TURKISH JOURNAL of ONCOLOGY

Turk J Oncol 2024;39(1):100–106
doi: 10.5505/tjo.2023.4049

ORIGINAL ARTICLE

Analysis of Cancer Cases Presented in The National Tumor Board of Bahrain Between 2016 and 2020

Hala KALAJI,[1] Farina SHABBIR,[2] Karine FADEL,[3] Elias FADEL,[4] Huseyin ABALI,[5]

[1]Department of National Tumor Board Medical, Bahrain Oncology Center, Al Sayh-*Bahrain*
[2]Department of Quality and Patient Safety, Bahrain Oncology Center, Al Sayh-*Bahrain*
[3]Department of Gastroenterology, Foundation Year 2 House Officer, Norfolk & Norwich University Hospital, East Anglia Deanery, Cringleford-*United Kingdom*
[4]Department of Bahrain Oncology Center & The National Tumor Board, Bahrain Oncology Center, *Bahrain*
[5]Department of Head of Medical Oncology, Bahrain Oncology Center, Al Sayh-*Bahrain*

OBJECTIVE

The Bahrain National Tumor Board (NTB) was established by a decree issued by the Bahrain Supreme Health Council. Cancer cases are regularly referred to the NTB from all health facilities across the Kingdom. Our aim is to investigate the epidemiological trends of cancer in Bahrain during the period between 2016 and 2020.

METHODS

We reviewed the NTB data collected between February 2016 and February 2020. All the cancer cases submitted to the NTB Office from private and public hospitals in Bahrain from 1 February 2016 to 29 February 2020 were collected.

RESULTS

A total of 2,061 cancer cases were recorded. The median age at diagnosis was 56 years. Of the 2,061 cancer cases, 1,367 (66.4%) were female and 694 (33.6%) were male. Our study only considered solid tumor cases, which were 2,024 from the initial 2,061 cases. Among the 2,024 solid tumor cases, the top 5 cancers were breast (37.1%), colorectal (11.8%), thyroid (6.5%), prostate (5.9%), and head & neck (4.8%). In males, the top 5 cancers were colorectal (19.2%), prostate (17.3%), head & neck (10.1%), urinary bladder (7.2%), and lung (6.6%). In females, they were breast (55.2%), colorectal (8.0%), thyroid (7.3%), uterine (6.2%), and ovarian (3.22%) cancers. In the 1,173 cases with recorded stage, 44 (3.8%) were at stage 0, 198 (16.9%) at stage I, 347 (29.6%) at stage II, 299 (25.5%) at stage III, and 285 (24.1%) at stage IV.

CONCLUSION

The frequency distribution of cancer in the Kingdom of Bahrain differs from the rest of the world, with much higher percentages of breast and thyroid cancer, and fewer lung cancers in our study. They also present at late stages. We believe that we need to focus on prevention and early detection of cancer in Bahrain.

Keywords: Bahrain; cancer; frequency; national tumor board; solid tumors; stage.

Received: May 06, 2023
Revised: July 25, 2023
Accepted: November 16, 2023
Online: December 11, 2023

Accessible online at:
www.onkder.org

Dr. Hala KALAJI
Department of National Tumor Board Medical,
Bahrain Oncology Center,
Al Sayh-Bahrain
E-mail: hk13311@rcsi.com

INTRODUCTION

Cancer is defined as the abnormal division of cells beyond control, resulting in the invasion of nearby and distant tissues.[1] Globally, it is a leading cause of death after cardiovascular diseases, responsible for 10 million deaths in 2020.[2] The International Agency for Research on Cancer (IARC) estimates that globally 1 in 5 people develop cancer during their lifetime.[2]

According to IARC, in 2020, there were 19,292,789 new cases worldwide, and 9,958,133 of them died of cancer.[2] Breast cancer is the most frequent cancer (11.7%), followed by lung (11.4%), colorectal (10.0%), prostate (7.3%), and stomach (5.6%) in both genders worldwide.[2]

Bahrain is a 717.5 km² archipelago of 33 islands off the western shores of the Arabian Gulf. With an estimated population of 1.7 million people, it was reported as the third most densely populated country in the world in 2020.[3] Overall, the population of Bahrain comprises 52.6% expatriates and 47.4% local citizens.

