RESEARCH ARTICLE

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Estimating the Cancer Treatment Cost for 5 Common Types of Cancer with Separating Out-of-Pocket and Governmental Costs in Afghanistan, 2020

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Abstract

The objective this study was to estimate the cost of cancer treatment services for 5 common types of cancer (Breast, Esophageal, Colorectal, Stomach and lung) by the public sector and patients. This study was a cross-sectional study that conducted using the medical records of patients who were registered in the Jamhuriyat Hospital from 1, 2020 to 12, 2020. The prevalence-based approach was used to estimate the costs of five major cancer types. The data of 769 patients were eligible to include for the analysis. The considered cost of services was obtained from the average cost in 3 private hospitals in Kabul. Also all costs converted in to US dollar using the exchange rate of each USD equaling to AFN 77 in 2020. The data was analyzed using Ms. Excel Program. The total number of patients with 5 types of cancer were 769. Of these, female, in the age group of 40-60 years and were illiterate. The most common cancers based on the cancer treatment services' costs of health services was breast cancer, followed by esophagus, colorectal, stomach and lung. Moreover, the most common cancers based on the cancer treatment services' costs of health services which cancer patients needed was breast cancer, followed by esophagus, colorectal, stomach and lung. Moreover, total cost of cancer treatment is US$590,662.98, in which Patients paid USD 82,537 of it out-of-pocket. The costs of cancer treatment services for 5 common types of cancer are high which a considerable portion are paid by patients. There is a need for the government to pay more attention to the provision of these services and to increase the centers providing these services and the existing facilities. Also, support of the international community in this process can enable more people to access these services and reduce the economic burden on patients.

Keywords: Cancer- cancer health services- breast cancer- colorectal cancer- esophageal cancer- lung cancer

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Introduction

Cancer is a chronic, non-communicable disease with a high premature death rate (Eghdami et al., 2019). The burgeoning incidence of cancer in society has led to loss of economic resources, job opportunities by the patients and their family members besides reduced health-related quality of life (Yabroff et al., 2011). The nature of the disease is almost the same worldwide, but the treatment and diagnosis may vary.

The important issue here is the extent to which people in the community particularly the public of low-income countries (LICs) has access to healthcare services, because LICs generally lack sufficient health facilities and financial resources. In Afghanistan, although majority of cancer types can be treated, if it is detected in time, it's very difficult to identify their symptoms in people who have no primary information about these, and that is why around 75% of affected people annually die due to cancer in the country (Globocan, 2020). The latest report by the World Health Organization (WHO) in 2020, reported 22,817 new cancer cases in Afghanistan (Globocan, 2020). The continuous rise in the cases of cancer has severely led to the loss of financial and human resources, which are two very important factors in economic growth and development (Romer, 2012). The possible cause of increased prevalence was considered too late diagnosis, lack of awareness, lack of access to medical services or even lack of financial resources (Bhandari et al., 2021) Cancer patients in Afghanistan are usually unable to

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allocate a significant part of their income to health services due to their essential household obligations (World Bank, 2019).

In 2016, the Action Against Cancer Foundation (ACF) started their activities to aware people and prevent cancer in the country. Later, the National Cancer Control Program (NCCP) in Afghanistan was initiated at Jamhuriyat hospital as "Cancer Diagnosis and Treatment Project" in March 2016, after receiving funds from the Ministry of Finance (NCCP, 2016). Currently, Jamhuriyat hospital has 72 beds for cancer patients and some segregated sections like OPD (Outpatient Department), endoscopy, ultrasound, laboratory, pathology and surgery are active, and about 50 patients visit the facility daily. Also, two governmental centers have been opened in Herat and Mazar for cancer treatment. Moreover, most of the private hospitals can't treat cancer. For example, there are three private hospitals (Global, French Medical Institute for Mother and Children and City) in Kabul but with no cancer treatment facilities. High costs of cancer treatment also compel cancer patients to go to public hospitals. Since Jamhuriyat hospital is the only government hospital in Kabul for cancer treatment, a large number of patients visit the Cancer Department of this hospital every day and they can receive free health services at Jamhuriyat hospital, except some services such as magnetic resonance imaging (MRI), computed tomography (CT) scan and mammography, which people should pay out-of-pocket(OOP) to date. Currently, no accurate statistics exist on the amount of these costs, to determine OOP and government's expenditure on cancer treatment. Total 35 cancer types have been registered in Afghanistan but with no accurate estimates of accurate costs such as direct, indirect, and human resources' costs. Hence, in present study, treatment costs of five common types of cancer was estimated and OOP and public expenditure for cancer patients was explored at Jamhuriyat hospital. These study can help people to decide, do they tend to travel outside for treatment or be treated within the country. The study also aimed to help government and non-government organizations (NGOs) develop a comprehensive plan and budget for cancer treatment.

