

Psychological antecedents and psychological benefits of physical exercise for the elderly under the elderly law

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Abstract

The study investigates the psychological antecedents and advantages of physical exercise for the old under the law governing the aged. This paper studies the effects of physical exercise on psychological emotion and psychological benefits by employing a questionnaire and referring to the law of older people. The study discovered that the psychological advantages of physical exercise for the elderly depend on the amount of exercise performed each week and the time spent exercising. Individuals who exercise more than five times per week and for at least 30 minutes are more mentally healthy. Physical exercise can not only improve mood, enhance self-concept and coordinate interpersonal relations, but also eliminate fatigue, reduce stress response, reduce or eliminate mental diseases to indeed promote the fitness and mental health of the elderly.

Keywords: Physical exercise; Psychological benefits; older people; the Elder law; elderly people

Introduction

According to the provisions of Articles 32, 35 and 36 of the Elder-law, enriching the spiritual and cultural life of the elderly is the objective requirement of the elderly's life. The elderly must have a sense of learning and enjoyment intrinsically tied to their spiritual and cultural lives. According to Article 3 of the Elder-law, "the state and society shall take measures to organise mass cultural, sports, and recreational activities geared at the elderly to enrich their spiritual and cultural lives." " This provision lacks operability. First, the title of "state and society" is too general because they are not the specific executors of "old people have fun". It is suggested to change "state" to "government" and "society" to "enterprises and institutions". Secondly, it should be clear which level of government is responsible. The Central People's Government, specifically the State Council, is responsible for national elderly work; the people's governments of all provinces, autonomous regions, and municipalities directly under the central government are responsible for provincial elderly work; and the people's governments of prefecture level cities, provincial capital city districts, counties, districts, and cities are responsible for elderly work below the municipal level. Second, funds should be listed in the government plan to provide material guarantees for enriching the spiritual and cultural life of the elderly (Ojha et al., 2020).

General Secretary Xi Jinping proposed actively responding to ageing in the report of the Communist Party of China's 19th National Congress, and the "Development Report on

Actively Responding to Population Ageing in the New Era" also stated: "Population ageing is China's new fundamental national condition in the twenty-first century, and it is also the primary challenge confronting China's social and economic development at this stage and for a long time in the future" (Ishii et al., 2020). Previously, there were the concepts of successful ageing and healthy ageing, which regarded ageing as ageing without disease and disability, which considered the elderly as the burden of social development rather than social wealth, and active ageing as the best strategy to deal with ageing, both in terms of theoretical superiority and practical necessity. In 2002, the World Health Organization (WHO) defined active ageing as maximising the benefits of health, participation, and security to improve the quality of life when people reach old age (Bhansali et al., 2019). Active ageing requires the active participation of the elderly and the entire society, so that people of all ages, including those who are frail, disabled, or in need of care, can participate fully in society, maximise their potential, extend their life expectancy, and improve their quality of life, and embrace active ageing as a new strategy for addressing global ageing. Active ageing has changed the traditional attitude toward the elderly and ageing. It is not only an idea, but also a theoretical and policy framework, which has guiding significance for population ageing. As a way of social participation, the public has widely accepted physical exercise. The participation of the elderly in physical exercise can effectively enhance their physique and promote their mental health. This can also promote the elderly to participate in physical exercise more actively and

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consciously. Therefore, the study of the psychological benefits of physical exercise has very important theoretical and practical significance for promoting active ageing. Chinese research found that physical exercise can reduce anxiety and antidepressant. After physical exercise, the elderly have a higher positive experience, enhanced positive emotion, a higher positive experience, enhanced positive emotions, and reduced negative emotions. Zwingmann et al. have also proved that fitness Qigong and Tai Chi Health stick exercise can improve the negative emotions of elderly women, induce positive emotions, and play a positive role in enhancing the mood and maintaining the mental health of older women (Zwingmann et al., 2021). Foreign studies have proved that the lower the level of physical activity, the lower the score of positive emotion. In addition, some studies have shown that gender, exercise frequency, exercise time and exercise items have a specific correlation with positive emotions (Laguna Sanz et al., 2019). Cho, H.M. and others investigated the elderly with the concise Depression Scale for the elderly and the physical exercise scale for the elderly. The results showed that physical exercise had a significant impact on the depression of the elderly. The

elderly exercisers with less exercise time, shorter time, and fewer partners had higher depression.

