



# The Relationship of Exercise and Nutrition during the Epidemic Period

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## Abstract

As the measures taken regarding the epidemic increased, people started to have a more sedentary lifestyle. In particular, curfews and calls to stay at home have caused an inactive life during the pandemic process. On top of this inactivity, constant eating at home has led to an unhealthy diet. This situation triggers obesity, diabetes and cardiovascular diseases caused by physical inactivity and unhealthy diet. Therefore, it is very important to prepare and implement appropriate physical activity programs. It has been seen once again how important the body's immune system is in this and similar epidemics. The importance of nutrition is undeniable as much as physical activity in increasing body immunity. Macro and micro nutrients taken into the body increase the endurance of the body. Extra attention should be paid to fluid intake during epidemic processes. With this review, which was prepared in line with the existing evidence on the anti-inflammatory and immune system supportive properties of physical activity and nutrition, and studies on the epidemic process, it has been tried to give appropriate recommendations on appropriate and adequate nutrition for those who will just start exercising and who will review their physical activity patterns in epidemic conditions.

**Keywords:** Epidemic; Nutrition; Physical Activity

## Introduction

Epidemics have been a problem for humanity throughout history because they affect not only infected individuals, but the entire society in many ways. As microorganisms, like humans, take advantage of modern transportation facilities, epidemics are much faster and imminent dangers than before. An epidemic is defined as an infectious disease caused by the direct or indirect transmission of a disease-causing infectious agent to a susceptible organism, spreading and causing disease in many living things. The term pandemic (ancient Greek: pan: al + demos: people) is the general name of epidemic diseases that spread and affect a very wide

area such as a continent or even the entire world surface. All infectious diseases that spread in the form of epidemics have a typical course. The spread of the disease by infecting healthy people in a short time, its acute and severe course, the death or complete recovery of the infected people in a short time, the development of long-term or life-long immunity in the survivors of the disease, and the presence of a certain proportion of porters are the typical features of the infectious disease cycle [1].

The cause of the epidemics was mostly the reactions of microorganisms to the great turbulences in nature. Wars, population growth, earthquakes, floods, storms, famine,

climate anomalies, homelessness and environmental pollution can trigger one or two of the epidemics. For example, throughout history, poverty and deaths in Africa have been exacerbated by cholera, Ebola, AIDS and tuberculosis. HIV spreads to the slums of Asia and Hantavirus to the slums of North America. Epidemics have collapsed empires, broken armies, constantly changed our way of life, and still continues to do so. Studying past outbreaks can provide better insight into the present. When we look at the epidemics of our world; Outbreaks of cholera caused hygiene measures to be taken, led to the development of nursing and brought up the use of oral fluid therapy, smallpox epidemics led to the discovery of a vaccine that played a major role in its eradication, and tuberculosis outbreaks led to the development of attenuated live vaccines. Plague led to the development of quarantine measures, syphilis introduced fear to sexual life, paved the way for drug therapy, malaria formed the basis of vector control [2].

#### **In history:**

- MERS (Middle East Respiratory Syndrome)
- EBOLA EPIDEMIC,
- SYPHILIS EPIDEMIC,
- SARS (Severe Acute Respiratory Syndrome) EPIDEMIC
- MALIA OUTLOOKS (mal'aria: bad weather)
- FLU OUTLOOKS
- SPANISH FLU (1918-1920),
- PLACE OUTBREAKS,
- OUTDOORS OF cholera,
- LEPRAS OUTBREAKS,
- TYPHO OUTLOOKS,
- AIDS (Acquired Immune Deficiency Syndrome) Outbreaks,
- TUBERCULOSIS SALFINI,
- TYPHO EPIDEMIC
- Many infectious diseases such as COVID-19 have been seen.

According to the definition of the World Health Organization (WHO) [3], health is considered not only as prevention from diseases, but also as a state of complete physical, mental and social well-being. From the past to the present, new diseases have emerged or disappeared, and the definition of health has become more solid. According to the age we live in, there are social and social well-beings among the substances added to health. With the current pandemic, there are very difficult times in the world, especially in terms of physical and social aspects. There is a relationship between obesity, which is one of the important problems of our age, and insufficient physical activity. Inadequate physical activity and obesity due to unbalanced nutrition, which are the leading causes of death worldwide, have become even more serious risk factors in the last period we live in. During the quarantine period staying at home, it is of great importance to protect our health by staying away from microbes but by doing physical activity and eating a balanced

diet. The purpose of this study is to mention the importance of exercise and the nutritional relationship between them during the epidemic diseases we are in [4].