Materials and Methods

Study design

A cross-sectional retrospective study was conducted to estimate direct costs for cancer treatment services for cancer patients at Jamhuriyat hospital in Kabul from 1st January to 31st December 2020.

Sampling and data collection Procedure

The prevalence-based approach was used while estimating and the costs of five major cancer types, where the costs of a disease (i.e., cancer) within one-year period. All patients in Jamhuriyat Hospital who were diagnosed with one of the five types of cancers (i.e., breast, esophageal, colorectal, lungs and stomach) in year 2020 were included in the study. The data collection sheet consists of two parts. The first part was related to patients' demographic characteristics, and the second part included items related to cancer treatment services' costs, namely costs related to physicians' and oncologists' visits, chemotherapy, surgical services, laboratory tests, ultrasonography, endoscopy, biopsy, X-rays, echocardiography, mammography, CT-scan and MRI. These costs were calculated using patients' medical records available at Jamhuriyat hospital. The medical records consisted of two parts, the first part was for the free services provided to the cancer patients by Jamhuriyat hospital and the second part for the paid services (i.e., paid by patients OOP) provided by private hospitals.

There were 2180 registered cancer patients in 2020 at Jamhuriyat Hospital, a main government center for cancer treatment in Afghanistan. Out of the total 2180 registered cancer patients, 1091 cases were associated with breast, esophageal, colorectal, lungs and stomach cancers. To avoid any potential bias, each patient's file was checked twice separately. Therefore, 322 patients are excluded as their key information for the study was missing and only included data of 769 patients for the analysis.

Data Analysis

To estimate the costs of the services at Jamhuriyat hospital, their respective market prices were collected from three major centers providing these services and then its average was computed. Also, all costs were converted in to US dollar using the average annual exchange rate of 2020, which was one US dollar equaled to AFN 77. The data collected were analyzed using Microsoft Excel program

Results

Demographic Characteristics

Out of the total participants 466 (60.60%) were female. More than half of the participants, 539 (70.07%) were in the age group 40-60 years and majority of them 735 (95.58%) were illiterate. While the most common cancer was esophageal 293 (38.10%) and the least common was lung cancer 10 (1.30%) (Table 1).

Total Treatment cost for cancer patients (Provided by Jamhuriyat Hospital)

The total treatment costs for cancer patients at Jamhuriyat Hospital in 2020 were USD 508,125.32 (Figure 1). The highest cost associated with breast cancer USD 212,848.38 and the lowest with lung cancer USD 2,177.92 (Figure 2). The amount of total costs by health services ranged from USD 77.9 for X-rays to USD 194,545.45 for surgical service (Figure 3).

Among the total treatment cost, the cost for surgery was highest for breast cancer, esophageal cancer and colorectal cancer. For stomach cancer and lung cancer it was highest for chemotherapy. The lowest cost for the four types of cancer treatment services were associated with X-ray and for lung cancer the lowest cost of cancer treatment was associated with Ultrasonography (Annex 1).

Total Treatment cost for cancer patients (Provided by Jamhuriyat and Private Hospitals)

The total cost of cancer treatment services for all services received by the cancer patients at Jamhuriyat and

