ORIGINAL ARTICLE
RISK FACTORS FOR URINARY BLADDER CANCER IN BALUCHISTAN

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Background: Urinary Bladder cancer is a life threatening and aggressive disease. This retrospective study was conducted in Baluchistan for assessing the risk factors for urinary bladder cancer. **Method:** A questionnaire was developed in order to collect the requisite information about the characteristics like age, drinking habits, smoking history, family history of cancer and others factors. Interview method was used to obtain the information from 50 cases and 100 controls from two hospitals of the province. Binary logistic regression model was run to study the odds ratios and 95% confidence intervals. **Results:** The odds ratios and 95% confidence intervals for cigarette smoking, fluid consumption and higher use of fruits were [26.064; 7.645–88.856], [0.161; 0.059–0.441], and [0.206; 0.059–0.725] respectively. **Conclusions:** The higher risk of urinary bladder cancer was observed in smokers as compared to non-smokers. Higher consumption of fluid and fruits are protective factors against the disease.
Keywords: Risk factors, Controls, Odds ratio, Questionnaire, Bladder Cancer

INTRODUCTION

The bladder cancer in males is ranked among the top five common cancerous diseases in Netherlands, Belgium and United States.[1–3] In 2009, the number of bladder cancer cases and deaths were observed to be 71,000 and 14,000, respectively in the US.[4] In United States, estimated number of bladder cancer cases and deaths in 2010 were 70,530 and 14,680, respectively.[5]

In Pakistan, urinary bladder cancer is one of the top ten malignancies in men and most common malignancy in both men and women.[6] Bladder tumours occur rarely before the age of 40 but are most commonly observed in the age of seventy and above.[3] Bladder cancer is more common in men than women, with a worldwide male/female ratio of 10:3.[7]

Cigarette smoking (CS) is considered the major cause of bladder cancer in Pakistan and worldwide. About four times higher risk of bladder cancer was observed in the cigarette smokers compared to the non-smokers.[8–10] One-third of bladder cancer cases are associated with cigarette smoking.[11] High fluid intake is associated with a decreased incidence of bladder cancer in men, and lesser intake of daily fluids proportionally increases the risk of bladder cancer.[12] The risk of urinary bladder cancer is inversely associated with high consumption of fruits and vegetables.[13]

A study in Khyber Pukhtunkhwa reported that moderate lifestyle, high fluid consumption (FC) and use of fruits are found to be protective factors against the disease, while chemical exposure, cigarette smoking, and high use of fried items increase the risk of urinary bladder cancer.[14]

This study was conducted in Baluchistan to assess the risk factors for urinary bladder cancer.

MATERIAL AND METHODS

This retrospective case control study was conducted in Quetta, Baluchistan. Provincial Sandeman Hospital, and Centre for Nuclear Medicine and Radiotherapy (CENAR) Quetta were selected for the study. The data were collected from all patients of urinary bladder cancer admitted in the urology/cancer wards of the two hospitals by using a questionnaire. The requisite information was obtained by interview method about the characteristics like age, smoking history, family history of cancer, occupation and several other factors from the cases and controls without caring the gender, in October and November, 2009. The total sample was based on 50 cases (patients) and 100 controls (healthy persons). The reliability of the questionnaire using the Cronbach's Alpha was 0.84. For the purpose of analysis, percentages of the different factors and the odds ratio with their 95% confidence interval were used. The data were analysed using SPSS-16.

Lifestyle was assessed from the exercise and taken as sedentary (no exercise), normal (about 30 minute exercise daily), and active (more than 30 minute exercise daily). The social status was captured from the income which was low (Income<10,000), medium (Income=10,001–20,000) and high (Income>20,000).

The response variable was binary and the independent variables were nominal, ordinal and continuous type. Therefore, binary logistic regression was run to find out the odds ratio and their confidence intervals. The p-value is compared with the predefined values alpha (5%) for the significance of the variables. Omnibus test and Hosmer and Lemeshow (HL) Test were used for checking the adequacy of the model.[15] Cox and Snell R^2 and Nagelkerke R^2 are used to observe the association between the regressors and regressand.

RESULTS

Counts and the percentages were used to explain the different factors. The sample was based on 50 (33.3%) cases and 100 (66.7%) controls. This study contained 33

(22.0%) females and 117 (78.0%) males, of which 79 (52.67%) belonged to urban and 71 (47.33%) to rural areas. Among the 50 patients, 27 (54%) belong to urban and 23 (46%) from rural areas. In the overall sample, the counts (percentages) of the literate and illiterate patients were 25 (16.67%) and 125 (83.33%), respectively. Among the 50 patients literate and illiterate were 9 (18%) and 41 (82%), respectively. None of the case or control reported family history of cancer. Low, medium and high income status in all subjects were 118 (78.7%), 32 (21.3%), and 0 (0%), respectively. Low, medium and high status in patients were 39 (78%), 11 (22%) and 0 (0%), respectively. Similarly, low, medium and high status in controls were 79 (79%), 21 (21%), and 0 (0%) respectively. The number of the cases and controls having sedentary lifestyle were 50 (100%) and 98 (98%), respectively. The higher percentage of the patients was living a sedentary life than in controls.

The percentages of patients and controls having chemical exposure were 16% and 11%, and the percentage of tea drinkers were 96% and 94%, respectively. The percentages of the cases and controls consuming less than 10 glasses of total fluid were 78% and 25%, respectively. The higher percentage of cases was using less than 10 glasses of water compared to the controls. The percentages of the cases and controls consuming tap water were 74% and 72%, respectively. Similarly, 26% of the cases and 28% of the controls were consuming the government provided water. Cases and controls using fruits 2 or less than 2 days per week were 82% and 51%, respectively, and those using fruits 3 or 4 days per week were 18% and 49%, respectively. The higher percentage of controls was using fruits 3 or 4 days per week compared to the cases. Out of 38 smokers, 31 (81.6%) were patients of bladder cancer.

