

Research Article

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Are we Capable of Contributing to the Reduction of Eyelid Basal Cell Carcinoma? Building a Healthcare Team

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ABSTRACT

Background: Basal Cell Carcinoma (BCC) is the most common malignant eyelid tumour encountered by oculoplastic surgeons (ophthalmologists), contributing significantly to morbidity. The objective of this study was to assess awareness levels and knowledge among healthcare professionals and the general public, regarding eyelid BCC, with a specific focus on the following areas: risk factors, prevention habits and pharmaceutical counseling.

Methods: A cross-sectional survey study was employed for data collection. Anonymous surveys were distributed to two distinct groups: healthcare professionals (comprising physicians, pharmacists, and pharmacy students) and members of the general community in Setúbal. Data collection took place on a single day for each of these two groups.

Results: The study encompassed 201 participants, consisting of 155 (77.1%) females (mean age = 42 years-old), and 44 (21.9%) males (mean age = 46 years-old). The survey revealed that 55.2% of respondents were unaware of the typical location of eyelid BCC. Furthermore, the majority of participants expressed consensus on the importance of applying sunscreen as a preventive measure.

Conclusion: The study underscores the necessity for enhanced efforts in preventing eyelid BCC, emphasizing the crucial role of implementing protocols and educational initiatives targeting both healthcare professionals and the general public. These measures are essential to raise awareness, facilitate early detection, and enhance the management of eyelid BCC cases.

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Introduction

Cancer is ranked as the second leading cause of death globally [1,2]. Although studies show that Portugal has survival rates above the European average, there are strong geographic disparities in the incidence of oncology diseases [3,4]. Thus, there are improvements to be achieved in cancer screening and treatment.

Skin tumours are the most prevalent in the world [5,6]. among these, malignant eyelid tumours are mostly represented by BCC and Squamous Cell Carcinoma (SCC) [3,7]. However, BCCs in general are misdiagnosed because they are rarely biopsied, which impairs the true percentage of diagnostic results [8-10].

Given the increasing global incidence of BCCs (i.e., 85-95%), especially the cases of eyelid malignant tumours, which can result in vision impairment and morbidity, collaboration among

professional health care for the early prevention of eyelid malignant tumours [11,12]. It is vital to underscore the significance of interdisciplinary expertise.

Among healthcare professionals for prompt diagnosis and the formulation of effective treatment plans [3,13]. In recent decades, the depletion of the ozone layer and global climate change have led to higher levels of exposure to UV solar light and an increased incidence of various types of eyelid and conjunctival tumours [3,14]. Other factors such as age, gender, skin colour, family history, actinic damage is recognized as risk factors.

With great potential to increase susceptibility to eyelid tumours. New technological advances have contributed to the development devices for UV-blocking like sunglasses and hats. Taking responsibility for educating about eyelid tumours, this research project was conducted as a collaboration between pharmacists and ophthalmologists. Its aim was to assess awareness levels and knowledge among healthcare professionals and the general public regarding eyelid BCC, with a specific focus on the following areas:

risk factors, prevention habits, and pharmaceutical counseling.

Methods

Data Collection & Study Design

The data collection for this study was carried out in 2022 within the Portuguese population through an anonymous confidential survey. The survey targeted two primary groups: healthcare professionals (including physicians, pharmacists, and pharmacy students) and members of the general community in Setúbal. The survey was administered using QR codes and Google forms. The survey aimed to assess knowledge and awareness related to eyelid tumours, with a specific focus on the following areas:

Awareness. Basal Cell Carcinoma and Its Risk factors: Do you know if skin tumours can occur on the eyelid? Are you aware that eyelid basal cell carcinoma may resemble a chalazion? Do you know if exposure to ultraviolet radiation increases the risk of eyelid basal cell carcinoma? What is the most common site for the emergence of eyelid tumours?

Awareness. Prevention Habits: Which objects do you use for eyelid protection to prevent tumours? What do you use for eyelid protection during the summer? Do you use sunscreen on your face?

