Evaluation of Awareness, Knowledge and Attitude of General Population Towards Skin Cancer

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ABSTRACT

BACKGROUND
Skin cancer is a prevalent and potentially life-threatening disease, but it is often preventable and highly treatable when detected early, if the subject is aware about the symptoms and warning signs of unusual skin lesions.

AIM
To assess the level of awareness, knowledge, and attitudes of the general population regarding skin cancer.

OBJECTIVES
• To assess the level of knowledge the participant posses with reference to skin cancer, its symptoms and preventive measures.
• To educate the population about early detection, prevention techniques, and timely medical services to seek for suspicious skin lesions.
• To inform public health campaigns, educational initiatives, and policy development to enhance skin cancer prevention and early detection efforts.

MATERIALS AND METHODS
This is a cross sectional study where a Google form is created and prior consent taken from participant as per the guidelines set in the Helsinki Declaration, 2013. The Google form was circulated throughout India across various institutions and individuals to maintain a uniform response from every region possible. No personal information of the participant was collected.

RESULT
274 individuals (68.5%) were aged between 18-28 years, and 280 (70%) were female. 70.3% reported knowing the causes for skin cancer. 192 (48%) did not use any sunscreen. 70.3% of general population has idea about causes of skin cancer out of which 49.3% received the information regarding skin cancer. 30.30% (p value 0.312) have the knowledge of identifying the symptoms for skin cancer. 147 out of 340 (43.23%) do not prefer to check the SPF of the sunscreen. Out of 400 participants, 292 people (73%) go for regular medical skin examination and 262 of them prefer medical assistance depending on severity of skin changes.

CONCLUSION
There was a potential gap in level of understanding about symptoms and preventive measures of skin cancer amongst a large group of people. While a portion of the population already demonstrates proactive behaviors, such as regular skin examinations, visits to dermatologist there remains a substantial opportunity to further encourage positive attitudes and behaviors.

KEYWORDS—NON MELANOMA SKIN CANCER, BASAL CELL CARCINOMA, SQUAMOUS CELL CARCINOMA, MALIGNANT MELANOMA, POPULATION, KNOWLEDGE, ATTITUDE, PRACTICE.

I. INTRODUCTION

Skin cancer is a malignancy which is characterized by the irregular growth of skin cells, typically emerging on skin that's been exposed to sunlight. The assertion that UV radiation is a key contributor to these cancers arises from indirect evidence, mainly the correlation between exposure to solar radiation (the primary source of UV radiation) and the development of these cancers. The fact that only UV radiation has the capacity to directly harm DNA supports this argument and that solar radiation causes skin cancer is based on a substantial body of direct and indirect epidemiological studies. [1] However, it's important to bear in mind that this common type of cancer can also appear in regions of the skin not normally exposed to sunlight. When it comes to skin cancer, there are three primary types to be aware of: a)Non melanoma skin cancer which includes- basal cell carcinoma and squamous cell carcinoma and b)melanoma. Other types include Dermatofibrosarcoma protuberans (DFSP), Merkel cell carcinoma and Sebaceous carcinoma. [2] In contrast to melanoma, which originates from pigment-producing melanocyte cells, non-
melanoma skin cancers generally originate from different kinds of skin cells. They are mainly linked to prolonged exposure to the sun and are more prevalent in individuals with fair skin. However, they can affect people of various skin types and ethnic backgrounds. Other factors that increase the risk of developing basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) include various concurrent illnesses and specific treatments, like those used for psoriasis. Chronic exposure to human papillomavirus (HPV) and drug induced immune suppression in transplant recipients are also associated with heightened risk. Various research has shown that individuals with a lower socioeconomic status are more likely to develop non-melanoma skin cancers. [3]. Timely detection and treatment are vital for effectively managing these skin cancers and reducing their impact on a person's overall health and quality of life. Routine skin evaluations performed by a healthcare provider, coupled with self-examinations, play a crucial role in early identification and management of non-melanoma skin cancers. Basal cell carcinoma typically appears as a small, waxy bump or a pinkish patch on the skin while squamous cell carcinoma manifests as a scaly red patch, a raised growth with a central depression, or a wart-like growth.[4]. The cultural significance of the sun in India has elevated it to a divine entity. A suntanned complexion is equated with vitality, while laboring under the sun's rays symbolizes industriousness. Presently, the recognition of sunlight's role in synthesizing essential vitamin D is growing. However, adherence to sun protection measures, such as sunscreen and protective clothing, remains inadequate among many individuals in India. Understanding and being knowledgeable about skin cancer is important for several compelling reasons. Early detection is key to effective treatment, as skin cancer is highly treatable when identified in its initial stages. Equipped with knowledge about its signs and symptoms, individuals are better equipped to recognize potential issues on their skin and seek timely medical attention. Being informed about the risk factors and preventive measures allows people to minimize their chances of developing skin cancer. This encompasses adopting sun-safe practices such as wearing sunscreen, protective clothing, and seeking shade when necessary. Moreover, knowledge about skin cancer can save lives by facilitating timely intervention and treatment, particularly crucial for melanoma, which can be fatal if left untreated or diagnosed late. Skin cancer affects people across diverse demographics, making awareness essential for all, regardless of skin type or family history. By promoting preventive behaviors and early detection, individuals can contribute to lessening the burden of this disease on healthcare systems and economies. There remains a need for deeper understanding of sun exposure and its connection to preventing skin cancer. This understanding can help identify reasons behind lapses in preventive actions, enabling targeted communication strategies. [5] This paper delves into the factors influencing sun exposure practices in the Indian context. Although people of all races and ethnicities can get skin cancer, little has been done to promote skin cancer prevention among non-white populations.

