Original Article

Relationship between prostate cancer and sexual activity: A case-control study

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Abstract

Background: Prostate cancer is the fourth most prevalent cancer in the world with both environmental and genetic risk factors. Recently, the role of sexual activity (in terms of period and frequency) has been considered as a possible risk factor.

Methods: A total of 120 patients participated in the present case-control study, 59 with prostate cancer and 61 with other urologic conditions, in Shahid Beheshti Hospital of Hamadan, Iran, in 2016. A researcher-designed questionnaire was used to collect required information such as participants' sexual habits. Finally, data were analyzed using SPSS software 16 (SPSS Inc., Chicago, IL, USA).

Results: Mean sexual activity (per week) for the past 5-10 years was 1.8±1.02 and 1.6±0.22 in case and control group, respectively (P=0.2). Mean sexual activity (per week) one year prior to diagnosis of the disease was also 1.3±1.10 and 1.1±1.03 in cases versus in the controls (P=0.45). In 71-80 years and >80 years age group, sexual activity (days per week) in 5-10 years before diagnosis was significantly higher in cases compared with in control group (P=0.005 and $P=0$.03, respectively). In <60 years age group, participants' sexual activity in 5-10 years before diagnosis was significantly higher in controls as compared with case group (P=0.03). Also, sexual activity (days per week) at age 71-80 years in one year before diagnosis was significantly higher in case group compared with that of the control group (P=0.001).

Conclusion: According to the results, it seems there is no clear relationship between sexual activity and prostate cancer, but the results indicated different impacts of sexual activity in different ages in patients with prostate cancer.

Keywords: Iran; Prostatic Neoplasm; Sexual Behavior

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Introduction

The prostate is one of the accessory male sex organs frequently affected by benign or malignant neoplasms. Prostate cancer is the fourth most common cancer worldwide (1); in addition, it is the most diagnosed cancer and the second leading cause of death among American men, with a prevalence that increases rapidly with age (2). Prostate cancer is more frequent in developing countries and in northern Europe compared with Southern Europe.

In Iran, it is the third most common cancer in men and, in total, the sixth most common cancer (3). The prevalence of prostate cancer among Chinese and Japanese is very low, which may show the role of genetic factors in the disease (1).

Family history is the strongest risk factor for prostate cancer. About 9% of prostate cancers are inheritable, which highlights the role of genetic factors (1, 4). The role of environmental factors in prostate cancer is also important. High fat intake, cigarette smoking (cadmium), and high calcium intake are some important environmental risk factors for prostate cancer (1, 5). The association between vasectomy and prostate cancer is insignificant (6). The role of sexual activity in prostate cancer is still unclear and either low or high sexual activity has been proposed as a risk factor. Theoretically, sexual activity can expose the prostate to infectious agents, which may increase the risk of prostate cancer. On the other hand, some studies have proposed an inverse relationship between sexual activity (ejaculation) and prostate cancer, with an unclear biological basis (6, 7).

Considering the above-mentioned, the current study was carried out to investigate the role of sexual activity in prostate cancer patients in Hamadan, Iran.

Methods

The present case-control study was conducted in the Urology Ward of Shahid Beheshti Hospital, in Hamadan, Iran, in 2016. This Hospital is governmental, referral, public, and academic hospital containing 182 inpatient beds. Urology, renal transplant, internal, dialysis, and ICU were different wards in the hospital. We enrolled 59 definite prostate cancer patients (case group) and 61 patients with other urologic conditions such as UTI or BPH (control group). All the samples were enrolled in the study through census sampling, so that each definite prostate cancer patient and his individualized matched control, admitted in the hospital between 1st January and 1st October 2016 (10 months), were enrolled in the study. The inclusion criteria for cases and controls were being married and having sexual activity for the past 5-10 years. In order to match two groups for possible confounders such as age, social class, cigarette smoking, STD history, weight, and BMI, we performed individual matching so that both the controls and cases were almost similar in such variables. To be more specific, in some variables (numeric variables, i.e. age and weight) we accepted a two-unit deviation between the two groups and for some categorical confounders (cigarette smoking and STD history) an exact individual matching was performed. Finally, for the left confounders (living condition, education) we did not have any specific plan and after controlling for above-mentioned confounders, we repeatedly checked the latter ones to find out if the two groups were not significantly different.

