

UNIDAD EDUCATIVA JAVIER BACCALAUREATE IN SCIENCE

MONOGRAPH

**“Skin cancer causes, treatment and possible
solutions”**

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Gratitude

First of all, I want to thank God for giving me the opportunity to study at this school, and also; for having a great family that always supports me and shares their love too. I want to especially thank my mom, for all her help and support. Also for always being concerned about my learning and my improvement, which will lead me to become a good professional in the near future. I also want to thank Miss Liss for helping me in this monograph that was a bit difficult but following the processes I was able to complete it satisfactorily.

Summary

To carry out a research about skin cancer is an interesting and at the same time worried process. On the one hand you can learn about the wonderful composition of the skin and how the different layers (epidermis, dermis and hypodermis) act so that they can form a protective barrier for the rest of the human body, however the neglect in the care of this organ can become a serious problem.

Being clear about the composition of the skin, allows people to have a better understanding about the development of cancer in it. There are different types of skin cancer that appear, develop and are treated in different ways, but most of them are related to constant and unprotected exposure to ultraviolet rays. Of the different forms of skin cancer, the most common is the one known as carcinoma which usually appears more frequently on the face, ears, lips, mouth, neck, hands, arms and back.

On the other hand, melanoma is a less frequent skin cancer than the previous one but much more aggressive. Melanoma is a cancer that affects the melanocytes. The disease can develop as a new mole or as part of a pre-existing mole. However, this type of cancer can be very likely to be cured when it is diagnosed early.

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For this reason, it becomes important to constantly highlight the importance of daily skin care as well as to follow the different prevention measures suggested by scientists and other experts in this area. Factors such as the use of sunscreen to inhibit as much as possible the effects or damage of ultraviolet rays as well as to comply with a good diet, which should be rich especially in vitamin D, becomes essential for those who have developed an awareness of the dangers of skin cancer.

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Introduction

This work entitled The Skin Cancer: Treatments and possible solutions, seeks not only to inform but also to awake people to be more aware of this disease and its consequences. The creation of this monographic work arises from the need for people to better inform themselves about the way in which this disease could be giving signs that can be recognized

Regarding this issue, different analyzes and studies have been carried out, which allow people to understand that skin cancer is of world interest due to the rates of it. In addition, all this information will be obtained from reliable and academic sources that will allow a detailed and complete study on skin cancer. For example, according to the General Medicine Library of the United States, this type of cancer is the most common in this country.

Skin cancer is the most common form of cancer in the United States. The two most common types are basal cell cancer and squamous cell cancer. They usually form on the head, face, neck, hands and arms. Another type of skin cancer, melanoma, is more dangerous but less common. (MedlinePlus, 2017)

The main objective of the work is to deepen the influence of ultraviolet radiation on skin cancer and assess possible ways to prevent this cancer, because it has both positive and negative effects on human health. There is some ignorance of the population about the long-term harmful effects of ultraviolet radiation. Primary prevention should start from childhood and secondary prevention consists of a specialized skin scan with the aim of carrying out an early diagnosis of the lesions. The melanoma, the third most common type of skin cancer, is more dangerous and causes the most deaths.

Taking everything previously mentioned, in the development of the three different sections of this research, it is possible to notice different aspects to consider about skin cancer. In the first chapter, for example, an analysis is made of the consistency of the layers of the skin, as well as in what part and under what circumstances it is more possible that different symptoms or signs appear that could be evaluated. Then, chapter two, makes a detailed study of the different types of cancer as well as what is the general symptomatology, the diagnostic process and the treatment applied. Finally, the last part, will try to create an awareness of prevention in which those who read this document can understand the urgency of daily skin care as well as preventive measures for it.

Chapter I

The Skin

According to the Stanford Children Health website (2018), the skin is an organ system that regulates body temperature, perceives pain and pleasure, does not allow certain substances to enter the body, the skin also acts like a protective barrier against the damaging effects of the sun. The color, texture, and folds of the skin help identify individuals. In addition, it is an extensive membrane that envelops the human and allows it to contact the outside world, through a surface of approximately 18,000 cm². The injuries that affect it are multiple and varied, mostly of small size.

