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GLOBAL PRACTICE OF SLEEP MEDICINE

Sleep medicine in Africa: past, present, and future

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Interest in sleep and sleep disorders in Africa dates back thousands of years, influenced by various cultural and religious beliefs. However, the practice of sleep medicine as a specialty has been inadequate compared to other regions of the world. The objective of this study was to explore the current status of sleep medicine in Africa vis-à-vis education, professional societies, and facilities, and to identify challenges of the specialty in the region. A literature search of major electronic databases (PubMed, Google Scholar) was done. This revealed that there is a high prevalence of sleep disorders in Africa and a significant association with epilepsy, human African trypanosomiasis, human immunodeficiency virus, and other diseases. There are 6 sleep societies in Africa located in 4 countries. Forty-one sleep laboratories were identified located in 4 countries. The challenges hindering development of sleep medicine in Africa include lack of awareness, poor funding, lack of facilities, and inadequate training.

Keywords: sleep medicine practice, sleep societies, Africa

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INTRODUCTION

Africa is the second largest continent in the world in both area and population with a landmass of 30.37 million km^2 and a population of 1.3 billion.[1] It has diverse ethnicities, cultures, and languages. Interest in sleep and sleep disorders has existed in all cultures since the beginning of humankind.[2] Historically, as far back as 4000 BC, ancient Egypt regarded sleep medicine as an integral part of their civilization and tackled various aspects of the nature of sleep and dreaming. These include dream interpretation and analysis, use of sleep as therapy, sleep temples for sleep incubation and healing, description of sleep problems like insomnia, and prescription of hypnotics (poppy seeds) for insomnia.[3] The belief was that dreams could serve as oracles, bringing messages from the gods, and the best way to get the desired answer, especially in infirmity, was to induce or "incubate" dreams.[3]

In current times in Africa, perception of sleep and sleep disorders is still based largely on cultural beliefs and is influenced by religion. The Zulu and Xhosa diviners (traditional healers) are regarded as "a house of dreams" to whom the ancestors communicate answers to problems and prescribe the specific plant to cure illnesses through dreams during sleep.[4] The native Amharic language speakers of Ethiopia use dreams in prophecy and fortune-telling, while the Yorubas of Nigeria believe that nightmares and dreams during sleep connote negative meaning and may be associated with witchcraft.[5]

Sleep is a basic biologic function essential for life and occupies one-third of people's lives.[6] However, sleep medicine is underdeveloped in Africa despite rapid urbanization in developing countries. This is due to the limited number of well-trained sleep specialists and other specialists like neurologists or pulmonologists, the unavailability of sleep labs in a majority of the countries, a lack of awareness and trivialization of sleep disorders, the very small number of sleep societies in Africa with certifying programs, and a lack of motivation even among medical practitioners. The data from Africa about these sleep laboratories, sleep societies, training programs/certification, challenges to the practice of sleep medicine, research focus/trends in sleep disorders, and the current status of sleep medicine in Africa are summarized.

The aims of our study are as follows:

- To delineate the current status of sleep medicine, sleep societies, and sleep laboratories in Africa.
- To delineate the challenges to the practice of sleep medicine in Africa.
- To delineate the research focus and trends in sleep disorders across the region.
- To describe the sleep training programs and certification in Africa.

METHODS

A literature search for publications on sleep studies performed in African countries in major electronic databases (PubMed and Google Scholar) was conducted in English from August to September 2020. The following key search terms and logic were used: [Africa or name of the country] + [sleep disorder or sleep medicine society] + [training programs]. Publications considered were limited to the last 10 years.

RESULTS

Our search yielded 566 publications in Africa on sleep disorders in the last 10 years, with a distribution across 18 countries as shown in **Figure 1**. Data were also obtained from the available sleep societies in Africa. Only 4 out of the 54 countries in Africa (7.4%) have an established sleep society. However, no articles were published about sleep societies or laboratories in the majority of the countries in Africa.

Sleep societies and sleep laboratories in Africa

The number of sleep societies in Africa is small with only 6 sleep societies spanning 4 countries (South Africa, Egypt, Algeria, Morocco). Some of their features and activities are summarized in **Table 1**. Sleep laboratories are also few in Africa with a majority of countries having none. South Africa has the highest number with about 29 sleep facilities both public and private. These sleep laboratories have been accredited by the South African Society of Sleep Medicine (SASSM). Egypt has 6 sleep facilities that are mostly privately owned. Nigeria and Kenya have 4 and 2 sleep laboratories, respectively. Other countries do not have a functioning sleep laboratory. Even in countries with sleep facilities, the number of sleep medicine specialists and technologists does not currently meet the demand for the service by the population.