### **Exercise during the Epidemic Period**

When talking about healthy individuals and quality of life, people who enjoy life, are free from illness, and are active in social life should come to mind [5]. Quality of life maximizes people's functionality, physical and mental well-being, strong family ties, and satisfaction in social relations [6]. Physical activity gives people vitality for a quality life. Sports correct posture and give a good posture [7]. Engaging in sports activities positively affects human life and increases the quality of life [8,9]. While people continue their lives, they become stronger biologically, psychologically and socially by engaging in activities such as sports, health, aesthetics, adventure and entertainment [10]. Along with this process, the habit of doing sports is one of the leading preventive and preventive health recommendations. Physical activity is a set of movements that increase muscle strength and affect people's psychological and physiological resistance [11]. In many epidemics, it has been observed that in addition to the deterioration of the physiological health of the person, his psychological health also deteriorates, the self-confidence of the person decreases, he becomes depressed and develops health anxiety, and he experiences mood disorders.

The main result of the quarantine is the reduction of physical activity levels. Spending a long time at home causes an increase in sedentary behaviors and a decrease in energy expenditure, as well as the formation and/or progression of chronic diseases, and loss of muscle strength and mass. In addition, it creates a loss of immunity and increases the viral potential risk [12].

It has been determined that physical activity increases the concentration of satiety hormones and decreases the concentration of ghrelin, which is one of the hunger hormones. However, it should not be forgotten that the concentration of hunger and satiety hormones is affected depending on the type, duration and severity of exercise.

The protective and therapeutic effects of physical activity against non-communicable diseases such as diabetes and obesity have been proven. In addition, it increases the quality of life and well-being. Physical activity can be carried out in many different ways, such as walking, cycling and active recreation (dance, yoga). However, most of these activities are prohibited by governments in order to prevent the spread of Covid-19, which causes insufficient physical activity.

Strength, balance, control exercises or combinations that can be safely applied at home are very beneficial for health.

Examples of home exercises are walking, carrying and/or moving things, climbing stairs, doing push-ups and sit-ups. In addition, yoga exercises that require very little space and equipment are among the suggestions. It has opened many exercise videos to protect physical and mental health in mobile technologies. It is also recommended for sports done in isolation (such as badminton) in the garden by taking special precautions (maintaining the distance, using a mask) [12].

Various suggestions are made in order to increase the effectiveness of the exercises and to ensure their continuity. The following items can be given as examples of these suggestions.

- Physical activity should be supported by a healthy and balanced diet.
- Fluid intake should be increased before, during and after exercise.
- It is necessary not to start exercise while in extreme hunger or satiety.
- Meals containing simple carbohydrates and high fat should not be consumed before exercise.
- You should not stay in a sitting position for more than half an hour while performing any activity.
- An activity that you enjoy doing and that is suitable for your lifestyle should be preferred.
- Instead of feeling guilty when the exercise is not done, ways to ensure the continuity of the exercise should be sought.

### Positive Effect of Pilates on Spanish Flu

Joseph Pilates, the inventor of Pilates, began to be interested in human anatomy from his childhood; She is heavily involved in gymnastics thanks to her father, who is also a gymnast. For the first time, the differences created by the exercise system he started to develop were noticed in Camp Lancaster, where he stayed with other German prisoners during World War I. The German captives, whom he subjected to this new exercise system he was working on, survived the 1918 Spanish flu epidemic, in which many people lost their lives. Recognized by this preventive technique, Pilates enables people who are victims of war to be rehabilitated from where they sleep. As can be seen from this example, regular exercise has many effects on the human body. Based on all this information, the changing living conditions during the new type of coronavirus (Covid 19) pandemic, the fact that individuals are isolated in closed areas, the increase in the time spent inactively affected their quality of life. Exercising has had positive effects on the mental and physical quality of life of individuals during the pandemic process.

### Covid-19 Pandemic

COVID-19, which emerged in December 2019 in the city of Wuhan, China, is a disease that is transmitted from person to person by droplet infection, spreads rapidly, and is therefore defined as a pandemic by the World Health Organization. Currently, there is no vaccine, drug, food or nutritional supplement to stop the disease. During the pandemic, social isolation, complying with the rules of hygiene, and adequate and balanced nutrition are of great importance. The need for energy, protein and micronutrients increases due to high fever or respiratory distress in people diagnosed with the disease and hospitalized. Evaluation of the nutritional status of the patients along with hospitalization and feeding them in line with their needs positively affect the course of the disease. In this process, health professionals need to carry out individual treatment according to the patient. The transmission of the disease with breastfeeding has not been reported, and it is recommended that all infants continue to receive breast milk during this period. Although contamination from food is not reported, general hygiene rules must be followed during the preparation and storage of food [12].