We used a researcher-designed questionnaire for data collection that questioned sexual activities in different periods of the patient's life. This questionnaire was designed and validated by the expert group including three of the academic staff of Urology Department and two academic staff of Community Medicine department at Hamadan University of Medical Sciences. The questionnaire had a convenient level of internal consistency as measured by Cronbach's alpha (0.71).

To meet the purpose of the study, i.e. studying the relationship between sexual activity and prostate cancer, we considered three different life periods: sex frequency (per week) one year, and 5-10 years before the disease and sexual activity during an earlier stage of life (at a young age). A qualitative three-part Likert scale (less than normal, normal, more than normal) was used to collect data about the sexual patterns at a young age in the participants. The SPSS software 16 (SPSS Inc., Chicago, IL, USA) was used for data analysis

running the paired sample t-test and McNemar's test. For each comparison, statistical significance was set as $P<0.05$.
Written informed consent was obtained from all patients. The ethics committee of the HUMS approved the consent procedure granting the ethical code no. REF4584.

Results

The two groups had almost the same characteristics in background (confounder) variables (Table 1).
Mean sexual activity (per week) of the two groups one year before diagnosis of the disease was 1.3±1.10 in the cases versus 1.1±1.03 in the controls (P=0.45). In addition, means of sexual activity (per week) in the two groups 5-10 years before diagnosis of the disease were 1.8±1.02 in the cases versus 1.6±0.22 in the controls (P=0.26). Both the cases and controls had less sexual activity (per week) after disease diagnosis and this finding was more prominent in the case group (0.6±0.41) compared with the control group (0.9±0.77; P=0.006). After age group stratification, the two groups exhibited different sexual patterns during different age strata (Table 2). Finally, the two groups were questioned about the age of their first sexual encounter. The results indicated that the mean ages of the first sexual encounter was 21.8±4.3 years for the case group and 21.4±4 years for the control group (P=0.57).

Discussion

Sexual activity in our patients decreased dramatically after the diagnosis in both groups, which was more prominent in prostate cancer patients. Different studies on prostate cancer patients reported the same results, which might be attributed to chemotherapy and/or other medications (8, 9).
A comparison of the two groups in relation to sexual activity at different times before diagnosis of the disease (one year before diagnosis, 5-10 years before diagnosis, and at a young age) did not show any significant differences between the two groups in 61-70 year age group. Rosenblatt et al. studied a group of 60 to 64 year-old men in Washington and reported the same results. They concluded that no association existed between prostate cancer and sexual activity (10).

Table 1. Basic characteristic of prostate cancer patients and control groups

Variable	Case (N=59)	Control (N=61)	*P*
Living condition N (%)*			
Urban	26 (47.5)	31 (52.5)	0.59
Education N (%)*			
Illiterate	38 (62.3)	42 (71.2)	0.61
Some high school education	20 (32.8)	15 (25.4)	
High school graduate and higher	3 (4.9)	2 (3.4)	
Cigarette smoking N (%)*			
Yes	10 (16.4)	9 (15.3)	0.71
STD history N (%)*			
Yes	5 (8.2)	4 (6.8)	0.69
Age (Mean±SD)#	71±6.73	69± 8.91	0.28
Anthropometric measures (Mean±SD)#			
BMI	27.4±1.14	26.4±2.02	0.49
Weight	78±2.34	76±1.83	0.18

* McNemar's test, # Paired sample t test

Table 2. Sexual activity (days per week) in different age groups and at different time periods

Variable	Case (N=59)	Control (N=61)	*P**
	Mean±SD	Mean±SD	
≤ 60 years			
After diagnosis (days per week)	0.9±0.78	1.8±0.96	0.1
One year before diagnosis (days per week)	1.6±0.75	2.6±1. 31	0.2
5-10 years before diagnosis (days per week	1.6±0.75	4.1±1.93	0.03
61-70 years			
After diagnosis (days per week)	0.5±0.00	1.1±0.50	0.26
One year before diagnosis (days per week)	1.6±1.00	1.2±0.75	0.20
5-10 years before diagnosis (days per week)	2.0±0.72	2.3±0.76	0.28
71-80 years			
After diagnosis (days per week)	1.1±0.39	1.0±0.00	0.07
One year before diagnosis (days per week)	1.5±0.69	1.0±0.00	0.001
5-10 years before diagnosis (days per week)	2.0±0.62	1.5±0.51	0.005
>80 years			
After diagnosis (days per week)	1.0±0.0.00	1.0±0.00	-
One year before diagnosis (days per week)	1.2±0.43	1.0±.0.00	0.14
5-10 years before diagnosis (days per week)	1.4±0.51	1.0±0.00	0.03

