

INFLUENCES OF EXERCISE APPS ON THE HEALTH OF OBESE COLLEGE STUDENTS



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INFLUÊNCIAS DE APLICATIVOS DE EXERCÍCIO FÍSICO SOBRE A SAÚDE DE ESTUDANTES UNIVERSITÁRIOS OBEOSOS

INFLUENCIA DE LAS APLICACIONES DE EJERCICIO EN LA SALUD DE ESTUDIANTES UNIVERSITARIOS OBEOSOS

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ABSTRACT

Introduction: In a scenario of continuous improvement of telecommunications network infrastructure and the maturation of related industrial chains, sports-oriented cell phone applications can meet the needs of different types of user groups due to their characteristics - close to the human body, able to collect users' health, favorite sports, location, and other personal characteristic data in real-time. With the support of cloud computing, big data, and other techniques, the regularity of users' sports health can be analyzed. **Objective:** Explore the effect of obese college students' use of cell phone apps on their exercise routines. **Methods:** 53 obese college students volunteered for the research project. They were investigated by a questionnaire about their use of apps to aid exercise and health. Then, the participants' exercise status was monitored, including weekly exercise time, exercise frequency, and exercise items, among other pertinent data. Finally, physical health data collected before and after the experiment were analyzed and statistically compared. **Results:** Some obese college students did not acquire the habit of adhering to physical exercise, their psychological resilience and ability to fight frustration proved deficient, and the effect of an exercise assisted by cell phone apps left to be desired. However, for some obese college students who determined to exercise, the regular moderate exercise showed an improvement in physical health. **Conclusion:** Exercise-focused health maintenance apps can stimulate obese college students' enthusiasm for exercise, making the exercise process more enjoyable, controlled, and scientific. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Obesity Management; Students; Mobile Applications.

RESUMO

Introdução: Num cenário de melhoria contínua da infraestrutura da rede de telecomunicações e o amadurecimento das cadeias industriais relacionadas, os aplicativos de celulares voltados ao esporte podem atender às necessidades de diferentes tipos de grupos de usuários devido às suas próprias características - próximas ao corpo humano, capazes de coletar a saúde dos usuários, esportes prediletos, localização e outros dados de características pessoais em tempo real. Com o suporte da computação em nuvem, big data e outras técnicas, pode-se analisar a regularidade da saúde esportiva dos usuários. **Objetivo:** Explorar o efeito do uso de aplicativos de celulares por estudantes universitários obesos em suas rotinas de exercícios físicos. **Métodos:** 53 estudantes universitários obesos foram voluntários do projeto de pesquisa. Foram investigados por um questionário sobre a utilização de aplicativos voltados para auxiliar o exercício físico e a saúde. Em seguida, a situação de exercício físico dos participantes foi monitorada, incluindo tempo de exercício semanal, frequência de exercícios, itens de exercícios, entre outros dados pertinentes. Finalmente, os dados de saúde física coletados antes e depois do experimento foram analisados e comparados estatisticamente. **Resultados:** Alguns estudantes universitários obesos não adquiriram o hábito de aderirem aos exercícios físicos, sua resistência psicológica e sua capacidade de combater à frustração mostraram-se deficientes, e o efeito do exercício assistido por aplicativos de celulares deixou a desejar. Porém, para alguns estudantes universitários obesos com determinação em se exercitar, o exercício regular e moderado evidenciou uma melhora sobre a saúde física. **Conclusão:** Os aplicativos focados em exercícios para a manutenção da saúde podem estimular o entusiasmo dos estudantes universitários obesos no exercício físico, tornando o processo de exercício mais prazeroso, controlado e científico. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descritores: Manejo da Obesidade; Estudantes; Aplicativos Móveis.

