THE EFFECT OF VARIOUS SUN TIME UNDER EXPOSURE TO ULTRAVIOLET LIGHT OF THE SUN ON INTERLEUKIN 10 CYTOKINE

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Abstrak
Aktivitas berjemur di bawah sinar matahari sering ditemukan terjadi pada saat wabah pandemi virus severe acute respiratory syndrome coronavirus 2 (SARS CoV2) yang menyebabkan penyakit Corona Virus Disease 2019 (COVID 19). IL-10 merupakan sitokin inhibitor untuk makrofag dan sel dendritik yang berperan dalam mengontrol reaksi imun non spesifik dan seluler. Tujuan penelitian ini yaitu untuk menjelaskan imunosupresi oleh sitokin interleukin 10 yang sering ditemukan terjadi akibat paparan sinar ultra violet matahari (sun exsposure). Metode penelitia ini merupakan penelitian eksperimental dengan rancangan penelitian Rangcangan Acak Lengkap (RAL). Desain penelitian digunakan adalah randomized post test only control group design. Data dianalisis dengan menggunakan uji kruskal wallis dengan hasil uji statistik diperoleh nilai p 0,550 (> 0.05) berarti tidak ada perbedaan kadar sitokin interleukin 10 pada setiap kelompok perlakuan.

Kata Kunci: Berjemur, Sinar Ultraviolet, Interleukin 10

Abstract
Sunbathing activities are often found to occur during the severe acute respiratory syndrome coronavirus 2 (SARS CoV2) pandemic that causes Corona Virus Disease 2019 (COVID 19). IL-10 is an inhibitory cytokine for macrophages and dendritic cells that play a role in controlling non-specific and cellular immune reactions. The purpose of this study was to explain the immunosuppression by the cytokine interleukin 10 which is often found to occur due to sun exposure. This research method is an experimental study with a completely randomized design (CRD). The research design used was a randomized post test only control group design. Data were analyzed using the Kruskal Wallis test with statistical test results obtained p value 0.550 (> 0.05) meaning there was no difference in the levels of cytokine interleukin 10 in each treatment group.

Keywords: Sunbathing, Ultraviolet Rays, Interleukin 10

1. INTRODUCTION

COVID-19 was first discovered in Wuhan, China in late 2019, has spread rapidly around the world, infecting tens of millions of people (Kotlar et al., 2021). The impact of the Covid-19 pandemic is that awareness of the importance of maintaining immunity is one of the main components that is important and must be considered for everyone because increasing immunity can make a person able to avoid exposure to the virus. Immunity or immunity is the body's ability to fight various pathogenic microbes, such as viruses such as COVID-19 (Maulana et al., 2021).

Sunlight boosts the immune system, which slows down the development of influenza and SARS agents in the human body. In this case, Covid-19 patients who experience sun exposure while undergoing treatment both at the hospital and at home are more likely to recover from the disease. Sunlight triggers the production of vitamin D which functions to boost the immune system (Asyary & Veruswati, 2020).

Vitamin D is very beneficial for the health of the body, exposure to sunlight in sufficient time the body will get adequate vitamin D. Adequate levels of vitamin D in the body also play a role in the prevention of various diseases, ranging from degenerative

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diseases to malignancies. Vitamin D, which was previously known to play a role in improving bone health and calcium homeostasis, turns out to have potential as an immunomodulator for therapy in cases of infection (Fiannisa, 2019).

In addition to causing changes in immune cells, absorption of UV radiation produces molecular changes, many of which have been widely reported. UV radiation is known to be absorbed directly by DNA (particularly by adjacent pyrimidine bases) and by cis-urocanic acid in exposed cells and to increase the production of reactive oxygen species (ROS), which can cause DNA damage. These changes lead to changes in the production of different molecules associated with the immune system, including interleukin-10 (IL-10), IL-4, and prostaglandin E 2 (PGE 2). These molecules, in turn, modulate the systemic immune response, promoting defects in cellular immunity (González Maglio et al., 2016). IL10 is a potent anti-inflammatory molecule produced by both innate and adaptive immune cells, including T cells, natural killer cells, antigen-presenting cells (APCs) as well as tumor cells, including melanoma (Sun et al., 2015).

The time and duration of sunbathing that is good for health is still much debated in Indonesia. Someone if you want to get the benefits of sunbathing must pay attention to the time and duration of doing these activities (Judistiani et al., 2019).

Based on this description, the researcher is interested in conducting research on the Effect of Various Sunbathing Time Under Exposure to Ultraviolet Rays of the Sun on Interleukin 10 Cytokine Levels.

2. RESEARCH METHOD

This research is an experimental study with a completely randomized design (CRD). The research design used was a randomized post test only control group design. This study consisted of a control group that was not given any treatment, treatment group 1 was exposed to ultraviolet light from the sun between 09:00 WIB and 10:00 WIB for 20 minutes. Treatment group 2 was exposed to ultraviolet light from the sun between 10:00 am and 11:00 am for 20 minutes. This need is done every 2 days for 6 weeks. The number of samples in this study was 13 for each group.

