Research Article

Stomach Cancer in Patients Referred to Tohid Hospital in Sanandaj, 2012 - 2018: An Epidemiological Study

Mastore Rahimi [1], Ghodratollah Roshanaei [ID][2], Javad Faradmal [2], Bayazid Ghaderi [3] and Leila Moradi [ID][4], *

[1]Department of Biostatistics, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[2]Department of Biostatistics, Modeling of Noncommunicable Disease Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[3]Department of Medicine, School of Medicine, Kurdistan University of Medical Sciences, Kurdistan, Iran
[4]Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran

*Corresponding author: Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran. Email: leilamoradi073@gmail.com

Abstract

Background: Stomach cancer is the fourth most common cancer in the world and first cancer in Iran. The northern and northwestern regions of the country are areas with a high prevalence of gastrointestinal cancers, especially gastric cancer. Different factors are effective in the incidence of this cancer.

Objectives: The present study aimed to evaluate the epidemiology of gastric cancer.

Methods: This research was a cross-sectional study. All patients referred to Tohid Hospital in Sanandaj between 2012 and 2018 were examined. Data were extracted using patients' medical records. Descriptive information was collected through SPSS software, and the results were analyzed.

Results: The number of patients in this study was 553. The mean age was 66.9 years, and the highest age group was 60 - 80 years. Four hundred twelve patients were male, and 141 were female. In 50% of patients, the location of the cardiac tumor was gastric. Chemotherapy was the most common treatment in more than 60% of patients.

Conclusions: The results of this study show that smoking is unfortunately high in patients in this province. An educational intervention to quit smoking is recommended. Smoking is an important risk factor for gastric cancer, and this intervention may also be effective in reducing the incidence of this disease.

Keywords: Stomach Cancer, Gastric Cancer, Risk Factor, Sanandaj, Intervention

1. Background

The second leading cause of death worldwide is cancer (1-3). The global incidence of this disease has increased from 10 million per year in 2000 to 15 million in 2020. More than half of these deaths occur in developing countries (4). Lung cancer, breast cancer, colon cancer, skin cancer, prostate cancer, and stomach cancer are the most common cancers in the world (1). Reducing the incidence of infectious diseases, increasing life expectancy, lifestyle changes, and genetic predisposition are some of the effective reasons for increasing the incidence of cancer.

One of the most common cancers of the gastrointestinal tract is stomach cancer. Unfortunately, this disease is mainly diagnosed in advanced stages (5-7).

The classification of this disease is based on two types: Anatomical classification (cardia and noncardia) and histological classification (diffuse and intestinal). Each of them has different causes, symptoms, and prognoses (8). South America, Central America, East Asia, and East Europe are the areas with the highest incidence of this disease, and South Asia, North Africa ,East Africa, Australia, and North America are the areas with the lowest incidence of this disease (9). The incidence and mortality of this disease have decreased over the last 70 years. Despite this decrease, stomach cancer has been identified as the fourth most common cancer in Iran and the second leading cause of cancer deaths. The incidence and mortality of gastric cancer in the north and northwest of the country are higher than in other regions (5). Gastric cancer is more common in men, and smoking and aging are its risk factors (10).

2. Objectives

Kurdistan province is one of the regions with a high incidence of gastric cancer in Iran. Therefore, identifying risk

factors and epidemiological studies is an effective step in preventing this disease.

3. Methods

This study was approved by the Ethics Committee of Hamadan University of Medical Sciences (IR.UMSHA.REC.1397.103). This research was a cross-sectional and descriptive-analytic study. The statistical population consisted of all patients with gastric cancer identified by pathology tests and referred to Tohid Hospital in Sanandaj from the beginning of April 2012 to the end of March 2018. The data collection was performed using a checklist which was completed by studying the patients' medical records. This checklist included information such as age at the time of diagnosis by year, a previous history of smoking, tumor location, metastasis location, number of metastases, a family history of cancer in first and second degree relatives, a previous history of cancer (cancer of any type), treatment method, metastasis, surgery, and type of surgery. The data were entered into SPSS software version 24 after initial registration in the checklist. The results of descriptive statistics were calculated and presented in terms of mean and standard deviation, number, and percentage.

4. Results

In this study, all patients with stomach cancer referred to Tohid Hospital in Sanandaj during 2012 - 2017 were included (n = 553). Four hundred twelve patients (74.5%) were male, and 141 (25.5%) were female. Their mean age was 66.9 years with a standard deviation of 13.3 years, and the highest age group was 60 - 80 years with a frequency of 315 people (57% of patients). Three hundred thirteen patients (56.6%) had a previous history of smoking (Table 1). The most common treatment was chemotherapy for 339 patients (61%). In Two hundred twenty-seven patients (50.1%), tumor were located at the site of the cardiac. Four hundred twenty-three patients (76.5%) had no metastases, and 164 patients (29.7%) needed surgery (Table 2).

