

Research Paper

Epidemiological Evaluation of Basal Cell Carcinoma in Patients Referring to the Dermatology Clinic of Allameh Bohlool Gonabadi Hospital from 2016-2019



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**Keywords:**

BCC,  
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**ABSTRACT**

**Aims** Skin cancers are among the most prevalent skin diseases across the globe. In recent years, we are witnessing an increasing rate of skin cancer. Therefore, the present study aimed at epidemiological evaluation of basal cell carcinoma (BCC) in patients referring to the dermatology clinic of Allameh Bohlool Gonabadi Hospital from 2016 to 2019.

**Materials & Methods** The present retrospective cross-sectional study was conducted on patients with suspected BCC referring to the skin clinic of Allameh Bohlool Gonabadi Hospital from April 2015 to September 2018. Their skin biopsy samples were sent to Allameh Behlool Gonabadi Hospital Pathology Laboratory for diagnosis. Based on the research criteria, 149 completed pathology reports were examined, and BCC was on the list of clinical differential diagnoses of skin lesions. Data were analyzed in SPSS software (version 20). A p-value less than 0.05 was considered statistically significant.

**Findings** In the present study, the prevalence of BCC was calculated at 36.2%. Based on the location of the BCC lesion, the most affected area was the face. A statistically significant relationship was found between age and the prevalence of BCC. Nonetheless, the prevalence of BCC displayed no statistical relationship with gender and place of residence.

**Conclusion** As evidenced by the obtained results, old age and male gender increase the probability of facial BCC. This finding can be ascribed to more prolonged contact of the face with direct sunlight or carcinogenic substances; therefore, screening programs are recommended for the diagnosis of this disease in its early stages.

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مقاله پژوهشی

ارزیابی اپیدمیولوژیک کارسینوم سلول بازال در بیماران کلینیک پوست بیمارستان علامه بهلول گنابادی بین سال‌های ۱۳۹۵ تا ۱۳۹۸

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چکیده

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**هدف:** یکی از مهم‌ترین بیماری‌های پوست سرطان‌های پوستی می‌باشند، در سال‌های اخیر بروز سرطان‌های پوستی افزایش یافته است. بنابراین مطالعه حاضر با هدف ارزیابی اپیدمیولوژیک کارسینوم سلول بازال در بیماران کلینیک پوست بیمارستان علامه بهلول گنابادی بین سال‌های ۱۳۹۵ تا ۱۳۹۸ طراحی شده است.

**مواد و روش‌ها:** مطالعه حاضر یک مطالعه توصیفی-مقطعی می‌باشد که بر روی تمامی بیمارانی که از ابتدای سال ۱۳۹۵ تا انتهای نیمه اول سال ۱۳۹۸ مبتلا به نوعی ضایعه پوستی مشکوک به BCC بوده‌اند و نمونه بیوپسی پوستی آنان جهت تایید تشخیص از کلینیک پوست به آزمایشگاه پاتولوژی بیمارستان علامه بهلول گنابادی ارسال شده بود مورد غربالگری قرار گرفته و براساس معیارهای پژوهش تعداد ۱۴۹ برگه پاتولوژی تکمیل شده که BCC در لیست‌های تشخیص‌های افتراقی بالینی ضایعه پوستی بود، مورد بررسی قرار گرفت. داده‌ها با استفاده از نرم‌افزار SPSS نسخه ۲۰ و در سطح معنی‌داری کمتر از ۰/۰۵ تجزیه و تحلیل شد.

**یافته‌ها:** در مطالعه حاضر شیوع BCC ۳۶/۲ درصد محاسبه گردید، براساس محل ضایعه BCC، بیشترین محل درگیر مربوط به ناحیه-ی صورت با ۷۷/۷ درصد بود، بین سن و شیوع BCC ارتباط آماری معنی‌داری یافت شد، در حالیکه بین شیوع BCC با محل زندگی و جنس ارتباط آماری یافت نشد.

**نتیجه‌گیری:** یافته‌ها حاکی از آن بود افزایش سن و مرد بودن احتمال ابتلا به سرطان BCC را در ناحیه صورت افزایش می‌دهد. که می‌تواند به علت تماس بیشتر صورت با محیط بیرون و تابش مستقیم آفتاب و یا تماس بیشتر با مواد سرطان‌زا باشد بنابراین برنامه‌های غربالگری جهت تشخیص زودرس این بیماری در مراحل اولیه آن توصیه می‌شود.

کلیدواژه‌ها:

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## Introduction

**S**kin cancer is one of the most common skin diseases with a high prevalence across the globe. According to the World Health Organization, skin cancer affects three million people worldwide each year and is growing at an alarming rate. Skin cancer is one of the most prevalent malignancies, an expanding disease, and painful in appearance. This disease imposes substantial emotional and financial costs on the affected people. Each type of skin cell is responsible for the development of different skin cancers. Basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and melanoma are derived from basal cells, squamous cells, and melanocytes, respectively. [1, 2]. Previous studies have demonstrated that BCC is one of the most common types of cancer in Iran [1].

