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Environmental Skin Cancer Epidemiology-An Updated Review Article

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Abstract:

Background: Skin cancer, especially non-melanoma skin cancers and melanoma, has become a growing public health concern globally. The incidence and prevalence of these cancers have seen significant increases, with an estimated 4 million cases of basal cell carcinoma, 2.4 million cases of squamous cell carcinoma, and 0.4 million cases of melanoma globally by 2019. This upward trend underscores the need for effective prevention and treatment strategies, with Mohs micrographic surgery gaining prominence as an advanced treatment option due to its precision and high cure rates.

Aim: This review aims to examine the environmental risk factors contributing to the increasing rates of skin cancer, focusing on ultraviolet (UV) radiation, arsenic exposure, polycyclic aromatic hydrocarbons, cigarette smoke, and immunosuppression. It also discusses the role of climate change in exacerbating these risks and provides insights into the clinical management of skin cancer.

Methods: The article synthesizes data from global epidemiological studies and medical literature, highlighting the environmental factors that significantly contribute to skin cancer development. It incorporates evidence from recent studies and clinical practices to analyze the relationship between these environmental risks and the rise in skin cancer incidence.

Results: The review found that prolonged exposure to UV radiation is the primary risk factor for skin cancer, particularly non-melanoma skin cancers and melanoma. Other environmental risks, such as arsenic, polycyclic aromatic hydrocarbons, cigarette smoke, and certain medications, also increase the likelihood of

skin cancer. Additionally, climate change is exacerbating the risks by increasing UV exposure due to higher temperatures and ozone depletion.

Conclusion: The rising incidence of skin cancer is largely attributed to environmental risk factors, with UV radiation being the most prominent. Climate change is contributing to the intensification of these risks. Preventive measures, such as sun safety practices and increased public awareness of environmental risks, are crucial in combating the growing burden of skin cancer. Moreover, Mohs micrographic surgery remains an effective treatment option for managing skin cancer with minimal recurrence.

Keywords: Skin cancer, environmental risk factors, ultraviolet radiation, climate change, Mohs micrographic surgery, arsenic, polycyclic aromatic hydrocarbons, cigarette smoke, immunosuppression.

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Introduction:

Skin cancer has emerged as an increasingly significant public health issue, characterized by rising incidence and prevalence globally. Between 1990 and 2019, a discernible upward trend was observed in the rates of both non-melanoma skin cancers and melanoma. The Global Burden of Disease Study provides compelling evidence of this rise, with global incidence estimates for 2019 reaching approximately 4 million cases of basal cell carcinoma, 2.4 million cases of squamous cell carcinoma, and 0.4 million cases of melanoma [1][2]. This escalation underscores the growing burden of skin cancer and the need for robust intervention strategies. The management of skin cancer involves a range of treatment options, spanning both conservative and invasive methods. Among these, Mohs micrographic surgery stands out due to its precision in removing malignant tissue while preserving healthy surrounding structures. Mohs surgery, by offering high cure rates and minimal recurrence, has become a prominent choice in the treatment of certain skin cancers, particularly in areas where cosmetic and functional outcomes are crucial. This discussion aims to provide a comprehensive overview of the current state of knowledge regarding the epidemiology of skin cancer, with a particular focus on environmental risk factors. Among these, climate change-related influences are gaining increasing attention, as they exacerbate the conditions that facilitate skin cancer development. Clinicians engaged in this activity will explore the clinical indications for Mohs micrographic surgery in skin cancer treatment, as well as examine the role of community-based initiatives in addressing these risks. Furthermore, the importance of interprofessional collaboration will be highlighted, particularly in fostering awareness and promoting preventive measures within diverse populations.

Ultraviolet Radiation

Exposure to ultraviolet (UV) radiation from sunlight is universally acknowledged as the principal risk factor in the pathogenesis of skin cancer. This radiation has the potential to inflict substantial damage to the DNA within skin cells, ultimately promoting carcinogenesis. UV radiation is classified into three distinct types based on its wavelength: UVA, UVB, and UVC. Of these, UVA rays, with wavelengths ranging from 320 to 400 nm, are primarily responsible for photoaging, characterized by the degradation of collagen and elastin fibers in the skin. This process leads to the formation of wrinkles and other pigmentary alterations. UVB rays, with wavelengths between 290 and 320 nm, are the main cause of sunburns and contribute to skin cancer by inducing DNA mutations in skin cells. UVC rays, with wavelengths below 290 nm, are largely absorbed by the earth's atmosphere, particularly by the ozone layer, and thus do not significantly reach the surface of the earth.

