

Research Hotspots and Dynamics in the Field of Sports and Sleep

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ABSTRACT. *Objective To understand the research hotspots and dynamics in the field of sports and sleep abroad. Methods Citespace visualization software was used to statistically process related documents from 2010-2019 included in the Web of science database. Results A total of 1198 articles were included. Research subjects are mainly elderly people. The research focuses on sleep quality, insomnia, and depression caused by insomnia, physical and mental fatigue, obesity, increased cardiovascular disease, increased hypertension, decreased quality of life, and healthy Decline and rising mortality. Conclusion At present, the research group is more concentrated, and the research content is relatively shallow. In the future, young women may be the main body in the research group, and the research content may be related to the mechanism of exercise on sleep disorders.*

KEYWORDS: *Exercise, Sleep, Citespace*

1. Introduction

Good sleep is the basic guarantee for maintaining normal life activities and maintaining the normal functioning of human physiology. However, as learning pressure, work stress, and life stress increase, more and more groups are affected by stress and other factors and cannot perform (maintain) normal sleep activities, that is, sleep disorders. When the human body can not guarantee sufficient sleep for a long time, the body may have reduced learning efficiency, reduced work efficiency, decreased cognitive level, decreased immunity, mental disability, emotional irritability, etc. [1-3]. However, as far as the general situation in China is concerned, the treatment of sleep disorders is more biased towards drug intervention, and sports and psychological measures are rarely taken [2]. This may be because there is no very clear evidence that exercise can produce good sleep aids. However, the human body has certain tolerance and dependence on most of the sleep aid drugs. Long-term use of related drugs may also have certain side effects on some physiological functions of the human body, which leads to many people suffering from sleep disorders. I will not seek medical help for the first time, but choose to be patient [4-

7]. If you do not take certain measures to intervene when you have a sleep disorder, but simply endure it, it may aggravate the sleep disorder and form a vicious circle.

According to the search for sleep journal articles in the databases of HowNet, Wanfang and Weipu, it can be learned from the timeline that although the attention and research on sports and sleep in China has increased, it is still weak. So what is the current status of international research on sports and sleep? What are the hot topics of research? What about the future trend? This article will use Citespace software to visually analyze the relevant literature on sports and sleep research in the web of science, and strive to explore the research frontiers, hotspots and possible dynamic development trends in the field of sports and sleep.

2. Data Source

This article uses “sleep” as the title word to search in the Web of Science database, and “exercise” to refine the search results. The selected document type is Article, the time span is 2010-2019, and a total of 1198 documents are retrieved. In order to be able to analyze the data using Citespace, the full record of the literature and the cited references are all downloaded in plain text.

Targeted by the core collection of Web of Science, including SCI, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR, IC, using the visualization software Citespace.5.5.R2 for knowledge mapping, through quantitative and The combination of qualitative analysis, combing the research hotspots in the field of motion and sleep and analyzing its dynamic trends.

3. Results and Analysis

3.1 Distribution

The 1198 documents retrieved, as of October 24, 2019, were cited 33,335 times.

3.1.1 Time and Journal Distribution

According to Table 1, from 2010 to 2019, the relevant literature published by the Institute of Sports and Sleep has shown an upward trend as a whole, indicating that foreign research on the field of exercise and sleep has gradually increased, and the degree of attention has gradually increased. However, the number of relevant documents published each year is only over 200 in 2018, that is, despite the increasing attention and research in the field of sports and sleep in society and the state, it is still weak.

Table 1 Number of Publications Related to Sports and Sleep (2010-2019)

years	Number of documents	years	Number of documents
2010	58	2015	136

2011	58	2016	129
2012	81	2017	156
2013	99	2018	205
2014	110	2019	166

3.1.2 Regional and Institutional Distribution

By knowing the regions and institutions from which the documents are included, it is possible to basically determine which countries have made outstanding contributions in this research field, and at the same time indirectly indicate which countries are dominant in this research field.

The 1198 articles included in 41 countries/regions, of which the United States, Australia, and Brazil have published more relevant literature than other countries. To a certain extent, this shows that the United States, Australia, and Brazil have relatively strong research on exercise and sleep. In particular, USA has an absolute position. In 1198 articles, 350 articles are from the United States. However, there is no China in these 41 countries, which indicates that there is no relevant literature from China in the Web of Science database, which to some extent shows that China's research in the field of sports and sleep is rather weak.

In terms of the distribution of research institutions, it is mainly concentrated in higher education institutions, with the Federal University of São Paulo in the first place, followed by the University of Pittsburgh, the University of Basel, and the University of Pennsylvania. In general, the research strength of foreign universities and colleges in the field of sports and sleep is relatively strong.

3.1.3 Author Distribution

By understanding the distribution of scholars in this field, we can basically know what influential people in this field, the influence of these characters, and to some extent reflect their contribution to the field. According to the map drawn by Citespace, the research on exercise and sleep is generally more dispersed. The highest output author, SERGIO TUFIK, published only 28 related articles in 2011-2019, and the number of publications declined over time. In 2019, no relevant literature was published. Except for this author, the status of the second and third output producers is basically consistent with the highest output author. To a certain extent, this suggests that research in the field of exercise and sleep may not have made breakthroughs in recent years, leading to a decline in scholars in the field of research and sleep. This indirectly indicates that foreign research in the field of exercise and sleep is still at a relatively preliminary stage.



Fig.1 High-Output Authors in the Field of Exercise and Sleep

3.2 Research Hotspots

The keywords included in the literature are the generalization and description of the contents of the literature, which basically reflect the focus of the literature. Therefore, by understanding the keywords of the literature, it can reflect the research hotspots in this research field to a certain extent. In this paper, Figure 2 is obtained from the map drawn by Citespace, and the obtained data is classified into Table 2.