On the contrary, the degree of depression was lower. It can be seen that physical exercise is a critical way to prevent and reduce the depression of the elderly (Cho et al., 2019). Tomao put forward the "extension construction" theory of positive emotion, expanding its instantaneous thinking action reserve, building lasting personal resources (material and intellectual resources, psychological resources and social resources), and transferring them to life. Finally, as a reserve, the positive emotion obtained from exercise urges individuals to continue participating in physical exercise, forming a virtuous circle. The cognitive decision-making model of exercise persistence introduces emotional experience, which predicts and explains college students' exercise persistence behaviour. Therefore, the positive emotional experience and psychological advantages formed by the elderly in exercise, and then transferred to daily life through psychology, can not only improve the elderly's exercise persistence but also dare to face family or their emergencies and setbacks, which can better adapt to the elderly life, but pay attention to the appropriate amount. Otherwise it will cause a sports injury, as shown in Figure 1 below.

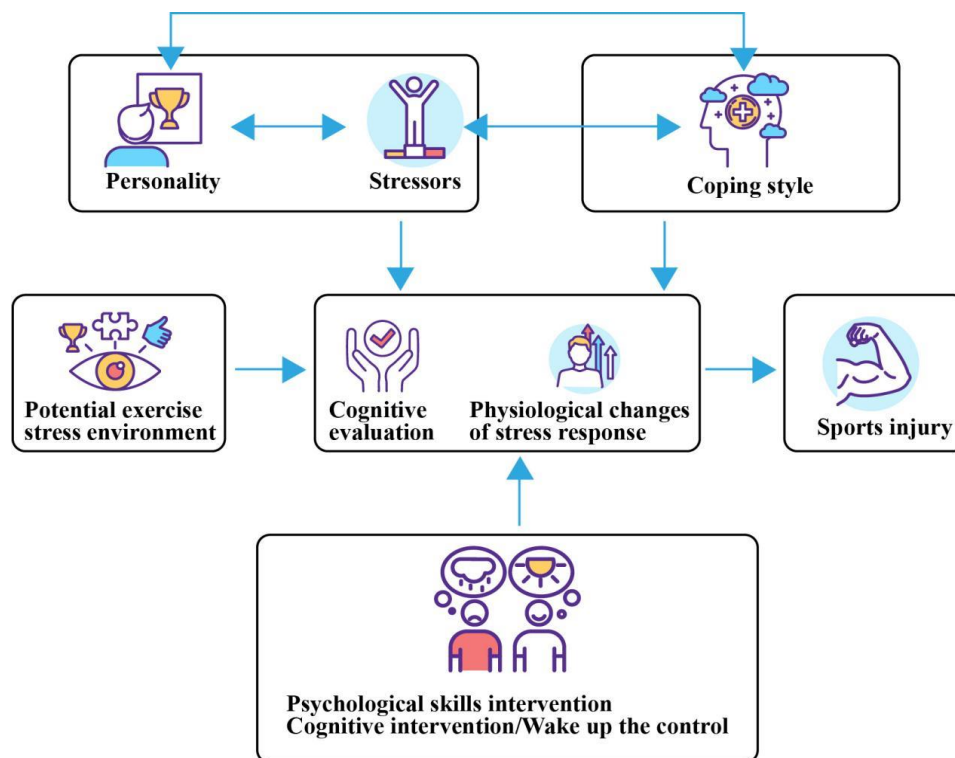


Figure 1. Sports injury model

Physical exercise is a critical way to improve the subjective well-being of the elderly. Black, K.J. and others pointed out that the elderly who adhere to morning exercise have higher life satisfaction and subjective well-being. Numerous research conducted in China have also

established that exercise can boost the elderly's contentment (Black et al., 2019). The meta-analysis of Marotta, L. and others found that physical activity intervention can improve individual subjective well-being, and the medium effect amount $d = 0.51$ (Marotta et al.,

