

The incidence rate of prostate cancer in Saudi Arabia: an observational descriptive epidemiological analysis of data from the Saudi Cancer Registry 2001–2008

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BACKGROUND: This study presents descriptive epidemiological data related to prostate cancer cases diagnosed from 2001 to 2008 among Saudi men, including the frequency and percentage of cases, the crude incidence rate (CIR) and the age-standardised incidence rate (ASIR) adjusted by region and year of diagnosis.

METHODS: This is a retrospective descriptive epidemiological analysis of all Saudi prostate cancer cases recorded in the Saudi Cancer Registry (SCR) between January 2001 and December 2008. Statistical analyses were conducted using descriptive statistics, the Poisson regression model, a simple linear regression model and analysis of variance with the Statistical Package for the Social Sciences version 20.0 (SPSS).

RESULTS: A total of 1739 cases were registered in the SCR between January 2001 and December 2008. The eastern region of Saudi Arabia had the highest overall ASIR at 10.1 per 100,000 men, followed by Riyadh at 7.1 and Makkah at 5.2, while Jizan and Najran had the lowest average ASIRs at 1.4 and at 2.0, respectively. The Poisson regression model for the region of Jizan shows that the incidence rate ratio (IRR) was significantly higher ($p < 0.001$); for the regions of Riyadh at 3.43 times (95% CI, 3.13–3.73), followed by Makkah at 2.56 (95% CI, 2.38–2.74) and the eastern province at 1.93 (95% CI, 1.64–2.23). The annual prediction of the CIR of prostate cancer in Saudi Arabia could be defined by the equation $1.53 + (0.094 \times \text{Years})$, and the prediction of the ASIR could be defined by the equation $2.98 + (0.182 \times \text{Years})$.

CONCLUSION: There was a steady increase in the CIRs and ASIRs for prostate cancer between 2001 and 2008. The eastern region, Riyadh and Makkah had the highest overall ASIR in Saudi Arabia. Further effective screening programmes and active treatment measures are needed to control prostate cancer disease among Saudi men.

Prostate cancer is one of the most common cancers among men, and it is the sixth leading cause of cancer-related mortality in men worldwide.^{1–4} It has become a significant health problem in both developed and developing countries.^{2,4} The incidence rate of prostate cancer differs from country to country, and the proportion of cases vary by more than 25-fold globally.⁵ According to the American Cancer Society, in 2008 an estimated 903,500 new cases of prostate cancer were reported among men internationally, while the number of deaths was 258,400.^{4,5}

Prostate cancer is the second leading cause of death among men in the United States,¹ and will influence one in six males during their life span. In 2013, it is estimated that 238,590 new cases will be detected and 29,720 men will die from prostate cancer.⁶ The burden of prostate cancer has increased in Europe, with an estimated 379,000 new cases and 94,000 deaths reported in 2008.⁷ In addition, mortality rates continue to increase in African people, and decrease in the Asian population.^{4,7}

In Saudi Arabia, the International Agency for Research on Cancer (IARC) estimated that the

age-standardised incidence rate (ASIR) for prostate cancer was 7.7 per 100,000 men in 2008, and the age-standardised mortality rate (ASMR) was 5.1 per 100,000 men.⁷ Furthermore, the registry of the King Faisal Specialist Hospital and Research Centre (2011) recorded 1213 cases (1.7%) of prostate cancer admitted to the hospital during the years 1975–2011.⁸ In 2008, the Saudi Cancer Registry (SCR) reported that prostate cancer ranked sixth in cancer incidence among Saudi men.⁹

The age standardized incidence rate of prostate cancer in Saudi Arabia is very low in comparison to Arab Gulf and European countries. For example, in 2008, the reported ASIRs for Qatar, Bahrain, Kuwait, and United Arab Emirates were higher than Saudi Arabia at 15, 13.3, 11.6 and 9.6, respectively.⁷ Despite lacking information about prostate cancer in Saudi Arabia, except for the SCR reports, we have attempted to study the incidence of prostate cancer in different regions of Saudi Arabia during the years 2001–2008. The objectives of this study are to investigate and describe the distribution of prostate cancer in terms of the characteristics of person, place and time among Saudi men.¹⁰

MATERIALS AND METHODS

We conducted a retrospective descriptive epidemiological study of all Saudi men prostate cancer cases diagnosed between January 2001 and December 2008. Data for cancer in Saudi Arabia are publicly available and easily accessible. The data sources for this study were made possible by the SCR, a population-based registry established in 1994 by the Ministry of Health in Saudi Arabia. The data cannot be obtained directly from the SCR, except through published reports. There were no available data from 1994 to 2000, and the latest published report of the SCR was in 2008. Other cancer reports have been published by the King Faisal Specialist Hospital and Research Center, which is a hospital-based registry. We were therefore unable to use them for a general analysis of the Saudi male population.

Since its establishment, the SCR has been providing reports on the pattern of cancer in Saudi Arabia with a primary objective of defining the population-based incidence of the disease. Based on these data, there are currently comprehensive reports for 13 administrative regions from 2001 to 2008 that outline the frequency and percentage of cases, the CIR and the ASIR adjusted by the provinces of Saudi Arabia and the year of diagnosis for each case. This study was conducted using these reports from the Saudi

Table 1. Segi (World) standard: For making comparisons with intermediate-age population (Segi, 1960). It can be used in direct method of standardization to calculate the ASIR & ASMR.

Age group	Segi (World) standard
0–4	12,000
5–9	10,000
10–14	9000
15–19	9000
20–24	8000
25–29	8000
30–34	6000
35–39	6000
40–44	6000
45–49	6000
50–54	5000
55–59	4000
60–64	4000
65–69	3000
70–74	2000
75+	2000
Total	100,000

Cancer Registry with the aim of presenting the descriptive epidemiology of prostate cancer in Saudi Arabia.

For data analysis, we used the Statistical Package for the Social Sciences version 20.0 (SPSS). The descriptive analysis of the epidemiological data was performed by calculating the overall percentage, the CIR and the ASIR adjusted by the age group, region and year of diagnosis. The percentage was calculated by adding the number of prostate cancer cases and then dividing that number by the total number of male cancer cases. Furthermore, analysis of variance test (ANOVA) was performed to determine any significant differences among the regions and years of diagnosis.¹¹ In addition, the linear regression model that investigates the strength of the association between independent variables and an outcome was applied to predict the annual CIR and the ASIR for prostate cancer among Saudi men.¹² In addition, the Poisson regression model was conducted to calculate the incidence rate ratio of prostate cancer cases in each region of Saudi Arabia.

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