In 1994, a Ministerial Decree mandated the notification of all cancer cases to the Bahrain Cancer Registry (BCR) at the Ministry of Health.[4] In 2007, a cancer statistic based on 2,405 cases from 1998 to 2002 was published.[5] In this publication, the age-standardized incidence rates (ASR) were 162.3 and 145.2 per 100,000 for Bahraini males and females, respectively. Generally, Bahraini men had a higher ASR for most cancer types, and the most common type of cancer in males was lung (35.2 per 100,000), followed by bladder (14.5 per 100,000) and prostate (14.3 per 100,000) while in females it was breast (46.8 per 100,000), followed by lung (12.2 per 100,000) and ovarian (7.7 per 100,000).[5] Furthermore, the Gulf Center for Cancer Control and Prevention published a report in 2011, where Bahrain was reported to be one of the three countries with the highest incidence in the Gulf.[6]

Earlier, cancer treatment was mainly carried out in the King Hamad University Hospital and Salmaniya Medical Complex. In February 2019, the 206-bed Bahrain Oncology Center (BOC) was inaugurated to provide comprehensive services in the domains of oncology, hematology, pediatric oncology, and hematopoietic stem cell transplantation. With the establishment of the Center, the standard of care and treatment modalities was significantly upgraded. Furthermore, the National Tumor Board (NTB) was started several years before the inauguration of the center, which became a national platform for healthcare professionals to discuss cancer cases diagnosed in the whole country and conduct in-depth case discussions, fulfilling its aim. The cases documented carefully within the National Tumor Board platform, now in a web-based system, from 2016 onwards are from all over the islands, presented from both public and private healthcare facilities. The cases discussed through the NTB represent the majority of the solid cancer cases in Bahrain and can be used as a database to conduct further research in the epidemiology of specific cancers in the future. This will ultimately provide evidence to quantify types of prevalent cancers, guide future research, cancer treatment, and resource allocation.

Our aim is to analyze cancer cases presented in the National Tumor Board in the Kingdom of Bahrain from 2016 to 2020.

MATERIALS AND METHODS

All the cancer cases submitted to the NTB Office from both private and public hospitals in Bahrain between 1 February 2016 and 29 February 2020 were collected and stored in a Microsoft Excel spreadsheet. This spreadsheet was then further upgraded to include key demographic, epidemiologic, and clinical parameters. Before starting the study, approvals from the Bahrain Oncology Center and King Hamad University Hospital Research and Ethics Committee (Approval number 20-354) were obtained. The collected data was reviewed by the researchers to ensure accuracy. Patients with hematological cancers were excluded from the final analysis, and only solid tumor cases were included. The patient charts with insufficient, deficient, or unreliable information were excluded. Staging was recorded in line with the American Joint Committee on Cancer (AJCC) TNM Staging Edition 8 wherever applicable. Missing data was labeled as unknown.

The Excel data analyzed was transferred to and analyzed using the Statistical Package for the Social Sciences (SPSS) software v28. Most of the data were presented as frequencies and ratios. Ratios were expressed as percentages (%).

RESULTS

Our data collection included 2,336 patients between February 2016 and February 2020. Out of these 2,336 patients, 2,061 were histopathologically proven malignant cases at presentation, 48 were benign cases, and 227 were suspicious of malignancy at presentation. Therefore, the results and discussion will be based on the data obtained from the 2,061 cases.

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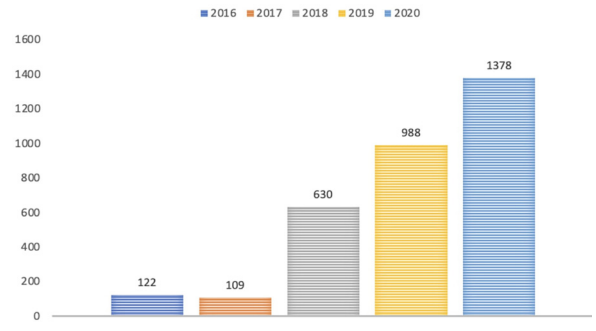

Fig. 1. Distribution of cancer diagnosis over the years. Note: Year 2020 cases were added only graphic puroses but not analyzed in database.

