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Review Article

Epidemiology and patterns of GI tract cancers in Saudi Arabia: benefit of prompt lifestyle changes

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Abstract: Background: The economic prosperity experienced by Saudi Arabia in recent decades has had significant effects on the epidemiology and patterns of numerous non-communicable diseases, including cancer. The risk factors that often accompany financial prosperity include adopting a western diet, lack of physical activity, and a sedentary lifestyle. These factors contribute to an increased prevalence of chronic diseases andcan gradually increase the risk of gastrointestinal cancers. Therefore, the purpose of this review was to investigate the effect of embracing a western lifestyle on the epidemiology and patterns of gastrointestinal cancers in Saudi Arabia. Methods: I gathered information from various sources in Saudi Arabia regarding the incidence, rate, contributing factors , and other epidemiologic measurements of gastrointestinal cancer. I utilized a range of electronic search platforms, encompassing PubMed, Web of Science, Scopus, Google Scholar, and other electronic databases that met the specified criteria. I also made use of the Global Cancer Observatory and the Global Health Observatory databases. Results: The incidence of gastrointestinal cancers significantly rose during this period of prosperity. Colorectal cancer had the highest incidence, while liver cancer had the highest mortality rate. There has been a significant rise in various risk factors for gastrointestinal issues, especially physical inactivity, obesity, diabetes, and infections such as hepatitis and Helicobacter pylori (*H. pylori*). Conclusion: Although data on gastrointestinal cancers in Saudi Arabia are limited, there are notably high epidemiological rates, particularly for colorectal, liver, and stomach cancers. A range of risk factors have been linked to the emergence of gastrointestinal cancers, likely due to recent changes in lifestyle in Saudi Arabia, especially the embrace of western habits. The most common risk factors include dietary influences, obesity, and infections. Intervention at both the policymaker and community levels is critical.

Keywords: Gastrointestinal cancers, Saudi Arabia, lifestyle, obesity

Introduction

Worldwide, gastrointestinal cancers account for a significant percentage of cancer-related mortality. Middle- and low-income countries face a disproportionately high risk of gastrointestinal cancer compared to high-income countries [1]. The prognosis for other gastrointestinal malignancies remains generally unfavorable, even though colon cancer screening has led to notable advancements [2]. In 2020, gastrointestinal cancer resulted in 3.5 million deaths worldwide, with approximately 5 million individuals diagnosed [1, 3]. There are six primary types of gastrointestinal cancer: esophageal, gastric, liver, pancreatic, colon, and rectal cancers [4].

Gastrointestinal cancers exhibit significant diversity. Non-modifiable and modifiable risk factors facilitate the progression of normal cells to precursor cells, precursor cells to premalignant cells, and premalignant cells to malignant cells. Gastrointestinal cancers arise from various origins and are treated by multiple therapeutic approaches [5]. Factors such as age, gender, obesity, pathogenic infections, smoking, alcohol consumption, and dietary habits increase the risk of gastrointestinal cancer. The majority of cancers occur sporadically. Certain individuals exhibit elevated risk due to a familial history of gastrointestinal cancer. Chronic systemic disorders induce inflammation across various organs. These diseases are also associated with gastrointestinal cancer [1].

The presence of cancer represents a significant challenge to the healthcare system in Saudi Arabia. The cancer registration system in Saudi Arabia exhibits significant inequities, resulting

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in a fragmented landscape of cancer epidemiology throughout the country [6]. The interplay of economic prosperity, urban development, and the embrace of a western lifestyle have profoundly shaped the cancer epidemiology landscape in Saudi Arabia over the past three decades.

Saudi Arabia has undergone significant economic and population growth, accompanied by notable demographic and socioeconomic changes. The alterations encompass heightened tobacco consumption, reduced physical activity, and modified dietary practices. These factors are anticipated to affect the prevalence of particular cancer types in the country [7]. This study aimed to assess the influence of adopting a western lifestyle on the epidemiology and prevalence of gastrointestinal cancers in Saudi Arabia.

