Issues in calculation of the rate of diagnosis of skin cancer amongst the Indian population.

Suvir Wadhwa[1]

[1] *12 Grade, Ebenezer Int School, Singena Agarahara Road, Electronic city, Bangalore, Karnataka, India*

Email: suvirwadhwa@gmail.com (Suvir)

Abstract

Skin Cancer, the most prevalent type of cancer in the group of cancers, is causing more and more deaths as the years progress. Skin cancer can happen to anyone, even if they have a high percentage of melanin in their skin. India, a highly populated country with a vast amount of poverty, faces thousands of medical issues every month.

This paper is focused on the reasons why such a deadly cancer, like skin cancer, has a low incidence and diagnosis rate. It addresses all of the issues and gaps in proper incidence rate calculations and diagnosis, and proposes possible methods of improving on these issues. The study may lead to increased awareness about the issue and may serve as proving point for calculation changes.

This paper has found that one of the key causes for a low rate of diagnosis is awareness of the issue and lack of education and training for local workers and doctors respectively. Additionally, another key factor is the transformation of the cancer into other forms of cancer. Resolving of these issues can lead to an increasing in diagnosis and a decrease in the mortality rate.

Introduction

'Skin Cancer occurs when unrepaired DNA damage to skin cells (most often caused by ultraviolet radiation from sunshine or tanning beds) triggers mutations, or genetic defects, that lead the skin cells to multiply rapidly and form malignant tumors.' (Sarnoff, 2019) It occurs in many different forms, namely Basal Cell Carcinoma, Squamous Cell Carcinoma, and Melanoma.

Many darker skin people have high concentration of melanin, a pigment that protects from DNA damage in the skin, hence, it is believed that it makes them less prone to skin cancer in comparison to someone fairer. Although skin cancer has many other causes aside from sun damage. The environment and the water one drinks can also cause someone to develop DNA damage.

For a country like India, there is no stable data base for the incidence rates of skin cancer. (Diwan and Meshram, 2017) Although research has given us close to possible numbers. The incidence rates of melanoma in India for males and females were 0.3% and 0.2% respectively. (Ali and Wani, 2011) With the Indian population being 1,366,017,431 (as of 26th April 2019), the number of people who end up having skin cancer each year is about 41 million. 41 million people is a very high amount, and if we are able to calculate a standard incidence rate then this toll may even go above 50 million peo-

ple(Prediction). The Cancer Society estimates that more than a million new cases of basal cell and squamous cell carcinomas and approximately 55,100 new cases of melanoma will be diagnosed in the India each year. (YogitaThakran et al., 2012) Although the incidence rates are low, due to the fact that India has a high population, the number of people who get this lesion in India is very high.

The rate of diagnosis is the success rate in percentage of diagnosing a disease out of a population sample. The rate of diagnosis is very low in terms of the diagnosis of skin cancer in India. This causes a variety of issues as discussed throughout the paper.

Reasons for Low rate of diagnosis in India

Since skin cancer can occur due to other reasons other than sun exposure;it must have a higher incidence rate in comparison to the ones researched. There are many gaps in the calculation/collection of data for the diagnosis and incidence rates. Skin cancer may not be diagnosed due to a variety of reasons, hence make its incidence rate fall. A country like India, with a vast population is in need of proper skin cancer treatment. (SV Deo, 2005) Below, the reasons for low incidence rates are discussed.

Issues in early diagnosis of skin cancer

As a whole, there are many issues in the diagnosis of cancer.

