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The Epidemiological Survey of the Cancer Patients Referring to the Radiotherapy Center at Vali-e-Asr Teaching Hospital in Zanjan, Iran (2016-2018)

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A R T I C L E   I N F O

A B S T A R A C T

Background: Cancer is defined as the uncontrolled growth of abnormal cells and the second most common cause of death across the world. More than half of new cancer cases are reported in developing countries, the prevalence of cancer is on the rise in these countries due to the lifestyle risk factors associated with cancer. It is predicted that cancer will become the main cause of death worldwide. The present study aimed to attain the epidemiologic data of cancer patients in Zanjan province, Iran.

Methods: The data required for this descriptive study were obtained by reviewing the medical records of the patients during 2016-2018. Data analysis was performed by IBM SPSS version 25.

Results: In total, 518 cancer cases were studied, (male-to-female ratio: 1.15). The mean age of the male patients was more than the females. The most common cancers were reported to be breast and brain cancer. The prevalence of cancer was higher in the residents of urban areas.

Conclusion: Unlike the most of findings in this study, some of them were not in line with the studies conducted in the other provinces in Iran. Therefore, it is recommended that further investigations be conducted in this regard.

1. Introduction

Cancer is defined as the unhampered and uncontrolled growth and spread of abnormal cells [1]. The initial symptoms of cancer cells manifest through the mechanism of destruction, invasion, and occupancy of various regions in the body. These cells spread through the body organs via blood or lymph [2]. Cancer is considered to be a severe health Concern in Iran and other countries [3,4], markedly Affecting Public health across the world [5]. More than half of the new cancer cases are reported in developing countries, such as South America and Asia [6]. Currently, cancer is the second cause of death in developing countries and the third cause of death in Iran following cardiovascular diseases and road accidents [1,7-13]. Cancer and other lifestyle-related diseases have been on the rise in Asia and other developing countries due to the lifestyle risk factors associated with cancer; such examples are smoking habits, stress, and physical inactivity [14].

Such disorders account for most of the mortalities that occurred in 2010 [15]. It is predicted that cancer will become the main cause of death across the world [16]. Furthermore, cancer is expected to become a major cause of disease in the world, with the incidence rate increasing from 10 million cases per year in 2000 to 15 million cases per year in 2020 [1]. The age standardized incidence rate (ASIR) for cancer was reported to be 105 men and 165 women per 100,000 population per year in 2011 by the Global Cancer Incidence, Mortality, and Prevalence (GLOBOCAN) [3], which rose to 205.4 cases in 2012 [17].

Environmental and lifestyle changes due to the industrialization of developing countries may affect the epidemiological pattern of cancer incidence in these regions [1,18,19]. As a developing country, Iran has experienced population growth within the past decades, as well as changes in lifestyle and socioeconomic status. According to statistics, the 10 most prevalent cancers in Iranian men are skin cancer, gastric cancer, prostate cancer, bladder cancer, colorectal cancer, hematopoietic cancers, lung cancer, esophageal cancer, non-Hodgkin lymphoma, and brain cancer. As for women, the most prevalent cancers have been reported to be breast cancer, skin cancer, colorectal cancer, gastric cancer, esophageal cancer, thyroid cancer, hematopoietic cancer, ovarian cancer, brain cancer, and urinary tract cancer [3].

In 2008, the incidence rate of cancer in Iran was reported to be 98 and 110 per 100,000 population in men and women, while the mortality rate of all cancer types was estimated at was 41.1 and 65 in men and women, respectively [11]. However, the mortality rate increased to 90.4 deaths per 100,000 population in 2012 [17].

Zanjan province is located in the northwest of Iran and is the 25th province in terms of population, with the area of 22,164 square kilometers. In 2008, the ASIR for cancer in Zanjan province was reported to be 69 and 60 per 100,000 population in men and women, respectively [11]. Changes in the epidemiological patterns and lack of updated data on cancer status in Zanjan province precludes accurate planning for cancer control and treatment.

The present study aimed to attain the epidemiological data of the cancer patients in Zanjan province, Iran.

2. Materials and Methods

2.1. Data Collection

This descriptive survey was conducted by collecting the data on cancer by reviewing the medical records of the patients referring to the radiotherapy department of Vali-e-Asr Teaching Hospital in Zanjan province during 2016-2018. In total, 519 cases were investigated, and data on the age, gender, cancer type, treatment method, season of referral, and residence status of the patients were obtained.