Due to the fact that the skin is the most extensive organ of the body, it covers all its eminences and depressions. The sense of touch is based on it. Its thickness is variable, being thinner in parts such as the eyelids, the penis, the flexor face of the joints, and at the bottom of the large skin folds, and thicker on the extensor face of the joints, plantar and palmar regions exposed to greater touch.

1.1 How is the skin formed?

The skin is formed by three different layers: The first to be analyzed will be the Epidermis.

This is the outer layer and is the thinnest in most of the body, it contains keratin, which is

formed by the remains of dead cells and protects the skin of the harmful substances. In the lower part of the dermis, there are the melanocytes, which are those that produce melanin, which is in turn, the substance responsible for pigmentation. (Bercow, 1986)

The dermis is constituted by a squamous epithelium that has a thickness of 0.05 to 1.5 mm and that varies according to age. It is formed by four layers and there are located several cell types like keratinocytes, melanocytes, Langerhans cells and Merkel cells.

Beneath the epidermis is the Dermis, which contains tactile and pain receptors. The ramifications of this layer reach the skin and various functional glands like the sweat glands, which produce sweat, the sebaceous glands, which produce sebum and hair follicles. Inside, there are blood vessels that provide nutrients and heat to the skin. There is also a layer of fat that helps to isolate the body from heat and cold.

Bercow, R (1986) mentions that the dermis is also formed by a network of collagen and elastic fibers. It also contains vascular networks that are arranged in parallel to the cutaneous surface and connected to each other by vertical vessels. Its approximate thickness is between 0.5 and 3 mm. In the dermis, it is possible to find collagen, elastic and reticular fibers, cells such as fibroblasts, mast cells and macrophages, vascular elements, neural and annexes such as hairs, and finally eccrine, apocrine and sebaceous glands.

This layer (dermis) is divided into 2 parts. Navarrete Franco (2003) classify them between the papillary or superficial dermis, located below the dermal papillae, is highly vascularized

and has reticulin fibers; and the reticular or middle dermis is rich in collagen and elastic fibers. The fibroblast is the most abundant cell and its mission is the production of the fibrous elements of the dermis, especially collagen. This is a protein that in addition to the fibroblast can be produced by other cells such as myofibroblast, osteoclast, etc. Collagen is not homogeneous throughout the body, in fact, there are 13 types according to their morphology, composition of amino acids and physical properties. Elastic fibers are essential for the retractile properties of the skin and only represent 2-4% of the dermis.

The hypodermis, also called panniculus adipose or subcutaneous cellular tissue, is made up of fat cells, which are known as adipocytes, which are arranged in lobes separated by connective tissue called interlobular septa, and it is the deepest layer of the skin. This part is composed of a network of collagen and fat cells, which helps to conserve body heat and protects the body against injuries as it cushions the impacts.

1.2 The skin functions

From the investigation of Navarrete Franco (2003), the three main functions of the skin are a barrier, thermal regulator, and Vitamin D producer. It is considered as a barrier since it controls the exchange that the skin carries out with the outside world. And it is a protection against external aggressive factor such as sun, cold, pollution, infections, etc.

To another side, skin acts like a thermal regulator, because it allows and maintains a body temperature of 37 °, thanks to its power of isolation and other processes, such as transpiration.

After the barrier and regulator, the skin is also a Generator of vitamin D, which is the only vitamin produced by the human body, under the action of UV rays. The skin, under sun exposure, becomes provitamin D essential for the body when working on the creation of bones, protecting chronic diseases, etc.

Another of its many functions, is to carry the pigmentation, through the production of the melanin, which gives different tonalities to the skin. This is how different races exist: white race, less melanin, and less protection; yellow race, black race, more melanin and more protection. These pigments protect humans from the sun's rays.

For example, *albinos* have no pigment, so it is essential for them to avoid the sun, which could cause significant burns and can lead to skin cancer. The pigmentation intensifies in the summer and decreases in the winter because of the presence or absence of the sun.

Once determined the different layers of the skin and its constitution it is important to carry out an analysis of the possible affectations that this organ of the human body could have. This research work will be based specifically on skin cancer and will include topics such as its symptoms, diagnosis, and treatment.

Chapter II

Skin Cancer

It is important to start mentioning a definition about what cancer is. According to Berkow (1899), “cancer is a condition in which a cell has lost its control mechanisms and because of this, the cell goes through an uncontrolled growth” (p. 819). It can be developed in any tissue and organ. As cancer cells grow and multiply, they form two adjacent cells that could be spread throughout the body in a process that is called metastasis.