3. RESULT

The data analysis test used to determine the effect of various times of sunbathing under the sun's ultraviolet rays on the levels of the cytokine Interleukin 10 was Kruskal Wallis. The selection of nonparametric test is because the normality test is not normally distributed.

Table 1. Mean and standard deviation (SD) of cytokine Interleukin 10 . levels

Group	Mean±SD
Group 1	196,49±51,42
Group 2	244,27±143,55
Group 3	243,90±83,35

Based on table 1, it was shown that the mean in group 1 was 196.49 pg/mL, the mean the average in group 2 was 244.27 pg/mL. the mean in group 3 was 243.90 pg/mL. These differences can be observed in the graph below :
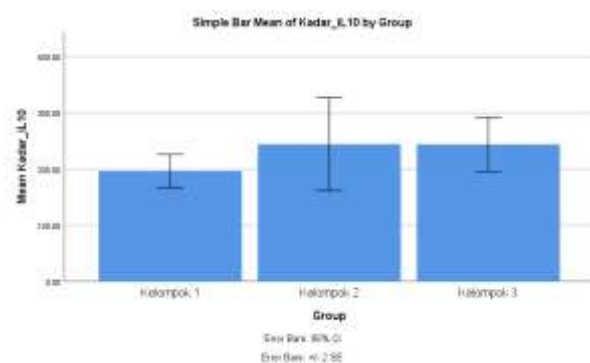

Table 2. Analysis of different test mean levels of cytokines Interleukin 10

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Variabels	Group	P Value
Interleukin 10 Cytokine levels	Group 1 Group 2 Group 3	0,550

4. DISCUSSION

Based on the results of statistical tests, the p value of 0.550 (> 0.05) means that there is no difference in each treatment group. A similar study was also conducted by Omer et al., 2019 which stated that there was no difference in IL-10 levels in exposure to ultraviolet sunlight from 11 to 12 noon with a duration of 30 minutes for 14 days in experimental animals. A similar study was also conducted by Narbutt et al., 2005 no significant changes in IL-10 were found and its cytokine level was detected before irradiation in single subjects only. After UVB or SSR irradiation, an increase in such cases was observed, but none over the normal range.

In this study, levels of IL-10 in group 2 and group 3 there was an increase in IL-10 . levels compared with group 1. The increase was due to immune activation and inflammation in COVID-19 patients, which supports the hypothesis that IL-10 plays a proinflammatory and immune-activating role in the pathogenesis of COVID-19 (Lu et al, 2021).

IL-10 is a pleiotropic cytokine known for its potent anti-inflammatory and immunosuppressive effects. Originally identified as a product of T helper 2 cells, IL-10 is now known to be produced by various myeloid and lymphoid-derived immune cells that participate in innate and adaptive immunity. The main function of IL-10 during infection is to inhibit the host immune response to pathogens and microbiota, thereby reducing tissue damage and immunopathology. To achieve this, IL-10 inhibits pro-inflammatory cytokine synthesis and antigen presentation in activated monocytes/macrophages and dendritic cells, while also limiting excessive T cell activation and proliferation (Islam et al., 2021).

IL-10 is largely considered a negative regulator of the initiation of adaptive T cell responses. This activity counteracts hyperinflammation but also inhibits antiviral defenses in COVID-19. In addition to acting on antigen-presenting cells and T cells, IL-10 has also been shown to stimulate the expansion and production of cytokines in murine mast cells. Mast cell activation contributes to hyperinflammation in severe COVID-19 and may also be a target for therapeutic inhibition. The anti-inflammatory effect of IL-10 has a role in lung protection and interference with viral clearance (Lindner et al., 2021).

Elevated levels of IL-10 can inhibit the host response to microbial pathogenesis and prevent resolution of associated tissue damage and hemodynamic disturbances (Iyer & Cheng, 2012). Vitamin D also suppresses the pro-inflammatory cytokines IL-17 and interferon gamma and increases the production of the anti-inflammatory cytokine IL-10 by CD4+ (Griffin et al., 2020).

Vitamin D is a fat-soluble steroid hormone precursor that arises from exposure to ultraviolet B (UVB) 7-dehydrocholesterol (7-DHC) radiation in the skin epidermis, where it is converted to circulating cholecalciferol precursors. In the liver, cholecalciferol is hydroxylated to form 25-hydroxyvitamin D, which is converted to the active hormone 1,25-hydroxyvitamin D (1,25(OH) 2D) in the kidney. Vitamin D has roles in various body systems, including in innate and adaptive immune responses (Shakoor et al., 2021).

Fat-soluble vitamin D is essential for maintaining healthy, growing, and strong bones. It can be produced in the skin with the help of sun exposure. Vitamin D has been recognized as important for the skeletal system and plays a major role in monitoring

the immune system, including immune reactions to viral infections (Yisak et al., 2021).

5. CONCLUSIONS AND SUGGESTIONS

There was no effect of interleukin 10 cytokine levels on sunbathing activities between 09.00 WIB - 11.00 WIB with a duration of 20 minutes for 6 weeks.

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