

The relationship between outdoor activities and the stage of skin squamous cell carcinoma in the head neck region in patients at Dr. Soetomo General hospital Surabaya in 2020-2022

Pinkan Shafira Widiyarta ^{1,*}, Afif Nurul Hidayati ^{2,3,4}, Sahudi ^{5,6} and Yulianto Listiawan ^{2,3}

¹ Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.

² Department of Dermatology and Venerology, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.

³ Department of Dermatology and Venerology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo, General Academic Hospital, Surabaya, Indonesia.

⁴ Department of Dermatology and Venerology, Faculty of Medicine, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia.

⁵ Department of Surgery, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.

⁶ Department of Surgery, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academy Hospital, Surabaya, Indonesia.

World Journal of Advanced Research and Reviews, 2024, 23(02), 2744–2755

Publication history: Received on 17 July 2024; revised on 24 August 2024; accepted on 26 August 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.2.2514>

Abstract

Background: Skin Squamous cell carcinoma of the head and neck region is a multilayered squamous epithelial malignancy that has the ability to damage surrounding tissues and is located on the skin area of the face and neck. Skin cancer due to UV exposure obtained through outdoor activities is considered a health problem but is still neglected.

Aim: To determine the relationship between outdoor activities and the degree of malignancy skin squamous cell carcinoma of the head and neck region in patients at DR. Soetomo General Hospital Surabaya in 2020-2022.

Methods: Cross-sectional analytic study with data taken retrospectively. Samples were taken from medical records of patients with skin squamous cell carcinoma of the head and neck region in 2020-2022.

Results: There were 40 research subjects, the most subjects were 67.50% male. Most subjects were aged 56-65 and > 65 years. Most subject 22.50% of the eye and cheek area. Most subjects 92.50% have no family history. History of HPV/HIV infection 10%. Most subjects 70% in degree I and degree III have a type of work or activity outdoors, 83.3%. Was obtained between the type of outdoor activity and the degree of malignancy. Based on the vulnerable time of outdoor activities, degree III KSS patients are 100% between 10:00 to 14:00. Was obtained between the relationship between the vulnerable time of outdoor activities and the degree of malignancy skin SCC of the head and neck region in patients at DR. Soetomo General Hospital Surabaya in 2020- 2022.

Keywords: Squamous Cell carcinoma; Skin; Vulnerable Time; Activity; Outdoor

1 Introduction

Skin Squamous cell carcinoma of the head and neck region is a stratified squamous epithelium that has the ability to damage the surrounding tissue and is located in the scalp and neck area including the face, can metastasize to further sites and its development is considered a long and aggressive process [1]. Basically, everyone has their own needs, both

* Corresponding author: Pinkan Shafira Widiyarta

indoors or what is called indoor activity and outdoors which is called outdoor activity. Outdoor activities are activities carried out in the open air to meet a person's needs [2]. People who are outdoors continuously can receive 10% - 70% of UV exposure every day [3]. The highest UV exposure in Indonesia occurs at 10.00 am to 14.00 pm with high, very high, and extreme risks of UVA and UVB rays that can harm skin health [4]. Outdoor activities with uncontrolled exposure to UVA and B rays have a negative impact on the quality of life of patients and on national health systems in the world [5]. Along with changes in unhealthy lifestyles accompanied by various factors that can cause damage such as increased ultraviolet radiation, genetic factors, and infections can also cause uncontrolled growth, leading to a condition known as cancer [6].

Skin cancer is considered a health problem due to work or other activities but until now it has been ignored and considered a less serious problem [7]. Squamous cell carcinoma can be caused by ultraviolet (UV) radiation, genetic predisposition, viral infection, chronic inflammation, physical and chemical carcinogens, immunosuppression, drugs, and chronic injuries [8]. Sun exposure is very susceptible to the facial skin area on the head and neck and other exposed body parts [9]. Squamous cell carcinoma of the scalp and neck will become an important problem in Indonesia due to the need for people to do outdoor activities with exposure to UVA and UVB rays so that if not treated properly, squamous cell carcinoma of the skin in the head and neck region can damage surrounding tissue, have various stages, spread to the lymph nodes or other organs so that it can interfere with daily activities or even be fatal [10].

Globally, there are 2.4 million cutaneous SCC with approximately 62.8 thousand deaths and 1.2 million Disability Adjusted Life Years (DALY) each associated with men having a higher burden than women with higher age-specific Stages in older adults, an increase observed from age 50 years and above [11]. While the prevalence of cutaneous squamous cell carcinoma in Indonesia is 25,485 cases [12]. Cases of cutaneous squamous cell carcinoma in the head and neck region in a study in Padang were found at the age of 51-60 years by 30%, men 71.4%, and well- differentiated 42.8% [13]. The stage of squamous cell carcinoma of the skin of the head and neck region will determine a person's survival [14].

Therefore, the author is interested in examining the relationship between outdoor activities and the Stage of skin SCC in the head and neck region in patients at Dr. Soetomo Hospital, Surabaya in 2020-2022 because in everyday life, there is often a high prevalence of squamous cell carcinoma of the skin in the head and neck region, lack of public awareness of the dangers of UV exposure due to outdoor activities, and the impact of dangerous squamous cell carcinoma of the skin in the head and neck region so that with this study, it is hoped that the surrounding community can be more concerned with UV exposure due to outdoor activities on skin health, especially SCC of the skin in the head and neck region. In addition, this study can help prevent and overcome squamous cell carcinoma of the skin in the head and neck region so that it can reduce the incidence of squamous cell carcinoma of the skin in the head and neck region.

