RESEARCH COMMUNICATION

Incidence and Survival of Cancers in the Elderly Population in Iran: 2001-2005

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Abstract

　__Objective__: This study concerns the incidences of different types of registered cancers among the Iranian elderly population. The aim owas to estimate the 5-year survival of cancers between 2001 and 2005, according to elderly age groups and history. Since data on the health status of the Iranian elderly are non existent, these findings will, in part, fill the gap in geriatric knowledge in Iran. __Methods__: Data from the national cancer registry department of the Ministry Health and Medical Education (MOH & ME), which are pathology-based registration data, were used as the main source of information on incident types of cancers in Iran from 2001-2005. The coverage rate was nearly 80% of majority types of cancers and almost 100% of pathologically diagnosed forms of cancers in the elderly. Survival estimates calculated by Kaplan-Meier method. The survival probability was calculated for the overall cohorts, as well as gender and anatomical sites of tumor. __Results__: The highest incidence of cancerin five-year cohort was for skin cancer among the elderly population. The youngest aged group (60-74) years had high incidences (64.3%) of all types of cancers. Incidence rates of breast and thyroid cancers in old women were greater than in elderly men. In terms of survival rate, relative risk reflects significant association with gender (RR= 1.03; 95% CI: 0.84-0.95), P = 0.00. __Conclusion__: Based on the results in this study, the incidence of cancers in the elderly population increases with age. The mean age of the five-year survival cohorts was 88.2 years old. The incidence rates of cancers in old men are generally higher than in elderly wemon.

Keywords: Cancer - incidence - survival - elderly - Iran

Introduction

　Cancer is a common disease among all age groups all over the world (Adminastration on Aging, 2000). Gerontologists and geriatricians are responsive of the frequent incidence of cancers in elderly population (Ershler, 2006). The mainstream of cancer incidence and mortality arises in aged 65 years old and over. In US population projected significant increasing in cancers in the number of elderly people (Kumar et al., 2010). About 60% cases of cancer diagnosed belong to people aged 65 years and more (Wedding, 2007). Hence, age is a greatest risk factor for cancer (Colditz, et al., 2006).

　The growth of the elderly population across the world is predictable in terms of global population trends (Hodigere, 2005). It is estimated an increasing to account for a 51% raise in the number of elderly patients undergoing oncology procedures by 2020 (Hodigere, 2005). Cancer prevalence increases with longevity (Yancik, 1997). The 13% of elderly 65+ year's population in USA contain about 60% of all cancers and maintain 70% of cancer-related deaths (Edwards et al., 2002). Nevertheless, ther

is a gap in the number of review articles on cancer in elderly people, even in the number of primery research papers (Ershler, 2006).The survivalence increased in an invasive cancer is nearly 45% in men and 38% in women (Vercelli, 2000). The incidence of cancer is anticipated to steady over time, while the incidence of cancer in elderly people is estimated to rise by nearly one third over the next 30 years (Ferlay, 1999). These days cancer-related mortality is increasing, although cardiac disease-related death has declined (Hodigere, 2005). The average age of cancer is currently 70 years, and this will go up to 75 years or older by 2030 In USA (Ershler, 2006).Thus in near future, cancer will become the leading cause of death in old population 70 years and over (Vercelli, 2000).

　Since the survival rates for most types of cancer in old people are less than younger adults, it anticipated that the majority of older cancer patients suffer from cancer during the course of their illness (Zivic, 1997). Cancer survival rate anticipated to be independed of chronological age for most solid tumors (O`Connell et al., 2004). Cancer is often diagnosed at a later stage in older adults compared to younger patients, and older cancer patients

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tend to receive less aggressive therapy (Giordano, 2005). This undertreatment diminishes the survival of patients with certain cancers (Girre, 2008). In cancer patients, the clinical trials and register analyses confirmed that advanced age is associated with insufficient diagnosis, treatment and with shorter survival rate (Gross, 2006). Therefore, understanding the cancer patients' status as an age group will assist to health care policy. There is a gap in data concerning the incidence and survival of cancers in elderly population in Iran. Meanwhile, reported incidence of elderly cancers also was less as compared to the other countries that could be explained by the lack of nation wide screening programs, young age structure and quality of cancer registration system in Iran (Sadjadi et al., 2005). The aims were to determine of incidence and estimate the 5-year survival rate of different types of cancers among elderly Iranian population according to the records Ministry of Health and Medical Education.

