

ORIGINAL ARTICLE

Awareness of Smoking as a Risk Factor for Bladder Cancer: A Cross-Sectional Study in Jordan

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Abstract

Background and Aims: Bladder cancer (BCa) is a relatively common cancer, ranking 10th worldwide and the 6th most common tumor in Jordan. Smoking is considered the most important risk factor for bladder cancer, and in Jordan, there is a high documented smoking rate (65% in males and 42% in both sexes).

Our aim is to evaluate the awareness of smoking as a risk factor for BCa among a sample of the Jordanian population.

Materials and Methods: This quantitative population-based cross-sectional study used an online structured self-administered questionnaire to collect data from a sample of 726 participants who were selected from the most populated governorates of Jordan. They were queried about their demographics, smoking status, and knowledge regarding smoking as a risk factor for BCa among other multiple medical conditions.

Results: Overall, 400 (55.1%) of the participants were female and 203 (28%) were active smokers. Although 50.6% of the participants knew that smoking is a risk factor for BCa only 25% indicated that it is the most important risk factor. In addition, awareness of smoking as a risk factor for other medical conditions such as lung cancer, heart diseases and oral cancer was significantly higher than that of BCa.

Conclusion: The overall knowledge among our sample regarding the relationship between BCa and smoking was not satisfactory, highlighting the need to raise public awareness of smoking effect on BCa.

Keywords: Awareness, bladder cancer, Jordan, risk factor, smoking.

INTRODUCTION

Bladder cancer (BCa) is the 10th most common cancer worldwide [1]. According to the Jordan Cancer Registry (JCR), BCa ranked as the sixth most common cancer in both sexes and the fourth most common

among males [2].

Smoking is considered the most important risk factor for BCa [3]; according to the Jordanian Ministry of Health statistics in 2019, the Jordanian population has a high documented smoking rate reaching 42%

among both sexes and 65% in males [4].

Worldwide and in the MENA region, several investigators reported a low level of awareness about the relationship between smoking and BCa [5-11].

In Jordan, a notable shortage of studies exists concerning the awareness of the relationship between smoking and BCa, with only a singular study assessing awareness regarding BCa symptoms and risk factors [12]. This highlights a notable gap in the scientific literature regarding understanding the awareness of the link between smoking as a major risk factor for BCa in the Jordanian context.

BCa is considered one of the cancers that have high costs as it requires extensive treatment and long follow-up [13,14]. Thus, primary prevention by decreasing the modifiable risk factors, most importantly smoking, is the best way to decrease the incidence of BCa as the effectiveness of secondary prevention is not proven yet [15].

Given the importance of smoking as a modifiable risk factor in BCa, we aim to measure the level of awareness of smoking as a risk factor for BCa among a sample of the Jordanian population.

MATERIALS AND METHODS

We conducted a population-based cross-sectional study between March and November 2022 aiming to evaluate the awareness of smoking as a risk factor for BCa in Jordan. Stratified random sampling was adopted to select eligible participants. In addition, subjects were stratified according to the governorates of Jordan, and the five most populated ones were chosen (Amman, Irbid, Zarqa, Mafrqa, and Balqa). Subsequently, samples were taken from each selected governorate based on its proportionate population size.

Finally, 726 participants who were above the age of 18 and from both sexes were

included in the study. Medical doctors, medical students and nurses were excluded to measure awareness in the general population.

This study obtained Institutional review board approval from Jordan University Hospital, decision number (166/2022), before commencing data collection.

An online structured self-administered questionnaire, available in two languages; Arabic and English was used. It started with a consent form stating that the participation was voluntary and anonymous and that no personal identifying information would be required.

Demographic data including sex, age, weight, height, presence of medical problems, level of education and occupation was obtained from all participants. Additionally, participants were asked to indicate the risk factors for BCa from a list of factors and which factor, in their opinion, is the most important one.

Moreover, the questionnaire queried knowledge of smoking as a risk factor for multiple medical conditions including lung cancer, kidney cancer, BCa, prostate cancer, oral cancer, gastric cancer, colon cancer, stroke, poor wound healing, and ischemic heart disease [8,16,17].

The other part of the questionnaire was dependent upon the participant's smoking status categorizing them into smokers (age of starting and duration of smoking, the intent for quitting, previous trials and methods used for quitting), ex-smokers (age of starting and duration of smoking, previous urologist's advice of quitting and whether the decision to quit was related to a health condition) and non-smokers (second-hand smoking and if they are annoyed about it) [10,17,18].

