
ORIGINAL ARTICLE

Lifestyle risk factors and comorbidities of cancer patients in a country with limited resources

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ABSTRACT

Aim To investigate quality of life and exposure to lifestyle risk factors of cancer patients in Bosnia and Herzegovina and a correlation of cancer type with lifestyle risk factors.

Methods This was a cross-sectional study conducted on 200 cancer patients from the Clinical Centre of the University of Sarajevo. The respondents completed an anonymous questionnaire consisting of seven sections: basic patient information, physical activity, dietary habits including alternative medicine, tobacco use, alcohol consumption, anxiety, and comorbidities.

Results A total of 150 (75%) patients were overweight with 113 (56%) of them being less physically active after the confirmed diagnosis. After the diagnosis, 79 (40%) patients ate less food, and 154 (77%) healthier; 130 (65%) reported consumption of alternative medicine and food supplements, 39 (30%) spent >1/4 of average monthly salary on these products. Majority never consumed alcohol, 135 (68%) and 101 (51%) patients reported history of tobacco use. Being obese was an independent predictor for colorectal carcinoma; being less obese was linked to a decreased risk of breast cancer diagnosis. Physical activity was linked to a decreased risk of lung cancer diagnosis. Many patients (122; 61%) reported having chronic comorbidities, mostly hypertension, while 44 (22%) patients were proven to be clinically anxious.

Conclusion Our data suggest lack of public awareness of the consequences of unhealthy lifestyles. Risk factors such as alcohol consumption and tobacco use differed from other European countries. Significance of lifestyle changes after the diagnosis for reducing mortality and cancer recurrence requires further research. Prevention programs and more data are needed.

Key words: body weight, Bosnia and Herzegovina, diet, medical oncology, tobacco use

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INTRODUCTION

Incidence of cancers has increased in the last years due to aging population, as well as greater exposure to cancer risk factors (1). According to Globocan (2), estimated cancer incidence in 2018 was 18 million cases worldwide, accounting for 9.5 million deaths. Data from Bosnia and Herzegovina (B&H) in 2018 estimated 14.385 new cancer cases and 9.012 deaths, with lung and breast cancer as the most common among males and females, respectively (2).

Up to 95% of cancers are linked to environmental and lifestyle factors (1), therefore prevention is the best strategy in the fight against cancer. Overweight individuals are at a greater risk of multiple malignancies, including colorectal, pancreatic, liver, kidney, breast and prostate cancer (3,4). After the diagnosis and during treatment, patients often have reduced physical activity and well-being, as well as significant weight loss and cachexia, leading to malnutrition (5). Malnutrition can influence the effectiveness and success of chemotherapy, radiotherapy, and cancer-related surgery due to changes in metabolism, pharmacokinetics and healing dynamics (6).

Various lifestyle behaviours, such as diet, smoking and alcohol consumption, have also been linked to the development of common cancers and may contribute to the overall survival rate of patients (7,8). Tobacco use, primarily cigarette smoking, is the largest exogenous carcinogen linked to lung, oesophagus, larynx, mouth, kidney, bladder, liver, pancreas and other cancers (9). Most studies evaluating the effects of smoking cessation after a cancer diagnosis on overall mortality, demonstrate a significant benefit of quitting smoking (10). Chronic alcohol consumption is associated with increased risk for respiratory tract, upper digestive tract, liver, colon, rectum and breast cancer (11). Studies suggest that adherence to a healthy dietary pattern is inversely associated with overall mortality, whereas an unhealthy Western dietary pattern is positively associated with the risk of overall mortality among cancer survivors (12).

Cancer patients often develop a chronic, clinically significant syndrome of psychosocial distress having depressive disorders, anxiety, and reduced quality of life. A previous meta-analysis reported that

30% to 40% of patients with various types of cancer have some combination of mood disorders (13).

Screening is of great importance for early cancer detection. Screening programs significantly improve public and individual health, but only if they are well organized and if they include overall target population (14). These programs for secondary cancer prevention are not a legal obligation in B&H and they are available for health insured people. Another problem are long waiting lists for diagnostic procedures in public health facilities. This is one of the few countries in Europe which does not have a national program for early detection of specific cancers.