Of the 2,061 malignant cases discussed in the 4-year period, 122 were presented between February and December 2016, 109 in 2017, 630 in 2018, 988 in 2019, and 212 cases were presented in January and February 2020. Although we were not able to analyze the whole year 2020 cases, we added the total number of new cases discussed in the year 2020 to give a sense of the trend, exceptionally in Figure 1.

The median age of all the patients was 56 years (range: 2–95). There were 1,367 females (66.4%) and 694 males (33.6%) as shown in Figure 2.

In 1,989 cases, nationality was recorded. Of these, 1,768 (88.9%) were Bahraini and the remaining 221 (11.1%) were of other nationalities. Therefore, our data is more representative of Bahraini patients, rather than expatriates.

Of the 2,061 malignant cases, 2,024 (98.2%) were solid tumor malignancies. 129 cases were diagnosed prior to 2016, 142 cases in 2016, 200 cases in 2017, 481 cases in 2018, 792 cases in 2019, 81 cases between January and February 2020, and 199 cases did not have a documented date of diagnosis on file (Fig. 3).

Among the 2,024 solid tumor cases, the top 5 cancers were breast cancer (37.1%), colorectal cancer (11.8%), thyroid cancer (6.5%), prostate cancer (5.9%), and head & neck cancers (4.8%) in the whole patient population (Fig. 4). The frequencies of cancer per gender were variable. In 693 males, the top 5 cancers were colorectal (19.2%), prostate (17.3%), head & neck (10.1%), bladder (7.2%), and lung (6.6%). In 1,368 females, the top 5 cancers were breast (55.2%), colorectal (8.0%), thyroid (7.2%), uterine (6.7%), and ovarian (3.2%) as shown in Figure 4.

It was possible to determine the stage of disease in 1,173 solid tumor cases. 44 cases (3.8%) were stage 0, 198 cases (16.9%) were stage I, 347 cases (29.6%) were stage II, 299 cases (25.5%) were stage III, and 285 cases (24.1%) were stage IV (Fig. 5).

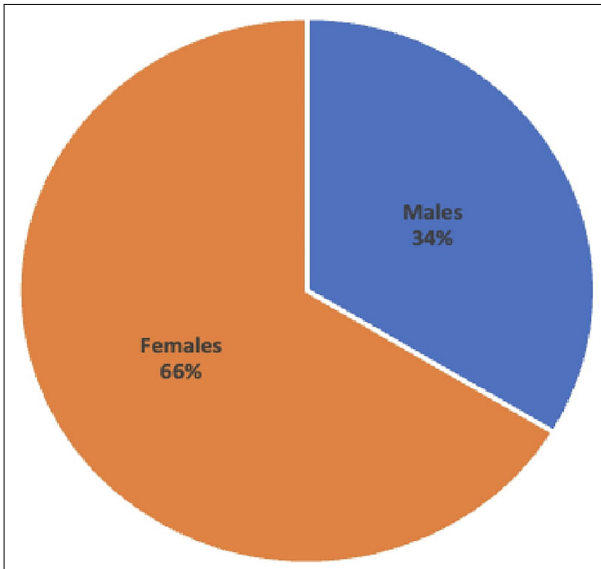

Fig. 2. Distribution of cancer in both sexes.

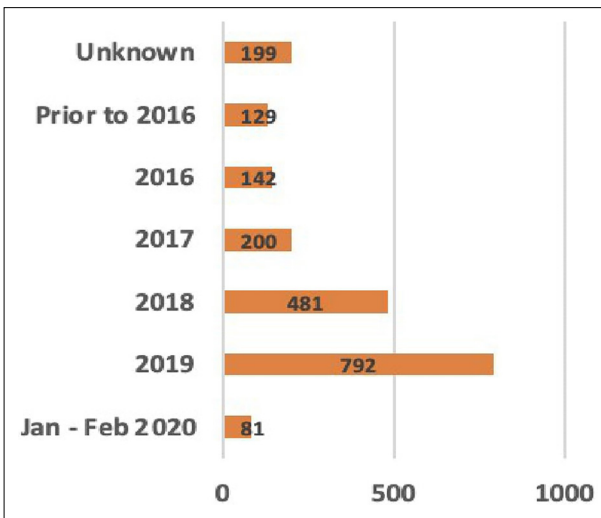

Fig. 3. Distribution of cancer diagnosis over the years.