In combination with Figure 2 and Table 2, in the field of sports and sleep in 2010-2019, the research focuses on sleep quality, insomnia, and depression caused by insomnia, physical and mental fatigue, obesity, increased cardiovascular disease, and increased hypertension. , the decline in quality of life, the decline in health and the rise in mortality. The subjects are mainly concentrated on the elderly, followed by adult women, adolescents, children, and adult males. This indicates that the elderly are more likely to develop sleep disorders. In terms of research methods, sports and physical activities are mainly used. In the research method, meta-analysis and randomized controlled experiments are mainly used.



Fig.2 Movement and Sleep Field Research Keyword Visualization Map

Table 2 High-Frequency Keyword Classification Table for Sports and Sleep Research

type	High frequency keyword
Research object	Older adult;adult;women;man;adolescent;children;
research content	Sleep;sleep quality;fatigue;insomnia;health;depression;cardiovascular disease;obesity;Hypertension;quality of life; mortality;
Research methods	Metaanalysis;randomized controlled trial;
Research means	Exercise;physical activity;

3.3 Research News

3.3.1 Research Frontiers

According to the cited network view in Figure 3, the research on sports and sleep is more concentrated. The research subjects are mainly middle-aged and elderly, followed by adult women, adolescents, children, and finally men. This may be due to the prevalence of sleep disorders in the middle-aged and elderly population, followed by adult women who are prone to sleep disorders. The research content mainly focuses on the harm caused by sleep disorders and the effect of different exercise methods on improving sleep disorders. Through the top ten cited documents in Table 3, and through the combination of research objects and research content, it can be inferred that the focus and frontiers of research in the field of exercise and sleep are basically based on the study of middle-aged and elderly groups by using different exercise methods for sleep disorders. What are the positive effects?

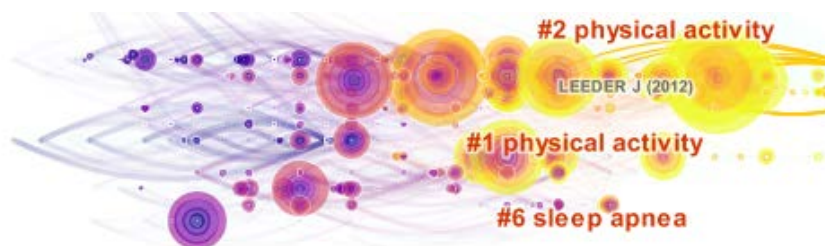


Fig.3 Sports and Sleep Field Research Literature Cited Network View

Table 3 Highly Cited Literature on Sports and Sleep Research (Top 10 Cited)

Serial number	Author, title of the document, time of publication, source publication	frequency	Explosive
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1	M. Alexandra Kredlow;The effects of physical activity on sleep: a meta-analytic review;2015;Journal of Behavioral Medicine	68	-
2	MounirChennaoui;Sleep and exercise: A reciprocal issue?;2015;Sleep Medicine Reviews	63	14.142
3	Kathryn J.Reid;Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia;2010;Sleep Medicine	61	9.06
4	Pei-YuYang;Exercise training improves sleep quality in middle-aged and older adults with sleep problems: a systematic review;2012;Journal of Physiotherapy	52	-
5	Abby C. King;Effects of Moderate-Intensity Exercise on Polysomnographic and Subjective Sleep Quality in Older Adults With Mild to Moderate Sleep Complaints;2008;The Journals of Gerontology Series	51	7.62
6	Christopher E. Kline;The Effect of Exercise Training on Obstructive Sleep Apnea and Sleep Quality: A Randomized Controlled Trial;2011;Sleep	47	-
7	Hugh H. K. Fullagar;Sleep and Athletic Performance: The Effects of Sleep Loss on Exercise Performance, and Physiological and Cognitive Responses to Exercise;2015;Sports Medicine	43	9.57
8	Shawn D.Youngstedt PhD;Effects of Exercise on Sleep;2005;Clinics in Sports Medicine	36	12.46
9	Yesim Salik Sengul;The effect of exercise on obstructive sleep apnea: a randomized and controlled trial;2011;Sleep and Breathing	35	2.52
10	Max Hirshkowitz PhD;National Sleep Foundation's sleep time duration recommendations: methodology and results summary;2015;Sleep Health	35	7.76

3.3.2 Research Trends

According to the conclusions obtained from the research frontier and the data obtained by Citespace, it is known that the current research in the field of exercise and sleep research is relatively superficial, and there is no in-depth study on how exercise improves sleep disorders. What is the physiological mechanism? According to WHO statistics, there are currently more than 300 million people suffering from depression worldwide, most of whom are women, and sleep disorders are one of the main features of clinical manifestations of depression. As social pressures increase, the elderly population may no longer be the main group with sleep disorders. In the

future, the major groups with sleep disorders may turn into youth groups, especially young women. This is mainly because women are not only under pressure from social work, but also need to bear the pressure of production and birth because of their special physiological structure. It is understood that the current research on the field of postpartum depression has increased, which shows that the number of women with postpartum depression in the society has increased, and it also shows that women are under special pressure in society. The risk of developing sleep disorders increases. In terms of research content, with the deepening of research, the research content will not only stay on the surface, but will study at a deeper level, such as the research mechanism of the effect of exercise on sleep disorders.

4. Conclusions

The countries with high output in the field of sports and sleep are the United States, Australia, and Brazil. Research subjects are mainly elderly people. The research focuses on sleep quality, insomnia, and depression caused by insomnia, physical and mental fatigue, obesity, increased cardiovascular disease, increased hypertension, decreased quality of life, and healthy Decline and rising mortality. In the future, young women may be the main body in the research group, and the research content may develop towards the mechanism of exercise on sleep disorders.

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