2 Material and methods

This study is a type of retrospective analytical research using secondary data in the form of medical record data at the Skin and Surgical Oncology accumulated in ITKI of Dr. Soetomo General Hospital and analyzed using a cross-sectional approach in patients with a history of SCC of the skin at Dr. Soetomo Hospital, Surabaya on January 1, 2020 - December 31, 2022. The number of samples used was 40 patients obtained through the large two proportions formula. Variables in this study include: type of activity, time span of activity, SCC stage, other factors such as age, gender, location, family history, and history of infection. This research was conducted August 2023- January 2024 at Dr. Soetomo General Hospital, Surabaya. Data were processed with SPSS 25.0 and interpreted in the form of narrative and tables.

3 Results and discussion

3.1 Distribution of research subject based on sex

Table 1 Distribution of research based on sex

Sex	Frequency (n)	Percent (%)
Female	11	32.50%
Male	29	67.50%
TOTAL	40	100%

The results of the study showed that the majority were male, with a total of 29 people or 67.50%, while the research subjects were female, with a total of 11 people or 32.50% of the total number of subjects.

3.2 Distribution of research subject based on age

Based on the data obtained, it was found that the age group of 0 to 35 years was 0 people or 0.00%, patients aged 36 to 45 were 2 people or 5.00%, subjects aged 46 to 55 were 8 people or 20.00%, subjects aged 56 to 65 were 15 people or 37.50%, and subjects aged >65 were 15 people or 37.50% of the total number of research subjects.

Table 2 Distribution of research based on age

Age	Frequency (n)	Percent (%)
0-5 year	0	0.00%
6-15 year	0	0.00%
16-25 year	0	0.00%
26-35 year	0	0.00%
36-45 year	2	5.00%
46-55 year	8	20.00%
56-65 year	15	37.50%
>65 year	15	37.50%
TOTAL	40	100%

3.3 Distribution of research subject based on type of job activity

The results of this study showed a number of 29 or 72.50% which includes types of jobs and activities such as farmers, traders, online motorcycle taxis, couriers, motorcyclists, volunteer victims, while research subjects with types of jobs and activities indoors such as housewives were 11 people or 27.50% of the total number of research subjects.

Table 3 Distribution of research based on type of job activity

Type of activity	Frequency (n)	Percent (%)
Indoor	11	27.50%
Outdoor	29	72.50%
TOTAL	40	100%

3.4 Distribution of research subject based on activity time range

The data shows that subjects with a working time range of outdoor activities between 10.00 and 14.00 are higher, namely 32 people or 80.00% of all research subjects, while subjects with a working time span of outdoor activities <10.00 or >14.00 are 8 people or 20.00% of all research subjects.

Table 4 Distribution of research based on activity time range

Activity time range	Frequency (n)	Percent (%)
Between 10.00 – 14.00 and regularly	32	80.00%
<10.00 or >14.00	8	20.00%
TOTAL	40	100%

3.5 Distribution of research subject based on stage

The results of the study showed that the highest stage was at stage 1 with stage 1 being 20 people or 50.00% of all research subjects, stage 2 being 7 people or 17.50%, stage 3 being 12 people or 30.00%, and stage 4 being 1 person or 2.50% of all research subjects.

Table 5 Distribution of research based on stage

Stage SCC	Frequency (n)	Percent (%)
Stage I	20	50.00%
Stage II	7	17.50%
Stage III	12	30.00%
Stage IV	1	2.50%
TOTAL	40	100%

3.6 Distribution of research subject based on location

There were 0 people or 0.00% in the forehead and hair skin area, 9 people or 22.50% of patients who had skin squamous cell carcinoma in the eye area, 8 people or 20.00% of patients who had skin squamous cell carcinoma in the nose area, 7 people or 17.50% of patients with skin squamous cell carcinoma in the cheek area, 9 people or 22.50% of patients with skin squamous cell carcinoma in the lip area, 6 people or 15.00% of patients with skin squamous cell carcinoma in the neck area, and 1 person or 2.50% of patients with skin squamous cell carcinoma in the head and neck region with metastasis in the eye and cheek areas of all study subjects.

Table 6 Distribution of research based on location

Location SCC	Frequency (n)	Percent (%)
forehead skin area	0	0.00%
Hair Skin Area	0	0.00%
Eye Skin Area	9	22.50%
Nose Skin Area	8	20.00%
Cheek Skin Area	7	17.50%
Lip Skin Area	9	22.50%
Neck Skin Area	6	15.00%
Eye and cheek skin area	1	2.50%
TOTAL	40	100%

3.7 Distribution of research subject based on family history

Table 7 Distribution of research based on family history

Family History	Frequency (n)	Percent (%)
There is a family history	3	7.50%
There is no family history	37	92.50%
TOTAL	40	100%

The result of the study showed There were 3 people or 7.50% of patients who had a family history of squamous cell carcinoma of the skin in the head and neck region from all research subjects, while there were 37 people or 92.50% of patients who did not have a family history of squamous cell carcinoma of the skin in the head and neckregion from all research subjects.

3.8 Distribution of research subject based on history infection HPV/HIV

This data shows that 3 people or 10% of subjects had a history of HIV/HPV infection, while there were 37 people or 90% of subjects who had no history of HIV/HPV infection among all research subjects.