Awareness. Pharmaceutical Counseling: Did a pharmacist warn you about the risk of skin cancer? Do you see a need for more options of face sunscreens specifically designed for the eye area? Do you consider it useful to develop a sunscreen that can be applied to the eyelid region?

Participants were encouraged to respond to all questions to provide comprehensive data for the study. The survey was designed to gather valuable insights from both healthcare professionals and the general public, contributing to a better understanding of awareness and preventive practices related to eyelid tumours.

Statistical Analysis

Statistical analysis was performed using GraphPad Prism 5.0 statistical software and SPSS Statistics, version 28.0.1.0 (IBM, Armonk, NY, USA, 2021).

Results Demographics Data

A total of 201 survey responses were gathered for this study, involving participants aged 16 to 86 years (mean age = 43.0 ± 13.2 years-old), only 7 did not provide age information. The study cohort included 155 (77.1%) females (mean age = 42 years-old), and 44 (21.9%) males (mean age = 46 years-old). Furthermore, 2 participants did not specify their gender (Figure 1).

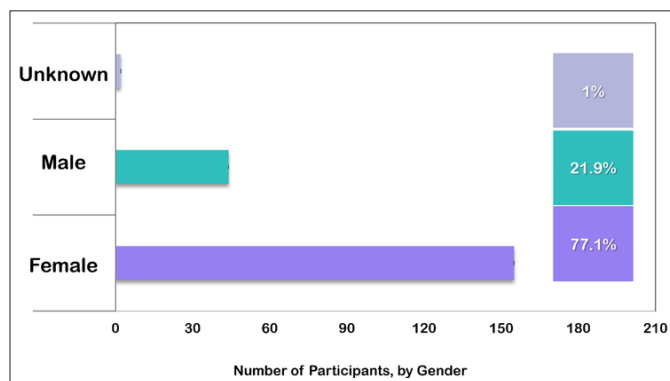


Figure 1: Answers (n=201) on prevention eyelid tumours standardised by Gender

Awareness: Basal Cell Carcinoma and Its Risk Factors

In this study, a total of 199 responses were obtained from participants (n=201) regarding the question “Can skin tumour occur on the eyelid?” (see Supplementary FigureS1). The sex ratio (M/F) was observed to be equivalent to 44/155, with 13 (29.5% male) and 27 (17.4% female) being unaware of this information. Affirmative responses were received from 79.1% of participants (mean age = 42.61 ± 13.08), while responses indicating unawareness about the occurrence of tumour on the eyelid were obtained from 20.9% (mean age = 44.9 ± 13.13). The results indicated a significant difference between healthcare professionals (95.0%) and the general public 75.2%; $\chi^2(1, N=201) = 7.634, p = 0.006$, suggesting that awareness of skin tumour occurrence on the eyelid varies between these two groups. Furthermore, we observed a marginally significant difference between males (70.5%) and females (82.6%), while other respondents answered “unknown,” with a p-value of 0.076 ($\chi^2(1, N=199) = 3.138$). However, when age was analysed, no significant differences were found (mean age for “yes” = 42.61, mean age for “unknown” = 44.92, $t(190) = -0.986, p = 0.325$).

In terms of knowledge about possible aspects of eyelid tumours, (n=124, 61.7%) responded that they are aware basal cell carcinoma may resemble a chalazion, whereas (n=72, 35.8%) were unaware, and (n=5, 2.5%) answered which didn’t know. Among these participants, the unawareness was obtained from individuals with a mean age of 46 years-old and a sex ratio (M/F) of (40.9% vs 34.2%). Similarly, there is a significant difference between healthcare professionals (87.5%) and the general public (55.3%) regarding the knowledge about basal cell carcinoma resembling a chalazion ($\chi^2(1, N=201) = 79.465, p < 0.001$). This finding suggests that awareness of this resemblance varies significantly between the two groups.