Both natural and artificial sources of UV radiation, such as tanning beds, penetrate the skin and directly damage cellular DNA. One significant form of DNA lesion induced by UV radiation is the pyrimidine dimer, which predominantly forms when adjacent thymine or cytosine bases are affected in the DNA sequence [3]. While the body’s repair mechanisms attempt to rectify these lesions, prolonged or repeated UV exposure can overwhelm these systems, leading to the accumulation of mutations within skin cells. Chronic UV exposure is strongly associated with the development of non-melanoma skin cancers, while intermittent intense sun exposure, especially during childhood, is a primary risk factor for melanoma. Severe sunburns in early life are linked to a higher likelihood of melanoma in later years [4].

Considering the substantial risk that UV radiation poses for skin cancer, it is imperative to adopt preventive strategies. Clinicians should strongly encourage patients to engage in sun safety practices, including avoiding sun exposure between 10 AM and 2 PM, when UV radiation is most intense. Wearing protective clothing, a wide-brimmed hat, sunglasses, and utilizing sunscreen are key measures. Sunscreen should be broad-spectrum, protecting against both UVA and UVB radiation, with an SPF of 30 or higher, and should be reapplied every two hours. Additionally, clothing with an ultraviolet protection factor, designed to block UV rays, offers an added layer of defense.

Arsenic

Arsenic exposure is associated with an elevated risk of developing skin cancer, particularly non-melanoma skin cancers. Arsenic, a naturally occurring element, is commonly found in soil and groundwater, entering the human body through various pathways, including contaminated drinking water, food, and air [5]. High exposure levels are more likely in geographical areas with significant contamination or due to occupational or agricultural activities. Notably, the risk is particularly pronounced in individuals experiencing chronic exposure. While public water systems are routinely tested for arsenic levels, private wells often remain unregulated, and homeowners are responsible for monitoring their own water sources [6]. Chronic arsenic exposure manifests as hyperpigmentation and hyperkeratosis of the skin, with the hands being one of the most affected areas. Arsenic acts as a co-carcinogen, enhancing the cytotoxic and mutagenic effects of UV radiation on skin cells [7]. Consequently, individuals exposed to both arsenic and UV radiation have a significantly higher likelihood of developing skin cancer than those exposed to UV radiation alone. Efforts to prevent arsenic-induced skin cancer should focus on raising public awareness about groundwater arsenic contamination and its potential entry routes into the body.

Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) represent a class of chemicals consisting of multiple fused aromatic rings. These compounds are predominantly produced during the incomplete combustion of organic materials, such as wood, coal, oil, and tobacco [8]. As a result, PAHs are pervasive environmental pollutants found in various settings, including industrial processes, vehicle exhaust, and cigarette smoke. Upon entering the body, PAHs undergo metabolic conversion by enzymes, generating reactive oxygen species that contribute to oxidative stress. This stress damages DNA strands and cellular membranes, simultaneously reducing the levels of antioxidants that protect the skin. The aryl hydrocarbon receptor (AhR) plays a pivotal role in the initiation and progression of skin cancer, mediating inflammatory responses and regulating cell death. Through its activation, AhR facilitates the toxic and biochemical effects of air pollutants such as ozone, dioxins, and PAHs, further exacerbating skin cancer development [9].

Cigarette Smoke

Cigarette smoke contains a myriad of harmful chemicals and has long been implicated in cancers affecting various organs, including the respiratory, gastrointestinal, and genitourinary systems. Emerging evidence also suggests a significant correlation between cigarette smoke and the development of skin cancer. Specifically, cigarette smoking has been associated with an increased incidence of squamous cell carcinoma, particularly on areas such as the lips, ears, penis, and vulva [10]. The risk of developing skin cancer is particularly high in heavy smokers and individuals with prolonged exposure to cigarette smoke. Quitting smoking not only reduces the risk of skin and respiratory cancers but also confers broader cardiovascular health benefits, thereby improving overall well-being.

