

## Original Research Article

# Cost analysis of patients with breast cancer undergoing adjuvant treatment at oncology ward of No. (2) Military Hospital (500 bedded), Yangon

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## ABSTRACT

**Background:** Breast cancer is a major public health concern among women associated with substantial amount of economic burden so as to assess the cost for treating breast cancer. This study aimed to identify the cost of patient with breast cancer who undergoing adjuvant treatment at Medical Oncology Ward of No. (2) Military Hospital (500 Bedded), Yangon.

**Methods:** The hospital based cross-sectional descriptive study was done with total of 33 patients by using semi-structured proforma and reviewing records. The top-down gross-costing method and bottom-up micro-costing method were applied for the direct and indirect costs.

**Results:** Among patients, their mean age was 55±10 years, almost all of the patients were married with at least three children. The mean family income was 131.49±50.09 USD. It was found that 26 patients were newly diagnosed and started treatment in 2023. The total provider cost was 14,500 USD in which the radiation therapy cost was the highest, followed by chemotherapy, and then food cost was the lowest. The total patient cost was 1,188 USD in which travel cost was the highest, followed by food cost and then caregiver cost was the lowest. The unit cost of treating breast cancer was 475 USD in which the provider expensed above 90% of them.

**Conclusions:** This study provides basic cost information for treating breast cancer from both the provider and patient perspective that useful for developing future budgeting of cancer care and allocation for equal access to sustainable oncology care in Myanmar medical context.

**Keywords:** Adjuvant treatment, Breast cancer, Direct costs, Indirect costs, Provider cost, Patient cost, Unit cost

## INTRODUCTION

Breast cancer represents as a major public health problem, globally, as it accounts for 1 in 8 cancer diagnoses and total of over 2.3 million new cases in 2020. It has been estimated that the incidence of women breast cancer will increase to over 3 million and 1 million deaths in 2040.<sup>1</sup> It has been shown that one-half of breast cancer cases and about 60% of mortality occur in developing

countries. Among the Asian countries, less developed countries showed lower survival rates, a more advanced stage at diagnosis, and a greater mortality-to-incidence ratio than developed countries. The pathology is highly heterogeneous, in certain cases, it manifests as a slow-growing tumor with a predictable prognosis, and in other instances, it manifests as an aggressive one. Approximately 81% of breast cancer cases are diagnosed among women of 50 years or older and about 90% of

breast cancer-related deaths occur in this group of women.<sup>2</sup>

Breast cancer can affect the patient in multidimensions, including physical, emotional, social, and financial because it requires long-term management. Over the past decade, cancer-related spending has been rising and is predicted to increase faster than other area of healthcare because of the advances in technologies of preventive, diagnosis, curative and rehabilitative services. Even in United States, the costs of cancer care have been increasing with an unsustainable rate, two to three times faster than the cost of other medical services. The expenditures on cancer care were rising from 72 billion USD in 2004 to 125 billion USD in 2010, and it reached 158 billion USD by 2020.<sup>3</sup> The direct medical costs of breast cancer, including diagnosis, treatment, and follow-up care, are high, with estimates ranging from 20,000 USD to 100,000 USD per patient, depending on the stage of the disease and the type of treatment required. In addition to direct medical costs, breast cancer imposes indirect costs on patients and families, including loss of productivity, caregiving costs, and out-of-pocket expenses.<sup>4</sup> As a result, the cost of treating cancer has become a major burden for both healthcare system and patients.

Myanmar, one of the developing countries, the breast cancer incidence was estimated at 22.9 per 100,000 women.<sup>5</sup> The oncology care services for breast cancer typically provided by the combination of public and private healthcare providers, as well as non-governmental organizations (NGOs). Public hospitals, particularly tertiary healthcare facilities in major cities, offer specialized oncology departments equipped to diagnose and treat breast cancer. These facilities may offer services such as mammography, ultrasound, biopsy, surgery (including mastectomy and breast-conserving surgery), chemotherapy, radiation therapy, and hormone therapy. Not only for all cancer patients, these hospitals provide other specialized healthcare services for all tertiary care with efficient allocation of existing resources to meet the healthcare need of all patients. In this situation, healthcare providers need to recognize and assess the supply and expenditure for different services that they provide. This can be obtained by analyzing the input of resources and the output of services provided by the hospital.

