Palestinian Patients With Cancer at the King Hussein Cancer Center

Razan Mansour

King Hussein Cancer Center <https://orcid.org/0000-0002-7719-9068>

Justin Z. Amarin

King Hussein Cancer Center

Maysa Al-Hussaini

King Hussein Cancer Center

Asem Mansour (✉ amansour@khcc.jo)

King Hussein Cancer Center

Research article

Keywords: Cancer Care Facilities, Gaza Strip, Middle East, Oncology Service, Hospital, Palestinians, West Bank

Posted Date: December 2nd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-115863/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

PURPOSE: The Palestinian Ministry of Health (MoH) routinely refers Palestinian patients with cancer to the King Hussein Cancer Center (KHCC), the largest cancer center in the Middle East. Our aim was to describe the characteristics of these patients.

PATIENTS AND METHODS: We performed a retrospective chart review of all Palestinian patients with cancer who were treated at the KHCC during 2018 and 2019. We retrieved data from the Cancer Registry and described the demographic and clinical characteristics of the cohort.

RESULTS: Out of 521 Palestinian patients, we excluded 41 patients who were misdiagnosed and included the remaining 480. Most patients were adults ($n = 426$, 88.8%). The most common cancer sites in men ($n = 200$) were the hematolymphoid system ($n = 47$, 23.5%), followed by the digestive system ($n = 35$, 17.5%), and lung and pleura ($n = 23$, 11.5%). In women ($n = 226$), the most common cancer sites were the breast ($n = 104$, 46.0%), followed by the digestive system ($n = 34$, 15.0%), and hematolymphoid system ($n = 23$, 10.2%). Children and adolescents accounted for 11.3% ($n = 54$) of the total cases. The hematolymphoid system was the most common cancer site ($n = 27$, 50%), followed by the brain ($n = 8$, 14.8%). More than a third of all patients presented with distant metastasis.

CONCLUSION: The most common cancer sites in our cohort are generally similar to data from the Palestinian territories. Many patients presented with advanced-stage disease, which signals the need for awareness campaigns and screening programs. Cancer is misdiagnosed in many patients with benign tumors, which is a consequence of a shortage in specialists and limited diagnostic equipment.

Introduction

Since its inception, the Palestinian Authority has strived to provide Palestinians with better access to health care services (1). However, limitations in infrastructure and human resources have prevented the health care system in Palestine from becoming independent (2–4). Cancer remains one of the leading causes of death in the Middle East and represents a significant challenge to many burdened health care systems (5–8). The limitations for private cancer care in the Palestinian territories include shortage of capable cancer specialists, restricted access to medical technology and equipment, and decreased funding from international organizations such as the World Health Organization and countries such as the United States (9). Health insurance from the Palestinian Ministry of Health (MoH) is the only available coverage for cancer care in the Palestinian territories. The insurance usually covers referrals to hospitals in neighboring countries that have advanced facilities for cancer care, such as the King Hussein Cancer Center (KHCC) in Jordan (10). The most common source of financial coverage for Palestinian patients with cancer treated at the KHCC is the Palestinian MoH. Other sources include the King Hussein Cancer Foundation (through the Goodwill Fund) and direct cash payments.

Cancer is the second leading cause of death in the Palestinian territories (11). In 2005, the crude incidence rate of cancer was 49.2 (per 100,000 persons) in the West Bank and 32.7 (per 100,000 persons)

in Gaza Strip. However, the number of diagnosed cancer cases increased markedly from 2,189 new cases in 2013 to 3,927 new cases in 2015 (12). The increasing burden of cancer, coupled with a limited health care system, represents an additional health care challenge in the Palestinian territories. The most common types of cancer diagnosed in Palestinian patients are similar to worldwide trends (13). Lung cancer is the most diagnosed type of cancer with an incidence rate of 5.2 cases (per 100,000 persons) in men, followed by leukemia and colorectal cancer. In Palestinian women, breast cancer is the most diagnosed type of cancer, followed by colorectal cancer and leukemias (9).

The KHCC is a comprehensive cancer center in Amman, Jordan that serves adult and pediatric patients from Jordan and other countries in the Middle East and North Africa (14). The center is crucial for the cancer care of Palestinian patients because the Palestinian territories lack a comprehensive cancer center. In this study, we describe the characteristics of all patients referred from the Palestinian MoH for cancer care at the KHCC between January 2018 and December 2019. We report the demographic characteristics of the patients, their financial coverage, distribution of cancer types, and most common treatment modalities. We also discuss the challenges faced by Palestinian patients. Finally, we provide recommendations for the management and treatment of cancer in the Palestinian territories.