Of the 2,061 malignant cases including hematological cancers, 41 (2.0%) cases had multiple primaries. In 1,078 patients, family history was recorded, among which 409 (19.8%) had a positive family history of cancer (Table 1).

DISCUSSION

After the establishment of the National Tumor Board in the Kingdom of Bahrain, this is the first publication

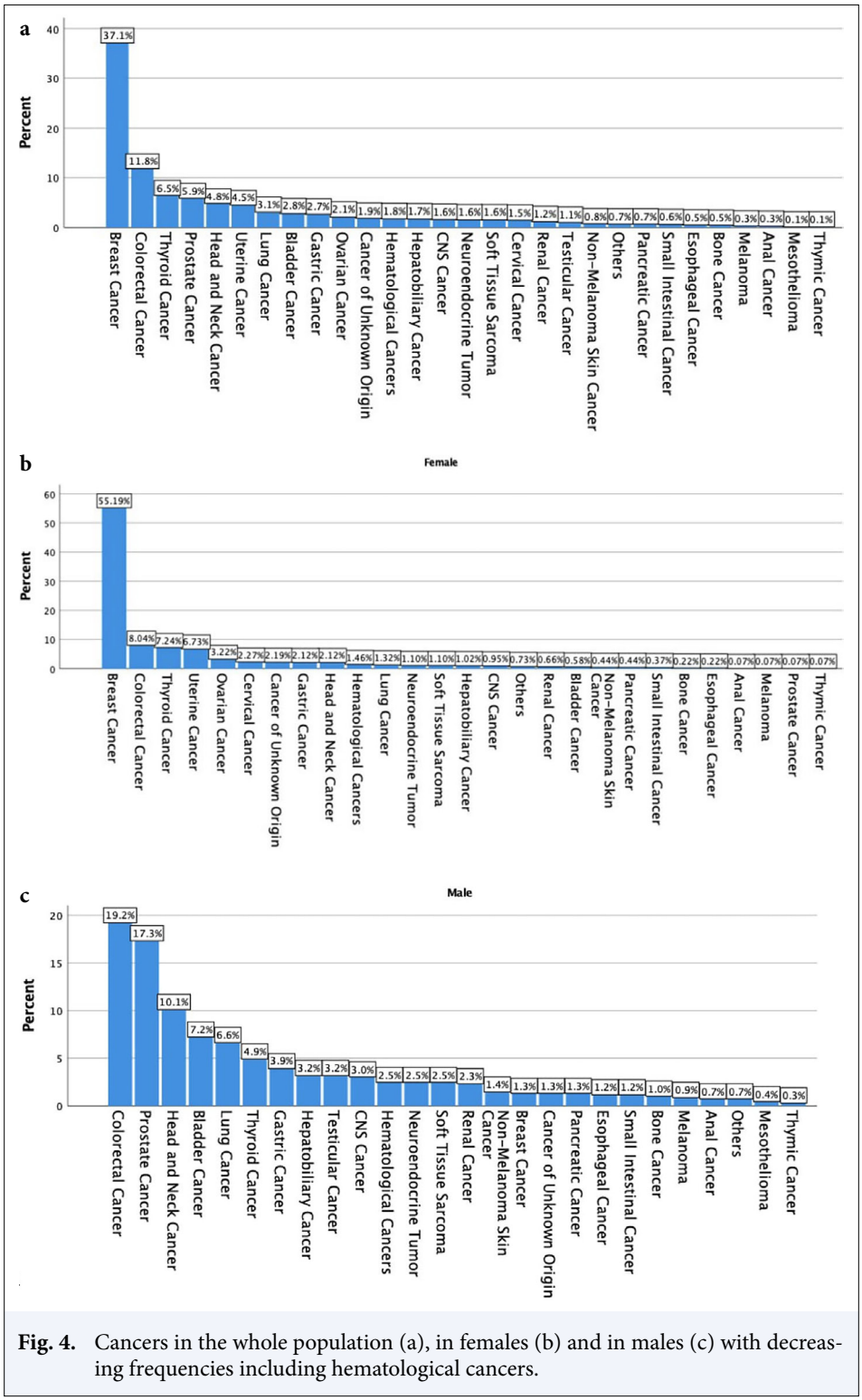

Fig. 4. Cancers in the whole population (a), in females (b) and in males (c) with decreasing frequencies including hematological cancers.