Table 8 Distribution of research based on history infection HPV/HIV

History Infection HPV/HIV	Frequency (n)	Percent (%)
History infection HPV	0	0%
History infection HIV	3	10%
There is no history infection HPV/HIV	37	90%
TOTAL	40	100%

3.9 Distribution of research subject based on type of outdoor activities with stage of SCC

The highest stage I is activity outdoors as many as 14 people or 70% while in stage I patients with squamous cell carcinoma of the skin of the head and neck region who are indoors are only 6 people or 30% of all research objects. In stage II there are 5 people or 71.4% of patients with squamous cell carcinoma of the skin of the head and neck region who have types of work or activities outdoors while in stage II indoors as many as 2 people or 28.6%. In stage III patients with squamous cell carcinoma of the skin of the head and neck region are the highest at 10 people or 83.3% who have types of work or activities outdoors while indoors are 2 people or 16.7%. In stage IV patients with squamous cell carcinoma of the skin of the head and neck region are the highest at 1 person or 100.0%, namely in patients who have types of work or activities indoors from all research objects while patients outdoors are 0 people or 0.0%. obtained a p value of 0.416 (>0.05), meaning that there is no significant relationship between the type of work or outdoor activities with the stage of squamous cell carcinoma of the skin in the head and neck region in patients at Dr. Soetomo Hospital, Surabaya in 2020-2022.

Table 9 Distribution of research based on type of outdoor activities with stage of SCC

Outdoor Activity with stage SCC					
Stage	Indoor		Outdoor		P value
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	
Stage I	6	30.00%	14	70.00%	0.416
Stage II	2	28.6%	5	71.4%	
Stage III	2	16.7%	10	83.3%	
Stage IV	1	100.0%	0	0.0%	

3.10 Distribution of research subject based on time range of outdoor activities with stage SCC

The highest in stage I, namely in patients who have a time span of outdoor activities between 10:00 and 14:00 routinely amounted to 14 people or 70% while at <10:00 or >14:00 there were 6 people or 30.0%. In stage II, the highest number of patients with squamous cell carcinoma of the skin in the head and neck region were patients who had a time span of outdoor activities between 10:00 and 16:00 there were 6 people or 85.7% while at <10:00 or >14:00 there were 1 person or 14.3%. In stage III, the most patients with squamous cell carcinoma of the skin in the head and neck region were 12 people or 100% who had a time span of activities between 10:00 and 14:00 while at <10:00 or >14:00 there were 0 people or 0.0%. Using the Fisher's exact test, a p value of 0.03 (P <0.05) was obtained, meaning that there is a relationship between the span of working time or outdoor activities with skin SCC of the head and neck region in patients at Dr. Soetomo Hospital, Surabaya in 2020-2022.

Table 10 Distribution of research based on time range of outdoor activities with stage SCC

Time Range Outdoor Activities with Stage SCC					
Stage	Antara 10.00-14.00 dan Routine		<10.00 atau >14.00		P value
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)	
Stage I	14	70,0%	6	30.0%	0.030
Stage II	6	85,7%	1	14.3%	
Stage III	12	100,0%	0	0.0%	
Stage IV	0	0,0%	1	100.0%	

4 Discussion

4.1 Prevalence of outdoor activity with skin SCC region head and neck based on sex

The prevalence of malignant tumors in Surabaya in 2019-2020 was 0.4% according to Nurlitasari [44]. In this study, it was found majority of cases were suffered by men, namely 29 people or 67.50%, while in the research subjects with female gender, there were 11 people or 32.50% of the total number of research subjects. Data according to the ministry of health [15] squamous cell carcinoma of the head and neck region, which is 55.6% compared to females at 44.4%. These results are in line with research conducted by Fania [1] which reported that squamous cell carcinoma is more common in white people than in people with colored skin and is more common in men than in women. Research by Wadoe et al [15] explains that the use of sunscreen is more widely used by women than men because women have a higher level of concern and knowledge about cancer prevention. In addition, male sufferers are more common because male gender can be associated with higher outdoor activity habits and potential smoking factors that are more frequent, which can increase the risk of squamous cell carcinoma of the head and neck region as stated in the research by Musyarifah et al [13]. SCC causes most metastases due to aggressive lesions caused mostly by UVA and UVB rays that can penetrate the epidermis and dermis layers to damage the tissue in the skin, causing uncontrolled cell growth so that with increasing age it will get worse [33]. Skin affected by SCC lesions will damage the stratum corneum, epidermis, and dermis [34].

4.2 Prevalence of outdoor activity with skin SCC region head and neck based on age

Invasive SCC can develop into verrucous or papillomatous with increasing age according to Stratigos et al [42]. Research data shows that the majority of patients are in the age range of 56 to 65 years and >65 years, which is 15 people or 37.50%. The median value in this study subject is 62 in the range of 56 to 65 years. This is in line with research conducted by Barsouk et al [11] which explains that the specific age of cancer burden is higher in older adults, an increase is observed from the age of 50 years and above. Nasrullah's research [16] also states that squamous cell carcinoma of the skin of the head and neck region often occurs in ages over 50 years with the most common location in areas that are exposed to the sun such as the face, neck, ears, lower lip, back, hands, and legs. Patients with squamous cell carcinoma of the skin of the head and neck region are high at the age of over 50 years, this is because the growth of squamous cell carcinoma of the skin of the head and neck region tends to be slow and aggressive in its development so that it is only seen at the age of over 50 years according to Kang S et al [17]. In addition, in Hutasuhut's research, F [18] also stated that people over 50 years of age have a lower immune system compared to those under 50 years of age, this causes people over 50 years of age to be susceptible to infections such as cancer.