II. MATERIALS AND METHODS

Study Design: This is a cross-sectional study done in India. The survey was circulated online via a Google form during the months of June, July and August, 2023.

Questionnaire:
A google form was created with the following questions, prior consent taken from the participant as per the Helsinki Declaration, 2013. No personal information of the participant was collected to maintain anonymity.

After the survey was conducted, a feedback section was included to analyse the gap in our study and what can be improved.

1. Do you consent to participate in the following survey?
   a) Yes
   b) No

2. Age
   a) ≤18 years
   b) 18-28 years
   c) 29-38 years
   d) 39-50 years
   e) >50 years

3. Education Background
   a) High school
   b) College
   c) University & Higher
   d) Others

4. Gender
   a) Male
   b) Female
   c) Others
   d) Prefer not to say

5. State of Residence (In India only)

6. Occupation
   a) Farmer
   b) Teacher
   c) Cleaner(janitor)
   d) Office employee
7. Do you know about the causes of skin cancer?
   a) Yes
   b) No

8. Do you know the different types of skin cancer?
   a) Yes
   b) No

9. How often do you check your skin for suspicious moles or spots?
   a) Daily
   b) Weekly
   c) Monthly
   d) Yearly
   e) Never

10. Have you received information or education about skin cancer?
    a) Yes
    b) No

11. Which of the following factors do you believe can increase the risk of developing skin cancer? (Tick multiple, if applicable)
    a) Excessive exposure to sunlight/UV radiation
    b) Family history of skin cancer
    c) Fair skin complexion
    d) History of severe sun burns
    e) Weakened immune system
    f) Use of tanning bed/sunlamp
    g) Other

12. Do you think skin cancer is found only on parts exposed to the sun?
    a) Yes
    b) No

13. How frequently are you exposed to sun in a day?
    a) Everyday
    b) 3-5 days a week
    c) Weekends

14. How many hours are you exposed to sun in a day?
    a) Less than 2 hours
    b) 3-5 hours
    c) 6-8 hours
    d) >9 hours

15. Does any of your family members have skin cancer?
    a) Yes
    b) No

16. How often do you check the ingredients listed in the cosmetics you purchase?
    a) Every time I purchase a product
    b) Quite often
    c) Sometimes
    d) Rarely
    e) Never
    f) I don't use cosmetics

