RESEARCH COMMUNICATION

Cancer in East Azerbaijan, Iran: Results of a Population-based Cancer Registry

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Abstract

Background and aims: Regardless of the fact that cancers of GI tract have been reported to be the most common fatal neoplasms in East Azerbaijan, there is a serious lack of population-based studies in this region. Methods: A comprehensive search was therefore undertaken to prospectively register all cases of cancer occurring in the province during March 2006-2007. Diagnosis of cancer was based on histopathology of primary lesions in 84.0% of cases, clinical investigation and ultrasound in 7.2%, only clinical investigation in 5.4%, and histology of metastasis in 2.9. Less than 1% were based on cytology and death certificates in one official year. Results: A total of 4,922 cancers (mean age 60.2+18.13 years) were diagnosed during this population-based study. Of these, 56.8% (2114) were in males. ASRs for all cancers in males and females were 164.3 and 130.6 respectively. The top five sites for cancer in males (excluding skin cancer) according to the calculated ASR (world) were stomach (26.0), bladder (15.7), esophagus (12.4), colon and rectum (11.6) and blood (10.8); in females, they were breast (23.5), esophagus (11.7), stomach (11.6), colon and rectum (9.7) and nervous system (5.5). Conclusion: This first comprehensive report on cancer incidence in East Azerbaijan, documents particularly high incidence rates for esophageal and gastric cancer across the sexes.

Key Words: Cancer incidence - East Azerbaijan - Iran

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Introduction

Due to the serious lack of epidemiologic data on cancer in Iran and reports of high incidences and possible special characteristics in this population, increasing attention is now being made to well designed and trustworthy cancer registry programs. Variation in the incidence of different cancers in our country has been subject of interest (Habibi,1965; Habibi and Nasr, 1965; Mosavi-Jarrahi et al.,2001) and necessitates reliable local cancer registries to supply data about the incidence, burden and changes in mortality and morbidity of the cancers over the years.

At this time, a few Cancer Registries are providing reliable source of data on cancer incidence in Iran. Published data have pointed to one of the highest rates in the world for esophageal cancer in Mazandaran and Gilan provinces (Kemet and Mahboubi, 1972; Aramesh and Salmasizadeh,1975) and gastric cancer in Ardebil province of Iran (Sadjadi et al., 2003). Previously published statistics by ourselves on cancers of gastrointestinal tract in East Azerbaijan (Somi et al., 2006) also documented a high incidence rate for gastric cancer in this province by a pathology based study. However a population-based study has previously been lacking. The homogeneous Azeri ethnic population and cultural similarities in East Azerbaijan and Ardebil provide a consistent ensemble study population for studies about gastrointestinal and other cancers.

East Azerbaijan is located in north western Iran. The population in this area is 3,603,456 according to the census of 2006, most being from the Azeri ethnic background. Forty-seven percent of the population is younger than 25. This report describes the data derived from the liver and gastrointestinal diseases research center (LGDRC), the first population-based cancer registry in the East Azerbaijan Iran.

Materials and Methods

The census report for March 2006-2007 (one official year in Iran) was considered as the population at risk. The survey team, general practitioners and specialists in medical records collected and reviewed all records of cancer cases respectively from all pathology laboratories, hospitals and out-patient public and private clinics, diagnostic and clinic laboratories, radiotherapy and chemotherapy centers of East Azerbaijan province. Copies of documents were obtained where possible.

Data were gathered over a 20 month period and coded

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using ICD O. A final data check was performed and repeated cases with the same name, age and sex (with alphabetical organization of data) were removed. Inhabitants of other provinces and cases without valid information about the site of cancer were excluded as well.

The results are presented as incidence rates of cases by age, sex, site (ICD O), crude rate, age specific incidence rates and age-adjusted and standardized incidence rates per 100,000 using the direct method of standardization to the world population (Lensen et al., 1991). Data were analyzed using SPSS Software (version 13). The Student's t-test was used to compare means and the Chi-square test was employed to evaluate associations between the desired variables. The significance level was set at a P value 0.05.