Sleep training programs and certification

With the continuous development of the field, sleep medicine has evolved into an independent specialty in many regions of the world. Medical residencies and training programs are provided to practitioners who desire to specialize in the field. However, in Africa, sleep medicine as a modern medical specialty is still an emerging field. The South African Society of Sleep Medicine was established in 2010 and it accredits sleep services providers in Southern Africa by establishing a core set of minimum clinical and technological standards in sleep medicine but it provides no training certification. The society's membership is diverse, spanning several specialties. Most sleep specialists in Africa obtained their certification outside the continent, most commonly from the European Sleep Research Society and from the former American Board of Sleep Medicine, now the American Board of Medical Specialties. Currently, none of the African countries offers a certified sleep training program. In addition, almost all the countries in Africa have inadequate numbers of health care professionals, thus reducing the chances of interest in sleep medicine. The doctor-to-patient ratio for African countries is summarized in **Table 2**.

Research focus and trends in sleep disorders in Africa

Sleep disorders affect more than 45% of the world's population and they have emerged as important global public health concern.[7,8] Individuals experiencing sleep disorders have increased risks of certain chronic diseases such as cancer, hypertension, diabetes, cognitive impairment, and obesity, as well as increased all-cause mortality.[9] Despite individual efforts by some sleep specialists to educate the public on sleep disorders, the majority of the population of Africa remains unaware of the serious consequences of sleep disorders, sleep deprivation, and disturbances of biological sleep rhythms. Significant research has been done over the last 10 years in Africa, with Egypt and South Africa having the highest number of research articles published. Major areas of research focus have included insomnia, parasomnia, sleep-related breathing disorders, restless legs syndrome, sleep and culture, sleep and infections, sleep and other neurological conditions, among others.[10–12] **Figure 1** summarizes the estimated number of research articles published in the last 10 years.

A recent cross sectional study in a southern city of Nigeria showed that the prevalence of poor sleep quality among young adolescent school students was 12.2%. Anxiety, depression and internet use were significantly associated with poor sleep quality.[13] Olorunmoteni et al also revealed that about 44% of young adolescents develop insomnia and attributed this to the use of electronic devices, especially at bedtime.[14] Studies in Ethiopia showed that poor sleep quality was associated with 3.46-fold increased odds of suicidal ideation in adults after adjusting for confounders such as depression.[15] Insomnia has also been attributed to the chewing of khat among Ethiopians.[16] Khat is an evergreen shrub grown at high altitudes of East Africa that has properties similar to amphetamines and a high abuse potential.[17]