17. Which of the following preventive measures do you practice to reduce the risk of skin cancer?
    a) Seeking shade or staying indoors during peak sunlight hours
    b) Wearing protective clothing (e.g., Long sleeves)
    c) Using sunscreen with SPF 30 or higher
    d) Avoiding tanning beds and sunlamps
    e) Regularly checking skin for any changes
    f) None
    g) Others

18. Do you use Sunscreen?
19. Reasons for not using sunscreen (If above answer is No)
   a) Expensive
   b) I forget to apply from time to time
   c) Not necessary
   d) Not interested to use
   e) Don’t know the efficacy
20. If yes, what is the SPF of the sunscreen you are using currently?
   a) ≤15
   b) 15-29
   c) 30-49
   d) ≥50
   e) I don’t know
21. How often do you use sunscreen or other sun protection measures when you are exposed to the sun?
   a) Always
   b) Often
   c) Sometimes
   d) Rarely/Never
22. Have you used any natural or alternative remedies to treat skin conditions or prevent skin cancer?
   a) Yes
   b) No
   c) Maybe
   d) Maybe not
   e) I don’t know
23. If yes, do you believe natural remedies are better than chemical therapy?
   a) Yes
   b) No
24. Do you know about the ABCDE rule for identifying potential skin cancer symptoms?
   a) Yes
   b) No
25. How frequently do you go for professional skin examination?
   a) Often
   b) Rarely
   c) Very Rarely
   d) Never
26. How willing are you to seek medical attention for suspicious skin changes?
   a) Very willing
   b) Depends on severity
   c) Unwilling
27. Have you undergone a skin cancer screening or had a suspicious mole examined by a healthcare professional?
   a) Yes
   b) No
28. If recovered, what treatment was given?
   a) Chemotherapy (Medications)
   b) Excision (removal) of suspicious mass
   c) Radiotherapy (radiation)
   d) None
   e) Other
29. What is your main source of information about diseases like skin cancer?
   a) Social media apps
   b) Books
   c) Journals
   d) Advertisements of certain products
   e) Healthcare professionals
   f) Internet
   g) Other
30. On a scale of 1-5, how aware are you about the potential factors causing skin cancer? (5 being best)
31. On a scale of 1-5, how confident are you in recognising potential skin cancer symptoms? (5 being best)

**Statistical Analysis:**
The data was analysed using the software IBM SPSS Statistics 26. Frequency and percentage were used to compare the data. Participant’s age and gender were compared. Variables of interest were analysed, including risk factors for skin cancer, knowledge about skin cancer, and preventative habits. Chi-square analyses was done to compare knowledge about skin cancer between the genders. The sample size was calculated using OpenEpi Software and came out to be 384.

**Data Analysis:**
A total of 400 responses were received. Frequency and percentage of the age and gender of participants is shown in Table 1 and Table 2. 274 (68.5%) were aged between 18-28 years, and 280 (70%) were female. Participants were also asked how aware they were about factors causing skin cancer, and how confident they were at recognising symptoms (Table 3). Table 4 analyses knowledge about skin cancer. The variables ‘Have you used any remedies to treat skin conditions or prevent skin cancer’ and ‘have you undergone a screening’ were found to be statistically significant. 70.3% reported knowing the causes for skin cancer. 192 (48%) did not use any sunscreen. Table 5 analyses risk factors, including use of sunscreen, exposure to the sun, and screening for skin cancer. 248 participants reported being exposed to the sun every day, but 149 participants reported rarely or never using sun protection.

### II. RESULTS

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;18 years</td>
<td>7</td>
<td>1.80%</td>
</tr>
<tr>
<td>18-28 years</td>
<td>274</td>
<td>68.50%</td>
</tr>
<tr>
<td>29-38 years</td>
<td>45</td>
<td>11.30%</td>
</tr>
<tr>
<td>&gt;50 years</td>
<td>13</td>
<td>3.30%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>On a scale of 1-5 how aware are you about the potential factors causing skin cancer (5 being best)</td>
<td>1</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>49</td>
</tr>
</tbody>
</table>

| On a scale of 1-5 how Confident are you in recognizing potential skin cancer symptoms (5 being best) | 1 | 99 | 24.80% |
|          | 2         | 85        | 21.30%     |
|          | 3         | 124       | 31.00%     |
|          | 4         | 51        | 12.80%     |
|          | 5         | 41        | 10.30%     |
Table 4:

