Study on the influencing factors of exercise addiction in healthcare combined with generative artificial intelligence

Qingyuan Xie[1,2]

[1]Jinan University, Guangzhou, 510632, China
[2]Gdansk University of Physical Education and Sport, Gdansk, 80-336, Poland
xieqingyuancassy@qq.com

Abstract: This review provides the overview of the role of healthcare combined with **Artificial intelligence** (AI) in motor inhibitor intervention and its related strategies. First, we introduced the concept and classification of motor inhibitory factors, including biological factors, psychosocial factors, and environmental factors. Secondly, we explore the current status of healthcare and AI in the study of the inhibitory factors of exercise, emphasizing the importance of AI in exercise assessment and intervention. Then, the influence mechanism of exercise inhibitory factors was analyzed and the intervention strategies based on AI were proposed, including intelligent device-assisted intervention, virtual reality technology-guided intervention, social network support intervention and data-driven continuous intervention. Finally, we summarize the advantages and prospects of AI-based intervention strategies for motor inhibitory factors and indicate future research directions.

Keywords: health care; artificial intelligence; movement inhibitory factors; intervention strategy

1. Introduction

In recent years, with the improvement of people's living standards and increasing health awareness, more and more people begin to pay attention to the importance of exercise. However, in the process of pursuing health, some people may experience excessive exercise, or even form exercise addiction, which brings negative effects on physical and mental health. More than 10 million people are suffering from sports addiction worldwide, and that number is growing[1]. Sports addiction not only affects the quality of life of individuals, but also brings a certain burden to the society and the family. Therefore, understanding the influencing factors of exercise addiction and seeking effective interventions have important theoretical and practical implications. This study aims to explore the influencing factors of exercise addiction combined with generative AI, in order to provide a reference for the prevention and intervention of exercise addiction[2]. Through the concept of, the classification of movement inhibitory factors and health care and artificial intelligence in the application of motion inhibition factors research status, analyze the influence of movement inhibition mechanism, discusses the role of artificial intelligence in health care in movement inhibitory factors intervention, aims to provide new ideas and methods to solve the problem of sports addiction. Through the in-depth discussion of this study, it is expected to provide new theoretical and practical support for the prevention and control of sports addiction, and provide more scientific guidance for promoting people's health exercise, which has positive social impact and promotion value.

2. Overview of motor inhibitory factors in healthcare combined with AI

2.1 Conception and classification of motor inhibitory factors

Motor inhibitory factors refer to the factors that hinder or restrict individuals when they exercise. According to their nature and origin, motor inhibitory factors can be divided into three categories: biological factors, psychosocial factors and environmental factors[3].

Biological factors: Biological factors refer to the influence of individual characteristics in physiological structure and function on movement. Including but not limited to genetic factors, physical health status, physical quality level, etc. Genetic factors may lead to individual differences in

their interest in exercise and their ability to exercise, and their physical health status directly affects their willingness and ability to perform exercise[4].

Psychosocial factors: psychosocial factors refer to the influence of individual characteristics on movement at the psychological and social levels. Including but not limited to individual psychological state, interpersonal relationship, social support, etc. Individual's mental states, such as emotion, stress and self-efficacy, may affect their motivation and persistence of exercise, while good interpersonal relationships and social support help individuals adhere to exercise[5].

Environmental factors: Environmental factors refer to the influence of the environment around an individual on his or her motor behavior. Including but not limited to family environment, community environment, cultural environment, etc. Family environments, such as the attitudes and behaviors of family members towards sports, community environments, such as the convenience of sports facilities, and cultural environments, such as the cognition and values of sports, will all have an impact on individual movement[6].

To sum up, the exercise inhibitory factors are the result of the comprehensive effect of many factors. Only by fully understanding and scientific intervention of these factors can we better promote people's health exercise.

2.2 Current status of healthcare and artificial intelligence in the study of motor inhibitory factors

The application of healthcare combined with artificial intelligence in the study of motor inhibitory factors is one of the current research hotspots in the field of sports medicine. The combination of healthcare and artificial intelligence allows for more accurate identification and analysis of movement inhibitors to provide personalized interventions for individuals and thus more effective health outcomes move [7]. First, in terms of the identification of motor inhibitory factors, healthcare combined with artificial intelligence can use big data and machine learning algorithms to conduct a comprehensive analysis of individual biological, psychosocial and environmental factors to accurately identify possible motor inhibitory factors. For example, by analyzing individual genetic data and health records, their interest in exercise and exercise performance can be predicted, providing a basis for personalized intervention. Secondly, in terms of the intervention of exercise inhibitory factors, healthcare combined with AI can design personalized exercise plans and behavioral intervention programs according to individual characteristics and needs. Through the monitoring and guidance of intelligent devices and applications, individuals can help to overcome exercise inhibitory factors and develop healthy exercise habits[8]. For example, smart wristbands can monitor the amount of exercise and how often individuals exercise, and smartphone apps can provide customized exercise guidance and incentives. In addition, healthcare combined with AI can also provide continuous exercise support and guidance for individuals through telemedicine services and virtual health management platforms. Individuals can receive professional healthcare advice and health management services through the Internet anytime and anywhere, thus better manage their exercise behavior.

