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Research Article

The Link Between Alcohol Consumption and Cancer Incidence Across Continents: A Global Study

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Abstract

Introduction: Alcohol consumption is associated with an increased risk of various types of cancer.

Aim: The aim of this study was to examine the relationship between alcohol consumption and the incidence of different types of cancer in different continents.

Methods: Data from the Globocan database was used to calculate age-standardized rates of cancer incidence for colon, colorectum, larynx, liver, oesophagus, oral cavity, pharynx, rectum, and breast cancers in different regions. The study focused on the regional variations in age-standardized rates (ASR) of alcohol-related cancers across continents and by gender.

Results: According to this study, Europe had the highest age-standardized rate of alcohol-related cancers, followed by Oceania, North America, Asia, Latin America and the Caribbean, and Africa. This is due to alcohol consumption. Furthermore, the incidence of colon, colorectal, larynx, liver, esophageal, oral cavity, pharyngeal, and rectal cancers was higher in males than in females, while breast cancer was more prevalent in females than in males due to alcohol consumption.

Conclusion: This study suggests that alcohol consumption is associated with an increased risk of cancer, especially in areas where alcohol consumption is high. The findings of this study may have implications for public health policies related to alcohol consumption and cancer prevention, especially in areas where ASR is high. This study highlights the need for further investigation of the mechanisms underlying the link between alcohol consumption and cancer and the development of effective prevention strategies.

Keywords: Alcohol consumption; Cancer incidence; GLOBOCAN; Age-standardized rates; Continents

Context and Significance

This study investigated the association between alcohol consumption and the incidence of different types of cancer across continents and genders. The results showed that regions with high alcohol consumption, such as Europe, had the highest age-standardized incidence of alcohol-related cancers. The study emphasizes the need for public health policies and cancer prevention strategies in these regions and calls for further research to understand the mechanisms behind the relation between alcohol consumption and cancer. Overall, the study provides valuable insights into the global burden of alcohol-related cancers and highlights the importance of addressing this public health challenge.

Introduction

Cancer is one of the leading causes of death worldwide and is a major public health concern [1,2]. According to the World Health Organization (WHO), cancer kills approximately 9.6 million people each year, making it the second leading cause of death worldwide [3,4]. Despite significant advancements in cancer research and treatment, the burden of cancer continues to grow, with a projected 19.3 million new cases and 10 million cancer-related deaths projected for 2020 [5,6].

Alcohol consumption has been known as a significant risk factor for various types of cancer including colon [7,8], larynx [9,10], liver [11,12], oesophagus [13,14], oral cavity [15,16], and breast cancer [17,18]. Alcohol has been classified as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC), providing significant evidence that alcohol consumption is associated with carcinogenesis in humans [19,20]. It is estimated that alcohol consumption is responsible for approximately 3.6% of all cancer cases worldwide [21,22].

The association between alcohol use and cancer depends on the type of cancer, with certain types of cancer being more associated with alcohol than others. The most commonly recognized alcohol-related cancers include liver, breast, colorectal, and esophageal cancer, but alcohol consumption has also been linked to other cancers such as stomach, pancreatic, and lung cancer [23].

Furthermore, the association between alcohol consumption and cancer varies geographically, with different regions of the world having varying levels of alcohol consumption and different patterns of alcohol-related cancers [24]. Understanding the geographic variations in alcohol consumption and its association with different

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cancers is crucial for developing targeted prevention and intervention strategies. This research article aims to investigate the global burden of alcohol-related cancers. We will also explore regional variations in the association between alcohol consumption and different types of cancer by gender and geographic location. The goal of this study is to provide a detailed understanding of the global impact of alcohol on cancer and the need for targeted prevention and intervention strategies. By examining the data, we aim to contribute to the development of effective policies and interventions that can mitigate the negative effects of alcohol consumption on cancer incidence and mortality.

Methods

Data Source

In this study, we obtained data from the Globocan database, which provides the latest estimates of cancer incidence, mortality, and prevalence for different countries and regions around the world. The database was accessed for the years 2020. This database is publicly available and does not contain any personal or identifiable information.

Selection of Cancers

We selected nine types of cancer for this study based on their established association with alcohol consumption, including colon, colorectum, larynx, liver, oesophagus, oral cavity, pharynx, rectum, and breast cancers. These cancer types were selected because they are among the most common cancers globally and have been previously linked to alcohol consumption.

Data Analysis

To investigate the association of alcohol with different cancers in different continents, we used age-standardized rates (ASR) per 100,000. The ASR allowed us to compare cancer incidence rates across different populations by adjusting for differences in age structure. We calculated the ASR for each cancer type and continent separately for both genders. For each continent, we examined the relationship between alcohol consumption and cancer incidence for each of the selected cancer types. Furthermore, we separately analyzed the data for males and females for each continent.

Ethical Considerations

This study is based on publicly available data from the Globocan database, and no personal or identifiable information was used. Therefore, ethical approval was not required. We ensured that all data used in this study was handled in a confidential and secure manner to protect the privacy of individuals.

Results

Age-Standardized Rates of All Cancers (Excluding Non-Melanoma Skin Cancer) by Continent

Based on Figure 1, the age-standardized rate (ASR) of all alcohol-related cancers (excluding non-melanoma skin cancer) varies significantly by continent. Europe has the highest ASR of 7.2 per 100,000 people, with an uncertainty range of 5.3% to 9.0%. Oceania follows closely behind with an ASR of 6.9 per 100,000 people, and an uncertainty range of 4.7% to 9.5%. North America has an ASR of 5.5 per 100,000 people, with an uncertainty range of 3.5% to 7.7%. Asia has a slightly lower ASR of 4.8 per 100,000 people, with an uncertainty range of 3.1% to 6.9%. Latin America and the Caribbean have an ASR of 2.7 per 100,000 people, with an uncertainty range of 1.7% to 3.8%. Africa has the lowest ASR of all continents, with a rate of 1.7 per 100,000 people, and an uncertainty range of 1.0% to 2.4%. Finally, the world ASR for all alcohol-related cancers (excluding non-melanoma skin cancer) is 4.7 per 100,000 people, with an uncertainty range of 3.3% to 6.2% (Figure 1).

