Analysis and Prospect of Research on Mobile Phone Addiction

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Software citespace5 5 is used to visually analyze the core literature data related to the study of mobile phone addiction in the web of science database. The results show that the number of research results on mobile phone addiction continues to grow, and the hot research on mobile phone addiction mainly focuses on college students and teenagers, focusing on the causes, influencing factors, and internal mechanism of mobile phone addiction; Future research should further expand the research object, expand new research methods and improve the mechanism model, so as to explore the depth of mobile phone addiction research.

Keywords: Citespace; mobile phone addiction; research status; visual analysis; depression.

1. INTRODUCTION

The popularity of smart phones has brought great convenience to human life, study and work, but excessive use often leads to the initiation of mobile phone addiction. Mobile phone addiction refers to a kind of behavioral addiction, which is excessively addicted to mobile phone mediated activities, has a strong and continuous desire and dependence on mobile phone use, and leads to obvious damage to social and psychological functions. It can increase GABA levels and disrupted balance between GABA and glutamate in the anterior cingulate cortex. The investigation of mobile phone addiction found that both adults and teenagers have a certain proportion of mobile phone addicts, and there is an increasing trend year by year [1-3]. Mental

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health experts believe that mobile phone dependence will become one of the most important types of non-drug dependence in the 21st century. Thus, the problem of mobile phone addiction will become increasingly prominent. In addition, mobile phone addiction will have a great negative impact on individual physiology and psychology. Previous studies have shown that the abuse of mobile phones will not only cause physical hazards such as cervical spondylosis, headache, and vision loss [4], but also lead to adverse psychological effects such as sleep disorder [5], burnout [6], anxiety [7] and depression [8,9]. Therefore, the attention and research on mobile phone addiction have important practical significance, and this field has gradually become the focus of international scholars. By combing the research review of mobile phone addiction, it is found that these studies still have the following deficiencies: first, in terms of research methods, the existing research reviews summarize the existing research from a qualitative perspective, and rarely integrate and analyze the existing research status with a more objective quantitative analysis method; Second, in terms of research content, most research reviews mainly discuss the connotation, use status and influencing factors of mobile phone addiction, but rarely review and analyze the distribution status, research hotspots, and research frontiers of mobile phone addiction. Therefore, the purpose of this study is to use CiteSpace software to visually analyze the current research status of mobile phone addiction in the world, vividly show the research distribution, research hotspots and research frontiers in this field through the network map, and make a prospect for this research field on this basis, in order to provide a reference for the follow-up better research of mobile phone addiction.

2. RESEARCH DATA AND METHODS

2.1 Database Sources

Web of Science (WOS) is the world's largest comprehensive academic information resource covering most disciplines. It contains the world's authoritative and influential academic journals, [8] among which SSCI database contains the world's most authoritative social science literature. In order to ensure the validity and reliability of the source data, this study will take the SSCI of Web of Science as the literature source database of mobile phone addiction research.

In the process of foreign literature retrieval, take "smart phone addition" or "mobile phone addition" as the theme, set the document type to "article", and limit the language to "English". A total of 1658 documents were preliminarily retrieved. On this basis, the retrieved documents were manually screened to eliminate the documents with incomplete data records and irrelevant to the subject, and the retained documents were duplicated through CiteSpace. Finally, a total of 1345 valid documents were obtained. The year span of all retrieved documents was from 2008 to 2022 (March).

2.2 Research Tools and Methods

With the help of CiteSpace (5.5. R1) software developed by Professor Chen Chaomei of Drexel University [10], this study uses bibliometrics and word frequency analysis to reveal the distribution, research hotspots and cutting-edge issues of mobile phone addiction research at home and abroad.

