

Analysis and Study on the Effects of Exercise on the Emotions and Psychological Stress of the Elderly Population

Xinqi Lin^{1*}

¹ Fuzhou Sunshine Experimental School, Fuzhou, China

Abstract. This paper delves into the impact of exercise on the emotions and psychological stress of the elderly population, aiming to reveal the important role of exercise in promoting their mental health. Through a systematic literature review and rigorous empirical research, this paper analyzes how exercise effectively improves the emotional state of the elderly population and alleviates their psychological stress reactions. The research results show that moderate exercise can not only significantly improve the emotional stability and positivity of the elderly population but also effectively regulate stress hormone levels and improve their cognitive evaluation of psychological stress. These findings indicate that exercise, as a non-pharmacological intervention, significantly promotes the mental health of the elderly population. Based on these findings, this paper further proposes application strategies for exercise intervention in the mental health of the elderly population, aiming to provide scientific and effective exercise guidance for older people, help them better manage emotions, cope with psychological stress, and thus improve overall quality of life and happiness. This research is significant for promoting the theoretical and practical development of elderly mental health.

1 Introduction

Against the backdrop of global population aging, the mental health issues of the elderly population are gradually becoming prominent and have become a focus of attention for all sectors of society. Emotional and psychological stress are key factors affecting the quality of life of older people, and their effective management and regulation are crucial for improving the overall well-being of older people. However, traditional drug interventions often come with many side effects and are not suitable for all older adults. Exploring non-pharmacological intervention methods, especially exercise application in elderly mental health, is particularly important. In recent years, exercise has shown unique advantages in improving emotions and alleviating psychological stress as a low-cost, easy-to-implement, and effective intervention method. More and more research show that moderate exercise can promote the physical health of older people and positively impact their mental health. Exercise can help improve the emotional stability of older adults, enhance their positive attitude toward life, and regulate stress hormone levels, reducing psychological stress reactions.

Because of this, this paper will explore in depth the positive effects of exercise on emotional regulation in the elderly population, the alleviation of psychological stress response through exercise, and the application of exercise intervention in the mental health of the elderly population through a systematic literature review and empirical research, this paper aims to reveal the specific mechanism of exercise in promoting the mental health of older people and propose practical and feasible

exercise intervention strategies. This study is expected to provide strong theoretical and practical guidance for promoting older people's mental health, helping them better manage emotions and cope with psychological stress, thereby improving their overall quality of life and happiness. At the same time, it also provides useful reference and inspiration for the government, communities, and families in elderly mental health services [1].

2 The Positive Impact of Exercise on the Emotional Regulation of the Elderly Population

2.1 Improvement of Emotional State

2.1.1 Improvement of Emotional Stability

Improving emotional stability is important to older people's mental health, especially when facing life changes, health challenges, and other situations. Older people are often prone to emotional fluctuations, affecting their overall well-being. As a positive coping strategy, exercise has significantly promoted emotional stability among older people. Older people can improve their physical function and enhance their physique through regular aerobic exercise. They can also broaden their social circle and increase communication and connection through social interaction during exercise. These positive physical and social experiences help older adults develop a more optimistic mindset,

* Corresponding author: linxinqi2006@126.com

stabilizing their emotions. Research has shown that long-term aerobic exercise can significantly reduce anxiety and depression in older adults, improve their ability to cope with stress, and make them calmer and more composed when facing various challenges in life. Exercise is a beneficial physical exercise and an effective psychological regulation tool that can help older people better manage their emotions and improve their mental health. In promoting the mental health of older people, exercise should be fully valued, and older people should be encouraged to actively participate in sports activities and enjoy the dual benefits of physical and mental health [2].

2.1.2 Enhancement of Emotional Positivity

Enhancing emotional positivity is another important aspect of older people's mental health, and exercise plays a significant role. Exercise can not only alleviate negative emotions, such as anxiety and depression, in older people but also actively stimulate their positive emotions, such as a sense of achievement and satisfaction. During exercise, older adults can experience the joy of success and affirmation of self-worth by overcoming difficulties and achieving exercise goals. These positive emotional experiences help to enhance their overall emotional positivity and make them more optimistic and upward.

