

Editorial

COVID-19, cancer-related immunity, and nursing care



The coronavirus disease 2019 (COVID-19) pandemic has been threatening lives worldwide since 2019. Although no end is in sight for this pandemic, preventive vaccines and therapeutic medicines related to the immune system have been developing rapidly. In this situation, patients such as those with cancer face a number of different problems, including a lack of adequate treatments and early detection due to a shortage of hospital beds and healthcare staff, restrictions on hospital visits, and changes in appointments. Meanwhile, cancer is known to be related to the immune system, so immunotherapy continues to be an effective therapeutic approach for a variety of cancers.

This present situation might be a good opportunity for nurses to review the fundamental nursing care described by Florence Nightingale (1820–1910). She described fundamental nursing care in relation to hygiene management, such as fresh air, cleanliness, physical space, sunlight, and a balanced diet, to prevent infectious diseases based on mortality rates among infected and wounded soldiers who had fought in the Crimean War, during which, she worked at a hospital in Istanbul, Turkey from 1854 to 1856. This is what Nightingale called “natural healing power.” Even after nearly 200 years, such infection control measures can be applied as nursing care for the prevention and treatment of COVID-19 and cancer. It is important for cancer nurses to reconsider the need for such fundamental nursing care in relation to infection control from both acute and critical care to the end of life.

On the other hand, numerous social and psychological issues, such as stress and health problems, have become clear during the pandemic. Therefore, from the perspectives of health promotion and disease prevention, fundamental nursing care needs to be maintained up to the end of the pandemic and beyond.

Immune system in relation to infection^{1,2}

The immune system is a biological defense system that protects the body against pathogens such as bacteria and viruses. Immunity consists of both innate and adaptive immunity, and involves three barriers. The first barrier is the extracorporeal contact area of the skin and mucous membranes, where hand-washing, gargling, and mask-wearing are important strategies to protect against pathogens. If pathogens are not killed at the first barrier, they reach the second barrier, which involves types of white blood cells such as macrophages that consume pathogens. These two barriers are referred to as innate immunity, which is a relatively well-understood defense mechanism. If the innate immune system cannot protect against pathogens, they are destroyed by the third barrier, the adaptive immune system, which involves lymphocytes, T cells, and B cells. [Figure 1](#) shows a flowchart of this biological defense system.

To avoid infection by pathogens, it is important to strengthen individual innate and adaptive immunity on a daily basis. Accordingly, regular life rhythms, such as eating/excreting, sleeping, exercising, and cleansing, which are the basic needs of humans, need to be maintained. Furthermore, coping with stress to maintain good mental health is also necessary because continuous stress is known to weaken the immune system, making a person more likely to catch COVID-19 or develop cancer. Therefore, individual self-management for maintaining the rhythm of daily life is needed to enhance immune function ([Figure 1](#)).

Eating/excreting³

Immunity depends on the condition of the intestines because they contain about 70% of the body's immune cells. Therefore, improving the function of the intestines and the intestinal environment strengthens immune function. Eating a nutritionally balanced diet enables regular and active intestinal movement, or peristalsis. Regarding the diet, fermented foods such as yogurt and cheese, and nutrients such as dietary fiber and oligosaccharides, improve the intestinal flora and enhance immunity. Vegetables are also rich in vitamins that enhance immunity, and vitamins A (β -carotene), C, and E have antioxidant effects and reduce the active oxygen that oxidizes cells. Ensuring proper movement of the intestines and maintaining a healthy intestinal environment helps to relieve constipation and promote relief. Since immune cells and antibodies are made of protein, it is necessary to consume high-quality protein (e.g., fish, meat, and soybeans). Furthermore, vitamin D has immunomodulatory effects and can reduce the risk of infection because cytokines, which are proteins emitted from cells, play an important role in the activation and functional suppression of immune cells, and vitamin D decreases the inflammatory cytokine concentration and increases the anti-inflammatory cytokine concentration. Therefore, vitamin D enhances the ability of an individual's innate immunity to resist new pathogens.

