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ORIGINAL PAPER

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# Analysis of the Skin Basocellular Carcinoma (BCC) Among the Smokers in Bosnia and Herzegovina

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## ABSTRACT

**Aim:** The aim of this article is to determine the possible correlation between the smoking habit and the incidence of basocellular skin cancer (BCC).

**Patients and methods:** The prospective study, which lasted from June 2012 to June 2018, included subjects diagnosed with basocellular skin cancer (BCC). Respondents were divided into 3 groups. The first, group A (21 respondents), are respondents who smoke 20-35 cigarettes a day. The second, group B (19 respondents), consists of respondents who smoke 35-50 cigarettes a day. The third, group C (91 respondents), consist of non-smokers. Observed parameters are sex, age, current and previous smoking habits, including duration (total smoking year) and intensity (average number of cigarettes smoked per day), age at the start of smoking, and prolonged exposure to the sun. **Results:** No statistically significant relationship was found between smoking and BCC frequency. It was shown that with BCC of the skin was more affected those who did not smoke. There is no clear relationship between the duration of smoking and/or the amount of smoking and the development of BCC, and it follows that this relationship is not likely to be causative. A suggestive, but not significant, evidence of relationship between smoking and skin cancer is found at this time. **Conclusion:** Since it is a conglomerate of possible etiological factors, further research is needed to definitively clarify the effect of tobacco consumption on the development of BCC by monitoring a larger number of respondents over a longer period of time in large prospective studies. In any case, a possible association with skin cancer is a reason to avoid smoking.

**Keywords:** smoking, basocellular cancer, skin.

## 1. INTRODUCTION

Despite the availability of smoking-awareness information and carcinogenic smoking-awareness campaigns, this phenomenon remains an unsolvable social problem to date. The full range of harmful effects of smoking on health today is quite clear. Within the evaluation of possible causes of increased incidence of carcinoma of the skin, it seems reasonable to examine the possible impact of smoking.

Skin cancer is the most common malignancy of the human population. Basocellular carcinoma (BCC) is a major burden on global public health due to its very high incidence in relation to all other carcinomas (1, 2). The ultraviolet sunlight is characterized as the main etiological factor (3), but other lifestyle factors can also be involved. In fact, sun cannot be the only reason for the appearance of skin cancer. One of the possible risk factors for the development of skin cancer may be smoking. Smoking cigarettes can play a role in the causality of the BCC given its moderate high prevalence in most populations and established carcinogenic effects (4, 5).

## 2. AIM

Bearing in mind the heterogeneity of the published literature on the topic, the goal is to determine the possible correlation between the smoking habit and the incidence of kin BCC in BiH among citizens in Bosnia and Herzegovina and assessing whether there is a correlation between the smoking intensity (the number of cigarettes and the smoking duration) and the BCC.

### 3. PATIENTS AND METHODS

The prospective study, which lasted from June 2014 to June 2018, included 131 subjects diagnosed with basocellular skin cancer (BCC). Respondents were divided into 3 groups. The first, group A (21 respondents), consist of respondents who smoke up to 20-35 cigarettes a day. The second, group B (19 respondents), consists of respondents who smoke from 35 to 50 cigarettes a day. The third group, group C (91 respondents), consist of non-smokers.

Respondents of both sexes with the diagnosis of BCC provided information on smoking status and if they declared themselves as smokers they answered on: current and past smoking habits, including duration (total years of smoking) and intensity (average number of cigarettes smoked daily), age at the beginning of smoking and possible prolonged exposure to the sun.

### 4. RESULTS

The relationship between the number of cigarettes and sex is statistically significant. Namely, women (statistically) significantly more often belong to group B of smokers, who smoke more cigarettes ( $p < 0.01$ ).

The onset of smoking and belonging to group B (according to the number of smoked cigarettes) is significantly correlated ( $p < 0.05$ ). At the same time, the age of the respondents and the smoking period, as the observed characteristics, did not show statistical correlation (Tables 1-4).

Gender	Group A	Group B	Group C
Female	6 (28.6%)	14(73.6%)	33(36.2%)
Male	15(71.4%)	5(26.4%)	58(63.8%)
Total	21(100%)	19(100%)	91(100%)
Total	40(100%)		91(100%)
Total	131 (100%)		

Table 1. The sex of respondents with diagnosed BCC

Age	Group A	Group B	Group C
40-50	2(9.6%)	3(15,8%)	5(5,5%)
51-60	3(14.3%)	3(15,8%)	11(12,1%)
61-70	8(38%)	7(36,8%)	33(36,3%)
71-80	5(23.8%)	4(21%)	23(25,3%)
81-90	3(14.3%)	2(10,6%)	19(20,8%)
Total	21(100%)	19(100%)	91(100%)
Total	40(100%)		91(100%)
Total	131(100%)		

Table 2. Age of respondents with diagnosed BCC

Age when started smoking (Years)	Group A	Group B
Before 18	6(28.6%)	12(63,2%)
After 18	15(71.4%)	7(36,8%)
Total	21(100%)	19(100%)
Total	40 (100%)	

Table 3 Smokers with BCC in relation to age of smoking onset

Smoking duration (Years)	Group A	Group B
10-20	2(9.6%)	1(5,2%)
21-30	4(19.1%)	6(31,6%)
31-40	8(38%)	6(31,6%)
41-50	7(33.3%)	6(31,6%)
Total	21(100%)	19(100%)
Total	40 (100%)	

Table 4. Smoking with BCC in relation to smoking duration

### 5. DISCUSSION

A prospective analysis examined the association of smoking habits and the frequency of skin BCC in a population group of a total of 131 respondents of both sexes who suffered from BCC, taking into account established risk factors.