Methods

The literature for this review was sourced from searches conducted in the Global Cancer Observatory, Global Health Observatory databases, PubMed, Scopus, Web of Science, Google Scholar, and additional electronic databases. The primary search focused on the incidence, prevalence, and risk factors associated with gastrointestinal cancers, including esophagus, stomach, liver, pancreatic, gallbladder, and colorectal cancers, in Saudi Arabia and other regions. In the electronic search, I ensured the inclusion of all pertinent epidemiological metrics that aligned with the numerous characteristics associated with gastrointestinal cancers in Saudi Arabia. I did not apply any specific filter to this search. The investigation primarily relies on a comparative analysis of these characteristics in both historical and contemporary contexts in Saudi Arabia. I analyzed the relationship between the incidence of gastrointestinal cancer and national human development indices (HDIs), identified the risk factors, and forecasted age- and sex-specific changes in incidence and mortality rates.

Epidemiology of cancer

In 2020, the International Agency for Research on Cancer (GLOBOCAN) reported approximately 9.9 million cancer-related deaths and 19.3 million new diagnoses, excluding nonmelanoma skin cancer. Breast cancer is the most common cancer among females, representing 2.3 million new cases or 11.7% of the overall total. Colorectal cancer accounts for 11.4% of the total incidence. Prostate cancer and stomach cancer represent the subsequent most prevalent types, comprising 7.3% and 5.6%, respectively.

Lung cancer (18%), colorectal cancer (9.4%), liver cancer (8.3%), stomach cancer (7.7%), and female breast cancer (6.9%) represent the primary contributors to cancer-related mortality. Developed countries exhibit a frequency of both sexes that is 2-3 times greater than that observed in emerging countries. Males exhibit a higher mortality rate compared to females. Predictions indicate that the global cancer burden is expected to reach approximately 28.4 million cases by 2040, representing a 47% increase attributed to demographic changes in the population. Developing countries are projected to experience growth ranging from 64% to 95%, while developed countries are expected to increase from 32% to 56%. However, the situation may worsen as globalization and economic growth continue to expand rapidly. It is crucial for global cancer control that emerging nations develop sustainable healthcare systems and infrastructure for cancer prevention [8]. The incidence rate of all cancer types in Saudi Arabia is 88.7 per 100,000 individuals, while the age-standardized mortality rate (ASMR) is 43.3 per 100,000 inhabitants [9]. Saudi Arabia has a population of 35,844,913, comprising 20,702,764 males (57.76%) and 15,142,149 females (42.4%). The 2022 forecast indicated an incidence rate of 7.84 per 100,000 individuals, with rates of 71.22 per 100,000 for males and 88.28 per 100,000 for females. The age-standardized incidence rate was 87.1, with rates of 80.0 for men and 100.4 for women. The cumulative probability of developing cancer prior to age 75 is 9.1%, comprising 8.4% for males and 10.3% for females.

Epidemiology of gastrointestinal cancers in Saudi Arabia

Globocan's (2022) data indicates an esophageal cancer incidence of 0.95%, a cumulative risk of 0.11, and a 5-year frequency of 0.42 per 100,000 individuals. The mortality rate for esophageal cancer was 1.9%, reflecting the proportion of mortality among diagnosed individuals. The cumulative risk of esophageal can-

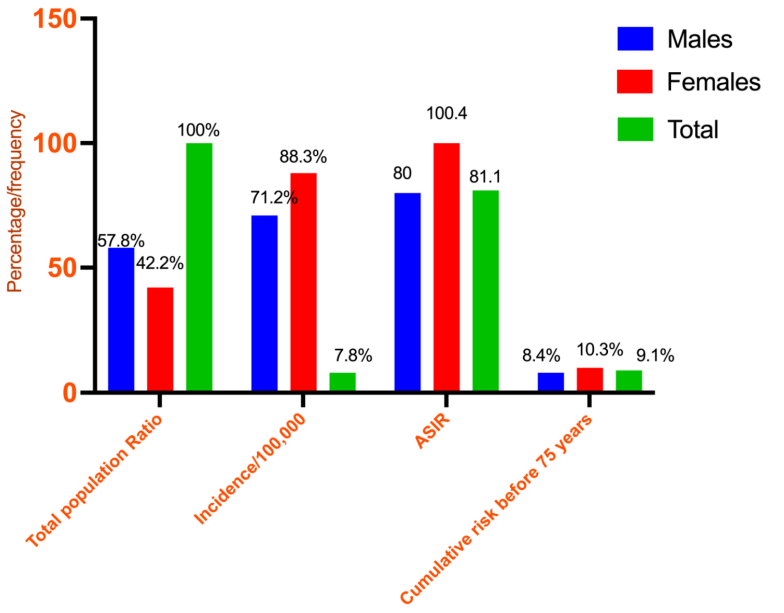

Figure 1. Epidemiology of cancer in Saudi Arabia.

