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Sunbathing as Caring for Covid-19 Patients: A Literature Review

Priscilia Merilyn Saluy[1], Nova Lina Langingi[2], Grace Fresania Kaparang[3]
Fakultas Keperawatan, Universitas Klabat
E-mail: nova_langingi@unklab.ac.id

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ABSTRACT
COVID-19 is a newly critical emerging disease as it is termed as novel coronavirus disease and adding burden of disease globally. The study aimed to investigate the literature regarding the effectiveness of sunbathing in patients of COVID-19. The analysis of research articles, nursing theories and bible reading were performed to synthesize the concepts. The finding revealed that although the role of sunshine as protective factor for COVID-19 is still contradictive, however, extent literature from nursing theories and numerous recent studies both literature reviews and other method of researches have proven to be positively affecting the recovery by manipulating the virus itself and/or by promoting the immune system or other body healing mechanism. Thus, it is recommended for nurse practitioners, especially in clinical setting may include the sunbathing in caring for COVID-19 patients. This procedure, however, need a support policy from the related health institution, and thus, the recommendation is extended to the hospital administrator, especially for nursing and medical director to incorporate this sunbathing procedure into the Standard Operating Procedure in caring for COVID-19 patients accordingly. For future research, experimental approaches or qualitative study to further investigate the lived experience of patients cared by incorporating the sunbathing procedure can be taken.
Keywords
caring, COVID-19, nursing, sunbathing

ABSTRAK
COVID-19 adalah penyakit baru yang muncul kritis karena disebut sebagai penyakit coronavirus baru dan menambah beban penyakit secara global. Penelitian ini bertujuan untuk mengetahui literatur mengenai efektivitas berjemur pada pasien COVID-19. Analisis artikel penelitian dan teori keperawatan dilakukan untuk mensintesis konsep. Temuan tersebut mengungkapkan bahwa meskipun peran sinar matahari sebagai faktor pelindung untuk COVID-19 masih kontradiktif, namun, teori keperawatan dan berbagai penelitian terbaru baik tinjauan literatur maupun metode penelitian lainnya telah terbukti bahwa terpapar sinar matahari secara positif mempengaruhi pemulihan. dengan memanipulasi virus itu sendiri dan/atau dengan meningkatkan sistem kekebalan atau mekanisme penyembuhan tubuh lainnya. Oleh karena itu, disarankan bagi para praktisi perawat khususnya dalam setting klinis dapat mengikutsertakan berjemur dalam merawat pasien COVID-19. Namun, prosedur ini memerlukan dukungan kebijakan dari instansi kesehatan terkait, sehingga rekomendasi diberikan kepada pengelola rumah sakit, terutama bagi direktur keperawatan dan medis untuk memasukkan prosedur berjemur ini ke dalam Standar Operasional Prosedur dalam merawat pasien COVID-19. demikian. Untuk penelitian masa depan, pendekatan eksperimental atau studi kualitatif untuk menyelidiki lebih lanjut pengalaman hidup pasien yang dirawat dengan memasukkan prosedur berjemur dapat diambil.
Kata kunci
berjemur, *caring*, COVID-19, keperawatan

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INTRODUCTION

COVID-19 is a newly critical emerging disease as it is termed as novel coronavirus disease. Subsequently, due to its novelty, limited data and information on how to manage this disease especially for those who are having comorbid situation was found to be an urgency for researchers around the world to dig below the surfaces of the identified information.

As per February 2020, COVID-19 has been declared to be a public health emergency by WHO. 222 countries are affected with 79,673,754 confirmed cases and 1,761,381 deaths globally recorded for COVID-19 only as per December 29, 2020, 4.56 pm CET (World Health Organization (WHO) Coronavirus Disease (COVID-19) Dashboard, 2020). Locally, in Indonesia, 727,122 confirmed cases, 596,783 recovered and 21,703 died is reported (Satgas COVID-19, 2020).

For adults only, Center for Disease Control and Prevention (CDC) (2020) listed several conditions that put the sufferer to be prone in acquiring severe form of COVID-19 such as cancer, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), heart conditions (heart failure, coronary artery disease, or cardiomyopathies), immunocompromised state (from solid organ transplant, immune deficiencies, HIV, use of corticosteroids, or use of other immune weakening medicines), obesity, pregnancy, sickle cell disease, smoking, type 1 and 2 diabetes mellitus, asthma, cerebrovascular disease (CVD), cystic fibrosis, hypertension, neurologic conditions such as dementia, liver disease, pulmonary fibrosis (having damaged or scarred lung tissues), and Thalassemia. Despite of this long list of disease, some conditions may be unknown since the knowledge for COVID-19 itself is still in its infancy as it is only known for one year.