2.1 What is skin cancer?

In order to have a specific panorama about what is a skin cancer condition, some medicine specialists determine that:

“Cancer is a disease in which the cells of the skin begin to multiply uncontrollably and start to have shapes that are not normal. It initially appears as a small spot on the skin. Some cancers can extend deeply into the surrounding tissues; they can also spread from the skin to other organs of the body”. (Medline Plus, 2017)

To other side, Familydoctor (2009) also affirms that "Skin cancer is the most common form of this sickness in the world. Almost all types of skin cancer are the result of excessive

exposure to ultraviolet light. This light is found in sunlight and solar lamps "(p.1). The parts of the body that are more common to suffer are the face, neck, hands and arms, just the ones that are more exposed to sunlight.

2.1.1 Pathology and symptoms of the disease. (level 3)

Despite the great symptomatology present when a skin cancer is diagnosed, the main and most common sign, regardless of the existing typology, is the appearance of a new or changing lump, a lump, an injury, a mole or a rough spot on the skin. It is important to note that not all signs are manifested with the same type in all patients.

For this reason, it is very important that people recognize changes or alterations in their body. For example, experts define that:

"A normal mole is tan, brown, dark brown or flesh-colored, its edges are well defined, it is usually less than ¼ inch in diameter and has a round or oval shape, it must be flat or cup-shaped " (Familydoctor, 2009)

The ABCDE rule can help the patient remember what to observe when examining moles on the skin. Each of these letters is the initial of a parameter that must be pending.

The same Family Doctor website (2009) lists them as follow:

- A for **asymmetry**: the mole is not symmetrical. This means that it is not the same on both sides. If I cut it in half, the two halves will not match.
- B for **border** the border of the mole are blurred and irregular.
- C for **color**: changes in the mole color. It could be the darkening, the loss of color, the diffusion of color or having several colors.
- D for **diameter**: one place more than 1,4 inch in diameter.
- E for **evolution**: the mole looks different from others or is changing shape, size or color

2.1.2 Types of skin cancer

According to health experts, there are several types of skin cancer are. One of these is known as carcinoma:

Basal cell carcinoma is a cancer that originates in the deepest layer of the epidermis. This type of cancer usually develops on skin surfaces that are exposed to solar radiation. The tumors begin as very small, hard, bulky, bulky formations that appear on the skin (nodules) and enlarge very slowly, sometimes so much that they may go unnoticed. (Berkow, 1899, p.1026)

On the other hand, there is another type of cancer called squamous cell carcinoma. This is a cancer that originates in the middle layer of the epidermis and can be developed in various parts of the body, such as the tongue or buccal mucosa.

In addition, there is a more aggressive type of cancer that is known as melanoma. It is a cancer that originates in the cells that produce pigment; which are, melanocytes. Melanoma can start as a new, small and pigmented skin formation that appears on normal skin, very often in areas exposed to the sun, it can appear in existing moles, as it happens in half of the cases. The risk of this cancer is that it spreads rapidly or does metastasizes to distant parts of the body, where it continues to grow and destroy tissue.

On the other hand, Kaposi's sarcoma is a not so frequent type that originates in the blood vessels, usually of the skin. This type of cancer is adopted in two forms: the first is a disease that affects elderly people, in which it grows very slowly on the skin and rarely spreads, the second form is characteristic of children and young males of AIDS .

Finally, Paget's disease is the least recognized cancer. It is a rare type of skin cancer that looks like a red and inflamed skin plaque (dermatitis); it originates in the cutaneous or subcutaneous glands.

2.2 Detection and diagnostic

The doctors have designed different clinical analyzes in order to diagnose if there is an abnormality that can result in skin cancer. Usually these tests verify the presence of cancer before the person manifests any symptoms and because of this, the disease can be

detected in early stages when treatments can be more effective. On the other hand, when the skin already has lesions it is possible that the cancer has begun to spread.

A general doctor uses to analyze the life of his patients and the different daily activities that they develop to identify if there is any factor hat could be exposing him to develop certain diseases. This information helps doctors recommend who should have cancer screenings, what tests should be used and how often they should be done.

If the result of a stopping test is abnormal, more tests may be needed to determine the cancer has appeared. These are called diagnostic tests.