There is a significant lack of information about the quality of life of cancer patients in B&H, since this is a developing country with limited resources. There is a lack of similar data in the region as well. Most of the studies related to quality of life had small sample size for individual cancers (15-17). Deficiency of statistical data disables health costs planning and rationalization.

The aim of this study was to investigate quality of life of cancer patients in B&H and a correlation of cancer type with exposure to lifestyle risk factors, with a specific focus on habits after diagnosis, considering parameters of physical and mental state. Our hypothesis is that some risk factors and habits are unique in B&H and different from other Balkan countries.

PATIENTS AND METHODS

Patients and study design

This was a cross-sectional study on patients treated at the Clinic of Oncology, Clinical Centre of the University of Sarajevo, B&H. The study was conducted from 02 April to 30 October 2019. The research was accepted and approved from the *Institute for Scientific Research* and Development of the Clinical Centre of the University of Sarajevo and completed in compliance with the Helsinki Declaration.

The respondents completed an anonymous questionnaire, which took approximately 10 minutes to complete. The study followed a stratified multistage random sampling design to represent the socio-epidemiological characteristics of Bosnian population. A total of 200 patients completed the questionnaire.

Methods

The questionnaire consisted of 7 sections: the basic information about patient (i.e. age, gender, occupation, date of oncological diagnosis etc.), physical activity practices, food and alternative medicine consumption habit, smoking habit, alcohol intake anxiety level and comorbidities among the patients.

Body Mass Index (BMI) was calculated from patients height and weight. Having BMI below 18.5 kg/m² was considered as underweight, from 18.5 to 24.9 kg/m² as normal weight, from 25 to 29.9 kg/m² as overweight and above 30 kg/m² as obese.

Monthly expenditure on alternative medicine supplements compared to average salary was calculated by dividing the reported expenditure on these products with average salary in B&H.

To assess anxiety levels a Self-rating Anxiety Scale (SAS) was used. The 20-question SAS is based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) definitions of anxiety (18). Respondents were asked to indicate how they felt according to “None or a little of time” (scored as 1), “Some of the time” (2), “Most of the time” (3) or “All of the time” (4). Total score from this scale ranged from 20 to 80, and higher score indicated the person with greater anxiety. Zung (18) stated that raw scores above 36 indicated that patients had “clinically significant” anxiety.

Statistical analysis

Descriptive statistics summarized the data. The results were shown in frequencies and percentages. Differences between age, gender, BMI and diagnosis in respect of frequency were also assessed by conducting binary logistic regression and the Mann Whitney U test. Correlation between parameters was assessed by Pearson Correlation test.

RESULTS

In total, 206 patients treated at the Clinic of Oncology at Clinical Centre of the University of Sarajevo responded to the survey. After excluding six patients because of lack of data regarding their diagnosis, the final sample consisted of 200 patients. Female patients were predominant, 139 (69.5%). The mean age was 57.89±11.62 years (range 24-83 years).

The vast majority reported living in an urban area, 166 (83.0%) The highest prevalence of malignancies in our sample was for breast cancer patients 81 (41.8%), followed by colorectal carcinoma 43 (22.2%) and lung cancer 15 (7.7%) (Table 1).

Table 1. Distribution of cancer diagnoses in patient cohort according to place of residence

Type of cancer	No (%) of patients		
	Urban	Rural	Total
Breast cancer	70 (86.5)	11 (13.5)	81 (41.8)
Colorectal carcinoma	37 (86.1)	6 (13.9)	43 (22.2)
Lung cancer	12 (80.0)	3 (20.0)	15 (7.7)
Cervical cancer	11 (78.6)	3 (21.4)	14 (7.2)
Ovarian cancer	7 (70.0)	3 (30.0)	10 (5.2)
Prostate cancer	6 (85.8)	1 (14.2)	7 (3.4)
Pancreatic cancer	3 (60.0)	2 (40.0)	5 (2.6)
Testicular cancer	5 (100)	0 (0.0)	5 (2.6)
Stomach cancer	1 (33.3)	2 (66.66)	3 (1.5)
Melanoma	2 (100)	0 (0.0)	2 (1.0)
Endometrial cancer	2 (100)	0 (0.0)	2 (1.0)
Larynx cancer	2 (100)	0 (0.0)	2 (1.0)
Nasopharyngeal cancer	1 (100)	0 (0.0)	1 (0.5)
Cholangiocarcinoma	1 (100)	0 (0.0)	1 (0.5)
Myoepithelioma	0 (0.0)	1 (100)	1 (0.5)
Mesothelioma	1 (100)	0 (0.0)	1 (0.5)
Thyroid cancer	1 (100)	0 (0.0)	1 (0.5)

The BMI ranged from 16.5 to 47.3 kg/m² with a median value of 25.9 kg/m². Most of the patients were overweight, 150 (75%), followed by 39 (19.5%) obese and 5 (2.5%) underweight patients. Only 6 (3%) patients had BMI within the normal range.