2020). Through 18 weeks of Taiji Softball training for the elderly, HT and others found that the mood state of the elderly improved, and their life satisfaction improved significantly after training (Hoang-Tung & Kubota, 2019). The higher the participation of the elderly, the higher the life satisfaction and happiness, and the young people with high life satisfaction are more willing to participate in exercise and obtain happiness. It can be seen that physical exercise and life satisfaction affect each other. Akiyama and others believe that 44 of the 150 elderly have depressive symptoms, accounting for 29.33%; 18 people have anxiety symptoms, accounting for 12.00%. Kitkowska regression found that the main influencing factors of depression in the elderly were the low number of visits of children, their own physical diseases, lack of harmony with others, life stress events in recent 1 year, and inability to self regulate in case of unhappiness; The main influencing factors of anxiety of the elderly are physical diseases, poor life satisfaction and family dysfunction (Kitkowska et al., 2020). In the article "analysis of mental health and related factors of the elderly in the community", Yma and others found that the cognitive evaluation of life events is the main factor affecting the mental health and well-being of the elderly; Marital status also significantly affects the life satisfaction of the elderly, which is closely related to their mental health (Ma et al., 2021). The research on the retired elderly found that age affects their self-confidence. The older they are, the lower their self-confidence is.

Methodology

Research object and method

According to the research needs of this paper, the number of middle-aged and older people, economy, transportation, activity places, cultural level and other aspects in the six regions of a city are higher than those in other regions. The elderly over 60 years old in a city are selected as the survey objects.

Sample composition

According to the statistical results of an on-site interview and questionnaire, 600 older people are doing physical exercise. Since this paper focuses on the impact of physical exercise on the mental health of the elderly, the effects of gender factors on the test indicators will not be considered temporarily. Firstly, some samples are appropriately selected from the research samples for preliminary interviews, and individual samples at all levels are interviewed separately to deeply understand the mental health differences of the samples and prepare for the preparation of the questionnaire. According to the research purpose and content requirements of this paper, the selection of mental health indicators is still based on

the research results of Szocik, K. and others, which are selected as five aspects: personality, emotional stability, social adaptability, interpersonal communication ability and cognitive function. At the same time, a comprehensive selection is carried out, and a special scale is prepared according to the research content. The fundamental data sources are gathered through the use of effective surveys and scales. The "Questionnaire on the basic situation of physical exercise for the elderly in Zhengzhou" and the "Questionnaire on mental health for the elderly in Zhengzhou" are prepared based on the "Compilation of mental health questionnaires for the elderly" and the real situation (mainly to have an overall understanding of the selected connotation of mental health). The whole design process follows the basic requirements of questionnaire design, and 12 experts are consulted to test the validity of the questionnaire before issuing the questionnaire. At the same time, the GDS geriatric depression scale, SCL-90 symptom checklist and SAS anxiety Checklist (these three scales mainly compare the difference between the two in the mental health of the elderly by the method of reverse exclusion comparison) (Fedushko & Ustyianovych, 2019). According to the report of Janeczko, E. and others, the reliability coefficient is 0.77 ~ 0.99. According to the parallel validity test of SCL-90 using gas and Si, it is found that the total score of SCL-90 is negatively correlated with gas ($P < 0.05 \sim 0.01$) and positively correlated with Si ($P < 0.01$), indicating that the scale is practical (Janeczko et al., 2020). The scale contains 90 items, and each item adopts a 5-level scoring system:

From "None" (conscious of not having the symptom problem) to "mild" (conscious of having the symptom problem, but it does not occur frequently and seriously) to "moderate" (conscious of having the symptom, its severity is light to moderate) to "quite severe" (conscious of often having the symptom, its severity is medium to severe) to "serious" (conscious of having the symptom, its frequency and degree are intense). The scale includes 10 factors: somatisation, obsessive-compulsive symptoms, interpersonal sensitivity, depression and anxiety, hostility, terror, paranoia, psychosis and additional items (factor 10 is not used for this statistics). In this study, the reliability coefficient of each dimension is between 0.61 and 0.85.

Research procedure

Firstly, consult the literature, design the questionnaire and train the researchers who implement the survey. The questionnaire survey began in July 2021 and ended in October 2021. Screen the returned questionnaire and delete the waste volume. The SPSS 11.0 statistical software package was used to manage and analyse the collected data.

Results and Discussion

Characteristics of the elderly participating in sports activities

According to the survey, the aged who are not engaged in physical activity account for 29%, while those who are involved in physical activity account for 71%. The percentage of years spent exercising is 30% for less than five years, 25% for five to ten years, and 45% for more than ten years. 35% exercised once or twice a week, 13%

exercised three or four times a week, and 52% exercised more than five times a week. Each activity lasts less than 30 minutes in 24% of cases, 30-60 minutes in 32% of cases, and more than 60 minutes in 44% of cases. Long walking (walking), aerobics, dance, and Qigong are the primary forms of exercise. The findings indicate that more older individuals exercise frequently and that more elderly persons exercise for more than five years, more than five times a week, and for more than 30 minutes each time.