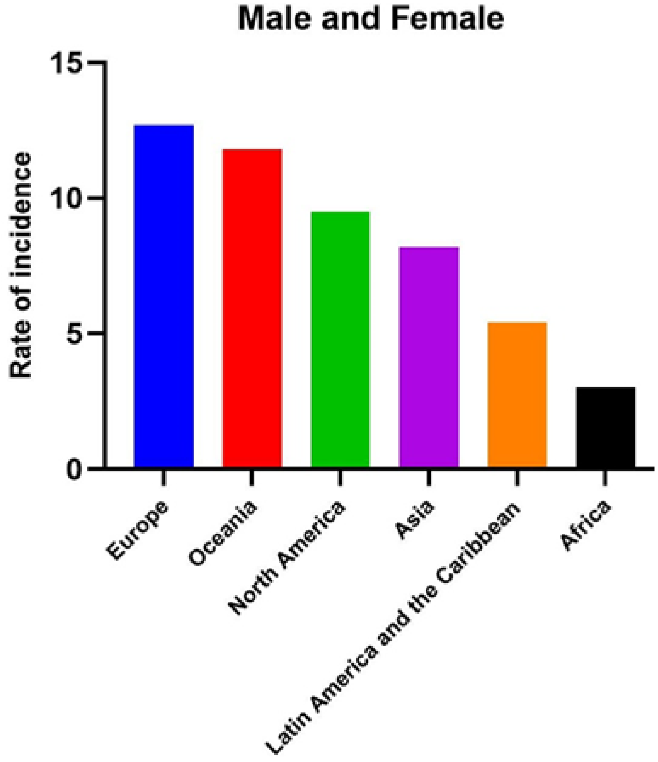

Figure 1: This figure shows the age-standardized rates of all cancers (excluding non-melanoma skin cancer) for different continents, based on data from the Global Cancer Observatory. The rates are expressed as the number of new cancer cases per 100,000 population per year, standardized to the World Standard Population. The data are presented for the most recent year available. The figure highlights the variations in cancer incidence across different continents.

Regional Variations in Age-Standardized Incidence Rates of Colon Cancer per 100,000 Population by Gender-wise

The study examined the continent-wise association of alcohol with different cancers by gender, and found that Europe and Oceania have the highest ASR of colon cancer among all regions, with an ASR of 2.2 per 100,000 population. However, the study also found that alcohol was associated with colon cancer in these regions, as the uncertainty limits for both Europe and Oceania suggest that the ASR could be as low as 1.6 or as high as 3.0. North America followed with an ASR of 1.6 per 100,000 population, with an uncertainty range of 1.0 to 2.1. Latin America and the Caribbean had an ASR of 0.9 per 100,000 population, with an uncertainty range of 0.6 to 1.1, while Asia had an ASR of 0.7 per 100,000 population, with an uncertainty range of 0.4 to 0.9. Africa had the lowest ASR of colon cancer among all regions, with an ASR of 0.2 per 100,000 population and an uncertainty range of 0.1 to 0.3. Furthermore, the study found that Europe had the highest

ASR of colon cancer for both males and females, with an ASR of 4 and 0.8 per 100,000 population, respectively. The uncertainty limits for males and females in Europe suggest that the ASR could be as low as 3.1 or as high as 4.9. Oceania followed closely behind with an ASR of 3.8 for males and 0.8 for females per 100,000 population, and the uncertainty limits for males and females in Oceania suggest that the ASR could range from 2.7 to 4.9 and 0.5 to 1.3, respectively. North America had an ASR of 2.7 for males and 0.5 for females per 100,000 population, with uncertainty limits ranging from 1.8 to 3.6 for males and 0.3 to 0.8 for females. Latin America and the Caribbean had an ASR of 1.6 for males and 0.3 for females per 100,000 population, with uncertainty limits ranging from 1.2 to 2.0 for males and 0.2 to 0.4 for females. Asia had the second-lowest ASR among all regions for both males and females, with an ASR of 1.2 and 0.2 per 100,000 population, respectively, and an uncertainty range of less than 0.1 to 0.3 for both genders. Finally, Africa had the lowest ASR of colon cancer among all regions for both males and females, with an ASR of 0.4 and less than 0.1 per 100,000 population, respectively, and an uncertainty range of 0.3 to 0.5 and less than 0.1 to less than 0.1, respectively (Figure 2).

Regional Variations in Age-Standardized Incidence Rates of Colorectum Cancer per 100,000 Population by Gender-wise

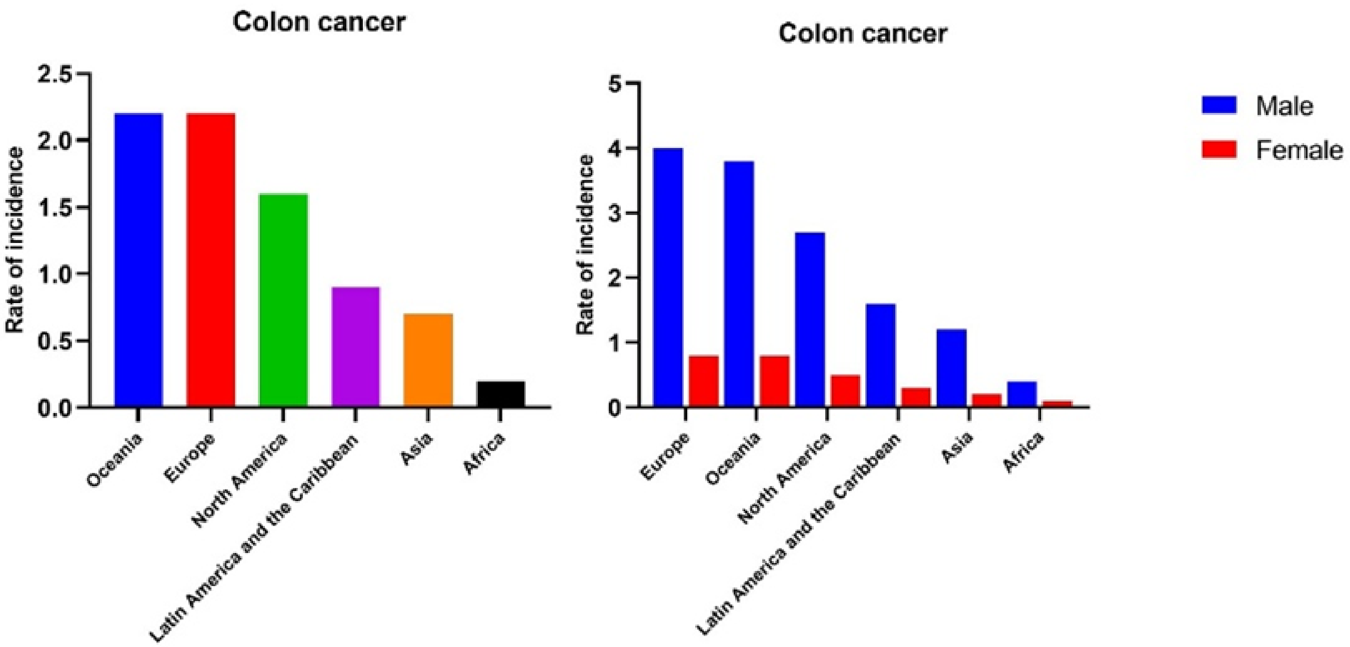

Figure 2: This figure presents the age-standardized incidence rates of colon cancer per 100,000 population for different regions, stratified by gender.