Immunosuppression and Medications Linked to Skin Cancer

Immunosuppression refers to the impairment of the immune system, which diminishes the body's capacity to protect against infections and abnormal cellular growth. Organ transplant recipients face an elevated risk of developing non-melanoma skin cancer, predominantly due to the immunosuppressive therapies prescribed to prevent organ rejection [11]. These medications, which are essential for the graft's survival, compromise the immune system, rendering it less effective at identifying and eliminating malignant cells. Consequently, skin cancers in transplant recipients are typically more aggressive, exhibit a

higher recurrence rate, and are more prone to metastasizing to other body parts [12]. As a result, these cancers often necessitate more extensive treatment and tend to have a poorer prognosis. The key immunosuppressive drugs include calcineurin inhibitors, such as cyclosporine; antiproliferative agents, such as azathioprine; mammalian target of rapamycin inhibitors, such as sirolimus; and corticosteroids, such as prednisone. Among these, cyclosporine forms the cornerstone of immunosuppressive therapy in transplant recipients. The use of calcineurin inhibitors has been linked to a significantly higher incidence of cutaneous squamous cell carcinoma, with the risk being 65 to 100 times greater than that of the general population [13]. Azathioprine, a well-known immunosuppressive, also increases the risk of cutaneous squamous cell carcinoma and, to a lesser extent, basal cell carcinoma [14]. Moreover, these medications are often prescribed in combination, further compounding the carcinogenic risk and elevating the probability of non-melanoma skin cancer development [15].

Other medications associated with an elevated risk of skin cancer include hydrochlorothiazide, methotrexate, and tumor necrosis factor (TNF) inhibitors. Hydrochlorothiazide, a diuretic commonly prescribed for hypertension, has been linked to an increased risk of non-melanoma skin cancer, particularly squamous cell carcinoma [16]. The precise mechanism remains unclear, though it is believed to be related to the photosensitizing effects of the drug, which increase the skin's sensitivity to UV radiation and enhance the likelihood of sunburn. Methotrexate, an antineoplastic agent that inhibits dihydrofolate reductase—an enzyme necessary for cell division—has been associated with an elevated risk of both melanoma and non-melanoma skin cancers due to its immunosuppressive and photosensitizing properties [17]. Additionally, biologic agents such as TNF inhibitors, which are frequently used to treat rheumatologic disorders, have been shown to increase the risk of developing non-melanoma skin cancers [18][19]. In addition to the aforementioned medications, many others possess photosensitizing properties, thereby heightening the risk of skin cancer. Antibacterial agents such as tetracyclines and sulfonamides, nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen, and antidiabetic medications like glipizide have all been demonstrated to enhance the skin's sensitivity to ultraviolet light [20][21].

Connecting Skin Damage with Climate Change

The shifting global climate and weather patterns, particularly the increase in the Earth's average surface temperature, are intrinsically linked to greenhouse gas emissions and disruptions in the carbon balance induced by human activities. These anthropogenic activities, including the burning of fossil fuels, industrial greenhouse gas emissions, and deforestation, have contributed to a significant reduction in the planet's carbon-absorbing resources [22]. Rising global temperatures may also influence human behavior by encouraging extended outdoor activities throughout larger portions of the year, which in turn increases UV exposure. This behavior, coupled with the depletion of the stratospheric ozone layer, exacerbates the total UV exposure the skin receives [23]. The extent of skin damage from UV radiation is influenced by ambient temperatures, with higher temperatures intensifying the damage at identical UV light levels [24].