3. RESULTS AND ANALYSIS

3.1 Literature Publishing Trends and Distribution

In order to more intuitively and clearly grasp and compare the issuance of documents on mobile phone addiction research at home and abroad, this study makes time-series quantity statistics of 1345 relevant documents according to the time order of issuance, and draws a broken line chart of the number of documents, as shown in Fig. 1. First of all, in terms of the time of issuing the document, the research on mobile phone addiction started earlier, and the research on mobile phone addiction appeared in 2008; Secondly, from the changing trend of articles, the number of articles on mobile phone addiction was small in 2015 and before, and the number of articles has been hovering between 50. However, since 2016, the number of articles on mobile phone addiction began to increase, and the research showed a steep increase. At present, research is on the rise, and mobile phone addiction has become a hot research topic.

3.2 Analysis of Issuing Organization

Select "institution" for node types to run. The operation results show that there are 183 nodes and 385 connections in the visual map of institutional cooperation, indicating that a certain
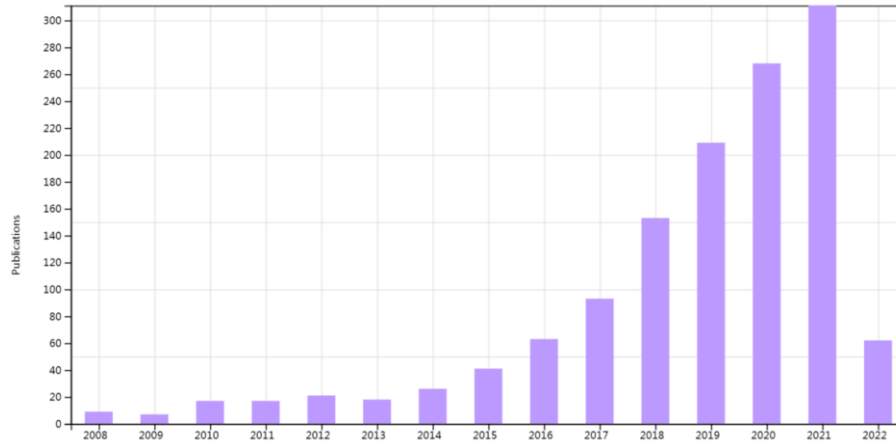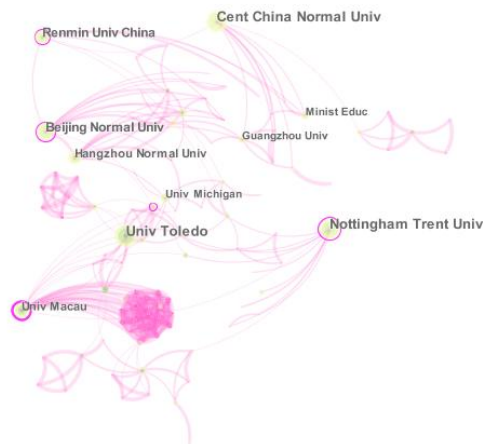
Fig. 1. Number of messages sent by mobile addiction

Fig. 2. Main sending institutions of mobile phone addiction research at home and abroad
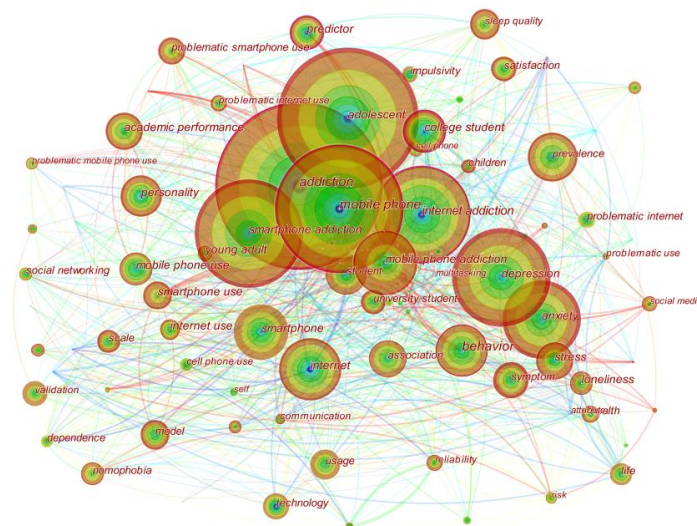