In addition to direct emotional experiences, exercise can promote emotional positivity in older people through physiological mechanisms. Research has shown that exercise can promote the release of neurotransmitters such as dopamine in older people, which are closely related to positive emotions such as pleasure and happiness. Exercise brings psychological pleasure and satisfaction to older people and enhances their inner happiness through physiological mechanisms [3].

In summary, exercise can significantly enhance the emotional positivity of older people. Exercise can help older people maintain an optimistic attitude by stimulating positive emotions and promoting the release of neurotransmitters, thereby improving their overall quality of life. In promoting the mental health of older people, exercise should be fully valued, and older people should be encouraged to actively participate in sports activities and enjoy the positive emotional experiences of exercise.

3 Elimination of Psychological Stress Response by Exercise

3.1 The Regulation Mechanism of Psychological Stress

3.1.1 Regulation of Stress Hormone Levels

Psychological stress is a psychological state that older people often encounter when facing various challenges and changes in life. This psychological state is often accompanied by complex physiological changes, among

which the most significant is increased stress hormone levels. Maintaining a high level of stress hormone for a long time will not only cause many adverse effects on the physical health of older people, such as increasing the risk of cardiovascular disease, diabetes, and other chronic diseases but also may further aggravate the occurrence of their psychological problems, such as anxiety and depression. Effectively regulating stress hormone levels has become an important means of alleviating psychological stress and maintaining older people's physical and mental health.

In this context, exercise as a non-pharmacological and low-risk regulatory approach has gradually gained widespread attention. Research has shown that exercise has shown significant effects in reducing stress hormone levels. By promoting the body's metabolism and improving endocrine function, exercise can effectively reduce the levels of stress hormones (especially cortisol) in older people. This regulatory mechanism helps alleviate the physiological burden of psychological stress on older people. It enhances their ability to cope with life challenges, protect their physical health, and improve their overall quality of life [4]. As shown in Figure 1:

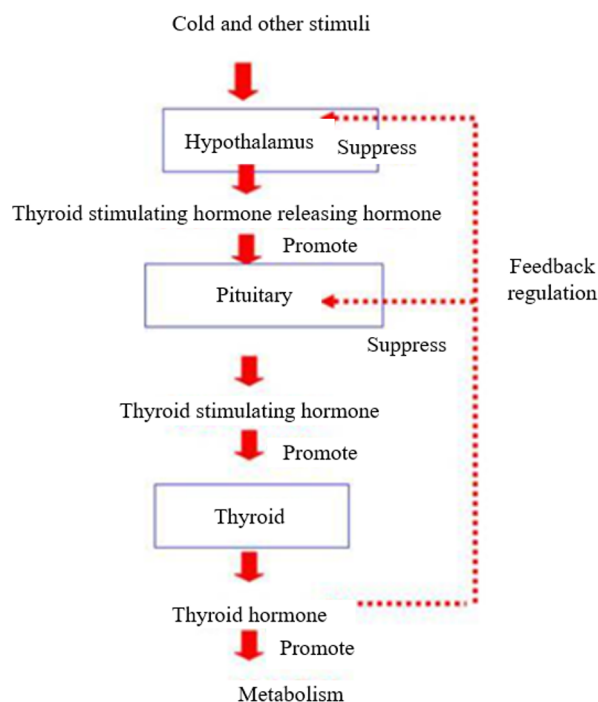


Fig. 1. Regulatory chart of stress hormone levels

3.1.2 The Impact of Cognitive Evaluation on Psychological Stress

The cognitive evaluation of psychological stress is crucial in older people coping with life challenges. This evaluation process involves an individual's perception, understanding, and interpretation of stress events, which profoundly affects the degree and nature of stress responses. Specifically, when older people view stressful events with positive cognitive evaluations, they are often able to face them with a more optimistic and confident attitude. This positive mindset helps

effectively alleviate stress reactions and makes them more resilient when facing difficulties. On the contrary, if the cognitive evaluation of older people tends to be negative, they may experience excessive anxiety and fear towards stressful events, which undoubtedly exacerbates the stress response and makes them feel more helpless and confused when facing challenges.