Results

A total of 4,922 new cases with primary malignant lesions were registered in this population based study in East Azerbaijan province over a 1-year period. 2,798 (56.8%) of the subjects were male and 2,114 (43.0%) were female, with 0.2% having an undefined gender. Most of them had a Turkish ethnic back ground and only 0.2% were Kurdish. The diagnosis was based on histopathology of the primary lesion in 84.0%, clinical investigation and ultrasound in 7.2%, only clinical investigation in 5.4%, histology of metastasis in 2.9%, cytology in 0.3% and death certificate in 0.2% of cases.

Total numbers of cancer cases, 10-year age specific incidence rates, relative frequencies as well as crude rates and ASRs of the principal cancer sites for both males and females are shown in Tables 1 and 2.

The mean (±SD) ages at time of first diagnosis were 60.2 ±18.1 and 53.4±18.0 years for men and women, respectively (all: 57.3± 18.4). The age group >65 Y/O accounted for 41.1% of reports. We noted a significant younger age for women compared to men ($p<0.005$).

The top 5 cancers in males according to the calculated ASRs were stomach (26.0), skin (24.4), bladder (15.7), esophagus (12.4) and colon and rectum (11.6); in women, they were breast (23.5), skin (14.7), esophagus (11.7), stomach (11.6) and colon and rectum (9.7). ASRs of cancer overall were 164.3 in males and 130.9 in females.

Discussion

Differences in incidence rate of cancer between regions can provide approaches in decoding risk factors. The first report on cancer incidence in Iran dates back to a study of cancer in the Caspian littoral region between 1968 and 1972 (Mahboubi et al.,1973).

There have subsequently been a number of cancer registry reports from different parts of Iran (Larijani et al., 2004; Babaei et al., 2005; Ansari et al., 2006) but our study is the first population based cancer registry report from East Azerbaijan which can be applied as the primary

Table 1. Total Number of Cancer Cases, Age-specific Incidence Rates, Crude Rates and Annual ASR in Females in East Azerbaijan, 2006-2007