Fig. 3. Knowledge map of keyword co-occurrence in mobile phone addiction research

3.3 Analysis of Research Hotspots Based on Keyword Co-occurrence

Institutional cooperation network has been formed abroad, and the degree of cooperation is much higher than that in China. In terms of centrality, the University of Toledo has the largest number of articles (21 articles) and the highest centrality (0.12) in the research of mobile phone addiction, which shows that the institution has a prominent influence in the research of mobile phone addiction at home and abroad, followed by Nottingham trend University (22 articles), central China Normal University (21 articles), Beijing Normal University (20 articles) Renmin University China (17 articles), University of Macau (16 articles), Hangzhou Normal University (14 articles), University Michigan (11 articles), Guangzhou University (10 articles) and University Granada (10 articles), as shown in Fig. 2.

Keywords are the high generalization and refinement of the content of the article. Through the analysis of keywords and frequency, we can explore the development trends and research hotspots in a certain field. This study draws the knowledge map of keyword co-occurrence with the help of CiteSpace software (see Fig. 3). By summarizing and summarizing the top 50 high-frequency keywords of "mobile phone addiction" research at home and abroad, it is found that the hot research on mobile phone addiction is mainly reflected in three aspects: research object, research content, and research tools.

Firstly, in terms of the research objects of mobile phone addiction, the two keywords "college student" and "adolescent" are presented with the highest frequency, which indicates that scholars' research on mobile phone addiction mainly focuses on college students and adolescents. This is because the investigation of mobile phone addiction shows that the detection rate of mobile phone addiction tendency in college students and adolescent groups reaches 15% - 35%, and adolescent and college students are the high incidence groups of mobile phone addiction [11-13]; In addition, compared with other groups, adult and college students are in a critical period of mental maturity and social development. Mobile phone addiction will have a great negative impact on their physical and mental health. Therefore, "adolescent" and "college students" have become the key research objects of mobile phone addiction. The hot research on mobile phone addiction also involves a special group of medical students. Among them, six core pieces of literature involve the keyword "medical student", "nursing student". The main content is to explore the influencing factors of mobile phone addiction of medical students and nursing students in order to provide theoretical guidance for the prevention of mobile phone addiction of medical students and nursing students [14-20].

Secondly, from the research content of mobile phone addiction, the research content of mobile phone addiction mainly includes the influence of mobile phone addiction, the causes of mobile phone addiction, and its internal mechanism. In terms of the impact of mobile phone addiction, scholars pay attention to the impact of mobile phone addiction on individual mental health (or mental health), focusing on the relationship between mobile phone addiction and mental states such as "depression", "anxiety", "stress", and find that mobile phone addiction and mental health interact. In addition, sleep quality is also a key topic in the research of mobile phone addiction. At present, the research on sleep quality mainly has two aspects: on the one hand, taking sleep quality as a dependent variable to explore the direct impact of mobile phone addiction on sleep quality; On the other hand, taking sleep quality as an intermediary variable, it proves that mobile phone addiction has an impact on individual mental health, cognitive attitude and behavior through sleep quality. In terms of the causes of mobile phone addiction, it mainly includes internal individual factors and external social factors. In the study of internal factors, it focuses on the impact of personality traits and interpersonal adaptation on mobile phone addiction, while in the aspect of external factors, it mainly discusses the role of social support. In terms of the internal mechanism of mobile phone addiction, "association" and "model" are high-frequency keywords in the research of mobile phone addiction, which shows that the research of mobile phone addiction focuses on the internal influence mechanism between mobile phone addiction and various variables. By combing the relevant source literature, it is found that the mediating variables in the influence model of mobile phone addiction are relatively single, and most of them are emotional states, such as anxiety, negative emotional experience, loneliness and so on. At present, there are only parental monitoring and negative coping styles, which need to be further adjusted in the future [21-26].