Materials and Methods

The data from national cancer registry of Iran, 2001-2005, was used as recorded all pathological laboratories, daily cancer clinics, medical centers and other states central registries that sent to analysis to the Diseases Management Center in Ministry of Health and Medical Education in Iran. Data submitted were edited for quality and consolidated to remove duplicate cases. Data were then analyzed to the crude, age adjusted and age-specific annual cancer incidence rates that could be produced, and trends in incidence for all cancers and for specific types/ sites of cancer by aged groups and sex could be assessed. The data in the maximum capability consisted 81% of incident cases, and in the first year of registration was less than 40%.

From the national cancer registry file, 77862 cases of old people 60 years and over among types of cancers; bladder, osophage , colorectal, gastric, breast, ovarian, cervicx, thyroid, lung, luchemia, lymphoma, prostate cancers that had telephone number and were diagnosed between years 2001 and 2005 were called to obtain information about their life status. Survival estimates were calculated by using Kaplan-Meier method, and the survival probability calculated for the overall cohorts and also for gender and anatomical sites of tumor. Relative Ratios (RR) according to demographic and risk variables were calculated by Cox's proportional hazard model. The demographic features were precise and complete, items such as age, sex, cancer site and pathology all being consistently covered. To obtain information about patients, telephone calls were made. Eigh thousands and six hundred seventy cases out of 77862 were available for follow-up. Active follow-up of patients, baed on their phone number and address, was done. Duration of follow-up was calculated from the data of diagnosis to the data of death. The Kaplan-Meier method was used to estimate overall survival and survival according to age and histology. Differences between survival curves were evaluated by log rank test. Statistical significance results was defined by a P value < 0.05. The data were analyzed by SPSS version 16.
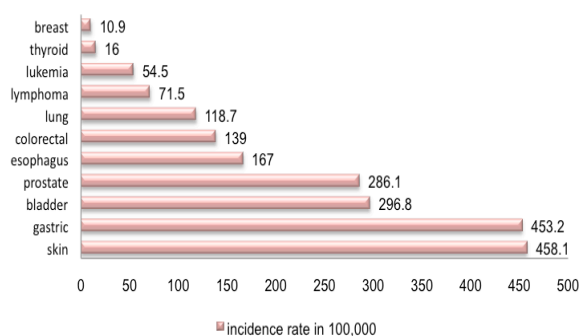
Figure 1. Incidence Rate of Common Cancers in Iranian Aged Men Population (2001-2005)
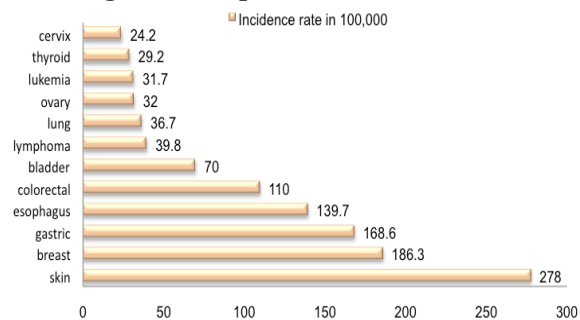

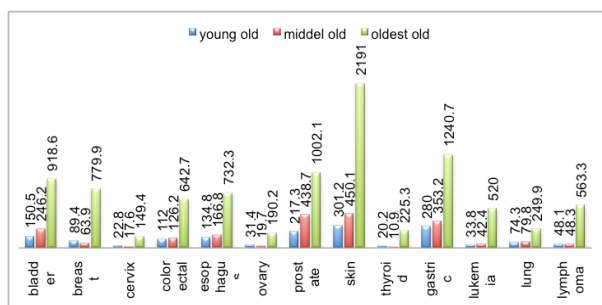**Figure 2. Incidence Rate of Common Cancers in Iranian Aged Women Population (2001-2005)**

Results

Based on demographic data 33.5% (26067 cases) population were women elderly and 66.5% (51769 cases) were old men. The youngest aged group (60-74) years was 64.3%, the middle old (75–90) years was 27.8% and the oldest old (90+) was 7.8%. The mean and median of cohort population were 71.2 years, and 70 years respectively.

The most incidences of cancers in five-year cohort among elderly population were skin cancer (371 per 100,000). The regular cancers among elderly men were skin(458/1), gastric (453/2), bladder (296/8), prostate (286/1), osephge (167), colorectal(139), lung (118/7), lynphoma(71/8),luckemia(54/5), thyroid (16) respectively (Figure 1). The common types of cancers among elderly women population were skin(278 per 100,000) breast (186/3), gastric (168/6), osephge (139/7), colorectal(110),bladder (70),lymphoma(39/8),lung(36/7), ovarian(32), luchemia(31/7) (Figure 2).

