover the majority of Iran's comprehensive insurance, operate under the supervision of the Ministry of Welfare and Social Security, with the government having varying shares in their financial support (29). However, due to the diversity of healthcare services, not all services are covered by basic insurance. Therefore, supplemental or complementary insurance services are delegated to private health insurance companies (30). The private healthcare sector often provides its services by directly receiving fees from patients, and in some cases, it also receives a portion of its expenses through supplementary insurance organizations. The substantial growth of insurance organizations in recent years and the diversity of health service providers have led to numerous interactions between these organizations and the involved professional groups, posing challenges in establishing effective communication (31).

In a study by Jaafaripooyan et al., various challenges were reported for hospitals and insurance organizations in Iran, such as delays in hospital expense payments, insufficient interaction between the two organizations, lack of responsibility among hospital staff in cost management, and the absence of contracts between public hospitals and supplementary insurance, as well as private hospitals with basic insurance (31). The costs of sleep tests and continuous PAP (CPAP) devices are relatively high compared to the average income of the Iranian population. Basic insurance in Iran, as the primary people's insurance company, only covers the costs of sleep tests for hospitalized patients, excluding equipment, medications, and prosthetics from their coverage (20).

In this study, we found that in the field of sleep medicine education and guidelines, over 90% of fellowships believed there was a need for national guidelines for sleep disorders. A significant portion of participants believed that the existence of national guidelines could not only enhance the treatment process but also contribute to solving the insurance-related problems of patients. As mentioned earlier, developing national guidelines for sleep disorders could significantly reduce the financial burden resulting from untreated conditions and lead to resource savings in the healthcare sector. One of the reasons for the lack of necessary standards for the timely diagnosis and treatment of these patients is the absence of national guidelines for sleep medicine. The consequences of this absence include the inadequate assessment of these patients using specialized sleep devices and tests, as well as the lack of effective treatment and timely intervention. Given the diverse clinical manifestations, diagnostic criteria, and specialized management of sleep disorders, there is an urgent need for specialized sleep medicine guidelines from professionals in this field in Iran.

In the present study, more than half of the fellowships expressed a deficiency in the university curriculum for sleep medicine, indicating that the courses offered in the sleep medicine fellowship program were not considered sufficient for treating patients. In a study conducted by Stamm et al., which aimed to evaluate the understanding of family medicine, internal medicine, psychiatry, and neurology residents regarding knowledge and training in sleep disorders at the University of California, residents surveyed, consistent with our findings, were dissatisfied with the training and assessed their competence in diagnosing and treating sleep disorders at a mediocre level (32). Given the high prevalence of various sleep disorders and their potential side effects, proper education in sleep medicine fellowships is deemed essential for the appropriate care of patients with sleep problems, often left unrecognized during medical encounters. Therefore, a collaborative effort among relevant specialists is necessary to review the university courses related to sleep medicine education in general medicine, specialty training, and specifically in sleep medicine fellowship programs (26). This revision should emphasize the importance of accurate and timely diagnosis and treatment of sleep disorders to healthcare decision-makers in the country.

In the present study, general practitioners had the lowest referral rate (5%) to sleep fellowships. In the general medicine program in Iran, topics related to sleep disorders, especially sleep-related respiratory disorders, are presented to fourth-year students in the respiratory diseases course (20). In line with our results, Stamm et al.'s study demonstrated that most residents were not adequately familiar with sleep-related education in medical school, with only one-third receiving sleep-related training during their general medicine course (32). Based on the assessments, it appears that general practitioners, due to insufficient training in sleep disorders, may lack the capability to diagnose these disorders in patients. This issue contributes to the delayed diagnosis and referral of patients to sleep medicine specialists. Revising the general medicine program's curriculum and increasing medical students' awareness of sleep disorders and their diagnostic methods could effectively address this problem.

Conclusion

The successful growth of sleep medicine as a multidisciplinary and emerging specialty in many countries relies not only on training sleep specialists and establishing specialized sleep clinics but also on educating all healthcare providers about healthy sleep and related disorders. Considering the findings of this study, formulating native guidelines for sleep medicine can provide practical solutions for the Iranian community. Through this, standardizing and improving service delivery and enhancing management in timely diagnostic interventions for these patients can be achieved. Furthermore, by strengthening the educational curriculum in general medical training programs, specialization, and sleep medicine fellowships, timely interventions can be facilitated, hospitalization duration and subsequent treatment costs will be reduced, the burden of illness will be decreased, the clinical effectiveness of interventions will be enhanced, and consequently, patient satisfaction will be increased. Building upon this initiative and drawing upon the insights gained from the data collected in this study, continuous endeavors should be underway to articulate a comprehensive roadmap for developing sleep fellowships in Iran.

Conflict of Interests

Authors have no conflict of interests.

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