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OCCUPATIONAL RISK FACTORS OF URINARY BLADDER CANCER AMONG MEN IN PUNJAB, PAKISTAN

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ABSTRACT

Objective: Several occupations having chemical exposure at work place are considered to be the high risk of bladder cancer. The main purpose of this study is to investigate the occupational risk factors and their predictive strength using the odds ratio for the urinary bladder cancer in Punjab, Pakistan.
Study Design: A descriptive and analytical case control study conducted in five hospitals of Punjab comprising, Services Hospital, Lahore, Jinnah Hospital, Lahore, Sheikh Ziad Hospital, Lahore, INMOL Hospital, Lahore and Allied Hospital, Faisalabad.
Material and Method: The requisite information was collected from 100 cases and 200 controls by the interview method through a well defined questionnaire. Odds ratio and 95% confidence intervals were calculated using logistic regression model. For the purpose of analysis, the SPSS software was used.
Results: The odds ratios and 95% confidence intervals for the cooks, drivers, painters, metal workers and textile workers were (4.539; 1.676-12.298), (7.263; 1.735-30.401), (3.632; 0.999-13.20), (6.860; 2.833-16.607) and (2.594; 1.221-5.511), respectively.
***Conclusion*:** The higher bladder cancer risk is observed in the cooks, drivers, metal workers and textile workers in Punjab, Pakistan.

Key words: Bladder cancer, Controls, Odds ratio, Retrospective, Risk factors

INTRODUCTION

In United States, the estimated number of urinary bladder cancer cases and expected bladder cancer deaths that are identified in every year are 51200 and 10600 Persons, respectively [1]. The information about the number of bladder cancer cases and deaths annually are not available in Pakistan. World wide, the male/female ratio of bladder cancer is 10:3 [2].

The occupational factors are playing their role in increasing the bladder cancer in industrial areas. Bladder cancer is a cancer that was shown to be industrially associated and play an important role in the history of occupational disease. Significant risk was found in the metal workers, mechanics and machinists, leather workers, truck drivers, painters, hairdressers, dry cleaners [3, 4]. About 20% of the bladder cancer cases are account for occupational exposures [5]. Excess risks have been commonly investigated among painters, machinists, aluminum process and other metal workers, leather workers and shoemakers, printers, hairdressers, transport workers and workers in the textile industry [6, 7].

In the recent five decades, several studies of occupational causes of bladder cancer have identified several high-risk occupations. In spite of these struggles, strong indications of association are observed for the occupational groups including manu-

facturing workers, rubber workers, dyestuffs workers and dye users, aromatic amine, leather workers, painters, truck drivers, and aluminum workers [7]. The workers in printing, plastics, rubber, mining, dyestuffs industries, oils, petroleum, truck drivers, exposure to paints and pesticides had significantly higher risk of urinary bladder cancer [8]. The statistically significant odds ratios and 95% CI were investigated in males for the primary metal workers and auto mechanics (2.40; 1.29-4.50) and (1.69; 1.02-2.82), respectively [9].

Many bladder cancer patients do not die of the disease bladder cancer, but suffer numerous recurrences [10]. Consequently, it becomes necessary to take steps for controlling such a harmful, fatal, life threatening and aggressive disease.

AIMS AND OBJECTIVES OF THE STUDY

The specific objectives of this study were:

1. Observing the frequency of the patients working in the occupations having carcinogen at the work place.
2. Investigating the occupational risk factors and their predictive strength using the binary logistic model.

MATERIAL AND METHOD

In material and method, study design including the method of data collection, cities and hospitals from which the data was collected and statistical methods were discussed.

STUDY DESIGN

It is hospital based case control study which is conducted to explain the occupational risk factors by using the descriptive and inferential approaches. This study was conducted in four hospitals of Lahore and one of Faisalabad. The selected hospitals are Services Hospital, Lahore, Jinnah Hospital, Lahore and Sheikh Zaid Hospital, Lahore, Inmol Hospital, Lahore and Allied Hospital, Faisalabad.