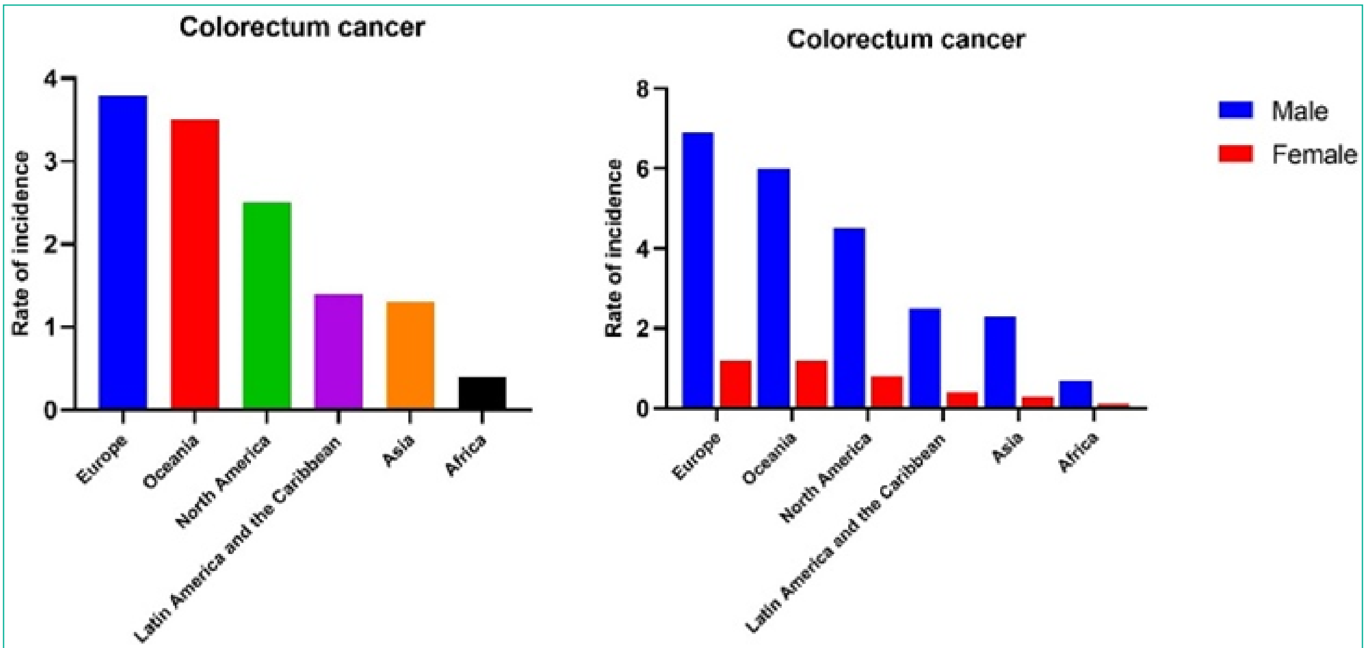

Figure 3: This figure presents the age-standardized incidence rates of colorectum cancer per 100,000 population for different regions, stratified by gender. The figure highlights the regional variations in colorectum cancer incidence rates, Furthermore, the figure shows that male have higher incidence rates of colorectum cancer than female.

The Figure 3 provides the age-standardized incidence rates (ASR) per 100,000 population of colorectum cancer for both sexes, males, and females, along with their corresponding uncertainty limits, in various regions of the world. However, it is important to note that the study also looked at the association of alcohol consumption with different cancers by gender. In terms of both sexes, Europe has the highest ASR of colorectum cancer, with 3.8 cases per 100,000 population, followed by Oceania with 3.5 cases per 100,000 population. On the other hand, Africa has the lowest ASR of colorectum cancer, with 0.4 cases per 100,000 population. The ASR of the world for both sexes is 1.7 cases per 100,000 population. In terms of gender-specific incidence, Europe has the highest age-standardized rates (ASR) in both men and women. In men, ASR is 6.9 per 100,000 population, while in women it is 1.2 per 100,000 population. Oceania followed, with 6.0 per 100,000 population for males and 1.2 per 100,000 for females. North America ranks third for the incidence of ASR in both men and women, with rates of 4.5 and 0.8 cases per 100,000, respectively. Latin America and the Caribbean rank fourth in the incidence of ASR in men and women, with 2.5 and 0.4 cases per 100,000 population, respectively. ASR is relatively low in both men and women in Asia, with 2.3 and 0.3 cases per 100,000 population, respectively. Africa has the lowest ASR of any region, with 0.7 cases for men and 0.1 cases for women per 100,000 population (Figure 3).

Regional Variations in Age-Standardized Incidence Rates of Larynx Cancer per 100,000 Population by Gender-wise

Findings suggest a strong association between alcohol consumption and an increased risk of throat cancer in both men and women, with the highest age-standardized rate (ASR) in Europe, per 100,000 population 0.7 people. After Europe, North America, Latin