Finally, in terms of research methods, the keyword "scale" appears more frequently in

Top 21 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2007 – 2022
mobile phone	2007	4.8545	2008	2014	
internet addiction	2007	5.7615	2009	2014	
predictor	2007	4.8004	2009	2015	
addiction	2007	7.6737	2010	2014	
internet	2007	5.5144	2010	2014	
technology	2007	7.284	2011	2015	
impulsivity	2007	4.2625	2012	2017	
computer	2007	3.339	2012	2014	
attribute	2007	3.1636	2012	2015	
problematic internet	2007	4.5616	2013	2017	
college student	2007	4.4097	2014	2018	
multitasking	2007	3.5945	2015	2016	
gender	2007	5.6393	2015	2017	
psychometric property	2007	4.589	2016	2018	
dependency	2007	5.4691	2017	2019	
self	2007	5.2968	2017	2019	
self-esteem	2007	3.3363	2017	2019	
risk	2007	4.0619	2018	2020	
behavioral addiction	2007	5.345	2018	2019	
mediating role	2007	5.9867	2019	2020	
problematic mobile phone use	2007	4.3894	2019	2020	

Fig. 4. Key words of foreign mobile phone addiction research

foreign research. The vast majority of studies use the method of questionnaire to measure mobile phone addiction. The current research focuses on the preparation and revision of mobile phone addiction scale. For example, most studies have discussed the effectiveness of the mobile phone addiction scale in adolescents, and investigated the applicability of the scale in different countries, such as the UK, Italy and the United States, which further confirmed the effectiveness and popularization of the scale.

3.4 Research Frontier Analyses of Keyword Emergence

Emergent words refer to words that appear frequently in a specific time. CiteSpace uses the emergent word reduction algorithm to determine the research frontier of a certain field. By counting the vocabulary frequency in the literature title, abstract, keyword and its identifier of the selected field, CiteSpace determines the research frontier terms according to the increase of vocabulary frequency. Therefore, through the analysis of emerging keywords, this study understands the cutting-edge trends of mobile phone addiction research at home and abroad, and then grasps the research direction. The documents are imported into CiteSpace respectively, the time slice is set to 1, and the top ten keywords of outburst intensity are selected for presentation. The results are shown in Fig. 4.

In terms of the intensity of emergent words, the top three of the emergent intensity of keywords are addition, technology and mediating role. The current development of mobile phone technology benefits all groups in the community. At the same time, this technology can cause mobile phone addiction. Mediating role focuses on the mediating and regulating effects of mobile phone addiction and many factors such as alexithymia, cognitive impairment, depression, anxiety and self-evaluation, so as to better elaborate the relevant mechanisms of mobile phone addiction.

In terms of emergence time, the earlier keywords appear are "addition", "Internet addition", "gender difference", college student, etc. This shows that at the beginning, the research on mobile phone addiction mainly focused on college students, and discussed the relationship between loneliness, social support and mobile phone addiction earlier. In addition, the study also explored the relationship mechanism between mobile phone addiction and the internal variables. In the early research, it mainly defined the concept of mobile phone addiction, focusing on the definition of the connotation of mobile phone addiction and demographic variables, which laid a foundation for the follow-up research of mobile phone addiction. In addition, the research on gender differences of mobile phone addiction is also an early topic in the research. Recently, research hotspots mainly focus on risk, behavioral addition, mediating role and

problematic mobile phone use. Countries have gradually recognized the epidemiological trend of mobile phone addiction, the related factors of smart phone overuse in various countries and the cross-sectional study of different groups. And many scholars seek effective coping strategies for mobile phone addiction from the fields of medicine, nursing, sociology and psychology.

