Chapter 3
General Oncology Care in Bahrain

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3.1 Bahrain Demographics

The Kingdom of Bahrain is an island nation of about 800 sq km, the smallest among the Gulf Cooperative Council (GCC) region, rich in its culture and history. It has a population of about 1.56 million (according to the 2019 statistics). The native population is about 49% and Expatriates consist of 51% of the population. Bahrain has a universal health care system dating back to 1960 with all its citizens are provided with free health care by the government and to a certain extent subsidized to expatriates. With an average life expectancy of 77.7 years, (females 78.9 and males 76.9), The Kingdom of Bahrain has been ranked first in the Arab region as the healthiest country, and 36th in the world, among 169 countries around the world, based on various factors that reflect on health in general, and published by "Bloomberg" in a detailed report monitoring the health index globally in 2019 [1].

3.2 Cancer Statistics in Bahrain

The average annual crude cancer incidence rate is 86.3/100,000 for Bahraini males and 97.5/100,000 for Bahraini females (according to 2020 statistics). The average age-specific incidence rate of cancer is 136.4 and 135.8 per 100,000 Bahraini males and females, respectively, which is higher than GCC states and lower than Australia/New Zealand [2]. Lung cancer tops the list among males [3]. Breast, Lung, Colorectal, Bladder, and Prostate are the top five cancers among solid tumors;

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furthermore, Leukemias and lymphomas tops among the hematological malignancies. For females, breast cancer tops the list with an incidence of 53 per 100,000 population; it is second highest in the GCC only after Kuwait [4]. Lung cancer is the number one cause of death among males and breast cancer among females. The detailed list is given in Table 3.1 [5].

3.3 Oncology Care in Bahrain

Cancer treatment has been made available in the multi-specialty tertiary care hospital in the Ministry of Health facility at the Salmaniya Medical Complex (SMC), Manama, Bahrain since 1997, with a Radiotherapy unit. Subsequently, a chemotherapy unit and hemato-oncology services were added in 1999. General surgeons were offering the surgical management of solid tumors to a certain extent. Till then, the majority of the cases were referred for treatment abroad in Europe, the United States, India, and Singapore. After 2000, a greater number of Bahraini physicians got training abroad in oncological subspecialties including medical, radiation, and surgical oncology, and started treating cancer patients requiring multidisciplinary cancer care. Pediatric oncology and hemato-oncology services were available from 2000 onward. But most pediatric cancer patients were referred abroad for treatment till 2010. In early 2019, a new center was developed – Bahrain Oncology Center (BOC) on the premises of King Hammad university hospital (KHUH) with state-of-the-art equipment including the latest generation Linear accelerators, Brachytherapy, PET CT scans, PET MRI, and other Radio-nuclear pharmaceuticals. Apart from that, this facility also offers bone marrow/stem cell transplantation. From the diagnosis standpoint, most of the molecular testing is made available in this new facility [6]. No comprehensive cancer care facility is available in the private sector at present, but few multi-specialty hospitals provide surgical oncology, medical oncology services and palliative care. Bahraini citizens are treated free of charge, but expatriates are treated on payment to a certain extent for diagnostics and treatment in public hospitals.

3.4 Cancer Risk Factors

Cancer risk factors in Bahrain are similar to other GCC countries. Smoking is one of the most important risk factors, particularly among the young population. Obesity is another important risk factor; 33% of the Bahraini population is obese, particularly adolescents, which is one of the highest in the GCC. Due to consanguineous marriages, the prevalence of genetically transmitted cancers has been identified like BRCA 1 and 2. A government sponsored program of the genetic testing of all Bahraini citizens was started at the beginning of 2019 [7, 8].

Table 3.1 Incidence, mortality, and prevalence by cancer site in Bahrain 2018 (Source: Globocan 2020) [5]