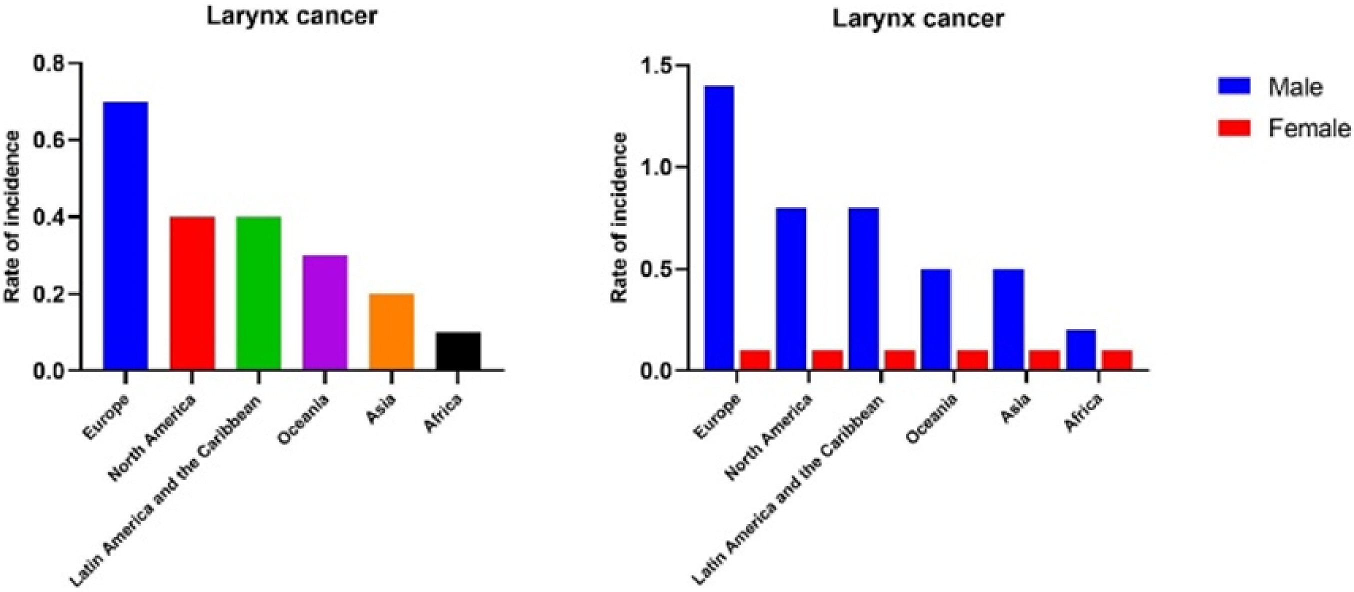

Figure 4: This figure presents the age-standardized incidence rates of larynx cancer per 100,000 population for different regions, stratified by gender.

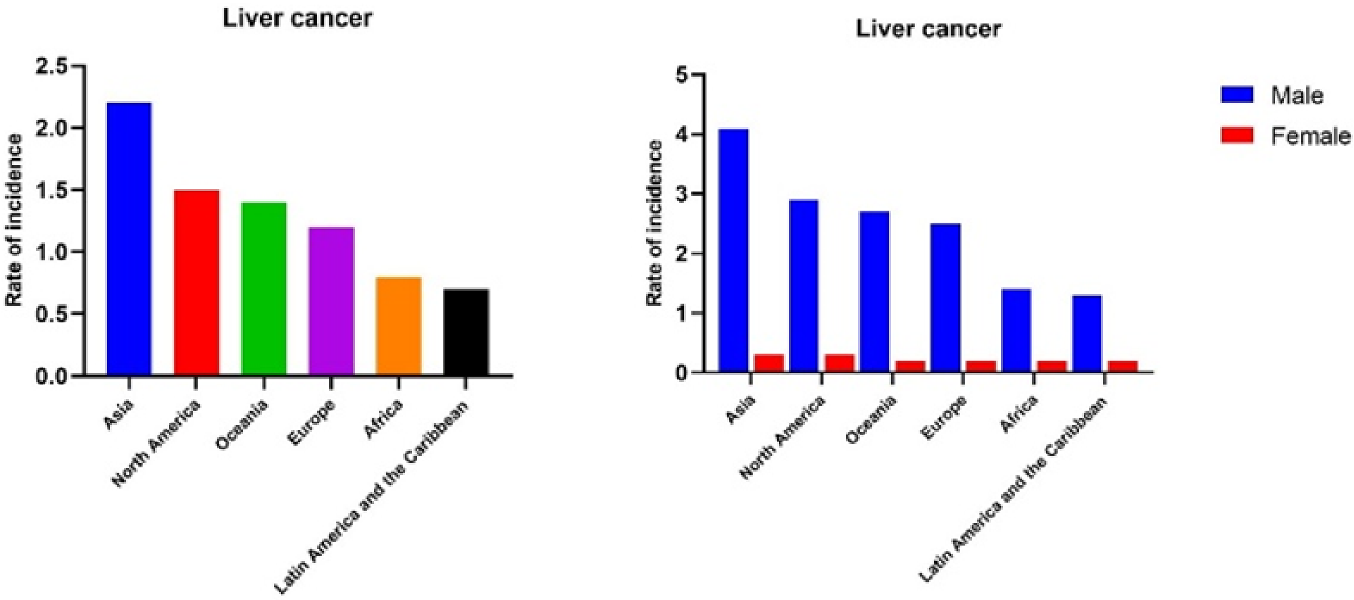

Figure 5: This figure presents the age-standardized incidence rates of liver cancer per 100,000 population for different regions, stratified by gender.

America, the Caribbean, Oceania, Asia and Africa differ in ASR for pharyngeal cancer. In terms of gender, males exhibit a significantly higher incidence rate of larynx cancer than females across all regions of the world, with the ASR almost double that of females in Europe, North America, Latin America and the Caribbean, Oceania, and Asia. Interestingly, the ASR for larynx cancer in females is extremely low, with values less than 0.1 per 100,000 population across all regions of the world. These findings suggest that alcohol consumption is a significant risk factor for larynx cancer, particularly in males (Figure 4).

Regional Variations in Age-Standardized Incidence Rates of Liver Cancer per 100,000 Population by Gender-wise

Alcohol consumption was found to be associated with a higher incidence of liver cancer in both sexes in all regions. The highest ASR was observed in Asia with an ASR of 2.2, followed by North America with an ASR of 1.5. Europe and Oceania had an ASR of 1.2 and 1.4, respectively, while Africa and Latin America and the Caribbean had lower ASRs of 0.8 and 0.7, respectively.

When considering gender-wise incidence rates, it was found that males had a higher ASR for liver cancer in all regions. Asia had the highest ASR for males with 4.1, followed by North America with an ASR of 2.9. Europe had an ASR of 2.5, while Oceania had an ASR of 2.7. Latin America and the Caribbean and Africa had lower ASRs of 1.3 and 1.4, respectively. For females, Asia had the highest ASR with 0.3, followed by North America and Europe with ASRs of 0.3 and 0.2, respectively. Oceania, Latin America and the Caribbean, and Africa had lower ASRs of 0.2 (Figure 5).

Regional Variations in Age-Standardized Incidence Rates of Oesophagus Cancer per 100,000 Population by Gender-wise

The study found a significant association between alcohol consumption and oesophagus cancer across different regions. It was observed that the ASR for oesophagus cancer varies greatly among different regions and that this variation can be attributed to differences in alcohol consumption.

Asia has the highest ASR for both sexes with 3.5 cases per 100,000 individuals, which can be largely attributed to the high levels of alcohol consumption in the region. When looking at the data by gender, it can be seen that the ASR for males is significantly higher than for females, with 5.7 and 1.4 cases per 100,000 individuals, respectively. This gender difference is also observed in other regions with high levels of alcohol consumption.