A common test is a biopsy. From this type of analysis there are several ways, for example, the scraping biopsy in which a small blade or razor is used to extract or scrape the most superficial layers of the skin. In a needle biopsy, the doctor uses a punch to remove deeper layers of skin. The area that is extracted is roughly the size or shape of a pencil eraser. One of the biopsies is examined under the microscope, the other is sent to the laboratory to be evaluated by bacteria. (culture of the skin.) Excisional biopsy can also be done: a surgeon uses the scalpel to remove the entire lesion. This can include deep layers of skin and fat.

2.3 Causes and consequences

Most cases of skin cancer are caused by excessive exposure to ultraviolet (UV) radiation.

This comes from the sun, tanning beds and solar lamps. There are 2 types of UV: On the one

hand UVA (long wave): UVA rays penetrate the clouds and glass. These penetrate the skin more deeply and damage the basal layer of the epidermis and on the other hand the UVB rays (short wave): UVB rays damage the upper layers of the epidermis. These are the main causes of tanning and sunburn.

Some people are at a higher risk of developing skin cancer. The Family Doctor website lists some factors that could increase a person's risk of developing skin cancer

- Have white skin, be blond or redhead and have light eyes.
- Long-term sun exposure, such as working outdoors.
- History of severe sunburn, especially during childhood or adolescence.
- The use of tanning beds
- Have a weakened immune (immune) system, including an organ transplant (transplant).
- Family history of cancerous moles or melanoma.
- Presence of moles larger than a pencil eraser.
- The skin that usually burns, but does not tan.

The physical side effects experienced by cancer patients may be due to the cancer itself or to the aggressive treatments used to fight it. But the most important are related with the effects of the treatment. Short-term side effects are those that occur during treatment. Common symptoms include nausea, hair loss, pain, fatigue and weight loss. In general, these side effects disappear after the active treatment ends. But there are some long-term side effects that persist after treatment ends, such as sterility or memory loss.

2.4 Treatments.

After the diagnosis of cancer, it is important that a therapeutic plan could be designed, which will usually be surgical and will have as main objective to remove the injured area of the skin.

The treatments may vary depending on the type of skin cancer, its stage and the patient's condition. In the same way as other cancer treatments, in other organs or systems of the body, these can include chemotherapy, radiotherapy and immunotherapy all of them with side effect

Chapter III

Creating awareness of skin care to avoid risks

Considering that of all the factors mentioned above, the main enemy to develop skin cancer is exposure to ultraviolet rays, this research project proposes some recommendations for skin care, thus avoiding the appearance of this disease.

3.1 Daily care of the skin

It is important that people develop a prevention awareness that allows them to understand how urgent it becomes to take care of the skin every day, to avoid the risk of skin cancer and not after it has appeared, and it is too late to start with the care of this organ. The website Prevention, Detection and Life (2017) give a list of important ideas that everybody can apply in their daily routine and that are analyzed from the type of clothing worn to the use of products created to protect against the effect of ultraviolet rays.

For example, it mentions the use of protective clothing such as long-sleeved shirt, pants, a hat and sunglasses, whenever possible, can prevent lightning from hitting directly on these parts of the body such as the arms or legs that are usually the most exposed together with the face. In addition, it is important to find places with shadow whenever it is

appropriate, remembering that ultraviolet rays are stronger within a few hours specifically since 10 am to 2 pm.

Likewise, nutrition greatly influences skin care, so to obtain vitamin D safely, it is suggested to have a healthy diet that can include vitamin supplements. And finally, another curious fact is to be careful to be closer to the water, sand and snow as they reflect and intensify the harmful rays of the sun, increasing the chances of burning in the sun.

Sunscreens are agents that help to prevent ultraviolet (UV) rays from reaching the skin. The use of sunscreen is of great importance since it mainly helps to prevent skin cancer and the wrinkles. According to the suggestions of dermatological experts, the correct way to use sunscreen is to spray about one ounce of sunscreen on all exposed skin about 15 minutes before going outdoors.

The website Fertilab (2018) explains important facts about these products that include the following ideas: “good absorption capacity of ultraviolet radiation, resistance to external agents, such as sweat or water, do not cause skin irritation, be stable to the sun and be compatible with the rest of the substances of the formula”.