Relationship between physical exercise and mental health of the elderly

Table 1

Test of psychological benefits of physical exercise for the elderly

Indicator category	Not taking exercise	Taking exercise	T-test
Total score	143.03±54.45	123.71±38.37	3.61**
Somatization	1.56±80.61	1.57±0.50	3.01**
Obsessive compulsive symptoms	1.78±0.58	1.56±0.42	3.31**
Interpersonal sensitivity	1.51±0.54	1.31±0.36	3.20**
Depressed	1.70±0.63	1.41±0.40	4.11**
Anxious	1.53±0.58	1.31±0.36	3.61**
Hostile	1.42±0.61	1.31±0.38	1.82
Terror	1.56±0.78	0.28±1.47	3.13**
Paranoid	1.44±0.61	0.25±0.36	2.52**
Psychotic	1.42±0.53	1.23±0.34	3.05**

Note: * $P < 0.05$ indicates significant difference; ** $P < 0.01$ indicates that the difference is very significant; The same below.

It can be seen from Table 1 that participation in physical exercise has significant differences in the mental health of the elderly. The mental health level of the elderly who participate in physical exercise is significantly better than those who do not participate in physical exercise. Except

that the difference between negative factors is not significant, the differences between other factors are very significant. This result suggests that the elderly participating in physical exercise can effectively promote the improvement of psychological benefits.

The relationship between years of physical exercise and the mental health of the elderly

Table 2

T-test of the impact of physical exercise years on the mental health of the elderly

Indicator category	Less than 5 years	More than 5 years	T-test
Total score	143.03±33.25	115.07±30.61	16.28**
Somatization	1.68±0.52	1.48±0.41	10.00**
Obsessive compulsive symptoms	1.68±0.46	1.44±0.36	14.01**
Interpersonal sensitivity	1.41±0.41	1.21±0.27	12.78**
Depressed	1.54±0.44	1.21±0.40	4.11**
Anxious	1.53±0.58	1.31±0.24	16.78**
Hostile	1.40±0.41	1.24±0.28	3.17**
Terror	1.43±0.61	1.16±0.26	13.73**
Paranoid	1.35±0.41	1.16±0.31	10.52**
Psychotic	1.32±0.41	1.14±0.26	11.17**

It can be seen from Table 2 that the mental health level of the elderly who have participated in physical exercise for 5 years or more is significantly higher than that of the elderly who have

participated in physical exercise for less than 5 years. This result suggests that persistence is the premise for the elderly to participate in physical exercise to promote psychological benefits.

The relationship between the frequency of physical exercise and the mental health of the elderly

It can be seen from Table 3 that the psychological indicators of the elderly who participate in physical exercise more often are better than those who participate in physical activities fewer times, indicating that the frequency of physical exercise is closely related to the

indicators of mental health. Post hoc analysis showed that the mental health level of the elderly who participated in physical exercise more than 5 times a week was significantly higher than that of the elderly who participated in physical activities 3-4 times and 1-2 times a week. This result suggests that physical exercise must maintain a specific frequency to promote mental health better.

Table 3

Variance test of the impact of physical exercise frequency on the mental health of the elderly

Indicator category	1 ~ 2 times / week	3 ~ 4 times / week	More than 5 times/week	F test
Total score	130.17±30.08	125.01±26.51	114.56±26.86	12.61**
Somatization	1.62±0.51	1.66±0.46	1.40±0.45	12.62**
Obsessive compulsive symptoms	1.63±0.43	1.57±0.41	1.44±0.41	10.57**
Interpersonal sensitivity	1.35±0.37	1.30±0.36	1.24±0.34	8.38**
Depressed	1.48±0.40	1.40±0.33	1.32±0.37	14.16**
Anxious	1.37±0.40	1.30±0.34	1.20±0.31	13.10**
Hostile	1.35±0.41	1.35±0.40	1.24±0.34	2.23**
Terror	1.36±0.51	1.32±0.51	1.15±0.38	10.62**
Paranoid	1.28±0.34	1.30±0.41	1.20±0.35	6.15
Psychotic	1.28±0.36	1.20±0.28	1.26±0.31	8.18**

Relationship between physical exercise time and mental health of the elderly

It can be seen from Table 4 that the mental health indicators of the elderly who exercise for more than 60 minutes each time are significantly different from those who exercise for 30 ~ 60 minutes and less than 30 minutes each time. Post analysis showed that the mental health indexes of the elderly who participated in physical exercise

for more than 60 minutes each time were better than those who participated in physical exercise for 30 ~ 60 minutes and less than 30 minutes each time. The indexes of mental health of the elderly who take part in physical exercise for 30 ~ 60 minutes each time are better than those of the elderly who exercise for less than 30 minutes each time. It shows that the elderly must adhere to a certain period before receiving the corresponding effect.