reporting specific patient demographics, types of cancers, their relative frequencies, and stage distribution. We studied 2,061 cases discussed in the National Tumor Board over a 4-year period. The median age was 56 years, and 66.4% were females. The top 5 cancers were breast (37.1%), colorectal (11.8%), thyroid (6.5%), prostate (5.9%), and head & neck (4.8%) in both genders. In males, the top 5 were colorectal (19.2%), prostate (17.3%), head

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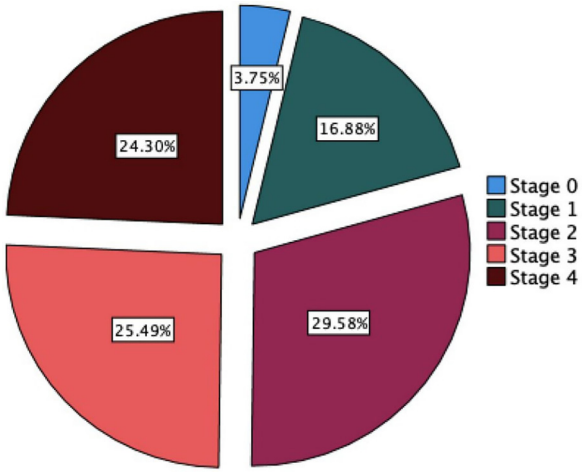

Fig. 5. Distribution of cancer by stages at diagnosis, N=1173.

Table 1 Key parameters of patients analyzed

Category	Total	%
Total discussed	2.336	100
Suspicion for malignancy	227	9.7
Benign	48	2.1
Malignant cases	2.061	88.2
Hematological cancers	37	–
Median age (years, min-max)	56	(2–95)
Gender		
Female	1.367	66.4
Male	694	33.6
Nationality (N=1.989)		
Bahraini	1.768	88.9
Non-bahraini	221	11.1
Patients with multiple primaries	41	1.8
Family history of cancer (N=1.078)	409	19.8

This table summarizes the key parameters of the patients analyzed in the study

& neck cancers (10.1%), bladder (7.2%), and lung (6.6%); whereas in females, they were breast (55.2%), colorectal (8.0%), thyroid (7.2%), uterine (6.7%), and ovarian (3.2%). Around 50% were in advanced stages of III or IV. The number of new cases in 2019 was almost 1,000, and it was 1,378 in the year 2020 (personal communication with NTB). Although our data does not come from a cancer registry, it provides valuable information on statistics, since the majority of cases diagnosed in Bahrain are discussed in the National Tumor Board where the data are recorded in a structured fashion.

According to the International Agency for Research on Cancer (IARC) in 2020,[2,7] breast cancer was the most frequent cancer (11.7%) followed by lung (11.4%), colorectal (10.0%), prostate (7.3%), and stomach cancer (5.6%) in both sexes.[2,7] In males, the most frequent cancer is lung cancer (14.3%), followed by prostate (14.1%), colorectal (10.6%), stomach (7.1%), and liver cancers (6.3%). In females, the most frequent cancer is breast cancer (24.5%), followed by colorectal (9.4%), lung (8.4%), cervical (6.5%), and thyroid cancer (4.9%).[2,7] In Bahrain in 2020, according to the IARC fact sheet, there were 1,215 new cases in a population of 1,701,583.[8] The data was taken from the Bahrain National Cancer Registry. In both genders, the top 5 cancers were breast (20.0%), colorectal (12.1%), lung (7.9%), non-Hodgkin's lymphoma (5.8%), and leukemia (4.6%).[7] In males, they were colorectal (14.5%), lung (11.4%), prostate (8.9%), non-Hodgkin lymphoma (7.9%), and bladder (7.7%). In females, they were breast cancer (37.9%), colorectal (10%), ovary (5.9%), uterine (5.5%), and lung (4.8%).[7]