3.2 How to create awareness about skin cancer

Few people become aware of the damage that exposure to our skin to the sun can cause. If we could know that a prolonged exposure will cause burns, most people are unaware that the sun accelerates the aging of the skin, and that it can cause skin cancer.

The World Health Organization (WHO) points out that the use of sunbeds carries a risk of skin cancer, and that no person under 18 should use them. It is known that young people who suffer burns from exposure to ultraviolet (UV) rays are at greater risk of developing melanoma later in life. On the other hand, recent studies that have a direct relationship between the use of sunbeds and skin cancer.

As it was mentioned before, people can do auto revisions to identify if they are having changes on them. The ABCDE rule can help the patient remember what to observe when examining moles on the skin. Each of these letters is the initial of a parameter that must be pending. The same Family Doctor website (2009) lists them as follows:

- A for asymmetry: the mole is not symmetrical. This means that it is not the same on both sides. If I cut it in half, the two halves will not match.
- B for border the border of the mole are blurred and irregular.
- C for color: changes in the mole color. It could be the darkening, the loss of color, the diffusion of color or having several colors.
- D for diameter: one place more than 1,4 inch in diameter.
- E for evolution: the mole looks different from others or is changing shape, size or color.

According to the WHO, it is estimated that every year there are 132,000 cases of skin cancer in the world, with more than 66,000 people suffering from skin cancer. The increase in the use of sunbeds, along with the desire and the fashion to wear tanned skin are the main causes of this rapid increase in skin cancer. The incidence of melanoma can vary more than 150 times from one country to another. The highest rates are registered mainly in countries where the population has the clearest skin and tan culture is more deeply rooted, such as Australia, New Zealand, North America and northern Europe.

So in order to conclude it is important to start developing a culture of prevention in which people know the urgency of the care and treatment of the skin to avoid the appearance of diseases that are difficult to treat or that could cause other serious complication

Conclusions

From this research work it is possible to conclude that:

- ❖ The skin is formed by three layers which act as a protective barrier of the skin and for this reason is vitally important the daily care of it.
- ❖ Prolonged and unprotected exposure to ultraviolet rays is one of the main causes that can lead to skin cancer, but other biological and genetic factors can also be considered.
- ❖ There is a high percentage of the population that does not know the damage of the exaggerated exposure to ultraviolet rays, which produces skin effects such as burns, the acceleration of skin aging and the manifestation of skin cancer.
- ❖ One of the skin cancer that most affect people is carcinoma while the dangerous one is melanoma since it is usually more difficult to treat and can expand quickly.
- ❖ Prevention is the most effective strategy to avoid the development of this disease.

For this reason, it is important that people are periodically tested, especially if they begin to identify any abnormality in the composition of skin, such as a change in color in some spot or maybe it could be an increase in the size of moles.

- ❖ The treatments are not the same for all cases, but they can vary according to the type of skin cancer, its stage and the patient's condition.
- ❖ The treatments that are most used to fight skin cancer are: chemotherapy, radiotherapy and immunotherapy, all of them with side effects.
- ❖ There is no general skin care culture for the prevention of skin cancer. For this reason, it is important that people develop awareness through the implementation of

different workshops, conferences, advertising and other communication strategies

that allow society to begin to worry about lifestyles that favor skin care.

- ❖ · It is necessary that we wear protective clothing such as, long sleeve shirt, hat, etc.

So that the rays do not fall directly in our body and generate the development of

diseases such as skin cancer

Recommendations

At the end of this research work it is important to write down the following recommendations for further investigations:

- ❖ To improve the study and analysis of the skin, it should be possible to have a laboratory that allows making the respective observations and comparisons of the layers of the skin in a healthy state versus the skin layers affected by the cancer. This would make possible to have a clear vision of the change that there is in the composition of skin.
- ❖ To improve the social conscience on the development of the same ones, the campaigns of awareness and prevention must develop in all the spheres of the society, they must be worked with children from the preschool age to teenagers in the secondary schools. It should also be done with adults, in their workplaces or they could be reached in their homes through television media
- ❖ To improve the care of the skin it is necessary to deepen studies on the creation of products that protect the skin. Products that have more natural elements than chemicals since in some cases, these products such as creams, perfumes, makeup and others, even though they may not produce cancer, generate other alterations that affect the skin.

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