Majority of patients reported doing low intensity type of physical activities, which included long walks, low intensity cycling or yoga, 142 (71%). Being diagnosed made a change in physical activity: 113 (56.5%) patients being less physically active, 21 (10.5%) reported being involved in more physical activity, and 65 (32.5%) reported no change in physical activity habits. Our study showed that higher BMI significantly increased the probability of developing colorectal carcinoma (OR=1.063; 95% CI 1.001-1.130; p=0.047) and breast cancer (OR=1.463; 95% CI 1.263-1.694; p<0.001), and decreased the risk for developing lung cancer (OR=0.603; 95% CI 0.447-0.814; p=0.001). Being physically active also decreased the risk for developing lung cancer (OR=0.138; 95% CI 0.032-0.604; p=0.009).

Most of the patients consumed 3 meals/day, 153 (76.5%), followed by 36 (18%) patients who consumed 2 meals/day and 11 (5.5%) patients who consumed only 1 meal/day (Table 2).

Table 2. Food consumption habits of patients with cancer

Consumption habit	No (%) of patients			
	Fruits and vegetables	Refined sugars and sweets	Red meat	Milk and dairy products
Every day	168 (84.0)	27 (13.5)		
3-4 days a week	18 (9.0)	12 (6.0)	144 (72.0)	171 (85.5)
1-2 days a week	12 (6.0)	47 (23.5)		
Never	2 (1.0)	114 (57.0)	56 (28.0)	29 (14.5)

After the diagnosis, 89 (44.5%) patients did not change the amount of food they ate per day, while 79 (39.5%) ate less, and 32 (16%) patients started eating more. On the other hand, 154 (77%) patients reported that their diet was healthier after the diagnosis, and almost two thirds, 130 (65%) had been using some form of supplements and alternative medicine products. Breast cancer patients were more prone to consume alternative medications than other oncological patients (p=0.009).

Monthly expenditures on these supplements was for the vast majority, 87 (43.4%) patients, between 25 and 100 €, followed by 44 (22.1%) patients who spent between 100 and 250 € monthly in average (Figure 1).

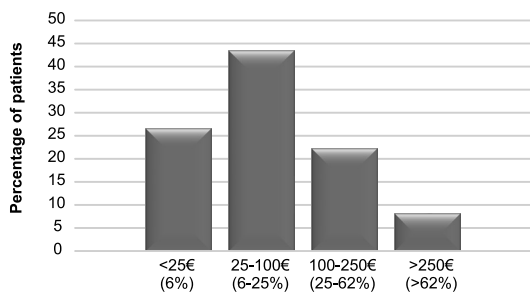


Figure 1. Monthly expenditure in euro (€) on alternative medicine in the patients with cancer

Current tobacco use was reported by 57 (28.5%) patients, but more than half, 101 (50.5 %) had smoking history. The majority of smokers were tobacco users for more than 20 years, 116 (73.3%). The diagnosis changed the pattern of tobacco consumption, 34 (21.3%) reported that they quit smoking, 32 (20%) smoking less, and 2 (1.3%) reported smoking more (Figure 2).