Public emergency trigerred the researchers around the world to find preventive and curative measures for COVID-19, and one of the subject under investigation is sunshine. In the article of "COVID-19 Mythbusters" (WHO, 2020), it was stated that "Exposing yourself to the sun or temperatures higher than 25°C DOES NOT protect you from COVID-19" (see figure 1), indicating that it was a myth to consider that sunshine may prevent or even cure COVID-19. Similarly, American Academy of Dermatology Association (2020) denied that sunlight can eradicate the coronavirus since no compelling evidence showing the fact.

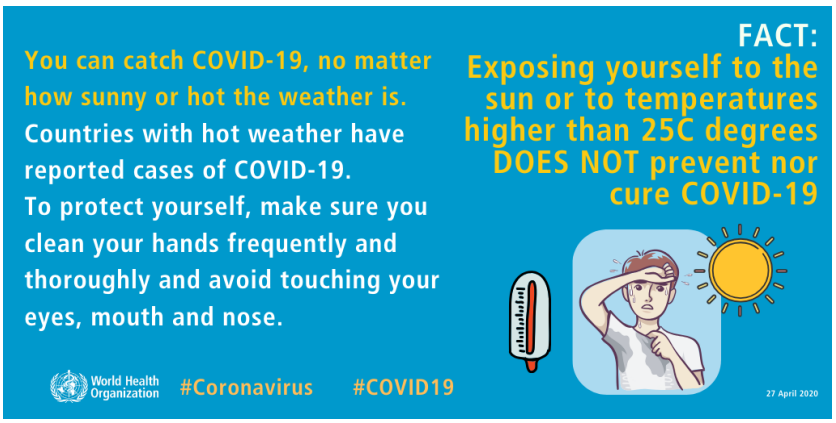

Figure 1. WHO's COVID-19 myth-buster on sunshine

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Contrary to that, several studies, probably in response to this public emergency, conducted in various perspectives and designs, covering large populations have shown the effectiveness of sunshine, especially the ultraviolet rays to inactivate the coronavirus (Azuma et al., 2020; Isaia et al., 2020; Heilingloh et al., 2020; Lytle & Sagripanti, 2005; Ratnesar-Shumate et al, 2020; Sagripanti & Lytle, 2020) and stimulating Vitamin D production in the body in the attempt of combating the virus and decreasing the risks of contracting COVID-19 (Asyary & Veruswati, 2020; Isaia et al., 2020; Li et al., 2020; Moozhipurath, Kraft, & Skiera, 2020; Thangriyal et al., 2020; Schwarcs, 2020). Several studies recommended further clinical trial or experimental studies to prove its effectiveness (Isaia et al., 2020; Li et al., 2020; Moozhipurath, Kraft, & Skiera, 2020).

This pro-contra of statements and research shreds of evidence regarding sunshine exposure makes it a demand for further investigation to prove the effectiveness to promote COVID-19 recovery or as one of the protective factors against it in works of literature.

METHOD

The study is a literature review of recent studies (from 2010 to 2020) with the keywords of coronavirus, sunbathing, and nursing theories related to sunshine. The concepts have then synthesized the role of sunshine in sunbathing procedure and its effect on COVID-19 disease and this novel coronavirus.

RESULT AND DISCUSSION

Search results incorporated 45 articles fitting the relevance of the study. 22 articles explained the coronavirus, while 15 articles elaborated the sunshine and COVID-19, and 8 nursing theories mentioned the sunshine.

COVID-19

A virus is a Latin word that means “toxin or poison”, and it “is a small infectious agent that can only replicate inside the cells of another organism” (Kaminskyy & Zhivotovsky, 2010). In other words, it cannot live by itself, demanding a “host” to metabolize and replicate.