To improve immune function, exposure to sunlight (ultraviolet B) for 15–20 min daily is recommended, in addition to consuming foods such as fish, eggs, butter, mushrooms, as well as vitamin D supplements to maintain optimal blood levels.

Sleep

Growth hormone that is closely related to immune system function and involved in cell repair, is secreted a few hours after falling asleep. Immune cells responsible for immune function are involved in a system

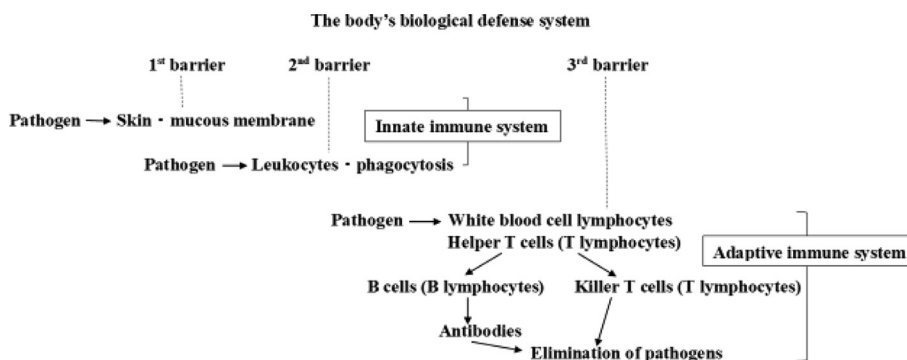


Figure 1. The three barriers of the immune system.

called immunological memory, which makes the pathogen less likely to take hold in the case of reinfection, or helps the immune cells attack the pathogen faster than during the first infection, because the cells store information on pathogens such as viruses and bacteria. Immune cells, mainly T cells, play an active role in immunological memory and prevent reinvasion by recognizing and eliminating pathogens that have already invaded. Sufficient sleep increases the duration of T cell memory, which is important for health.

Exercise⁴

Immune modulators are produced by muscles and bones. Moderate exercise is effective for the activation of natural killer cells, the proliferation of lymphocytes, and the improvement of macrophages, which enhances immune function. However, excessive exercise reduces immune function. Athletes who overtrain have been reported to be three times more likely to catch a cold than nonathletes because the hormones and anti-inflammatory substances secreted during exercise suppress the function of immune cells and reduce glutamine, an amino acid that acts as an energy source for immune cells. Therefore, exercise causes changes in antibodies and white blood cells. As these antibodies or white blood cells circulate rapidly in the body, they can detect infection-causing cells earlier than they might have during periods of inactivity.

Coping with stress⁵

Stress is a response of biological functions to stimuli (stressors) that is commonly seen in states such as nervousness, labor, pain, cold, and infection. Continuous stress causes mental and physical illnesses. The central nervous and endocrine systems are associated with immune function and they interact with each other via a feedback circuit. The hypothalamus plays an important role in the response to stress by integrating both psychological (mind) and physiological aspects (body). Therefore, reducing stress through effective coping mechanisms enhances the natural healing power of humans in an integrated manner and helps prevent health disorders. Furthermore, stress reduction is considered not only to help prevent COVID-19 infection, but also to protect against cancer development and recurrence.

In the context of nursing skills, pleasant stimuli, such as those derived from massage therapy, aromatherapy, music therapy, and psychotherapy

(e.g., meditation, yoga, laughter, deep breathing, listening carefully), can reduce stress by blocking the stress mechanism, thereby aiding nursing care to maintain immune function.

Fundamental nursing care

Based on the above descriptions, fundamental nursing care is important for nurses in supporting healthy lifestyles to help prevent the development of health disorders. This includes strategies such as maintaining a healthy diet, regular excretion, exercise, sufficient sleep, and proper mental health. Such nursing care helps strengthen the immune system, and high immune function might prevent the development or lead to less severe cases of COVID-19 and prevent the development of cancer. In addition to working with advanced medicine and medical technologies, I think it is time to reconsider fundamental nursing care to help improve natural healing power.

Declaration of competing interest

None declared.

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