3. Analysis of the influence mechanism of motor inhibitory factors

3.1 Biological Factors

Biological factors are one of the important factors affecting individual movement behavior, which involves the physiological structure and functional characteristics of individuals. In the influence mechanism of motor inhibitory factors, biological factors play a vital role[9]. First, genetic factors occupy an important role in biological factors. Studies suggest that individual interest in exercise and exercise capacity may be influenced by genetic factors. The phenotypic characteristics of some genes associated with exercise, such as muscle fiber type, cardiovascular adaptation ability, may affect individual sensitivity and fitness to exercise. In addition, genetic factors may also affect individuals' happiness and satisfaction with exercise, and then affect their motivation and persistence for exercise. Secondly, the physical health status is also an important part of the biological factors. The physical health status of individuals directly affects their willingness and ability to perform exercise. Some chronic diseases, such as cardiovascular disease and diabetes, can make individuals feel uncomfortable, thus reducing their desire to exercise. In addition, some sports injuries and diseases can also affect an individual's exercise ability and willingness to exercise. Finally, the physical quality level is one of the important contents of the biological factors. The level of individual physical fitness is influenced not only by genetic factors, but also by long-term exercise. Individuals with high physical fitness levels

usually have better motor adaptability and motor performance, which are more likely to generate exercise motivation.

3.2 Psychosocial factors

Psychosocial factors play an important role in individual movement behavior, which involves the individual mental state and the influence of social environment on movement[10]. Among the influence mechanisms of motor inhibitory factors, psychosocial factors have an important influence. First, the individual psychological state is one of the important contents of the psychosocial factors. Psychological factors such as individual emotional state, stress level and self-efficacy can directly affect their enthusiasm and persistence for exercise. Some studies have shown that whereas individuals with happy emotions are more likely to develop interest and motivation for exercise, individuals with negative emotions may be resistant to exercise. Secondly, individuals' interpersonal relationships can also affect their motor behavior. Good interpersonal relationships and social support can improve individuals' motivation and sustainability for sports. Family members, friends, colleagues and others have important effects on individuals' exercise behavior, and their support and encouragement contribute to individual adherence to exercise. Thirdly, the social and cultural environment is also an important part of the psychosocial factors. The cultural environment in which an individual lives has an important influence on their cognition and values of movement. Some cultures view exercise as a symbol of health and encourage individuals to participate actively, while others may have negative attitudes towards exercise as a waste of time and energy.

3.3 Environmental Factors

Environmental factors play a crucial role in individual motor behavior, including many aspects of the family environment, community environment and cultural environment[11-12]. In the influence mechanism of motor inhibitory factors, environmental factors have important effects on individual motor behavior. First, the family environment is one of the important environmental factors affecting individual motor behavior. Family members' attitudes and behaviors towards movement can affect individual perceptions and attitudes towards movement. If family members value exercise and actively participate, individuals are likely to be influenced by them and be more actively involved in exercise. In addition, sports facilities and sports atmosphere in the home environment can also affect individual sports behavior. Individuals are more likely to adhere to exercise if convenient exercise facilities and a positive exercise atmosphere exist in the home environment. Secondly, the community environment is also one of the important factors affecting individual motor behavior. The convenience of exercise facilities and exercise resources in community settings can directly affect the movement behavior of individuals. If convenient exercise venues and facilities exist in the community, individuals are more likely to participate in sports. Moreover, the exercise atmosphere and social support in the community can also influence individuals' exercise motivation. Individuals are more likely to stick to exercise if people in the community generally value it and support each other. Thirdly, the cultural environment is also one of the important environmental factors affecting individual movement behavior. Culture has a profound influence on the individual's cognition and values of movement. Some cultures view exercise as a symbol of health and encourage individuals to participate actively, while others may have negative attitudes towards exercise as a waste of time and energy. Therefore, the cultural environment of individuals can directly affect their attitude and behavior towards sports.