Furthermore, to raise the population's awareness, a message was designed to appear after the submission of the questionnaire containing information about smoking being the most important risk factor for BCa in addition to statistical information about the high prevalence

of both BCa and smoking in Jordan.

The sample size was calculated using free online sample size calculators.

Data Analysis:

Categorical variables were presented as counts and percentages while the continuous variables were interpreted as mean, standard deviation, and range when normally distributed. Chi-square and T-test were used to assess the factors associated with participants' knowledge. Any test with a P-value < 0.05 was considered significant. Data analysis was done using IBM-SPSS v.25.

RESULTS

Characteristics of the Included Participants

The total number of included participants was 726. Of these, 400 (55.1%) were females. The majority of the participants did not have any comorbidity 580 (70.1%). Most participants had a university level of education (56.6%) and were employed (61.6%). Around 70% of participants were non-smokers. Moreover, 71.8% of the non-smoker participants were passive smokers. Only 18.9% of the participants from the ex-smokers received advice from their healthcare provider to quit smoking. 39.4% of the participants had intentions to quit smoking and 55.7% of them had tried to quit smoking. Table 1 reports the baseline characteristics of included participants.

Table 1. The General Demographics of the Participants.

Variable	Response	Frequency (n = 726)	Percentage (%)
Sex	Male	326	44.9
	Female	400	55.1
Comorbidities	Yes	146	20.1
	No	580	79.9
Comorbidities	None	650	89.5
	1 Comorbidity	59	8.1
	2 Comorbidity	17	2.3
	3 Comorbidity	0	0.0
Educational Level	School	162	22.3
	Diploma	13	1.8
	University	468	64.5
	Higher Education	83	11.4
Employment	Yes	497	61.6
	No	279	38.4
Smoking	None	486	66.9
	Smoker	203	28.0
	Ex-smoker	37	5.1
Passive Smoking	Yes	349	71.8
	No	137	28.2
Being a Passive smoker is annoying	Yes	361	81.3
	No	83	18.7
Did any urologist ask you to stop smoking	Yes	7	18.9
	No	5	13.5
	Do not visit a urologist	25	67.6
Do you intend to stop smoking	Yes	80	39.4
	No	74	36.5
	Do not know	49	24.1
Did you try to stop smoking	Yes	113	55.7
	No	90	44.3
Methods used for smoking cessation	Never tried	99	49.3
	Without help	50	24.9
	Nicotine Replacement	52	25.9

Smoking and Risk of Diseases

Regarding smoking as a risk factor for diseases, 94.8% of the participants reported that smoking is a risk factor for lung cancer. Furthermore, 90.8% and 68.0% of the participants reported that smoking is a risk factor for heart diseases and strokes,

respectively. Also, 74.5% reported that smoking is a risk factor for oral cancer and 60.9% acknowledged smoking as a risk factor for gastric cancer. On the other hand, only 340 (46.8%) of participants reported smoking as a risk factor for BCa (Table 2).

Table 2. Participants' opinions regarding smoking as a risk factor for cancers and diseases.

Variable	Response	Frequency (n = 726)	Percentage (%)
Lung Cancer	Yes	688	94.8
Liver Cancer	Yes	387	46.8
Bladder Cancer	Yes	340	46.8
Prostate Cancer	Yes	340	46.8
Oral Cancer	Yes	541	74.5
Gastric Cancer	Yes	442	60.9
Stroke	Yes	494	68.0
Poor Wound Healing	Yes	343	47.2
Heart Diseases	Yes	659	90.8

Participants' Knowledge regarding the Risk Factors of Bladder Cancer

The most commonly reported risk factor for BCa by participants was urinary tract infections (67.1%) followed by alcohol (55.4%) and smoking (50.6%). Only 37.1%

and 17.8% of the participants reported that radiation and nitrate amines are risk factors for BCa, respectively. Moreover, 52.8% of the participants reported that age is a risk factor for BCa and 36.2% of them reported that male sex is a risk factor (Table 3).

Table 3. Participants' opinions regarding the risk factors of bladder cancer.

