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PROSTATE CANCER IN IRAN: AN EPIDEMIOLOGICAL REVIEW

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Abstract – *Objective:* *Prostate cancer is one of the most common cancers among men. The various epidemiological aspects of this cancer in Iran are not obviously detected. Therefore, the aim of this review is to evaluate the epidemiological aspects of prostate cancer in Iran.*

Patients and Methods: *The information of study was gathered by searching Database of PubMed, Scopus, Web of Science, SID and IranMedex with the key words of prostate cancer, neoplasm of prostate and Iran. The title and abstract of the papers were reviewed, and a total of 23 full papers were selected.*

Results: *According to previous studies, the incidence of prostate cancer in Iran is rising with the age increase. However, in comparison with Western countries, this incidence is lower in Iran. One of the most risk factors for prostate cancer is age and positive family history. The most common type of this cancer in Iran is adenocarcinoma. It is reported that the pathological grade has a negative effect on the survival of prostate cancer in Iran.*

Conclusions: *The trend of the incidence of prostate cancer in Iran has risen and the death rate of this malignancy is high among Iranian males with increasing age. According to the findings of this study, the pattern of food in Iranian men is associated with prostate cancer.*

KEYWORDS: *Epidemiology, Prostate cancer, Iran, Incidence.*

INTRODUCTION

Prostate cancer is one of the most common malignancies among men in Western countries[1-9] and all around the world[10-12], which has various incidence among different ethnic groups and population. According to statistical reports in 2010, prostate cancer had the highest incidence rate totally (28%)[13,14] with the highest incidence in northern America and the lowest one in the south of the United States (US). As reported by estimation, 1.1 million of men with prostate cancer were diagnosed in 2012, whose 70% in developed country[11]. It is anticipated that by 2025, the incidence of prostate cancer in developing countries will rise up to 45%[15].

This cancer is the second leading cause of death (11%) after lung cancer (29%)[11,13,14,16] and the second foremost principal of death for United States (US) men[1,17]. Unlike the decline in prostate cancer in the US and Western countries, its incidence is rising in less developed and developing countries[14], but this rate is still much lower in Asia than in the Western world[1].

Prostate cancer is the third cancer among Iranian men[12,18,19]. It is reported that 7 to 9% of Iranian men were involved[15]. The incidence and the standardized incidence rate of this cancer in Iranian men has increased by 3.7 and 1.7 times, respectively[20], so that the incidence of this cancer is 9.6 per 100,000 people[21]. The death rate from prostate cancer in Iran is higher than other malignancies[13]. Prostate cancer has a different geographic distribution[15,22,23] These discrepancy can be due to diversities in genetic, exposure to unknown environmental risk factors, difference in health care and cancer registration[14].

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Depending on the numerous types of cancer, there are various morphologies, including carcinoma, adenocarcinoma and sarcoma which could be detected in person more than 65-year-old[15]. Adenocarcinoma is the most common pathologic finding in prostate cancer[1,24], which occurs among Iranian men over the age of 50, so that this is called the elderly people disease[14].

In order to reduce the mortality rate, one diagnostic method is PSA (Prostate-specific antigen) for early detection. By utilizing PSA screening, in addition to increasing the diagnosis of the malignancy, the incidence of metastatic disease has also decreased[12]. Various factors such as age and nutrition factors affect the progression of the disease[15]; however, the cause of prostate cancer is still ambiguous[7,19].

Given the importance of this cancer, different statistics and lack of a comprehensive study on the epidemiology of prostate cancer in Iran, this review study aimed to evaluating different epidemiological aspects including incidence, prevalence, mortality and other risk factors such as food patterns affecting illness, sexual problems caused by cancer and in this way, screening have been done in Iran.

MATERIALS AND METHODS

This review study was conducted to investigate incidence, prevalence, screening and diagnosis, risk factors of prostate cancer without time constraints.

In order to access the articles, PubMed, Scopus, Web of Science, SID and IranMedex were searched with the key words of prostate cancer, neoplasm of prostate and Iran with no time restriction. In addition to this, the reference lists of relevant articles were manually searched.

Articles about epidemiological aspect of prostate cancer were entered in to the study and summarized in review. Studies with focus on treatment have been excluded.

RESULTS

Study characteristics

Initially, after searching on electronic database, 2026 related articles obtained and 19 articles entered into the study by manual search. Then, duplicated articles were removed by utilizing Endnote X8; after that, title and abstract of 1961 remaining articles were reviewed. In the next step 88 study remained, whose 65 were omitted due to lack of relevance to the research goal. Finally 23 articles reviewed totally.