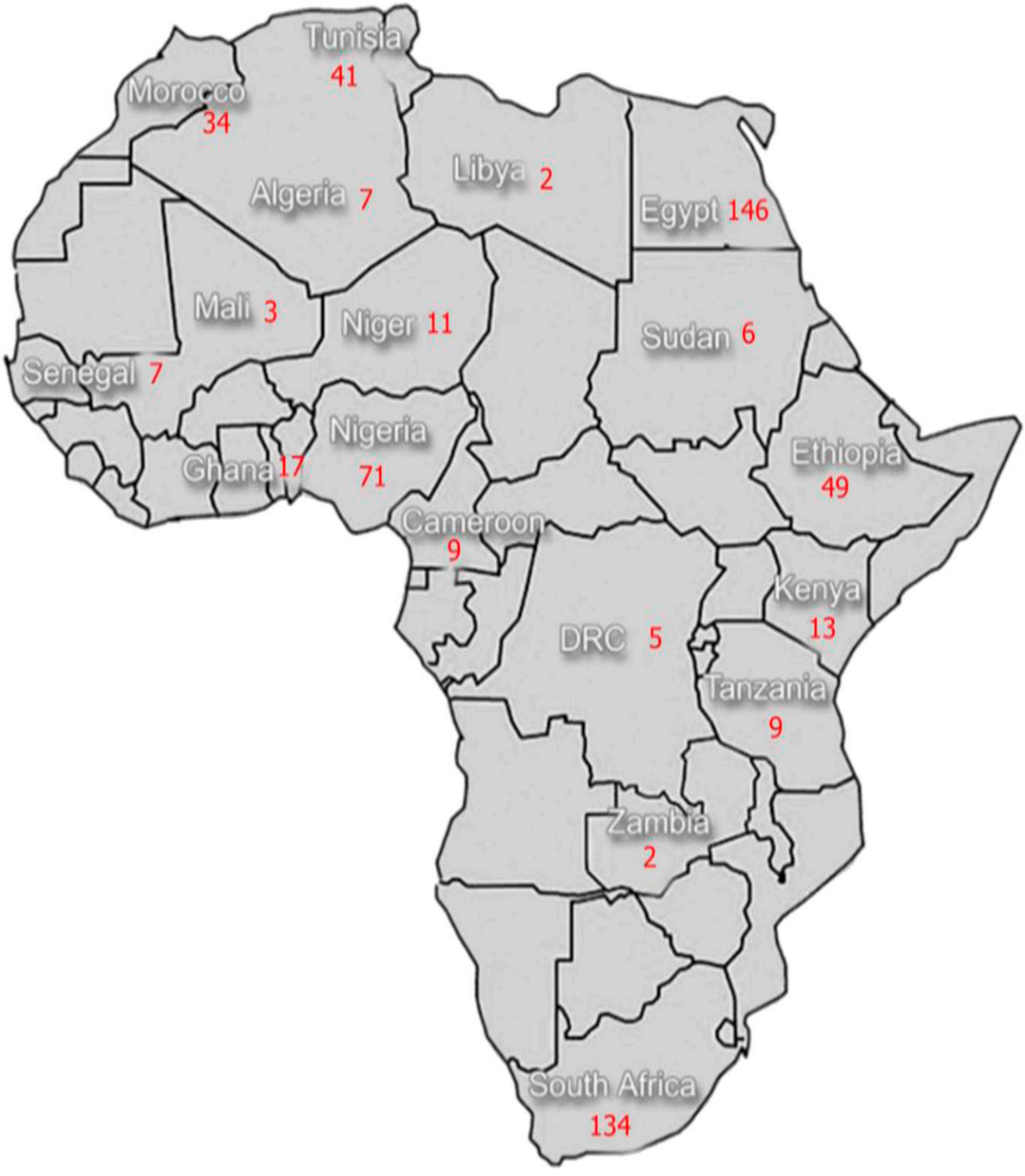
Parasomnias are common in Africa with more than 70% of the Nigerian population having experienced parasomnias at any time in the past. Nightmares, enuresis, sleep paralysis, and night terrors are the commonest parasomnias experienced.[12] A hospital-based study carried out in southwest Nigeria revealed that the prevalence of isolated sleep paralysis and overall lifetime prevalence rate of sleepwalking to be 28% and 57%, respectively.[11,18] In Africa, most of the parasomnias, especially sleep paralysis and nightmares, are not recognized as medical disorders; nearly half of the general Egyptian population believes it to be caused by jinn (a spirit-like creature) or witchcraft.[19] They resort therefore to prayers or faith healers and usually present late for medical care.

Obstructive sleep apnea is another relatively common entity, with a prevalence of 57%, 23%, and 69% among Cameroonian, Nigerian, and South African populations, respectively.[20–22] Obstructive sleep apnea has been recognized as a cardiovascular risk factor responsible for significant morbidity and mortality if untreated. Although it is relatively easily recognized by health care professionals, only a few have the resources to manage patients effectively with continuous positive airway pressure, reflecting gaps in knowledge and attitude regarding the management of obstructive sleep apnea.[23]

A few studies have also assessed the prevalence of other sleep disorders. Fawale et al revealed the prevalence of restless legs syndrome to be 3.5%, with a male-to-female ratio of 2:1 in a Nigerian elderly cohort.[10] The prevalence of restless legs syndrome in South Africa appears to be higher than in other populations, with a rate of 16.5%. Epilepsy has also been shown to be associated with a significant number of sleep disorders. Komolafe et al showed that the prevalence of sleep disorders in people living with epilepsy was 82%, and with parasomnia, obstructive sleep apnea, insomnia, excessive daytime sleepiness, and restless legs syndrome, 46%, 23%, 19%, 17%, and 11%, respectively.[24]

Sleep disorders can be caused by infections. Africa has the highest incidence of human African trypanosomiasis (HAT),

Figure 1—Number of published articles on sleep disorders per country in the last 10 years (search using PubMed and Google Scholar was conducted in December 2020).



also called "sleeping sickness." This is caused by several species of trypanosome, which are suspected to have infected the human species for thousands of years.[25] Sleep-wake disorders, with nocturnal insomnia and excessive daytime somnolence, can be observed in stage-2 HAT patients and can be exacerbated with worsening of the illness. A study by Dauvilliers et al showed that HAT is associated with low cerebrospinal fluid hypocretin levels and the presence of major sleep-wake cycle disruptions.[26] There has been a downtrend in the number of reported HAT cases from a peak of

Table 1—Sleep societies and sleep laboratories in 6 countries.

