

## Research Progress on health risk and exercise intervention of sedentary group

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### Abstract

**Objective:** The health problems caused by insufficient physical activity are widespread worldwide. How to assess the health risks caused by inadequate physical activity or sedentary behavior is the current research focus. This study will use the literature to review the health risk status of sedentary groups and the related effect of exercise intervention to provide more effective exercise intervention strategies and health management modes. The study found that more than 300 minutes of moderate and high-intensity physical exercise per week can effectively reduce the health risks of sedentary groups. At the same time, it proposed that this time should be equally allocated to each day as much as possible. In terms of health management, implementing an active lifestyle is a positive strategy to reduce health risks effectively.

### Keywords

**Metabolic Equivalent; Physical Activity Level; Movement Mode; Exercise Intensity; Health Risk Assessment.**

### 1. Introduction

The widespread prevalence of long-term sedentary behavior around the world, coupled with the severe lack of physical activity, has led to a series of metabolic diseases, such as cardiovascular problems caused by sedentary behavior: hypertension and cardiovascular disease [1]. Sitting for more than 6 hours daily means you are already "slightly sedentary." If sitting for more than 10 hours a day, it is "severely sedentary". JAMA sub-issue: Sedentary 8 hours a day increases the risk of death by 20%! The less money you earn, the higher the risk [2]. This is mainly because sitting for a long time without exercise will lead to poor blood circulation and increase the risk of cardiovascular diseases such as hypertension and coronary heart disease. Similar situations include obesity and metabolic disorders: sitting still for a long time can easily lead to insufficient energy consumption, increased body fat accumulation, and increased risk of metabolic diseases such as obesity and diabetes. Osteoporosis: Long-term sitting affects bone health and may lead to osteoporosis and increase the fracture risk. Muscle and joint problems: prolonged sitting can lead to muscle atrophy and joint stiffness, increasing the risk of musculoskeletal pain and arthritis. Mental health problems: prolonged sitting and lack of exercise may lead to mental health problems such as increased mental stress, depression, anxiety, and depression. This series of issues not only affects the quality of human life but also restricts the life span of human beings and affects the process of healthy and active aging. Therefore, how to scientifically assess the health risks of sedentary groups and implement effective intervention and dynamic tracking evaluation is a critical issue to be solved, which is worth further discussion.

Previous studies have shown that BMI, blood pressure, cholesterol levels, diabetes risk assessment, and smoking status assessment are common health risk assessment indicators,

including family genetic history and past disease history as essential reference materials. The method of using these indicators to assess health risk can be summarized as the following steps: data collection: (1) it is necessary to collect the relevant information of individuals, including sedentary situation, physical activity level, BMI, blood pressure, cholesterol level, blood glucose level, smoking, drinking, living habits, etc. This information can be obtained through a questionnaire survey, physical examination, and laboratory examination. (2) Data processing: process and analyze the collected data to obtain the risk value of each indicator. For example, individuals can be classified as usual, overweight, or obese according to BMI; According to the blood pressure value, we can judge whether there is hypertension; The risk of cardiovascular disease can be assessed according to cholesterol levels; The risk of diabetes can be determined according to the blood glucose level; The risk of related diseases can be assessed according to smoking and drinking. (3) Risk assessment: comprehensively assess each indicator's risk value to obtain the individual's overall health risk. For example, if an individual has risk factors such as high blood pressure, high cholesterol, and smoking, his cardiovascular disease risk is relatively high. (4) Formulate a health improvement plan: according to the comprehensive evaluation results, corresponding health suggestions can be provided for individuals. For example, if an individual is overweight or obese, it is recommended that he lose weight through diet and exercise; If the individual has hypertension, it is recommended that he take measures to reduce blood pressure; If an individual has smoking or drinking problems, it is recommended that they quit smoking or limit drinking. (5) Implementation of health improvement plan: individuals implement corresponding measures to improve their health status according to the health improvement plan they have formulated. (6) Regular review and evaluation: regularly review the health status of individuals, detect the changes of various indicators, and adjust and optimize the health improvement plan to improve the health status of individuals [3, 4]. There are many reports on defining sedentary behavior and physical activity deficiency. Next, we will explore the related concepts and standards.

## 2. How to Define Sedentary Behavior and Physical Activity Level

As for the description of sedentary behavior, the sedentary time per day is used to describe it. For example, the definition of sedentary behavior is that sitting continuously for more than a certain time per day is often used in research. For example, according to the recommendations of the American College of Sports Medicine, sedentary behavior is regarded as sedentary behavior when the average daily sedentary time exceeds 8 hours [5]. Frequent interruption of sedentary: according to the research, frequent interruption of prolonged sedentary can reduce the health risks associated with sedentary. The way to interrupt sedentary can be standing, walking, stretching, etc. [6]. The ratio of sedentary time to active time: researchers also use the percentage of sedentary time to physical activity time to evaluate the degree of sedentary time. When sedentary time is relatively long and physical activity time is less, it is highly correlated with health risks [7].