Clinical Significance

Non-melanoma skin cancers, particularly basal cell carcinoma and squamous cell carcinoma, represent the most frequently diagnosed forms of skin cancer. These malignancies are less aggressive than melanoma, which is associated with higher mortality rates, yet they outnumber melanoma cases. Basal cell carcinoma typically manifests as pearly pink papules with rolled borders and telangiectasias, while squamous cell carcinoma appears as an erythematous, hyperkeratotic papule or plaque with central erosion. Melanoma, on the other hand, generally presents as an asymmetric, darkly pigmented nevus with irregular borders and a diameter greater than 6 mm. Although non-melanoma skin cancers are less likely to metastasize, squamous cell carcinoma exhibits a greater propensity for metastasis compared to basal cell carcinoma. Nevertheless, the clinical significance of these diseases should not be minimized. The observed increases in the incidence and mortality of non-melanoma skin cancers may be underreported, as certain cancer registries do not require their mandatory documentation [25]. Between 1990 and 2019, male patients in the United States experienced significantly higher rates of non-melanoma skin cancer, including incidence, prevalence, disability-adjusted life years, and mortality, when compared to females. The

mortality rate for males was 3.2 per 100,000 individuals, whereas for females, it was 1.4 per 100,000 individuals. While both melanoma and non-melanoma skin cancer incidences have risen, mortality rates have either stabilized or decreased. From 2007 to 2011, the estimated cost of treating skin cancer in the United States was substantial, amounting to $4.8 billion for non-melanoma skin cancer and $3.3 billion for melanoma, highlighting the significant financial burden these cancers place on the healthcare system [26].

A range of well-established risk factors contribute to the onset of skin cancer. These include ultraviolet (UV) radiation exposure, early-life severe sunburns, tanning bed use, exposure to carcinogenic chemicals such as arsenic and polycyclic aromatic hydrocarbons, tobacco smoke, weakened immune systems, and genetic predispositions such as a family history or a personal history of multiple melanocytic nevi [27]. Among these, UV radiation is the most prominent and direct cause of skin cancer [28]. Various factors are likely driving the observed increase in skin cancer incidence, including global climate change-induced rising temperatures and the heightened exposure to UVB radiation due to depletion of the stratospheric ozone layer. These environmental changes are thought to play significant roles in this trend [29]. The link between UV exposure and skin cancer pathogenesis has been well-documented, and there is growing awareness of this connection. Furthermore, heightened diagnostic vigilance and increased rates of screening biopsies have likely contributed to the rise in diagnosed cases [30].

Mohs Micrographic Surgery for Skin Cancer Management

A wide array of treatment options exists for skin cancer, with Mohs micrographic surgery emerging as a particularly effective method for achieving precise excision while conserving as much healthy tissue as possible. This advanced technique is predominantly utilized for non-melanoma skin cancers, yet it has also proven beneficial for treating rarer and more aggressive forms of skin cancer, such as melanoma and Merkel cell carcinoma. Mohs micrographic surgery is primarily indicated for high-risk skin cancers, as well as for tumors situated near critical structures or in areas where cosmetic outcomes are especially important. High-risk skin cancers typically include those with larger tumor sizes, more aggressive histologic subtypes, and cancers that exhibit resistance to previous treatments [31]. Additionally, this technique is particularly advantageous for tumors located in proximity to vital structures such as the eyes, nose, or ears, or in aesthetically sensitive regions, including the face, hands, and genital area [32]. Skin cancers with ill-defined margins, such as morpheaform or sclerosing basal cell carcinoma, can be challenging to remove entirely using conventional methods [33]. In these cases, Mohs surgery is an optimal solution due to its precision and the ability to confirm complete excision by examining the tissue margins during the procedure. Moreover, patients frequently choose Mohs micrographic surgery over other treatment alternatives because of its high cure rates and favorable cosmetic outcomes, ensuring both effective cancer treatment and minimal scarring.

Enhancing Healthcare Team Outcomes

Interdisciplinary collaboration plays a pivotal role in delivering holistic, patient-centered care, particularly in the complex management of skin cancer. This collaborative approach is crucial given the multifaceted nature of the disease, which requires the integration of diverse expertise for effective prevention, diagnosis, and treatment. Healthcare professionals, including nurses and advanced practice providers, occupy a key position in the frontline of patient care and significantly contribute to reducing the incidence of skin cancer. Due to their frequent interactions with patients, these clinicians are ideally situated to educate individuals about the importance of skin cancer prevention and early detection. By equipping these healthcare providers with comprehensive knowledge regarding the environmental risk factors for skin cancer, such as ultraviolet (UV) radiation exposure and the use of tanning beds, they can promote the adoption of sun-safe behaviors among patients. This includes encouraging regular self-examinations and professional skin screenings for early identification of suspicious lesions, which can lead to timely intervention and better outcomes. Furthermore, interdisciplinary collaboration extends beyond clinical environments to broader public health initiatives that aim to mitigate the overall burden of skin cancer on the population. Healthcare providers have an essential role in raising public awareness about the dangers of excessive sun exposure, promoting the consistent use of protective measures such as sunscreen