	New cases				Deaths				5-year prevalence (all ages)	
Cancer	**Number**	**Rank**	**(%)**	**Cum.risk**	**Number**	**Rank**	**(%)**	**Cum.risk**	**Number**	**Prop.**
Breast	227	1	21.7	4.77	67	2	11.1	1.57	798	139.05
Lung	81	2	7.7	1.18	76	1	12.6	1.18	82	5.23
Colon	72	3	6.9	1.01	40	3	6.6	0.56	184	11.74
Non-Hodgkin lymphoma	61	4	5.8	0.88	23	11	3.8	0.44	181	11.55
Leukaemia	50	5	4.8	0.37	39	4	6.5	0.30	147	9.38
Bladder	47	6	4.5	0.68	25	9	4.1	0.34	142	9.06
Rectum	46	7	4.4	0.64	28	6	4.6	0.40	127	8.10
Prostate	39	8	3.7	1.16	14	13	2.3	0.30	124	12.49
Ovary	35	9	3.3	0.97	25	10	4.1	0.81	101	17.60
Thyroid	34	10	3.2	0.23	11	16	1.8	0.14	126	8.04
Brain, central nervous system	34	11	3.2	0.37	22	12	3.6	0.29	108	6.89
Liver	30	12	2.9	0.37	28	7	4.6	0.36	22	1.40
Pancreas	30	13	2.9	0.52	29	5	4.8	0.52	22	1.40
Stomach	30	14	2.9	0.39	27	8	4.5	0.39	48	3.06
Corpus uteri	29	15	2.8	0.58	8	22	1.3	0.16	97	16.90
Cervix uteri	19	16	1.8	0.46	12	15	2.0	0.37	59	10.28
Kidney	18	17	1.7	0.15	10	19	1.7	0.10	47	3.00
Lip, oral cavity	16	18	1.5	0.19	10	18	1.7	0.13	47	3.00
Multiple myeloma	13	19	1.2	0.14	12	14	2.0	0.13	35	2.23
Hodgkin lymphoma	13	20	1.2	0.08	4	25	0.66	0.04	52	3.32
Gallbladder	11	21	1.0	0.23	11	17	1.8	0.23	11	0.70
Larynx	10	22	0.95	0.16	8	21	1.3	0.14	30	1.91
Oesophagus	9	23	0.86	0.12	9	20	1.5	0.12	9	0.57
Testis	7	24	0.67	0.08	2	26	0.33	0.06	29	2.92
Nasopharynx	6	25	0.57	0.08	4	24	0.66	0.08	19	1.21
Mesothelioma	5	26	0.48	0.12	5	23	0.83	0.12	6	0.38
Anus	2	27	0.19	0.04	2	27	0.33	0.04	6	0.38
Vulva	1	28	0.10	0.02	1	28	0.17	0.02	4	0.70
Oropharynx	1	29	0.10	0.01	1	29	0.17	0.01	3	0.19
Melanoma of skin	1	30	0.10	0.01	1	30	0.17	0.01	3	0.19
Salivary glands	0	31	0	0	0	32	0	0	0	0
Kaposi sarcoma	0	32	0	0	0	33	0	0	0	0
Hypopharynx	0	33	0	0	0	34	0	0	0	0
Vagina	0	34	0	0	0	35	0	0	0	0
Penis	0	35	0	0	0	31	0	0	0	0
All cancer sites	1 048	-	-	11.49	603	-	-	7.82	2 828	180.47

3.5 Cancer Screening Programs

Cancer screening programs for breast and cervical cancers have been available for over a decade with mammography machines installed in some health centers in the country at primary care [9, 10]. PAP smear test is also available for women "at risk" in primary care. Prostate cancer screening is available in the tertiary care hospital at SMC for men at higher risk. Screening for colorectal cancer is also available at SMC.

3.6 Cancer Prevention Programs

Hepatitis B vaccination is undertaken at the primary care level. No vaccination program with HPV vaccine is available in public hospitals but it is optional and available in private hospitals [10].

3.7 Cancer Diagnosis

Imaging facilities of CT, MRI, Gamma cameras (scintillation cameras) are available in the tertiary care in SMC and at KHUH. PET/CT and PET/MRI are available only at KHUH. Organ-specific nuclear imaging is also available at KHUH. Laboratory Testing facility for Molecular testing, Cytogenetics and Genetic testing, e.g., KRAS, NRAS, BRAF, FISH, HER2, and hereditary cancer genetic tests are available at the tertiary hospitals of SMC and KHUH.

3.8 Treatment

3.8.1 Medical Oncology

Medical oncology and hemato-oncology departments in SMC and in BOC are active in providing treatment with cytotoxic chemotherapy and systemic treatment including immunotherapy, targeted therapy, and biological agents. Stem Cell Transplantation (autologous and allogeneic) facility is only available in BOC [11]. Medical oncology services are available in a few multi-specialty hospitals in the private sector. There are about 14 (3 Bahraini and all other expatriates) registered medical oncologists currently practicing in public and private hospitals [12].

3.8.2 Radiation Therapy

Currently, only one radiation oncology facility is functioning at BOC with four linear accelerators and one Gamma knife providing 3D, Intensity-Modulated Radiation Therapy (IMRT), Volumetric Modulated Arc Therapy (VMAT), Stereotactic Body Radiation Therapy (SBRT), and Stereotactic Radiosurgery (SRS) services. A dedicated brachytherapy unit is also functioning at the BOC. Currently, 12 registered radiation oncologists are practicing in public hospitals in BOC and SMC. None in the private sector.

3.8.3 Surgery

Many trained surgeons are providing services for specific cancers like breast cancers, gynecological cancers, thoracic, and head and neck cancers. Many of these qualified surgeons provide services in both public and private hospitals. Some of them are also offering laparoscopic and robotic surgeries (for radical prostatectomy). Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is currently not available in Bahrain.