4. DISCUSSION

In recent years, scholars have explored mobile phone addiction from different levels such as nursing, psychology, medicine and neurology. The research results are becoming richer and richer, and the academic research on mobile phone addiction is also gradually taking shape, but there are still some deficiencies. In the future, we can deepen and improve the existing research from the following aspects.

First, further expand the research object. At present, the research on mobile phone addiction is mainly focused on college students and teenagers, but smart phones have been popularized to children. At present, the frequency and time of mobile phone use of school-age children are worrying, but the current research has not conducted in-depth research on the psychological mechanism of children's mobile phone addiction. Future research can be deeply and systematically explore the problem and psychological mechanism of individual mobile phone addiction in different grades. Future research can also conduct horizontal comparison on the phenomenon and psychological mechanism of individual mobile phone addiction, so as to explore the differences of individuals in different grades.

Second, reveal the mechanism model of mobile phone addiction from multiple angles. In the mechanism model of mobile phone addiction, the research on mediation and regulation is relatively simple. For example, most mediating variables are mainly emotional state. In the future, we should consider exploring the research mechanism of mobile phone addiction from the perspectives of cognition, behavior and will process. In addition, the current research on mobile phone addiction is mainly from the behavioral level, but has not yet explored the characteristics of mobile phone addiction from the back brain mechanism level. Future research can explore the neurophysiological mechanism of mobile phone addiction with the help of modern equipment such as functional magnetic

resonance, near infrared and EEG, so as to provide reliable electrophysiological evidence for the research and intervention of mobile phone addiction, so as to improve the mechanism research of mobile phone addiction.

Third, a new research method of multi-layer surface extension. At present, the research method of mobile phone addiction is still relatively single. Most studies use a questionnaire survey. The results of questionnaire survey can only reflect the correlation between variables, which are not conducive to deeply reveal the causal relationship between variables. Therefore, the follow-up research can try to expand the research on the antecedents and aftereffects of mobile phone addiction by means of behavioral experiment, qualitative research and experimental observation. In addition, at present, most studies use cross-sectional methods to explore, and can not directly observe the development process of mobile phone addiction. Therefore, in the future, we can vertically track the occurrence and development of mobile phone addiction through cross lag and other research methods.

Fourth, we should further strengthen cooperation between non-uniform institutions and regions, and conduct in-depth research with multiple disciplines. Both the cooperation of authors and institutions are at a low level. Most authors and institutions are in a state of fighting alone. Future researchers can strengthen communication and cooperation, integrate multi-disciplinary backgrounds, such as nursing, psychology, medicine, neuroscience, computer science and other multi-disciplinary backgrounds, learn from each other, and jointly promote the continuous deepening and development of mobile phone dependence research.

5. CONCLUSION

The research uses CiteSpace software to visually analyze mobile phone addiction, and discusses the research distribution, research hotspots and research frontiers. The results show that: (1) the research of mobile phone addiction is in the rising area of research; (2) The breadth and depth of research on mobile phone addiction, especially the lack of cooperation on mobile phone addiction; (3) The research on mobile phone addiction mainly focuses on college students and teenagers, focuses on the causes, influencing factors and internal

mechanism of mobile phone addiction, and is also committed to continuously improving the existing measurement tools. (4) "Risk", "behavioral", "addition", "mediating role" and "problematic" mobile phone use are all cutting-edge topics of current research.

6. RECOMMENDATIONS

In regards to the findings of this study, the following recommendations were made;

1. Further expand the research object.
2. Reveal the mechanism model of mobile phone addiction from multiple angles.
3. New research method of multi-layer surface extension.
4. Further strengthen the cooperation between non unified institutions and regions, conduct in-depth research with multiple disciplines, and formulate multidisciplinary and comprehensive intervention measures for mobile phone addiction.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. This study was supported by grants from Natural Science Research Project of Anhui Universities (No. KJ2021H01).

CONSENT

It's not applicable.

ETHICAL APPROVAL

It's not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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