Subjects And Methods

We performed a retrospective chart review of all Palestinian patients with cancer who were treated at the KHCC between January 2018 and December 2019. The study protocol was reviewed and approved by the Institutional Review Board of the KHCC (Amman, Jordan). We sequentially included all patients registered in the institutional Cancer Registry (established July 2006). We filtered out nonunique records and excluded patients with benign tumors that were initially misdiagnosed as malignant. We retrieved the following data from the registry: date at first contact, age at diagnosis, sex, financial coverage, cancer site, histopathology, treatment, and SEER summary stage. We used IBM SPSS Statistics 23 to perform data analyses. First, we described the demographic and clinical characteristics of the full cohort. We then stratified the cohort according to age, sex, or cancer site, and described the clinical characteristics of the strata. We summarized continuous data as means and standard deviations and categorical data as absolute frequencies and percentages.

Results

Demographics

We screened 1,011 records for eligibility and 521 (51.5%) were unique. Of the 521 patients, we excluded 41 (7.9%) with benign tumors who were previously misdiagnosed. The most common sites of the misdiagnosed tumors were the breast (22.0%), central nervous system (19.5%), pituitary gland (12.2%), digestive system (12.2%), and soft tissues (9.8%). We included, in the final analysis, all remaining 480 patients, 186 (38.8%) and 294 (61.3%) of whom presented to the center in 2018 and 2019, respectively. Of the total, 248 patients were female (51.7%) and 232 (48.3%) were male. The mean age at diagnosis was

45 ± 19 years; 54 patients (11.3%) were children or adolescents (< 18 years old) and 426 (88.8%) were adults (≥ 18 years old). Most patients were financially covered by the Palestinian Ministry of Health ($n = 435$, 90.6%). Palestinian patients represented 5.3% of all patients treated at the KHCC during 2018 and 2019.

Clinical characteristics of the full sample

The most common cancer sites, in order, were the breast, hematolymphoid system, and digestive system (Table 1). Together, these sites accounted for 274 cancers (57.1%). We describe the SEER summary stage of all cases in Table 2. Of all patients, 239 (49.8%) received chemotherapy, 210 (43.8%) underwent surgery, 114 (23.8%) received radiotherapy, 92 (19.2%) received palliative therapy, 39 (8.1%) received hormonal therapy, 16 received immunotherapy (3.3%), and 16 (3.3%) underwent transplantation.

Table 1
Site-specific frequencies of cancers in Palestinian patients who presented to the King Hussein Cancer Center in 2018 and 2019 ($N = 480$).

Site	Total, n (%)	Female, n (%)	Male, n (%)
Breast	105 (21.9)	104 (41.9)	1 (0.4)
Hematolymphoid System	97 (20.2)	34 (13.7)	63 (27.2)
Digestive System	72 (15.0)	36 (14.5)	36 (15.5)
Lung and Pleura	30 (6.3)	7 (2.8)	23 (9.9)
Head and Neck	29 (6.0)	8 (3.2)	21 (9.1)
Thyroid	29 (6.0)	17 (6.9)	12 (5.2)
Urinary System	28 (5.8)	8 (3.2)	20 (8.6)
Male Genital System	22 (4.6)	0 (0.0)	22 (9.5)
Female Genital System	18 (3.8)	18 (7.3)	0 (0.0)
Brain	17 (3.5)	4 (1.6)	13 (5.6)
Bone and Soft Tissue	15 (3.1)	6 (2.4)	9 (3.9)
Skin	10 (2.1)	3 (1.2)	7 (3.0)
Miscellaneous	8 (1.7)	3 (1.2)	5 (2.2)

Table 2

The SEER summary stage at presentation of Palestinian patients with cancer who presented to the King Hussein Cancer Center in 2018 and 2019 ($N=480$).