### The Importance of Protection and Nutrition in the Covid-19 Pandemic

Adequate and balanced nutrition is important in order to be healthy in the presence of infectious diseases or before. Infections, especially when accompanied by high fever, increase the body's need for energy and nutrients. Therefore, a healthy diet should not be maintained during the COVID-19 pandemic. No diet or nutritional supplement can prevent COVID-19 infection. Maintaining a healthy diet is important to support a strong immune system [13,14]. The energy and nutrients obtained through adequate and balanced nutrition support the immune system. Nutrition Guidelines for Turkey include nutritional and nutritional requirements for adequate and balanced nutrition. Daily meat, milk, cereal, Vegetable and fruit groups should be consumed in recommended amounts according to age and gender [15] at the same time, it is recommended not to smoke, to do regular physical activity, to provide an adequate sleep pattern and to reduce the stress level to support a healthy life in this period [14].

WHO's dietary recommendations for adults during the covid-19 pandemic are listed below:

1. Consume fresh and unprocessed foods every day. (fruits, vegetables, legumes, whole grain products, oilseeds and foods of animal origin)
2. Choose raw vegetables and fresh fruit for snacks rather than foods high in sugar, fat or salt.
3. Do not cook vegetables and fruits for a long time, as this can cause significant losses in vitamin levels.

4. When using canned or dried vegetables and fruits, choose varieties without added salt or sugar.
5. Drink 8-10 glasses of water every day.
6. Choose healthy fats.  
(Oils containing unsaturated fatty acids instead of saturated fatty acids, white meat instead of red, low-fat dairy products)
7. Consume less salt and sugar. (less than 5 g of iodized salt per day)
8. Avoid foods containing trans fatty acids, sugary drinks, caffeinated beverages, and ready-made foods that contain high salt and sugar.
9. Avoid eating outside the home.

### Nutrition in the COVID-19 Pandemic

It is recommended to evaluate the nutritional status of all patients infected with COVID-19 at the time of admission to the hospital, and to receive nutritional support with oral nutritional supplements as early as possible for patients at nutritional risk [16]. Ensuring adequate daily protein (1.5 g/kg/day) and energy (25-30 kcal/kg/day) intake for the patient even if malnutrition is not observed [17]. High energy digestible foods and snacks for all hospitalized patients (yogurt, pudding, fruit puree, sliced fruit, soft cheese, etc.), protein and energy intake should be supported, micronutrient requirements should be met [18]. In clinics where indirect calorimetric is not available, it is recommended to calculate the total energy and protein requirement with the formula 1.5 g/kg/day by multiplying the basal metabolic rate calculated by the Harris-Benedict equation with a correction factor of 1.5.

It has been reported that calculations should be made over ideal weight in obese individuals (body mass index [BMI] >30 kg/m<sup>2</sup>) (TUBER, 2017). It is emphasized that in addition to age, smoking status, high body temperature, respiratory failure, C-reactive protein and serum albumin levels are independent prognostic markers [19]. It has been suggested that low prealbumin levels, another marker of malnutrition, predict progression to respiratory failure and mechanical ventilation [20]. An important issue to be considered in the treatment of COVID-19 is dehydration. Dehydration is under-recognized and poorly managed in hospital and community-based care. Therefore, dehydration should not be overlooked during the evaluation of the patient's nutritional status and the diagnosis should be made in the presence of dehydration [21]. Because providing hydration is the most important component of all treatment methods. Inadequate hydration, especially in elderly individuals, causes progression of diseases or important health problems. Dehydration increases the risk of mortality in acutely ill patients. Therefore, the daily fluid requirement of patients should be met in order to prevent dehydration [22].

There are no studies of high scientific quality on specific nutritional supplements for COVID-19. In some studies, it has been reported that high doses of some vitamins such as vitamin D, vitamin C and vitamin B12 may help reduce inflammation caused by the disease and regress the problem of shortness of breath or may affect the inhibition of the virus [23]. Although the positive effects of prebiotics and probiotics, herbal products and various nutritional supplements are mentioned, there is no effective food, product or supplement for the prevention of disease or disease for COVID-19 [12]. For these reasons, it is recommended to eliminate the micronutrient deficiencies of the patients, if any, and to meet their daily needs. There is not enough scientific evidence regarding the routine use of any micronutrient in excess of the daily requirement during the treatment of the disease [14,18]. In patients quarantined due to COVID-19, the level of physical activity may decrease. For this reason, it is recommended to increase physical activity with exercises that can be applied at home and in hospitals. In order to maintain mental health, muscle mass and thus body composition, exercise for >30 minutes every day or >1 hour every other day should be encouraged.