5. Discussion

According to the results of this study, the sex ratio of the disease (male to female) was 2.9, which is almost similar to Jenabi et al.'s study (the study on the national distribution of the disease in Iran) (11). However, the results of this study were slightly different from the results of Ghasemi-Kebria et al.'s study conducted in Golestan

Table 1. The Frequency Distribution of Stomach Cancer According to Its Epidemiological Indicators

Epidemiological Indicators	Frequency (%)
Age (y)	
Less than 40	30 (5.4)
40 - 60	162 (29.3)
60 - 80	315 (57.0)
More than 80	46 (8.3)
Gender	
Female	141 (25.5)
Male	412 (74.5)
Family history of cancer in first- and second-degree relatives	
Yes	20 (3.6)
No	533 (96.4)
Previous history of smoking	
Yes	313 (56.6)
No	240 (43.4)
Treatment method	
Surgery	28 (5.1)
Chemotherapy	339 (61.3)
Radiotherapy	27 (4.9)
A combination of three methods	159 (28.8)

province, which might be due to the difference in the population distribution of these two provinces (12). The mean age of patients in this study was 66.9 years which was similar to Hedayatizadeh-OMRAN et al.'s study conducted in Mazandaran province and was a little different from Nikbakht et al.'s study performed in Fars province, indicating the differences between the age groups of these two provinces (13, 14). In this study, 56.6% of patients had a previous history of smoking which was higher than Toorang et al.'s study performed on patients referred to Imam Khomeini Hospital in Tehran (a hospital which accepts patients from almost all provinces of Iran). The high frequency of smoking probably affects the high prevalence of this disease in Kurdistan province (15). Family history of cancer in first and second degree relatives in this study was less than 4% in patients, , while in Farhadifar et al.'s study, it was less than 12%. On the other hand, in Mehravar et al.'s study conducted in Ardabil province, it was more than 70%. However, this discrepancy may be due to the small number of patients in the study performed in Ardabil province. Due to the contradictory results, investigating risk factors in future studies is recommended (16, 17) In this study, in more than 50% of cases, tumor location was cardia, sim-

Table 2. The Frequency Distribution of Stomach Cancer by Malignancy Indices

Malignancy Indicators	Frequency (%)
Metastasis	
Yes	209 (37.8)
No	344 (62.2)
Surgery	
Yes	164 (29.7)
No	389 (70.3)
Type of surgery	
Not operated	386 (69.8)
Partial	50 (9.0)
Subtotal	22 (0.4)
Total	38 (6.9)
Other	57 (10.3)
Tumor location	
Antrum	120 (21.7)
Body	57 (10.3)
Cardia	277 (50.1)
Fund	53 (9.6)
Unknown (unregistered)	46 (8.3)
Metastasis location	
No metastasis	423 (76.5)
Liver	165 (13.7)
Lung	23 (2.4)
Bone	7 (1.1)
Distant lymph nodes	14 (6.3)

ilar to Gohari-Ensaf et al.'s study carried out in Hamadan province (18). The most common metastasis location in this study was the liver, which was similar to Safari et al.'s study performed in Hamadan province (19).

5.1. Conclusions

Stomach cancer is more common in men than women. Smoking is also more common in men than women. Using a proper educational intervention in smoking cessation will probably reduce the incidence of this disease. Since this disease is the most common cancer in Iranian men, it is recommended to plan for educational intervention in the whole country with the priority of the northern and western provinces, which have a high incidence of gastric cancer. The patient age group is mostly 60 - 80 years. Due to increasing life expectancy and aging, appropriate planning for early screening regarding this disease in the country, especially in high-risk provinces such as Kurdistan, is recommended.

References

1. World Health Organization. *Cancer*. 2018, [updated 12 September 2018]. Available from: https://www.who.int/news-room/fact-sheets/detail/cancer.

2. Moradzadeh R, Anoushirvani AA. Trend of gastric cancer incidence in an area located in the center of Iran: 2009-2014. *J Gastrointest Cancer*. 2020;**51**(1):159-64. doi: 10.1007/s12029-019-00227-8. [PubMed: 30911981].

3. Ahmadi Hedayati M, Khani D. Relationship of social risk factors and helicobacter pylori infection with pathological characteristics of gastric carcinoma. *Iran J Med Microbiol*. 2020;**14**(1):30-43.

4. Asgarian F, Mahdian M, Amori N. Epidemiology and trends of gastrointestinal cancer in Iran (2004–2008). *J Cancer Res Ther*. 2020;**0**(0):0. doi: 10.4103/jcrt.JCRT_509_19.