Regarding the knowledge association between ultraviolet radiation and the risk of developing eyelid tumours, a majority (84.6%) of participants with mean age of 43 years- old correctly identified this connection (see Supplementary FigureS1). The difference in unawareness between sex ratio (M/F) was only 4% (18.2% vs 14.2%). The results show a significant difference in the level of awareness between healthcare professionals and the general public regarding the association between solar radiation exposure and the risk of eyelid cancer ($\chi^2(1, N=201) = 9.106, p = 0.003$). Among healthcare professionals, 100.0% were aware of this association, while only 80.7% of the general public demonstrated awareness. Regarding the perception of ultraviolet light exposure, we did not identify significant differences between males (81.8%) and females (85.8%), while other respondents answered “unknown,” with a p-value of 0.514 ($\chi^2(1, N=199) = 0.426$). Similarly, the age analysis did not uncover significant differences (mean age for “yes” = 42.65, mean age for “unknown” = 45.14, $t(192) = -0.936, p = 0.351$).

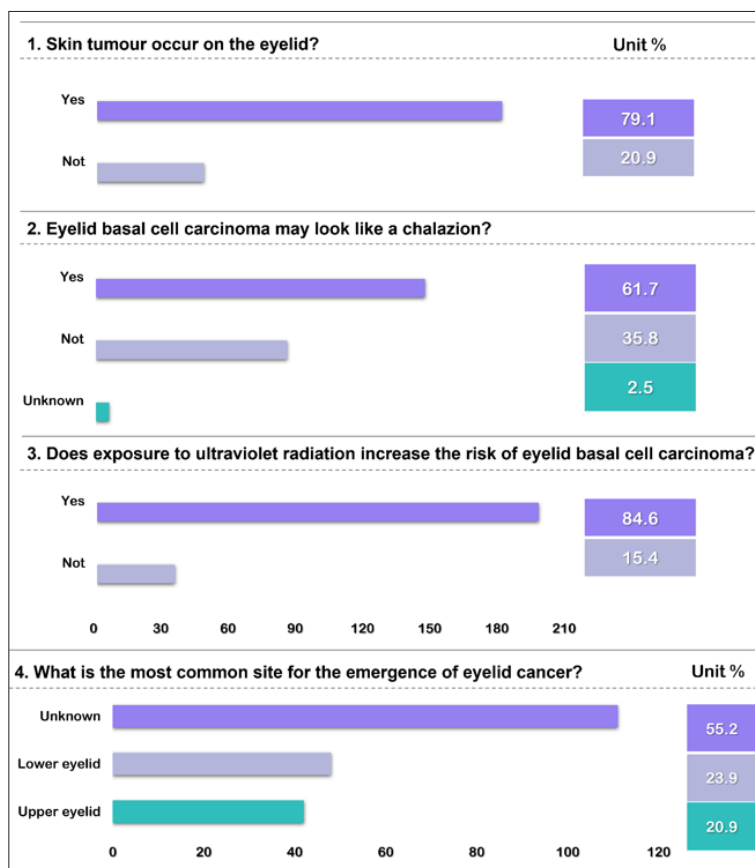


Figure S1: Answers About Awareness: Basal Cell Carcinoma and its Risk Factors

A notable finding from the survey was that a significant majority of respondents (n=111, 55.2%) demonstrated a lack of awareness regarding the common occurrence of eyelid BCC in situ (Figure 2). Furthermore, a considerable proportion of participants (n=42, 20.9%) were unaware that skin tumours can occur on the eyelid. Out of a total of 201 participants, only 48 (23.9%) recognized the location as the lower eyelid.

