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Distribution of Cancer of the Stomach and Cancer of the Rectum in Jamaica 2008

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ABSTRACT

Objective: To determine the distribution of cancer of the stomach and cancer of the rectum in Jamaica 2008.
Methods: The study included all 14 parishes. Data was obtained from the Jamaica Cancer Registry located in the Pathology Department of the University of the West Indies. Population denominators were obtained from the 2011 census taken by the Statistical Institute of Jamaica. The statistical package which was used to analyze the data was SPSS.
Results: The highest frequencies of cancer of the stomach in 2008 occurred in the age group 50 years to 54 years and 65 years to 69 years. The mean age at which cancer of the stomach was diagnosed in 2008 was 64.6 years. Based upon the Crude Incidence Rate (CIR), the probability of developing gastric cancer (GC) was greater in men than women (male/female ratio, 1.73). The distribution of cancer of the stomach across all parishes in Jamaica 2008 was investigated using the CIR. The highest probability of developing cancer of the stomach would be for someone residing in Kingston and St. Andrew (5.1), then St. Catherine (4.6), Clarendon (4.1), St. Mary (2.6), St. Ann (2.3), St. Elizabeth (2.0), Manchester (1.1) and St. Thomas (1.1). In the case of cancer of the rectum, onset began in the 35 years to 39 years group it then peaked within the 75 years to 79 years group. Cases of cancer of the rectum decreased from 80 years onwards. The mean age at which cancer of the rectum was diagnosed was 70.6 years. Based upon the CIR, the probability of developing cancer of the rectum was greater in men than women, (male/female ratio, 1.33) The CIR was used to determine the probability of developing cancer of the rectum across all parishes in Jamaica 2008. The highest probability of developing cancer of the rectum occurred in Kingston and St. Andrew (4.4), then Portland (3.7), St. Thomas (2.1), St. Catherine (1.5), Trelawny (1.3), Clarendon (0.8), St. Elizabeth (0.7), St. Ann (0.6) and Manchester (0.5).
Conclusion: In mitigating cancer, it is important to study the onset, the age groups affected as well as gender. It is also important to look at geographical locations to see the probability of developing a particular type of cancer. Once this is done, then appropriate screening and lifestyle changes should be promoted by the various health administrators.

Keywords: Cancer; Registry; Crude incidence rate; Probability; Environmental factors; Gender; Helicobacter Pylori; Genetics; Onset; Sanitation; Parishes

INTRODUCTION

Since the inception of the Jamaica Cancer Registry in 1958 the incidence of cancer in Jamaica has been monitored by reports being produced regularly [1]. These reports are based upon the incidence of cancer in males and females in Kingston and St. Andrew which forms the population base of the registry [1,2]. Gibson et al. (2008) determined the Crude Incidence Rate (CIR) for cancer of the stomach for males and females in Kingston and St. Andrew for the period 1998 to 2002 [1]. In the case

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of males the CIR was determined to be 7.6 and in the case of females it was 4.7. They also determined the CIR for cancer of the rectum during the same time period from 1998 to 2002. In the case of males the CIR was determined to be 3, however the CIR for females was 3.5. This present study has been undertaken to investigate the distribution of cancer of the stomach and cancer of the rectum across all fourteen parishes in Jamaica in the year 2008.

METHODS

Study Population

This research project consists of persons from all parishes in Jamaica. A map of Jamaica is shown in **Figure 1** [3]. Data was obtained from the Jamaica Cancer Registry located in the Pathology Department of the University of the West Indies. The methodology of the registry has been previously stated [4,5]. Cases are registered from information gleaned from public and private hospitals and general practitioners in Kingston and St. Andrew then verified by pathologists at Jamaica Cancer Registry in accordance with standard techniques of registration [6].