RESUMEN

Introducción: En un escenario de mejora continua de la infraestructura de las redes de telecomunicaciones y de maduración de las cadenas industriales relacionadas, las aplicaciones de telefonía móvil orientadas al deporte pueden satisfacer las necesidades de distintos tipos de grupos de usuarios gracias a sus propias características: cercanas al cuerpo humano, capaces de recoger en tiempo real los datos de salud, deportes favoritos, localización y otras características personales de los usuarios. Con el apoyo de la computación en nube, big data y otras técnicas, se puede analizar la regularidad de la salud deportiva de los usuarios. **Objetivo:** Explorar el efecto del uso de aplicaciones para teléfonos móviles por estudiantes universitarios obesos en sus rutinas de ejercicio. **Métodos:** 53 estudiantes universitarios obesos participaron como voluntarios en el proyecto de investigación. Fueron investigados mediante un cuestionario sobre el uso de apps destinadas a ayudar al ejercicio físico y la salud. A continuación, se realizó un seguimiento del estado



de ejercicio de los participantes, incluido el tiempo de ejercicio semanal, la frecuencia de ejercicio, los elementos de ejercicio, entre otros datos pertinentes. Por último, se analizaron y compararon estadísticamente los datos de salud física recogidos antes y después del experimento. Resultados: Algunos universitarios obesos no adquirieron el hábito de realizar ejercicio físico, su resistencia psicológica y su capacidad para luchar contra la frustración resultaron deficientes, y el efecto del ejercicio asistido por aplicaciones de telefonía móvil dejó que desear. Sin embargo, para algunos estudiantes universitarios obesos con determinación para hacer ejercicio, el ejercicio regular y moderado evidenció una mejora en la salud física. Conclusión: Las aplicaciones para el mantenimiento de la salud centradas en el ejercicio pueden estimular el entusiasmo de los estudiantes universitarios obesos por el ejercicio físico, haciendo que el proceso de ejercicio sea más placentero, controlado y científico. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptor: Manejo de la Obesidad; Estudiantes; Aplicaciones Móviles.

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INTRODUCTION

Through the survey and analysis of the physical health data of college students by the Ministry of Education of China, it can be seen that the healthy physical fitness level of domestic college students at this stage is not optimistic, showing the characteristics of gradual decrease.¹ According to the data of the "2010 Chinese Student Physical Fitness and Health Survey Report", it can be found that at present, the domestic adolescent group has improved the level of individual appearance indicators (height, chest circumference, weight, etc.), the number of students in obesity and overweight has increased significantly, while the size of students with nutritional deficiencies and low weight has been shrinking; From the measurement results of spirometry indexes, the overall trend is to a stable level; The explosiveness index has steadily increased among Chinese teenagers; Improvement in flexibility quality; Strength indicators have been significantly enhanced.² Through the description of the above data, it can be found that the physical health problems of young students in China have been significantly reduced.³ The "China Youth Sports Development Report (2015)" pointed out that the overall physical health level of China's youth group has been significantly improved, but when it is detailed to the college student group, its physical fitness problems are more manifested, especially in the waist core strength, endurance, lung capacity, absolute speed, etc., middle school students are far stronger than college students. The key reason for this problem is that in order to meet the demand for extra points in the entrance examination, middle school students must seriously attend physical education classes, or cultivate relevant physical exercise skills,⁴ so all physical indicators are steadily improved, while on the contrary, college students do not have the pressure of extra points in the entrance examination, and basically become free-range education, and the effect of physical education classes is not very ideal. Usually, many students do not exercise at all, and the students who do physical exercise are also very many who do not meet the requirements of physical exercise.⁵

Since entering the 21st century, with the continuous development of science and technology, mobile phones and the Internet have become essential carry on items in people's daily life. With the emergence of mobile phones and tablets launched by domestic and foreign technology giants such as Apple, Samsung and Xiaomi, people's lives have changed and consumers have greatly welcomed them.⁶ With the popularization of smart devices represented by smart phones, the application programs installed on these smart devices, namely APP, have developed rapidly. People download and install these different kinds of APPs for social networking, entertainment, news, sports and fitness purposes, which bring great convenience to people's lives. Under the background of continuous improvement of network infrastructure and continuous maturity of related industrial chains, sports APP can meet the needs of

different types of user groups because of its own characteristics - close to the human body, able to collect users' health, sports, location and other personal characteristic data in real time. With the support of cloud computing, big data and other technical means, it can analyze users' sports health regularity, and its popularity is increasing.⁷ In addition, WeChat, microblog, QQ and other mainstream new media platforms continue to promote the application of sports APP, which has won the favor of college students as the main user group. Sports APP has become a unique landscape on campus.⁸