5. Taheri M, Nazari J, Anoshirvani AA, Aghabozorgi R, Tabaeian SP, Bahrami M, et al. Incidence trend of gastrointestinal cancer in Markazi, in the center of Iran, population-based cancer registry results: 2010–2014. *J Gastrointest Cancer*. 2020. doi: 10.1007/s12029-020-00509-6.

6. Norouzirad R, Khazaei Z, Mousavi M, Adineh HA, Hoghooghi M, Khabazkhoob M, et al. Epidemiology of common cancers in Dezful county, southwest of Iran. *Immunopathol persa*. 2017;**4**(1). e10. doi: 10.15171/ipp.2018.10.

7. Nikniaz Z, Somi MH, Jafarabadi MA, Naghashi S, Faramarzi E. *Is dietary pattern associated with gastric cancer risk? A case-control study in Iran*. 2020. Available from: https://assets.researchsquare.com/files/rs-42625/v1/1a9cf834-f486-42d7-982f-de0f69cf7380.pdf.

8. 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. doi: 10.7314/apjcp.2015.16.7.2757. [PubMed: 25854359].

9. Karimi P, Islami F, Anandasabapathy S, Freedman ND, Kamangar F. Gastric cancer: descriptive epidemiology, risk factors, screening, and prevention. *Cancer Epidemiol Biomarkers Prev*. 2014;**23**(5):700–13. doi: 10.1158/1055-9965.EPI-13-1057. [PubMed: 24618998]. [PubMed Central: PMC4019373].

10. Marques-Lespier JM, Gonzalez-Pons M, Cruz-Correa M. Current perspectives on gastric cancer. *Gastroenterol Clin North Am*. 2016;**45**(3):413–28. doi: 10.1016/j.gtc.2016.04.002. [PubMed: 27546840]. [PubMed Central: PMC4993977].

11. Nematollahi S, Jenabi E, Saatchi M, Khazaei S, Mansori K, Ayubi E, et al. National distribution of stomach cancer incidence in Iran: A population-based study. *AHB*. 2019;**9**(1):89. doi: 10.4103/aihb.aihb_37_-18.

12. Ghasemi-Kebria F, Amiriani T, Fazel A, Naimi-Tabiei M, Norouzi A, Khoshnia M, et al. Trends in the incidence of stomach cancer in Golestan province, a high-risk area in northern Iran, 2004-2016. *Arch Iran Med*. 2020;**23**(6):362–8. doi: 10.34172/aim.2020.28. [PubMed: 32536172].

13. Hedayatizadeh-Omran A, Alizadeh-Navaei R, Ashrafi M, Ghazizadeh Z, Mousavi R, Shekarriz R, et al. Epidemiology of female reproductive cancers in Mazandaran Province (Northern Iran): Results of the Mazandaran population-based cancer registry. *Clin Cancer Invest J*. 2018;**7**(3):87–9. doi: 10.4103/ccij.ccij_11_18.

14. Nikbakht HA, Sahraian S, Ghaem H, Javadi A, Janfada M, Hassanipour S, et al. Trends in mortality rates for gastrointestinal cancers in Fars province, Iran (2005-2015). *J Gastrointest Cancer*. 2020;**51**(1):63–9. doi: 10.1007/s12029-019-00204-1. [PubMed: 30663013].

15. Toorang F, Sasanfar B, Hadji M, Esmaillzadeh A, Zendehdel K. Adherence to "dietary approaches to stop hypertension" eating plan in relation to gastric cancer. *Nutr J*. 2020;**19**(1):40. doi: 10.1186/s12937-020-00560-w. [PubMed: 32393262]. [PubMed Central: PMC7216586].

16. Farhadifar N, Fotoukian Z, Pouya M, Saravi M. Epidemiologic and malignancy indices of gastric cancer in patients referred to oncology clinic at ramsar emam sajjad hospital during 2002-2009. *SSU_Journals*. 2012;**20**(1):110–8.

17. Mehravar F, Najafi F, Taaraei Y, Mansoornia M, Holakoui K. Investigating the effect of several determinative factors on gastric cancer morbidity in Aghbulagh Village, Meshgin Shahr–Ardabil Province: A case control study. *J Torbat Heydariyeh Univ Med Sci*. 2018;**6**(2):21–8.

18. Gohari-Ensaf F, Berangi Z, Abbasi M, Roshanaei G. Determination of Affected Factor on Survival Rates In Referral Gastric Cancer Patients to Imam Khomeini Clinic in Hamadan Province from 2004-2017. *SSU J*. 2019;**27**(12):2159–69. doi: 10.18502/ssu.v27i12.2832.

19. Safari M, Abbasi M, Gohari Ensaf F, Berangi Z, Roshanaei GH. Identification of factors affecting metastatic gastric cancer patients' survival using the random survival forest and comparison with cox regression model. *Iran J Epidemiol*. 2020;**15**(4):343–51.