The majority patients never consumed alcohol, 135 (67.5%), 36 (18%) patients consumed it in the past and 29 (14.5%) patients were current alcohol consumers. In the group of current and past alcohol consumers, the usual dosage of drinks per session was less than one glass of wine for 13 (20%) patients, between one and two glasses of wine for 30 (46.2%) patients, between three to six glasses of wine for 14 (21.5%) patients, and 8

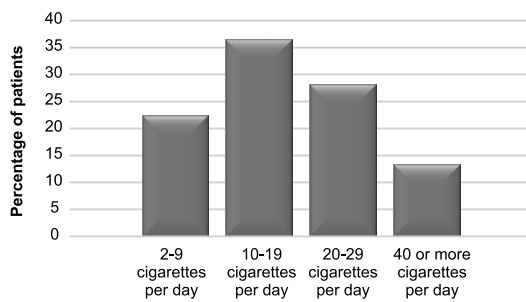


Figure 2. Average daily cigarettes consumption of active and former smokers among the patients with cancer

(12.3%) consumed more than 7 glasses of wine. In total, 18 (27.1%) patients reported that they stopped drinking alcohol after the diagnosis and 4 (6.2%) were drinking less.

Regarding the association between cancer type and alcohol consumption, breast cancer was significantly higher among former and current alcohol consumers (p<0.001). Among current alcohol consumers higher amounts of alcohol consumption (more than three glasses of wine) was significantly associated with breast cancer (p=0.001).

A total of 122 (61%) patients reported having one chronic comorbidity and 63 (31.5%) two or more chronic comorbidities. Hypertension, diabetes and hyperlipidaemia were the most common, with 80 (43%), 28 (15%) and 18 (10%), respectively (Figure 3).

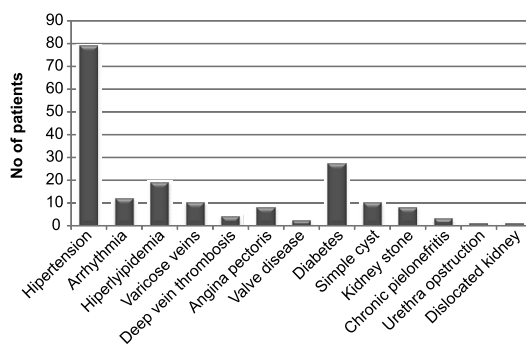


Figure 3. Comorbidities in the patients with cancer

Our results showed that 44 (22%) patients were >36 on SAS scale (clinically anxious). Correlation between anxiety measured on SAS scale and physical activity showed negative correlation (r=-0.173, n= 191; p<.0005), indicating that patients with higher anxiety were less physically active.

DISCUSSION

This study revealed that patients with malignancies in B&H usually make changes in daily habits after cancer diagnosis. Most of them are poorly physically active, but strive to eat healthy food. The majority use alternative medicine substances and have a history of smoking. It is a worrying fact that even 61% of patients have comorbidities, which indicates a high prevalence of chronic diseases in B&H.

Compared with national data, BMIs of our patients are reasonably well. Data from 2016 (19) shows 56.4% overweight and 19.4% obese people in adult population in B&H. Lack of physical activity and increased caloric intake are the main explanations for these largely preventable modern diseases (20). Cultural factors such as high caloric and low nutritional meals are also contributing to obesity (20). Obesity is also associated with a higher risk of breast cancer, particularly in postmenopausal women, and with worse disease outcome for women of all ages (20). Our study confirms this finding.

Interestingly, in neighbouring countries, Croatia and Serbia, there are 25.6% and 21.1% obese people, respectively, which is more than in B&H (21). These data support lower risk for various chronic diseases, including cancer, but in combination with other risk factors like smoking and anxiety, total risk cannot be considered less in B&H.

Being less involved in physical activity after the diagnosis is usually associated with debilitating illness and exhausting treatment (22). Mental state has a significant role in the quality of life of cancer patients as well, considering there is an estimated prevalence of major depression and minor depressive disorders in 16% and 22% of patients with cancer, respectively. (23). Our study proved that high BMI and obesity, as well as physical activity, are protective factors for lung cancer. Numerous studies confirm that physically active persons have 20 to 50% lower risk for lung cancer (24). Previous studies also proved unexpected and still unexplained inverse relationship between obesity and lung cancer mortality, called the *obesity paradox* (25). This fact is confounded by smoking since individuals who smoke are generally less active and have lower body weight than nonsmokers (26).

Consistent with our study, 56.1% patients in an Italian study (27) reported to have changed their food habits since the diagnosis, either reducing or increasing one or more food items. A Finnish study showed that 31.9% breast cancer patients had changed their diet after the diagnosis (28). Globally, patients tend to reduce food items more frequently than increasing them. Dietary factors are related to one-third of cancers, especially hormone-related malignancies (29). Reduction of milk and dairy products has been reported in 61% of patients in Italian study, significantly less than in our results (27). Reduction of dairy products is not in line with the World Cancer Research Fund (WCRF) recommendations (30), and probably has the origin in media misinformation.

