Original Article

Investigation of Prostate Cancer Associated with Prevalence

Farhad Tadayon, Zahra Tolou-Ghamari, Sajad Norouzi

Department of Urology, Isfahan Kidney Transplantation Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Context: Prostate cancer (PCa) incidence rates (IRs) are highly variable worldwide. **Aims:** The aim was to evaluate the period prevalence (PP) and IRs of PCa in Isfahan/Iran. **Materials and Methods:** Data from March 24, 2011, to March 19, 2015, were obtained from the Isfahan Cancer Registry. PCa was distinguished by the related established topography code (C61). IRs and PP were calculated and expressed per 100 000 males. **Statistical Analysis Used:** The statistical analyses of dBase were performed using Microsoft Excel and SPSS version 20 (IBM Corp., Chicago, IL, USA) for windows. **Results:** Over a period of study, there were 1648 males that were identified with PCa. For the total population, the PP was calculated as 65.2/100,000 males. Histologically, of the total population studied, 99% reported adenocarcinoma that majority of them had mild or moderate gleason score. According to available information monographic code M with no definition regarding to subtype showed code 81140 as generally named adenoma (n = 1156), code 8000 generally named neoplasm (n = 468), transitional cell papilloma (n = 9) and acinar cell adenoma (n = 5). IRs were calculated for each year, that is, 2011–2012, 2012–2013, 2013–2014, and 2014–2015, as 14.5, 17.4, 15.5, and 17.8 (per 100,000 males), respectively. The mean (standard deviation, min-max) age of the patients was 72.0 (10.6, 16–110) years. In relation to the age of the study population, PCa occurred in 84% of patients aged >60 years. **Conclusions:** The number of deaths versus alive in patients with PCa was 583 versus 1065, respectively. Further studies toward pharmacotherapy management and genetic and environmental factors in PCa carcinogenesis recommended to be clarified in Iran.

Keywords: *Cancer, prevalence, prostate, tumor*

Introduction

Prostate cancer (PCa) is the tumor of the gland in the male reproductive system. In addition to the race, family-specific gene variants such as hereditary PCa gene may contribute to PCa risk. Previous reports indicated PCa as the main reason for disease and death in men, with approximately 1.6 million incident cases in 2015 that 70% were from developed countries, which was diagnosed as the most common cancer worldwide.[1,2] Its global burden is considerable, which ranks it as the top five cancers for both incidence and mortality.[3] In the United States, it is estimated that 180,890 new cases diagnosed in 2016,[4] and in Iran during 2003–2008, 16,071 cases of PCa were reported.[5] The highest and lowest incidence and prevalence of PCa were reported in North America and South Asia, respectively.[6] There is a strong association between age and the risk of PCa, as it is rare in men younger than 40 years of age. There is a dramatic increase in incidence rates (IRs) of PCa after 55 years of age.[7] The study showed that the mortality of PCa was stronger for men with body mass index (BMI) ≥25.[8]

Obesity could be associated with an increased risk of fatal PCa. The study showed that the correlation between weight change, BMI, and lethal PCa was stronger for men with BMI ≥25 at age 21 compared to those with BMI <25.[8] In a case–control study of 95 incidents, pathologically confirmed PCa and 95 controls, in Isfahan/Iran, potential risk factors revealed as increased age and positive family history.[9] In Brazil, death from PCa was reported to be correlated with late diagnosis of the tumor, palliative treatments, and worse medical conditions.[6-8] Regarding occupational risk, the publication reported that in patients with PCa, the miners of iron have the potential contact to carcinogen.[10] Based on the collected data from all related sources in Fars Province, Iran, from 2007 to 2010, a growing rate reported in men associated with bladder and PCa.[11] A positive significant relationship was distinguished among the IRs of PCa and the human development index and

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Address for correspondence:
Dr. Zahra Tolou-Ghamari, Isfahan Kidney Transplantation Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: toloeghamari@pharm.mui.ac.ir

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its extents with life anticipation at birth, education, income, and obesity (Western diet).[12] Isfahan Province is located in the center of Iran, a developing country that is located in the Middle East. It covers 107,027 km^2, with a population of 4,982,100 people, which is ranked as the third province in the country.[13] Although there have been some studies of PCa in Iran, to the best of our knowledge, no investigation has been published on the prevalence and incidence of PCa from 2011 to 2015, in Isfahan/Iran.