All patients should be checked for food consumption from the moment they are admitted to the hospital. If the daily energy and nutrient requirements cannot be met with the meals given for various reasons, OBT should be started within 24-48 hours and evaluated regularly. EN should be administered if there is no oral intake for more than three days or if less than half of the energy requirement is met by oral intake for more than one week. In non-intubated intensive care patients, oral intake should be tried first, and EN via nasogastric tube should be started within 48 hours if it is not sufficient. Hypocaloric feeding for the first 48 hours (<70% of the patient's daily energy requirement) should be applied, then the energy should be increased to meet the entire requirement. If enteral nutrition is not sufficient to meet the daily energy requirement, 3-7 days after admission to the intensive care unit. It is reported that PN should be started on the next day [24,25]. Feeding of patients intubated in the intensive care unit should be initiated with a nasogastric tube. Post pyloric nutrition should be performed in patients who develop gastric intolerance or who are at high risk of aspiration. It is recommended to use an indirect calorimeter to determine the energy requirement.

If a calorimeter is not available, formulas that include oxygen consumption from the pulmonary arterial catheter or production of ventilator-derived carbon dioxide should be used to calculate the energy requirement. Feeding should be started with 30% of the calculated energy requirement and should be increased gradually. The daily protein requirement should be given as 1.3 g/kg. Adjusted weight for obese patients; It should be calculated with the formula [ideal body



weight + (actual body weight - ideal body weight) x 0.33]. If enteral nutrition cannot be achieved, PN should be initiated. Blood glucose should be maintained at target levels of 6-8 mmol/L and blood triglycerides, phosphate, potassium and magnesium levels should be monitored [12]. In patients who have been intubated for a long time, dysphagia may last up to 3 weeks after intubation. The presence of dysphagia is associated with serious outcomes, including pneumonia, intubation, and hospital mortality. This situation increases the risk of complications for COVID-19 patients and negatively affects the disease process. Therefore, patients should also be evaluated for dysphagia [26]. In intensive care patients with swallowing difficulties, soft foods should be considered after intubation. If swallowing is proven to be unreliable, EN should be administered. In cases with a very high risk of aspiration, post pyloric EN application or if this application is not possible, temporary PN can be performed together with swallowing training [12]. Supporting the immune system especially in healthy individuals during the disease process Adequate and balanced nutrition should be provided for children and babies should continue to receive breast milk. In order not to worsen the condition of the cases diagnosed with the disease, the nutritional status should be followed up and evaluated closely together with the hospitalization. Nutritional treatments should be applied under the control of dietitians in line with the needs of the patients. Although there is no definite information about nutritional supplements, special nutritional supplements can be given with the decision of the physician, if deemed necessary according to the patient's condition. There is currently no standard nutritional treatment or recommendation for routine nutritional support.

## Discussion

Due to the Covid 19 virus in the world and in Turkey, many people lose their lives or get infected and are treated in hospitals. What is thought-provoking in such an environment is that although some people are infected with the virus, they pass without feeling the disease, and some people are faced with situations that can lead to death. Scientists explain the reason for this situation mostly with whether the immune system is strong or not. On the other hand, the prominent thoughts in increasing the quality of life and strengthening immunity are exercise and nutrition habits. Exercise strengthens the musculoskeletal system and human psychology and positively affects the immune system. Individuals who remain inactive in closed environments during the pandemic period need to exercise and benefit from the physiological and psychological benefits of exercise.

According to the studies carried out; A statistically significant difference was found in the general health environment sub-dimension of those who exercise regularly

during Covid 19. There is a significant difference in the physical health sub-dimension in individuals who do not exercise regularly ( $p < 0.05$ ). Considering the averages, male participants' scores were higher than females. In a study of 700 people in the literature, different results were obtained between the sexes in the relationship between exercise and quality of life in male and female adults. The quality of life of the men who exercise was higher than the women who exercised. Salici (2010) reported in his study that exercise did not make a statistically significant difference according to the gender variable. Kangal (2009) found a significant difference in favor of women in terms of gender in his study investigating the quality of life among university students. Although there are many studies in the literature that are parallel to these studies, there are different studies.

## Conclusion

Nutrition is one of the key parts of health. Nutritional therapy is recommended in many diseases, including acute, chronic and infectious diseases. It has been observed that supportive nutrition therapy reduces the case fatality rate in the Ebola virus epidemic. The same situation is thought to be valid for SARS-CoV-2. For this reason, it is very important to comply with the principles of healthy eating during quarantine and normal times. Likewise, he states that increasing physical activity during quarantine periods and normal times is very important for staying healthy and increasing body immunity. Strength, balance, control exercises or combinations that can be safely applied at home are very beneficial for health.

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