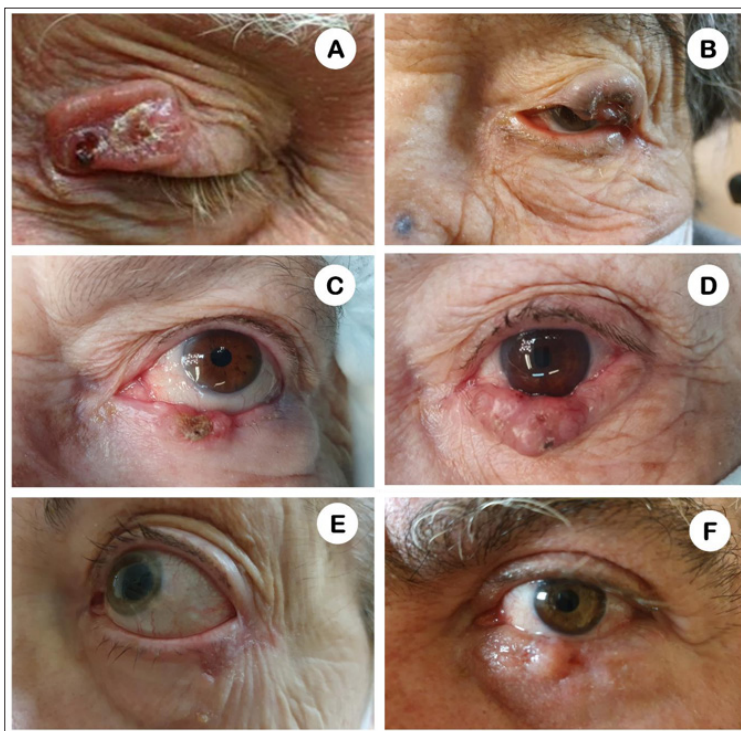


Figure 2: Ulcerative eyelid BCC, A-B: upper eyelid and B-F: lower eyelid. Photography by Daniele Oliveira (B-F) & Sofia Almada (A) [22,23].

Awareness: Basal Cell Carcinoma and The Prevention Habits

Concerning protective measures, it was evident from the findings that the majority of respondents recognised the importance of using both hats and sunglasses to prevent UVB rays from causing eyelid tumours, with a sex ratio (M/F) observed among participants with a mean age of 43 years-old (90.9% vs. 87.1%) (see Supplementary FigureS2). Furthermore, important data revealed that 184 (91.5%) participants with a mean age of 42.41 ± 12.8 years reported applying sunscreen on their face, particularly when going to the beach (54.3%), while 16 participants (mean age = 50.38 ± 14.3 years) do not use protection. However, for the participants who did not use sunscreen, further enquiry was made regarding their reasons. The majority expressed discomfort when using sunscreen (35.3%) or a preference for other forms of protection, such as hats and/or sunglasses, over sunscreen (35.3%) (see Supplementary FigureS3).

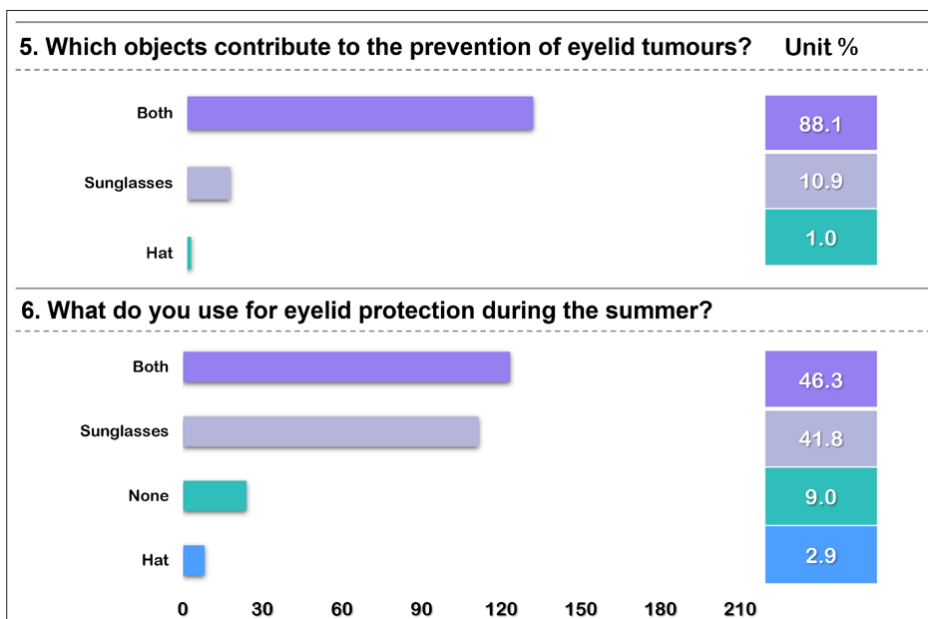


Figure S2: Answers About Awareness: Basal Cell Carcinoma and The Prevention Habits