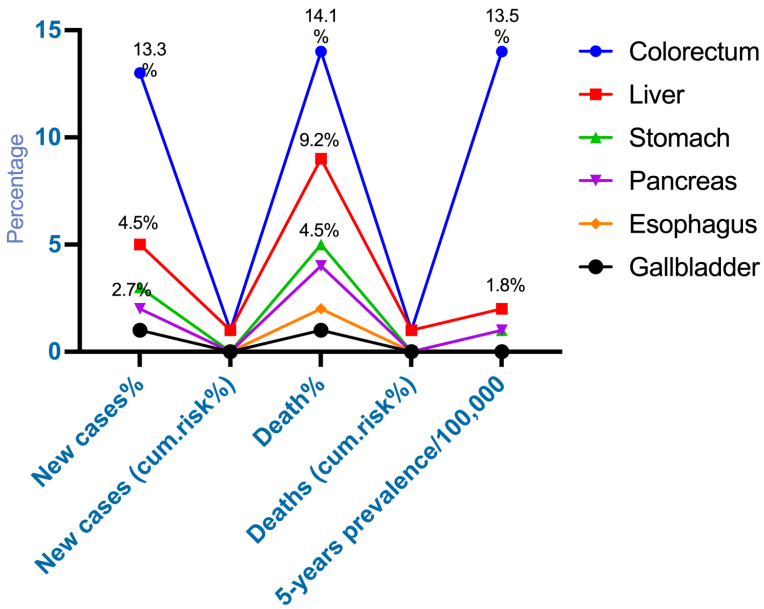

Figure 2. Epidemiology of GI cancers according to Globocan's (2022) report [10].

cer was 0.11, signifying the overall likelihood of disease development during a designated timeframe.

During a 5-year span, the incidence of stomach cancer was 1.3 cases per 100,000 individuals. The cumulative risk of having gastric cancer was 0.30, and the incidence rate was 2.7%. The death rate for stomach cancer was 4.5%, signifying the proportion of individuals who succumbed to this illness. The cumulative risk of developing stomach cancer was 0.24, indicating the overall likelihood of acquiring this ailment.

The incidence of liver cancer was 4.5%, with a cumulative riskof0.57anda5-yearfrequency of 1.8 cases per 100,000 individuals. The death rate from liver cancer was 9.2%, reflecting the proportion of individuals who succumbed to the disease. The cumulative risk of liver cancer development was 0.55, signifying the overall likelihood of acquiring the disease within a designated timeframe.

The incidence of gallbladder cancer was 0.71%, with a cumulative risk of 0.09 and a 5-year frequency of 0.33 per 100,000 individuals. The mortality rate of gallbladder cancer was 1.1%, whereas the cumulative risk was 0.07.

The incidence of pancreatic cancer was 2.1%, with a cumulative risk of 0.24 and a 5-year frequency of 0.76 per 100,000 individuals. The death rate for pancreatic cancer was 4.2%. The cumulative risk of obtaining pancreatic cancer was 0.23, during the designated timeframe.

The incidence of colorectal cancer was 13.3%, with a cumulative risk of 1.3 and a 5-year rate of 13.5 cases per 100,000 individuals. The mortality rate for colorectal cancer was 14.1%, with a cumulative risk of 0.67 [10]. See **Figures 1** and **2**.

Moreover, the Globocan (2020) study indicates that Saudi Arabia had the highest incidence and mortality rates of esophageal cancer in men within the Gulf regions, succeeded by Iraq. In contrast, Iraq had the greatest incidence and

mortality rates of esophageal cancer among women, succeeded by Saudi Arabia, across all age demographics [11, 12].

Pathogenesis of gastrointestinal cancers

The pathophysiology and pathogenesis of gastrointestinal cancers evolve through a series of complex, interconnected processes that are primarily influenced by inherited and environmental factors. These elements produce biologic alterations, including DNA mutations and changes in gene expression, which eventually cause uncontrolled cell proliferation and tumor growth [13-15]. In the context of gastric cancer, chronic inflammation, frequently resulting from *H. pylori* infection, is significant in triggering these alterations [16]. Inflammatory bowel disease causes inflammation in the intestines, and as the illness persists, the yearly chance of developing colitis-associated colorectal cancer increases [17-19].