Europe and Africa have the second and third highest ASR for oesophagus cancer, respectively, and this is also largely attributed to alcohol consumption. In Europe, the ASR for both sexes is 1.2 cases per 100,000 individuals, whereas in Africa, it is 1.1 cases per 100,000 individuals. When looking at the data by gender, it can be seen that in Europe, the ASR for males is higher than for females, with 2.2 and 0.3 cases per 100,000 individuals, respectively. Similarly, in Africa, the ASR for males is higher than for females, with 1.8 and 0.3 cases per 100,000 individuals, respectively.

Latin America and the Caribbean, Oceania, and North America have the lowest ASR for oesophagus cancer, and this is largely attributed to lower levels of alcohol consumption in these regions. In Latin America and the Caribbean, the ASR for both sexes is 0.8 cases per 100,000 individuals, whereas in Oceania and North America, it is 0.6 and 0.4 cases per 100,000 individuals, respectively. The difference in ASR between males and females is less pronounced in these regions than in other regions with higher levels of alcohol consumption (Figure 6).

Regional Variations in Age-Standardized Incidence Rates of Oral Cavity Cancer per 100,000 Population by Gender-wise

The figure 7 illustrates the Age-Standardized Rate (ASR) per 100,000 population and uncertainty limits for both sexes for various regions of the world for oral cavity cancer, with a focus on the

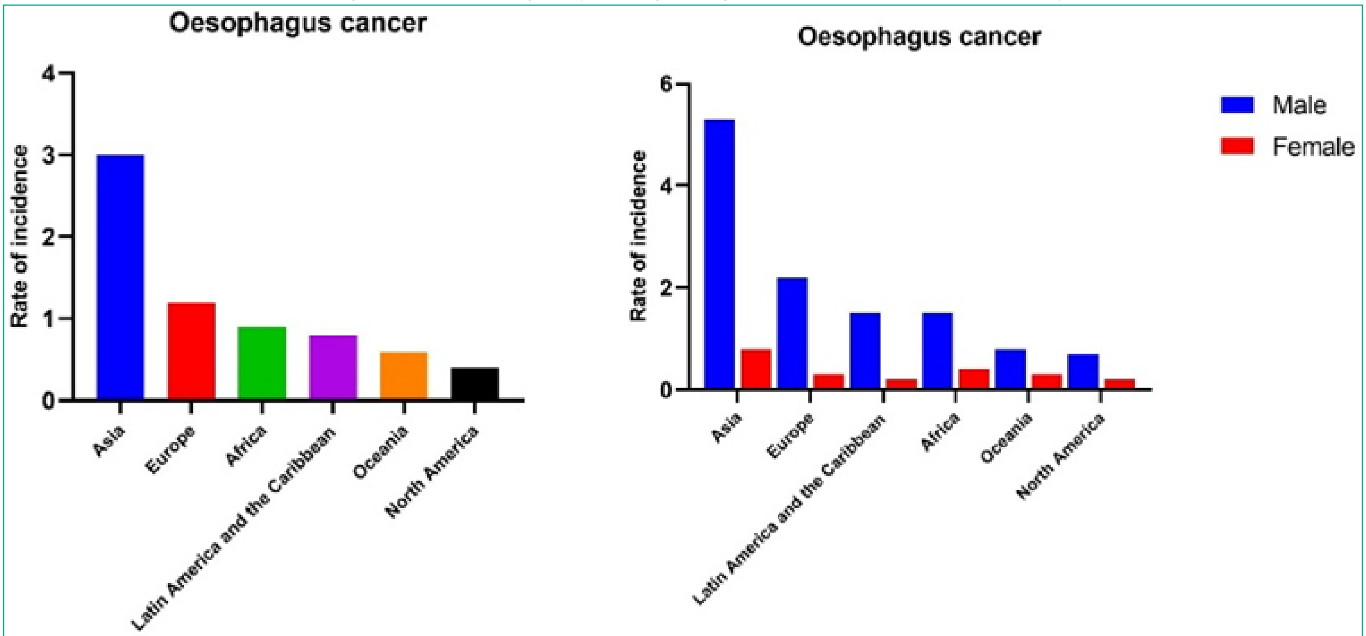

Figure 6: This figure presents the age-standardized incidence rates of oesophagus cancer per 100,000 population for different regions, stratified by gender.

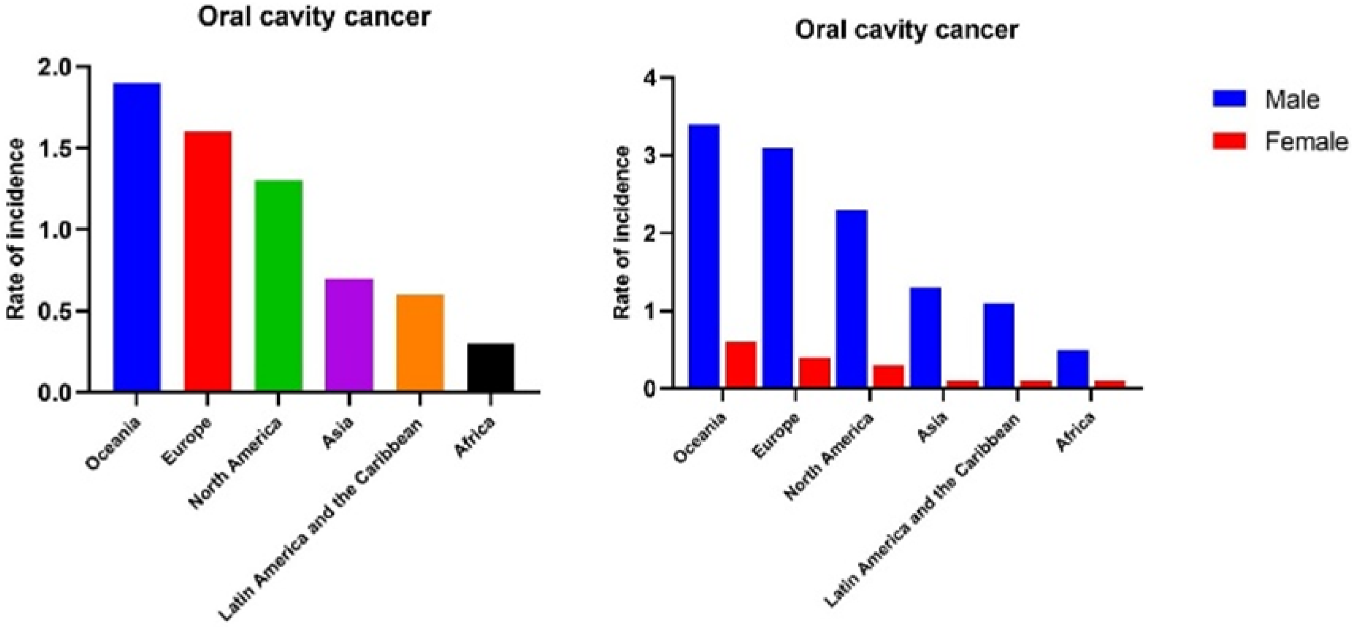

Figure 7: This figure presents the age-standardized incidence rates of oral cavity cancer per 100,000 population for different regions, stratified by gender.