The development of SCC has four phases with the fourth phase being dissemination, which is when cancer cells have spread to other organs, which takes a certain amount of time, so that many patients come to the hospital at an advanced stage [35]. This SCC in situ can remain in the epidermis for a long time and is unpredictable according to Tessier et al [43].

4.3 Prevalence of outdoor activity with skin SCC region head and neck based on location

In the head and neck region, there are several other parts such as facial skin, skin in the head and neck area, nasopharynx, nasal, oral which are located in the human head and neck which are susceptible to several types of cancer that can interfere with health and endanger the body [30]. Cancer can grow in various organs in the human body according to the type and cause, with most of them being in the head and neck according to Kusumadewi [9]. In this study, it was found as many as 0 people or 0.00% in the forehead and hair skin area, as many as 9 people or 22.50% of patients

who had squamous cell carcinoma of the skin of the head and neck region in the eye area, as many as 8 people or 20.00% of patients who had squamous cell carcinoma of the skin in the nose area, as many as 7 people or 17.50% of patients with squamous cell carcinoma of the skin in the cheek area, as many as 9 people or 22.50% of patients with squamous cell carcinoma of the skin in the lip area, as many as 6 people or 15.00% of patients with squamous cell carcinoma of the skin in the neck area, and as many as 1 person or 2.50% of patients with metastatic squamous cell carcinoma of the skin in the eye and cheek area of all study subjects. SCC often occurs in the head, neck, ears, lips, hands, and feet with relatively slow growth but can spread to nearby tissues, bones, and lymph nodes according to Saputro [45].

Of the total locations of patients with skin SCC of the head and neck region, the most common was in the facial skin area. This is in line with Husna's research [9] who stated that UV exposure is very susceptible to the facial skin area on the head and neck and other exposed body parts. The study explained that the facial skin area located on the head has a layer that is sensitive to UV exposure, making it easier for UV exposure to penetrate the skin layer from the outside to the inside. In addition, the study stated that out of 33 patients, 31 patients had squamous cell carcinoma of the skin around the eyelids which can be fatal but can have a good prognosis if detected early. In addition, according to Alferraly [24] cutaneous SCC is found to have clinical features in the form of keratotic papules or erythematous plaques or ulcers that are not reached accompanied by clear or diffuse lesion boundaries and can be accompanied by pain if it has progression, it will be fixed with the surrounding tissue until hematogenous or lymphatic metastasis can occur. Ulceration usually occurs near the center of the tumor, can occur quickly or slowly, often before the tumor is 1-2 cm in diameter with a granular tumor surface that bleeds easily, while the edge of the ulcer is usually raised and hard, and crusting can be found [31].

4.4 Prevalence of outdoor activity with skin SCC region head and neck based on history infection HPV/HIV

As many as 3 people or 10% of subjects had a history of HIV/HPV infection while there were 37 people or 90% of subjects who did not have a history of HIV/HPV infection from all study subjects. This shows that patients with squamous cell carcinoma of the head and neck region are more likely to not have a history of HIV/HPV infection. This is because a history of HPV infection is not always the main risk factor for squamous cell carcinoma of the head and neck region, but can be accompanied by other risk factors. This is in line with the research of Yeung et al

[19] which states that Human papilloma virus infection, iatrogenic immunosuppression with the incidence of carcinoma in patients who are under immune system pressure is only 10% due to aging, drugs, viral infections. In a study conducted by Ferrari [20], it was stated that squamous cell carcinoma of the skin of the head and neck region caused by HPV/HIV infection is rare, but can occur in types of oral and nasopharyngeal squamous cell carcinoma which have a higher potential due to a history of HIV/HPV infection. This is in accordance with table

5.8 which shows that patients with squamous cell carcinoma of the skin of the head and neck region are more likely to have no history of HIV/HPV infection. However, it is possible that patients with a history of HIV/HPV infection have squamous cell carcinoma of the skin of the head and neck region because it can be a risk factor that accelerates the infection process in the body's immunity. According to Chi et al [32]. SCC is mostly caused by cigarette and alcohol consumption and HPV infection. In addition, as a person ages, their immune system will also weaken compared to when they were young, which is also a risk factor for squamous cell carcinoma of the skin in the head and neck region [39].

4.5 Prevalence of outdoor activity with skin SCC region head and neck based on history of family

The head and neck have a very important structure and function in protection from UVA and UVB rays as well as protection from other factors that affect health [27]. As many as 3 people or 7.50% of patients who have a family history of squamous cell carcinoma of the skin in the head and neck region from all research subjects while there are 37 people or 92.50% of patients who do not have a family history of squamous cell carcinoma of the skin in the head and neck region from all research subjects. From the results of demographic data, it can be concluded that patients with squamous cell carcinoma of the skin in the head and neck region are more likely to have no family history. This is in line with the research of Kang S et al [17] which states that patients with a family history of squamous cell carcinoma of the skin in the head and neck region will not always be affected by squamous cell carcinoma of the skin in the head and neck region, the main determining factor for squamous cell carcinoma of the skin in the head and neck region depends on each person's lifestyle.

The World Health Organization (WHO) estimates that, each year, between 2 and 3 million non-melanoma cancers and 132,000 melanomas occur globally with 17% of cancer cases recorded as squamous cell carcinoma, 70% basal cell carcinoma, 10% melanoma, 2% marcell carcinoma, and 1% of the data are affected by dermatofibrosarcoma protuberans [36]. Each person has different protection depending on the pigment a person has not only from the genetic factors they have [37]. This type of SCC often occurs in people who have various pre-existing lesions such as solar

keratosis, chronic radiation keratosis, hydrocarbon keratosis, arsenical keratosis, cutaneous cornu, Bowen's disease and Queyrat's erythroplasia by Gupta [40]. This is also in line with research by Corchado et al. which states that squamous cell carcinoma can be caused by ultraviolet (UV) radiation, genetic predisposition, viral infections, chronic inflammation, physical and chemical carcinogens, immunosuppression, drugs, and chronic injury [47].