Primary site	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	>=85	Crude rate	%	ASR (W)
Oral cavity	44	0.79	0.00	0.00	0.49	0.45	1.63	0.00	0.00	3.82	2.16	9.43	1.86	4.45	16.2	21.3	34.0	7.80	20.0	2.49	2.1	**2.78**
Salivary gl	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.0	**0.05**
Pharynx	13	0.00	0.79	0.00	0.49	0.00	0.00	0.00	0.00	0.00	2.16	1.35	5.57	6.68	2.71	3.05	0.00	0.00	0.00	0.73	0.6	**0.95**
Esophagus	179	0.00	0.00	0.00	0.00	0.00	0.54	0.69	1.59	5.74	11.9	21.6	27.8	60.1	81.2	61.0	111	109	100	10.1	8.5	**11.65**
Stomach	175	0.00	0.00	0.00	0.00	0.00	0.00	1.38	1.59	4.78	13.0	27.0	26.7	51.2	70.4	94.5	82.7	70.2	120	9.91	8.3	**11.60**
Colorectum	150	0.00	0.00	0.66	0.46	0.45	1.63	3.45	3.97	10.5	18.4	21.6	31.5	44.5	43.3	64.0	29.2	39.0	20.0	8.50	7.1	**9.73**
Liver	34	0.00	0.00	0.66	0.00	0.00	0.00	2.07	1.59	1.91	3.24	2.70	3.71	11.1	5.41	9.15	19.5	15.6	20.0	1.92	1.6	**2.03**
Gallbladder	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	1.35	5.57	13.4	16.2	6.10	14.6	7.80	0.00	1.47	1.2	**1.68**
Pancreas	21	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.79	0.96	0.00	2.70	3.71	4.45	0.00	27.4	14.6	0.00	0.00	1.19	1.0	**1.30**
Larynx	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	2.70	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.22	0.2	**0.26**
Lung etc.	60	0.00	0.00	0.00	0.00	0.91	1.63	0.69	1.59	4.78	5.40	6.74	3.71	15.6	19.0	30.5	14.6	23.4	40.0	0.34	2.8	**3.70**
Hematopoietic system	92	4.76	2.37	1.98	4.86	1.81	2.17	5.52	3.18	3.82	7.56	12.1	11.1	15.6	10.8	9.15	29.2	0.00	60.0	5.21	4.4	**5.72**
Skin	239	0.00	0.00	0.00	1.94	4.08	2.17	2.76	4.77	3.82	16.2	20.2	57.5	55.7	75.8	94.5	102	171	156	13.5	11.3	**14.71**
Breast	393	0.00	0.00	0.66	0.97	2.27	7.05	17.3	45.3	67.9	60.5	59.3	64.9	55.7	67.7	39.6	19.5	23.4	40.0	22.3	18.6	**23.47**
Cervix	32	0.00	0.00	0.00	0.00	0.91	0.54	0.69	4.77	5.74	1.08	1.35	1.86	2.23	10.8	21.3	0.00	7.80	0.00	1.81	1.5	**1.87**
Ovary	85	0.00	0.00	0.66	1.46	1.36	3.25	0.00	4.77	12.4	13.0	14.8	7.42	20.0	13.5	24.4	9.73	15.6	0.00	4.81	4.0	**5.28**
Uterus	35	0.00	0.00	0.00	0.00	0.00	1.08	0.00	1.59	5.74	4.32	4.04	7.42	11.13	2.71	9.15	14.6	7.80	0.00	1.98	1.7	**2.18**
Other female genital	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.00	1.35	0.00	0.00	2.71	0.00	0.00	0.00	0.00	0.17	0.1	**0.20**
Kidney	28	1.59	0.00	0.00	0.00	0.00	0.54	0.69	1.59	1.91	4.32	5.39	3.71	6.68	0.00	12.2	4.86	7.80	0.00	1.58	1.3	**1.76**
Bladder	26	0.00	0.00	0.00	0.00	0.00	0.54	0.00	0.79	2.87	0.00	6.74	11.1	4.45	37.9	27.4	19.5	15.6	99.9	1.47	1.2	**3.68**
Brain/CNS	90	3.97	0.00	0.66	3.40	2.72	5.42	3.45	6.36	4.78	8.64	13.5	20.4	13.4	13.53	3.05	9.73	0.00	0.00	5.10	4.3	**5.48**
Thyroid	94	0.79	0.00	1.98	0.97	2.27	4.34	12.43	7.15	3.82	8.64	16.17	5.57	8.90	10.83	9.15	9.73	0.00	20.0	5.32	4.4	**4.90**
Adrenal	2	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.1	**0.17**
Other endocrine	16	0.00	0.00	0.00	0.00	0.45	1.08	0.00	0.79	0.96	3.24	1.35	7.42	4.45	2.71	0.00	0.00	0.00	0.00	0.90	0.8	**1.05**
Lymph node	50	0.00	0.00	2.64	1.94	1.36	3.25	1.38	2.38	1.91	4.32	2.70	9.28	4.45	18.95	9.15	0.00	7.80	0.00	2.83	2.4	**2.86**
Bone	24	0.00	0.00	3.30	0.97	0.91	1.63	0.69	1.59	1.91	1.08	1.35	1.86	2.23	0.00	9.15	0.00	0.00	0.00	1.36	1.1	**1.32**
Unknown	46	0.00	0.00	0.66	0.00	0.45	1.08	0.00	1.59	4.78	2.16	2.70	7.42	11.1	24.4	12.20	14.6	15.6	20.0	2.60	2.2	**2.87**
Others	123	2.38	3.95	1.32	1.46	2.72	3.80	6.91	4.77	8.61	13.0	16.2	13.0	26.7	32.5	12.20	38.9	7.80	39.98	6.97	5.8	**7.69**
All sites	2085	15.1	7.1	15.2	19.4	23.6	43.4	60.1	104	164	206	276	342	454	579	612	593	553	760	115	98.6	**131**

Table 2. Total Number of Cancer Cases, Age-specific Incidence Rates, Crude Rates and Annual ASR in Males in East Azerbaijan, 2006-2007