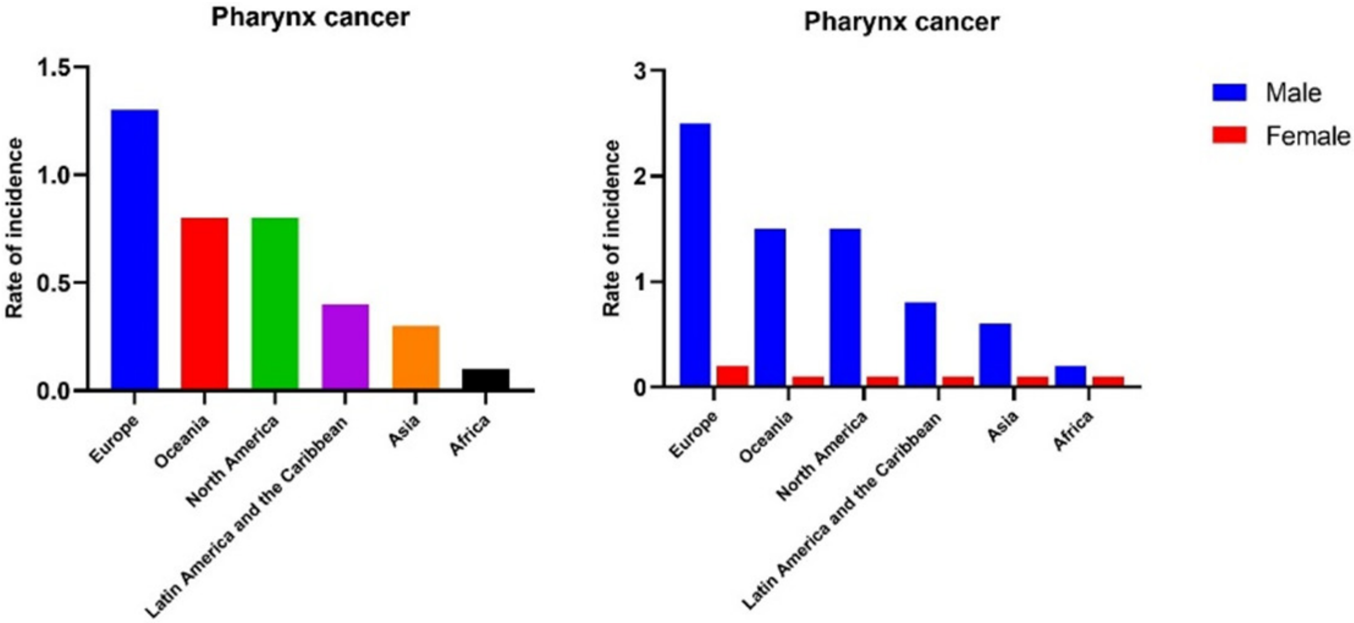

Figure 8: This figure presents the age-standardized incidence rates of pharynx cancer per 100,000 population for different regions, stratified by gender.

association with alcohol consumption. Analyzing the data by gender reveals the prevalence of colorectal cancer in different regions of the world and its association with alcohol consumption.

For males, the highest ASR per 100,000 population associated with alcohol consumption is observed in Oceania, with an ASR of 32.4 and an uncertainty limit of [22.5-44.1]. The second-highest ASR is observed in Europe, with an ASR of 31.3 and an uncertainty limit of [21.2-43.2]. The lowest ASR is observed in Africa, with an ASR of 6.8 and an uncertainty limit of [<0.1-16.5].

For females, the highest ASR per 100,000 population associated with alcohol consumption is observed in Europe, with an ASR of 19.5 and an uncertainty limit of [13.5-26.9]. The second-highest ASR is observed in Oceania, with an ASR of 19.0 and an uncertainty limit of [12.9-26.2]. The lowest ASR is observed in Africa, with an ASR of 5.3 and an uncertainty limit of [<0.1-13.0] (Figure 7).

Regional Variations in Age-Standardized Incidence Rates of Pharynx Cancer per 100,000 Population by Gender-wise

The figure. 8 shows the age-standardized rates (ASR) of Pharynx cancer for both sexes in different regions of the world, along with their population and uncertainty limits. When considering the potential association with alcohol consumption, it is worth noting that heavy alcohol consumption is a well-known risk factor for pharynx cancer.

The ASR for Pharynx cancer in males is higher than in females in all regions of the world, with Europe having the highest ASR among males (2.5 per 100,000) followed by Oceania (1.5 per 100,000) and