Materials and Methods

This retrospective study was approved by the Institutional Review Board (No. 397599, IR.Mui.Med. 1397.221). The study was conducted at the Isfahan Kidney Transplantation Research Center. PCa data from March 24, 2011, to March 19, 2015, were obtained from the Isfahan Cancer Registry located at the Isfahan Deputy of Health. The Isfahan Cancer Program is intended to record all cancer cases in the Isfahan. The management arm of the program is the deputy of research at the Isfahan University of Medical Sciences. The cancer sites studied were defined according to the International Classification of Disease for Oncology (ICD-O; 3rd edition). PCa was distinguished by the topography code C61. To clarify invasive or noninvasive neoplasms, the monography code was used for tumor description, including cell type. Collected coded data were linked using the de-identified patients' name and surname. In the next step, the code for each patient, father's name, age, gender, and pathology report and its date, topography, and monography code were recorded in Microsoft Excel.

Statistical analysis

Microsoft Excel was used to arrange raw data before being inputted into the Statistical Package for the Social Sciences (SPSS® version 20; IBM Corp., Armonk, NY, USA) for analysis. Age, as a continuous variable, was expressed as mean ± standard deviation (SD). The normality distribution of age was tested using the Kolmogorov–Smirnov test. Variables such as alive/dead, type of PCa, and year of report were expressed by frequency, percentage, period prevalence (PP), and IRs. As the data were related to PCa occurrence, therefore, normality distribution test of the patient population was studied only in comparisons associated with the age of the males. The total population of the male in Isfahan city was obtained from the Isfahan/Program and Budget Management Organization. The PP was calculated as the proportion of the total males with PCa over the period 2011–2015/to populate at risk during the same period × 100,000. The IRs were calculated by dividing new cases of PCa during a given time period/to the population at risk during the same time period × 100,000.[13-20]

Results

Epidemiological characteristics of patients with PCa are shown in Table 1. Over a period of 4 years, for a total population at risk included 2,527,486 males, there were 1648 recorded cases with PCa. The normality distribution of age was tested by the Kolmogorov–Smirnov test. The mean (SD; min–max) age was 72.0 (10.6; 16–110) years. As shown in Figure 1, the most incidences of PCa (84%) occurred between the ages of 60 and 90 years.

Histologically, of the total population studied, 99% reported adenocarcinoma that majority of them had mild or moderate gleason score. According to available information monographic code M with no definition regarding to subtype showed code 81140 as generally named adenoma (n = 1156), code 8000 generally named neoplasm (n = 468), transitional cell papilloma (n = 9) and acinar cell adenoma (n = 5). With a minimum of 59 and a maximum of 81, the mean age of patients with invasive PCa was 73.7 years.

The PP of PCa was 65.2 per 100,000 males. Figure 2 shows the IRs for PCa between the years 2011–2015. The IRs for the related years of study were 14.5, 17.4, 15.4, and 17.8/100,000 persons, respectively.

Figure 3 shows that there were 583 recorded deaths (35%). The number of reported deaths versus alive in patients with PCa was corresponded to 117 versus 241 (2011–2012), 166 versus 270 (2012–2013), 147 versus 247 (2013–2014), and 153 versus 307 (2014–2015).

Discussion

PCa is the most common malignancy among males, with a wide variation in mortality and IRs worldwide.[21] As the

Table 1: Epidemiology data in patients with prostate cancer

Population studied	*n*	ELC	ED	Related PP or IR
2011-2015	1648	1065	583	PP=65.2
2011-2012	358	241	117	14.5
2012-2013	436	270	166	17.4
2013-2014	394	247	147	15.5
2014-2015	460	307	153	17.8

ELC: Estimated living cases, ED: Estimated death, PP: Period prevalence, IR: Incidence rate

