

Advances in the Relationship Between Physical Activity and Eating Disorders

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Abstract. Goal: progress of research analyzing the relationship between physical activity and eating disorders through the literature. Methodologies: search for journals and master's and doctoral literature on the topics of "physical exercise" and "eating disorders" on CNKI and foreign knowledge network. Results: first, The factors affecting eating disorders are complex, involving not only the individual's own physiology, but also psychological and other aspects of behavioral; second, although physical activity is only an adjunctive treatment for eating disorders, it can be very preventive; third, the diagnosis rate of eating disorders is increasing year by year in China, but the treatment rate is unsatisfactory; fourth, exercise load and exercise duration need to work together to affect eating disorders, duration of physical activity is more important than load in positively influencing eating disorders, positive effects were greater in open exercise programs than in closed exercise programs, long-term practice of exercise loads such as sprouting can achieve better results. Conclusions: physical exercise is negatively correlated with eating disorders within a certain threshold, but there are fewer domestic research results on the relationship between the two, which need to be confirmed in various aspects through more scientific methods; only in this way can we accelerate the popularization of the preventive effect of physical activity on eating disorders and the alleviation of eating disorder symptoms, and increase the importance of mental health to the people of China.

Keywords: Key words: Physical activity; Eating disorders; Diet; Exercise.

1. Introduction

Thinness as beauty is an undesirable trend early in the West is more prevalent, but with the increasingly developed Internet technology, information from all over the world began to flood people's lives. In recent years, the abnormal aesthetic of "white, young, thin" has become the mainstream, although many media, news, and even the People's Daily have strongly condemned this abnormal trend, but there are still many young women are trapped in the quagmire, unable to get out of it, and regard the frail beauty created by society as the ideal body. This body proportion that goes against the normal growth and development of the human body forces many to start trying extreme behaviors such as dieting and hyperventilating, which in turn starts them on the road to eating disorders.

Previous studies have shown that physical exercise, as an adjunctive treatment for eating disorders, can have an influential effect on eating disorders, and the correlation between the two has been specifically analyzed through previous literature, with the aim of finding the optimal form of physical exercise that can alleviate the symptoms of eating disorders and reduce the prevalence of eating disorders.

2. Definition of Relevant Concepts

2.1 Physical exercise

Foreign scholars defined physical exercise as early as 1985 as a physical exercise that is planned and repeated with the main purpose of promoting and maintaining the level of physical fitness and health, relying on sports programs.[25].

In China, physical exercise, in the dictionary of sports science, refers to physical activities carried out under the condition of having a plan and following the law of movement, which can produce benign improvement of physiological structure and promote growth and development in case of long-term persistence[1]. Liu Zhenkai's explanation of physical exercise refers to the physical activities that people do in their daily lives, according to their own needs, combining various sports means and utilizing a variety of sports facilities, with the purpose of strengthening the body, entertaining the body and mind[2], and Du Jianjun defined physical exercise in 2019 as: taking rich sports programs as the main content, following the basic principles of sports, and in accordance with the law of threshold of the effective value of physical exercise. Adopting scientific fitness methods and means, the process of physical activity with the main purpose of enhancing physical fitness, improving physical and mental health, and promoting the overall development of human beings[3].

In short, physical exercise is one of the methods to adjust the psychological state, physical exercise under a certain load can eliminate the bad emotions generated in working life, regulate the state of mind, release the accumulated psychological pressure, and prevent the distress caused by excessive psychological pressure. Psychological activities and physical exercise interact with each other, individuals benefit from physical exercise, and the reward mechanism of the brain improves the interest in exercise and stimulates the desire to exercise again, forming a virtuous cycle[4].

2.2 Eating disorders

Eating disorders are a group of syndromes characterized by abnormal eating behaviors and psychological disturbances accompanied by weight changes or physiological dysfunction[5]. Lin Lin (2020) et al. proposed that the current severe eating disorder disorders include 3 types of anorexia nervosa (AN), bulimianervosa (BN) and bingeeating disorder (BED), which usually coexist with depression, agitation, substance abuse use, and Axis II personality disorder among others[6]. The categorization of eating disorders changes over time, and the latest edition of the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V) has changed the classification of eating disorders from the original[26].