The incidence of cancers increased with age. The most incidences of cancers among young old (60–74) years was skin cancer followed by gastric,prostate, bladder, esophagus, colorectal, breast,lung, lymphoma, luchemia, ovarian, cervix, and thyroid. In the middle old (75–84) years, skin cancer was the most common folowed by prostate, gastric, bladder, esophaguse, colorectal, lung, breaast, lynphoma, luchemia, ovarian, cervix, and thyroid. In the oldest old (90+) years, skin cancer had the highest incidence followed by gastric, prostate, bladder,breast, esophaguse, colorectal, lynphoma, luchemia, lung, thyroid, ovarian, cervix in the five-year cohort 2001-2005 (Figure 3)

Incidence rate of cancers in old men are more than incidence rate in elderly wemon. Breast and thyroid cancers had more incidence in elderly women as incidence

Figure 3. Incidence Rate of Common Cancers in Iranian Aged Population (2001-2005)

rate of breast cancer in old women was 17 times bigger than in aged men and Incidence rate of thyroid cancer in old women was 1.8 times bigger than incidence rate of thyroid cancer in aged men.

The number of elderly patients with common cancers recorded in data set was 77,862 between years 2001 and 2005 of whom, 8,670 (11.1%) cases survived during the follow-up time. The mean age of five-year survival for the whole cohorts was 88.2 years old respected with median 84.5 years old. In terms of survival rate in elderly patients, relative risk reflects the significant assossiation changing between gender and death by cancer (RR= 1.03; 95% CI: 0.84-0.95), P = 0.00. The likelihood of death was higher in old men in comparision to elderly women (RR= 0.82; 95% CI: 0.84-0.95). The relative risk of death by cancers in elderly population increased 1.06 times in each year with a 95% confidence interval.

Discussion

The most common cancers in Iran based on reported in 2000 year were gastric, breast, bladder, prostate, lymphoma and thyroid (Farahmand et al., 2000). Regarding the results of this study the most incidence of cancers in five-year cohort in elderly population were skin, gastric, prostate, bladder, esophagus, colorectal, breast, lung, lymphoma and leukemia cancers. Akbari et al. (2008) addressed that bladder cancer is the commonest genitourinary cancers especially in elderly patients in Iranian population. They indicated that the incidence rate of genitourinary cancers were notably higher more in men, especially older men 70+ years. Survival study of gastric cancer in Iran also demonstrated that the peak incidence of gastric cancer was in the age group more than 60 years old, followed by the age group 50-59 years old (Movahedi et al., 2009).

In Saudi Arabia (Al-Eid et al., 2008) cancer ranked eleventh for males and sixth for females. It affected 136(52.1%) males and 125(47.9%) females with a male to female ratio of 109:100. The median age at diagnosis was 67 years among males (range 17-101 years) and 65 years among female (range 3-99 years).

Cancer is a predominant disease in the population aged 65 years old and over (Retomaz et al., 2007). Yancik et al. (2000) reported more than 60% of all incident cases of cancer and >70% of all deaths from malignant tumors occur in older individuals. Similary in US population, Kumar et al. (2010) observed that the majority of cancer incidence and mortality occurs in people aged 65+ years, and the number of older adults with cancer is

projected to significantly increase secondry to the aged adults. Wedding et al. (2007) found that about 60% of all people diagnosed with cancer were aged 65 years and over. However, in Iran, the reported incidence of elderly cancers was low as compared to the other countries that can at least partly be explained by the lack of nation wide screening programs, young age structure and quality of cancer registration system (Sadjadi et al., 2005).

According to the results of this study incidence rate of cancers in old men are more than incidence rate in elderly wemon. However, the highest number of cancer cases in Michigan study for 1995 was among females in the 70 to 74 age group (Michigan Dept. of Public Health, 1995). The gender make up was similar to that later research who examined loss of functioning among elderly cancer patients (Zivic, 1997).

Breast and thyroid cancers had more incidence rates in old women Iranian survey. Breast cancer remains a common and frequently fatal disease, the most commonly diagnosed cancer in women and the second ranking cause of cancer death in the Eastern Mediterranean Region (WHO, 2011). Based on a study between 1994 and 1996 in the subjects of old people that were diagnosed with cancers, prostate and breast cancers were the largest diagnostic group (Zivic, 1997). Cancer of the breast was the third most frequent cancer in 1993 according to the Michigan Department of Public Health. Although, the study findings differ from those of other researchers; Given et a.,l (1994) reported relative frequencies of various cancer sites: breast followed by colon, blader, prostate, and lung in old people. Meanwhile, based on a study in 2005 in patients 70 years old or older to a geriatric oncology at the Institut Curie cancer center women with breast cancer were predominance (Girre et al., 2008).