4. The role of healthcare combined with AI in the intervention of motor inhibitory factors

4.1 AI-based assessment method of motor inhibitory factors

Assessment of exercise inhibitors is an important step for effective intervention in individual exercise behavior, and AI-based assessment methods have unique advantages and application prospects in this field. This section will present the principles and applications of the AI-based motor inhibition factor assessment methods[13-14]. First, AI-based assessment methods often use machine learning algorithms to perform a comprehensive analysis of individual biological, psychosocial, and environmental factors to identify and evaluate possible motor inhibitors. These algorithms are able to process large-scale data, identify potential motor inhibitors, and provide personalized assessment outcomes and intervention recommendations for individuals. Secondly, AI-based assessment methods can use intelligent devices and sensor technologies to monitor real-time individual movement behavior

and physiological state, so as to more accurately assess movement inhibitory factors. For example, smart wristbands and smart phones can record data on individuals 'exercise, exercise frequency and heart rate. By analyzing these data through machine learning algorithms, they can assess individuals' exercise motivation and exercise inhibition factors. Thirdly, AI-based assessment methods can use natural language processing technology to analyze individual speech and written expressions, understand their attitude and motivation towards movement, so as to evaluate the impact of psychosocial factors on movement. This method can understand the individual psychological state and social environment of individuals by analyzing the speech and words on social media, and provide a basis for personalized intervention[15-16]. Finally, AI-based assessment methods can also use VR and augmented reality to simulate movement scenarios in different environments and evaluate individual movement motivation and inhibitory factors in different environments. This approach can help individuals to more intuitively feel the influence of different environments on their motor behavior, and thus more effectively identify and intervene with motor inhibitory factors.

4.2 AI-based intervention strategies for motor inhibitory factors

4.2.1 Personalized intervention program

The AI-based personalized intervention program is a customized exercise program and behavioral intervention strategy designed for individual characteristics and needs, aiming to help individuals overcome exercise inhibitors and promote the development of health exercise. This program tailored exercise programs, providing personalized exercise guidance and motivation by analyzing their biological, psychosocial, and environmental factors, and accordingly. First, the AI-based personalized intervention program uses machine learning algorithms to analyze individual biological factors, such as genetic characteristics, physical health status, and physical fitness level, to design appropriate exercise intensity, frequency, and manner for individuals. By monitoring individual physiological data, such as heart rate and blood pressure, the exercise plan is adjusted in time to ensure the safety and effectiveness of exercise. Secondly, personalized intervention programs based on AI can also analyze individual psychosocial factors, such as emotional state, stress level and social support, to provide mental health support and behavioral guidance for individuals. Monitor individual changes in mental status through smart devices and applications, and timely adjust intervention strategies to help individuals overcome psychological barriers and maintain a positive exercise attitude. Thirdly, personalized intervention programs based on AI can analyze individual environmental factors, such as family environment, community environment and cultural environment, to provide individuals with movement advice and behavioral guidance for environmental adaptability. Intelligent devices and virtual reality technology to simulate the movement scenes in different environments, help individuals to adapt to the movement requirements of different environments, and improve the diversity and interest of sports.

4.2.2 Intelligent device-assisted intervention

Smart devices play an increasingly important role in the intervention of exercise inhibitory factors, helping individuals overcome exercise inhibitors and promoting healthy exercise by providing real-time monitoring, personalized guidance and behavioral motivation. This section will present the principles and applications of AI-based intelligent device-assisted intervention strategies. First of all, smart wearable devices such as smart wristbands and smart watches can monitor physiological indicators such as individual exercise amount, exercise frequency and heart rate in real time, and analyze these data through artificial intelligence algorithm to provide real-time exercise guidance and feedback for individuals. By monitoring the movement state of individuals, intelligent devices can adjust the exercise plan in time to remind individuals to exercise timely, so as to improve the enthusiasm and effect of exercise. Second, mobile devices such as smartphones and tablets can provide individuals with personalized exercise planning and behavioral guidance by installing sports and health apps. These applications can design exercise protocols based on an individual's biological, psychosocial and environmental factors, and provide regular reminders and movement recording functions to help individuals manage and monitor their own motor behavior and maintain movement continuity and regularity. Thirdly, virtual reality and augmented reality technology can simulate different movement scenarios, provide immersive exercise experience, and increase individual sports interest and participation. Through smart glasses and other devices, individuals can experience different sports items and scenes in the virtual environment, and enjoy the fun of sports, so that it is easier to stick to the exercise. Finally, smart devices can also provide interaction and support between individuals through social networks and online platforms, establish sports communities, share sports experience and achievements, enhance individuals' social support and sense of belonging, and promote the sustainability and effect of sports.