Table 4

Variance test of the impact of each physical exercise time on the mental health of the elderly

Indicator category	Less than 30 minutes	30 ~ 60 minutes	More than 60 minutes	F test
Total score	128.58±26.81	126.08±31.61	111.51±21.00	12.74**
Somatization	1.71±0.51	1.58±0.48	1.34±0.41	13.61**
Obsessive compulsive symptoms	1.60±0.41	1.60±1.44	1.44±0.40	8.88**
Interpersonal sensitivity	1.34±0.36	1.31±0.38	1.23±0.31	8.06**
Depressed	1.47±0.41	1.44±0.41	1.25±0.31	15.56**
Anxious	1.40±0.38	1.30±0.37	1.17±0.27	13.31**
Hostile	1.34±0.35	1.36±0.42	1.21±0.31	2.71**
Terror	1.36±0.43	1.32±0.54	1.11±0.32	11.01**
Paranoid	1.26±0.35	1.28±0.40	1.17±0.28	6.17**
Psychotic	1.23±0.28	1.28±0.41	1.14±0.23	8.31**

Comfortable experience

Comfortable experience refers to people's psychological understanding of their physical and mental health obtained from exercise. This index can be further decomposed into physical and mental health experiences

gained from exercise, and whether an individual has a healthy way of exercise. With the growth of age, the physical functions of the elderly are weakening", which is mainly reflected in sensory and motor functions, such as ageing eyes, hearing loss and slow movement. The muscles

also gradually begin to shrink and lose elasticity, the bones become shorter and brittle, and the brain and heart functions decline. The adaptability of the elderly to environmental changes and changes in living habits has also decreased (Sun et al., 2020). As a result, the elderly frequently exhibit despair or helplessness when confronted with life's pressures. Physical activity is one of the most effective techniques to improve the elderly's circumstances. Numerous studies have been conducted on the benefits of physical exercise in promoting the physical and mental health of the elderly. From Li Rongyuan's research on the impact of physical exercise on the physique and quality of life of the elderly in urban areas, regular participation in physical exercise can make the body composition of the elderly more reasonable, reduce the percentage of body fat of the elderly, and help the elderly control their weight, so as to prevent obesity and reduce the occurrence of diseases. Regular physical exercise can also improve the cardiopulmonary function and physical quality of the elderly to improve health and delay ageing. There are significant differences in heart rate, vital capacity, systolic blood pressure and vital capacity between the regular exercise group and the infrequent exercise group, indicating that the cardiopulmonary function of the periodic exercise group is better than that of the irregular exercise group. In addition, physical exercise can also improve the regulatory role of the human central nervous system. Appropriate physical activities stimulate the pituitary gland to produce Endofibrin. Endofibrin is a kind of morphine hormone. It has an analgesic effect and can improve the function of the central nervous system to make the individuals participating in exercise feel happy and excited. On the other hand, exercise is accompanied by an increase in blood flow and oxygen intake, which positively affects the central nervous system.

Suggestions

Research shows that physical exercise can strengthen the function of the muscle, bone system and cardiovascular system of the elderly, enhance the ability of the immune system of the elderly, reduce the level of body fat and lose weight to reduce the diseases caused by obesity. The impact of physical exercise on the physical function level of the elderly is as follows: ① During the quiet period of long-term exercise, the heartbeat frequency is reduced, the heart slows down, and the diastolic period of the heart is prolonged. Therefore, the myocardium can be fully rested, and the heart has more blood filling (Guazzini et al., 2020). ② Long term physical exercise can keep the lung tissue elastic and strengthen the strength of respiratory muscles to improve the lung's ventilation and ventilation function and improve lung tissue's ability to absorb oxygen and

discharge carbon dioxide. ③ Physical exercise can comprehensively enhance the sport's ability of the elderly. In the survey, it is found that the strength quality (grip strength), flexibility quality (forward flexion range), balance ability (standing on one foot), speed endurance (the number of squats in 30s) and other indicators reflect the exercise ability of the elderly. The elderly who often participate in exercise are better than those who do not exercise. ④ Physical exercise has an excellent therapeutic effect on the common diseases of the elderly. The results showed that the effective rate for constipation was 100%, for joint pain was 28.5%, for headache and dizziness was 44.5%, and for hypertension was 76%. This study confirmed that physical exercise can improve their physical satisfaction and enjoy a more comfortable experience of life to improve their physical health and enhance the subjective well-being of the elderly.