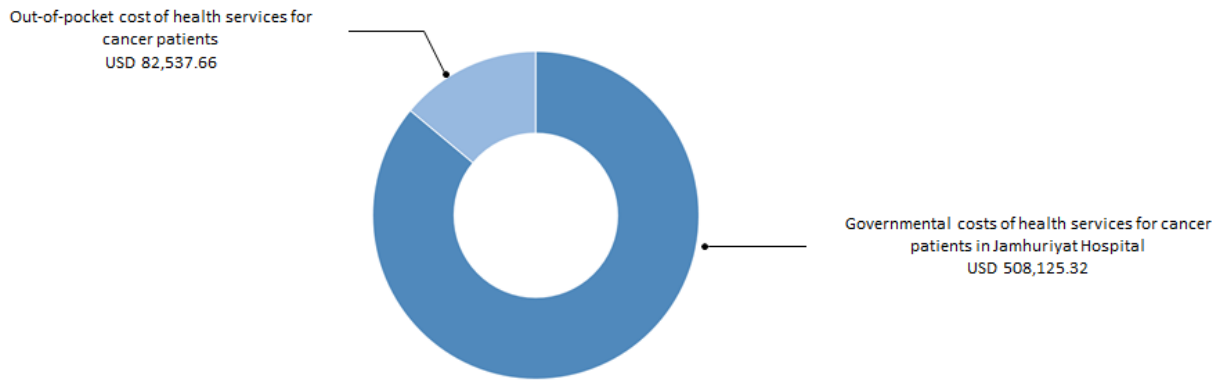

Figure 1. Portion of Out-of-Pocket and Governmental Costs for Patients of Jamhuriyat Hospital in 2020.

Table 1. Demographic Characteristics of the Studied Patients

Characteristics	Frequency (%)
Sex	
Male	39.40% (303)
Female	60.60% (466)
Education	
Illiterate	95.58% (735)
Primary School	0.13% (1)
Secondary School	0.13% (1)
12th Grade	1.56% (12)
Bachelor	2.34% (18)
Master and Upper	0.26% (2)
Age	
<40	21.97% (169)
40-60	70.07% (539)
>60	7.96% (61)
Type	
Esophageal	38.10% (293)
Breast	36.93% (284)
Colorectal	13.39% (103)
Stomach	10.27% (79)
Lung	1.30% (10)

private hospitals in 2020 was USD 590,487.67 (Figure 1), of which the highest cost was prominent with breast cancer and the lowest with lung cancer therapy (Figure 4). The amount of total costs of health services at Jamhuriyat and private hospitals ranged from USD 77.2 for X-rays to USD 265,844.15 for surgical services (Figure 5).

Separately, the highest treatment cost for breast cancer, colorectal cancer and stomach cancer was associated with surgical services. For Esophageal cancer and lung cancer it was associated with Chemotherapy. The lowest cost for the four types of cancer treatment services were prominent with X-ray and for lung cancer the lowest cost of cancer treatment was associated with Ultrasonography (Annex 2). Overall, types of cancer based on their treatment costs can be ranked from highest to the lowest as follows; breast cancer, esophageal cancer, colorectal cancer, stomach cancer and lung cancer.

Total Out-of-pocket Treatment by cancer patients

As estimated, the total cost of cancer treatment services offered by Jamhuriyat hospital was USD 508,125.32 and when totaled with the services obtained from private hospitals, it summed up to USD 590,662.98. Accordingly, patients paid USD 82,537.66 out-of-pocket, which is about 13.97% of all expenses (Figure 1). In this the highest Out-of-pocket cost of cancer treatment services was Prominent to Esophageal cancer 39.2% and the lowest

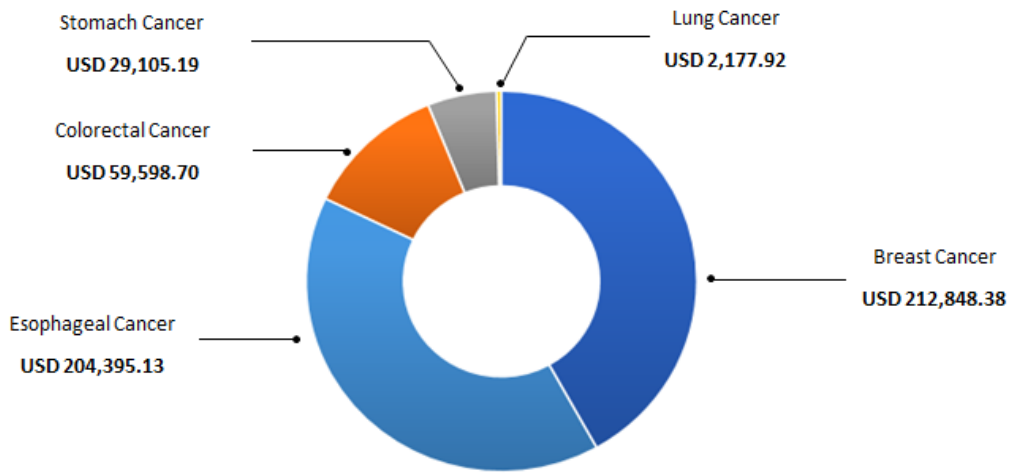

Figure 2. Proportion of Cancer Treatment Cost for Each Type of Cancer Provided by Jamhuriyat Hospital