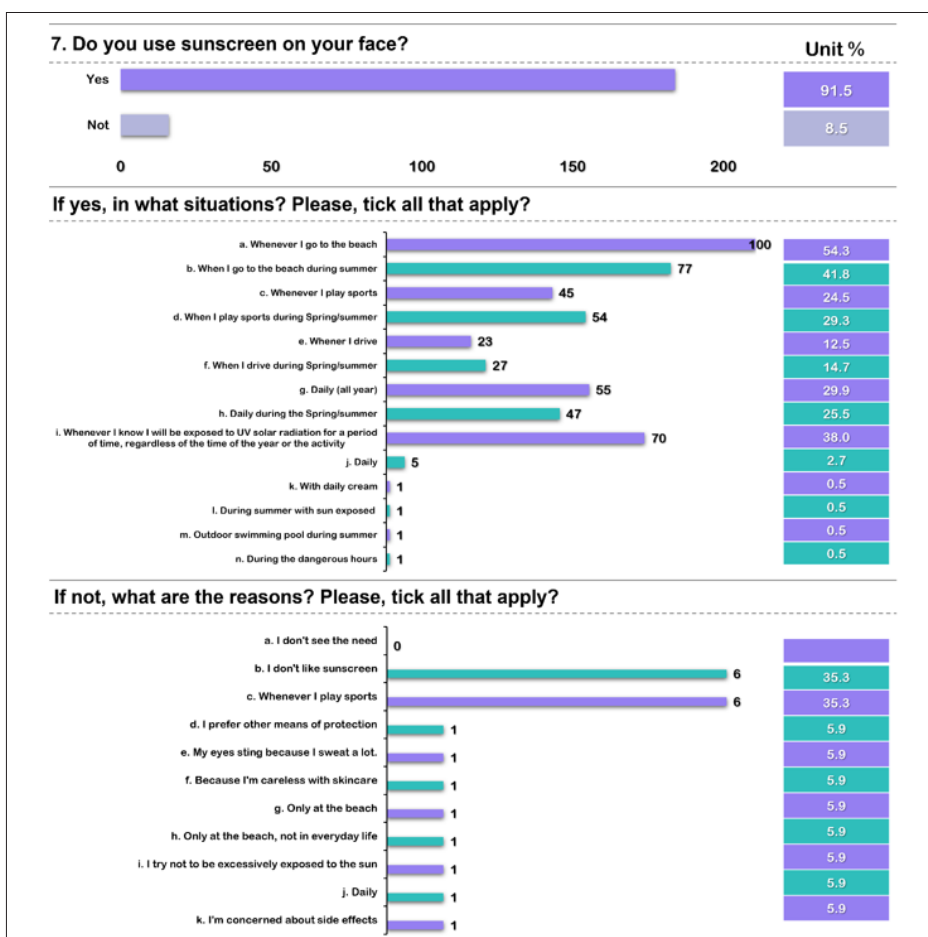


Figure S3: Answers About Awareness: Basal Cell Carcinoma and The Prevention Habits

Awareness: Pharmaceutical Counseling

The study findings underscore the substantial acknowledgment of pharmacists (n=148, 73.6%) as proactive advocates in promoting awareness of the risks associated with skin tumour. Among participants with a mean age of 42 years-old, the sex ratio (M/F) was nearly equal (22.7% vs 27.1%) (see Supplementary FigureS4). These results highlight the pivotal contribution of pharmacists in educating the public about skin tumour prevention and management.

In relation to the prevention of eyelid tumours, a majority of participants (n=151, 75.1%) recognised the need for a wider range of facial sunscreens specifically formulated for the ocular area. Encouragingly, a significant number of respondents (n=168, 83.6%) expressed their belief that the development of a sunscreen specifically designed for eyelid/ocular use would be beneficial. The sex ratio (M/F) of participants with a mean age of 43 years-old was nearly equal (84.1% vs 83.9%) (see Supplementary FigureS4).