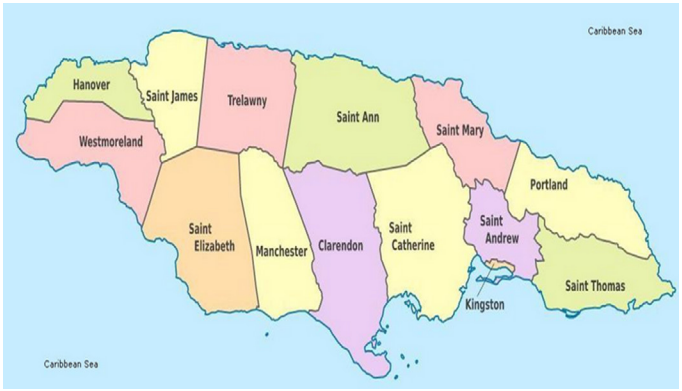

Figure 1: Map of Jamaica showing all the parishes

Data Extraction

Variables that were obtained from the Jamaica Cancer Registry included cancer code, date of diagnosis, age at diagnosis, permanent residence, parish of birth, diagnosis, gender, smoker, source of case and date of death. The codes used for classification of the various types of cancers were cross-checked using the 10th edition of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) [7]. Population denominators were obtained from the 2011 census taken by the Statistical Institute of Jamaica, Kingston, Jamaica [8].

Statistical Analysis

The statistical package which was used to analyze the collected data was SPSS and Microsoft excel. The data was initially stored in an excel database. The crude incidence rate (CIR) was also determined. It was calculated by dividing the total number of cases of cancer diagnosed in a specific population by the size of the population and then multiplying the result by 100000 [1,2].

RESULTS AND DISCUSSION

When **Table 1** was examined, the highest frequency of cancer of the stomach in Jamaica 2008 occurred in the age groups 50 years to 54 years and 65 years to 69 years. The mean age at which cancer of the stomach was diagnosed in 2008 was 64.6 years. Karimi et al. (2014) stated that the incidence rate of gastric cancer (GC) increased with age [9]. In **Table 1**, this can be observed and after 89 years the cases of GC drastically fell. In **Table 1**, the data shown when both genders were considered was expressed in the form of a histogram shown in **Figure 2**. This data was negatively skewed, having a value of -0.34. In 2008 the CIR for cancer of the stomach in men was 3.8, however in the case of women the CIR was 2.2. Hence the probability of developing GC was greater in men than women (male/female ratio, 1.73). Gibson et al. (2010) only investigated GC in Kingston and St. Andrew during the period 2003 to 2007. They obtained a CIR of 6.6 for men and in the case of women it was determined to be 4.2, (male/female ratio, 1.57) [2]. Brown and Devesa (2002) also determined that males have a higher risk of developing GC compared to females [10]. Freedman et al. (2010) stated that elevated rates of GC in men persist even in countries where men and women have similar smoking patterns [11]. In this present study no smokers were recorded of the 81 cases. Karimi et al. (2014) declared that estrogens may protect against the development of GC. The International Agency for Research on Cancer (IARC) concluded that there was enough evidence of causality between smoking and cancer of the stomach (GC) [12]. Karimi et al. (2014) stated the following risk factors for developing GC, were older age, male sex, tobacco smoking, radiation and family history. Yaghoobi et al. (2010) stated that the most important environmental risk factor for developing GC is infection with Helicobacter Pylori [13]. Jakszyn andGonzález (2006) and Tsugane and Sasazuki (2007) suggested dietary risk factors such as increased intake of nitrites, nitrosamines, salted foods and a low intake of fruits and vegetables [14,15]. Hartgrink et al. (2009) suggested the following strategies to reduce cases of cancer of the stomach, improve sanitation, high intake of fresh fruits and vegetables, safe food preservation methods and avoidance of smoking [16]. The distribution of cancer of the stomach across all parishes in Jamaica was investigated using the CIR. Based on **Table 2**, the highest probability of developing GC would occur for someone residing in Kingston and St. Andrew (5.1), then St. Catherine (4.6), Clarendon (4.1), St. Mary (2.6), St. Ann (2.3), St. Elizabeth (2.0), Manchester (1.1) and St. Thomas (1.1). Yaghoobi et al. (2010) stated that both environmental and genetic factors have causative roles in the development of GC. Hence this can explain the variation in the CIR across the different parishes in Jamaica since the CIR is an expression of the probability of developing GC. It should be emphasized that the environmental factors would be dependent on your socioeconomic status as well as the conditions at work or home.