Stage	Total, n (%)
<i>In situ</i>	10 (2.1)
Localized	99 (20.6)
Regional by direct extension	29 (6.0)
Regional to lymph nodes	67 (14.0)
Regional both by direct extension and lymph nodes	45 (9.4)
Distant	173 (36.0)
Unknown	57 (11.9)

Clinical characteristics according to age and sex

Adults

Of 426 adult patients, 226 (53.1%) were women and 200 (46.9%) were men. The most common cancer sites in women, in order, were the breast, digestive system, and hematolymphoid system (Table S1). In men, the most common cancer sites, in order, were the hematolymphoid system, digestive system, and lung and pleura (Table S1). The mean age at diagnosis was 49 ± 14 years for women and 51 ± 16 years for men. At the time of presentation, 59 women (26.1%) and 83 men (41.5%) had distant metastases (Table S2).

Children and adolescents

Of 54 children and adolescents, 22 (40.7%) were female and 32 (59.3%) were male. The most common cancer sites in girls and female adolescents were the hematolymphoid system and bone and soft tissue (Table S3). In boys and male adolescents, the most common cancer sites were the hematolymphoid system and brain (Table S3). The mean age at diagnosis was 11 ± 6 for girls and female adolescents and 8 ± 5 for boys and male adolescents. At the time of presentation, 16 girls and female adolescents (72.7%) and 15 boys and male adolescents (46.9%) had distant metastases (Table S4).

Clinical characteristics according to the most common cancer sites

Cancers of the breast

The most common cancer site overall was the breast ($n=105$, 21.9%). The patients were exclusively adults, and all except one were women ($n=104$, 99.0%). The mean age at diagnosis was 50 ± 13 years. According to the SEER summary stage, the disease was *in situ* in six patients (5.7%), localized in 24

(22.9%), regionalized in 44 (41.9%), distant in 15 (14.3%), and unknown in 16 (15.2%). The predominant type, by histology, was invasive ductal carcinoma ($n = 101$, 96.2%). The remaining cases were invasive lobular carcinoma and mucinous adenocarcinoma (each $n = 2$, 1.9%). Overall, 50 patients (47.6%) underwent surgery, 49 (46.7%) received chemotherapy, 29 (27.6%) received hormone therapy, 17 (16.2%) received radiotherapy, seven (6.7%) received palliative therapy, and four (3.8%) received immunotherapy.

Cancers of the hematolymphoid system

Cancers of the hematolymphoid system were the second most common overall ($n = 97$, 20.2%). The number of adults ($n = 70$, 72.2%) was more than twice the number of children and adolescents ($n = 27$, 27.8%). In addition, the number of male patients ($n = 63$, 64.9%) was almost twice the number of female patients ($n = 34$, 35.1%). The mean age at diagnosis was 32 ± 18 years. According to the SEER summary stage, the disease was localized in six patients (6.2%), regionalized in 12 (12.4%), distant in 72 (74.2%), and unknown in seven (7.2%). The most common type, by histology, was non-Hodgkin lymphoma ($n = 30$, 30.9%), followed by chronic lymphocytic leukemia ($n = 21$, 21.6%), Hodgkin lymphoma ($n = 19$, 19.6%), acute myeloid leukemia ($n = 9$, 9.3%), chronic myeloid leukemia ($n = 5$, 5.2%), multiple myeloma ($n = 5$, 5.2%), and acute lymphocytic leukemia ($n = 1$, 1.0%). Overall, 77 patients (73.3%) received chemotherapy, 20 (19.0%) received palliative therapy, 14 (13.3%) received radiotherapy, 13 (12.4%) underwent transplantation, four (3.8%) underwent surgery, and four (3.8%) received immunotherapy.

Cancers of the digestive system

Cancers of the digestive system were the third most common overall ($n = 72$, 15.0%). Most patients were adults ($n = 69$, 95.8%), and the sexes were equally affected (each $n = 36$, 50.0%). The mean age at diagnosis was 54 ± 17 years. According to the SEER summary stage, the disease was localized in seven patients (9.7%), regionalized in 26 (36.1%), distant in 32 (44.4%), and unknown in seven (9.7%). The most common type was colorectal carcinoma ($n = 39$, 54.2%), followed by gastric carcinoma ($n = 14$, 19.4%), pancreatic adenocarcinoma ($n = 12$, 16.7%), hepatocellular carcinoma ($n = 4$, 5.6%), carcinoid ($n = 1$, 1.4%), cholangiocarcinoma ($n = 1$, 1.4%), and carcinoma of the small intestine ($n = 1$, 1.4%). Overall, 41 patients (56.9%) received chemotherapy, 29 (40.3%) underwent surgery, 21 (29.2%) received palliative therapy, six (8.3%) received radiotherapy, and two (2.8%) received immunotherapy.