A large number of studies have confirmed that physical exercise helps to vent the emotions of the elderly to alleviate and release the psychological pressure and mental tension of the elderly caused by family and society and plays a positive role in driving away from the loneliness of the elderly (Cao & Wan, 2020). Researchers agree that long-term physical exercise is closely related to good mental health. Among them, regular physical exercise is positively correlated with reducing anxiety. Long term physical exercise is moderately correlated with some mental health indicators (such as positive emotional states such as life satisfaction, low anxiety and low depression) (Sha et al., 2021). The above results show that mental health is closely related to physical exercise. This study shows that the elderly who often participate in exercise can effectively eliminate the adverse psychological problems such as anxiety and depression of the elderly. The overall level of mental health is significantly higher than that of the elderly, who do not often exercise. Because we insist on physical exercise, we often exchange ideas with the exercise group to form a pleasant and harmonious atmosphere to improve mental health and enhance the subjective well-being of the elderly.

Those who take part in the exercise are more mentally healthy than those who don't. The results show that the mental health indexes of the elderly who participate in physical exercise are significantly better than those who do not participate in physical exercise. Relevant research shows that the primary motivation of the elderly to participate in exercise is "improve health", "like exercise", "feel good", "like communication", and so on. The study also found that the elderly over the age of 75 participate in exercise because they "like social activities". The elderly at this age may take exercise as a main means to eliminate loneliness and

loneliness. In addition, physical exercise also positively affects the adaptation of the elderly after retirement. Every year, many older people in China retire from their jobs. These people will have negative emotions after retirement, such as "they are old and no longer as energetic as before; they are no longer as respected as before; their interpersonal network is shrinking...". These older people will show many maladjustments to life after retirement. Sports training can make the older people still have something to do after retirement and feel that they are still energetic. Unlike what others think, they can also make many new friends in the exercise process, which can make up for the narrowing of the interpersonal network caused by retirement, vent and ease the bad emotions of interpersonal interaction, and have great physical and mental pleasure and fun. Therefore, the mental health level of the elderly participating in exercise is higher (Williams, 2019).

According to relevant studies, each activity should last 20 to 30 minutes. The American Academy of Sports Medicine and the Centers for Disease Control and Prevention made public statements encouraging all Americans to engage in 30 minutes of moderate-intensity activity each day. They also outlined the following fitness and heart-strengthening principles: The elderly can participate in aerobic exercise, extensive muscle group activity guidelines, and repetition methods 3-5 times a week, preferably once a day, for 30-60 minutes each time, at a level of intensity equal to or greater than 50% of VO₂max (40 percent - 85 percent VO₂max). The elderly should be grouped according to their age and physical condition, gradually consuming around 240-340 kcal energy for each activity and then maintaining a specific level and intensity of exercise (Wang & Wang, 2019).

Conclusion

On the whole, the elderly often participate in physical exercise. More older people exercise for more than 5 years, more than 5 times a week and more than 30 minutes each time. It shows that the elderly have fully realised the importance of exercise. In addition, the main exercise items for the elderly are long walking (walking), aerobics, dance and Qigong. Most of these projects are soothing, slow-paced and very suitable for the physical and age characteristics of the elderly. Some studies regard running (walking), Taijiquan (sword), sports dance, unarmed exercises (aerobics), sports tourism, Qigong massage, door

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(net) ball, swimming and cycling as the exercise items in the exercise prescription of the elderly.

The findings indicate that the psychological advantages of physical exercise for the elderly depend on the amount of exercise performed each week and the time spent exercising. Individuals who exercise more than five times per week and for at least 30 minutes are more mentally healthy. As a result, it is recommended that the elderly exercise more, and the ideal duration of each activity is greater than 30 minutes.

In short, physical exercise improves mood, self-esteem, and interpersonal interactions and eliminates weariness, reduces stress reactions, and reduces or eliminates mental disorders, thereby promoting the elderly's fitness and mental health.

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