There are many research studies in the field of evaluating the level of physical activity, among which the international physical activity questionnaire is a commonly used simple scale, which is widely used in the investigation and research in the field of population census. IPAQ questionnaire (International Physical Activity Questionnaire): this questionnaire can be used to assess individuals' physical activity levels, including work, leisure, and transportation. We can understand participants' sedentary time and physical activity level by asking participants about their physical activities in the past seven days [8]. Accelerometer/motion monitor: by wearing an accelerometer or motion monitor, an individual's activity level and sedentary time can be measured quantitatively. These devices can record various physical activities, such as walking, running and standing, and provide detailed data analysis [9]. It also includes a physical

activity log: individuals can use a physical activity log to record their activities, including sedentary time and physical activity duration. Records can consist of sitting/standing time, unplanned walking and other information [10]. The current research idea is clear that scientific exercise intervention is an effective means to reduce health risks.

nts said the teaching experiment could be carried out.

### 3. Research Progress of Exercise Intervention in this field

Research Progress on the impact of exercise intervention on health risk indicators of sedentary groups mainly includes the following aspects: 1. cardiovascular health: regular exercise can improve cardiovascular function and reduce the risk of cardiovascular disease in sedentary groups. Studies have shown that moderate intensity of aerobic exercise significantly reduces hypertension and improves blood lipid levels and cardiovascular metabolism. 2. metabolic health: moderate exercise can improve insulin sensitivity and reduce the risk of obesity and metabolic diseases in sedentary groups. Studies have found that regular exercise intervention can improve glucose metabolism and insulin regulation and reduce the risk of diabetes [11]. 3. bone health: exercise intervention positively impacts the risk of osteoporosis in sedentary groups. Studies have shown that aerobic exercise and strength training can increase bone mineral density and bone strength and reduce fracture risk [12]. 4. mental health: regular exercise positively impacts the mental health of sedentary groups. Studies have found that moderate exercise can relieve anxiety, depression, and mental stress and improve emotional and psychological well-being [13].

Recently, a study published in the British Journal of Sports Medicine showed that compared with 8 hours, people who sit for more than 12 hours a day could largely offset the increased risk of death as long as the time of "moderate and high-intensity exercise" is  $\geq 22$  minutes a day! No matter how long the sedentary time is, as long as you move, it reduces the risk of death. It is the best passive remedy [14]—medium-intensity exercise- medium and high-intensity evaluation method. During moderate-intensity exercise, the heart rate is 100~140 times/minute. You can feel sweating, shortness of breath, and a slight difficulty during activity. For example, brisk walking, jogging, cycling, swimming, yoga, etc. High-intensity exercise. The heart rate of high-intensity training is more than 140 times/minute. At this time, I feel sweaty, my heart beats violently, panting and out of breath. For example, fast running, high-speed cycling, fast high leg raising, deep squat jumping, HIIT (high-intensity interval training), etc. Another study showed that people who sat for more than 12 hours a day had a 38% increase in the risk of death. However, moderate to vigorous exercise could reduce the risk of death caused by passive, and only 10 minutes of exercise per day could reduce the risk of death by 15%. Because these exercises can improve cardiopulmonary function, enhance muscle strength, promote metabolism, and reduce the risk of chronic diseases to protect our health [15].

How long does physical exercise take to offset the harm caused by sedentary? The research published by the Norwegian Academy of Sports Sciences as the first unit in the British Journal of Sports Medicine shows that being sedentary increases the risk of death. Moderate to high-intensity exercise of 30-40 minutes a day can offset the harm caused by 10 hours of sedentary, and any amount of exercise will help to a certain extent [16]. Researchers from Tianjin Medical University found in the Lancet sub-issue "E-clinical medicine" that sedentary sitting for more than 6 hours a day is associated with high risk of 12 diseases, including ischemic heart disease, diabetes, chronic obstructive pulmonary disease, asthma, chronic kidney disease, chronic liver disease, thyroid disease, depression, migraine, gout, rheumatoid arthritis, and diverticulum disease. If the sedentary time of participants is reduced to less than 6 hours per day, about 3.7%-22.1% of chronic diseases will be prevented. If sedentary use the same amount of mild, moderate, and intense physical activity instead, the risk of 4, 6, and 10 common chronic diseases

can be reduced, respectively [17]. Researchers found that higher levels of exercise could reduce the risk of breast cancer by 41%.

In contrast, prolonged sitting increases the risk of triple-negative breast cancer by 104% [18]. Another study published in the British Journal of Sports Medicine showed that improving physical activity and reducing sedentary time can reduce the risk of breast cancer and strengthen the causal analysis for the first time [19]. A study published in the Lancet showed that more excellent physical activity can reduce or even eliminate the increased risk of death due to sedentary. However, it should be noted that when our physical activity level is low, the increase in death risk will be more evident with the rise of sedentary time [20].

#### 4. Conclusions

WHO has issued the "guidelines on physical activity and sedentary behavior", calling on everyone to carry out at least 150 to 300 minutes of moderate to severe aerobic activity every week to reduce the physical harm caused by sedentary inactivity. In daily life, in addition to jogging and brisk walking, working people can also relieve the fatigue caused by sitting for a long time in a day through indoor yoga or swimming. It is still essential to reduce continuous sedentary. From the perspective of the best health, the most healthy mode of daily life and work is: first, reduce continuous sedentary for 1.5 hours; Second, if you can't avoid sitting for a long time, how long can you sit for 1.5 hours and then get up and move around for 5 minutes; Third, whether sedentary or not, at least 150 minutes of moderate-intensity or 75 minutes of high-intensity activities are accumulated weekly. The more exercise, the greater the health benefits. Exercise can partially offset the harm of being sedentary. Therefore, future research will consider using different intensity and intervention cycles to evaluate the intervention effect for more populations.

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