4.6 Relationship outdoor activity with stage skin SCC head and neck region

Skin SCC in the head and neck region has a stage that is obtained through a biopsy examination so that the size of the tumor, metastasis, and nodules can be determined which are divided into several criteria that can help determine the choice of therapy that is appropriate to the stage of the patient with squamous cell carcinoma of the skin in the head and neck region [49]. In this study, Fisher exact test analysis with a significance level of 0.05 obtained a p value = 0.416 ($p > 0.05$). Because the p value is more than 0.05, it is stated that there is no significant relationship between the type of work or outdoor activities with squamous cell carcinoma of the skin in the head and neck region at Dr. Soetomo General Hospital, Surabaya. Various activities that can be done outdoors such as working as farmers, fishermen, miners, contractors, and field workers or doing hobbies and other activities to meet needs [51]. This is not in line with research conducted by Hanriko [7] which states that outdoor workers are exposed to UV radiation six to eight times more often than workers who are indoors. This is explained in research conducted by Sun et al [21] stating that the type of work or outdoor activities is not the only cause of health problems but there are multifactorial factors such as phenotype characteristics, environmental exposure time, genetics, lifestyle factors such as sunbathing habits that are too frequent and not at the right time, lack of use of sunscreen, and health history and family hereditary susceptibility can affect dangerous skin damage to become a risk factor on the development and progression of skin SCC of the head and neck region. The geographical location of Indonesia, which is a tropical country, means that Indonesia always receives exposure to sunlight as a source of life in sufficient or even excessive amounts [50]. In addition, the type of work or outdoor activities without a continuous time span and routine have not been able to prove the relationship between outdoor activities and skin SCC of the head and neck region because in Ristanto's research [4] it was stated that patients with squamous cell carcinoma of the skin of the head and neck region often occur in someone who does outdoor activities for a long time between 10:00-14:00 and without continuous protection can make someone exposed to excessive UVA and UVB radiation which can cause carcinogenesis materials to cause squamous cell carcinoma cell mutations and is the main risk factor for squamous cell carcinoma of the skin of the head and neck region.

This is related to research conducted by Hidayati, Afif Nurul, Widodo Jatim Pudjirahardjo and Pohan [28] which states that UV exposure results in an increase in interleukin-10 (IL-10) which is a potent immunosuppressive cytokine produced by keratinocytes and macrophages, causing increased mutations and cell proliferation to cause squamous cell carcinoma of the skin in the head and neck region. In addition, in the study of Azyyati et al [29] also stated that the sun from 10:00 to 14:00 has a high to extreme UV index so that when this happens, the damage caused allows this area to become a focal point for squamous cell carcinoma of the skin in the head and neck region and can be harmful to skin health due to the geographical location that causes exposure to ultraviolet rays to expose areas of the human body for too long and too often. SCC can cause side effects in the form of decreased immunity, causing discomfort such as itching and pain, as well as serious complications in other organs due to metastasis according to Pramesti [41]. Ionizing rays used for radiation therapy can also cause cancer [48].

Fisher Exact Test analysis with a significance stage of 0.05 obtained a p value = 0.03 ($p < 0.05$). Because the p value is less than 0.05, it is stated that there is a significant relationship between the time span of working or doing activities outdoors with squamous cell carcinoma of the skin in the head and neck region at Dr. Soetomo General Hospital, Surabaya. This is in line with research conducted by Shoviantari and Agustina, 2021 [22] which states that from 10:00 to 14:00 UVB is very strong and can cause squamous cell carcinoma of the skin in the head and neck region. From the data, the highest frequency is patients with outdoor activities between 10.00 and 14.00, namely 14 people with stage I. This is in line with research on SCC of the skin in the head and neck region conducted by Shabrina, 2020 [23] which states that SCC of the skin in the head and neck region due to UV exposure is often found in the early or advanced stages depending on how long and how often they are exposed to UV light, in the early stages it is 83.4% which can still be treated well if early detection is carried out immediately. This SCC can be at high risk for regional or distant metastasis if not incised as soon as possible according to Alzahrani [25]. This is also in line with Ansary et al who stated that at that time UVA and UVB rays fully penetrate the epidermis with a thickness of 0.03-0.13 mm and are able to penetrate slightly below it into the dermis with a thickness of 1.1 mm

[26] and which states that skin SCC of the head and neck region grows slowly so that many patients come to the hospital with a more advanced stage and require further treatment as well. In addition, the book by Kang S et al

[14] states that the more risk factors a patient with SCC of the skin of the head and neck region has, the wider the metastasis of skin SCC of the head and neck region will be, causing increasingly severe symptoms and complaints, so that greater treatment is needed in order to overcome skin SCC of the head and neck region.