Etiology of GI cancers

Hepatitis B and C

Hepatitis B virus infection is a recognized risk factor for hepatocellular carcinoma. Evidence linking chronic HBV infection to various extrahepatic cancers, such as gastric cancer, remains inconclusive [20]. HCV is a hepatotropic RNA virus that leads to both acute and chron ic hepatitis, possibly advancing to cirrhosis, decompensated liver disease, and hepatocellular carcinoma [21].

The highest crude incidence rates were observed in Qunfudah, Jeddah, Tabuk, and Taif, with values of 28.5, 25.2, 25.1, and 23.4 per 100,000, respectively. In contrast, Hail exhibited a CIR of 3.6 per 100,000, followed by Qurayyat at 3.5, Jouf at 2.9, and Hafr al-Baten at 1.2. The incidence rates differed among age groups, with the highest observed in individuals aged 45 and older (30.6 per 100,000), followed by those aged 15-44 (14.2 per 100,000), and the lowest in the 0-14 age group (0.8 per 100,000). The prevalence of hemophilia B virus infection among men was 1.4% higher in Saudi Arabia compared to other countries, where it was 2.2% higher. Participants in the study exhibited a 4.2-fold increased likelihood of contracting HBV compared to individuals from non-Saudi countries [22]. From 2019 to 2022, the incidence of hepatitis C in Saudi Arabia decreased by 56.9%. During this period, incidents per 100,000 individuals decreased from 9.94 to 4.29. Males exhibited a higher incidence than females; however, both genders experienced a decline from 2019 to 2022 [23].

H. pylori

Helicobacter pylori, the most prevalent chronic bacterial infection, unequivocally induces stomach cancer, the primary cause of cancer mortality globally [24]. In Saudi Arabia, the prevalence of *H. pylori* infection varies from 10% to 96%. Risk factors for *H. pylori* include socioeconomic status, medical history, personal hygiene, and behavioral habits. The predominant virulence genes in *H. pylori* are cagA and vacuolating cytotoxin (vacA). The pathogenicity of the disease and its clinical manifestations are linked to these genes [25].

Smoking and alcohol

Smoking elevates the risk of gastrointestinal disorders, including peptic ulcers, Crohn's disease, and specific types of cancer. Smoking can lead to these disorders as a result of mu cosal irritation, alterations in gut irrigation, and modifications in immune response [26]. The prevalence of smoking in Saudi Arabia is 14.09%. The smoking rate among men is 25.34%, compared to 1.91% for women [27].

Numerous studies indicate that moderate alcohol consumption reduces the risk of developing thyroid cancer, non-Hodgkin's lymphoma, renal cell carcinoma, and multiple myeloma. Increasing alcohol consumption elevates the risk of developing cancers of the breast, colon, pancreas, and aerodigestive tract. Except for upper aerodigestive malignancies, which are more common in smokers, neither fat nor smoking was shown to increase the cancer risk linked to alcohol consumption [28]. Alcohol tolerance exhibits significant variation across different cultures. Research indicates that religious beliefs and social desirability may affect the reporting of such actions [29]. Saudi Arabia enforces sociological, cultural, legal, and religious restrictions on alcohol consumption; however, cases of drinking and abuse continue to occur [30, 31].

Dietary habits

Several cancers, including gastrointestinal cancer, have been linked to various dietary pat-

terns. It remains uncertain whether a healthy eating pattern can influence the risk of developing gastrointestinal malignancies in individuals with varying genetic backgrounds [32]. Epidemiologic research indicates a correlation between nutrition and colon cancer. Nonetheless, the precise cause-and-effect relationship between dietary habits and colorectal cancer remains to be established [33].

Eating habits in Saudi Arabia have progressively shifted toward a western diet, marked by elevated levels of sugar, salt, and unhealthy fats. The newly acquired behaviors exacerbate the obesity epidemic nationwide, along with associated comorbidities, including type 2 diabetes. Research has established that various nutritional regimens, including the ketogenic diet, intermittent fasting, gluten-free diet, and calorie restriction diet, are effective for weight loss [34].