Exercise plays a significant role in cultivating positive stress cognitive evaluation patterns in older people. Through regular exercise, older people can gradually feel the changes in their bodies and the improvement of their abilities, which helps to enhance their self-efficacy, that is, confidence and affirmation of

their abilities. When they realize that they can improve their physical condition and quality of life through exercise, they will have more confidence in their ability to cope with and overcome various challenges in life [5].

Meanwhile, exercise can also enhance older people's control over their environment. Older people must constantly adapt and adjust their physical condition to cope with different exercise intensity and difficulty levels during exercise. This experience makes them more confident in their ability to control their living environment and, thus, more confident in facing stressful events. As shown in Table 1:

Table 1. Psychological Stress Cognitive Evaluation and Exercise Intervention Effect Data table

Evaluation Dimension	Pre-intervention status (average)	Post-intervention status (average)	Improvement Effect Description
Cognitive appraisal tendency (positive/negative)	Negative: 60%	Positive: 80%	Significantly turn to positive
self-efficacy	3.0/5	4.5/5	Significantly raise
Anxiety level (scale score)	25(High)	15(Low)	Decreased significantly
Sense of control score	2.8/5	4.2/5	Significantly enhanced
Confidence in coping with challenges	3.2/5	4.7/5	Significantly increased

In summary, exercise helps older people face challenges and stressful events with a more positive attitude by cultivating a positive cognitive evaluation model for stress. This positive attitude can not only alleviate the impact of psychological stress but also improve older people's quality of life and happiness. We should encourage older people to actively exercise regularly to gain health, confidence, and happiness through exercise.

4 The Application of Exercise Intervention in the Mental Health of the Elderly

4.1 Implementation of Exercise Intervention Program

4.1.1 Adaptation of Exercise Type and Intensity

The exercise intervention plan for the elderly population needs to fully consider their unique physical condition and long-term exercise habits to ensure the safety and effectiveness of the exercise plan. When choosing exercise types, priority should be given to low-intensity, low-impact aerobic exercises such as walking, Tai Chi, etc. These exercises promote the cardiovascular function of older people and enhance their muscle strength and flexibility while avoiding excessive impact on joints and reducing the risk of sports injuries.

The choice of exercise intensity should also be based on the subjective feelings of older people, ensuring that the exercise process is neither too easy nor too intense. Monitoring indicators such as heart rate, respiratory rate, and fatigue level after exercise in older people makes it possible to more scientifically evaluate whether the

exercise intensity is appropriate. Avoiding the physical burden caused by excessive exercise is important to prevent unnecessary health problems [6]. As shown in Figure 2:

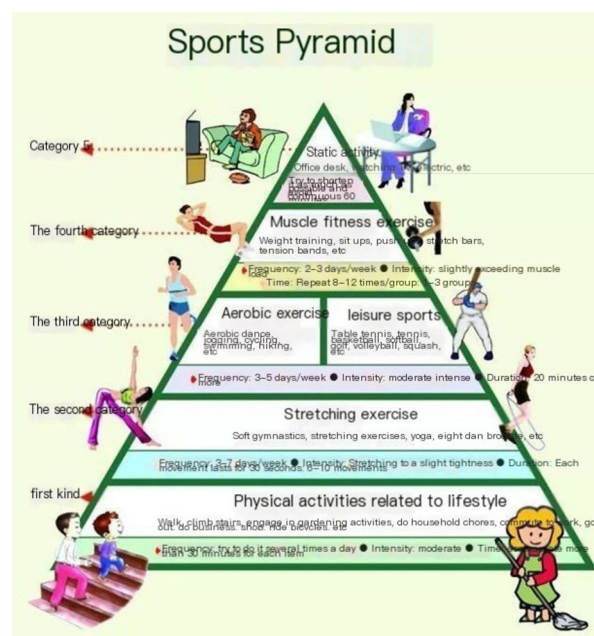


Fig. 2. The movement pyramid of the elderly

4.1.2 Optimization of Motion Frequency and Time

The optimization of exercise frequency and time for the elderly population's exercise intervention is particularly important. The core of this process lies in fully considering older people's lifestyle habits and body rhythms to ensure that the formulated exercise plan is reasonable and feasible. Generally speaking, it is

recommended that older people exercise 3-5 times a week. This frequency setting has a scientific basis: it can maintain the physical activity of older people, effectively promote health, and avoid fatigue and discomfort that may be caused by excessive exercise. In other words, this frequency range has found an appropriate balance between promoting health and preventing excessive exercise.