and clothing, and advocating for policies that foster sun safety. By leveraging the expertise and efforts of various professionals within and outside clinical settings, interdisciplinary collaboration is indispensable for comprehensive skin cancer care. Through education and advocacy, healthcare teams can significantly reduce the incidence and impact of skin cancer, leading to improved public health outcomes.

Epidemiological Data of Environmental Skin Cancer:

Skin cancer is one of the most common types of cancer worldwide, with its incidence continually rising, particularly in regions with high ultraviolet (UV) radiation exposure. Environmental factors, particularly UV radiation, play a dominant role in the pathogenesis of skin cancer. The epidemiology of environmental skin cancer provides valuable insights into its distribution, risk factors, and trends, which can inform public health strategies and prevention efforts. The global incidence of skin cancer has increased significantly in recent decades, with non-melanoma skin cancers, such as basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), being more prevalent than melanoma. Non-melanoma skin cancers are less aggressive but are still associated with considerable morbidity. In contrast, melanoma, although less common, carries a higher mortality rate due to its ability to metastasize rapidly. According to global estimates, the incidence of skin cancer is highest in countries located closer to the equator, where UV radiation is more intense. Countries such as Australia, the United States, and those in Southern Europe report some of the highest rates of skin cancer, which is consistent with their geographical locations and levels of sun exposure. Environmental factors are critical in understanding the rising rates of skin cancer, and UV radiation is the primary environmental risk factor. UV radiation is classified into two main types: UVA and UVB, both of which contribute to skin damage and carcinogenesis. UVA radiation is more prevalent and penetrates deeper into the skin, leading to premature aging and DNA damage. UVB radiation, although less prevalent, is more biologically active and is the primary cause of sunburn and DNA damage that leads to skin cancer. Chronic exposure to UV radiation, particularly in childhood and adolescence, is associated with an increased lifetime risk of developing skin cancer. The risk is further exacerbated by intermittent, intense sun exposure, such as that resulting from sunburns.

Epidemiological studies have shown a clear link between occupational and recreational UV exposure and the development of skin cancer. Outdoor workers, such as farmers, construction workers, and athletes, who spend prolonged periods exposed to sunlight, are at a higher risk for both non-melanoma skin cancers and melanoma. Similarly, individuals who frequently engage in recreational activities such as sunbathing or tanning are also at greater risk, especially if they have a history of severe sunburns. The rising popularity of indoor tanning, particularly among young individuals, has further exacerbated the problem of skin cancer. Studies indicate that individuals who use tanning beds are at a significantly higher risk of developing both melanoma and non-melanoma skin cancers, with the risk increasing with early and frequent use. In addition to UV radiation, other environmental factors contribute to skin cancer risk. Air pollution, particularly the presence of ozone-depleting chemicals and other environmental toxins, may exacerbate the effects of UV radiation by increasing the intensity of UV exposure. Deforestation and urbanization, which alter the natural landscape and contribute to the creation of "urban heat islands," also affect local climates and may lead to increased UV radiation exposure. Additionally, climate change, with its rising temperatures and shifting weather patterns, is predicted to further increase UV radiation exposure in many regions, thereby contributing to the higher incidence of skin cancer in the future. Certain demographic factors, such as skin type, age, and gender, also interact with environmental exposures to influence skin cancer risk. Fair-skinned individuals with a history of frequent sunburns are at the highest risk for developing skin cancer, as their skin lacks sufficient melanin to protect against UV damage. The elderly population, whose ability to repair UV-induced DNA damage decreases with age, is also at a higher risk. Furthermore, gender differences are evident in the epidemiology of skin cancer. Although both men and women are affected by skin cancer, studies suggest that men are more likely to develop non-melanoma skin cancers and have higher mortality rates from melanoma. Conversely, women are more likely to develop melanoma at a younger age, particularly in areas with intermittent sun exposure such as the legs.