3. Current Distribution of Literature Related to Physical Activity and Eating Disorders

3.1 Methodologies

In this study, China National Knowledge Infrastructure(CNKI) and foreign knowledge network were selected to search the literature on the topic of physical activity and eating disorders. The search was conducted with the search terms of physical education, exercise, diet, and eating.

3.2 Results

With the keywords of "physical exercise" and "eating disorders", a total of 3 domestic journals and 93 foreign journals were searched. With the keywords "physical exercise" and "eating", a total of 71 domestic journals, 362 foreign journals, 19 master's theses and 1 doctoral thesis were searched. The distribution of keywords and disciplines is shown in Figures 1 and 2.

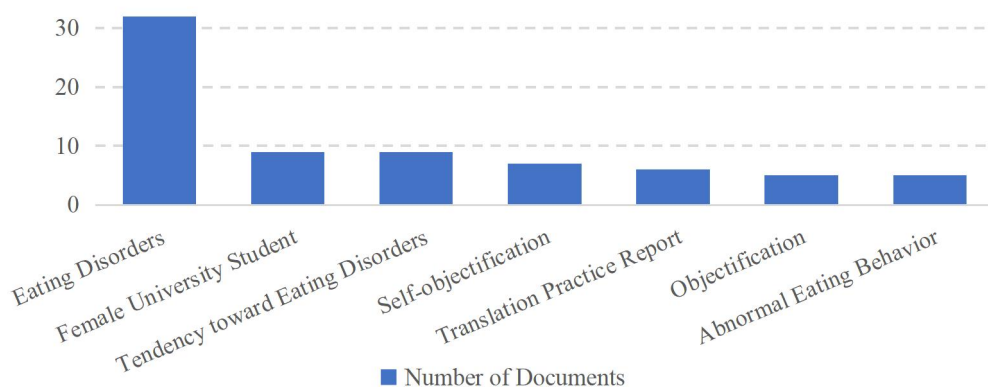


Fig. 1. Distribution of Keywords of Master's and Doctoral Dissertations in China with the Keyword "Eating Disorders"

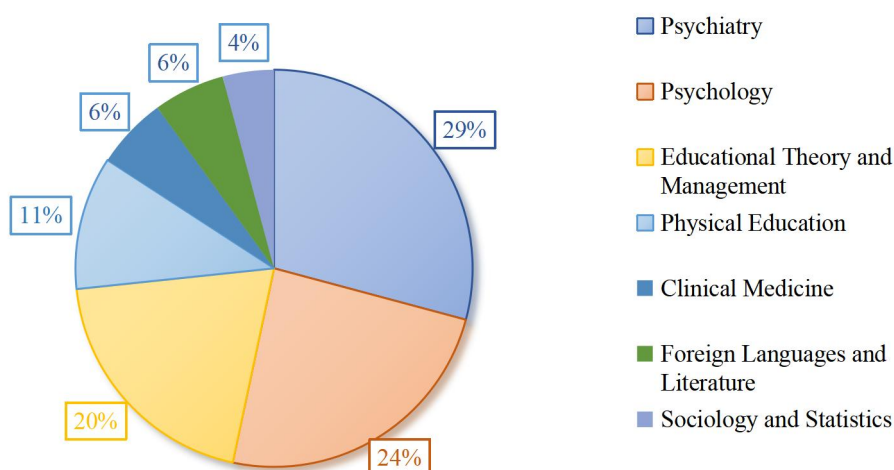


Fig. 2. Disciplinary Distribution of Master's and Doctoral Theses in China Using "Eating Disorders" as a Keyword

As can be seen from the figure, first of all, the current research group of eating disorders in China is mainly female college students, that is to say, those who are most negatively affected by eating disorders are female college students. Butterfly backs, coins on collarbones, A4 waists, cartoon legs, and a series of "beauty" definitions for girls on the Internet have deeply affected female college students who should not be bound by these definitions in their youthful years. Secondly, in the disciplines related to the study of eating disorders, physical education ranked fourth, which is relatively high, and this also indicates that exercise interventions as an adjunctive treatment for eating disorders are recognized by the majority of researchers.