Meanwhile, the duration of each exercise session is also a factor that needs to be carefully considered. It is generally recommended to control the duration of each exercise between 30-60 minutes. This duration ensures that older people receive sufficient exercise to achieve the expected results while preventing excessive fatigue caused by prolonged exercise. This schedule reflects respect for older people's physical abilities and consideration for their pace of life.

The choice of exercise time should try to avoid interfering with the rest time of older people, especially at night, to avoid adverse effects on their sleep quality. On the contrary, the morning or afternoon period is considered a better exercise choice. During these two periods, the physical condition of older people is relatively good, making it easier to engage in exercise and more likely to achieve better exercise results. The formulation of exercise plans should fully consider older people's biological clock and daily habits and choose the most suitable exercise time.

4.2 Evaluation of the Effect of Exercise Intervention

4.2.1 Quantification of Emotion Regulation Effect

The quantitative evaluation of the emotional regulation effect of exercise intervention on the elderly population selected standardized scales that have been widely validated and have good reliability and validity, such as the Anxiety and Depression Scale and the Happiness Scale. These two scales can help us objectively and accurately understand the emotional state of older people and provide powerful tools for quantifying the emotional changes brought about by exercise interventions.

In the evaluation process, we also need to consider other possible influencing factors, such as individual differences among older people and changes in their living environment. These factors may all impact the evaluation results, so we need to adopt multiple methods for a comprehensive evaluation to ensure the accuracy and reliability of the results. By comprehensively applying multiple evaluation methods, we can have a more comprehensive and accurate understanding of the effect of exercise intervention on emotional regulation in older people, providing strong support for the development of more scientific and effective exercise intervention plans [7].

4.2.2 Improvement of the Psychological Stress Response

The improvement of psychological stress response is one of the important indicators for evaluating the emotional regulation effect of exercise intervention on the elderly population. To comprehensively and objectively evaluate this improvement, we can start with stress hormone levels and changes in stress cognitive evaluation. The changes in stress hormone levels, especially cortisol levels, can directly reflect the psychological stress state of older people.

By detecting the cortisol levels of older people before and after exercise intervention, we can clearly understand the regulatory effect of exercise on stress hormones. If cortisol levels decrease after intervention, there is undoubtedly strong evidence that exercise relieves psychological stress reactions in older people.

In addition to physiological assessments, we also need to pay attention to changes in the cognitive evaluation of stress in older people. By conducting a stress cognitive evaluation questionnaire survey, we can better understand older people's cognitive, emotional, and behavioral responses when facing stressful events. If the scores of older people on the questionnaire improve after the intervention, it further proves the positive relieving effect of exercise on psychological stress response [8].

5 Conclusion

As a non-pharmacological intervention, exercise has shown significant and unique advantages in improving the emotional state of the elderly population and alleviating psychological stress reactions. Moderate exercise intervention can not only effectively improve the emotional stability and positivity of older people, making them more optimistic about life, but also effectively regulate stress hormone levels, reduce the secretion of stress hormones such as cortisol, and thus alleviate the psychological stress burden of older people. Exercise can also improve the cognitive evaluation of psychological stress in older people, helping them view and handle stressful events more rationally and positively, enhancing their psychological adaptability.

In future research, we can further explore the specific effects of different types, intensities, frequencies, and durations of exercise on the mental health of the elderly population to provide more precise and personalized exercise intervention strategies for promoting the mental health of older people. These studies will help us better understand the exercise needs and preferences of older people, develop exercise plans that align with their actual situation, and thus maximize the role of exercise in promoting mental health in older people.

At the same time, the government, communities, and families should work together to provide more sports opportunities and resource support for older people. The government can increase investment in elderly sports facilities and services, communities can organize various sports activities, and families can encourage and support older people to participate in sports that suit

them. Through the joint efforts of the whole society, sports can become an important component of a healthy lifestyle for older people, adding more vitality and happiness to their later years.

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