

CANCER OCCURRENCE IN ARDABIL: RESULTS OF A POPULATION-BASED CANCER REGISTRY FROM IRAN

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The provincial health authority reported a high mortality rate from upper GI cancer in the newly established Ardabil Province of northwest Iran. A comprehensive search was undertaken to survey and register all cases of cancer during a 4-year (1996–1999) period among the indigenous population of Ardabil Province, including subjects seeking care in the cities of Tabriz and Tehran. Diagnosis of cancer was based on histopathology in 71.4%, clinical or radiologic findings in 25% and death certificate in 3.6% of cases. A total of 3,455 cancers (mean age 57.1 ± 17.3 years) was found during the study. Of these, 60% (2,072) were in males. ASRs for all cancers in males and females were 132.0 and 96.3, respectively. The top 5 cancers in males (excluding skin cancer) according to the calculated ASR were stomach (25.4), esophagus (15.4), lung and bronchus (7.9), colon and rectum (7.9) and bladder (7.6); in females, these were stomach (25.42), esophagus (14.4), breast (7.6), colon and rectum (5.9) and lung and bronchus (3.6). Compared to rates obtained 30 years ago, the incidence of upper GI cancer in this region has increased about 100%, and there is a striking increase in the incidence of gastric cancer with a decline in the esophageal cancer rate. ASRs for gastric cancer in Ardabil were 49.1 for males and 25.4 for females, while for esophageal cancer these were 15.4 and 14.4, respectively. The ASR for cervical cancer was the lowest (0.4) recorded in the world before. Gastric cancer alone constitutes one-third of all cancers in Ardabil, the ASR of which is the highest reported from Iran up to now and one of the highest in the world.

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For more than 40 years, several groups have tried to map out cancer incidence rates in different areas of Iran.^{1–5} Among these, only the Caspian Cancer Registry in the city of Babol, which was established in 1969 by joint collaboration of the IPHR of Tehran University and the IARC, has provided a reliable source of data on cancer incidence in the Caspian littoral of Iran.⁶ Although the study area was limited to the Caspian coastline [2 provinces of Mazandaran and Gilan and the district of Ardabil (now a province)], data published by this registry alarmed the local and national health authorities, by documenting one of the highest incidence rates of esophageal cancer in the world to be in the northeast of the Caspian littoral, the Turkman plain.^{7,8} This led to an international effort to search for the risk factors of this disease in this region.^{9,10} However, these efforts were discontinued due to the sociopolitical events of the 1980s in Iran. According to recent statistics issued by the Ministry of Health, cancer is the third most common known cause of death in Iran, after cardiovascular diseases and accidents.¹¹ In recent years, there has been an increasing demand for reliable cancer incidence data by national health officials and researchers in the field of cancer.^{12,13}

We selected Ardabil Province for 2 main reasons: first, Ardabil was reported to have the highest incidence of upper GI cancer in Iran¹¹ and, second, the cancer registry data of this region from the 1970s were available for comparison. In addition, Ardabil has a

homogeneous Azeri ethnic population with a minimum immigration rate, which provides an excellent set-up for field studies, and established cancer registries. We also aimed to obtain cancer incidence data from the whole province, to select the target populations and hot spots for our future upper GI cancer field studies. The project began with active surveillance for all cancer cases and the establishment of a population-based cancer registry in this province.

Geographic and demographic description

Ardabil was previously a district of East Azerbaijan Province but became a separate province 5 years ago. It is located in northwest Iran, an area 50 km inland from the western Caspian coastline (Fig. 1), with an area of about 17,953 km² (1.09% of the total area of Iran). The capital city of Ardabil is at 38°-14'-32" latitude N and 48°-17'-53" longitude E. The province is mountainous with an altitude ranging from 4 to 4,811 m above sea level. Ardabil city is near the silent volcano of Sabalan, with an altitude of 4,811 m. The weather is moderate, with cold winters and mild summers. The total population of Ardabil Province, according to the 1999 census, is 1,128,864 (1.94% of Iran's total population), with 46% living in 9 cities and 54% in rural areas. The population is homogeneous, 95% being from the Azeri ethnic background, which is of Aryan Caucasoid ancestry. They speak in Azeri, which is a variant of the Turkish language, and are Shi'a Muslims. Consanguinity is common in both urban and rural areas. Sixty-three percent of the population is younger than 25 (mean age 23, median 18 years) (Fig. 2). LE at birth is 60 years for men and 61 for women. Sixty-six percent of men are farmers, and 90% of women are housewives, who occasionally work on the farms as well. The rest of the population are workers in local industries, in business or government employees. Based on the 1999 health statistics, the physician-to-patient ratio is 1/2,830; there are 10

Abbreviations: ASR, age-standardized rate; DCO, death certificate only; DDRC, Digestive Disease Research Center; GI, gastrointestinal; ICD-O, *International Classification of Disease for Oncology*; IPHR, Institute of Public Health Research; LE, life expectancy; MV, microscopic verification; TUMS, Tehran University of Medical Sciences.

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