In **Table 3**, the age distribution of cancer of the rectum is displayed. Onset began in the 35 years to 39 years; it then peaks within the 75 years to 79 years. Cases of cancer of the rectum decreased from 80 years onwards. The mean age at which cancer of the rectum was diagnosed, was 70.6 years in 2008. Draganov and Dyson (2009) declared that cancer of the rectum appears to affect individuals between the ages of 39 to 93 years and the mean age being 57 years [17]. In Table 3, the data displayed when both genders were combined was expressed in the form of a histogram. This is shown in **Figure 3**. This data was negatively skewed, having a skewness of -0.39. This is to

be expected as most cases were diagnosed later in life. In 2008 more males developed cancer of the rectum than females. In the case of males the CIR was 2.0 and in the case of females the CIR was 1.5, hence the prevalence in males (male/female ratio, 1.33). Gibson et al. (2010) investigated cancer of the rectum in Kingston and St. Andrew during the period 2003 to 2007. They obtained a CIR of 4.3 for males and a CIR of 4.3 for females, (male/female ratio, 1.00). Purim et al. declared cancer of the rectum is more dominant in males than females [18]. There is a common worldwide trend of higher incidence rate in men of cancer of the rectum than in women [19-21]. Larson and Wolk reported that obesity to be a major risk factor for rectal cancer in men and to a lesser extent in women [22]. The CIR was used to determine the probability of developing cancer of the rectum across all parishes in Jamaica. Kingston and St. Andrew were treated as one as they are so interwoven. The results are displayed in **Table 4**. From this table we can see that the highest probability of developing cancer of the rectum would occur in Kingston and St. Andrew (4.4), then Portland (3.7), St. Thomas (2.1), St. Catherine (1.5), Trelawny (1.3), Clarendon (0.8), St. Elizabeth (0.7), St. Ann (0.6) and Manchester (0.5). It is very likely that environmental factors and genetics have affected the results obtained.

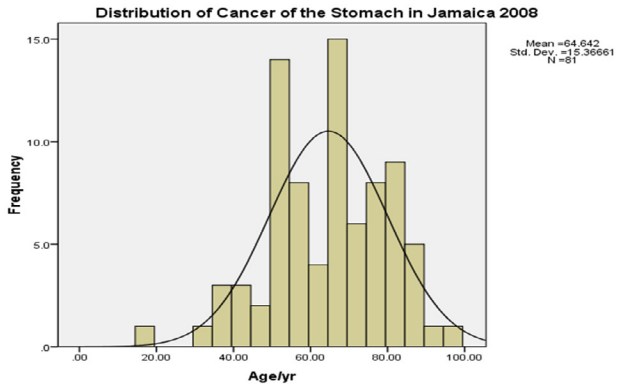

Figure 2: Histogram showing the distribution of cancer of the stomach in Jamaica 2008

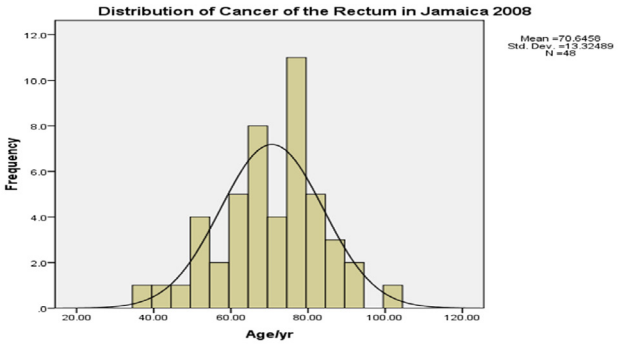

Figure 3: Histogram showing the distribution of cancer of the rectum in Jamaica 2008