The sample was taken by consecutive visits from the selected hospitals in the month of March to October, 2009. All the patients (cases) of urinary bladder cancer admitted in the urology/cancer wards were interviewed. These cases were diagnosed by basic symptom of PPP's (Profuse Periodic Painless Heamuturia) and biopsy report. A self designed questionnaire was used to collect the requisite information from the individuals. All this information was obtained from the cases (patients) and controls (healthy persons) by face to face interview. Both males and females of all ages admitted in the urology / cancer wards of the selected hospitals for the treatment of urinary bladder cancer were included in this study. In this way, the total sample contains 300 subjects consisting of 100 cases and 200 controls. It is considered much more beneficial that the controls come from the same population from which the cases are derived, in order to reduce the chance of other differences in the populations under study.

RESULTS

The statistical analysis contains both the descriptive and inferential parts. In descriptive parts, the counts and percentages were used to explain the factors. While in the inferential section, the odds ratios and the 95% confidence intervals for the odds ratios were calculated by using the binary logistic regression model. For comparing the significance of the results, P-values were compared with the 5% level of significance.

DESCRIPTIVE RESULTS

The mainly considered occupations are cook, driver, farmer, painter, metal worker, textile worker and others (occupations not having the chemical exposure at work place) in order to investigate their effect on bladder cancer. The frequencies of these occupations with percentages are given in the Table 1.

From the Table 1, it is observed that the percentage of the drivers is very small in the sample that is 3% only. While the maximum

TABLE 1
CLASSIFICATION OF SUBJECTS IN DIFFERENT OCCUPATIONS WITH PERCENTAGES

Occupations	Bladder cancer		Total	Percentage
	No	yes		
Cook	8	10	18	6.0
Driver	3	6	9	3.0
Farmer	16	9	25	8.3
Painter	5	5	10	3.3
Metal Worker	9	17	26	8.7
Textile Worker	21	13	34	11.3
Others	138	40	178	59.3
Total	**200**	**100**	**300**	**100.0**

TABLE 2
MODEL COEFFICIENTS WITH ODDS RATIOS AND 95 % CI'S FOR ODDS RATIO

	β	S.E.	Wald	Sig.	Exp(β)	95.0% C.I for EXP(β)	
Occupations			30.868	.000			
Cook	1.513	.508	8.851	.003	4.539	1.676	12.298
Driver	1.983	.730	7.369	.007	7.263	1.735	30.401
Farmer	.714	.455	2.463	.117	2.043	.837	4.985
Painter	1.290	.658	3.836	.050	3.632	.999	13.200
Metal Worker	1.926	.451	18.222	.000	6.860	2.833	16.607
Textile Worker	.953	.385	6.145	.013	2.594	1.221	5.511
Constant	-1.290	.183	49.557	.000	.275		

59.3% of the subjects fall in the category having no chemical exposure at their work place (others). The maximum subjects having chemical exposure at their work place fall in the category of the textile workers (11.3%). The percentages of cooks, drivers, farmers, painters, metal workers, textile workers and others in the cases are 10%, 6%, 9%, 5%, 17%, 13% and 40%, respectively. While the percentages of cooks, drivers, farmers, painters, metal workers, textile workers and others in the controls are 4%, 1.5%, 8%, 2.5%, 4.5%, 10.5% and 69%, respectively. In the similar way, the overall percentages for each profession are presented in the last column of Table 1.

INFERENTIAL RESULTS

In this section, the binary logistic regression model was run in order to find out the regression coefficients, odds ratio, p-value and 95% confidence intervals for odds ratios. The p-value was compared with the predefined value alpha (5%) for the significance of the variables. The interpretations of the significant risk factors were given in term of the odds ratio and 95% confidence interval of the odd ratio. For the over all significance of the model, Omnibus test was used.