The Medical Corps operates its own healthcare network including hospitals and unit clinics across the country to provide free medical benefits for all healthcare services to military personnel and their families. According to the healthcare services levels, the curative services and advanced oncology services are only available in tertiary hospitals, especially in Oncology Unit. According to the records of hospital, 316 women were admitted to get breast cancer treatment from 2018 to 2022.<sup>6,7</sup> Accordingly, breast cancer incidence and prevalence rates are also increase and then major costs of cancer care are driven by breast cancer treatment. The costs of breast

cancer management, primarily driven by outpatient, and hospitalization, comprise the majority of overall medical costs. Although the patients with breast cancer rely on provider to receive the treatment, some hidden expenses for the patients at healthcare institutions are not negligible.

Therefore, making decision on cost projection, base line hospital costing, unit cost calculation of various diseases and appropriate methods for cost recovery have been prepared to maintain this free medical services policy.<sup>8</sup> The hospital administrators also have responsibilities to provide healthcare services at acceptable level of community with proper utilization of costs and resources. Cost finding and analysis can give valuable information on costs planning for policy-maker, hospital administrator and the departmental manager. Moreover, cost of breast cancer care in Myanmar remains limited economic evidence due to inadequate studies. For this reason, cost analysis of breast cancer in military hospital is a critical area of research that can inform health policy and resource allocation decisions as well as to develop appropriate breast cancer control strategies. The objective of this study was to identify the cost of patients with breast cancer undergoing adjuvant treatment at Medical Oncology Ward of No. (2) Military Hospital (500 Bedded), Yangon.

## METHODS

In this study, the hospital based cross-sectional descriptive study design was used to determine the cost of patient with breast cancer undergoing adjuvant treatment at Medical Oncology Ward of No. (2) Military Hospital (500 Bedded), Yangon from April 2023 to March 2024. The study population was all patients with the diagnosis of breast cancer who were taking adjuvant treatment after breast saving surgery (n=33).

Two types of data collection methods were applied to obtain the information from all patients. Firstly, hospitalization and treatment related data were collected by reviewing records. Information regarding patients' socio-demographic data, direct and indirect cost incurred by patients were obtained by face-to-face interviewing with the patients. The length of hospital stays, provisional diagnosis, started year of treatment and types of treatment were reported as hospitalization related data. The collected cost items were categorized into direct and indirect costs from both the provider and the patient perspective and then the unit cost of treating breast cancer was calculated. Average costing technique was used with top-down and bottom-up approach in calculation of the costs borne by provider in unit cost analysis.

In the provider side, direct costs included costs for drugs and investigations, costs for materials, and radiation costs. These costs were categorized into recurrent and capital costs. The cost of drugs and all materials were calculated by the tender price list of respective

departments. The individual treatment data regarding the uses of drugs, medical supplies and laboratory investigations were collected by bottom-up micro-costing approach. The cost of laboratory investigations was calculated from the reference price of National Health Laboratory. Capital items were calculated by top-down costing of annual capital cost instead of original price because the assets were depleted on a daily basis with the hospital regular routine. The annualizing factor was defined based on the discount rate and the estimated useful life of the items. In this study, the discount rate was taken as 10% for all capital item. The estimated useful life was 11 years for radiation machine, 10 years for CT simulator, MRI and USG and eight years for ECG. These values in local currency were determined by converting USD using the official exchange rate as of November 17, 2023 (1USD=2100MMK), obtained from the website of Central Bank of Myanmar.<sup>9</sup> The official exchange rate was got from the website of the Central Bank of Myanmar. According to Creese and Parker (1994), the following formula was used for the calculation of capital items:<sup>10</sup>

$$\text{Annual cost} = \frac{\text{Current value of item}}{\text{Annualizing factor}}$$

Discount rate: 3% and 10% of discount rate (real interest rate) is used in this study according to Shepard et al (2000).<sup>11</sup>

Annualizing factor: According to data of useful life and discount rate, it consults annualizing tables to calculate the correct factor.<sup>10</sup>

The staff costs and food costs were calculated as indirect costs borne by provider. Staff costs were calculated as fixed costs by salary. To calculate staff costs, the salaries of staff were obtained from the payroll data in the administrative department. The costs of diet were calculated by multiplying the patient length of hospital stay into the direct price. The overhead costs like building, electricity, water supply and administrative costs like stationary, linen, sanitation were excluded in this study.