Incidence

In Rafiemanesh et al[14] study in 2003 to 2009 with the title of "evaluation the incidence of standardized age" showed that prostate cancer in Iran has been observed in older men that most cases occur after the age of 50. The peak in prostate cancer in Iran is between the ages of 70 and 80. Also, the highest incidence of this cancer was 26.35 per 100000 persons in Tehran in 2007. Totally, 1548 cases were diagnosed in 2003 and 3859 in 2009, reflecting the progression of this cancer over the period of 7-year study[14]. Sadjadi et al[25] showed that in 5 provinces of Iran the age standardized incidence rate for prostate cancer was 5.1 per 100000 people per year, and no significant difference was found between the 5 provinces. The incidence of prostate cancer in Iran is much lower than in Western countries, but it rises among Iranian immigrant in Western countries[25].

According to the res ult of study by Haddad-Khoshkar et al[17] in the period of 2005 to 2008, the most cases of prostate cancer were found in Fars (1955 persons) and Tehran (1880 cases) and the least was in Ilam (60 cases)[17].

The risk of prostate cancer is related to the human development index (HDI)[17]. The study by Pouresmaeili et al[26] which is conducted on healthy control subjects with no history of any type of cancer and prostate cancer patients who were referred to medical clinics depicted that the highest number of patients were in Tehran province, as well as center of provinces, large and industrial cities[26]. Hassanipour et al[11] in 2017 reported that the incidence of prostate cancer in Iran is lower than in the rest of the world and the standardized incidence rate is 9.11[11]. Review article by Mousavi[18] in the period of 1975 to 2003 illustrated that the incidence of prostate cancer was 6.6 per 100,000 in several geographical locations. This amount is significantly lower than developed countries[18]. Thus, based on the studies of prostate cancer, it is raising in Iran[13].

Prevalence and mortality

Prostate cancer in Iran is the third most common cancer in men[15], so that its prevalence in patients with benign prostatic hyperplasia was 6.3%. In general, the prevalence of cancer in Iran is similar to that of the Eastern Mediterranean country. It is expected to face prevalence enhancement in the future due to an increase in life expectancy and longevity. This malignancy is the seventh cause of death (in 2004, the death rate was 4.5 per 100,000 people) in the world[18].

According to Rafiemanesh et al[13], the mortality rate of prostate cancer ranged from 2.67 per 100,000 in 2005, to 3.24% in 2009, and generally the rate of death increases with age as a result of this cancer[13].

Risk factors

Risk factors for prostate cancer in Iran are different from other populations because of lifestyle, nutrient and environmental factors. Table 1 shows the most important risk factors for prostate cancer in Iran.

TABLE 1. Most important risk factors for prostate cancer in Iran.

Row	Author's name	Place of study	Type of study	Sample size	Risk factors
1	Mazda et al (22)	Isfahan	Case-control	Case: 95 Control: 95	Positive family history, aging Tomato Consumption Protective Agent
2	Pourmand et al (7)	Tehran, Isfahan, Hamedan, Lorestan, Khorasan, Gilan, Mazandaran and Fars	Case-control	Case: 130 Control: 75	Level of education, marital status, meat consumption, vasectomy and smoking
3	Hosseini et al (1)	Mazandaran	Case-control	Case: 137 Control: 137	The history of other cancers Prostatitis, alcohol consumption, pipette or hookah, walking to work, duration of professional activity, physical activity intensity and older age
4	Pouresmaeili et al (26)	Whole provinces	Case-control	Case: 208 Control: 332	Smoking, Drug using, place of residence
5	Mousavi (18)		Systematic review	40 full texts, 7 national reports, and 10 provincial reports were accessed	Aging, intercourse more than twice a week, high serum estradiol, increased fat intake *High serum testosterone and a history of diabetes and an increase in the consumption of lycopene protective factor

The results of the study showed that a positive family history of prostate cancer is a major contributor to the onset of this malignancy. Also, increasing consumption of tomato sauce is associated with a reduced risk of prostate cancer and is a contributing factor, while, the risk is not impacted by the effects of smoking, alcohol consumption, vasectomy, diabetes, sexually transmitted diseases, and the consumption of garlic and fat in the diet[27].

In Pourmand et al[7] study, which was conducted between 2005 to 2007, factors such as level of education, marital status, consumption of meat, vasectomy and smoking did not have a significant effect on the increase or decrease of the risk of prostate cancer among the Iranian population[7]. Whereas, Hosseini et al[1] in Mazandaran showed that the effect of family history of prostate cancer, the history of other cancers, prostatitis, alcohol consumption of pip and hookah, walking to work, duration of professional activity, physical activity and older age group, are the risk factors for prostate cancer[1]. Pouresmaeili et al[26] in 2014 investigated the impact of smoking and drug abuse on this cancer; also, the place of residence is a risk factor for dangerous behaviors that increase the amount of prostate cancer and its related malignancies[26]. The result of Mousavi[18] study manifested that aging, intercourse more than twice a week, high serum estradiol, increased fat intake are the main risk factors; however, high serum testosterone, history of diabetes and increased use of lycopene are a protective factor[18].