Obesity and overwight

Obesity is associated with gastrointestinal malignancies, increasing risk, facilitating progression, and deteriorating overall outcomes. The variability of obese adipose tissue is influenced by location, structure, cellular composition (including local immune cell populations), and fatty acid consumption. Saturated fatty acids promote hypertrophy and inflammation in adipose tissue, while monounsaturated fatty acids contribute to hyperplastic, less-inflammatory tissue [35].

32.8% of the Saudi population is classified as overweight, while 23% are categorized as obese [36].

Physical inactivity

Research has established a correlation between low physical activity and sedentary behavior with various disorders, including colorectal cancer. Engagement in physical activity has been associated with a reduction in colorectal cancer morbidity and mortality ranging from 13% to 60%. Sedentary behavior correlated with increased all-cause mortality [37].

Physical inactivity represents a significant public health concern in Saudi Arabia, impacting individuals across all age groups. There is a need for innovative strategies and personalized health education activities within academic institutions and communities to foster the development of healthy habits. Increasing the availability of local sports facilities and concession packages, especially for female gym users, may promote exercise participation [38]. The robust economic growth in Saudi Arabia has led to unhealthy lifestyles and an increase in noncommunicable diseases [39]. In Riyadh, Saudi adults exhibited considerable sedentary behavior, with education, occupation, monthly income, physical activity status, types of physical activity, and reasons for non-exercise identified as prevalent characteristics [40].

Diabetes milletus

The association between diabetes and glycemic control remains unclear; nevertheless, the majority of meta-analyses indicate a positive correlation, suggesting that diabetes may serve as an independent risk factor. Numerous clinical trials indicate that gastrectomy enhances glycemic control in patients with diabetes mellitus and gastric cancer. Obesity, hyperglycemia, hyperinsulinemia, *H. pylori* infection, and metformin use may interact to induce diabetes mellitus and gastric cancer [41].

A fixed-effect meta-analysis included 10 trials with a total of 8457 adult participants, both male and female, aged 18 and older. From 2016 to 2022, the prevalence of type 2 diabetes in Saudi Arabia was 28% (95% CI = 27-28, $P < 0.001$). The risk for individuals over 40 years of age was nearly double (OR = 1.74, 95% CI = 1.34-2.27) compared to those under 40. The difference was statistically significant ($P < 0.0001$). The research identified notable trends in the prevalence of T2DM from 2016 to 2022, though the findings were inconsistent. Adults in Saudi Arabia aged 40 and above exhibit a significant risk for the development of type 2 diabetes [42].

Hypertension

Previous studies have established a significant link between hypertension and a heightened risk of stomach cancer development. This research indicates that individuals with a self-reported history of hypertension are twice as likely to develop esophageal and gastric cardia adenocarcinoma [43, 44].

The prevalence of hypertension ranged from 15.2% to 32.6% in national community studies and from 4.2% to 71.3% in regional community studies [45].

Ulcers

Environmentally induced peptic ulcer disease elevates the risk of gastric cancer, a prevalent and lethal tumor. The mechanisms that explain this association remain unclear. Only a specific type of gastrointestinal cancer can induce spasmolytic polypeptide-expressing metaplasia and intestinal metaplasia [46].

The prevalence of inflammatory bowel disease, including Crohn's disease and ulcerative colitis, has risen in Saudi Arabia over the past decade. Although medical treatment is the primary approach, surgical intervention is often necessary for this condition. Literature from the Middle East and Saudi Arabia inadequately addresses issues related to inflammatory bowel disease stoma formation [47]. Gastric cancer represents a significant health concern in Saudi Arabia, with its prevalence differing across regions [48].

Hereditary factors

Hereditary cancer represents a crucial area of study in oncology, constituting around 10% of global cancer cases. Recent advancements in sequencing technology have enhanced our comprehension of hereditary cancers. However, similar to other genetic traits, the prevalence of cancer-associated mutations differs among populations. Most studies identifying hereditary cancer genes have predominantly concentrated on European or Asian populations. It is imperative to identify hereditary cancer genes in the Arab population. Consanguineous marriages and the incidence of genetic diseases are common in Arab countries. Cultural and educational factors differentiate Arab populations from other studied groups regarding cancer awareness and treatment [49].