4.2.3 Virtual reality technology-guided intervention

Virtual reality (VR) technology is a simulation environment created by computer simulation technology, where users can immerse themselves in the virtual environment through devices such as head-mounted displays. In the exercise inhibitors intervention, VR technology can be used to provide an immersive exercise experience, thus helping individuals overcome the exercise inhibitors and promote the progress of healthy exercise. First, virtual reality technology can simulate a variety of different sports scenarios and environments, enabling individuals to experience different sports items and sports scenarios in the virtual environment. This immersive exercise experience can increase individual interest in and participation in exercise, allowing for easier adherence to exercise. For example, through virtual reality technology, individuals can experience outdoor sports such as mountaineering and skiing at home, thus avoiding the restrictions and troubles of outdoor sports. Secondly, virtual reality technology can provide real-time movement guidance and feedback to help individuals to exercise correctly and safely. Through virtual reality technology, individuals can see their own movements and postures in the virtual environment, as well as the effects and results of the movement, so as to adjust their movement mode in time to ensure the effect and safety of the movement. Thirdly, virtual reality technology can also help individuals to adapt to the movement requirements in different environments by simulating the movement scenes in different environments and situations. For example, virtual reality technology can simulate movement scenarios under different terrain and climatic conditions, helping individuals adapt to a variety of different movement environments and improve the adaptability and flexibility of their movements. Finally, virtual reality technology can also provide individual interaction and support through social networks and online platforms, establish sports communities, share sports experience and achievements, enhance individuals' social support and sense of belonging, and promote the sustainability and effect of sports.

4.2.4 Social network support interventions

In the exercise suppression intervention, using the support and information resources provided by social networks can effectively help individuals overcome exercise inhibitors and promote the progress of healthy exercise. This section will present the principles and applications of the AI-based social network-enabled intervention strategies. First, social networks can provide exercise planning and behavioral guidance for individuals. By joining the sports community or following the health sports account, individuals can get professional sports advice and behavior guidance, learn about the latest health exercise knowledge and skills, so as to exercise more scientifically and overcome the obstacles and difficulties of exercise. Secondly, social networks can provide interaction and support among individuals. During the exercise process, individuals can share their exercise experience and achievements with other athletes through social networks, gain encouragement and support, and enhance the motivation and confidence of exercise. At the same time, social networks can also provide health competitions and challenges to stimulate individual sports interest and participation. Thirdly, social networks can analyze individuals' exercise behavior and health data through intelligent algorithms, and provide personalized exercise advice and behavioral guidance for individuals. For example, social networks can recommend suitable exercise items and exercise methods according to individuals' exercise habits and health conditions, help individuals to develop reasonable exercise plans, and improve the effectiveness and sustainability of exercise. Finally, social networks can also improve individuals' health literacy and exercise awareness by providing online health courses and lectures. By participating in online health activities, individuals can learn more about the knowledge and skills of health exercise, cultivate a healthy lifestyle, and prevent and control the occurrence of exercise inhibitory factors.

4.2.5 Data-driven continuous intervention

Data-driven perseverative intervention refers to providing individuals with continuous exercise advice and behavioral guidance by collecting, analyzing and utilizing their health data to help individuals overcome exercise inhibitors and promote health exercise. This intervention strategy is based on AI technology, which enables personalized monitoring and intervention of individuals through intelligent devices and applications, thus improving the motivation and sustainability of exercise. First, data-driven perseverative interventions can monitor individual exercise behavior and health data in real time with smart devices. These devices can monitor an individual's amount of exercise, exercise frequency, heart rate, sleep quality and other indicators, and upload the data to the cloud for analysis and processing. By analyzing their health data, individuals can understand their exercise habits and health status and provide personalized exercise advice and behavioral guidance. Second, data-driven sustained interventions can analyze individuals' health data through AI algorithms to develop continuous exercise plans for them. Based on an individual's movement goals, health status and living

habits, intelligent algorithms can generate suitable movement plans, and provide regular reminders and movement guidance to help individuals maintain the regularity and continuity of movement. Again, data-driven continuance interventions can provide personalized health advice and behaviour change support through smart apps. These applications can provide personalized health advice and behavior change support based on their health data, and help individuals adjust their poor living habits and improve their health status, thus enhancing their motivation and continuity of exercise. Finally, data-driven perseverative interventions can also provide ongoing health monitoring and management by establishing individual health records and health risk assessment models. Through regular analysis of individual health data, health problems and potential risks can be identified in time, and corresponding interventions can be taken to ensure individual health and exercise effects.