The cost incurred by patient were collected into direct costs and indirect costs. Direct costs, the patient's expenses directly related to their illness, were divided into two parts. One was direct medical costs that include drugs costs, laboratory tests and specialists request tests such as hemograms, immunohistochemistry tests. While the other food and travel costs were considered as direct non-medical costs. Indirect costs included absence from work, general expenses of caregiver. All these costs were calculated from data, obtained by interviewing the patients. Before calculation unit cost, total cost for breast cancer treatment was calculated by summarization of direct and indirect costs from both providers and patients. Finally, unit cost was obtained from the formula of total cost divided by total number of patients.

According to the Creese and Parker (1994), the following formulae were used in calculation of unit cost:<sup>10</sup>

$$\text{Unit cost for provider} = \frac{\text{Total provider cost}}{\text{Total number of patients}}$$

$$\text{Unit cost for patient} = \frac{\text{Total patient cost}}{\text{Total number of patients}}$$

$$\text{Unit cost} = \frac{\text{Total cost of provider and patient}}{\text{Total number of patients}}$$

### **Ethical approval**

Before conducting the study, in April 2023 (28/6/EHICS/2023), approval from our institute was obtained to ensure ethical standards for research. Before data collection, all patients were explained simple and clear information about the nature of the study, plan and time commitment and then their rights to refuse participation in the study.

## **RESULTS**

### **Patient's background and hospitalization related data**

A total of 33 patients with breast cancer were included in this study. The age of the patients was categorized into 3 groups, which were less than or equal 45 years, between 46 and 59 years and greater than or equal 60 years. The mean age of the study group was 55±10 years. After analyzing the age data of the patients, the highest age group was greater than or equal 60 years and the lowest was less than or equal 45 years, which was 14 (42.4%), 13 (39.4%) and 6 (18.2%) respectively. There was only one single respondent in this study population while the rest 32 women were married. Over half of the patients 18 (54.5%) had more than 3 children, the minimum was one child and the maximum were 8 children. Educational status was categorized into four groups such as primary school level, middle school level, high school level and university/graduate level. It found that middle school level was highest portion 46 (30.3%) and the lowest portion was graduate 5 (15.1%). The majority of the patients 26 (78.8%) were dependent and then only 4 (12.1%) were government employee and 3 (9.1%) were others (self-employee). The mean family income was 131.49±52.09 USD with the range of minimum 48 USD and maximum 286 USD.

The majority of patients were stay less than 11 days in hospital while the minority was more than 12 days for taking treatment. The mean length of hospital stay was 11±10 days with the range from minimum 2 days to maximum 30 days. Most of the patients 31(94%) were diagnosed invasive ductal carcinoma (IDC). The remaining two are lobular carcinoma of breast and myeloid liposarcoma in respectively. Regarding chemotherapy, nearly half of patients 16 (48.5%) were received at least 6 cycles, the minimum was 1 cycle and the maximum were 30 cycles. Only 7 patients were taking

radiation therapy during the data collection period. The majority of patients 23 (69.7%) were newly diagnosed and received treatment in 2023, followed by 7 (21.3%) were in 2022 while other years were relatively fewer

occurrence. Regarding chemotherapy regimens, 23 patients out of 33 was treated with first line regimen and this was the commonly used regimen during the study period. The detail data was illustrated in Table 1.