In one study published from Bahrain, where 2,405 cases were analyzed from 1998 to 2002,[5] the annual average number of cases was 481, and the age-standardized incidence rates (ASR) for Bahraini males and females were 162.3 and 145.2 per 100,000, respectively. The most common type of cancer was lung for males (35.2 per 100,000), followed by bladder (14.5) and prostate (14.3), and breast for females (46.8), followed by lung (12.2) and ovarian (7.7). In another report on GCC (Gulf Cooperation Council) Countries,[6] where 4,212 cases were reported from 1998 to 2007 from Bahrain, the ASR was 158.5 per 100,000 for both males and females, much higher than the reported 79.3 for all GCC countries. In this report, the top five cancers in males were lung (17.8%), colorectal (8.8%), prostate (8.2%), bladder (7.9%), and leukemia (6.3%), and in females; breast (37%), colorectal (6.1%), lung (5.7%), thyroid (5.7%), and ovarian (4.8%).

The previously reported annual number of cases in Bahrain was around 500,[5,6] but in our data, the discussed number of cases per year was almost 1,000 in 2019 and 1,378 in 2020 (personal communication with NTB) as shown in Figure 1. Although our data is not epidemiological, it comes from a national body where the majority of cases are discussed. In Figure 1, we see that the number of cases increases over time, which is a reflection of the increasing percentage of cases discussed in NTB. We assume that the contribution coming from a true increase must be much less, but it is from the fact that more of the newly diagnosed cases have been discussed in NTB over the years. We believe that our data is a better representa-

tion of the current situation. It strongly suggests that the incidence rate is higher than previous estimations. The possible reasons could be under-reporting during the previous studies, different reporting methods, and a possible increase in cancer incidence. Many Bahraini patients were treated abroad previously, while nowadays fewer patients are opting for treatment abroad after the establishment of the Bahrain Oncology Center. It was possible that those patients getting diagnoses and treatment abroad were not captured in the Bahrain Cancer Registry and GCC report.

In our data, the GCC report, and the Bahrain cancer registry, the percentage of breast cancer was much higher than the rest of the world, reaching up to 37.9–55% in females, compared to 24.5% in the rest of the world. Another interesting finding in our data is that thyroid cancer is the 3rd most frequent cancer in both genders, whereas it is not in the top 5 list in the world and IARC data in Bahrain. Uterine cancer was the 5th most frequent cancer in females in our data.

In Bahrain, lung cancer was one of the least frequent cancers in our data, which does not match with previous publications,[5,6] compared to the world where it is the 2nd most common in the whole population and the most common in males. This is noteworthy and perhaps requires further attention and explanation.

The difference from the rest of the world is difficult to explain. One important factor to consider could be the differing methodologies, as our data is not from a registry. However, it is expected to match a registry, since the majority of cases are discussed in the National Tumor Board, and we believe that we cover 70–95% of cases diagnosed. Looking at Saudi Arabia, which is very close to Bahrain and culturally similar, lung cancer (12.2%) is the most common, followed by breast (11.4%), colorectal (10.2%), stomach (6.6%), and prostate (6.2%) in the whole population, whereas in females, breast cancer was the most common with a frequency of 24%, and in males, the most common cancer was lung cancer (15.4%).[7] In Qatar, the pattern was similar to Saudi Arabia.[7] One explanation might be the population structure. Although 52.6% of 1.64 million people are expatriates, only 14% of cases discussed were of other nationalities in our data, while 85.8% of the cases discussed were Bahraini nationals, which accounts for 1,768 cases out of a population of 777,360 (0.23%). This likely reflects the fact that expatriates tend to return to their home countries to receive a diagnosis or start treatment for several reasons, including but not limited to, avoiding the cost of treatment in Bahrain, being near family and loved ones, etc. Likewise, IARC uses the whole population of Bahrain while making estimations, which might not reflect what is happening in Bahrain. Furthermore, Bahrain is a country of islands, naturally restricting population movements. This might have created the difference through the accumulation of certain genetic factors. Marriage among relatives is a common practice as well. Factors like obesity, sedentary lifestyle, diet patterns, smoking patterns, or differences in data capture methods might explain the difference. As per the Global Obesity Observatory, obesity among women is 42% and the category of overweight is around 70% in Bahrain,[9] while smoking seems to be less prevalent in Bahrain (28% in males, 6% in females) compared to the average in the world (36.7% of all men and 7.8% of the world's women).[10]