The Omnibus test with $\div^2$ =30.729 was significant at P-values =.000 showing that at least one of the category was significantly affecting the response variable i.e., the model was adequately fitted. For the goodness of fit, correct classification was used. The overall correct classified subjects were 79%. The amount of correct classification was much more so the fitted model was considered adequate. The results of the fitted model were presented in the Table 2. It is observed from the Table 2, that the four categories of the occupations including cooks, drivers, metal workers and textile workers were found to be significant. While the farmers and painters were found to be insignificant in Punjab.

DISCUSSIONS

The odds ratio and the 95% confidence interval for the odds ratio in cooks were found to be 4.539 and (1.676, 12.298), respectively. According to this study, cooks had 4.539 times higher risk of bladder cancer as compared to the all other professions those do not have chemical exposure at the work place. The percentages of cooks in the cases and controls were 10% and 4%, respectively. A case control study was conducted by pooling the primary data of the 11 studies conducted in Germany, France, Italy, Spain, Greece and Denmark and found that the cooks had insignificant risk of bladder cancer with odds ratio and 95 % confidence interval 1.19 and (0.91-1.55), respectively[12]. In the Punjab, the cooks had significantly higher risk of bladder cancer which is the contradiction of the above stated 11pooled studies [12].

The odds ratio and the 95% confidence interval for the odds ratio in drivers are found to be 7.26 and (1.735, 30.401), respectively. According to this study, drivers have highest risk of bladder cancer. The risk of bladder investigated in drivers is 7.26 times more as compared to the all other professions those do not have chemical exposure at the work place. Significant risk was found in the metal workers, mechanics and machinists, leather workers, truck drivers, painters, hairdressers, dry cleaners [3, 4]. The workers in printing, plastics, rubber, mining, dyestuffs industries, oils, petroleum, truck drivers, exposure to paints and pesticides had significantly higher risk of urinary bladder cancer [8]. The industrial workers, workers related to petroleum, oil and chemicals materials had a significantly increased relative risk of developing bladder cancer [11].

In this study, the metal workers were found to be significant with odds ratio and 95% confidence interval 6.86 and (2.833, 16.067), respectively. This result stated that the metal workers had 6.86 times higher risk of bladder cancer as compared to the all other professions those do not have chemical exposure at their work place. The statistically significant odds ratios and 95% CI were investigated in males for the primary metal workers and auto mechanics (2.40; 1.29-4.50) and (1.69; 1.02-2.82), respectively[9]. The significant higher risk of bladder cancer was observed in metal workers [12]. Significant risk was found in the metal workers, mechanics and machinists, leather workers, truck drivers, painters, hairdressers, dry cleaners [3, 4].

The odds ratio and the 95% confidence interval for the odds ratio in textile workers were found to be 2.594 and (1.221, 5.511),

respectively. According to this study, the risk of bladder cancer in textile workers was 2.6 times higher as compared to the all other professions those do not have chemical exposure at their work place. A study conducted in the 6 European countries (Germany, France, Italy, Spain, Greece and Denmark) from 1976 to 1996 observed that the occupations like metal workers, painters, miners, excavating-machine operators, transport operators, textile and electrical workers had the higher risks of bladder cancer as compared to the occupations do not have chemical exposure at their work place[12]. The industrial workers, workers related to petroleum, oil and chemicals materials had a significantly increased relative risk of developing bladder cancer [11]. The results of this study are supported by the results of the studies [11, 12].

CONCLUSION

The main objective of this study was to find out the occupational risk factor of urinary bladder cancer in Punjab. The 300 subjects consisted on cases and controls were selected from five public hospitals. The analysis has been done through descriptive and inferential measures. In the logistic regression analysis, four occupations including cooks, drivers, metal workers and textile workers were found to be significant. Consequently, four occupations having carcinogen at work place had higher risk of bladder cancer in Pakistan.

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