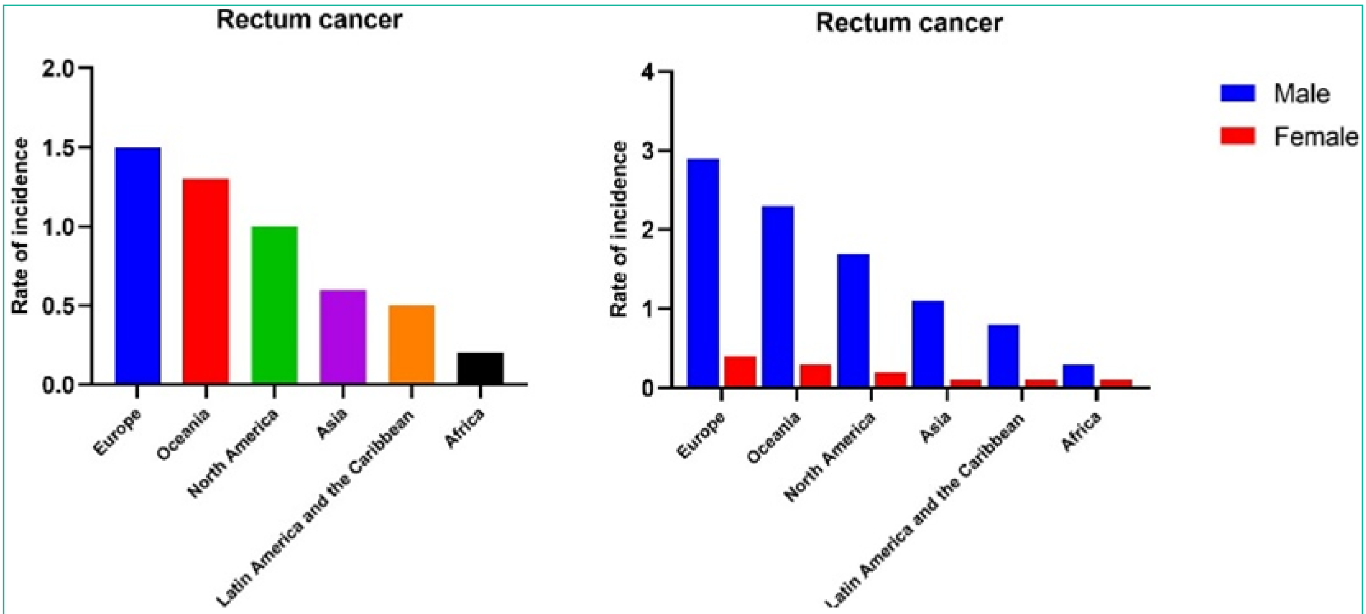

Figure 9: This figure presents the age-standardized incidence rates of rectum cancer per 100,000 population for different regions, stratified by gender.

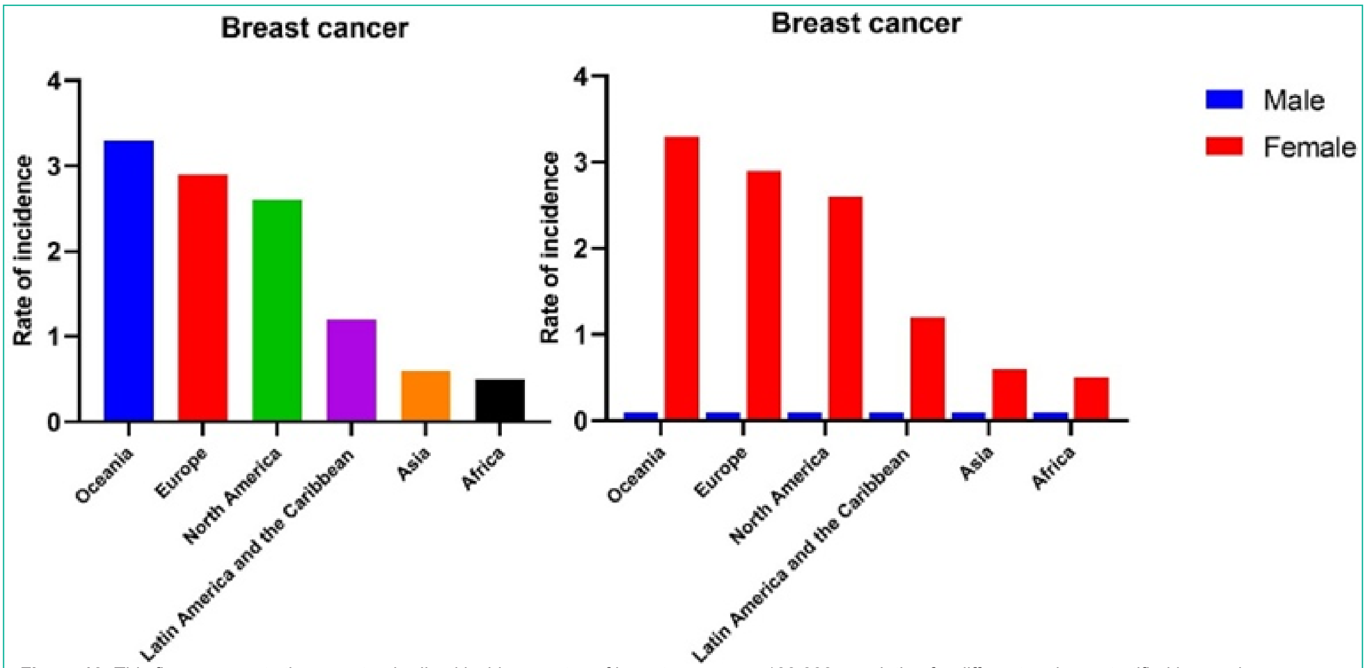

Figure 10: This figure presents the age-standardized incidence rates of breast cancer per 100,000 population for different regions, stratified by gender.

North America (1.5 per 100,000). These regions are also known for higher alcohol consumption rates. In contrast, Latin America and the Caribbean have the lowest ASR for males (0.8 per 100,000). The ASR of Pharynx cancer in females is considerably lower than that in males in all regions. Europe has the highest ASR for females (0.2 per 100,000), followed by Oceania and North America (0.1 per 100,000). Excessive alcohol consumption is a risk factor for throat cancer, especially in women, so it is important to recognize the possible association with alcohol consumption. Among regions, Latin American and Caribbean women have the lowest age-standardized rate (ASR) of pharyngeal cancer (<0.1 per 100,000) (Figure 8).

Regional Variations in Age-Standardized Incidence Rates of Rectum Cancer per 100,000 Population by Gender-wise

The association between alcohol consumption and rectum cancer varies across different regions of the world. In Europe, the ASR for rectum cancer is higher in males (4.6) than in females (1.6), with a wider uncertainty range in males (3.3-6.1) than in females (1.1-2.3). Similarly, in Oceania, the ASR for rectum cancer is higher in males (3.5) than in females (1.6), with a wider uncertainty range in males (2.2-4.8) than in females (0.8-2.3). In North America, the ASR for rectum cancer is also higher in males (2.1) than in females (0.9), with a wider uncertainty range in males (1.3-3.0) than in females (0.4-1.4). In Asia, the ASR for rectum cancer is higher in males (1.5) than in females (0.5), with a wider uncertainty range in males (1.1-2.2) than in females (0.2-0.8). In Latin America and the Caribbean, the ASR for rectum cancer is higher in males (1.3) than in females (0.4), with a wider uncertainty range in males (0.6-2.2) than in females (0.1-0.9). In Africa, the ASR for rectum cancer is higher in males (0.5) than in females (0.1), with a wider uncertainty range in males (0.2-0.9) than in females (<0.1-0.3). Overall, the ASR for rectum cancer is consistently higher in males than in females across all regions, and its association with alcohol consumption needs to be further investigated (Figure 9).