2.2 Statistical Analysis

Data analysis was performed in IBM SPSS version 25, and the acquired data were classified using tables and charts. Independent t-test and Chi-square were also used in the statistical analysis, and the P-value of less than 0.05 was considered significant.

3. Results and Discussion

In total, the epidemiological data of 518 cancer patients were assessed during 2016-2018. Accordingly, 53.9% of studied population were male (n = 278), and 46.1% were female (n = 240). The male-to-female sex ratio (SR) in this study was 1.15. The mean age of the male and female patients was 65.60 ± 15.18 and 58.46 ± 15.10 years, respectively. The youngest patient was a 19-year-old male, while the eldest patient was a 96-year-old male. A significant correlation was observed between the age and gender of the cancer patients ($P < 0.05$).

According to the obtained results, the most prevalent cancers in the studied population were breast cancer, brain cancer, prostate cancer, esophageal cancer, and gastric cancer. Moreover, the most prevalent cancer in men was prostate cancer, and breast cancer had the highest prevalence rate in women. The prevalence rate of various cancers in the patients is presented in Table 1.

According to the findings, more than half of the patients lived in urban areas, while other patients were residents of rural areas (Figure 1). A significant difference was observed in the incidence of some cancers between the patients living in urban and rural areas (Figure 2). Furthermore, most of the patient referrals to the hospital were reported in warm seasons, especially in case of rural residents (Figure 3).