Cancer is not detected early, because people don't feel its symptoms when it's at an early stage. Early stages of cancer don't have adverse effects on your body and if detected at that stage then in most cases the causality rate is low. 'This is also called the waiting time paradox, a phenomenon in which patients with late-stage cancers present with severe symptoms and are therefore diagnosed promptly but have poorer outcomes'. (Neal et al., 2015) Although it is only after a few medical checkups is when people feel the effects of cancer. By this stage it has already developed, as mentioned earlier, and it is in the stage of late diagnosis. (Emery, 2015) There are also many cases of missed opportunities in the diagnosis of cancers during general checkups. A patient may have all of the symptoms related to cancer, furthermore because of the fact that most of the symptoms are similar to the symptoms for other diseases, a doctor may prescribe a treatment for the less dangerous disease. In addition, doctors may not give enough treatment time to their patients, due to shorter working hours and higher number of patients. A short time consultation is not sufficient enough to diagnose cancer. (Emery, 2015)

Availability of medical care, and funds

Skin cancer rates are not required to be registered and reported to the Indian State Cancer Registry. (Diwan and Meshram, 2017) Due to this a lot of external research is done, and hence, this research may not give accurate numbers. There may be high variations. (Anderson et al., 1997) Also, in a country like India, due to lack of funds given by the ministry of health affairs, there may be a lack of trained/expert doctors in the country. With almost 40 million Indians living under the poverty line (Hofer et al., 2018), accessibility of high class medical care, and specialized doctors may not be available to everyone. Most people will depend on government hospitals and rural care centers. These government hospitals and rural centers have facilities that are not suitable for detecting a disease such as skin cancer. According to a study, in India, 94% of rural doctors are men, which makes it difficult to recognize pigments in a rural women's body. Out of these doctors, in a state like Madhya Pradesh, only 11 % have medical degrees, while 67% have no medical qualification. (Tabak et al., 2012) An unqualified doctor is least prone to detecting a lesion such as skin cancer. Even though a number of people may have it its incidence rate will remain low- because of issues and misjudgments in diagnosis.

Transformation of skin cancer, into other forms of cancer.

The DNA damage done to the skin cells can spread to other parts of the body. For each type of skin

cancer, there is a particular time period after which the cancer spreads. Once it spreads to other parts of the body; it may develop into other forms of cancer. (CONGER and Stanford Medicine, 2018)When the skin cancer spreads and develops into forms of cancer like, lung and liver is when the person will notice heavier symptoms. These symptoms will then be discussed with a doctor and then diagnosed as cancer. Although the cancer started in the skin, when diagnosed the report may show a different organ. This is because the cancer has progressed into a different stage and the detected organ needs the most immediate treatment. (Ruoslahti, 1996) The incidence rate may be low because of these mistakes in diagnosis and reporting. Melanoma can spread after 6 weeks of initial growth. (Victoria State Government, 2016) Hence, because of its growth into other organs, sometimes detecting the root cause of cancer, which is skin cancer, can be difficult(Leading to a lower incidence rate).

Knowledge about the Cancer

As mentioned earlier, a vast number of the Indian population lives under the conditions of poverty. They may not be able to receive education on how their body works and the diseases they are prone to. Therefore, when they get a disease, they may not know that they have it, and may continue to live a normal life. (Charan and Paramita, 2016) Because they can not afford medical care, they may also not be taken to the hospital in a case of death. (Krueger et al., 2015) Consequently, the reason for their death is not registered, and the incidence rate remains low.

Diagnosis improvement factors

The Indian population is in the billions. Even though the incidence rate of skin cancer is low, millions of people get affected by it each year. As mentioned earlier, there are a lot of factors that affect the diagnosis of such lesions and, hence, the incidence is low. Once these factors are addressed the calculation can lead to triple the current amount of people affected. With so many people getting affected, thereby this becomes a national medical issue. If addressed now, many people can be saved from this deadly cancer. There are many steps that can be followed to increase the diagnosis. Some of these steps are discussed under this heading.

Medical Care

India is a developing country. Because of the fact that it has a high population, even a low incidence rate can harm millions. As mentioned earlier, the number of people diagnosed with skin cancer in India each year is around 41 million. This is more people than the population of a major nation such as Canada which has 37 million people. (Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2017 Revision., 2019) A country like Canada has more awareness being spread on skin cancer than in India.