* Paired sample t-test

In a prospective study by Leitzmann et al. (2004), approximately 30'000 US men aged 46-81 years were asked about reporting ejaculation frequency in 1992. The study followed these patients with follow-up questionnaires every 2 years up to 2000. This study showed a relationship between high ejaculation frequency (21 or more per month) and a decreased risk of total prostate cancer. They concluded that ejaculation frequency was not related to the increased risk of prostate cancer (11). In two consecutive studies by Giles et al., an inverse association was observed between increased sexual activity in early adult life and the risk of prostate cancer (12, 13).

In our study, the inverse association between increased sexual activity and risk of prostate cancer was only observed in patients <60 years and at 5-10 years before diagnosis (days per week. In another case-control study by Mandel et al., the researchers concluded that a significant association existed between low sexual activity and higher prostate cancer risk. In this study, prostate cancer patients had almost half the sexual activity of their inpatient controls (OR=0.54) or relative controls (OR=0.68)(14). Oishi et al. and Jannini et al. reached the same conclusions in their studies, which emphasized the role of higher sexual activity in decreasing the risk of prostate cancer (15, 16). On the other hand, exactly opposite, Fernandez et al. reported a significant association between higher sexual activity and the risk of prostate cancer (17). A report by the Imperial Cancer Research Fund of Oxford University proposed that reasonably consistent evidence suggested the association between an increased risk for prostate cancer and a high level of sexual activity (18).

In relation to the age at which sexual activity began, we could not find clear differences between the two groups. The mean age of onset for sexual activity was the same in both groups. In Pienta et al. study, it was concluded that men with prostate cancer began their sexual activity at a younger age; had higher sexual activity particularly at younger ages, a lower frequency of coitus particularly at older ages; or a higher frequency until around 50 years of age (19).

In a case-control study by Dimitropoulou et al., overall sexual activity at a younger age (20s) increased the risk of prostate cancer, but it appeared to be protective against the disease at older ages (50s)(20). An epidemiological study in China in 1997 showed that coitus more than three times per week at a young age had a significant relation to prostate cancer (OR=3.38, 95% CI=1.51-7.58) (21). Another case-control study in China in 2007 showed that decreased risk of prostate cancer was related to sexual activity loss after age 60 (age 60-69: OR=0.51, 95% CI=0.20-1.27; age over 70: OR=0.31, 95% CI=0.08-1.24) (22)..

In a study by Vacchia et al., prostate cancer patients were older at the time of their first marriage compared with those who first married under age 25. The relative risk was 1.6 for marriage at ages 25 to 29 and 1.8 for ages 30 or more (23). Contradictory results exist in relation to this issue. For example, a case-control study in Tulane University in New Orleans (1988) reported that early age at first sexual intercourse was associated with increased prostate cancer risk (age less than 17 vs age greater than 21) (RR=2.3, 95% CI: 1.3-4.0)(24). Also, a Chinese study in 2007 showed that men who had their first sexual activity at a young age had a higher risk for prostate cancer compared with those with experiencing the first sexual activity over 30 (age 20-24: OR=2.25, 95% CI: 0.75-6.71; age 25-29: OR=2.34, 95% CI: 0.89-6.13) (22).

Like the results of the present study, another study in New South Wales showed association between higher levels of sexual activity and elevated BMI and prostate cancer (25).

According to the results of the current study, it seems that there is no clear relationship between sexual activity and prostate cancer but sexual activity has shown to have different impacts in different ages on patients with prostate cancer. This is a controversial subject in different studies. Therefore, more studies, especially meta-analyses and systematic reviews, should be carried out to shed more light on this issue.

Conflict of interest

Authors declare no conflict of interests.

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