The most common types of skin cancer are non-melanoma malignancies, affecting between two and three million people per year. Nonetheless, this is a rough estimate since sufficient statistics are not available. About 80% of non-melanoma skin cancers are BCC, and the remaining 20% are SCC. BCC and SCC are rarely fatal. In the United States, less than 0.1% of cancer deaths are due to this particular type of cancer. Melanoma was diagnosed in 232,000 people in 2012, resulting in 55,000 deaths Worldwide. The highest rate of melanoma in the world is observed in Australia and New Zealand [3, 4].

According to studies conducted in Iran, the incidence rate of this cancer is about 16.51 new cases per 100 people. It is the most widespread cancer among men and the second most prevalent malignancy among women [3]. BCC arises from basal cells of the lower epidermis and mainly develops on sun-exposed areas of the skin. Various factors, such as genetics, immunodeficiency, light skin, and chronic exposure to sunlight, are involved in the pathogenesis. Since metastasis is rare in BCC lesions, the mortality rate of this malignancy is very low; nonetheless, local spread and malformation can be observed in this disease [5, 6].

A wide array of factors is involved in the development of cancer, including viruses and bacteria, as well as chemical, physical, genetic, and family factors [7]. According to studies conducted in the Netherlands and England, the causes of skin cancer can be increased outdoor activities without adequate clothing, increased travel to the beach, prolonged exposure to sunlight, and ozone depletion [8]. One of the critical risk factors associated with the development of skin cancer is sunlight and ultraviolet rays [9]. We should expect a high prevalence of skin cancers in Iran due to intense sunlight in most seasons and the frequent contact of farmers, ranchers, sailors, and

construction workers with sun rays [10]

Cancer epidemiology examines gender, age, social, economic, and occupational differences in people with cancer in the geographical regions of the same country and different countries [11]. Such descriptive studies are of great help in understanding the causes of various cancers. Considering the aforementioned issues and the absence of any epidemiological study on patients with BCC in Gonabad, the present cross-sectional study aimed at epidemiological evaluation of BCC in patients referring to the skin clinic of Allameh Bohlool Gonabadi Hospital.

## Materials and Methods

The present retrospective cross-sectional study was conducted on suspected BCC patients referred to the skin clinic of Allameh Bohlool Gonabadi Hospital from April 2015 to September 2018. The inclusion criteria entailed completed pathology reports and residing in Gonabad. The sample size was calculated at 120 cases based on the study by Balducci et al. [12] and considering a 95% confidence level. The data collection tool included a checklist containing subjects' demographic characteristics and the results of their pathology report, completed in Allameh Bohlool Gonabadi Hospital. After the approval of the study by the Vice-Chancellor for Research of Gonabad University of Medical Sciences and receiving the Code of Ethics (IR.GMU.REC.1398.089), sampling began via the census method. After obtaining the necessary permits to examine the pathology reports, the necessary arrangements were made with the officials of Allameh Bohlool Gonabadi Hospital and the laboratory. The researcher referred to the pathology laboratories of Gonabad and selected the research sample based on the inclusion and exclusion criteria.

The samples were selected via the census method, and all the pathology reports suspected of BCC from the beginning of 2015 to the end of the first half of 2018 were included in the study. Thereafter, the data (age, gender, location of lesion, place of residence, and type of pathology) were extracted from pathology reports and recorded in the checklist. Data were analyzed in SPSS software (version 20) using descriptive tests (mean and standard deviation, percentage and frequency) and analytical tests (Fisher's exact and independent t-test). A p-value less than 0.05 was considered statistically significant.

$$n = \frac{z^2 \cdot \left(1 - \frac{\alpha}{2}\right) \cdot P(1 - P)}{d^2} =$$

$$d=0,008 \quad p=200 \setminus 10^5$$

## Results

In this study, the data about 149 patients was analyzed. The prevalence of BCC in this study was obtained at 36.2%. Based on the results, the prevalence of this disease was higher in men (51.8%), and the highest was in 2017 (71.8%) (Table 1). In addition, based on Fisher's exact test, there was no statistically significant relationship between gender and the distribution of

facial BCC.

As illustrated in Table 2, the prevalence of BCC was 36.2%, the highest rate was related to the face (77.8%), and the most common type of BCC was nodular.

Based on Table 3, there is a statistically significant relationship between the incidence of BCC and the mean age of the subjects, and BCC is more common in older participants.