WHO (2020) explains COVID-19 as "the illness brought on by a brand-new coronavirus known as SARS-CoV-2. In response to a report of a cluster of cases of "viral pneumonia" in Wuhan, People's Republic of China, on December 31, 2019, WHO first became aware of this new virus. In this late December 2019, there was an outbreak of viral pneumonia reported in Wuhan, China, and a type of unidentified coronavirus was exhibited (Lu et al., 2020). Moreover, a recent situation recorded by WHO (2020) revealed that globally, 79,673,754 confirmed cases and 1,761,381 deaths in total and specifically break down into WHO regions in table 1. While locally, in Indonesia, 727,122 confirmed cases, 596,783 recovered and 21,703 died are reported (Satgas COVID-19, 2020).

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Table 1. *COVID-19 situation by WHO Region*

WHO Region	Confirmed Cases
Americas	34,630,861
Europe	25,417,329
South-East Asia	11,871,954
Eastern Mediterranean	4,843,141
Africa	1,844,009
Western Pacific	1,065,715

Source: WHO Dashboard (2020)

Named as 2019 novel coronavirus (2019-nCoV) after the genomic characteristics was identified (Lu et al., 2020) SARS-CoV2 is a novel betacoronavirus that shares 79% genome sequence identity with SARS-CoV and 50% with MERS-CoV (Hu et al., 2020). SARS-CoV uses angiotensin-converting enzyme 2 (ACE2) as a receptor and infects ciliated bronchial epithelial cells and type II pneumocytes primarily (Cui et al., 2018). Hong et al., (2020) stated that "human coronaviruses belong to the order Nidovirales, family Coronaviridae, and genus Alphacoronavirus or Betacoronavirus". A new beta coronavirus called SARS-CoV-2 is capable of causing COVID-19, which the World Health Organization (WHO) have formally designated on February 11, 2020. The primary means of transmission for SARS-CoV-2 are respiratory droplets and direct contact, and the entire community is often vulnerable. Azuma et al. (2020) in their environmental factors analysis of COVID-19 suggested some interesting findings including that SARS-CoV-2 spreads predominantly by respiratory droplets when people are in close proximity to one another in a confined environment, particularly a building.

The symptoms of COVID-19 according to WHO (2020) are "fever, dry cough, and fatigue primarily, while other symptoms are loss of taste or smell, nasal congestion, conjunctivitis, sore throat, headache, muscle or joint pain, different type of skin rash, nausea or vomiting, chills or dizziness. Severe symptoms include shortness of breath, loss of appetite, confusion, persistent pain or pressure in the chest, and high temperature (above 38°C). Lastly, for other less common symptoms such as irritability, confusion, reduced consciousness (sometimes associated with seizures), anxiety, depression, sleep disorders, more severe and rare neurological complications such as strokes, brain inflammation, delirium, and nerve damage".

Furthermore, WHO (2020) described that people of all ages may become critically ill or die from COVID-19. However, geriatrics (above 60 years old) and those with "hypertension, heart and lung problems, diabetes, obesity or cancer are at higher risk of developing a serious form of symptoms". CDC (2020) informed long list of diseases termed comorbid situations such as "cancer, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), heart conditions (heart failure, coronary artery disease, or cardiomyopathies), immunocompromised state (from a solid organ transplant, immune deficiencies, HIV, use of corticosteroids, or use of other immune weakening medicines), obesity, pregnancy, sickle cell disease, smoking, type 1 and 2 diabetes mellitus, asthma, cerebrovascular disease (CVD), cystic fibrosis, hypertension, neurologic conditions such as dementia, liver disease, pulmonary fibrosis (having damaged or scarred lung tissues), and Thalassemia".

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In order to confirm the diagnosis of COVID-19, no matter pros and cons arise regarding this test, a molecular test of real-time Reverse Transcriptase – Polymerase Chain Reaction (RT-PCR) which is more popularly recognized as the S43wab test (since its procedure is conducted by obtaining a swab from the nose and/or throat) is the one used to confirm the diagnosis. However, another test namely the Rapid antigen test is also frequently used due to its quick delivery of results and less expensive, although it is generally less accurate than the PCR (WHO, 2020).

Regarding the recovery time, WHO (2020) shows that the recovery rate of COVID-19 is 80 %, while 15% might be seriously ill and the last 5% might be critically ill and need intensive care. However, several studies presented a various range of duration due to geographical, climate, and other variances. For instance, Barman et al. (2020) found the average recovery time of Covid-19 patients in India is 25 days (95% C.I. 16 days to 34 days), and only 4% of the patients fully recovered after 10 days of treatment. Meanwhile, in Israel, the average recovery duration ranged from 13.239 to 14.814 days (Voinsky et al., 2020). In China itself, the place where this novel coronavirus originated, the median time for recovery is 21 days (95% CI 20-22) (Bi et al., 2020).