Variable	Response	Frequency (n = 726)	Percentage (%)
Aging	Yes	383	52.8
Male Sex	Yes	263	36.2
Female Sex	Yes	92	12.7
Smoking	Yes	367	50.6
Alcohol	Yes	402	55.4
Urinary Tract Infections	Yes	487	67.1
Cystoscopy	Yes	130	17.9
Radiation	Yes	269	37.1
Nitrate Amines	Yes	129	17.8

Participants' Knowledge regarding the most Important Risk Factor of Bladder Cancer

Approximately one-third (30%) of the

participants reported urinary tract infections as the most important risk factor for BCa. Only 25% of the participants reported

smoking as the most important risk factor. Moreover, 15% and 10% of the participants

reported alcohol and radiation as the most important risk factors (Figure 1).

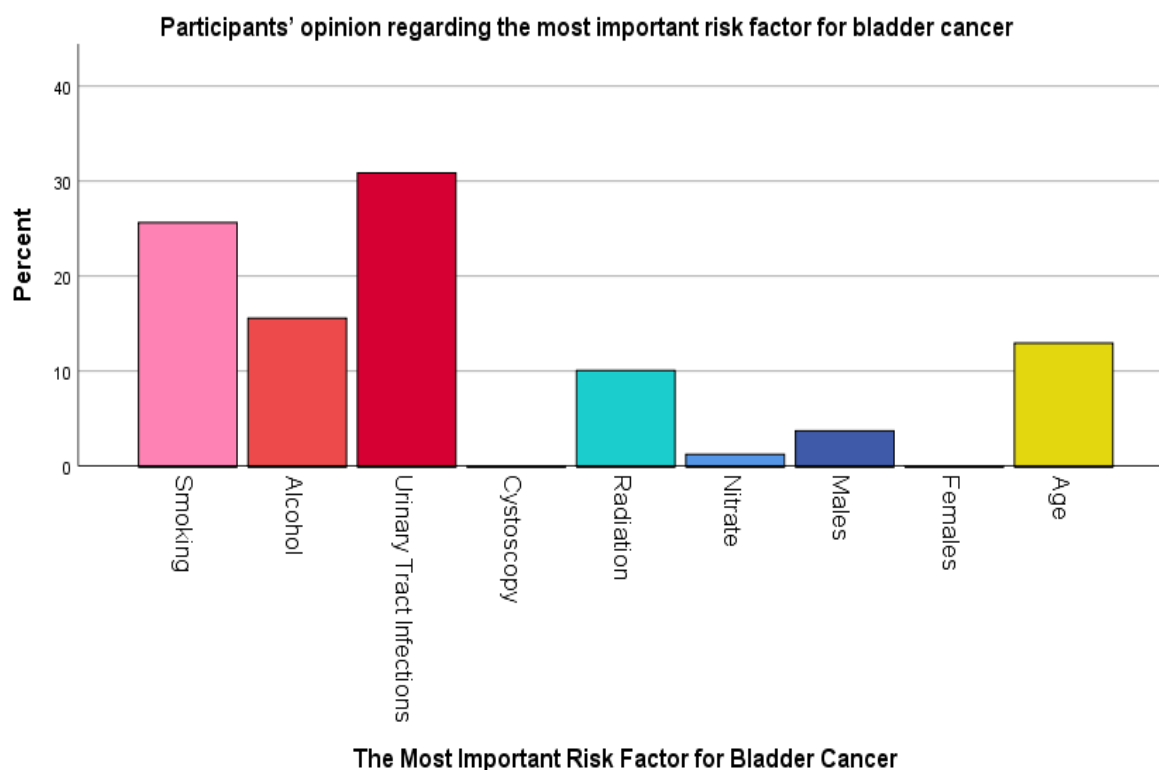


Figure 1. Participants' opinion regarding the most important risk factor for bladder cancer.

Regarding the factors associated with knowing that smoking is a risk factor for BCa, participants with comorbidities had higher knowledge that smoking is a risk factor (57.5%) compared to their counterparts (48.8%) (P-value=0.049). Moreover, participants who were smokers (40.9%) had lower knowledge that smoking is a risk factor compared to non-smokers (54.9%) (P-value=0.003). Additionally, participants who had exposure to passive smoking had

significantly lower knowledge (51.9%) compared to their counterparts (62.8%) (P-value=0.03). Regarding receiving advice from urologists to quit smoking, only employment status was significantly associated with receiving advice to quit smoking (P-value=0.044). Employed participants received advice from their urologist significantly higher (20.0%) than their counterparts (18.2%) (Table 4).