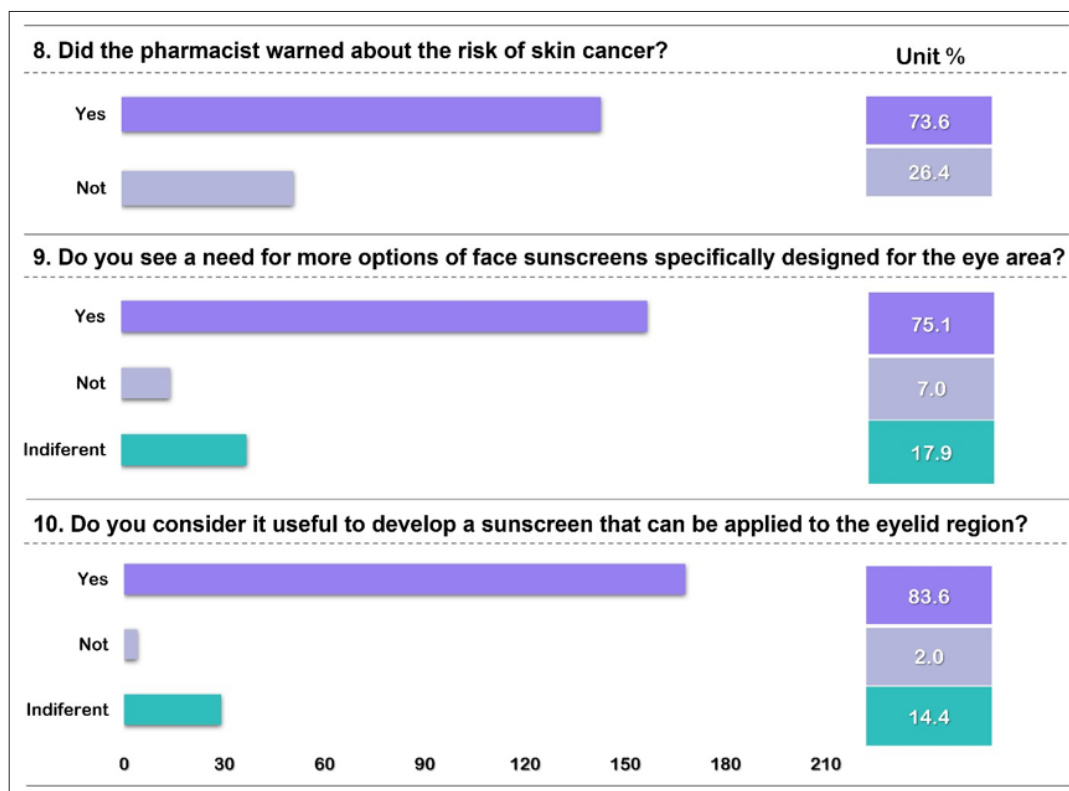


Figure S4: Answers About Awareness: Pharmaceutical Counseling

Discussion

Globally, skin tumour remains a major public health threat [15,16]. Despite the use of sunscreen, cases of BCC continue to develop in the eyelids, mainly in the lower lid compared to the upper lid due to not being protected by eyebrow [17]. The results of this study provide valuable insights into the awareness and knowledge levels among participants regarding BCC and its risk factors on the eyelid. The survey revealed that a significant proportion of respondents were unaware of the occurrence of skin tumours on the eyelid (20.9%), indicating a need for public health awareness efforts. This lack of awareness was more prominent among the general public compared to healthcare professionals (75.2% vs. 95.0%).

The findings showed that participants (35.8%) were unaware that BCC may resemble a chalazion, and this lack of knowledge was significantly higher among the general public than healthcare professionals (44.7% vs. 22.5%). These results underscore the importance of educating about the similarities between BCC and a chalazion.