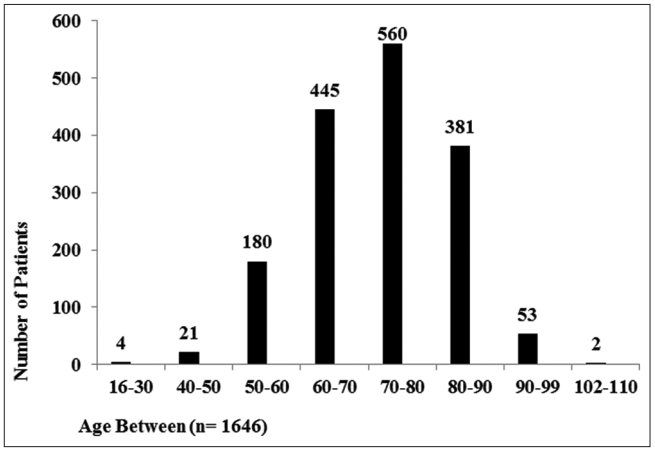

Figure 1: Distribution of prostate cancer according to the age

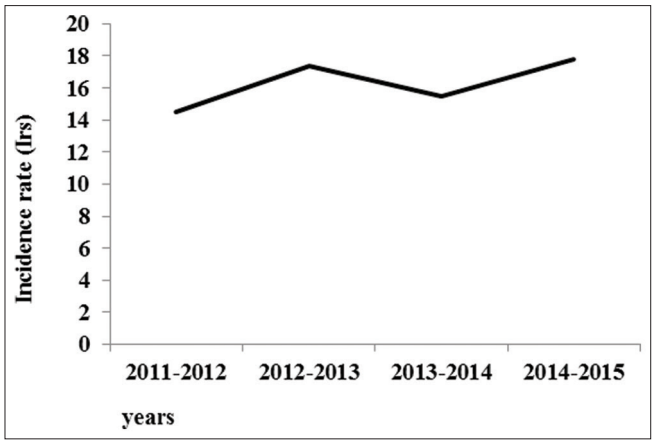

Figure 2: Incidence rates for prostate cancer from 2011 to 2015

incidence of PCa increases with advancing age, therefore, it can be expected that the prevalence of PCa in men older than age 65 years will continue to increase.[21] In this study, 84% of patients with PCa aged ≥60 years, that is in agreement with previous report that confirmed that 64% of new PCa cases in the United States were diagnosed in men older than age 65 years, and 23% in men older than age 75 years.[21] There are differences in incidence and mortality rates between men of African, Asian, Hispanic, and European ancestry, confirming the involvement of genetic factors.[22] The age-standardized rate was highest in Oceania (79.1/100,000 people) and North America (73.7), followed by Europe (62.1). Conversely, Africa and Asia have IRs that are lower than those from developed countries (26.6 and 11.5, respectively).[23]

In this study, 99% of patients with PCa, noninvasive forms such as adenoma were reported. The previous publication reported that the clinical incidence, mortality, and to a lesser degree prevalence of PCa vary among various geographical regions of the world. The approach to screening, early detection initiatives, and the availability of treatment modalities have a major impact on disease epidemiology.[23-28]

Throughout this investigation, the population studied experienced a 22.8% increase in IRs of PCa. In addition, in this study, there was an overall PCa frequency death by 35%. The previous publication confirmed that similar to the incidence data, mortality trends illustrate African–American men having the highest rates, followed by non-Hispanic White men. The lifetime risk of dying from PCa is significantly higher for African–American men at 4.2% versus 2.9% for Hispanic men, 2.3% for White men, and 2.1% for Asian and Pacific Islander men.[22]

Conclusions

As the number of reported deaths versus alive in patients with PCa was 583 versus 1065; therefore, understanding risk factors, pharmacotherapy management, and new ways to diagnose patients with PCa seem to be advantageous.

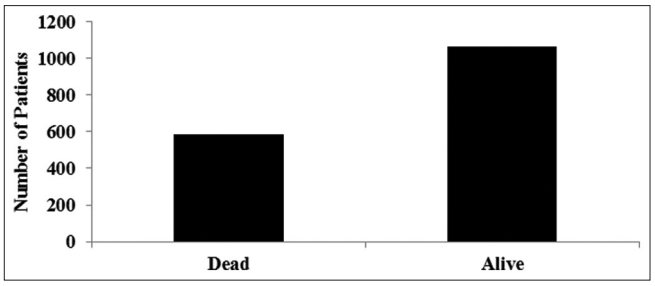

Figure 3: Deaths/alive in patients with prostate cancer from 2011 to 2015

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Conflicts of interest

There are no conflicts of interest.

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