LIMITATIONS

In 2008 and earlier there were two major cancer treatment centres in Jamaica for the public. These were Kingston Public hospital in Kingston and Cornwall Regional hospital in St. James. The machines they had at that time were cobalt machines. Hence many cases would be referred to Kingston Public hospital from other parishes or to Cornwall Regional hospital. This would depend on the proximity and the accessibility, meaning the length of the waiting list. Staff at the Jamaica Cancer Registry only gets data from hospitals and private sources in Kingston and St. Andrew Jamaica. Hence some patients from the western end of the island such as the parishes of St. James, Westmoreland, Trelawny and Hanover would not be recorded based upon the present practise. Hence these would contribute to errors in the data from parishes in those regions of the island. In Kingston at that period there was the Radiation Oncology Centre of Jamaica which was established in 2001. This is a private centre for the treatment of cancer. Hence the limitation here would be your socioeconomic status. There would also be persons who would seek alternative ways to treat their cancer.

Table 1: Frequency table showing grouped data of persons diagnosed with Cancer of the Stomach in Jamaica 2008

Age/yr	Frequency		
	Both Genders	Male	Female
0–4	0	0	0
5-9	0	0	0
10-14	0	0	0
15-19	1	1	0
20-24	0	0	0
25-29	0	0	0
30-34	1	1	0
35-39	3	1	2
40-44	3	1	2
45-49	2	2	0
50-54	14	9	5
55-59	8	7	1
60-64	4	1	3
65-69	15	11	4
70-74	6	5	1
75-79	8	3	5
80-84	9	7	2
85-89	5	2	3
90-94	1	0	1
95+	1	0	1
TOTAL (N)	81	51	30

Table 2: Comparing the crude incidence rate of cancer of the stomach for all parishes in Jamaica 2008

Parish	Cancer Cases	Population Size	Crude Incidence Rate
Kingston and St. Andrew	34	662426	5.1
St. Catherine	24	516218	4.6
Clarendon	10	245103	4.1
St. Mary	3	113615	2.6
St. Ann	4	172362	2.3
St. Elizabeth	3	150205	2.0
Manchester	2	189797	1.1
St. Thomas	1	93902	1.1
Portland	0	81744	0
Westmoreland	0	144103	0
Trelawny	0	75164	0
Hanover	0	69533	0
St. James	0	183811	0

Table 3: Frequency table showing grouped data of persons diagnosed with Cancer of the Rectum in Jamaica 2008

Age/yr	Frequency		
	Both Genders	Male	Female
0-4	0	0	0
5 –9	0	0	0
10-14	0	0	0
15-19	0	0	0
20-24	0	0	0
25-29	0	0	0
30-34	0	0	0
35-39	1	0	2
40-44	1	0	2
45-49	1	0	0
50-54	4	3	5
55-59	2	2	1
60-64	5	3	3
65-69	8	4	4
70-74	4	2	1
75-79	11	8	5
80-84	5	2	2
85 – 89	3	1	2
90 – 94	2	1	1
95+	1	1	0
TOTAL (N)	48	27	21

Table 4: Comparing the crude incidence rate of cancer of the rectum for all Parishes in Jamaica 2008

Parish	Cancer Cases	Population Size	Crude Incidence Rate
Kingston and St. Andrew	29	662426	4.4
Portland	3	81744	3.7
St. Thomas	2	93902	2.1
St. Catherine	8	516218	1.5
Trelawny	1	75164	1.3
Clarendon	2	245103	0.8
St. Elizabeth	1	150205	0.7
St. Ann	1	172362	0.6
Manchester	1	189797	0.5
Westmoreland	0	144103	0
St. James	0	183811	0
St. Mary	0	113615	0
Hanover	0	69533	0

CONCLUSION

This study has revealed that in Jamaica 2008 men were more prone to developing cancer of the stomach as well as cancer of the rectum than women. This is however in agreement with the worldwide trend. To mitigate the financial burden associated with cancers it is important that screening is done as early as 35 years and healthy lifestyle be promoted. Healthy lifestyle such as improve sanitation, high intake of fresh fruits and vegetables, safe food preservation methods, avoidance of smoking as well as exercise.

DATA AVAILABILITY STATEMENT

The data used were not available online and permission granted is in the document attached.

CONFLICTS OF INTEREST

None

FUNDING

None

ETHICAL APPROVAL

Ethical approval was not requested because data was treated anonymously.

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