In terms of geographical variation, skin cancer rates exhibit a notable increase in regions with high UV radiation exposure, particularly among individuals with lighter skin types. For instance, in countries like

Australia, skin cancer has reached epidemic proportions, with one of the highest rates of skin cancer in the world. The United States also reports high incidence rates, especially in states such as Arizona, California, and Florida, which experience higher levels of UV radiation. In Europe, Mediterranean countries like Spain and Italy also see a high incidence of skin cancer, particularly non-melanoma types, owing to their strong sun exposure during the summer months. While the incidence of skin cancer is on the rise globally, public health interventions have had some success in reducing the burden. Increased awareness campaigns and preventive measures, such as the promotion of sun-safe behaviors (e.g., sunscreen use, protective clothing, and seeking shade), have contributed to a reduction in the number of new cases in some regions. Additionally, early detection programs, such as regular skin examinations and public education on recognizing suspicious lesions, have improved survival rates for individuals diagnosed with skin cancer. In conclusion, the epidemiology of environmental skin cancer underscores the significant role of UV radiation and other environmental factors in the development of this disease. As the incidence of skin cancer continues to rise globally, understanding the environmental determinants of risk is crucial for developing targeted prevention and public health strategies. The interplay between environmental factors, demographics, and lifestyle behaviors highlights the complexity of skin cancer epidemiology, necessitating a multi-faceted approach to reduce the burden of this preventable disease. Public health initiatives, early detection efforts, and behavioral changes will be key in mitigating the future impact of skin cancer.

Conclusion:

The increasing incidence of skin cancer represents a significant public health challenge globally, driven by a combination of environmental and behavioral factors. Of these, ultraviolet (UV) radiation from sunlight remains the primary risk factor, significantly contributing to the development of both non-melanoma skin cancers and melanoma. The pathogenesis of skin cancer is primarily linked to the DNA-damaging effects of UV exposure, which can lead to mutations and ultimately malignant cell growth. Chronic exposure to UV radiation, especially intermittent intense sun exposure during childhood, is a major cause of non-melanoma skin cancers, while severe sunburns in early life are strongly associated with melanoma. Beyond UV radiation, other environmental risk factors, such as arsenic, polycyclic aromatic hydrocarbons (PAHs), cigarette smoke, and immunosuppressive medications, also play substantial roles in increasing the risk of skin cancer. Arsenic, often found in contaminated drinking water and soil, enhances the carcinogenic effects of UV radiation, leading to a higher incidence of skin cancers in areas with chronic exposure. PAHs, which are produced by incomplete combustion of organic materials, and cigarette smoke, containing a variety of carcinogens, have been linked to the development of skin cancer, particularly in the form of squamous cell carcinoma. Furthermore, immunosuppressed individuals, particularly organ transplant recipients, are at heightened risk of skin cancer due to the immunosuppressive therapies that weaken the body's ability to combat abnormal cell growth. In addition to these environmental risks, climate change is exacerbating the situation by contributing to rising global temperatures, which increase the intensity of UV radiation. This is compounded by the depletion of the ozone layer, which further enhances UV exposure. Changes in human behavior, such as spending more time outdoors due to longer, warmer summers, are also contributing to this increased exposure. As a result, the global burden of skin cancer is expected to continue to rise, further stressing the importance of prevention and early detection. Preventive strategies, such as promoting sun safety practices—avoiding midday sun exposure, wearing protective clothing, using sunscreen, and raising awareness about the dangers of tanning beds—are essential in mitigating the risks associated with UV radiation. In addition, public health initiatives should focus on addressing environmental pollution, such as arsenic contamination, and encourage healthier lifestyles to reduce smoking and other preventable risk factors. Enhanced vigilance and screening for skin cancer are also crucial, as early detection remains key to successful treatment outcomes. Among the various treatment options for skin cancer, Mohs micrographic surgery stands out as an effective and precise method for excising tumors while preserving surrounding healthy tissue. The high cure rates and low recurrence rates of this technique make it an invaluable tool for managing skin cancers, particularly those located in cosmetically and functionally sensitive areas. In conclusion, environmental factors, particularly UV radiation and climate change, play a significant role in the rising incidence of skin cancer. A multifaceted approach, combining prevention, early detection, and advanced treatment options, is essential to