Primary site	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	>=85	Crude rate	%	ASR (W)
Lip & oral cavity	57	0.00	0.00	0.62	0.00	0.42	0.53	2.02	0.00	2.78	6.43	8.12	7.77	20.26	10.2	24.4	16.6	13.2	43.9	3.09	2.0	**3.58**
Salivary gl	8	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.76	0.93	0.00	0.00	3.89	2.25	0.00	2.71	4.15	0.00	0.00	0.43	0.3	**0.48**
Pharynx	29	0.00	0.75	0.00	0.46	0.42	0.53	1.35	2.29	0.93	8.57	4.06	1.94	6.75	2.56	5.42	0.0	6.61	0.00	1.57	1.0	**1.75**
Esophagus	218	0.00	0.00	0.00	0.00	0.00	0.53	0.00	4.59	11.1	6.43	18.9	33.0	42.8	66.5	127	125	192	65.8	11.9	7.8	**12.43**
Stomach	436	0.00	0.00	0.00	0.46	0.84	0.53	0.00	1.53	6.49	18.2	25.7	64.1	117	161	271	257	317	263	23.7	15.6	**25.99**
Colon & Rectum	187	0.00	0.00	0.62	0.00	0.42	0.00	5.40	3.06	11.1	25.7	31.1	17.5	49.5	56.2	86.8	58.1	59.5	43.8	10.2	11.57	**15.6**
Liver	37	0.75	0.00	0.00	0.00	0.00	0.00	0.67	1.53	1.85	1.07	2.71	5.83	9.01	20.5	19.0	4.15	13.2	0.00	2.01	6.7	**2.23**
Gallbladder	19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.93	0.00	1.35	0.00	4.50	7.67	13.6	8.30	13.2	21.93	1.0	0.7	**1.16**
Pancreas	31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.93	0.00	4.06	0.00	9.01	23.0	16.3	12.5	19.8	0.00	1.68	1.1	**1.90**
Larynx	35	0.00	0.00	0.00	0.00	0.00	0.00	1.35	0.00	0.93	3.21	4.06	5.83	0.00	17.9	24.4	12.5	19.8	21.9	1.90	1.3	**2.12**
Lung etc.	167	0.00	0.00	0.00	0.00	0.00	0.00	3.37	2.29	2.78	12.9	18.9	19.4	42.8	43.5	92.2	103	92.6	43.9	9.07	6.0	**9.58**
Hemto. Sys.	178	6.01	4.49	3.12	4.12	4.64	1.07	4.05	3.06	6.49	8.57	20.3	17.5	33.8	61.3	57.0	66.4	52.9	43.9	9.67	6.4	**10.80**
Skin	409	0.00	0.00	0.62	2.29	0.42	3.21	4.72	6.12	13.9	27.9	51.4	62.2	99.1	109	176	190	297	285	22.2	14.6	**24.38**
Prostate	125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	1.35	9.72	33.8	35.8	73.2	120	146	197	6.79	4.5	**7.33**
Testis	35	0.75	0.00	0.00	0.00	1.27	1.07	4.05	30.6	4.63	3.21	4.06	3.89	2.25	7.67	2.71	0.00	6.61	0.00	1.90	1.3	**1.94**
Other male genital	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	1.35	0.00	0.00	0.00	0.00	4.15	0.00	0.00	0.16	**0.1**
Kidney	53	2.26	0.00	0.62	0.00	0.42	0.00	0.67	3.06	3.71	8.57	6.77	9.72	11.3	20.5	8.14	8.30	13.2	0.00	2.88	1.9	**3.42**
Bladder	269	0.00	0.00	0.00	0.00	0.00	1.07	0.67	3.06	6.49	16.1	21.7	42.8	54.0	92.0	124	187	198	197	14.6	9.6	**15.72**
Brain/CNS	88	0.00	0.75	0.00	2.29	2.11	4.81	8.77	5.35	7.41	6.43	8.12	5.83	29.3	5.11	19.0	12.5	0.00	0.00	4.78	3.1	**4.98**
Thyroid	33	0.00	0.00	0.00	0.00	1.27	3.21	2.02	3.06	1.85	2.14	1.35	0.00	6.75	0.00	8.14	4.15	0.00	0.00	1.79	1.2	**1.44**
Adrenal	5	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.71	1.94	0.00	0.00	2.71	0.00	0.00	0.00	0.27	0.2	**0.34**
Other endocrine	12	0.00	0.00	0.00	0.46	0.42	0.00	0.67	0.76	2.78	0.00	1.35	5.83	0.00	0.00	2.71	0.00	0.00	0.00	0.65	0.4	**0.68**
Lymph node	95	1.50	3.74	1.87	4.12	3.80	2.14	1.35	9.94	6.49	8.57	10.8	3.89	6.75	17.9	16.3	4.15	19.8	21.9	5.16	3.4	**5.23**
Bone	39	0.75	1.50	1.87	6.40	0.84	1.60	2.02	0.76	0.93	2.14	1.35	1.94	6.75	0.00	2.71	4.15	0.00	0.00	2.12	1.4	**2.04**
Unknown primary	84	0.00	0.00	0.00	0.00	1.27	0.00	0.67	1.53	2.78	1.07	10.8	11.7	20.3	15.3	24.4	20.8	46.3	0.00	4.56	5.8	**3.67**
Others	146	2.26	1.50	1.25	3.66	5.49	5.88	2.70	8.41	9.27	16.1	14.9	19.4	29.3	40.9	46.1	24.9	46.3	21.9	7.93	2.4	**9.39**
All sites	2798	14.3	13.5	10.6	24.3	24.0	26.2	47.2	94.0	107	185	277	356	637	815	815	1249	1574	1271	129	114	**164**