5 Conclusion

- Based on the type of work or activity and based on the time span of working or doing activities outdoors. There was a relationship between the time span of outdoor activities/working outdoors with the stage of squamous cell carcinoma of the head and neck region of the skin, but there was no relationship between the type of activity or working outdoors with the stage of squamous cell carcinoma of the head and neck region in patients at Dr. Soetomo Hospital, Surabaya in 2020-2022.
- In addition, the study concluded that patients with squamous cell carcinoma of the head and neck region of the skin for the period January 1, 2020-December 2022 at Dr. Soetomo Hospital, Surabaya were mostly male, the age range of patients with squamous cell carcinoma of the head and neck region of the skin was most common in the age range of 56 to 65, the most locations were in the eye and mouth areas, had no history of HPV/HIV infection, had no family history.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Fania, L., Didona, D., Di Pietro, F.R., Verkhovskaia, S., Morese, R., Paolino, G., Donati, M., Ricci, F., Coco, V., Ricci, F., Candi, E., Abeni, D. and Dellambra, E. (2021). Cutaneous Squamous Cell Carcinoma: From Pathophysiology to Novel Therapeutic Approaches. *Biomedicines*, 9(2),p.171. doi:https://doi.org/10.3390/biomedicines9020171.
- [2] Handoko, M., Asmarajaya, A., Section, M., Smf, Surgery, I., Medicine, F., Udayana, U., Pain, R., Center, U. and Denpasar, S. (n.d.). SKIN CANCER.
- [3] Pamudji, S.A.A., Satyarsa, A.B.S., Indriani, I.G.A.T., Sudarsa, P., Rusyati, L.M. and Adiguna, M.S., 2019. Relationship between Knowledge Stage and Attitude Regarding Sun Exposure and Skin Cancer in Marine and Fisheries Students at Udayana University.
- [4] Ristanto, S., Huda, C. and Kurniawan, A.F. (2021). Measurement of the Solar Ultraviolet Index and its Attenuation by Several Materials for Recommendations on Safe Sunbathing Time. *INDONESIAN JOURNAL OF APPLIED PHYSICS*, 11(2),p.248. doi:https://doi.org/10.13057/ijap.v11i2.52753.
- [5] Prima, M., Program, S., Education, T., Makeup, Department, K., Makeup, T., Beauty, D., Tourism, F., University, P. and Padang, N. (2019). USE OF SUNSCREEN FOR SKIN HEALTH. *JPK*, [online] 11(1).
- [6] Wilvestra, R.E.D., Rustam, R. and Elmatris, E. (2019). Relationship between Job Type and Skin Cancer at Dr. M. Djamil Padang General Hospital 2015 - 2020. *Indonesian Journal of Health Sciences*, 3(1), pp.67–73.
- [7] Hanriko, R., Sri, D., Hayati, J., Anatomi, B., Faculty, K. and Lampung (n.d.). Non-Melanoma Skin Cancer (NMSC). Basal Cell Carcinoma (BCC). [online] Squamous Cell Carcinoma. SCC. Available at: https://juke.kedokteran.unila.ac.id/index.php/agro/article/viewFile/2421/p df.
- [8] Corchado-Cobos, R., García-Sancha, N., González-Sarmiento, R., Pérez- Losada, J. and Cañueto, J. (2020). Cutaneous Squamous Cell Carcinoma: From Biology to Therapy. *International Journal of Molecular Sciences*, 21(8), p.2956. doi:https://doi.org/10.3390/ijms21082956.
- [9] Husna, K., Widajanti, N., Sumarmi, S. and Firdaus, H. (2021). Relationship between Sun Exposure Score and Vitamin D Intake with Serum 25(OH)D Levels in Elderly Women. *Indonesian Journal of Internal Medicine*, 8(2), p.63. doi:https://doi.org/10.7454/jpdi.v8i2.516.