Thus, to better the issue in India, more awareness must be spread. The government must start to require skin cancer prospect information in the country, college courses must train doctors with the proper diagnosis skills, and no doctor should be awarded a profile role without passing out an official test. The governments must start different programs so that people are more vary of the issue, and that they consult a doctor as soon as a pigment forms on their skin.

Doctors must also take longer for each consultation, as this will help in increasing the accuracy of diagnosis.

Data base for General Physicians

Due technological advancements and the communication of people through the internet, doctors can use technology and data bases to improve their knowledge about the disease. (Iain M Carey and Journal of Medical Informatics, 2004) Newer technology can improve the diagnosis of diseases because technology can scan and detect pigments that a human eye cannot. Doctors in general practice have detected pigments throughout their practice. They may have found methods to detect these pigments with greater accuracy. They can share these methods—such as identifying different symptoms, signs and

baseline risk factors in the patient — with other doctors, hence, improving overall diagnosis and prognosis. (Emery, 2015)

Self Diagnosis/ Identification

Detection of pigments in the skin can also be done by the affected themselves. Detecting specific pigment patterns by the use of various techniques can help in the process of diagnosis. (Friedman et al., 1993) The self observer can look for an unusual growth in their body, in the form of a mole, swelling, hole, or pigment. They can also make observation on massive changes in skin color in a particular area, and continued itching of the skin. Recognizing these symptoms can lead them to a doctor, where treatment can then begin. For somebody working in harsh sun conditions all day this should become a habit. (Foundation, 2019)

More detailed self examinations can also be carried out in areas with very low medical care.

ABCDE features(Figure 1), namely asymmetry (A), border irregularity (B), color variability (C), diameter greater than 6 mm (D), and evolution or change (E), can be used to identify melanoma. (NR et al., 2004)

[Figure 1 about here.]

(Council and The University of Sydney, 2019)

Methods such as the ugly duckling method can be used to identify more complex pigments.

Implementing all of these methods increase the detection of skin cancer, hence, improving the diagnosis and diagnosis rates.

Early Detection

Skin cancer transforms into other forms of cancer at a very quick rate. Within 6 weeks your skin cancer may pass on to lung cancer or stomach cancer. Thus, when diagnosed, the report may state lung cancer and hence lung Cancer will be put into the diagnosis calculation. Although skin cancer was the root cause it was not reported and identified. (Kopf et al., 1995)

Therefore, early detection of skin cancer – before it transforms into a higher stage – is vital. This will be fed into the data base and then the reason for cancer will be termed as a skin issue. Early diagnosis will hence improve the diagnosis rate of skin cancer.

Skin cancer can be diagnosed at an early stage doing regular checkups with your general physician and by spreading awareness about the cause so that people have knowledge about what it really is. Weekly self examinations as mentioned above will help in early identification. (M.D. and American Cancer Society, 1985)

Also, doctors must aim to report all of their checkups and diagnoses with a timeline. This will, when a report is needed- enable the doctor/reporter to go back to the root cause.

Conclusion

To conclude, recognizing of all of the gaps in diagnosis calculations and filling those gaps will lead to a higher diagnosis rate. A higher diagnosis rate will mean more detection and hence more opportunities to treat the issue. An increase in treatment will also mean fewer casualties.

Countries like India, believe the impact of skin cancer in their country is low. Although they do not take in to account many factors. Also, a large population of Indians live under the poverty line. These people do not have access to medical care, and the harsh conditions that they work under makes them more prone to skin cancer.

Awareness must be spread to improve the cause and information about apps that detect pigments must also be circulated. These steps will lead to better understanding and more care amongst people.

Acknowledgments

I would like to that all of my teachers and mentors who helped me complete this paper.

All of the journals and websites, mentioned in the references, have enabled me to get clear data and specific data to support my claims.