Table 4. Factors associated with knowing smoking as a risk factor for bladder cancer and receiving advice from a urologist to quit smoking.

Variable		Smoking		P-value	Did any urologist ask you to stop smoking			P-value
		Yes	No		Yes	No	Do not visit a urologist	
Gender	Females n=400	52.5%	47.5%	0.245	0.0%	12.5%	62.1%	0.281
	Males n=326	48.2%	51.8%		24.1%	13.8%	87.5%	
Comorbidities	Yes	57.5%	42.5%	0.049*	26.7%	20.0%	53.3%	0.310
	No	48.8%	51.2%		13.6%	9.1%	77.3%	
Number of Comorbidities	None	49.2%	50.8%	0.081	20.0%	10.0%	70.0%	0.586
	1 Comorbidity	64.4%	35.6%		16.7%	33.3%	50.0%	
	2 Comorbidities	52.9%	47.1%		0.0%	0.0%	100.0%	
Educational Level	School	46.3%	53.7%	0.663	14.3%	14.3%	71.4%	0.539
	Diploma	53.8%	46.2%		15.4%	15.4%	69.2%	
	University	51.9%	48.1%		50.0%	0.0%	20.0%	
	Higher Education	50.6%	49.4%		18.9%	13.5%		
Employment	Yes	50.8%	49.2%	0.874	20.0%	0.0%	80.0%	0.044*
	No	50.2%	49.8%		18.2%	22.7%	59.1%	
Smoking Status	Yes	40.9%	59.1%	0.003*	0.0%	0.0%	0.0%	-
	No	54.9%	45.1%		0.0%	0.0%	0.0%	
	X-smoker	45.9%	54.1%		13.5%	18.9%	67.6%	
Passive Smoking	Yes	51.9%	48.1%	0.030*	0.0%	0.0%	0.0%	-
	No	62.8%	37.2%		0.0%	0.0%	0.0%	

*P-value<0.05

DISCUSSION

The relationship between smoking and BCa is well-established [3]. In this study, we aimed to evaluate the awareness of smoking as a risk factor for BCa among a sample of the Jordanian population, as well as the factors associated with this knowledge.

Regarding the latest statistics published by the Jordanian Ministry of Health, it is documented that the Jordanian population has high smoking rates reaching up to 42% among both males and females and 65% among males [4]. In our study, two-thirds of the participants reported not smoking. However, 70% were exposed to second-hand

smoke. When calculating the percentage of passive smokers from the total participants, we found that 46% of the total participants were exposed to second-hand smoke. Combining this with the 28% of participants who reported active smoking, we estimated that approximately 74% of our study population were exposed to smoking either actively or passively. These findings suggest a high burden of smoking in Jordan.

A meta-analysis of 216 studies about the association between smoking and cancers reported that the risk of developing BCa is significantly associated with both current and former smokers [19]. Despite this well-

documented risk, previous studies have shown that there is poor knowledge of the relationship between smoking and bladder cancer [5-11,16-18,20].

First, we studied participants' knowledge of smoking as a risk factor for many cancers and diseases. We found that 94.8% of the participants reported that smoking is a risk factor for lung cancer. Furthermore, 90.8% and 68.0% of the participants reported that smoking is a risk factor for heart diseases and strokes, respectively, which is consistent with the results from previous studies [6-8,10,16-18,20]. However, only 46.8% of participants reported smoking as a risk factor for BCa which is considerably low and also consistent with previous literature [5-11,16-18,20].

Secondly, we investigated participants' knowledge of bladder cancer risk factors and their knowledge regarding the most important risk factor, approximately one-half of the participants identified smoking as a risk factor for BCa, preceded by urinary tract infections (UTI), alcohol consumption, and aging. Corresponding studies from Canada, the United States, Greece and Saudi Arabia reported awareness of smoking as a risk factor for BCa of 45.2%, 36%, 58.4% and 36.9% respectively [6,16,18,20].

Despite a prior study conducted in Jordan indicating a low awareness level, with only 9.5% of participants recognizing smoking as a major risk factor for BCa, our present study yielded consistent results, revealing that only 25% of participants were aware of smoking as the most important risk factor for developing BCa. This finding aligns with similar studies conducted in Lebanon, which reported that, overall, 30% of participants were aware of smoking as the primary risk factor for BCa [11,12].