Based on the report of (Freedman, 2004) in most populations, the incidence of thyroid cancer rose with increasing age up to 45-55 years and then reached a plateau. There was some variation in this pattern across individual countries at ages 60 and older; e.g., there seemed to be a decrease in Cyprus. Among females, the most striking pattern showed for Israeli Jews, with incidence rates among younger individuals comparable to the US populations.

The incidence of stomach cancer rises from age 50 years and is highest in the 70-and-older group. Regarding the report (Freedman, 2004), in the Middle East regions, the highest incidence of stomach cancer in that group was in Israeli Jews (121.2 in males; 60.5 in femals), and the lowest was in Egyptians (17.5 in males; 5.4 in females). The high incidence in older Israeli Jews, many of whom originated from Europe, could be related to the environmental and nutritional conditions they suffered. The low rates in Egypt in this oldest age group, among both males and females, might suggest that older cases have not been diagnosed, perhaps due to elderly patients' under utilize of health care services.

The result of a study (Sajadi et al., 2005) showed that the incidence of colorectal cancer in Iran was third in men and forth in women. Other similar findings showed that gastric cancer is the most common cancer among men in China, Japan and many other Asian countries and

in Europe rather than Iran (Negri et al., 1994). However, based on the report of (Freedman, 2004), a low male incidence rate was especially noticeable in Egypt and may be partially due to undiagnosed cases of stomach cancer, especially the elderly.

Understanding survival rate of the cancers old population is important for halth policy making and may also suggest opportunities for research eara in gerontology cancer prevention. Survival is influenced by a range of characteristics factors e.g. age, sex, additional illnesses and lifestyle; the nature of the tumours (Black et al., 1998). Based on results of this study the survival rate was relatively low particulary among men and age group of 70+ years. Regarding the report (Stanford et al., 1998), the five-year relative survival was 90.1%, 94.7%, 96.8%, and 89.2% for men 50-59, 60-69, 70-79, and 80+ years of age at diagnosis, respectively. Generally, this findings expressed that relative survival for younger men (age <50) was lower than for older men.

There are few other survival studies in Iranina ageing population. Arab et al., (2009) in a survival study of ovarian cancer in Iran addressed that the better survival in the younger aged group epithelial ovarian cancer patients may be due to more aggressive debulking because they do not have medical co-morbidities. Others have reported that elderly women are given less chemotherapy or are less likely to be placed on intensive experimental regimens.

In conclusion, to our knowledge, this is the first study to describe cancer status in elderly population in Iran. Among various types of cancers in old Iranian people, the incidences of skin, gastric, prostate, bladder, osephageal, colorectal, breast, lung, ovarian and thyroid cancers are high, along with lymphoma and leukemia. This study highlights the relatively low survival rate of cancers for elderly men at national level. There may be major regional differences in survival. Therefore, public programs should be focused on designation of population-based protocols for the screening and prevention of common cancers in the elderly and also to determine of the main predictors of the incidence of these malignancies for the implementation of these programs. The geriatric oncology consultation could lead to a modification of the cancer treatment plan for older cancer patients.

Acknowledgements

References

Administration on Aging. (AOA). Profile of older Americans 2000 [cited 2001 July 2]; Available from: http://www.aoa.dhhs.gov/aoa/STATS/profile/dfault.htm

Akbari ME, Hosseini SJ, Rezaee A, et al (2008). Incidence of genitourinary cancers in the Islamic Repablic of Iran: A survey in 2005. *Asian Pacific J Cancer Prev*, **9**, 549-52.

Al Eid H, Omar Arteh S (2008). Cancer incidence report Saudi Arabia 2004. [cited; Available from: ,www.emro.who.int / NCD/pdf/SAA_Cancer_registray_2008.pdf

Arab M, Khayamzadeh M, Mohit M, et al (2009). Survival of ovarian cancer in Iran: 2000-2004. *Asian Pacific J Cancer Prev*, **10**, 555-8.

Australian Institute of Health and Welfare. Cancer in Australia: an overview, 2008. Cancer Series, Number 46 Cat. no. CAN 42. Canberra: Australian Institute of Health and Welfare 2008.

Australian Institute of Health and Welfare. Ovarian cancer in Australia: An overview, 2010 ,No 52 Cat. no. CAN 48 Canberra:AIHW: Australian Institute of Health and Welfare and National Breast and Ovarian Cancer Centre, National Breast and Ovarian Cancer Centre (NBOCC) 2010.

Black RJ, Sankaranarayanan R, Parkin DM (1998). Interpretation of population-based cancer survival data: IARC Scientific Publication.

Clare-Zivic R (1997). Outcomes related to the quality of life of oncology patients aged 65 and older following initial cancer treatment U.S.A: Western Michigan University.