Discussion

We performed the first study of Palestinian patients with cancer seeking care and treatment in Jordan. We described the demographic and clinical characteristics of 480 Palestinian patients treated at the KHCC in 2018 and 2019. The most common cancer sites were the breast in female patients and the hematolymphoid system in male patients. Cancers of the digestive system were the second most common in both male and female patients.

Cancer is a leading cause of death in both developed and developing countries (13). Cancer care is challenging even in the best of conditions and becomes exceedingly so in areas of conflict in the Middle East with compromised health care systems (15). Barriers to high-quality cancer care include scarce

medical resources, limited access, financial difficulties, absent screening programs, and poor awareness (8, 16).

We found that breast cancer was the most common cancer in Palestinian women treated at the KHCC (41.9%). This finding is similar to data from the Palestinian MoH; the rate of breast cancer was 31.3% in the Palestinian territories in 2016 (17). Notably, we also found that 14.3% of Palestinian women with breast cancer treated at the KHCC had distant metastasis and 6.7% received palliative therapy. In the Palestinian territories, the 5-year overall survival of women with breast cancer is almost 50% (18). In comparison, the 5-year overall survival of women with breast cancer in the United States, Jordan, and Israel is almost 85% (19, 20). The difference may be attributed to poor breast cancer awareness, lack of screening programs for breast cancer, and limited access to and poor utilization of health care (21). These challenges to early detection can be addressed by awareness campaigns and a national screening program.

The distribution of cancer sites in our cohort was similar to data from the Palestinian territories for female patients but not male patients. In our study, the most common cancer sites in male patients were the hematolymphoid system, followed by the digestive system and lung and pleura. In the Palestinian territories, the most common cancer sites in men were the lung, followed by the prostate and colorectum (12). The rate of hematolymphoid cancers in our cohort is likely higher because the Palestinian MoH routinely refers patients to the KHCC for bone marrow transplantation; only one hospital in the Palestinian territories (namely An-Najah National University Hospital, located in the West Bank) provides bone marrow transplantation and the service is limited (18).

All patients who present to the KHCC undergo baseline diagnostic testing, and all available tissue material and radiographs are reviewed in-center. Interestingly, we found that 7.9% of patients with benign tumors were initially misdiagnosed. Tumors of the central nervous system and soft tissues are often reported by specialists, and pathologists with that expertise are lacking in the Palestinian territories. Lack of ancillary testing, which aids in diagnosis and helps distinguish malignant tumors from mimics, may also contribute to misdiagnosis. Many studies have investigated the rate of medical errors in the Palestinian territories, but no specific data are available for misdiagnosis in oncology (22–24). Misdiagnoses may be attributed to the lack of comprehensive cancer care as well as limited availability of advanced diagnostic equipment. For example, positron emission tomography/computed tomography is not available in the Palestinian territories, there are no nuclear medicine specialists, and patients who require the scan are referred to hospitals in Israel (18). The infrastructure of cancer care in the Palestinian territories is deficient and requires investment; there is an urgent need for advanced diagnostic equipment and specialist care. Further studies are required to identify the causes of misdiagnosis, and these causes may be addressed by non-punitive interventions.

The Palestinian territories lack a comprehensive cancer center that offers specialized, essential cancer care services, such as targeted therapies, multidisciplinary care, palliation, and rehabilitation. Surgery and chemotherapy are generally available, but only one hospital (namely Augusta Victoria Hospital, located in

the West Bank) offers radiotherapy (18). There are only one radiation oncologist and two medical oncologists per one million population (9). Moreover, to our knowledge, palliative care is generally not available to date in the Palestinian territories. Cancer care is expensive, especially if modalities such as bone marrow transplantation or immunotherapy are indicated. We found that 90.6% of Palestinian patients at the KHCC were covered by the Palestinian MoH. However, the MoH only covers the direct costs of Palestinian patients, which presents additional challenges to patients with cancer and their companions, who are not included in the coverage.

We acknowledge two limitations in our study. First, Palestinian patients are followed up for six months following discharge from the KHCC, so we could not perform outcome analyses. Second, the Cancer Registry did not restage patients using the 2018 version of the SEER summary staging system if they were initially staged as code 5 using the 2000 version. This largely contributed to missing staging data in 11.9% of patients.