The youngest respondent was 43 years old and the oldest respondent was 89 years old. Although BCC is thought to be more common in the male population, there are also studies pointing to a higher incidence of BCC in the female population (6, 7).

Our research has shown that BCC is more common in men, or 78 (59.5%) of them while 53 (40.5%) respondents were women.

A consensus on the impact of poor living habits, such as smoking, alcoholism, and similar, on the development of basocellular carcinoma of the skin (BCC) currently does not exist.

The cigarette smoke contains several carcinogenic compounds and has been shown to have an etiological effect in at least 18 types of cancers (8), but evidence of skin cancer is contradictory.

It is unclear whether smoking modifies the risk of BCC. In a few previous studies, no association with smoking has been revealed (9), while other studies have indicated that smoking can increase the risk of BCC in heavy smokers (10) or even be protective factor (11).

In two recent meta-analyzes, where the relationship between smoking and BCC was tested, inconsistent results were obtained. The first, which is a more extensive meta-analysis, did not show an increased risk of BCC in respondents who were smokers (12). Another analysis showed a slightly increased risk of BCC among former smokers (13).

And other researchers consider that the consumption of tobacco (and alcohol) is not a decisive etiological factor that affects the formation of basocellular skin cancer (14).

A study by Hughes and associates (5), shows a modest inverse relationship between current smoking and BCC, but it has nothing to do with former smoking. Study by Corona et al. found an unknown increased risk for current smokers (15).

On the other hand, there are researchers who believe that poor habits such as tobacco smoking and alcohol are factors that have an important influence on the emergence of basocellular skin cancer (16, 17).

Our research has shown that skin BCC is more present in non-smoking population. Namely, 91 (69.5%) of our BCC patients were not in the smoker's group.

It is generally accepted that natural factors such as photo

types of the skin, eye and hair color and possible exposure to the sun, are risk factors for the development of skin cancer, while ultraviolet (UV) radiation is an established risk factor for the environment (18).

At the same time, out of the total number of our respondents, 57 (43.5%) stated that they were more exposed to the sun for daily activities, while 74 (56.4%) did not usually have prolonged exposure to the sun.

Several studies presented reports stratified by sex and BCC location on the body, but most studies did not include frequency or duration of smoking (such as total smoking duration in years, how many cigarettes per day and boxes per year) (19-21).

At the same time, in a study published by Hughes et al. (5), there was no clear relationship between the duration of smoking or the number of smoked cigarettes and the development of the BCC, which probably led to the absence of conclusion on causality in this relation.

Our analysis showed that the majority of those with BCC who are smokers (40 or 30.5% of them) use cigarettes for 20-50 years. At the same time, 21 (52.5%) respondents smoke up to 35 cigarettes per day, and 35-50 and more cigarettes daily smoke 19 (47.5%) respondents.

Johnson et al. believes that tobacco smoking suppresses immune functions, resulting in a loss of immunological control, an important element in the carcinogenesis of the skin (22).

Smoking has been shown to reduce coronary blood flow and suppress immune responses, which can increase the risk of skin cancer (23), and on the other hand there is the possibility that smoking can protect the skin from an inflammatory reaction induced by UV radiation, which reduces the risk of skin cancer (24).

Although smoking is likely to affect the development of BCC, other explanations appears, such as: socioeconomic status, obesity and/or lack of physical activity or caffeine intake, although extensive investigation analyzes failed to find evidence for this (5).

Epidemiological studies are useful for identifying the correlation between illness and exposure to a particular noxae, but cannot reliably determine causality. Therefore, further research is needed to explain the observed associations, using well-designed, randomized, controlled studies on a smoking cessation strategy in high-risk groups (25)

It is important for clinicians to actively investigate high-risk patients, including current smokers, and to identify initial skin carcinoma, as early diagnosis will improve the prognosis and contribute to the easier and successful BCC treatment (25).

## 6. CONCLUSION

No statistically significant relationship was found between smoking and BCC frequency. It was shown that with BCC of the skin was more commonly affected those who did not smoke. There is no clear relationship between the duration of smoking and/or the number of smoked cigarettes and the development of BCC, and it follows that this relationship is not likely to be causative.

A suggestive, but not significant, evidence of relationship between smoking and skin cancer is found at this time.

Since it is a conglomerate of possible etiological factors, further research is needed to definitively clarify the effect of tobacco consumption on the development of BCC by monitoring a larger number of respondents over a longer period of time in large prospective studies. In any case, the possible association with skin cancer is another reason to avoid smoking.

- **Author's contribution:** D.L., R.F., V.J., A.S. and B.P. gave substantial contribution to the conception or design of the work and in the acquisition, analysis and interpretation of data for the work, Z.K., G.P., D.I. and I.G. had role in drafting the work and revising it critically for important intellectual content. Each author gave final approval of the version to be published and they are agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
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