Gastrointestinal tract cancers resulting from genetic abnormalities impact a significant population worldwide. Many gastrointestinal tract tumors arise spontaneously, but we have only identified and adequately characterized a limited subset associated with familial predisposition. The conditions include Cowden syndrome, MUTYH-associated polyposis, hereditary pancreatic cancer, Lynch syndrome, Peutz-Jeghers syndrome, familial adenomatous polyposis (FAP), attenuated FAP, serrated polyposis syndrome, and hereditary gastric cancer. Finding the genes linked to these conditions helped create tests to diagnose them and strengthened our knowledge of the genetics behind gastrointestinal cancer.

Numerous malignant neoplasms are associated with inherited genetic factors related to familial history. Next-generation sequencing has facilitated the identification of hereditary cancer susceptibility genes [50]. A study conducted in Saudi Arabia examined genetic cancer risk among 310 individuals, comprising 57 non-cancer patients, 110 cancer patients, 143 individuals from cancer families, and 16 individuals with current disease. Among the 310 instances, 38.4% exhibited gene variations recognized or presumed to be harmful. A total of 38.9% of cancer patients and their relatives were found to be either PV carriers or potential PVs. These individuals are closely associated with APCmc.3920T>A, which is connected to colorectal cancer and Lynch syndrome, and TP53 c.868C>T, which is related to multiple colon polyposis. They exhibited a higher background prevalence of familial cancer-related genetic variants compared to other groups [51].

Changes in Saudi lifestyle and GIT cancers

Saudi Arabia is an important global oil producer. Since its establishment in 1932, the oil discoveries and consumption in Saudi Arabia have greatly influenced the global economy. Saudi Arabia, the largest oil producer globally, has experienced significant growth over the past century due to the revenues generated from this sector. The wealth generated from oil and gas has significantly transformed the lifestyles, settlement patterns, and economies of Saudi Arabia. The built environment in Saudi Arabia demonstrates the influence of the oil industry on local economies and societies, alongside technological exchange, cultural forms, and social behaviors [52].

Insufficient physical activity has significantly contributed to the rise of noncommunicable diseases and is identified as one of the five principal health risk factors in the Arabian Peninsula. Noncommunicable diseases significantly contribute to mortality and morbidity

in the oil-producing nations of the Arabian Peninsula, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Rapid socioeconomic development has resulted in heightened urbanization, motorization, trade liberalization, and the adoption of "western" diets [53].

Obesity and overweight are prevalent risk factors for gastrointestinal cancers in Saudi Arabia, attributed to inadequate nutrition, a sedentary lifestyle, and insufficient physical activity. The aforementioned factors increase the likelihood of noncommunicable diseases, including diabetes, hypertension, and cancer. A study conducted in North Saudi Arabia indicates that 63.6% of individuals in Hail were classified as obese. The prevalence among males was 56.2%, while among females it was 71% [54, 55].

The epidemiology of various diseases has escalated recently, attributed to the adoption of a western lifestyle by Saudis, insufficient cancer awareness campaigns, inadequate early detection and long-term screening programs, and social barriers to cancer prevention. Also, in addition to genetic factors that make some people more likely to get certain cancers, several other risk factors have been found, such as smoking, infections from cancer-causing viruses, low vitamin D levels, lack of physical activity, and being overweight.

In 1979, researchers in Saudi Arabia found that malignancies of the oral cavity and esophagus were more prevalent than tumors of the lower intestinal tract [56].

The current and projected increases in the colorectal cancer rate in Saudi Arabia are alarming. From 1994 to 2003, the age-standardized incidence rate (ASIR) of colorectal cancer in Saudi Arabia nearly doubled, whereas ASRs in the United States experienced a nonsignificant decline. The incidence of colorectal cancer in the United States showed a nonsignificant decline in females from 2001 to 2003, whereas it experienced a 6% increase among females in Saudi Arabia. From 1999 to 2003, the average per capita consumption among Saudi males rose by 20.5%. The prediction model projected a fourfold increase in colorectal cancer incidence for both genders in Saudi Arabia by 2030 [57]. More than 85% of the Saudi population is under 50 years of age, which elevates the risk of early-onset colorectal cancer. Early-onset colorectal cancer exhibits the highest incidence in women aged 40 to 49 years. National statistics indicate a gradual rise in the incidence of colorectal cancer, highlighting a global concern regarding early-onset colorectal cancer. Further investigation is necessary to ascertain the cause of early-onset colorectal cancer. It is essential to inform primary care providers about the rising prevalence of early-onset colorectal cancer. To mitigate disease burden, colorectal cancer screening should commence at age 50 [58]. Advanced illnesses have been identified in one-third of Saudi colorectal cancer patients, according to researchers. A delayed diagnosis seems to worsen the prognosis. Understanding the risk factors linked to late-stage colorectal cancer is important for creating specific treatments that can improve patient results and detection rates [59].