Sunshine and COVID-19

Since most humans have relied on sunlight for their vitamin D needs, vitamin D is sometimes referred to as the "sunshine vitamin" because, when exposed to sunlight, ultraviolet B photons penetrate the skin and photolyze 7-dehydrocholesterol to previtamin D3, which is then isomerized by the body's temperature to vitamin D3 (Holick, 2008).

The role of sunshine as protective factor for COVID-19 is still contradictive. While WHO (2020) stated that it was a myth to say that sunshine may provide beneficial effect in preventing and curing COVID-19, and AAD (2020) confirmed that, numerous recent studies proven otherwise. One of the argument from AAD (2020) is that while Ultraviolet C (UVC) rays can slow coronavirus, nevertheless, UVC rays from the sun are not able to penetrate the earth’s atmosphere.

On the other hand, Azuma et al. (2020) found that SARS-CoV-2 is inactivated rapidly on surfaces with sunlight. Similarly, Isaia et al., (2020) found in an environmental-ecological study in Italia that “the amount of solar UV radiation is the variable contributing the most to the observed correlation, explaining up to 83.2% of the variance of the COVID-19 affected cases per population”, thus, consistently shown that “through the effect of vitamin D on the immune system or virus inactivation by sunlight,” the COVID-19 morbidity and mortality might be prevented. Confirmed in a recent study conducted by Thangriyal, et al. (2020) in 138 countries found that higher temperature and longer sunshine duration were negative and strongly associated with daily COVID-19 cases and deaths, therefore, sunshine and high temperature are important factors in the formulation of better preventive measures for COVID-19. Another recent study by Asyary and Veruswati (2020) exhibited sunlight exposure to be significantly and positively correlated with the recovery from COVID-19. Furthermore, sunlight triggered vitamin D that increased the body's immune. Again, Heilingloh et al. (2020) confirmed that SARS-CoV-2 was highly susceptible to ultraviolet light, while Moozhipurath, Kraft, and Skiera, (2020) discovered a strong

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inverse relationship between UVI and COVID-19 mortality, demonstrating UVB's protective effect in reducing COVID-19 deaths.

Furthermore, a scientific report by Lytle and Sagripanti (2005) suggested that the sun's UV light is the main environmental germicide, demonstrating that exposure to the sun can render a variety of viruses inactive. In 2020, Sagripanti and Lytle focuses more on COVID-19, the evidence shown that SARS-CoV-2 were inactivated relatively faster during summer in many populous cities of the world, therefore demonstrating that sunlight played a role in coronavirus pandemics incidence, spread rate and duration.

In detail, Schwarcs (2020) explained that, "in the current COVID-19 climate, is that low vitamin D levels are associated with an increased risk of viral and bacterial respiratory infections as well as other respiratory ailments such chronic obstructive pulmonary disease (COPD), tuberculosis, asthma, and chronic obstructive pulmonary disease (COPD. Furthermore, vitamin D also appears to have an effect on blood coagulation with low levels possibly causing the formation of microthrombi, a phenomenon noted in some COVID-19 patients."

Schwarcs, furthermore, argued that countries that lie below 35 degrees North of the equator have lower rates since they acquire adequate sunlight to allow for the synthesis of vitamin D. Interestingly, it was found also that homeless populations suffer fewer complications from coronavirus infection, possibly because of greater exposure to sunlight. Moreover, Schwarcs also stated that Vitamin D may not known as infection protector, however, it has an improtant role in suppresing the response of cells to cytokines which is a mediator of inflammation, and therefore "cytokine storm" that presented to COVID-19 patients with comorbidities which primarily identified with inflammatory diseases were prevented to suffer severe form of COVID-19, thus, preventing the lethal complications to occur.

Another explanation by Ratnesar-Shumate et al. (2020) to investigate the SARS-CoV-2 in outdoor condition, they found that SARS-CoV-2 was rapidly inactivated in either saliva or culture media and dried on stainless steel coupons. 90% of that virus was inactivated only in 6.8 minutes in saliva and 14.3 minutes in culture media when exposed to sunlight at 40-degree North latitude at sea level on a clear day, while under lower sunlight level still a significant inactivation occurred although in a slower rate. They conclude that sunlight may rapidly inactivate SARS-CoV-2 and that natural sunlight is an effective disinfectant.