- [10] Wibowo, I.S., Priyanto, W. and Hardianto, A. (2022). CHARACTERISTICS OF ORAL CAVITY SQUAMOUS CELL CARCINOMA AT DR. HASAN SADIKIN HOSPITAL, BANDUNG, JANUARY-DECEMBER 2019. *Journal of Medicine and Health: Scientific Publication of the Faculty of Medicine, Sriwijaya University*, 9(1), pp.97–102.
- [11] Barsouk, A., John Sukumar Aluru, Prashanth Rawla, Kalyan Saginala and Barsouk, A. (2023). Epidemiology, Risk Factors, and Prevention of Head and Neck Squamous Cell Carcinoma. 11(2), pp.42–42. doi:<https://doi.org/10.3390/medsci11020042>.
- [12] Marasescu, F., Petre Marasescu, Matei, M., Florescu, A., Claudiu Mărgăritescu, Petrescu, S.M.S. and Dumitrescu, C. (2018). Epidemiological and Histopathological Aspects of Tongue Squamous Cell Carcinomas- Retrospective Study. *Current health sciences journal*, 44(3), pp.211–224. doi:<https://doi.org/10.12865/chsj.44.03.03>.
- [13] Musyarifah, Z. and Yenita, Y., 2020. Clinicopathological Profile of Head and Neck Squamous Cell Carcinoma in Padang. *Andalas Health Journal*, 9(2), pp.203-210.
- [14] Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, et al. *Fitzpatrick's Dermatology*. 9th ed. In: Lonsdorf SA, Hadaschik NA. *Squamous Cell Carcinoma and Keratoacanthoma*. McGraw-Hill. 2019;2:1902-1910.
- [15] Wadoe, M., Syifaudin, D.S., Alfianna, W., Aifa, F.F., P, N.D., Savitri, R.A., Andri, M.D., Nuraini, D.M.I., Manggala, A., Fauzi, I.Q.K., Ayu, N., Mutrikah, M. and Sulistyarini, A. (2019). USE AND KNOWLEDGE OF SUNSCREEN AMONG UNAIR STUDENTS. *Journal of Community Pharmacy*, [online] 6(1), pp.1–8. doi:<https://doi.org/10.20473/jfk.v6i1.21821>.
- [16] Nasrullah, Z.A., 2021. DIFFERENCES BETWEEN BASAL CELL CARCINOMA AND SQUAMOUS CELL CARCINOMA BASED ON CLINICAL SYMPTOMS AND HISTOPATHOLOGICAL PICTURES: LITERATURE REVIEW.
- [17] Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, et al. *Fitzpatrick's Dermatology*. 9th ed. In: Hept VM, Schlager Gabriel. *Epithelial Precancerous Lesions*. McGraw-Hill. 2019;2:1857.
- [18] Hutasuhut, F., 2006. LOW IMMUNITY RESPONSE IN ELDERLY HUMAN BODY. *Health Series; Vol 10, No 1 (2006): June 10*.
- [19] Yeung, H., Balakrishnan, V., Luk, K.M.H. and Chen, S.C. (2019). Risk of Skin Cancers in Older Persons Living With HIV. *Journal of the Association of Nurses in AIDS Care*, 30(1), pp.80–86.
- [20] Ferrari, M., Taboni, S., Carobbio, A.L.C., Emanuelli, E., Maroldi, R., Bossi, P. and Nicolai, P. (2021). Sinonasal Squamous Cell Carcinoma, a Narrative Reappraisal of the Current Evidence. *Cancers*, 13(11), p.2835.
- [21] Sun, Z., Sun, X., Chen, Z., Du, J. and Wu, Y. (2021). Head and Neck Squamous Cell Carcinoma: Risk Factors, Molecular Alterations, Immunology and Peptide Vaccines. *International Journal of Peptide Research and Therapeutics*, [online] 28(1). doi:<https://doi.org/10.1007/s10989-021-10334-5>.
- [22] Shoviantari, F. and Agustina, L. (2021). SKIN CANCER PREVENTION COUNSELING WITH THE USE OF SUN SCREEN. *Journal of Community Engagement and Empowerment*, [online] 3(1). Available at: <https://ojs.iik.ac.id/index.php/JCEE/article/view/363> [Accessed 6 May 2023].
- [23] Shabrina Rizky Putri, A. (2020). Survival Rate of Oral Squamous Cell Carcinoma in Cipto Mangunkusumo Hospital. [online] Universitas Indonesia Library.
- [24] Alferraly, T.I., 2020. Relationship of CD20 Immunohistochemical Expression with Tumor-Infiltrating Lymphocytes (TILs) Infiltration Stage and Histological Grading of Cutaneous Squamous Cell Carcinoma (Doctoral dissertation, University of North Sumatra).
- [25] Alzahrani, A.M., Al Mutari, B., Alzahrani, A., Alkhodaidi, A. and Yahya, G. (2021). Spindle Cell Squamous Cell Carcinoma of the Scalp Treated With Pembrolizumab Cisplatin and 5-Fluorouracil. *Cureus*. doi:<https://doi.org/10.7759/cureus.20242>.
- [26] Ansary, T.M., Hossain, Md.R., Kamiya, K., Komine, M. and Ohtsuki, M. (2021). Inflammatory Molecules Associated with Ultraviolet Radiation- Mediated Skin Aging. *International Journal of Molecular Sciences*, 22(8), p.3974.
- [27] Anderson, B.W. and Kharazi, A. (2019). *Anatomy, Head and Neck, Skull*. [online] Nih.gov.
- [28] Hidayati, Afif Nurul, N., Widodo Jatim Pudjirahardjo, N. 9907147599 and Pohan, S.S. (2015). CUMULATIVE EXPOSURE TO SUN UVA-UVB RAYS AFFECTS THE INCREASED EXPRESSION OF INTERLEUKIN-10, AN IMMUNOSUPPRESSIVE CYTOKIN IN CUTANEOUS LYMPHOCYTES ANTIGEN (CLA)+ T LYMPHOCYTES IN PERIPHERAL BLOOD. *Media Dermato- Venereologica Indonesiana*, [online] 42(4), pp.157–162.