source for epidemiological research, as well as for the design and appraisal of cancer control programs. The prospective nature of this survey tried to improve the poor-quality of medical records in some medical centers. ICD coding system is not applied in most of the medical centers yet. Additionally we noticed unsatisfactory pathology reports in 3.2%. It is critically needed to regulate and improve medical records as well as pathology reports.

Cancers of GI tract has been reported as the most common fatal cancer in this region (Ministry of Health and Medical Education; 2004). Gastric cancer and esophageal cancer comprised 12.4% and 8.1% of records. This represents high incidence of gastric (ASR: 37.6) and esophageal cancer (ASR: 24.1). An especial focus is adenocarcinoma arising from the right side of the gastric cardia (Derakhshan et al., 2004). One possible risk factor is dietrary insufficiency, as note in one ecologic study of serum selenium and upper gastrointestinal cancers in Iran (Nouarie et al., 2004). Colorectal cancer had a lower incidence rate in comparison with western countries (Ahmedin et al., 2002; Keighley, 2004) as also noted in an earlier international comparison (Sadjadi et al., 2005). Colorectal cancer in Iran was the focus of a recent epidemiological study (Azadeh et al., 2008).

We noted a high prevalence of breast cancer in women with ASR 23.5 per 100,000 (compared to ASR 7.6 in Ardabil). In cases with satisfactory reports, 48% had only regional lymph nodes and 16% were localized. This may be as a result of successful training of self-examination and thus early diagnosis. A high burden of breast cancer in Iran was also evident in an earlier study of the Tehran population-based cancer registry (Mousavi et al., 2006).

The explanation for the higher frequency of the said cancers is not clear but many risk factors have been associated with the development of gastric cancer, and the pathogenesis is most likely multifactorial including a combination of genetic and environmental factors. Cigarette smoking, which is a major risk factor for many cancers, is increasing in Iran and has been reported to be more than 25% in adult population; been started at age 21 (Ahmadi et al., 2001)

Low prevalence of cervical cancer in our region is compatible with reports from other parts of Iran. The reason for this finding is not clear but has been dependence on family-based traditions, rare sexually transmitted diseases among women and the fact that cigarette smoking is an uncommon practice of females in our country (Draini et al., 2002). Kaposi's sarcoma is also rare (Mousavi et al., 2007).

Prostate cancer as a common cancer among males in Western countries ranks eighth in our region; this may due to inadequate screening and diagnostic work up in elderly especially in the rural areas in part. This cancer predominantly occurs in old age, also in Iran (Babaei., 2006) but is on the increase (Sadjadi et al., 2007).

Several studies from different parts of Iran have noticed dissimilarity to estimated rates for cancer in GLOBOCAN (Parkin et al., 2005) due to low prevalent

hospital based survey reports and differences with registries from other regions. There is still need for investigation in other provinces for reducing morbidity and incidence rates as well as for screening programs and to assist in mapping out the risk factors.

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