Food Pattern

Salem et al[19] in their study pointed out that there is an association between consumption of red meat as well as fat and higher risk of prostate cancer, while, tomatoes, tomato products and garlic would this risk and are considered as a protective factor[19]. Askari et al[21] reviewed the relationship between fruits and vegetables and found that in the group of fruits there was a significant and inverse relationship between consumption of apples and pomegranates and incidence of prostate malignancy. Similarly, in the vegetable group tomatoes were a contributing factor and there was an inverse relationship with prostate cancer[21].

Asgari et al[28] in a case-control study, concluded that among Iranian men, the pattern of food associated with prostate cancer, as the higher scores in the Western pattern (sweets and desserts, meat, snacks, tea and coffee, fries, salt, carbonated beverages, processed meat) have been associated with an increased risk of prostate cancer. A higher score in healthy patterns (legumes, fish, dairy, fruits and vegetables, boiled potatoes, whole grains and eggs) is associated with a reduced risk of prostate cancer[28]. Food pattern in prostate cancer is illustrated in Table 2.

Screening and diagnosis

Screening for prostate cancer plays a vital role by detecting the basis of prostatic specific antigens. Prostatic specific antigen (PSA) based screening with low PSA levels significantly would increases the incidence of prostate cancer diagnosis[23].

TABLE 2. Food pattern and risk of prostate cancer.

Row	Author's name	Place of study	Type of study	Sample size	Risk factors
1	Salem et al (19)	Tehran, Isfahan, Hamedan, Lorestan, Khorasan, Gilan, Mazandaran, Fars	Case-control	Case: 194 Control: 317	Tomatoes and its products and garlic agent
2	Askari et al (21)	Tehran	Case-control	Case: 52 Control: 104	An inverse and meaningful relationship for fruits such as apples and pomegranate Reverse and meaningful relationship for vegetables, especially tomatoes
3	Askari et al (28)	Tehran	Case-control	Case: 50 Control: 100	Western pattern (sweets and desserts, meat, snacks, tea and coffee, fries, salt, carbonated beverages, processed meat) increased risk factor Healthy pattern (beans, fish, dairy, fruits and vegetables, boiled potatoes, whole grains and eggs) Protective agent

The result of studies demonstrated that using prostatic specific antigen density instead of a specific antigen was a better tool for diagnosis and may improve its accuracy especially in patients who had the PSA of 4-10 ng/ml[10,29].

The study of the ethnic and racial differences of Iranian men in comparison with other men points to the fact that if male serum PSA levels exceed 4 ng/ml, they are known as prostate cancer[22]. In this study the reference ranges are varied as follow: the serum PSA levels in the age group of 59-50 years were ng/ml 0-3.6, in the age group of 69-60 years were ng/ml 0-5.7 and in the age group of 79-70 years were determined to be 0-6.8 ng/ml. It should be mentioned here that this statistics were specific for Iranian men and that are different from other races[12]. The rate of diagnosis of prostate cancer has been reported in men older than 40 years of age with a screening program of 3.6%[18].

Histology and survival rate

The most common type of prostate cancer in Iran is adenocarcinoma (93.75% of cases)[14,15,24] which tends to decrease over time[15]. Additionally, secondary Transitional Cell Carcinoma (TCC) was found with a primary source of 5% and sarcoma in 25% of cases of prostate cancer patients. Among observable symptom, obstructive symptoms were 25.56%, urinary tract infection 81.52%, hematuria 25.56%, and urinary incontinence was found in 5% of cases as well as16.3% had metastatic symptoms[24]. Zahir et al[16] stated that age and grade of pathology can have a negative impact on the survival of prostate cancer patients in Iran[16].

Sexual problem

The only study that examines the sexual problems of patients in several universities in Iran has conducted by Lin et al[30] showing that the incidence of PE (premature ejaculation) and ED (erectile dysfunction), varied according to different diagnostic methods. It means that based on the diagnosis of urologist, the incidence of PE and ED was 63.75 and 66.2%, respectively. They concluded that the prevalence of sexual problems in Iran was very high among prostate cancer patients[30].

CONCLUSIONS

The trend of the incidence of prostate cancer in Iran has risen and the death rate of this cancer is high among Iranian older aged men. According to the findings of this study, the pattern of food in Iranian men is associated with prostate cancer.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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