Since 1980, the Qassim region of Saudi Arabia has exhibited the highest prevalence of esophageal cancer. The Gassim Region in north-central Saudi Arabia reported 32 patients, accounting for 17% of the total [60]. From January 1987 to December 1995, the King Fahd Specialist Hospital in Buraidah, Al-Qassim, reported 1106 new cancer cases, comprising 642 males and 464 females. The prevalence of esophageal cancer was 7.7% [61]. Researchers in Saudi Arabia identified a slight rise in esophageal cancer cases from 2006 to 2016 [12].

The GLOBOCAN 2020 report indicates that gastric cancer (GC) constitutes 2.4% of all cancers in Saudi Arabia, 4% of cancer-related deaths, with an incidence rate of 3.21 per 100,000 individuals, and a cumulative risk of 0.31% [11, 62].

The Saudi Cancer Registry (SCR) reported that between 2004 and 2014, the prevalence of liver cancer in males in Saudi Arabia significantly exceeded that in females [63].

Pancreatic cancer represents a highly lethal neoplasm, exhibiting increasing mortality rates globally. The epidemiologic factors of pancreatic cancer exhibit significant variation across diverse geographical regions globally. A Saudi study utilizing cancer incidence records from 2005 to 2020, along with data from the IARC

Global Cancer Observatory, indicates that pancreatic cancer rates in Saudi Arabia are lower than the global averages. The disease has shown an increase throughout the research period, exhibiting regional variations [64].

Gallbladder cancer is rare, yet it can occur with some frequency [65]. A study conducted in Saudi Arabia from 2004 to 2015 revealed that the Saudi Cancer Registry (SCR) provides statistics on gallbladder cancer for thirteen different locations. During this period, a total of 1,678 cases of gallbladder cancer were recorded, comprising 702 (42%) males and 976 (58%) females. The highest frequency was observed among Saudi women and males aged 75 years and older. The cumulative ASIR for men in Saudi Arabia was 1.1 per 100,000. The eastern region exhibits the highest Age-Standardized Incidence Rate (ASIR), recorded at 1.5 per 100,000 males. Tabuk follows closely with a rate of 1.4, while Riyadh has a rate of 1.3. The incidence rate of ASIR among Saudi women was 1.6 per 100,000, as indicated by the data. Riyadh exhibited the highest population density at 2.4, followed by the Eastern Area at 1.9 and Qassim at 1.5. Men demonstrated a 0.7 reduction in ASIR and crude incidence rate relative to women [66].

A recent study on hepatobiliary cancers in Saudi Arabia indicates significant effects of these cancers in Saudi Arabia and neighboring Gulf countries. Various risk factors have led to the rising prevalence of these cancers. The main causes are linked to several factors, including hepatitis virus infection, smoking, drinking alcohol, diabetes, being overweight or obese, liver cirrhosis, non-alcoholic fatty liver disease, hemochromatosis, aflatoxins, anabolic steroids, and genetic factors. Hepatobiliary cancers, especially liver cancer, are common in Saudi Arabia. The main causes of hepatobiliary cancers in Saudi Arabia include viral hepatitis (mainly HCV, then HBV), non-alcoholic fatty liver disease, type 2 diabetes, obesity, and smoking, among others. The prompt implementation of hepatobiliary preventive measures and early detection strategies is considered essential. These encompass initial patient diagnosis and the management of significant risk factors. The limited occurrence of gallbladder and bile duct cancers complicates the assessment of their impact in Saudi Arabia, highlighting the need for additional research [66].

Conclusion

Despite the limited data available on gastrointestinal cancers in Saudi Arabia, the epidemiologic rates are notably high, especially for colorectal, liver, and stomach cancers. Various risk factors have been associated with the development of gastrointestinal cancers, likely connected to the recent shifts in lifestyle in Saudi Arabia, particularly the adoption of western habits. The most prevalent risk factors encompass dietary influences, obesity, and infections.

Disclosure of conflict of interest

None.

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