As confirmed by Li et al. (2020), a clinical and pre-clinical investigation was advised to further evaluate this conclusion after a study conducted in the United States revealed that exposure to sunlight and vitamin D, using latitude as an indicator, may be linked to lower chances for both COVID-19 cases and deaths. Similarly, Moozhipurath, Kraft, and Skiera, (2020), after examining earlier research showing that vitamin D production is a key mechanism by which ultraviolet-B (UVB) radiation protects human health, suggested clinical studies via sensible sunlight exposure to mitigate COVID-19. Moreover, another interesting fact that there are increasing studies demonstrate a connection between comorbidities such as cardiovascular disease, hypertension, obesity, type 1 and type 2 diabetes, and vitamin D insufficiency (Moozhipurath, Kraft, & Skiera, 2020).

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Best Time for Sunbathing

Moan, Dahlback, and Porojnicu, (2008) stated that in obtaining optimal vitamin D from the sun with minimal risk of developing cancer, the best sunbathing time is noon, specifically between 10 a.m. and 1 p.m. Otsuka Indonesia (2018) similarly stated that best hours in Indonesia is 10.00 to 15.00. Indonesia is located in the equator with 0.7893° S, 113.9213° E of coordinate point allowing adequate sunshine exposure to its geographical covering.

Nursing Theories and Sunshine

The essence of nursing is caring (Morse et al., 1990). Florence Nightingale, the mother of modern nursing stated that "the goal of nursing is to place the patient in the best possible condition for nature to act "in which the environment was considered the source of illness, while nursing was the activity that promoted health and well-being and enabled the patient to use her/his resources as much as possible" (Karlsson & Pennbrant, 2020).

Florence Nightingale (1860) write the famous Notes on Nursing presented the 13 canons of nursing known as Environmental Theory and one of the canon including "Light". Nightingale stated that one of the three ignorant in houses is "That it is not considered essential to air, to sun, and to clean rooms while uninhabited; which is simply ignoring the first elementary notion of sanitary things, and laying the ground ready for all kinds of diseases." Furthermore, Nightingale stated that "It is the unqualified result of all my experience with the sick, that second only to their need of fresh air is their need of light; Without sunlight, we degenerate body and mind; light essential to both health and recovery; aspect, view, and sunlight matters of first importance to the sick." Gilbert (2020) quoted Nightingale's belief of the "'Health of houses' (pure air, pure water, efficient drainage, cleanliness and light) was essential to promote healing and general wellbeing of the patient." Furthermore, Fernandez and Silva (2020) stated: "It is observed that the application of the theoretical foundations proposed by the environmental theory is related to the current practices used in the fight against the COVID-19 pandemic."

Aside from Florence Nightingale's canon on Warming and Light, other nursing theorists mentioned the need of sunshine exposure, though it was just implicitly stated. Some of them are Hildegard Peplau's mentioned nurse's knowledge is a reference for patient's needs, while Dorothea E. Orem mentioned it in her premise of balance of activities. Furthermore, Martha E. Rogers relate it in wake/sleep cycles, while Sister Callista Roy includes it in human physiologic needs. Next, Helen Erickson implicitly stated it in Holism idea and that basic needs affects human behaviour. Then, Imogene King stated that the focus of nursing is care of human being, while Ida Jean Orlando stated that the inability to meet basic needs might cause stress and hopelessness. Lastly, Virginia Henderson also mentioned about controlling body temperature by managing clothes or other manageable environment.

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CONCLUSIONS

Although the role of sunshine as protective factor for COVID-19 is still contradictive, however, extent literature from nursing theories, and numerous recent studies both literature reviews and other method of researches have proven be positively affecting the recovery by manipulating the virus itself and/or by promoting the immune system or other body healing mechanism. Thus, it is recommended for nurse practitioners, especially in clinical setting may include the sunbathing in caring for COVID-19 patients. This procedure, however, need a support policy from the related health institution, and thus, the recommendation is extended to the hospital administrator, especially for nursing and medical director to incorporate this sunbathing procedure into the Standard Operating Procedure in caring for COVID-19 patients accordingly. For future research, experimental approaches or qualitative study to further investigate the lived experience of patients cared by incorporating the sunbathing procedure can be taken.

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