Table 1: Prevalence of cancer types in Zanjan province

Num	Cancer	Frequency		
		In males	In females	Total
1	Breast	3	69	72
2	Brain	29	29	58
3	Prostate	46	0	46
4	Gastric	31	14	45
5	Esophagous	21	23	44
6	Rectum	19	16	35
7	Lung	29	6	35
8	Skin	16	10	26
9	Bone	15	9	24
10	Lymphoma	15	5	20
11	Sarcoma	6	9	15
12	Bladder	10	3	13
13	Uterus	0	13	13
14	Thyroid	1	10	11
15	Larynx	6	3	9
16	RCC	6	0	6
17	Melanoma	4	2	6
18	Cervix	0	6	6
19	Neurosarcoma	4	1	5
20	GeJ	2	3	5
21	Colon	5	0	5
22	Plasmocytoma	2	1	3
23	Pancreas	2	1	3
24	ACC	2	0	2
25	Spinal cord	1	1	2
26	Tongue	0	2	2
27	Hypophysis	0	1	1
28	Colangelo	1	0	1
29	Ovary	0	1	1
30	Testis	1	0	1
31	Desmoid	0	1	1
32	Adrenal	1	0	1
33	Liver	0	1	1
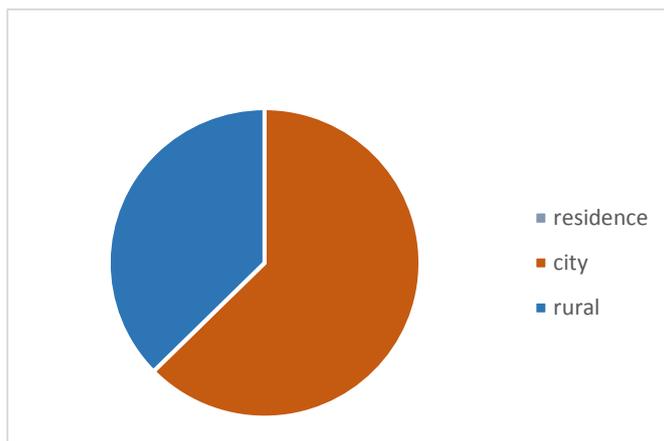
Figure 1: Abundance of patients based on residence
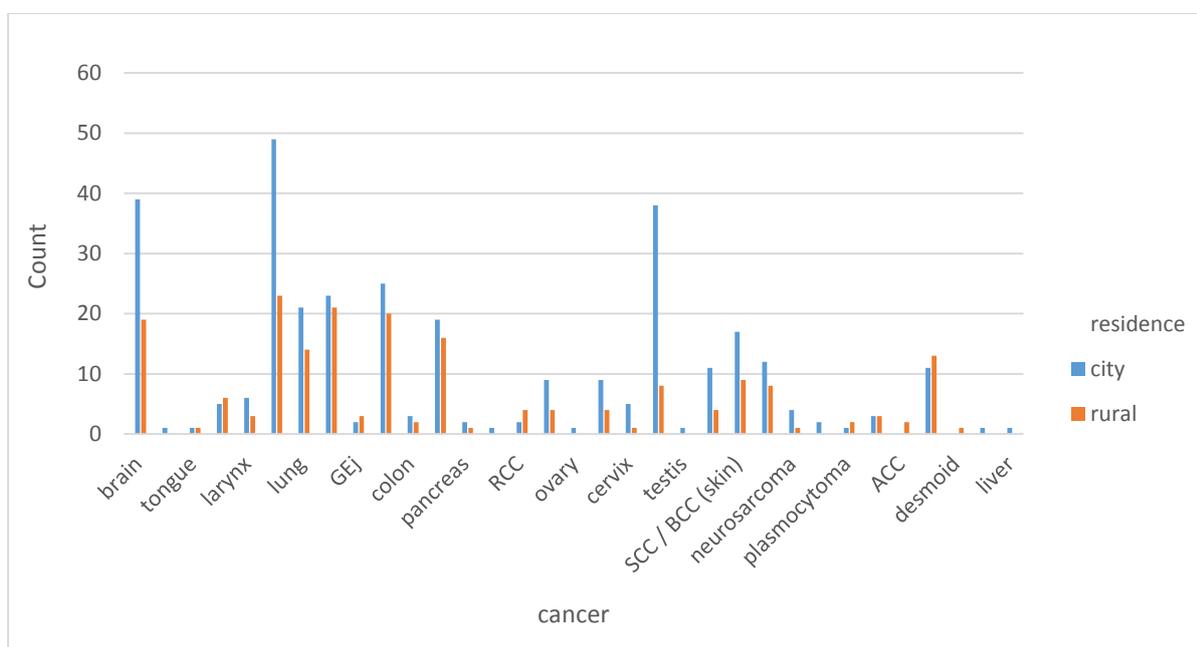
Figure 2: Abundance of cancer types based on residence
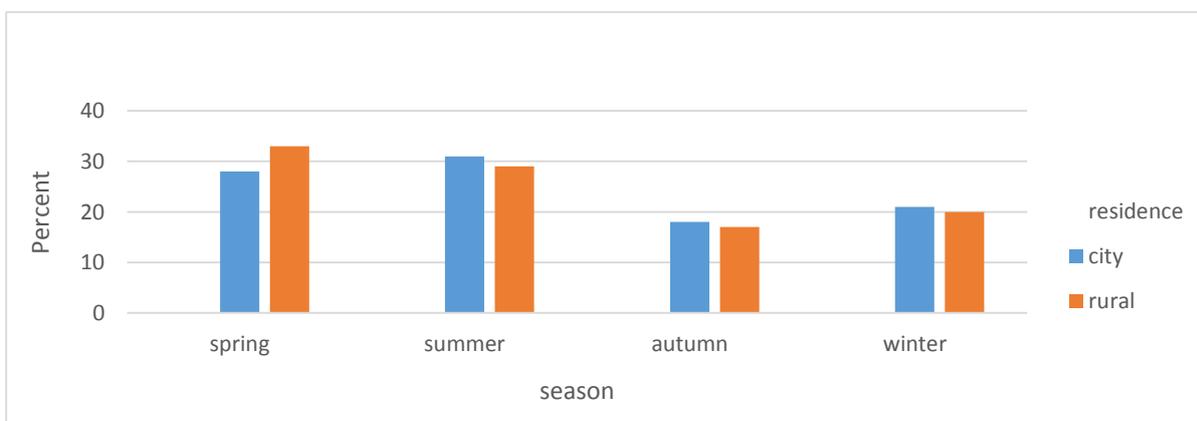
Figure 3: Reference of patients to the radiotherapy center in different seasons