3.8.4 Pediatric Oncology

Pediatric oncology services have been available in Salmaniya medical complex since the early 2000 and at BOC since 2019. Both the centers are providing comprehensive treatment for pediatric cancers.

3.8.5 Survivorship Track

Survivorship from cancer tracks is maintained with annual functions of the survivors by the government as well as by the Bahrain cancer society. Post-treatment surveillance is carried out on these patients and for long-time survivors. Screening and surveillance for second cancers is regularly undertaken for these cancer survivors.

3.8.6 Palliative Care Track

Palliative and best supportive care is available at Salmaniya medical complex and at BOC with palliative care physicians, counselors, dietitians, psychiatrists, pain management, and social support teams. Regular palliative care clinics provide

supportive care and pain management. Some of the patients are also provided with home care with the palliative team visiting the patient's residences. However, no hospice care center is available in Bahrain.

3.9 Research and Education

Currently, no oncology-related training programs are available in Bahrain. Bahraini doctors are sent abroad for specialized training in oncology. After obtaining the necessary qualification, these doctors typically work in public oncology facilities. Currently, both the oncology facilities are not involved in any international or national clinical trials. Regular national, regional international conferences and workshops are organized in Bahrain with public and private partnerships. There is a Bahrain Cancer Registry which is maintained by the Ministry of Health and cancer is a notifiable disease.

3.9.1 National Tumor Board (NTB)

The National Tumor Board (NTB) was established in early 2019 [13], where all cases of cancer, both from public and private hospitals are discussed for optimal multidisciplinary management. The meeting is organized twice a week at the BOC. Bahrain Cancer Society [14] was established in the late 1990s in the private sector, which organizes cancer awareness programs, educational events including organizing conferences, workshops, and other charitable programs in collaboration with the government oncology facilities.

There are few medical journals published from Bahrain. Bahrain Medical Bulletin is a popular medical journal in the country, but no specific oncological journal published. But every year few articles are published by Bahraini oncologists in national and international journals. Unfortunately, no basic research has been done so far on oncology in public hospitals.

3.10 Cost-Effective Cancer Care

Cancer treatment is expensive with the advent of new drugs and treatment modalities, it exhausts the health budget of the country [15]. Cancer care accounts for one-third of the health budget in Bahrain. To reduce the cost and to avoid human error, cases are discussed in the NTB for any change in the treatment modality following the current NCCN/NICE guidelines. Many generic molecules and biosimilars are incorporated into the pharmacy to cut short the cost of the treatment. Sometimes alternate therapies/molecules are used to reduce the financial burden.

3.11 Challenges and Advantages

Bahrain too comes across specific challenges in cancer care, particularly for the human resources of trained and qualified personnel [16]. The majority of the medical and radiation oncologists are expatriates, as few locals show interest in these challenging branches of oncology for training. Due to the social milieu, and taboo sometimes, patients' acceptance of a particular treatment modality is a daunting task. Many patients consult at an advanced stage of the disease when treatment is purely palliative. There is a considerable need for a greater number of facilities for palliative and supportive care, particularly a good hospice is the need of the hour as there are large numbers of terminally ill cancer patients.

The advantage is that the country is small in a compact area with a limited population, screening, surveillance, and follow-up are done effectively [1].

3.12 The Future of Cancer Care in Bahrain

With the new comprehensive cancer care center—Bahrain Oncology Center started functioning at the beginning of 2019, with its state-of-the-art equipment and qualified doctors in each subspecialty of oncology, there is great hope for cancer patients in Bahrain for *A HOLISTIC MANAGEMENT OF CANCER* in this center. Unfortunately, few of the Bahraini doctors are showing interest in the field of oncology, as a result, majority of the medical oncologists are expatriates. There is a need for more Bahraini doctors to be trained in oncology to fill the gap [16]. The available two public cancer care facilities need to increase the capacity to take the patient load [17]. More space and personnel are needed for palliative and supportive care. There is a strong need for a hospice center.

3.13 Conclusion

Bahrain, though a small country with a high incidence rate of cancer in the GCC, enjoys a high standard of health care. There is a comprehensive cancer center, Bahrain Oncology Center, which has been functioning since 2019. Salmaniya Medical Complex, a multi-specialty tertiary care center, takes care of cancer patients free of charge to all its citizens. Private hospitals treat a small number of cancer patients, both locals and expatriates. The majority of cancer caregivers are expatriates. There is a need for international collaboration for cancer research and clinical trials. The government must encourage local doctors to get trained in the field of oncology and its subspecialties, which are the needs of the hour. More beds are to be allocated for palliative care and hospice care.

Conflict of Interest Authors have no conflict of interest to declare.

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