5. Conclusion

In the motion inhibitor factor intervention of healthcare combined with AI, AI-based intervention strategies have great significance. Through the comprehensive use of smart devices, virtual reality technology, social network support and data-driven continuous intervention, it can effectively help individuals to overcome exercise inhibition factors and promote healthy exercise. First of all, the real-time monitoring and personalized guidance of intelligent devices can help individuals to conduct exercise scientifically and reasonably, and improve the enthusiasm and effect of exercise. Secondly, the immersive exercise experience provided by virtual reality technology can increase individuals' exercise interest and participation, and promote the persistence of exercise. Thirdly, the social network support can provide the interaction and support between individuals, and enhance the individual movement motivation and confidence. Finally, the data-driven sustained intervention helps individuals develop healthy exercise habits by analyzing their health data and providing them with continuous exercise advice and behavioral guidance. In conclusion, AI-based exercise inhibitory factor intervention strategies have broad application prospects, which can provide personalized and scientific exercise support for individuals and promote the popularization and sustainable development of healthy exercise. However, further research is needed to study the optimization and application of artificial intelligence technology in the intervention of sports inhibitory factors, so as to contribute more wisdom and strength to the development of sports health cause.

References

[1] Hyunjin C .A Study on the Change of Farm Using Artificial Intelligence Focused on Smart Farm in Korea [J].Journal of Physics: Conference Series, 2020, 1642(1):012025 (6pp).

[2] Shangqi Z .A Study on the Factors Influencing of Children's Amateur Table Tennis Training [J].Journal of Anshan Normal University, 2019.

[3] Ko H S .A Study on the Effect of the Electronic Declaration of Intention by means of Artificial Intelligence[J].Institute for Legal Studies Chonnam National University, 2018.

[4] Petersson L , Larsson I , Nygren J M ,et al.Challenges to implementing artificial intelligence in healthcare: a qualitative interview study with healthcare leaders in Sweden[J].BMC Health Services Research, 2022, 22(1):1-16.

[5] Smeets M R , Roetzel P G , Ostendorf R J .AI and its Opportunities for Decision-Making in Organizations: A Systematic Review of the Influencing Factors on the Intention to use AI[J]. Die Unternehmung - Swiss Journal of Business Research and Practice, 2021, vol. 75, issue 3, 432-460.

[6] Lefebvre B , Lehmann H I , Tordjman D ,et al.Comparison of QT interval readings between smartwatch ECG combined with artificial intelligence and 12-lead ECG in subjects hospitalized for antiarrhythmic drug initiation and follow-up[J].Europace, 2024

[7] Changwei G , Changhong J , Xin-An L ,et al.Generative artificial intelligence-enabled dynamic detection of rat nicotine-related circuits[J].Neural computing & applications, 2024(9):36.

[8] Lee J H .A Study on Artificial Intelligence Issues in Addiction Crime[J].Korean Association of Addiction Crime Review, 2019, 9(4):179-205.

[9] Dipietro L , Gonzalez-Mego P , Ramos-Estebanez C ,et al.The evolution of Big Data in neuroscience and neurology[J].Journal of Big Data, 2023, 10.

[10] Tsiotsou R H , Klaus P .Editorial: the 'nip and tuck' service framework: bright and dark side of beautification/modification services[J].Journal of services marketing, 2022(1):36.

[11] A A B , A M S , B K P ,et al.Enacting 'more-than-human' care: Clients' and counsellors' views on the multiple affordances of chatbots in alcohol and other drug counselling[J].International Journal of Drug Policy, 2020.

[12] Wu X , Yang F .A study on the development of computer-aided design in the context of artificial intelligence[J].Journal of Physics: Conference Series, 2021, 1982(1):012033-.

[13] Zhang X .A Comparative Study on the Influence of Artificial Intelligence Robot Distribution and Traditional Logistics Distribution Mode[J].Journal of Physics: Conference Series, 2021, 1966(1): 012020 (6pp).

[14] Malhotra D K .The Role of Artificial Intelligence (AI) in Assisting Applied Natya Therapy for Relapse Prevention in De-addiction[J].Springer, Cham, 2022.DOI:10.1007/978-3-030-98404-5_28.

[15] Wang L , Chen Z .Research progress of functional near infrared imaging in the field of drug addiction[J].Proceedings of the 3rd International Symposium on Artificial Intelligence for Medicine Sciences, 2022.

[16] Shu X , Miao Y .Research on the impact of artificial intelligence recommendation on academic procrastination under the background of big data——The mediating role of mobile phone addiction[J].Journal of Physics: Conference Series, 2021.