The findings of the current research indicated that curative and palliative methods were most frequently used for the treatment of the cancer patients referring to the hospital. The former was used for the treatment of primary tumors, and the latter was applied for the patients with secondary or metastatic tumors, who constituted less than half of the patients in the present study (Figure 4). However, no significant correlations were denoted between the treatment procedure, gender, and residence status ($P < 0.05$).
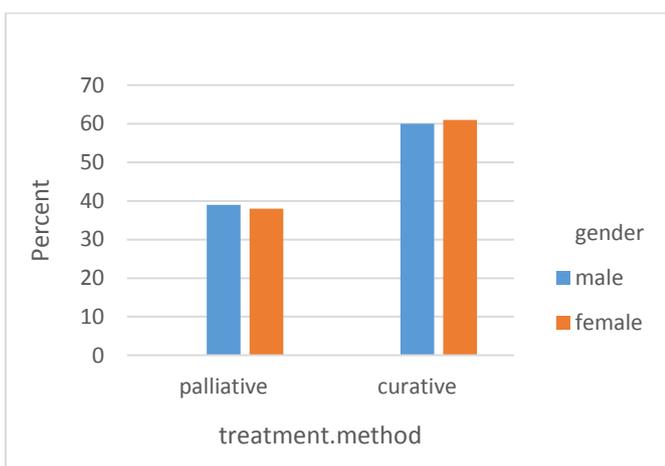
Figure 4: Abundance of patients based on treatment methods

The mean age of the cancer patients receiving palliative and curative treatment was 61.61 ± 15.95 and 62.86 ± 15.27 years, respectively. However, no significant association was observed between the age of the patients and their cause of referral ($P < 0.05$).

The current research was conducted on 518 patients, including 278 males (53.7%) and 240 females (46.3%); the male-to-female SR was 1:15. The previous studies conducted in Iran have indicated that the malignancy rate is higher in men compared to women (SR > 1). For instance, Abad et al. performed a 10-year study in Northern Khorasan province (Iran), reporting the prevalence of cancer to be 58.1% in men and 41.9% in women, with the SR estimated at 1.4 [20]. In some studies conducted on cancer patients in Iran, the male-to-female SR has been reported to be 1.13 (Sistan and Baluchestan province during 2004-2009) (1), 1.38 (Qom province during 2008-2011) [21], 1.38 (eastern Azerbaijan province in 2007) [22], and 1.2 (Mazandaran province in 2006) [23]. In another epidemiological study performed on cancer patients in Kurdistan province (Iran), 62% of the cases were male (SR = 1.63).

Also the mean age of the patients in the study accomplished in Kurdistan province was 59 years [24]. In a study conducted in the north of Iran (Babolsar city), the mean age of the male cancer patients was reported to be higher than females [25]. This is consistent with the current research, in which the mean age of the male and female cancer patients was 65.6 ± 15.18 and 58.46 ± 15.10 years, respectively.

According to the results of the present study, the most prevalent cancers in men were prostate cancer, gastric

cancer, brain cancer, lung cancer, and esophageal cancer, while the most common cancers in women included breast cancer, brain cancer, esophageal cancer, colorectal cancer, and gastric cancer. This finding is inconsistent with the results of the previous studies conducted in Iran and other countries. In 2012, GLOBOCAN reported that the five most prevalent cancers in the world are lung cancer, prostate cancer, colorectal cancer, bladder cancer, and liver cancer in men, while the most common cancers in women include breast cancer, colorectal cancer, lung cancer, cervical cancer, and gastric cancer [17]. In a study by Kolahdoozan et al. (2010), the five most prevalent cancers in Iran were reported to be skin cancer, gastric cancer, esophageal cancer, colorectal cancer, and bladder cancer in men, while the most prevalent cancers in women were reported to be skin cancer, breast cancer, esophageal cancer, gastric cancer, and colorectal cancer [8]. Skin and gastric cancers have been considered to be most common in men in the majority of the domestic studies in this regard, while such high prevalence rates have been attributed to breast and skin cancers in women [3,26, 27].

In the current research, skin cancer was the 8th most prevalent cancer type, and bladder cancer was the 12th most common cancer in Zanjan province in the examined patients. It is notable that several influential factors are involved in cancer incidence rate (e.g., obesity, physical inactivity, aging, and stress) [1], which may vary in different regions in Iran and even within the province. This could be the main reason for the variable incidence rates of cancer in Zanjan province compared to the other provinces in Iran. In addition to the differences the incidence rate of cancer between provinces, there are also differences in the incidence status of cancer in urban and rural areas. According to a study conducted in the United States in 2018, the incidence rate of cancer was higher in urban areas compared to rural areas [28]. Furthermore, the findings of a 15-year study in China indicated that female breast cancer and colorectal cancer were more prevalent in urban areas, while the incidence rate of liver and cervical cancers was higher in rural areas [29]. Consistently, the findings of the current research indicated that the prevalence rate of almost all the studied cancer types was lower in rural areas compared to the urban areas in Zanjan province. Moreover, the incidence rate of brain cancer, breast cancer, prostate cancer, sarcoma, lymphoma, and lung cancer was observed to be significantly higher in urban areas compared to rural areas. Differentiation of the cancer incidence rates in the urban and rural areas of Zanjan province is shown in Figure 2.