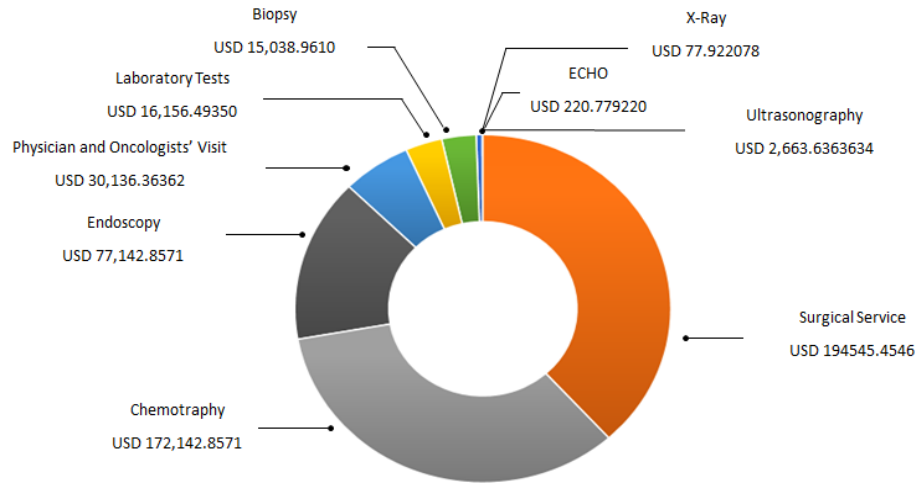

Figure 3. Cost of Cancer Treatment Services for Each Type of Cancer Provided by Jamhuriyat Hospital

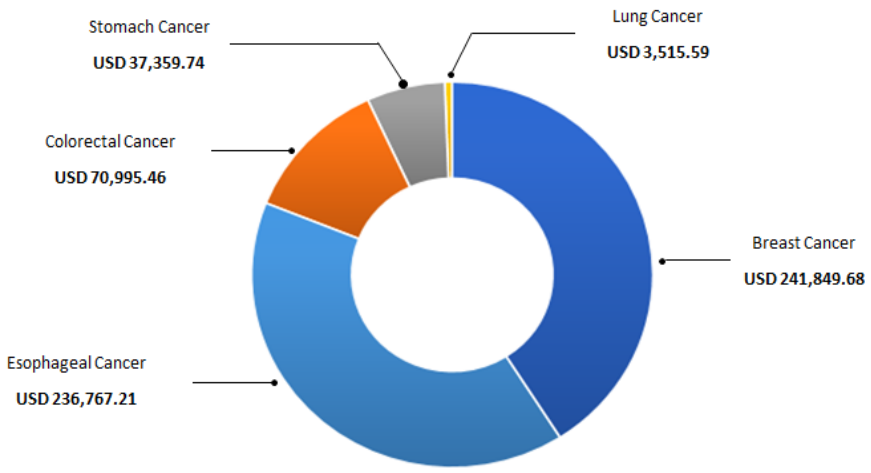

Figure 4. Proportion of Cancer Treatment Cost for Each Ttype of Cancer Provided by Jamhuriyat and Private Hospitals

were associated with lung cancer 1.6% (Figure 6).

Discussion

Based on the results of the present study, the total cost of cancer treatment service for cancer patient in Jamhuriyat is USD 590,662.98. In which the amount of breast cancer is the highest which followed by lung cancer. In addition, among the services CT-Scan, MRI and Mammography are not provided in the Jamhuriyat