We also analyzed the stage at presentation. It was available in 63% of the cases. Of the patients staged, 25.5% were at stage III, and 24.1% at stage IV (Fig. 5), indicating that 50% of the patients were diagnosed at an advanced stage, in contrast to the United States of America, where most patients are diagnosed at early stages.[11] This could be explained by many factors, from cultural to religious to healthcare system. Whatever the reason, it highlights the need for a nationwide intervention, from education to awareness and to screening programs.

Similarly, only 20% of the cases had a recorded family history, despite the strong prevalence of cancer on the island.

CONCLUSION

In this study, the number of cases, more than 2,000, is high enough to draw conclusions. It covers the great majority of cases diagnosed in Bahrain. Therefore, its results help us understand some fundamental parameters pertaining to cancer in Bahrain. It reveals some unique features. However, it must be kept in mind that this is not a formal registry.

In conclusion, our study shows that the National Tumor Board is becoming increasingly pivotal. The frequency distribution of cancer may differ from the rest of the world, with a much higher number of cases of breast and thyroid cancers, and fewer lung cancers. The cases are presenting at late stages. We believe that there is a need to focus on prevention and early detection of cancer in Bahrain.

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doi: 10.5505/tjo.2023.4049

Acknowledgment: The authors would like to acknowledge the commendable efforts of Dr. Yusuf Alawadhi.

Peer-review: Externally peer-reviewed.

Conflict of Interest: All authors declared no conflict of interest.

Ethics Committee Approval: The study was approved by the Bahrain Oncology Center and King Hamad University Hospital Institutional Review Board (no: 20-354, date: 21/07/2020).

Financial Support: None declared.

REFERENCES

1. National Cancer Institute. What is cancer? Available at: https://www.cancer.gov/about-cancer/understanding/what-is-cancer. Accessed Oct 4, 2022.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2021;71(3):209–49.
3. World Population Review. 2022 World population review by countries by population density - countries by density 2022. Available at: https://worldpopulationreview.com/country-rankings/countries-by-density. Accessed Oct 4, 2022.
4. Kingdom of Bahrain Ministry of Health. Notification of cancer to the cancer registry office. Ministerial Decree No.5, 1994. Manama: Kingdom of Bahrain Ministry of Health; 1994.
5. Alsayyad J, Hamadeh R. Cancer incidence among the Bahraini population: A five-year (1998-2002) experience. Ann Saudi Med 2007;27(4):251–8.
6. Al Madouj AN, Eldali A, Al Zahrani AS. 10 Year cancer incidence among nationals of GCC states 1998-2007. Available at: https://www.moh.gov.bh/Content/Files/Publications/GCC%20Cancer%20Incidence%202011.pdf. Accessed Dec 27, 2022.
7. WHO. Global Cancer Observatory. Available at: https://gco.iarc.fr. Accessed Oct 5, 2022.
8. WHO Global Cancer Observatory. Bahrain Cancer Fact Sheet. Available at: https://gco.iarc.fr/today/data/factsheets/populations/48-bahrain-fact-sheets.pdf. Accessed Oct 5, 2022.
9. World Obesity Federation. Global Obesity Observatory. Available at: https://www.who.int/news-room/fact-sheets/detail/tobacco. Accessed Oct 5, 2022.
10. WHO. Tobacco Fact Sheet. Available at: https://www.who.int/news-room/fact-sheets/detail/tobacco. Accessed Apr 5, 2022.
11. Centers for Disease Control and Prevention. Incidence and relative survival by stage at diagnosis for common cancers. USCS Data Brief, no. 25, 2021. Available at: https://www.cdc.gov/cancer/uscs/pdf/USCS-DataBrief-No25-November2021-h.pdf. Accessed Oct 6, 2022.