According to the results of the present study, the frequency of cancer patient referrals was higher in warm seasons, which could be due to easier transportation and better status of roads and weather in the spring and summer.

4. Conclusion

Cancer is considered to be a severe health concern across the world. Several influential factors are involved in the

incidence of cancer, including environment, lifestyle, genetic Specifications, stress level, and nutrition. Investigating the effects of only one of these factors without considering the others is unlikely to yield accurate results. The findings of this epidemiological survey on cancer could help identify the more common cancers in various regions, genders, and age groups, thereby leading to the reconnaissance and investigation of cancer risk factors in a more reliable manner. The current research was carried out based on the reviews of the medical records of the cancer patients referring to a radiotherapy center in Zanjan province. Though this method may not be optimally accurate, a key advantage of the applied methodology was that it was rapid and cost-efficient, which suits the countries or organizations with insufficient budget for such research purposes.

Most of the findings of this study were consistent with the previous studies conducted in Iran, while there were also discrepancies between the acquired data. Considering that the obtained data were not based on a specific region of cancer incidence, further investigations are recommended using more precise and comprehensive cancer registration plans in the urban and rural areas in Zanjan province in order to obtain the demographic and geographical data of cancer incidence, so that the identification of the risk factors and prevention of cancer would be possible.

Authors' Contributions

This paper was carried out by all the authors. H.C., conducted the field work and wrote the manuscript; H.R., designed the study and wrote the manuscript; K.K., contributed to carry out statistical analysis. Z.K.M., and F.S., contributed to carry out data collection. All authors revised and approved the final manuscript.

Conflict of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

References

1. Rafiemanesh H, Mehtarpoor M, Mohammadian Hafshejani A, Salehiniya H, Enayatrad M, Khazaei S. Cancer Epidemiology and Trends in Sistan and Baluchestan province, Iran. *Med J Islam Repub Iran*. 2015; 29: 254.

2. Shojaei H. Epidemiology of Communicable and Non-Communicable Acute Diseases. *Tehran: Publisher: Smat*; 2007. [In Persian].

3. Rafiemanesh H, Rajaei Behbahani N, Khani Y, Hosseini S, Pournamdar Z, Mohammadian Hafshejani A, et al. Incidence Trend and Epidemiology of Common Cancers in the Center of Iran. *Glob J Health Sci*. 2016; 8(3): 146-55.

4. Keyghobadi N, Rafiemanesh H, Mohammadian-Hafshejani A, Enayatrad M, Salehiniya H. Epidemiology and Trend of Cancers in the Province of Kerman: Southeast of Iran. *Asian Pac J Cancer Prev*. 2015; 16(4): 1409-13.

5. Ghanadi K, Anbari K, Obeidavi Z, Pournia Y. Characteristics of Colorectal Cancer in Khorramabad, Iran during 2013. *Middle East J Dig Dis*. 2014; 6(2): 81.

6. Farmer RDT, Lawrenson R. Medical Epidemiology and Public Health Medicine. 5th ed. *USA: Blackwell Publishing*; 2004. p. 35-9.

7. Enayatrad M, Mirzaei M, Salehiniya H, Reza M. Trends in Incidence of Common Cancers in Iran. *Age*. 2016; 20-5.

8. Radmard AR. Five Common Cancers in Iran. *Arch Iran Med*. 2010; 13(2):143.

9. Razi S, Salehiniya H. Epidemiology of Prevalent Cancer among Iranian Women and its Incidence Trends from 2003-2009 in Iran. *Arak Med Univ J*. 2015; 18(2): 17-24.

10. Mirzaei M, Pournamdar Z, Salehiniya H. Epidemiology and Trends in Incidence of Kidney Cancer in Iran. *Asian Pac J Cancer Prev*. 2015; 16(14): 5859-61.

11. Mousavi SM, Gouya MM, Ramazani R, Davanlou M, Hajsadeghi N, Seddighi Z. Cancer Incidence and Mortality in Iran. *Ann Oncol*. 2009; 20(3): 556-63.