Lastly, when we investigated the factors that were associated with awareness of

smoking as a risk factor for BCa, having comorbidities was found to be significantly associated with higher knowledge.

However, the association with the level of education and gender was not found to be significant which was consistent with a previous study [18], while contradicting another study [6]. No significant association was also found with age [18].

The perception of smoking as a risk factor for BCa showed a significant association with smoking status, similar to some studies [17,21] but contradicting others [6,16]. However, unlike other studies that showed being a smoker is significantly associated with higher knowledge, our study showed that smoking was significantly associated with lower knowledge.

Limitations

Our study suffers from several limitations. First, using an online questionnaire was a limitation to our study. Even though the Internet offers a quick way of reaching many participants at no cost, using an online questionnaire can threaten the validity and generalizability of the study findings.

Another limitation of our study is the limited target population, which might impact the generalizability of the results to the general population.

Lastly, there was no specific, widespread and validated tool to measure knowledge.

CONCLUSION

One-half of the participants were aware of the association between smoking and bladder cancer compared to 94.8% who knew smoking is a risk factor for lung cancer. This can explain the low overall knowledge among the Jordanian population regarding the relationship between BCa and smoking. Most people queried had low awareness about the association between bladder cancer

and smoking regardless of participants' specific factors. Our study highlights the need for the Jordanian public to be better educated to help reduce smoking-related BCa through awareness campaigns which should include counseling patients on the need for major changes in their lifestyle.

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Statements and Declarations

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The authors declare they have no direct or indirect financial interests.

Disclosure of potential conflicts of interest

The authors have no conflicts of interest to

declare relevant to this article's content.

Ethical approval and informed consent

The study methods were approved by the Ethics Review Board of the University of Jordan School of Medicine (IRB approval number 2022/166). Informed consent was obtained from all participants before being administered the questionnaire.

Consent for publication

Not applicable.

"The manuscript has been seen and approved by all authors and has not been published or is considered for publication elsewhere. The authors transfer all copyright and ownership to the Jordan Medical Journal."

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الوعي بالتدخين كعامل خطر لسرطان المثانة: دراسة مقطعية في الأردن

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الملخص

الخلفية والأهداف: يعد سرطان المثانة من السرطانات الشائعة نسبياً، حيث يحتل المرتبة العاشرة عالمياً والمرتبة السادسة كأكثر الأورام شيوعاً في الأردن. ويعتبر التدخين العامل الأكثر أهمية في زيادة خطر الإصابة بسرطان المثانة. بالإضافة إلى أن نسبة التدخين المسجلة في الأردن مرتفعة (65% للذكور و42% لكل من الجنسين). لذلك تهدف هذه الدراسة لتقييم الوعي بالتدخين كعامل خطر لسرطان المثانة بين عينة من المجتمع الأردني.

منهجية الدراسة: قامت هذه الدراسة المقطعية الكمية باستخدام استبيان ذاتي منظم عبر الإنترنت لجمع البيانات من عينة تتألف من 726 مشاركاً تم اختيارهم من المحافظات الأكثر اكتظاظاً بالسكان في الأردن. وقد تم استجوابهم حول بياناتهم الديموغرافية وحالتهم فيما يتعلق بالتدخين ومعرفتهم بالتدخين كعامل خطر لسرطان المثانة بالمقارنة مع الحالات الطبية المتعددة الأخرى.

النتائج: في المجمل، كان هناك 400 مشاركاً من الإناث (55.1%) و203 مشارك مدخن نشط (28%). وعلى الرغم من أن 50.6% من المشاركين كانوا يعرفون أن التدخين هو عامل خطر لسرطان المثانة، إلا أن 25% فقط أشاروا إلى أنه هو العامل الأكثر أهمية. بالإضافة إلى ذلك، كان الوعي بالتدخين كعامل خطر لحالات طبية أخرى مثل سرطان الرئة وأمراض القلب وسرطان الفم أعلى بشكل ملحوظ من ذلك بالنسبة لسرطان المثانة.

الاستنتاج: الوعي العام لدى عينتنا بالعلاقة بين التدخين وسرطان المثانة غير مرضٍ، مما يؤكد على ضرورة زيادة الوعي بتأثير التدخين على سرطان المثانة.

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