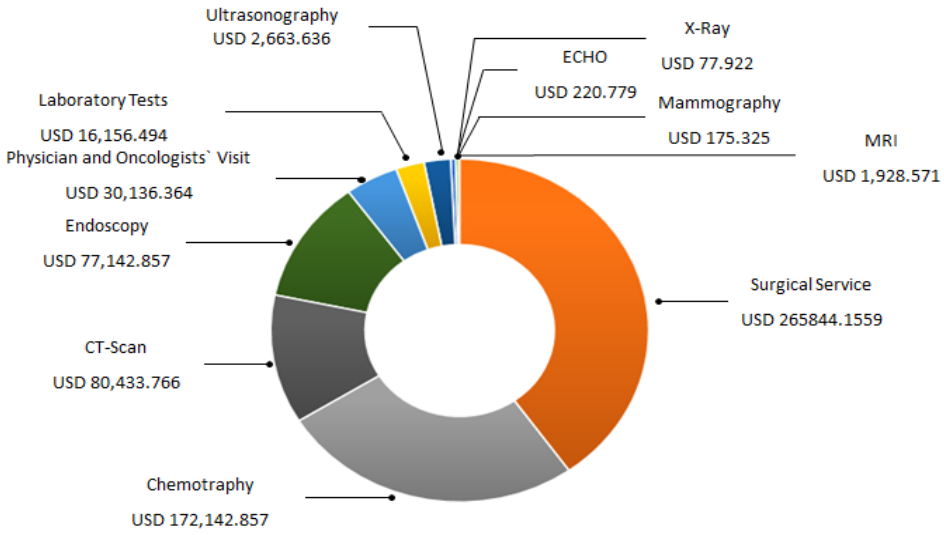

Figure 5. The Total Cost of Cancer Treatment Services for Each Type of Cancer Provided by Jamhuriyat and Private Hospitals

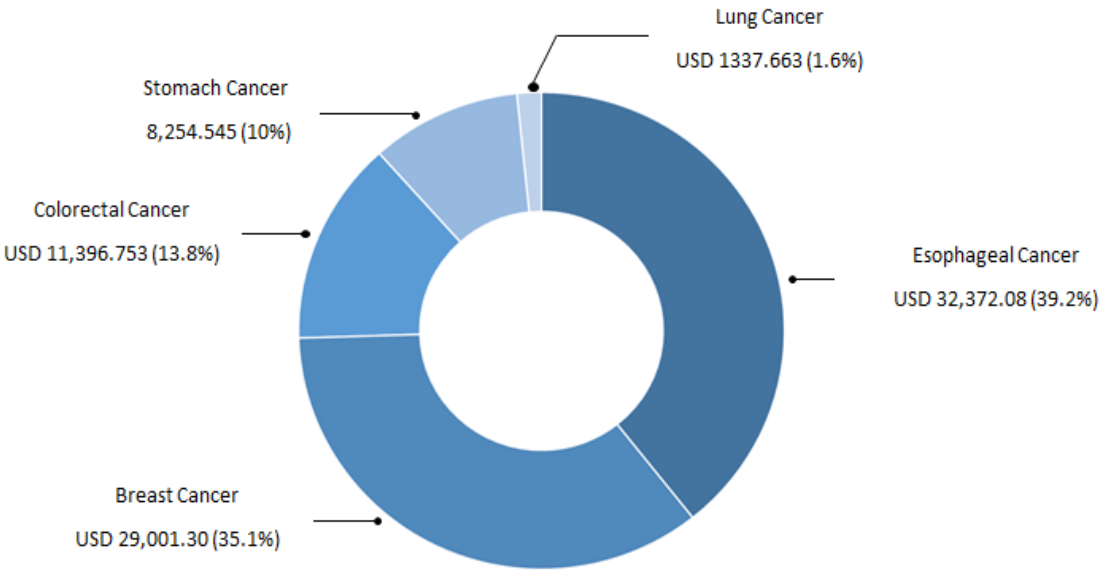

Figure 6. Portion of Out-of-Pocket Costs for Each Cancer of Jamhuriyat Hospital in 2020

Hospital, but are among the services required by cancer patients which paid for the disease out-of-pockets by patients and it is about USD 82,537.66, which it is a very high cost. Most of it is related to CT-Scan, because one of the main ways to diagnose this disease is this service.