addressing this growing public health issue. Public health efforts should focus on raising awareness, promoting preventive behaviors, and mitigating environmental risks to reduce the burden of skin cancer globally.

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الجلد البيني: مقال مراجعة محدث

الملخص:

الخلفية :أصبح سرطان الجلد، وخاصة سرطانات الجلد غير الميلانومية والميلانوما، مصدر قلق متزايد للصحة العامة على مستوى العالم. شهدت معدلات الإصابة والانتشار لهذه السرطانات زيادات كبيرة، مع تقدير حدوث 4 ملايين حالة من سرطان الخلايا القاعدية، و2.4 مليون حالة من سرطان الخلايا الحرشفية، و0.4 مليون حالة من الميلانوما عالميًا بحلول عام 2019. تؤكد هذه الزيادة على الحاجة إلى استراتيجيات فعالة للوقاية والعلاج، مع تزايد أهمية جراحة موهس المجهرية كخيار علاجي متقدم بسبب دقتها ومعدلات الشفاء العالية.

الهدف :يهدف هذا المقال إلى دراسة العوامل البيئية التي تسهم في زيادة معدلات الإصابة بسرطان الجلد، مع التركيز على الإشعاع فوق البنفسجي(UV) ، والتعرض للزرنيخ، والهيدروكربونات العطرية متعددة الحلقات، ودخان السجائر، وكبت المناعة. كما يناقش دور التغير المناخي في تفاقم هذه المخاطر ويوفر رؤى حول الإدارة السريرية لسرطان الجلد.

الطرق :يقوم المقال بتجميع البيانات من الدراسات الوبائية العالمية والأدبيات الطبية، مع تسليط الضوء على العوامل البيئية التي تسهم بشكل كبير في تطور سرطان الجلد. يتضمن المقال أدلة من الدراسات الحديثة والممارسات السريرية لتحليل العلاقة بين هذه المخاطر البيئية وزيادة معدلات الإصابة بسرطان الجلد.

النتائج :وجد المقال أن التعرض المطول للإشعاع فوق البنفسجي هو العامل الرئيسي لخطر الإصابة بسرطان الجلد، وخاصة السرطانات غير الميلانومية والميلانوما. كما أن المخاطر البيئية الأخرى مثل الزرنيخ، والهيدروكربونات العطرية متعددة الحلقات، ودخان السجائر، وبعض الأدوية، تزيد من احتمال الإصابة بسرطان الجلد. بالإضافة إلى ذلك، فإن التغير المناخي يزيد من تفاقم هذه المخاطر من خلال زيادة التعرض للأشعة فوق البنفسجية بسبب ارتفاع درجات الحرارة وتدهور طبقة الأوزون.

الاستنتاج :تعود الزيادة في معدلات الإصابة بسرطان الجلد إلى حد كبير إلى العوامل البيئية، مع كون الإشعاع فوق البنفسجي هو الأكثر بروزًا. يسهم التغير المناخي في تعميق هذه المخاطر. تعتبر التدابير الوقائية مثل ممارسات السلامة الشمسية وزيادة الوعي العام بالمخاطر البيئية أمرًا بالغ الأهمية لمكافحة العبء المتزايد لسرطان الجلد. علاوة على ذلك، تظل جراحة موهس المجهرية خيارًا علاجيًا فعالًا لإدارة سرطان الجلد مع الحد الأدنى من التكرار.

الكلمات المفتاحية :سرطان الجلد، العوامل البيئية، الإشعاع فوق البنفسجي، التغير المناخي، جراحة موهس المجهرية، الزرنيخ، الهيدروكربونات العطرية متعددة الحلقات، دخان السجائر، كبت المناعة.