<table>
<thead>
<tr>
<th>Do you know about the causes of skin cancer?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>119</td>
<td>29.80%</td>
<td>0.206</td>
</tr>
<tr>
<td>Yes</td>
<td>281</td>
<td>70.30%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you know the different types of skin cancer?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>197</td>
<td>49.30%</td>
<td>0.085</td>
</tr>
<tr>
<td>Yes</td>
<td>203</td>
<td>50.70%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you ever received information or education about skin cancer?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>203</td>
<td>50.70%</td>
<td>0.983</td>
</tr>
<tr>
<td>Yes</td>
<td>197</td>
<td>49.30%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you think skin cancer is found only on parts exposed to sun?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>325</td>
<td>81.30%</td>
<td>0.485</td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>18.80%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you used any natural or alternative remedies to treat skin conditions or prevent skin cancer?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>293</td>
<td>73.30%</td>
<td>.048*</td>
</tr>
<tr>
<td>Yes</td>
<td>107</td>
<td>26.80%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you ever undergone a skin cancer screening or had a suspicious mole examined by a healthcare professional?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>384</td>
<td>96.00%</td>
<td>.000*</td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>4.00%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you know about the ABCDE rule for identifying potential skin cancer symptoms?</th>
<th>Frequency</th>
<th>Percentage</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>279</td>
<td>69.80%</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>121</td>
<td>30.30%</td>
<td>0.312</td>
</tr>
</tbody>
</table>
Do you use sunscreen?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>192</td>
<td>48.00%</td>
</tr>
<tr>
<td>Yes</td>
<td>208</td>
<td>52.00%</td>
</tr>
</tbody>
</table>

Do any of your family members have skin cancer?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>394</td>
<td>98.50%</td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>1.50%</td>
</tr>
</tbody>
</table>

Table 5:

<table>
<thead>
<tr>
<th>How frequently are you exposed to sun?</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 5 days a week</td>
<td>102</td>
</tr>
<tr>
<td>Everyday</td>
<td>248</td>
</tr>
<tr>
<td>Weekends</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you use sunscreen or other sun protection measures when you are exposed to the sun?</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely/Never</td>
<td>149</td>
</tr>
<tr>
<td>Always</td>
<td>94</td>
</tr>
<tr>
<td>Often</td>
<td>84</td>
</tr>
<tr>
<td>Sometimes</td>
<td>73</td>
</tr>
</tbody>
</table>

If you use sunscreen, what’s the SPF of the sunscreen you’re using currently?

<table>
<thead>
<tr>
<th>SPF</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤15</td>
<td>10</td>
</tr>
<tr>
<td>≥50</td>
<td>87</td>
</tr>
</tbody>
</table>

How often do you check the ingredients listed in the cosmetics you purchase?