4. Current Status of Research on Physical Activity and Eating Disorders

4.1 Current status of physical activity in the country

Since physical activity has a favorable effect on both the human body and mind, research related to physical activity is divided into two main categories, mental health and physical health.

4.1.1 Mental health

It is well known that physical exercise, especially competitive sports, can not only improve the level of physical function of the individual child, but also hone the individual's willpower and physical endurance. In a 1983 survey, 60% of 1,750 psychologists recognized physical exercise as a

treatment to relieve anxiety, and 80% of psychologists considered physical exercise as one of the means to treat depression[8]. Sun Yanlin, Wang Zhiqing et al. (2014) stated in their article that the study of physical activity as an intervention to prevent or reduce anxiety and depressive symptoms is close to the involvement of physical activity as a treatment, which has the same efficacy as pharmacological or psychotherapeutic treatment, in addition to increasing the level of self-esteem in different populations[9]. In addition, other researchers have shown that groups with a higher frequency of physical activity also have a higher sense of well-being, which is a good indication that participation in physical activity can be an important means of enhancing people's well-being[10].

4.1.2 Physical health

Medically, physical exercise can relieve anxiety reduce tension and improve insomnia symptoms. It reduces blood sugar and blood pressure, slows down osteoporosis, and can also delay or prevent geriatric and chronic diseases[11].

Zhang Yajing (2010) pointed out that physical exercise can not only improve and enhance the function of the central nervous system and improve the function of the cardiovascular system, but also promote growth and development, shape a fit body, and improve athletic ability[12].

Zhang Mei (2016) stated that through physical exercise, adolescents can not only improve the overall body function and brain activity, but also lay the foundation for the improvement of the individual's stress resistance[13].

Dang Xue (2022) concluded after the experimental study of exercise pretreatment on mice fed with high-fat diet that the improvement effect of exercise on body lipid metabolism can still be maintained for a period of time after the cessation of exercise, which initially clarified that the exercise pretreatment has a certain protective effect on body lipid metabolism, and provided a reference for the further advocacy of national fitness to improve the body metabolism to prevent the occurrence of diseases[14].

In summary, physical exercise has an important impact on the individual's mental health and physiological health, not only can increase the body's social interaction ability, reduce the negative emotions such as low self-esteem, but also improve their own immunity, prevent or alleviate various diseases.

4.2 Current status of eating disorders in the country

By searching related literature through Knowledge.com, there are 717 pieces of my domestic literature, early investigations about eating disorders are mainly in Beijing, and the related data are shown in Figure 3.

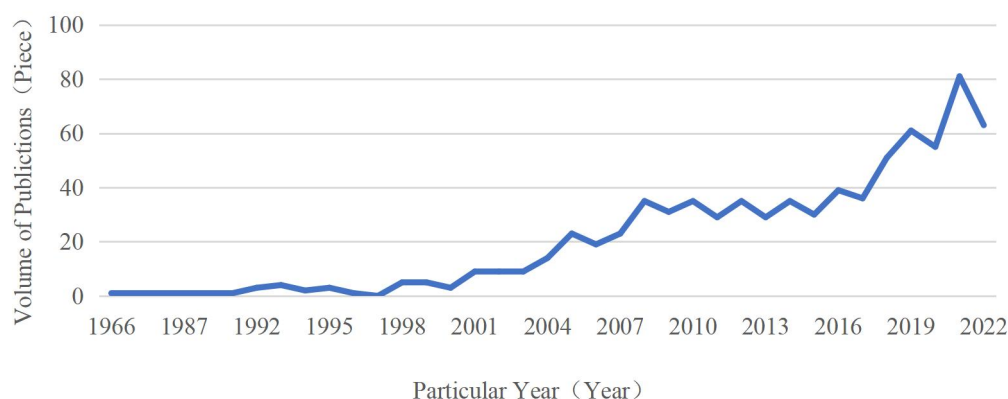


Fig. 3. A Survey of the Amount of Literature Related to Eating Disorders in Recent Years

In 2001, there were 261 junior and senior girls from two middle schools, Zaoying Middle School (vocational high school) and Heping Street No. 1 Middle School in Chaoyang District. The results showed that the detection rate of atypical eating disorder was 1.1%. Of the 38 subjects interviewed, except for 3 girls who were initially diagnosed with atypical eating disorders, 14 out of 35 had

normal or thin body mass indexes, and all of them believed that it would not affect their physical and mental health[15].