Country	Societies	No. of Sleep Labs/Centers	Founding Date	Activities in the Country
South Africa	South African Society of Sleep Medicine (SASSM)	29 Public and private	2009	Sleep laboratory membership and accreditation
				Promoting research and publications in the field of sleep medicine
Egypt	Egyptian Scientific Society for Sleep Medicine and Research The Egyptian Laryngology and Sleep Surgery Society	6 Mostly private	2014	No recent activities available online
Algeria	Algerian Society of Sleep Medicine	Not available	Not available	No online information
Morocco	Moroccan Society of Sleep and Alertness	Not available	Not available	Moroccan Congress of Sleep Medicine
	Sleep and Wakefulness Medicine Moroccan Federation	Not available	Not available	Promoting education, medical training, research, and publications
Nigeria	None	4 Mostly private	Not available	Not available
Kenya	None	2 Private	Not available	Not available

Table 2—Summary of population and estimated doctor-to-patient ratio in 20 African countries.

Country	Year[ab]	Total Population[a]	Medical Doctors (per 10,000 Population)[b]
Algeria	2018	42,228,408	17.193
Angola	2017	29,816,766	2.146
Cameroon	2011	20,906,388	0.881
Democratic Republic of Congo	2013	71,358,807	0.899
Egypt	2019	100,388,073	7.463
Ethiopia	2018	109,224,414	0.769
Equatorial Guinea	2017	1,262,002	4.017
Ghana	2019	30,417,856	1.064
Ivory Coast	2019	25,716,544	1.623
Kenya	2018	51,392,565	1.565
Morocco	2017	35,581,255	7.308
Nigeria	2018	195,874,683	3.806
Senegal	2019	16,296,364	0.881
South Africa	2019	58,558,270	7.923
Sierra Leone	2018	7,650,150	0.74
Tunisia	2017	11,433,443	13.025
Zambia	2016	16,363,458	0.925

[a]List of African Countries by population, from https://www.worldometers.info/population/countries-in-africa-by-population. Accessed March 30, 2021.
[b]Global Health Observatory data repository as at the last update, from https://apps.who.int/gho/data/node.main.HWFGRP_0020?lang=en. Accessed March 30, 2021.

almost 40,000 cases in 1998 to below 10,000 cases in 2009 and then 997 cases in 2018.[27] The exact mechanism by which HAT affects sleep, however, remains unclear. Another infection of note that has been linked with sleep disorders is human immunodeficiency virus, which has a high burden among Africans. Oshinaike et al revealed that human immunodeficiency virus is associated with poor sleep quality, longer sleep onset, and shorter sleep time.[28]

Challenges to the practice of sleep medicine in Africa

The demand in Africa for sleep medicine services is expected to increase significantly in the near future. Several obstacles that hinder the progress of the sleep medicine specialty in many regions of the world have been defined, including a lack of trained technicians, inadequate numbers of specialists, and poor funding.[29] Awareness about sleep disorders and their serious consequences, is low among health care workers, health care authorities, insurance companies, and the general public in Africa. To attain adequate numbers of staff and facilities, the education and training of health care professionals at the level of sleep medicine specialists and sleep technologists should be pursued.[29] Poor health systems and insurance policies in many countries in Africa is a major issue, as most patients pay out of pocket. The lack of sleep labs and clinics and diagnostic equipment and the high cost of drugs are common.

Recommendations

Sleep medicine education

Sleep medicine clinics need qualified sleep medicine specialists and sleep technologists. To overcome this problem, intensive courses and workshops should be organized to train more experts. Certification exams should be introduced in Africa to increase the opportunity for health care providers with interest in the specialty.

Sleep medicine facilities

As shown, few countries in Africa have sleep laboratories and other facilities for the practice of sleep medicine in Africa. Even in the countries that have, the numbers are not enough to serve the population. There is a need for investment to significantly increase the numbers of facilities available.

National accreditation of sleep medicine specialty

The licensing of sleep medicine practitioners and technicians in Africa would imply that the local health authorities recognize sleep medicine as a distinct medical specialty. This will enhance the growth of sleep medicine as a medical specialty while maintaining a high standard of care.

Establishments of sleep societies

The establishment of sleep societies in many countries of African will promote the specialty in the continent. With regular annual programs such as seminars and workshops, a better awareness of the importance of sleep medicine and the education of the public will be enhanced. There is also a need to consider the establishment of an African sleep society that will incorporate all sleep societies in African countries.

CONCLUSIONS

Sleep medicine is a poorly developed but emerging field in Africa. Despite the significant prevalence of sleep disorders, the availability of organized specialty care is low. There is a need for increased awareness, education, and funding.

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