12. Vakili M, Pirdehghan A, Adimi M, Sadeghian M, Akhondi M. Epidemiology and Trend of Cancer in Yazd, a Central Province of Iran, 2005-2009. *J Res Health Sci*. 2014; 14(3): 210-3.

13. Razi S, Rafiemanesh H, Ghoncheh M, Khani Y, Salehiniya H. Changing Trends of Types of Skin Cancer in Iran. *Asian Pac J Cancer Prev*. 2015; 16(12): 4955-8.

14. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global Cancer Statistics. *CA Cancer J Clin*. 2011; 61(2): 69-90.

15. Moore MA, Yoo K-Y, Tuncer M, Sobue T. Overview of Players and Information in the Cancer Epidemiology and Control World in Asia. *Asian Pac J Cancer Prev*. 2010; 11: 1-10.

16. Jemal A, Center MM, DeSantis C, Ward EM. Global Patterns of Cancer Incidence and Mortality Rates and Trends. *Cancer Epidemiol Biomarkers Prev*. 2010; 19(8): 1893-907.

17. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer Incidence and Mortality Worldwide: Sources, Methods and Major Patterns in Globocan 2012. *Int J Cancer*. 2015; 136(5): E359-E86.

18. Sobin LH. Cancer in Afghanistan. *Cancer*. 1969; 23(3): 678-88.

19. Almasi Z, Rafiemanesh H, Salehiniya H. Epidemiology characteristics and Trends of Incidence and Morphology of Stomach Cancer in Iran. *Asian Pac J Cancer Prev*. 2015; 16(7): 2757-61.

20. Abad M, Gangy R, Sharifian E, Nikdel R, Jafarzadeh M, Jafarzadeh F. Epidemiologic Distribution of Cancer in a 10-Yearstudy: Retrospective Review of Hospital records and Pathology Centers of North Khorasan Province from 2003 to 2012. *J North Khorasan Univ Med Sci*. 2015; 6(4): 689-96.

21. Vafajo DZ, Abedini Z, Ahmari TH, Mohamadgholizaeh L. Epidemiology of Cancer in Qom, Iran 2008-2011. *Payesh*. 2014; 13(2): 155-63.

22. Koosha A, Farahbakhsh M, Hakimi S, Abdolahi L, Golzari M, Farshad MS. Epidemiologic Assessment of Cancer Disease in East Azerbaijan 2007. *Med J Tabriz Univ Med Sci Health Serv*. 2010; 32(4): Pe74-9.

23. Norouzi Nejad F, Ramezani Daryasar R, Ghafari F. Epidemiology of Cancer in Mazandaran Province 2006. *J Mazandaran Univ Med Sci*. 2009; 19(72): 61-5.

24. Esmail Nasab N, Moradi G, Zareie M, Ghaderi A, Qeytasi B. An Epidemiological Study of Cancer Incidence in People Over 15 Years of Kurdistan. *Sci J Kurdistan Univ Med Sci*. 2007; 11(4): 18-25. [In Persian].

25. Tayyebi M, Shabestanimonfared A, Muslim D. Study Ten-Year-Old Cancer in Patient Look up at Ashahidrajai Hospital in Northern Iran Babolsar. *J Babolsar Univ Medl Sci*. 2012; 45(6): 97-101. [In Persian].

26. Somi MH, Farhang S, Mirinezhad SK, Naghashi S, Seif-Farshad M, Golzari M. Cancer in East Azerbaijan, Iran: Results of a Population-Based Cancer registry. *Asian Pac J Cancer Prev.* 2008; 9(2): 327-30.

27. Amoori N, Mirzaei M, Cheraghi M. Incidence of Cancers in Kuzestan Province of Iran: Trend from 2004 to 2008. *Asian Pac J Cancer Prev.* 2014; 15(19): 8345-9.

28. Zahnd WE, James AS, Jenkins WD, Izadi SR, Fogleman AJ, Steward DE, et al. Rural–Urban Differences in Cancer Incidence and Trends in the United States. *AACR*; 2018; 27(11): 1265-74.

29. Chen W, Zheng R, Baade PD, Zhang S, Zeng H, Bray F, et al. Cancer Statistics in China, 2015. *CA Cancer J Clin.* 2016; 66(2): 115-32.