- [31] Azyyati Adzhani, Fitrianti Darusman and Ratih Aryani (2022). Study of the Effects of Ultraviolet Radiation on the Skin.
- [32] Bandung Conference Series: Pharmacy, 2(2). doi:<https://doi.org/10.29313/bcsp.v2i2.3551>.
- [33] Brennan, B. (2020). Nasopharyngeal carcinoma. Orphanet Journal of Rare Diseases, [online] 1(1).
- [34] Combalia, A. and Carrera, C. (2020). Squamous Cell Carcinoma: An Update on Diagnosis and Treatment.
- [35] Dermatology Practical & Conceptual, [online] 10(3).
- [36] Chi, A.C., Day, T.A. and Neville, B.W. (2015). Oral cavity and oropharyngeal squamous cell carcinoma-an update.
- [37] CA: A Cancer Journal for Clinicians, [online] 65(5), pp.401–421.
- [38] Yanofsky, V.R., Mercer, S.E. and Phelps, R.G. (2011). Histopathological variants of cutaneous squamous cell carcinoma: a review. Journal of skin cancer, [online] 2011, p.210813.
- [39] Souto, E.B., da Ana, R., Vieira, V., Fangueiro, J.F., Dias-Ferreira, J., Cano, A., Zielińska, A., Silva, A.M., Staszewski,
- [40] R. and Karczewski, J. (2022). Non- melanoma skin cancers: physio-pathology and role of lipid delivery systems in new chemotherapeutic treatments. Neoplasia, 30, p.100810.
- [41] Gasparoto, T.H., de Oliveira, C.E., de Freitas, L.T., Pinheiro, C.R., Ramos, R.N., da Silva, A.L., Garlet, G.P., da Silva,
- [42] J.S. and Campanelli, A.P. (2012). Inflammatory events during murine squamous cell carcinoma development. Journal of Inflammation, 9(1). doi:<https://doi.org/10.1186/1476-9255-9-46>.
- [43] Laikova, K.V., Oberemok, V.V., Krasnodubets, A.M., Gal'chinsky, N.V., Useinov, R.Z., Novikov, I.A., Temirova, Z.Z., Gorlov, M.V., Shved, N.A., Kumeiko, V.V., Makalish, T.P., Bessalova, E.Y., Fomochkina, I.I., Esin, A.S., Volkov, M.E. and Kubyshkin, A.V. (2019). Advances in the Understanding of Skin Cancer:
- [44] Howell, J.Y. and Ramsey, M.L. (2019). Cancer, Squamous Cell of the Skin. [online] Nih.gov.
- [45] Kusumadewi, S., Studi, P., Dokter, P. and Kedokteran, G. (2017). ORAL SQUAMOUS CELL CARCINOMA.
- [46] Hardiati, R.H., Nabila, C. and Milenia, U.N. (2022). Classification, Risk Factors, Management and Complications of Nasopharyngeal Cancer. Scientific Journal of Batanghari Jambi University, 22(1), p.304.
- [47] Gupta, A., Harris, K. and Dhillon, S.S. (2019). Role of bronchoscopy in management of central squamous cell lung carcinoma in situ. Annals of Translational Medicine, [online] 7(15), pp.354–354.
- [48] PRAMESTI, T.A., 2020. HUBUNGAN EKSPRESI EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) TERHADAP STADIUM KLINIS KARSINOMA SEL SKUAMOSA KprimaULIT.
- [49] Stratigos, A.J., Garbe, C., Dessinioti, C., Lebbe, C., Bataille, V., Bastholt, L., Dreno, B., Concetta Fagnoli, M., Forsea, A.M., Frenard, C., Harwood, C.A., Hauschild, A., Hoeller, C., Kandolf-Sekulovic, L., Kaufmann, R., Kelleners- Smeets, N.W.J., Malvey, J., del Marmol, V., Middleton, M.R. and Moreno- Ramirez, D. (2020). European interdisciplinary guideline on invasive squamous cell carcinoma of the skin: Part 2. Treatment. European Journal of Cancer, 128, pp.83–102.
- [50] Tessier-Cloutier, B., Kortekaas, K.E., Thompson, E., Pors, J., Chen, J., Ho, J., Prentice, L.M., McConechy, M.K., Chow, C., Proctor, L., McAlpine, J.N., Huntsman, D.G., Gilks, C.B., Bosse, T. and Hoang, L.N. (2020). Major p53 immunohistochemical patterns in in situ and invasive squamous cell carcinomas of the vulva and correlation with TP53 mutation status. Modern Pathology, 33(8), pp.1595–1605.
- [51] Nurlitasari, D.A., Magdalena, R. and Fu'adah, R.Y.N. (2022). PERFORMANCE ANALYSIS OF SKIN CANCER CLASSIFICATION SYSTEM USING CONVOLUTIONAL NEURAL NETWORK SYSTEM. JOURNAL OF ELECTRICAL AND SYSTEM CONTROL ENGINEERING, 5(2), pp.91–99.
- [52] Saputro, R.R., Junaidi, A. and Saputra, W.A. (2022). Classification of Skin Cancer Disease Using Convolutional Neural Network Method (Case Study: Melanoma). Journal of Dinda: Data Science, Information Technology, and Data Analytics, 2(1), pp.52–57.
- [53] Kemkes.go.id. (2019). Cancer in Indonesia is Ranked 8th in Southeast Asia and 23rd in Asia – P2P Ministry of Health of the Republic of Indonesia. [online] Available at: <https://p2p.kemkes.go.id/penyakit-kanker-di-indonesia-berada-pada-urutan-8-di-asia-tenggara-dan-urutan-23-di-asia/>.

- [54] Corchado-Cobos, R., García-Sancha, N., González-Sarmiento, R., Pérez- Losada, J. and Cañueto, J. (2020). Cutaneous Squamous Cell Carcinoma: From Biology to Therapy. *International Journal of Molecular Sciences*, 21(8), p.2956. doi:<https://doi.org/10.3390/ijms21082956>.
- [55] Fathy, R. and Rosenbach, M. (2020). Climate Change and Inpatient Dermatology. *Current Dermatology Reports*, 9(4), pp.201–209. doi:<https://doi.org/10.1007/s13671-020-00310-5>.
- [56] Ezar, M. and Rivan, A. (n.d.). MDP STUDENT CONFERENCE (MSC) 2023 144| Universitas Multi Data Palembang CLASSIFICATION OF HUMAN SKIN CANCER TYPES USING CONVOLUTIONAL NEURAL NETWORK.
- [57] Sulistiyowati, A., Yushardi, Y. and Sudarti, S. (2022). Potential of Diversity of SPF (Sun Protection Factor) Sunscreen on Protection from Ultraviolet Ray Exposure Based on Climate in Indonesia. *Journal of Health Sciences*, [online] 12(3), pp.261–269.
- [58] Lady, L. and Wiyanto, A.S. (2019). WORK FATIGUE STAGE IN OUTDOOR WORKERS AND THE EFFECT OF PHYSICAL ENVIRONMENT ON INCREASING FATIGUE. *Journal Industrial Services*, 5(1).