**Table 1.** Demographic characteristics of participants

Variable	Variable levels	Frequency (percent)
Gender	Female	77 (51.7)
	Male	72 (48.3)
Place of residence	City	140 (93.9)
	Village	9 (60)
Year of referral	2016	68 (45.6)
	2017	21 (14.1)
	2018	40 (26.8)
	2019 (the first half)	20 (13.4)
<b>Type of variable</b>	<b>Mean±SD</b>	
Age	Female	55.17±66.73
	Male	60.20±11.12
	No	266 (66.5)

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**Table 2.** Distribution of prevalence and location of basal cell carcinoma among participants

Variable		Frequency (percent)
Location of the lesion	Face	42 (77.8)
	Neck	1 (1.9)
	Upper limb	1 (1.9)
	Lower limb	1 (1.9)
	Head	6 (11.1)
	Ear	3 (5.6)
Type of basal cell carcinoma	Invasive	10 (18.51)
	Nodular	42 (77.7)
	Others	3 (5.55)
Basal cell carcinoma development	Yes	54 (36.20)
	No	95 (63.80)

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**Table 3.** Relationship between demographic variables and basal cell carcinoma in patients

Variable	Variable levels	Frequency		P- value
		Yes	No	
Gender	Male	29 (40.3)	43 (59.7)	*P=0.34
	Female	25 (32.5)	(67.5) 52	
Place of residence	City	(35.7) 50	(64.3) 90	*P=0.72
	Village	(44.4) 4	(55.6) 5	
<b>Type of variable</b>		<b>Mean±SD</b>		<b>P- value</b>
Age	Yes	66.16±4.72		**P<0.001
	No	52.18±9.40		

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Fisher's exact test \*\*Independent t-test

## Discussion

The present study aimed at the epidemiological evaluation of BCC in patients referring to the skin clinic of Allameh Bohlool Hospital in Gonabad. As suggested by the obtained results, out of 149 patients who underwent biopsy from 2016-2019, 54 (36.2%) cases were diagnosed with BCC. Other studies have

yielded contradictory results regarding BCC cases. For instance, a study by Qasemzadeh reported that the prevalence of BCC in patients referred to Imam Khomeini Medical Center in Tehran was 56% [3]. In their study, Almasi-Hashiani et al. investigated the incidence of skin cancer in Markazi Province and reported that the prevalence rates of BCC, SCC, and malignant melanoma in Markazi Province were 74.7%,

20%, and 5.3%, respectively [13]. In a study by Darjani et al., the prevalence of this disease in Gilan province was reported to be 66% [9]. In a retrospective cohort study by Goldenberg et al., the prevalence of this disease was 53% in the United States [14].

In their study, Yazdanfar and Ghasemi assessed the rate of skin cancers in patients referred to Sinai Hospital in Hamadan and reported that the most common pathological type of skin cancer was BCC (59%) [15]. In another study conducted by Valavi et al., who evaluated the prevalence of skin cancer in the southwest of Iran, BCC was observed in 70.4% of patients [16]. According to a study by Afzali et al. in 2013, the incidence of skin cancer is increasing in Iran [17].

According to the studies reviewed, the prevalence of BCC was higher than that reported in the present research, which can be ascribed to residents' occupation, genetic factors, family history, participants' previous diseases, such as skin cancer or any other type of skin lesion, the geographical area, skin color, the use of sunscreen cream, and regular visit to a dermatologist for the examination of skin lesions. According to the results of studies, the annual incidence of melanoma in the world is reported to be 3%-7% [18].

Among the risk factors associated with skin cancer are immunodeficiency, AIDS, living in high altitudes, burns, chronic and unhealed wounds, tobacco abuse, and human papillomavirus [19]. BCC is the most prevalent skin cancer in white people in the world, and one of the leading causes of its development is long-term exposure to sunlight in exposed areas, namely the head. This cancer mainly occurs on the face [20]. According to the results of the current study, the prevalence of BCC was higher in men than in women; however, no statistically significant relationship was detected. The results of a study by Budhiraja et al. in India indicated a higher prevalence of BCC cancer in women [21]. This discrepancy in the results of these two studies can be attributed to the longer exposure of men to sunlight in Gonabad.

According to this study, the most affected site of BCC lesions is the face. In the study by Rezaei et al. in Kermanshah, face was the most common location of BCC lesions (87.7%) [22]. In a similar vein, the face was the most common site of involvement in the studies by Yazdanfar [15], Almasi-Hashiani [13], and Valavi et al. [16], reporting prevalence rates of 61.2%, 45.2%, and 66.5%, respectively. The results of the study by Budhiraja et al. in India indicated that the most prevalent site of BCC is the nose [21]. The majority of studies were in agreement with our research, probably due to contact with direct sunlight and UV rays.