With the rapid development of smart phones and the Internet, various forms of APP software are rapidly integrated into people. In daily life, Fitness APP effectively uses big data information mining technology to deeply analyze and identify individual characteristics and preferences, and then provide various service contents in a targeted and personalized manner, strengthen users' enthusiasm and initiative in fitness, and promote users to increase the frequency of physical exercise.⁹ College students can use the fitness plan advice given by the APP to carry out daily fitness, effectively avoiding the problem of health blindness; The APP also has social functions, through registering an account, logging in to social platforms, sharing their sports experience, and after communicating and interacting with other users of the platform, identify the shortcomings and problems in their own exercise process, and then effectively improve. At the same time, you can also establish a real relationship with your platform friends, exercise together, and supervise each other; Such apps have also developed teaching function modules, through which users can observe various professional fitness teaching videos to improve the professionalism and safety of their fitness.¹⁰ In general, with the further promotion and application of fitness APP, it has a significant impact on mobilizing college students to participate in fitness initiative, enthusiasm, self-confidence and professional ability improvement.

Research object and method

Subjects of study

This paper takes the impact and current analysis of health APP on obese college students' participation in physical exercise as the research object, and 53 obese students in many colleges and universities are the survey objects. Taking the commonly used international standard for measuring obesity - BMI index [weight (kg) divided by height (m) squared] as a reference, $BMI \geq 28$ is considered obesity.

The study is Purely observational studies which no need to registry ID of ICMJE, and all the participants were reviewed and approved by Ethics Committee of Henan University of Technology, China (NO. 2021042)

Research Method

Documentation Law: Taking "health APP" and "obese college students" as keywords, CNKI searched relevant literature, and summarized

and analyzed the retrieved literature, which was used as the theoretical basis of the study.

Questionnaire method: Develop relevant questionnaires according to the needs of the topic and based on the Self-Health Management Behavior Scale. 100 questionnaires were distributed to respondents, 98 were returned, the recovery rate was 98%, and 98 valid questionnaires were 100% effective.

Experimental method: Five to three obese students were selected as experimental subjects and divided into experimental and control groups. The experimental group used Keep, which is currently popular in China, as an intervention tool for physical exercise, and carried out a 2-month physical exercise intervention. In the early stage of intervention, a WeChat group with experimental team members as the main body was established, and special personnel guided the use of Keep software. After the pre-implementation, the experimental group students need to perform relevant exercises according to the plan made by the APP every week, and at the same time use the sports data recording function of Keep to upload data such as exercise items, time and energy consumption anytime, anywhere. After the experiment, the BMI index and WHR value of the experimental group and the control group students were obtained by using the body composition analyzer to analyze the impact of health APP on obese college students' participation in physical exercise.

Mathematical statistic

The data obtained by the questionnaire method were statistically analyzed by Excel software, and the SPSS 26.0 software was used to test the data obtained by the experimental method independently of the sample t, and the results were expressed as "mean ± standard deviation".

Analysis of the current situation of obese college students using health APP for physical exercise

According to the survey results, for the obese college students of the three universities that participated in the questionnaire survey, 30.6% of the group often used health apps in physical exercise, and 32.7% of the groups occasionally used health apps in physical exercise, accounting for 63.3% of the total. This shows that the use of health APP in the process of physical exercise of obese college students is becoming more popular.

According to the information provided in Figure 1, in order from largest to smallest, the types of fitness APP items for college students can be sorted as: KEEP (41.12%), Yue Running Circle (32.93%), Others (17.37%), Le Power (14.37%), Xiaomi Sports (13.57%), Gudong (8.97%), Yue Dynamic Circle (5.99%), and Fitness Baodian (4.79%), movable pedometer (3.59%), Hafei fitness and HI sports (2.79%, 2.79%)^[9]. The above-mentioned fitness apps are prominent in terms of download ranking, software development maturity, and download frequency. Through investigation