In conclusion, KHCC provides comprehensive cancer care to Palestinian patients referred from the Palestinian MoH. The distribution of cancer sites is similar to data from the Palestinian territories. However, awareness campaigns and screening programs are substandard relative to other countries in the region, which may explain the high rate of advanced-stage disease at presentation. Further studies are required to study the outcomes of Palestinian patients with cancer and the challenges they face during treatment.

To address the high rate of advanced-stage disease at presentation, we recommend awareness campaigns be held in the Palestinian territories. Awareness campaigns may improve early detection of the most common cancers and lead to better outcomes. Moreover, the implementation of affordable screening programs, especially for cancers of the breast and colorectum, can also improve early detection.

Shortage of specialists is another significant barrier to optimal cancer care in the Palestinian territories. This barrier may be addressed by virtual multidisciplinary team meetings, twinning between the KHCC and hospitals in the Palestinians, and other telemedicine solutions. Initiatives to train Palestinian physicians offer numerous advantages. First, the psychosocial outcomes of patients may improve because of the decreased financial burden as well as increased social support. Second, the physical health outcomes of patients may also improve because cancer care is less likely to be interrupted and patients can be followed up for longer durations.

There are two cancer registries in the Palestinian territories: one in the West Bank and the other in the Gaza Strip. Unifying the cancer registries may help highlight priorities in cancer care. Capacity-building is also needed to address the shortage of laboratories, diagnostic equipment, radiation oncology units, bone marrow transplantation units, cancer rehabilitation units, and palliative care wards.

Declarations

Ethics approval and consent to participate and Consent for publication:

The IRB at KHCC works in accordance with the Declaration of Helsinki to protect the rights and welfare of all research participants. The informed consent is waived under the bylaws of the KHCC-IRB if there will be retrospective use of data collected for non-research purposes. The identity of the participants remains unidentified during the collection of and later on the analysis of the data.

Competing interests:

The authors have no conflicts of interest to declare.

Funding:

Not applicable

Authors' contributions:

AM and MH conceived the research topic. All authors contributed in drafting and reviewing the manuscript. All authors read and approved the final version of the manuscript.

References

1. Gil Z, Atrash F, Za'aroura S, Billan S, Nammour W. Developing an independent Palestinian cancer care capacity. *Lancet Oncol*. 2019;20(11):1485–6. doi: 10.1016/S1470-2045(19)30651-5.
2. Giacaman R, Khatib R, Shabaneh L, Ramlawi A, Sabri B, Sabatinelli G, Khawaja M, Laurance T. Health status and health services in the occupied Palestinian territory. *Lancet*. 2009;373(9666):837–49. doi:10.1016/S0140-6736(09)60107-0.
3. Leone T, Alburez-Gutierrez D, Ghandour R, Coast E, Giacaman R. Maternal and child access to care and intensity of conflict in the occupied Palestinian territory: a pseudo-longitudinal analysis (2000–2014). *Confl Health*. 2019;13:36. doi:10.1186/s13031-019-0220-2.
4. Hassan-Bitar S, Narrainen S. 'Shedding light' on the challenges faced by Palestinian maternal health-care providers. *Midwifery*. 2011;27(2):154–9. doi:10.1016/j.midw.2009.05.007.
5. Anton-Culver H, Chang J, Bray F, Znaor A, Stevens L, Eser S, Silverman B, Nimri O, Pavlou P, Charalambous H, Demetriou A, Ward K, Ziogas A. Cancer burden in four countries of the Middle East Cancer Consortium (Cyprus; Jordan I; Izmir (Turkey)) with comparison to the United States surveillance; epidemiology and end results program. *Cancer Epidemiol*. 2016;44:195–202. doi: 10.1016/j.canep.2016.06.004.
6. Althubiti MA, Nour Eldein MM. Trends in the incidence and mortality of cancer in Saudi Arabia. *Saudi Med J*. 2018;39(12):1259–62. doi:10.15537/smj.2018.12.23348.
7. Hilal L, Shahait M, Mukherji D, Charafeddine M, Farhat Z, Temraz S, Khauli R, Shamseddine A. Prostate Cancer in the Arab World: A View From the Inside. *Clin Genitourin Cancer*. 2015;13(6):505–