In 2005, a survey of college students at Beijing Women's University was conducted by using the EDI and POMS-SF with 352 respondents aged 17-25 years. The results showed that eating disorder-related behaviors were more prevalent in Beijing Women's University; eating disorder-related maladaptive attitudes and behaviors were more severe in college students with normal body types than in college students with thin and over-thin body types; and eating disorder-related maladaptive attitudes and behaviors were age-differentiated, with freshmen and seniors being more severe[16].

In 2016, 1,022 female students in the senior nursing program of Jiangsu United Vocational College of Technology, Nanjing Health Branch, conducted an on-site questionnaire survey. This survey found that a very prominent problem is that 17.3% of low weight students and 29.9% of normal weight students adopted unhealthy dieting behaviors, and 22.2% of low weight students and 37.6% of normal weight students had the idea of trying dieting, which is a high-risk group for the occurrence of dieting behaviors that may be adopted in the future[17].

In 2021, 890 questionnaires were distributed to female college students in a university in Southern Jiangsu Province, and it was concluded that the phenomenon of eating disorder tendency among female college students was more common and the level of perfectionism was higher. Among them, college students' eating disorder tendency is mainly influenced by psychological dynamics and external environment, and produces corresponding behavioral manifestations and negative consequences[18].

Although there has been a lot of literature on screening local schools for eating disorders or atypical eating disorders by means of questionnaires, up to now, there is still a lack of specific examination of the confirmed diagnosis rate of eating disorders in large populations in China, although a number of scholars have already examined the eating disorders (or emotional eating, atypical eating disorders, eating disorders, and abnormal eating behaviors) in secondary school students and college students. The incidence of eating disorders (or emotional eating disorders, atypical eating disorders, eating disorders, and abnormal eating behaviors) among middle school and college students has been studied, and clinicians have summarized a number of eating disorder cases.

5. A Study on the Correlation Between Physical Activity and Eating Disorders

5.1 Current status of national studies on the correlation between physical activity and eating disorders

In a 2008 study, the authors concluded that different amounts of exercise have different effects on eating disorder tendencies, and that physical exercise is predictive of eating disorder tendencies in female college students, and the higher the physical exercise score, the stronger the attitudes toward thinning tendencies with respect to body shape and weight[19]. Later, after some exercise intervention experiments, some scholars believe that Hatha yoga can not only effectively reduce the risk of skinny tendency and bulimic behavior, but also improve the psychological conditions of internal sensory deficits, affective disorders, and perfectionism in female college students at risk for eating disorders. HIIT, although it can also reduce the risk of bulimic behavior but cannot effectively improve the mental conditions of bulimia in female college students at risk for eating disorders. HIIT is also effective in reducing the risk of bulimic behavior in female students at high risk for eating disorders, but it is not effective in improving the psychological conditions of female students at high risk for eating disorders[20]. In addition, emotional eating, as a manifestation of eating disorders, has received extensive attention from researchers since the 1950s. Literature on the correlation between the two has also indicated that physical activity status and emotional eating have a significant negative correlation within a certain threshold, i.e., the longer, more intense, and

more frequent an individual's physical activity is, the lower the likelihood that he or she will experience emotional eating behaviors.

In addition to the exercise program, the duration, load, and program of the exercise were also strongly associated with eating disorders, emotional eating, and abnormal eating behaviors, as shown in Table 1[21][22].