<table>
<thead>
<tr>
<th>How often</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every time</td>
<td>79</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>147</td>
</tr>
<tr>
<td>Always</td>
<td>94</td>
</tr>
<tr>
<td>Often</td>
<td>84</td>
</tr>
<tr>
<td>Sometimes</td>
<td>73</td>
</tr>
</tbody>
</table>
In India, <1% of cases reported are of skin cancer, where basal cell carcinoma is the commonest type and squamous cell carcinoma is most prevalent. The atypical melanocytic neoplasms and congenital melanocytic nevus can turn into malignant melanoma. Other types like Merkel cell carcinoma, sebaceous cell carcinoma needs to be educated. Our study is focused on assessment of knowledge in general population on sun exposure and protection index. This study basically includes sun exposure time, usage of sunscreen on daily basis, use of barrier protection like scarfs, light coloured clothes, broad wide brimmed hats, umbrellas and avoiding tanning beds. As the chemical sunscreen available in market is very expensive for the general population, it is advised to use to physical sunscreen like Zao. During winters, the general population is exposed to less sunlight, so it is advised to expose to sun for sufficient time. Awareness: 70.3 % of general population has idea about causes of skin cancer out of which 49.3% received the information regarding skin cancer. Knowledge: Among the general population, 30.30% (p value 0.312) have the knowledge of identifying the symptoms for skin cancer. Attitude: Most of them use sunscreen everyday but 147 out of 340 (43.23%) do not prefer to check the SPF of the sunscreen. Out of 400 participants, 292 people (73%) go for regular medical skin examination and 262 of them prefer medical assistance depending on severity of skin changes. Treatment protocol includes of all the diagnosed cancers in India, less than 1% is skin cancer. Worldwide BCC is the commonest cutaneous malignancy, but in India, SCC is reported to be the most prevalent skin cancer [6]. The regular histopathological examination represents the final gold standard for ruling out MM in a concerned lesion [7]. The National Comprehensive Cancer Network (NCCN) recommends wide local excision of melanomas with 1 cm margins if the primary tumour is equal to or less than 1 mm in thickness, 1–2 cm margins if the primary tumour is >1–2 mm in thickness, and 2 cm margins for all melanomas thicker than 2 mm. The addition of sentinel lymph node biopsy (SLNB) is recommended for tumours equal to or more than 0.8 mm in thickness or for tumours less than 0.8 mm in thickness if ulceration is noticed on histopathology. [8][9] Until recently, treatment of metastatic melanoma was mostly palliative with chemotherapy and/or radiation. T-VEC is approved as intralesional therapy for use in inoperable metastases that are accessible to injection.[10][11].

IV. CONCLUSION
From our study, it was found that there is a notable lack of awareness regarding skin cancer in many segments of the population. This knowledge gap has contributed to misconceptions and suboptimal attitudes towards prevention and early detection of skin cancer. While some individuals display commendable knowledge about skin cancer risk factors and prevention methods such as applying sunscreen, others exhibit significant gaps in understanding. This underscores the need for tailored educational programs that can disseminate accurate and accessible information, thereby empowering individuals to make informed decisions about sun exposure and skin health. However, the attitude uncovered in this study reveal both encouraging trends and areas for improvement. While a portion of the population already demonstrates proactive behaviors, such as regular skin examinations, visits to dermatologist there remains a substantial opportunity to further encourage positive attitudes and behaviors. This can be achieved through community engagement, healthcare provider involvement, and public policy that supports sun safety measures. The most common warning sign of skin cancer is certain peculiar changes on skin - typically a new growth or a change in an existing growth or mole. Skin
cancer symptoms include: 1) A new mole or a mole that changes in size, shape or color, or that bleeds. 2) A pearly, waxy bump on face, ears or neck. 3) A flat, pink/red or brown colored patch or bump on skin. 4) Sores that look crusty and bleed often and delayed wound healing with excess granulation.

V. ACKNOWLEDGMENT

I’d like to immensely thank each and every participant of the survey who have taken time to fill the form to help us learn better about the level of awareness about skin cancer. I’d also like to thank the following members who have helped us to circulate the google form to collect data: Dr. Arham Iqbal, Ms. Vithya Manoharan, Ms. Sneha Khanduja, Ms. Ananya Vishvas, Mr. Vishwas Ashok, Mr. Vikas P Gowda, Ms. Sukrutha Bharati R Kathare, Ms. Shreya Rajiv Bijnal, Mr. Varshith Gowda M, Mr. Dhanush Nagaraj, Ms. Syamly, Ms. Sushma P, Dr. Samhitha V, Ms. Thensi Ruby, Ms. Megha R, Ms. Bhoomika Reddy, Dr. Haleema Naaz, Mr. Mohammed Sami Iqbal, Mr. Umashankar C.

Declaration Of Patient Consent

The authors certify that they have obtained consent from all the participants by filling the question of giving consent in the Google form circulated. In the form, the patients had given their consent for using their clinical information to be reported in the journal. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity.

Conflicts Of Interest: None declared

Source Of Funding: Nil

Source Of Support: Nil

REFERENCES

3. 10.3390/ijms21155394. PMID: 32751327; PMCID: PMC7432795.