Colditz G A, Sellers T, Trapido E (2006). Epidemiology identifying the causes and preventability of cancer. *Nat Rev Cancer*, **6**, 75-83.

Edwards BK, Howe HL, Ries LA, et al (2002). Annual report to the nation on the status of cancer, 1973-1999, featuring implications of age and aging on US, cancer burden USA. Report No.: 94.

Ershler BW, L Long D (2006). A Reort Card for Geriatric Oncology: Borderline Pass, Improvement Needed The Journals of Gerontology. 61A (688).

Farahmand beigi M (2000). Cancer And Prevention. Shiraz, Iran: Medical University of Fars [In Persian].

Ferlay J, Bray F, Sankila R, Pakin DM (1999). Cancer incidence, Mortality and Prevalence in the Euoropean Union: Lyon: IARC Press 1999.

Freedman LS, Edwards BK, Young J, et al (2004). Cancer incidence in four member countries (Cyprus, Egypt, Israel, and Jordan) of the middle east cancer consortium (MECC) compared with US SEER. In: Institue NC, ed.: department of health and human services, National institutes of health, US 2004.

Giordano SH, Hortobagyi GN, Kau SW, Theriault RL, Bondy ML (2005). Breast cancer treatment guidlines in older women. *Clin Oncol*, **23**, 783-91.

Girre V, Falcou M C, Gisselbrecht M, et al (2008). Does a geriatric oncology consultation modify the cancer treatment plan for elderly patients? *J Gerontol A Biol Sci Med Sci*, **63**, 724- 30.

Given CW, Given BA, Stommel M (1994). The impact of age, treatment, and symptoms on the physical and mental health of cancer patients. *Cancer Supplement*, **74**, 2128-38.

Gross CP, McAvay GJ, Krumholz HM, et al (2006). The effect of age and chronic illness on life expectancy after a diagnosis of colorectal cancer: implications for screening. *Ann Int Med*, **145**, 646-53.

Pal SK, Katheria V, Hurria A (2010). Evaluating the older patient with cancer: understanding frailty and the geriatric assessment. *CA Cancer J Clin*, **60**, 120-32.

Michigan Department of public Health. Cancer incidence and mortality report. USA; 1995.

Movahedi M, Afsharfard A, Moradi A, et al (2009). Survival rate of gastric cancer in Iran. *J Res Med Sci*, **14**, 367-73.

Negri E, La Vecchia C, Franceschi S, Levi F (1994). Pattern of mortality from major cancers in Europe. *Cancer Epidemiol Biomarkers Prev*, **3**, 531-6.

O`Connell JB, Maggard MA, Ko CY (2004). Cancer-directed

surgery for localized disease: decreased use in the elderly. *Ann Surg Oncol*, **11**, 962-9.

Ramesh HS, Jain S, Audisio RA (2005). Implications of aging in surgical oncology. *Cancer J,* **11**, 488-94.

Retomaz F, Seux V, Sourial N, et al (2007). Comparison of the Health and Functional Status Between Older Inpatients With and Without Cancer Admitted to a Geriatric/Internal Medicine Unit. *J Gerontol A Biol Sci Med Sci*, **62**, 917-22.

Sajadi A, Nouraei M, Mohagheghi MA, et al (2005). Cancer Occurrence in Iran in 2002, an International perspective. *Asian Pac J Cancer Prev*, **6**, 359-63.

Stanford JL, Stephenson RA, Coyle LM, et al (1998). Prostate Cancer Trends 1973-1995. Maryland, USA: National Cancer Institute.

Vercelli M, Capocaccia R, Quaglia A, et al (2000). Relative survival in elderly European cancer patients: evidence for health care inequalities. *Crit Rev Oncol Hematol*, **35**, 161-79.

Wedding U, Rohrig B, Klippstein A, Ludger P, Hoffken K (2007). Age, severe comorbidity and functional impairment independently contribute to poor survival in cancer patients. *Cancer Res Clin Oncol*, **133**, 945-50.

WHO (2011). Noncommunicable diseases: Cancer, Breast cancer [cited; Available from: www.emro.who.int/ncd/cancer_breast cancer

Yancik R (1997). Integration of aging and cancer research in geriatric medicine. *J Gerontol A Biol Sci Med Sci*, **52**, 329-32.

Yancik R, Ries LA (2000). Aging and cancer in America. Demographic and epidemiologic perspectives. *Hematol Oncol Clin North Am*, **14**, 17-23.

Zivic RC (1997). Outcomes related to the quality of life of oncology patients aged 65 and older following initial cancer treatment. USA: Western Michigan University.