11. doi:10.1016/j.clgc.2015.05.010.
8. Kanavos P. The rising burden of cancer in the developing world. *Ann Oncol*. 2006;17 Suppl 8:viii15–23. doi:10.1093/annonc/mdl983.
9. Halahleh K, Gale RP. Cancer care in the Palestinian territories. *Lancet Oncol*. 2018;19(7):e359–64. doi:10.1016/S1470-2045(18)30323-1.
10. Hamdan M, Defever M, Abdeen Z. Organizing health care within political turmoil: the Palestinian case. *Int J Health Plann Manage*. 2003;18(1):63–87. doi:10.1002/hpm.691.
11. Abu-Rmeileh NM, Hussein A, Abu-Arqoub O, Hamad M, Giacaman R. Mortality patterns in the West Bank, Palestinian Territories, 1999–2003. *Prev Chronic Dis*. 2008;5(4):A112.
12. Hussein A, Abu-Rmeileh NM, Mikki N, Ramahi TM, Ghosh HA, Barghuthi N, Khalili M, Bjertness E, Holmboe-Ottesen G, Jervell J. Cardiovascular diseases, diabetes mellitus, and cancer in the occupied Palestinian territory. *Lancet*. 2009;373(9668):1041–9. doi:10.1016/S0140-6736(09)60109-4.
13. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2018;68(6):394–424. doi:10.3322/caac.21492.
14. Abdel-Razeq H, Attiga F, Mansour A. Cancer care in Jordan. *Hematol Oncol Stem Cell Ther*. 2015;8(2):64–70. doi:10.1016/j.hemonc.2015.02.001.
15. Omar S, Alieldin NH, Khatib OM. Cancer magnitude, challenges and control in the Eastern Mediterranean region. *East Mediterr Health J*. 2007;13(6):1486–96. doi:10.26719/2007.13.6.1486.
16. El Saghir NS, Soto Pérez de Celis E, Fares JE, Sullivan R. Cancer Care for Refugees and Displaced Populations: Middle East Conflicts and Global Natural Disasters. *Am Soc Clin Oncol Educ Book*. 2018;38:433–40. doi:10.1200/EDBK_201365.
17. Annual Report 2016. State of Palestine, Ministry of Health. 2017. <http://www.moh.gov.ps/portal/wp-content/uploads/Annual-Report-2016.pdf>.
18. Kharroubi AT, Abu Seir RY: Cancer Care in Palestine, in: Silbermann M, editor: *Cancer Care in Countries and Societies in Transition*. Cham, Springer, 2016, pp 77–97. https://doi.org/10.1007/978-3-319-22912-6_6.
19. Panato C, Abusamaan K, Bidoli E, Hamdi-Cherif M, Pierannunzio D, Ferretti S, Daher M, Elissawi F, Serraino D. Survival after the diagnosis of breast or colorectal cancer in the GAZA Strip from 2005 to 2014. *BMC Cancer*. 2018;18(1):632. doi:10.1186/s12885-018-4552-x.
20. Abdel-Razeq H, Mansour A, Jaddan D. Breast Cancer Care in Jordan. *JCO Glob Oncol*. 2020;6:260–8. doi:10.1200/JGO.19.00279.
21. Shaheen R, Slanetz PJ, Raza S, Rosen MP. Barriers and opportunities for early detection of breast cancer in Gaza women. *Breast*. 2011;20(Suppl 2):30–4. doi:10.1016/j.breast.2011.01.010.
22. Al-Ramahi R, Hmedat B, Alnjajrah E, Manasrah I, Radwan I, Alkhatib M. Medication dosing errors and associated factors in hospitalized pediatric patients from the South Area of the West Bank - Palestine. *Saudi Pharm J*. 2017;25(6):857–60. doi:10.1016/j.jsps.2017.01.001.

23. Najjar S, Hamdan M, Euwema MC, Vleugels A, Sermeus W, Massoud R, Vanhaecht K. The Global Trigger Tool shows that one out of seven patients suffers harm in Palestinian hospitals: challenges for launching a strategic safety plan. *Int J Qual Health Care*. 2013;25(6):640–7. doi:10.1093/intqhc/mzt066.

24. Hamdan M, Saleem AA. Assessment of patient safety culture in Palestinian public hospitals. *Int J Qual Health Care*. 2013;25(2):167–75. doi:10.1093/intqhc/mzt007.

Figures

Figure 1

Pyramid plot of the site-specific frequencies of cancers in Palestinian patients who presented to the King Hussein Cancer Center in 2018 and 2019 (N = 480) stratified by sex. The frequencies of cancers with distant metastases are indicated.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementalMaterial.docx](#)