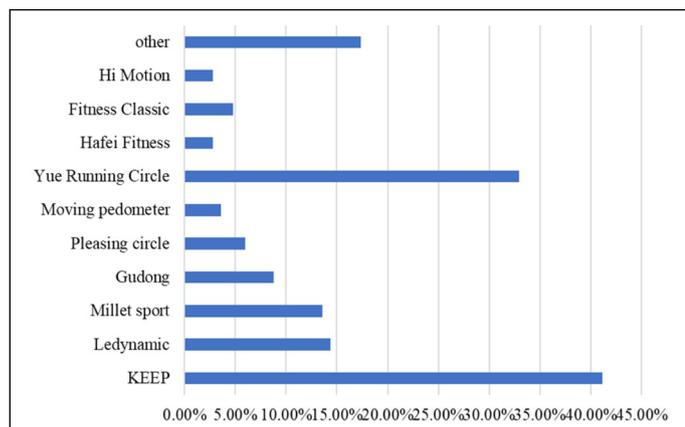


Figure 1. Analysis chart of the type of fitness APP selected by college students.

and research, fitness APP functional modules such as fitness manuals and mobile pedometers are not rich, and the existing functions are only for a specific field of physical fitness, so the performance in terms of download and use frequency is not high.

Experimental result and analysis

The impact of health apps on the awareness of obese college students to participate in physical exercise

Both high school and college students have a strong interest in learning physical education skills and knowledge, and they will keep listening carefully in physical education classes. Generally speaking, the proportion of cultural courses in major colleges and universities is large, occupying most of the students' time and energy, and more students need to spend more time to complete cultural course homework after finishing cultural courses, leaving little time for their own physical exercise. This is shown in Table 1.

Through the questionnaire survey, the proportion of people who chose to participate occasionally, basically did not participate, sometimes participated and participated frequently in physical exercise was 42.34%, 20.98%, 28.72% and 7.97% respectively. The proportion of physical activity (1 time) per week was the highest, at 43%, while the proportion of those who exercised more than 4 times a week was less, at only 8%; In addition, 4.5% of college students who spent more than 2 hours of single physical exercise were concentrated, and most of the students basically concentrated in less than 1 hour, accounting for 70%; More students have poor performance in sports and fitness awareness, think that physical fitness is not necessary, will delay their own cultural class learning, and daily study time is more tight, and they cannot spare energy to participate in various sports and fitness activities. The awareness of the importance and necessity of physical fitness is too shallow.

Use fitness apps to analyze the improvement of physical fitness through physical exercise

In Table 2, it can be seen that 30.74% of the physical fitness improvement is improved by using fitness apps to assist physical exercise, 48.90% of college students think that there is a higher improvement, 20.36% of the total number of college students think that there is a lower improvement, and 0% think that there is no improvement. It is explained that everyone feels that their physical fitness has improved after using fitness APP, and in the subsequent sampling interview, I learned that some of the students who feel that the physical fitness improvement is very high among the students are students who use longer, and most of the students who feel that the physical fitness has a low improvement are students who have just used a short time It has a promoting help for the improvement of college students' physical fitness.

Table 1. Obese college students' awareness of participating in physical exercise.

Physical exercise (weeks)	Number of people	Percentage	Sort by
Regular participation (5 times and above)	68	7.97%	4
Attend sometimes (3-4 times)	245	28.72%	2
Occasional participation (1-2 times)	361	42.32%	1
Basic non-participation	179	20.98%	3

Table 2. Analysis of physical fitness improvement by physical exercise using fitness apps.

Physical fitness improvement	Number of people	Percentage	Sort by
There are no enhancements	0	0.00%	4
There is a lower lift	102	20.36%	3
There is a high level of promotion	245	48.90%	1
Very high lift	154	30.74%	2

CONCLUSIONS

Health APP can formulate a more scientific and reasonable physical exercise plan according to the situation of obese college students, and at the same time use functions such as real-time analysis of exercise data to give obese college students positive and effective exercise feedback, stimulate their enthusiasm to participate in physical exercise, help them gradually develop the awareness of physical exercise, and finally get rid of the problem of obesity. In general, the current use of health APP in the fat college student

group is becoming popular, the number of people who use health APP for physical exercise is more than the number of people who do not use it, and the health APP has a positive effect on the change of obese college students' awareness, purpose and body shape to participate in physical exercise.

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