Regional Variations in Age-Standardized Incidence Rates of Breast Cancer per 100,000 Population by Gender-wise

Alcohol consumption is a known risk factor for breast cancer, and its association with breast cancer incidence varies across different regions of the world. Among females, the highest ASR for breast cancer was observed in Europe, with a rate of 50 per 100,000 population. Oceania and North America also had high rates of breast cancer among females, with ASRs of 31 and 29 per 100,000 population, respectively. In these regions, where alcohol consumption is also high, efforts to reduce alcohol intake could potentially help prevent and reduce the incidence of breast cancer among females.

On the other hand, for males, the ASRs of breast cancer were very low, with rates ranging from 0 to <0.1 per 100,000 population. The highest ASR for male breast cancer was observed in Europe and North America, where alcohol consumption is also high, with a rate of <0.1 per 100,000 population. Oceania, Latin America and the Caribbean, Asia, and Africa had no reported cases of male breast cancer. Further research is needed to understand the gender-specific risk factors and biology of breast cancer, particularly among males, in different regions of the world where alcohol consumption may be a contributing factor (Figure 10).

Discussion

This research article aimed to investigate the association between alcohol consumption and different types of cancer, specifically analyzing regional and gender-wise variations in cancer incidence rates across different continents. The findings suggest that alcohol consumption is a risk factor for several types of cancer and that the incidence rates of these cancers vary significantly by region and gender. Several studies have previously indicated that consumption of alcohol is associated with an increased likelihood of developing several types of cancer [25,26].

Looking at regional differences, the study found that Europe and Oceania had the highest rates of all cancers (excluding nonmelanoma skin cancer). North America, Latin America, Caribbean, Asia, and Africa followed in that order. These results are consistent with previous studies showing higher cancer incidence in industrialized regions compared to developing regions [27,28].

Regarding gender differences, the study found that the incidence rates of colon cancer and colorectal cancer were higher in males than females in all regions. This gender difference could be due to differences in lifestyle and hormonal factors. The outcomes are in line with prior investigations that have indicated that men who consume alcohol are more likely to have colon and colorectal cancer than women who consume alcohol [29,30].

The results of this study highlight the strong association between alcohol consumption and the risk of larynx cancer in both sexes, with males exhibiting a significantly higher incidence rate compared to females. The findings also reveal that Europe has the highest ASR for larynx cancer, followed by other regions of the world with varying rates.

Alcohol consumption is recognized as a risk factor for various types of cancer, including laryngeal cancer. This association is believed to be due to the metabolic breakdown of alcohol to acetaldehyde. Acetaldehyde is a carcinogenic compound that can cause DNA damage and increase your chances of developing cancer [31,32]. Additionally, alcohol consumption can reduce the effectiveness of the immune system in fighting cancer cells, weakening its defenses against cancer progression [33].

The higher incidence rate of larynx cancer in males compared to females is consistent with previous research, and may be due to differences in alcohol consumption patterns and smoking rates between genders [34]. Men are more likely to engage in heavy drinking and smoking, both of which are significant risk factors for larynx cancer.

The extremely low incidence rate of larynx cancer in females across all regions of the world is an interesting finding that warrants further investigation. This may be due to differences in hormonal and genetic factors between genders, as well as differences in lifestyle choices.

The findings of the study suggest that alcohol consumption is associated with a higher incidence of liver cancer in both sexes across all regions, with the highest ASR observed in Asia followed by North America. The gender-wise incidence rates indicate that males had a higher ASR for liver cancer than females in all regions, with the highest ASR observed in Asia.

The observed regional differences in the ASRs could be attributed to variations in alcohol consumption patterns and other risk factors, including viral hepatitis and aflatoxin exposure. For instance, Asia has a high prevalence of chronic viral hepatitis B infection [35,36], which is a well-known risk factor for liver cancer. In contrast, Africa, Latin America and the Caribbean have lower age-standardized rates (ASR), reflecting the relatively low alcohol consumption and distinct risk factor profiles in these regions.

The findings of the study suggest a significant association between alcohol consumption and oesophageal cancer, with higher ASRs observed in regions with higher levels of alcohol consumption. The highest ASRs were observed in Asia for both sexes, with males having a significantly higher ASR than females. Europe and Africa also had high ASRs, with males having higher rates than females. In contrast, Latin America and the Caribbean, Oceania, and North America had lower ASRs, which were attributed to lower levels of alcohol consumption in these regions. The study highlights the need for public health interventions to reduce alcohol consumption, particularly in regions with high ASRs for oesophageal cancer. These interventions could include increasing public awareness about the risks of heavy alcohol consumption and implementing policies to restrict access to alcohol. Additionally, efforts should be made to improve early detection and treatment of oesophageal cancer, particularly in regions with high ASRs. Overall, the findings of this study have important implications for cancer prevention and control efforts, particularly in regions with high levels of alcohol consumption.

A notable strength of this study is its large sample size, which includes data from different continents around the world. Furthermore, standardized methods for data collection and analysis were used in this study, which improved the reliability and comparability of the results obtained.

Nevertheless, this study has certain limitations. Using cancer registries as a primary data source can introduce potential biases as these registries may not fully represent the population of a country or region as a whole. Additionally, we only include data for selected countries and regions, so care should be taken when generalizing results to other geographic regions. In conclusion, it is important to note that this study focused only on morbidity and did not consider other important factors such as mortality or survival. This may lead to a more comprehensive understanding of the impact of cancer in the studied population. Overall, the study provides valuable insights into the association between alcohol consumption and cancer risk, highlighting the importance of implementing effective cancer prevention and screening programs in regions with high cancer incidence rates. The results of this study could be useful for developing targeted strategies for cancer prevention and treatment based on continent-wise and gender-wise differences in cancer incidence rates.

Conclusion

In conclusion, alcohol consumption is strongly linked with an increased risk of various types of cancers, and the incidence rates of alcohol-related cancers vary significantly by region. The highest rates are observed in Europe and Oceania, while the lowest rates are seen in Africa. The study has also shown that colon and colorectal cancer are more prevalent in Europe and Oceania, and alcohol consumption is linked to an increased risk of both types of cancer in these regions. Additionally, men are generally more likely to develop alcohol-related cancers than women, but this risk varies by cancer type and region. Therefore, reducing alcohol consumption may reduce the incidence of alcohol-related cancers, especially in regions where such cancers are increasing. These results highlight the importance of public health efforts aimed at reducing alcohol consumption as a means of reducing the burden of alcohol-related cancers globally.

Consent for Publication

All authors have given consent for publication.

Authors Contribution

Muhammad Usman Rashid: Conceptualization, Original Drafting, Visualization, Writing - Review & Editing. **Farhana Badar**: Original Drafting, Visualization; Shahid Mahmood: Writing - Review & Editing.

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