Table 1. Analysis of Factors Affecting the Level of Physical Activity

Time	Load	Project
Long-term Physical Activity has a Positive Impact	Generally Effective with Low Intensity Loads	Open Exercise Works Better than Closed
No Effect if Less	Medium Intensity Loads Work Better	Aerobic Exercise is more Effective
No Effect if One Time	Poor Results with High Intensity Loads	Exercise Programs that are Fun and Entertaining are more Effective

For the view that some foreign scholars believe that physical exercise will aggravate eating disorder symptoms, some scholars in China have also examined this issue. Through questionnaire data, Li Jingshi (2021) found that gym-goers with symptoms of exercise addiction in the gym were often accompanied by higher eating disorders, strong motivation to exercise, and higher state anxiety. Through analysis, it was shown that exercise addiction, exercise motivation, state anxiety, and eating disorders showed a significant positive correlation[23]. Jin Xinhong and Jin Yahong et al. indicated that muscle addiction tendency was positively correlated with body image disorder, eating disorder, and social anxiety, with higher concomitant morbidity[24].

Therefore, the current conclusion on the correlation between the two in China is that physical activity is negatively correlated with eating disorders within a certain threshold and positively correlated above a certain threshold.

5.2 Current status of foreign studies on the correlation between physical activity and eating disorders

There is a current debate abroad about the relationship between physical activity and eating disorders.

Scholars who support the negative correlation between physical activity and eating disorders believe that physical activity can be a good preventive measure by alleviating bulimia or binge eating symptoms, improving psychological anxiety, and reducing the risk of eating disorders. Snyder (1990) and others stated in their study that psychological self is positively correlated with exercise, and that compared to those who do not exercise, those who participate in physical activity on a regular basis will have more positive self-perceptions and evaluations would be more positive. And this positive appraisal leads to an effective reduction in the risk of developing eating disorders and alleviates clinical symptoms in people with eating disorders[28]. This perspective stems largely from the empirical evidence that physical activity plays a positive and protective role in promoting healthy behaviors and reducing risky behaviors in adolescents[29]. These researchers believe that organized participation in physical activity not only promotes the development of critical skills in adolescents during puberty, but also improves aberrant eating behaviors.

Another view is that physical exercise increases eating disorder crisis. Some foreign scholars believe that intense physical exercise can have a negative impact on adolescent health because competitive sports bring strict requirements in terms of body shape, which aggravates people's risk of developing eating disorders[30][31]. Moreover, female athletes are at a greater risk of developing eating disorders. female athletes with a higher percentage of BF (body fat) are at a lower risk of developing eating disorders and a lower risk of developing LEA (energy availability)[32].

This view is reinforced by the fact that the vast majority of foreign literature on eating disorders and sport investigates the prevalence of eating disorders in athletes, i.e., athletes would be at a much higher risk of developing eating disorders than the general population. Female athletes are at greater risk of developing eating disorders. There was no relationship between knowledge of sports nutrition and %BF. female athletes with a higher percentage of BF were at lower risk of developing eating disorders and lower risk of developing LEA.

6. Conclusion

(I) The influencing factors of eating disorders are complicated, and scholars at home and abroad have conducted a lot of research on this over the years, and finally came to the conclusion that there are family, individual and social factors. Because eating disorder not only involves the individual's own physiology, but also involves psychological and other aspects of behavior.

(II) Although physical exercise is only an auxiliary treatment for eating disorders, it can play a very good preventive role. Through reviewing a large amount of survey data, it is found that there are not many people diagnosed with eating disorders at home and abroad, but the number of people with atypical eating disorders, eating disorders, emotional eating, and abnormal eating behaviors is increasing, which may develop into eating disorders in the clinical sense if no complementary treatment is taken. Therefore, it is important to prevent the incidence of eating disorders through physical exercise.

(III) The diagnosis rate of eating disorders is increasing year by year in China, but the treatment rate is unsatisfactory. Few people are willing to go to the hospital to receive treatment, and there are fewer studies on the correlation between the two in China, which also reflects the low degree of importance attached to mental health by the people in China at present.

(IV) Exercise load and exercise duration need to work together to affect eating disorders. Duration of physical activity is more important than load in positively influencing eating disorders. Open exercise programs have a greater positive impact than closed exercise programs. Better results can be achieved with prolonged exercise load exercises such as sprouting.

Physical exercise is negatively correlated with eating disorders within a certain threshold, but there are fewer domestic research results on the relationship between the two, which need to be confirmed in various aspects through more scientific methods. Only in this way can we accelerate the popularization of the preventive effect of physical activity on eating disorders and the alleviation of eating disorder symptoms, and increase the importance of mental health to the people of China.

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