To our knowledge, just a few studies tried to pay attention to the cancer in Afghanistan. Although studies were already carried out on types and prevalence of some cancers (Joya et al., 2020; Hamrah et al., 2014), this study estimates the direct costs (but not indirect ones due to difficulty in getting access to the patients caused by security issues and social culture) of cancer treatment in the governmental hospital (i.e., Jamhuriyat hospital) in Kabul, Afghanistan. Being the only governmental cancer treatment center in the country, most people face lack of medical resources, and even have to wait 22-30 days to get admitted at Jamhuriyat hospital. The present study showed direct costs for breast, esophageal, colorectal, stomach and lung cancer patients. Luengo-Fernandez et al. found that breast, colorectal and lung cancers had the highest costs among all types of cancers (Luengo-Fernandez et al., 2013). Broadly, the highest cost was prominent with surgical services for colorectal, stomach and lung cancers, which Jafari et al. in their study showed that the surgical service has the highest cost for colorectal cancer treatment (Jaffari et al., 2021). Regarding stomach and lung cancers treatment cost there isn't any research to specify the highest costs of treatment services (Zhang et al., 2020; Kutikova et al., 2005; Joen et al., 2019). The chemotherapy had the highest cost in breast and esophageal cancers. Daroudi et al., (2015) in their study about breast cancer indicated that Chemotherapy costs constituted the main part of treatment services cost. Moreover, Guo and Huang, (2017) and Daroudi et al., (2018) showed that chemotherapy is one of the three main parts of cancer treatment costs, while X-rays had the lowest cost for all types of cancer. The results of this study in part of cancer treatment costs are not the same as other studies. As this study covered only cancer treatment services costs, the other researches published under the topic of cancers treatment costs are not comparable to the results obtained here, because other studies included other costs too (i.e. indirect costs, human capital) (Benson, 2007; Luengo-Fernandez et al., 2013). We found that cancer patients in average OOP paid 13.97% of the total treatment costs, it varying amount for different types of cancer. In fact, these costs were for the services not available at Jamhuriyat Hospital such as: mammography, CT scan and MRI. In fact, cancer patients receive about 86% of treatment services for free, which is a considerable amount, and just 14% of the treatment cost was paid by patients. Although it is not a huge amount but for the people who do not have access to even the most basic health care, is a very high cost, which a large part of the population cannot afford. Cancer treatment also includes indirect and nonmedical costs such as transportation, accommodation, meals and loss caused by patients' absence from work, which are to be paid OOP by themselves or their family members (Joya et al., 2020).

In general, this study showed that health services which provided for cancer patients are not enough and still they need improvement in quality and quantity of health services. Therefore, it is recommended that the required specialized care and services related to the cancer, should be provided in the provinces so that patients do not have to go Jamhuriyat Hospital to receive such services, and it will greatly decrease the cost of cancer due to the late diagnosis. Moreover, if there is a possibility of performing the CT-Scan service for the patients in Jamhuriyat Hospital will decrease the total out-of-pocket costs for patients. AS another reason that delays the diagnosis and the patient's visit or even in some cases leads to death, is the lack of financial resources available to families. Also the important thing that were really important is the information and training. Providing training courses on the prevention of cancer at the early age and before the onset of the disease and sharing required information on the disease during the training courses or the mass media can help to raise public awareness about the ways of cancer

prevention. Because cancer is not a simple disease and is not easily treated and in most cases leads to the death of patients. But the disease is not incurable, provided it is diagnosed in time. In addition, one of the reasons people go to Jamhuriyat hospitals is the free provision of health services, which is more severe in the case of cancer, because on the one hand it is the only treatment center for this disease in the country and on the other hand most services related to this disease they present together.

Strengths and Limitation

It is noteworthy that this is the first study highlighting the cancer treatment cost in Afghanistan. It provided a valuable estimation of treatment services costs for national and international communities to able prepare their supporting plans based on the result of current study. Along with the strength, the study has some limitations. Firstly, due to the dispersion in the patients' files the results of some tests performed and services received by patients were not available. Secondly, as the amount of medication used by patients was not included in the patients' files it was not possible to considering the cost of medications provided by Jamhuriyat Hospital, that has directly limited the generalizability the findings.

In conclusion, this Study revealed that the costs of cancer treatment services for cancer patients in Jamhuriyat Hospital are high, while a considerable portion of these costs are paid by patients. This is a challenge for the people of Afghanistan. As the households' income is at its minimum level, therefore, they are not able to pay these costs. Out-of-pocket payments are a huge burden for cancer patients which need prompt attention of government. Although a huge number of treatment services provided by government free of cos but still they are not enough. In general, cancer treatment cost is a burden for both sides (patients and government). Therefore, as it is very hard to empower the patients economically, the study recommended, that government should try to provide more facilities by launching trainings for experts and stablish cancer treatment centers in Kabul and provinces, to expand the treatment capacity. Moreover, international communities should invite to support this process. At this present moment, if government doesn't pay attention to this issue in future Afghanistan will lose a huge number of human capital due to the late diagnosis and treatment of cancer.

Author Contribution Statement

All authors contributed equally in this study.

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Availability of data and materials

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Ethical approval and consent

Ethical approval was obtained from Human research ethics committee of the Afghanistan National Charity Organization for Special Diseases (ANCOSD), Kabul, Afghanistan (AF, ANCOSD, HREC, 04, 18/12/2020) before data collection. Permission to access patients' files was obtained from Ministry of Public Health.

Conflict of Interest

There is no conflict of interest between authors. All the authors contributed to the development of the manuscript and read and approved the final work.

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