A study in the United States (31) showed that around half of cancer survivors had smoked regularly prior to their cancer diagnosis, which is similar as to our findings, and only 36% of them quit smoking after their cancer diagnosis. Our data show smoking cessation among much less patients, which could be linked to tobacco smoking as cultural heritage and post-war period. Croatia and Serbia have slightly less current tobacco smokers, 33% and 32.4%, respectively, while there is 35.1% of current tobacco smokers in B&H, according to WHO (24). The standard of care for all patients with cancer who use tobacco should include either direct tobacco cessation support by the clinician or referral to structured smoking cessation program (32).

On the contrary, many of our patients never consumed alcohol-which could be linked to cultural beliefs of this area, which is shown also in low prevalence of alcohol related cancer compared to tobacco related cancers. Total alcohol per capita consumption, in liters of pure alcohol is 12.6 in Serbia and 12.2 in Croatia; it is much less in B&H, 7.1 (24). Our results are comparable with the US study where 58% patients did not change their drinking habits after the diagnosis (33). Alcohol is also associated with 7–10% increased risk for breast cancer for each 10 g (~1 drink) alcohol consumed daily by adult women (34). Breast cancer survivors have the highest alcohol consumption among cancer survivors (33). Our study confirms these findings.

A study which included more than 10.000 cancer patients confirmed that 19% of patients showed

clinical anxiety, which is close to our results, but they also proved clinical anxiety almost twice as often in female patients (35). We did not find a statistically significant correlation between anxiety and gender. There may be a gender difference in willingness to report distress (36) which was not noticed in our patients. Our study, as well as other studies (35), showed that younger patients were more likely to be anxious. There is more disruption of everyday living in younger cancer patients, whereas older patients may already have impairments in physical function and are cognitively and emotionally better prepared to accept the illness (37). The post-war period probably has had a very significant contribution to anxiety of our cancer population.

Data from Medicare for patients aged ≥ 65 years in the United States indicate that 40% of patients with cancer have at least one other chronic condition, and 15% have two or more (37). The values in our study are about twice as high and we included patients of all ages. High prevalence of chronic diseases in B&H could be connected to a complex constellation of social, economic and behavioural factors leading to increased exposure to lifestyle risk factors. Cancer patients with comorbidity have poorer survival rate, quality of life, and a higher health care cost (37).

Awareness of early symptoms and signs of malignancies is generally low in B&H. More than half of patients are diagnosed with metastatic or locally advanced disease (38). Programs for early diagnosis of malignancies should be comprehensive and continuous, but in B&H they take the form of projects and are not part of the regular health care system. These programs include screening for cervical cancer, breast cancer and colorectal cancer, as they represent three most significant screenings according to EU recommendations as well (38).

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Disease prevention programs are limited in B&H. Reducing specific lifestyle risk factors demands joint efforts of health workers, media, civil society organizations, the private sector and municipalities.

In conclusion, unhealthy lifestyle of cancer patients in B&H is particularly related to smoking history and physical inactivity. Patients often tend to improve life habits after the diagnosis. Nevertheless, they sometimes develop anxiety and depression, which, along with the consequences of the disease and its treatment, reduces their quality of life.

Data were collected from a small number of participants, because patients were interviewed using a long survey which was time-consuming. These findings require further research in larger studies, as their overall impact might be large. It is necessary to investigate the relationship between risk factors exposure after the diagnosis and the risk of subsequent disease recurrence, progression, or death. Our data suggest lack of public awareness on the consequences of unhealthy lifestyles. Primary and secondary prevention programs in B&H must be improved. Awareness of healthy lifestyles and the importance of regular screening programs should be raised. This includes improvement of legislation in the field of tobacco control, implementation of programs for smoking and obesity prevention and healthy diet among children and youth in schools, implementation of campaigns on healthy lifestyle, better cooperation with mass media for health promotion purposes, as well as the development of mandatory screening programs accessible to the entire target population and implemented throughout the year.

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TRANSPARENCY DECLARATION

Conflicts of interest: None to declare.

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