Although the majority of respondents correctly identified the connection between ultraviolet radiation and the risk of developing eyelid tumours (84.6%), there was a small difference in awareness between healthcare professionals and the general

public (100.0% vs. 80.7%). Our results suggest that, although there is a marginally significant difference in the perception of eyelid BCC occurrence between male and female, this difference is not significant concerning age. Regarding ultraviolet light exposure, no significant differences were observed based on gender or age. This finding suggests the need for continued efforts to enhance public knowledge about the risks of ultraviolet radiation exposure and its impact on eyelid tumour development.

Notably, a statistically significant and robust correlation was found between female participation and the level of awareness regarding prevention, underscoring the influence of gender on this aspect. Advertising campaigns have given importance to the use of tinted sunscreen as a daily use make-up foundation, being a “2 in 1”, being convenient in women’s routine. This may explain the survey results correlation between the women participation (77.1%) and 84.6% knowledge that UV radiation from sunlight can increase the risk of tumour. Unfortunately, the number 29.9% is still low of participants who use it daily, regardless of the season of the year or whether they will be exposed to UV solar radiation.

The increased incidence of skin tumours can be attributed to higher levels of ultraviolet solar (UV) radiation caused by global climate change [3]. The fact that a high percentage of respondents recognised the importance of wearing a hat and sunglasses suggests

a growing awareness of the significance of eye protection against UVB rays and its role in preventing eyelid tumours. Additionally, the study reveals and emphasizes the need to address factors that may discourage individuals from using sunscreen, such as discomfort. This is crucial to improving overall sun protection practices and ultimately reducing the incidence of eyelid tumours.

The results obtained (55.2%) regarding the prevalent unknown location of eyelid BCC demonstrate the need for public health awareness efforts, as this may be one of the primary factors contributing to the high incidence of this disease.

The study findings highlight the significant role of pharmacists (73.6%) as proactive advocates in promoting awareness of the risks associated with skin tumours. Additionally, participants recognize the importance of the potential impact of tailored sun protection products in preventing eyelid tumours.

Pharmacists can raise awareness about the risk factors and warning signs of skin cancer, being in many places the only agents of healthcare promotion and prevention. They can educate patients on the importance of regular self-examinations and prompt medical evaluation if they notice any suspicious skin changes.

Primary prevention involves mitigating excessive exposure to solar radiation, which leads to oxidative stress, DNA damage, and the development of eyelid BCCs. On the other hand, secondary prevention entails a targeted approach to enable early detection of skin cancer lesions, facilitating timely interventions aimed at impeding disease progression and improving patient outcomes [3,14]. Accordingly, health literacy paramount importance in enabling patients to recognise primary lesions, while also equipping healthcare professionals with their specialised knowledge to deliver accurate information for differentiating between benign and malignant tumours [18-20]. For instance, eyelid basal cell

carcinoma can be present in different forms. The main clinical types of BCC include:[3]

Nodular or nodule-ulcerative: This is classic form of BCC, characterised by a shiny, firm, and indurated nodule with dilated blood vessels. The nodule may resemble non-cancerous lesions, such as chalazion-like nodules.

Pigmented: This type of BCC exhibits an increased concentration of melanin and may be mistaken for a melanoma due to its pigmented appearance.

Cystic: It presents as a dome-shaped, cystic nodule.

Infiltrative/sclerosing: This variant originates in the epidermis but invades the dermis-The margins of the lesion are not well delineated, resembling chronic blepharitis.

Ulcerative: This form is characterised by a large lesion with central necrosis.

Prevention strategies should be considered in reducing morbidity, thus, to provide evidence-based education on the prevention, early detection, and effective treatment of eyelid tumours, a variety of strategies need to be implemented. Thus, some examples of these strategies are presented in Figure 3. The role of the pharmacist in Public Health is decisive in contributing to the identification of people at risk, early detection of disease, competence in pharmacotherapy, in promoting good and healthy habits such as the use of sunscreen and referral of suspicious cases to specialised and appropriate medical care. To establish a comprehensive and multi-faceted approach to educate the population about eyelid BCC, healthcare teams can play a crucial role. These teams can support these efforts by implementing preventive measures, such as educational programmes and health campaigns that specifically target the reduction of excessive exposure to UV irradiation, particularly from solar radiation sources. Encouraging the use of sunscreen and the adoption of protective measures such as sunglasses and hats are strongly recommended.