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Author biography

Suvir Wadhwa Student

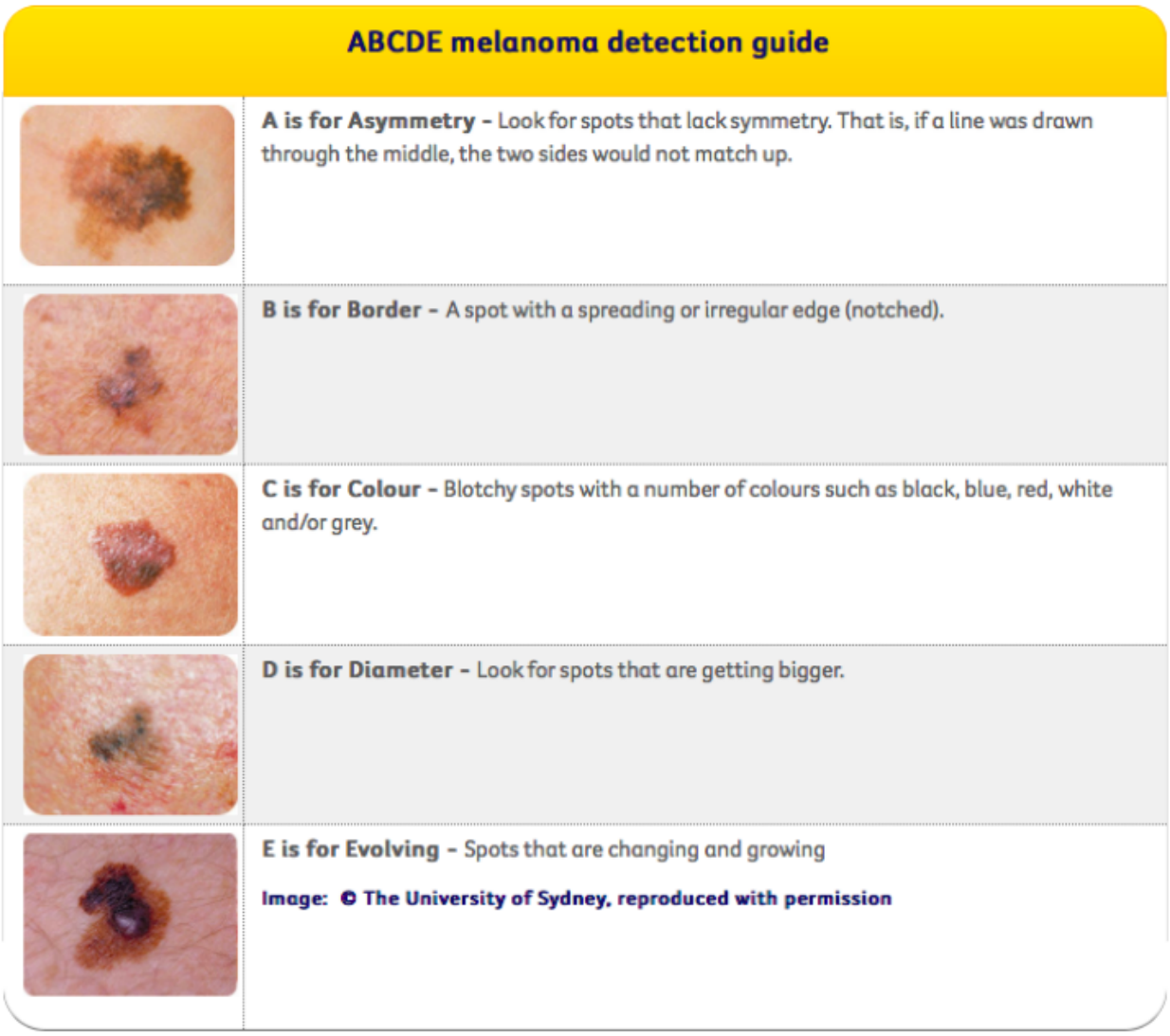

Figure 1: Skin cancer ABCDE Identification