The Omnibus test, with χ^2=116.922, was significant at p=0.0001. HL test was insignificant with χ^2=3.156 at p=0.924. The values of Cox and Snell R^2 and Nagelkerke R^2 were 0.541and 0.752, respectively. Out of 100 controls 91 (91.0%) were correctly predicted as controls (specificity=0.91) while out of 50 patients of bladder cancer, 37 (74.0%) were correctly predicted as cases (sensitivity=0.74). The overall percentage of correct classification was 85.3.

Table-2 shows the significant risk/protective factors and their predictive strengths by using the logistic regression. Cigarette smoking, total fluid consumption (more than 10 glasses per day) and use of fruits (more than two days/per week) were found to be significantly associated with the urinary bladder cancer in Baluchistan. The fitted binary logistic regression model is presented below:

Z= -0.275+3.261*CS -1.823*FC -1.579*Fruit

The odds ratio and 95% confidence interval for the odds ratio in cigarette smokers were 26.06 and (7.645–88.856), respectively. The odds ratio and 95% confidence interval for the use of fruits more than 2 days per week were 0.206 and (0.059–0.725), respectively.

Table-1: Classification of cases/controls with different risk factors in Baluchistan

Factors	Categories	Bladder cancer No	Yes	Total
Gender	Female	22	11	33
	Male	78	39	117
Residential Area	Urban	52	27	79
	Rural	48	23	71
Education	No	84	41	125
	Yes	16	9	25
Lifestyle	Sedentary	98	50	148
	Normal	2	0	2
Social Status	<Rs. 10000	79	39	118
	Rs.10000–20000	21	11	32
	≥Rs. 20000	0	0	0
Chemical Exposure	No	89	42	131
	Yes	11	8	19
Use of tea	No	6	2	8
	Yes	94	48	142
Hair dye	No	100	49	149
	Yes	0	1	1
Fluid taken (Glasses)	<10 glasses	25	39	64
	≥10 glasses	75	11	86
Source of drinking water	Untreated	72	37	109
	Govt. Provided	28	13	41
Fried item	Low	88	38	126
	Normal	12	12	24
	High	0	0	0
Fats items	Low	87	43	130
	Normal	13	7	20
	High	0	0	0
Fast food	Low	100	50	150
	Normal	0	0	0
	High	0	0	0
Fruits	Low	51	41	92
	Normal	49	9	58
	High	0	0	0
Cigarette Smoking	No	93	19	112
	Yes	7	31	38

Table-2: Model coefficients with odds ratios and 95% CI's

Factors	β	SE	Wald	p	Odds ratio	95% CI .for EXP(β) Lower	Upper
CS	3.261	0.626	27.150	0.000	26.064	7.645	88.856
FC	-1.823	0.512	12.668	0.000	0.161	0.059	0.441
Fruits	-1.579	0.642	6.052	0.014	0.206	0.059	0.725
Constant	-0.275	0.335	0.675	0.411	0.759	-	-

DISCUSSION

In Baluchistan, cigarette smoking was observed to be the major risk factor for the urinary bladder cancer. Cigarette smokers had 26 times higher risk of getting the disease compared to non-smokers in Baluchistan. A similar study conducted in Peshawar region of Khyber Pukhtunkhwa, Pakistan showed the odds ratio and 95% confidence interval for cigarette smokers 19.526 and 4.688–81.329, respectively.[14] In Spain, the odds ratios and 95% confidence intervals for current smoker in males and females were (7.4; 5.3–10.4) and (5.1; 1.6–16.4), respectively showing the 7.4 and 5.1 times higher risk of bladder cancer in males and females, respectively compared to the non-smokers.[16] A case-control study based on 549 bladder cancer cases and 1,099 controls was conducted in 4 western provinces of Canada which reported more than 3 times higher risk of bladder cancer in cigarette smokers compared to the non-smokers.[17]

The fluid consumption was observed to be negatively significant with odds ratio 0.161 and 95% confidence interval of odds ratio (0.059–0.441), which means that a person who consumes 10 or more glasses of water per day has 0.161 times risk of getting disease (i.e., 84% protection against the disease) as compared to the person who consumes the less than ten glasses of water per day. Excess of water in the bladder reduces the concentration and stay time of chemicals by frequent urination. A similar study conducted in Peshawar region of Khyber Pukhtunkhwa in Pakistan showed 97% protection against the disease in the subjects who were consuming 10 or more glasses of water per day as compared to the person who were taking less than ten glasses of water per day.[14] A high fluid intake is associated with a decreased incidence of bladder cancer in males, and lesser intake of daily fluids proportionally increases the risk of bladder cancer.[12]

The use of fruits was observed to be inversely significant with occurrence of urinary bladder cancer. Hence higher use of fruits is considered a protection against the bladder cancer. It was indicated that the use of fruits more than 2 days per week had 0.206 times risk of bladder cancer that is 79.4% protection against the bladder cancer compared to those who consume the fruits 2 or less than two days per week. The risk of bladder cancer was inversely associated with the high consumption of fruits and vegetables.[13] Another study conducted in Khyber Pukhtunkhwa also investigated that high use of fruits were found to be the protective factors against the bladder cancer.[14]

CONCLUSION

Cigarette smokers were found to be at higher risk of bladder cancer as compared to non-smokers. High consumption of fluid and fruits were protective factors against the disease.

ACKNOWLEDGMENTS

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