Ultraviolet wavelengths of 320-400 nm cause sun tan

and accelerate skin aging. Moreover, it causes erythema and DNA damage in the range of 280-320 nm [23]. The role of UV rays in carcinogenesis has been proven since 1992. The increase in cases of this cancer caused by UV rays is probably due to a combination of increased exposure to sunlight, increased outdoor activity, changes in the type of clothing, increased life expectancy, ozone layer depletion, genetics, and immunosuppression. The impact of ultraviolet rays on the skin can be classified into short-term effects, including tanning, vitamin D production, redness, and sunburn, and long-term effects, including lentigo, Actinic keratosis, BCC, SCC, melanoma, skin aging, and telangiectasias.

Intermittent but intense exposure to UV, which occurs in sunburns and tanning, causes BCC; nonetheless, continuous exposure (cumulative effect) increases the risk of SCC [24]. In our study, there was no significant relationship between facial BCC and gender. In line with the preset research, in the study by Memar et al. in Mashhad, there was no significant relationship between the prevalence of facial BCC and gender. This lack of association can be ascribed to women working in the outdoor environment and livestock farming without proper protection and sunscreen and, as a result, direct contact with sunlight and UV rays.

In accordance with the results of the present research, there was a significant relationship between the incidence of BCC and the mean age of subjects in the studies by Musah et al. in England [25], Almasi-Hashiani in Markazi province [13], Yazdanfar and Ghasemi in Hamadan [15], Valavi et al. in southwest of Iran [16], and Rezaei et al. in Kermanshah [22]. This finding can be due to the marked increase in the duration of exposure to sunlight and ultraviolet rays.

Furthermore, in the studies by Muzah in England [25], Almasi-Hashiani in Markazi Province [13], Yazdanfar and Ghasemi in Hamedan [15], and Valavai in the southwest of Iran [16], the mean age of patients with BCC was higher compared to that obtained in our study, which can be attributed to better care, genetic issues, people's occupation, their skin type, the geographical area where the subjects live, the high mean age of the entire population in the region, family history, and the history of previous diseases. In any case, the low mean age of subjects with BCC highlights the critical need to pay more attention to BCC and the periodic examinations of those at risk.

In our research, there was no significant relationship between the incidence of BCC and gender. Nevertheless, a significant relationship was found between the incidence of BCC and gender in the studies performed in Australia [26], England [25], and Iran in Markazi [13], Hamedan (prevalence of BCC in men was

65.1% in this study) [15], and Kermanshah provinces (out of 119 patients, 52.1% were men and 47.9% were women) [22]. This lack of association between gender and BCC can be ascribed to the employment of many women in agriculture, animal husbandry, and outdoor jobs and, as a result, long-term contact with sun and UV rays without protection.

In this study, there was no significant relationship between the incidence of BCC and the place of residence. However, the review of other studies, such as the research by Perera et al., demonstrated that BCC is more common in Australia than in Europe [26]. Moreover, locations near the equator and at higher altitudes have higher rates. In addition, Musah et al. conducted a systematic review study on all patients with BCC using data recorded in the UK health network from 2004 to 2010. They reported a significant relationship between the incidence of BCC and local area deprivation level, signifying that the prevalence of BCC is significantly higher among people residing in these areas [25].

In contrast to our research, these studies pointed to a significant relationship between the incidence of BCC and the place of residence, which can be due to working outdoors without protection from direct sunlight and UV radiation. In this study, the highest prevalence was related to nodular BCC (77.77%), and in both men and women, the highest frequency of BCC pertained to nodular lesions. The study by Rezaei et al. entitled "Clinical types and characteristics of basal cell carcinoma in Kermanshah province in 2009" demonstrated that the most common pathological type of BCC was nodular [22].

## Conclusion

As evidenced by the results of this study, the prevalence of BCC is higher in men than in women. Moreover, it more frequently affects older adults, and the face is the most common site of involvement in both men and women. Considering the geographical location

of Gonabad, where there is abundant sunshine on most days of the year, and residents' occupations, including agriculture, animal husbandry, and outdoor jobs under the sunlight, screening programs are recommended for the diagnosis of this disease in its early stages. It is worth noting that, unlike other studies, all suspicious and differential samples were tested for the possibility of BCC in this research.

## Ethical Considerations

### Compliance with ethical guidelines

this research has been registered with the ethical code number (IR.GMU.REC.1398.089) at Gonabad University of Medical Sciences.

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### Authors' contributions

Determining research objectives, research, analysis, and collection: Maryam Khakestani, Dr. Hamideh Mohammadzadeh; data analysis: Dr. Ali Alami; editing and finalizing the article: Maryam Khakestani, Dr. Hamida Mohammadzadeh, and Dr. Ali Alami; and final reading and approval: all authors.

### Conflicts of interest

The authors declare that they have no conflict of interest in the present study.

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