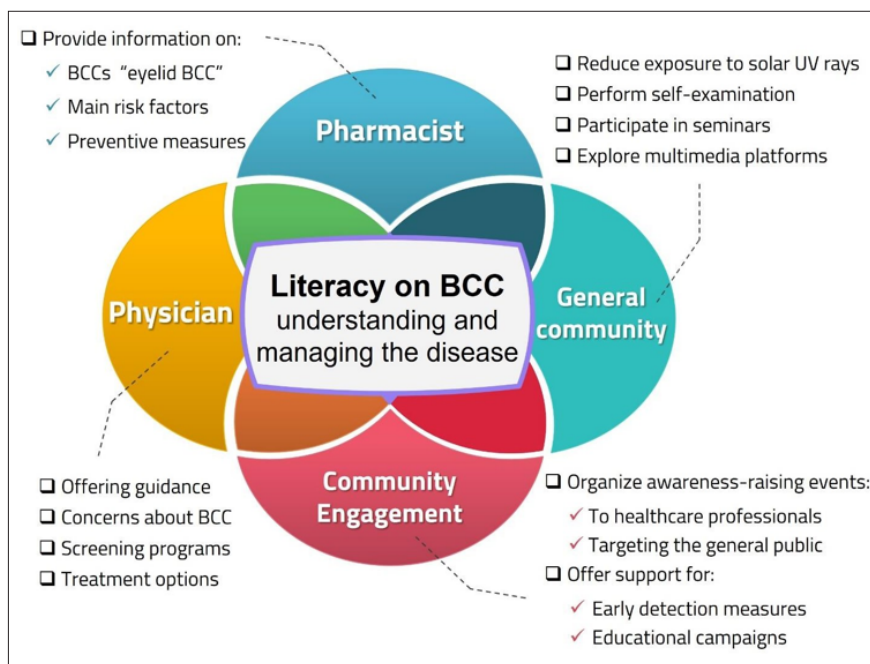


Figure 3: Literacy and Counseling on Basal Cell Carcinoma (BCCs).

The United Nations has established 17 Sustainable Development Goals, one of which aims to reduce the incidence of cancer by one-third by 2030 through comprehensive strategies encompassing prevention and treatment approaches [1].

In this context, the healthcare partnership pathway emphasises the significance of raising public awareness about BCCs. It aims to empower the public by providing them with knowledge about BCCs, its risk factors, and available treatment options. This

proactive approach is crucial for fostering understanding and effective management of the disease.

The unique characteristics of periocular skin render it susceptible to eyelid tumour development, impacting aesthetics and posing diagnostic challenges [21]. Healthcare professionals must be vigilant in recognising malignant features when evaluating eyelid lesions.

The study's limited number of participants may limit its generalizability to a larger population. Self-Selection Bias (participants who chose to respond may have a higher interest or awareness), potentially biasing the results. Cross-Sectional Design, the study's design only provides a snapshot and cannot establish causal relationships. The study identifies associations but cannot determine cause and effect. Grouping healthcare professionals together may not fully represent their individual knowledge levels. Respondents may provide socially desirable answers, leading to bias.

Conclusion

This study underscores the significance of enhancing public awareness and knowledge concerning BCCs. Efforts should focus on educating the general population about the prevalence of this tumour and its associated risk factors. Moreover, the development of specialized sunscreens for the ocular area could substantially improve prevention strategies. Pharmacists and other healthcare professionals play a pivotal role in advocating for preventive measures and raising awareness about eyelid BCC. The findings of this study hold crucial importance for public health initiatives. Therefore, further scientific investigations with larger cohorts and comprehensive reporting are necessary to facilitate the practical implementation of effective prevention strategies for eyelid BCC in real-world settings.

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Competing Interests

None declared by the authors.

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