**Table 1: Socio-demographic and hospitalization related data of patients (n=33).**

| Patients' characteristics        | Frequency | Percentage (%) | Means $\pm$ SD     |
|----------------------------------|-----------|----------------|--------------------|
| <b>Age groups (years)</b>        |           |                |                    |
| $\leq 45$                        | 6         | 18.2           |                    |
| Between 46-59                    | 13        | 39.4           | 55 $\pm$ 10        |
| $\geq 60$                        | 14        | 42.4           |                    |
| <b>Marital status</b>            |           |                |                    |
| Single                           | 1         | 3.1            |                    |
| Married                          | 32        | 96.9           |                    |
| <b>Number of children</b>        |           |                |                    |
| $\leq 3$ children                | 15        | 45.5           |                    |
| $> 3$ children                   | 18        | 54.5           | 3 $\pm$ 2          |
| <b>Educational status</b>        |           |                |                    |
| Primary school                   | 9         | 27.3           |                    |
| Middle school                    | 10        | 30.3           |                    |
| High school                      | 9         | 27.3           |                    |
| University/Graduate              | 5         | 15.1           |                    |
| <b>Occupation</b>                |           |                |                    |
| Dependent                        | 26        | 78.8           |                    |
| Government employee              | 4         | 12.1           |                    |
| Others                           | 3         | 9.1            |                    |
| <b>Family income</b>             |           |                |                    |
| $\leq 131$ USD                   | 22        | 66.7           |                    |
| $> 131$ USD                      | 11        | 33.3           | 131.49 $\pm$ 52.09 |
| <b>Length of hospital stay</b>   |           |                |                    |
| $\leq 11$ days                   | 23        | 69.69          | 11 $\pm$ 10        |
| $> 11$ days                      | 10        | 30.30          |                    |
| <b>Diagnosis</b>                 |           |                |                    |
| Invasive ductal carcinoma        | 31        | 94             |                    |
| Lobular carcinoma                | 1         | 3              |                    |
| Myeloid liposarcoma              | 1         | 3              |                    |
| <b>Chemotherapy cycle</b>        |           |                |                    |
| Under 6 cycles                   | 16        | 48.5           |                    |
| 7-18 cycles                      | 16        | 48.5           | 7 $\pm$ 6          |
| Above 19 cycles                  | 1         | 3.0            |                    |
| <b>Started year of treatment</b> |           |                |                    |
| 2018                             | 1         | 3.0            |                    |
| 2019                             | 1         | 3.0            |                    |
| 2020                             | 0         | 0              |                    |
| 2021                             | 1         | 3.0            |                    |
| 2022                             | 7         | 21.3           |                    |
| 2023                             | 23        | 69.7           |                    |
| <b>Chemotherapy regimens</b>     |           |                |                    |
| First line                       | 23        | 69.7           |                    |
| Second line                      | 7         | 21.3           |                    |
| Third line                       | 2         | 6.0            |                    |
| Fourth line                      | 0         | 0              |                    |
| Fifth line                       | 1         | 3.0            |                    |

**Table 2: Costs borne by the provider (n=33).**

| Costs items                         | Total costs (MMK) | Total costs (USD) | Mean $\pm$ SD costs (USD) | Percentage (%) |
|-------------------------------------|-------------------|-------------------|---------------------------|----------------|
| <b>Direct costs</b>                 |                   |                   |                           |                |
| Drug costs                          | 3,654,912         | 1,740             | 52.74 $\pm$ 10.24         |                |
| Laboratory and investigations costs | 3,570,591         | 1,700             | 51.52 $\pm$ 47.15         |                |
| Radiation costs                     | 20,286,061        | 9,660             | 292.72 $\pm$ 427.26       |                |
| Total direct costs                  | 27,511,564.00     | 13,100            | 396.99 $\pm$ 103.16       | 90.4           |
| <b>Indirect costs</b>               |                   |                   |                           |                |
| Staff costs                         | 2,430,131.33      | 1,157             | 35.06 $\pm$ 3.4           |                |
| Food costs                          | 509,540.00        | 243               | 7.36 $\pm$ 6.90           |                |
| Total indirect costs                | 2,939,671.33      | 1,400             | 42.42 $\pm$ 9.49          | 9.6            |
| Provider costs                      | 30,451,235.33     | 14,500            | 439.39 $\pm$ 109.15       | 100.0          |

Currency exchange rate was 1USD = 2100 MMK (17th November, 2023)

**Table 3: Costs incurred by the patient (n=33).**

| Costs items                                  | Total costs (MMK) | Total costs (USD) | Mean $\pm$ SD costs (USD) | Percentage (%) |
|----------------------------------------------|-------------------|-------------------|---------------------------|----------------|
| <b>Direct costs</b>                          |                   |                   |                           |                |
| Direct medical costs                         | 564,300           | 269               | 8.15 $\pm$ 16.99          |                |
| Direct non-medical costs                     | 1,037,850         | 494               | 14.97 $\pm$ 19.72         |                |
| Total direct costs                           | 1,602,150         | 763               | 23.12 $\pm$ 16.99         | 65.6           |
| <b>Indirect costs</b>                        |                   |                   |                           |                |
| Food costs and general expenses of caregiver | 555,000           | 264               | 8 $\pm$ 13.76             |                |
| Travel costs of caregiver                    | 337,850           | 161               | 4.8 $\pm$ 11.34           |                |
| Total indirect costs                         | 892,850           | 425               | 12.88 $\pm$ 22.54         | 34.4           |
| Patient costs                                | 2,495,000         | 1,188             | 36 $\pm$ 31.67            | 100.0          |

Currency exchange rate was 1USD = 2100 MMK (17th November, 2023)

### **Cost borne by the provider side**

The provider contributed drug cost for the minimum of 0.89 USD and the maximum of 253 USD for breast cancer; the total drug costs were 1,740 USD. The laboratory and investigation costs range from 13 USD to 569 USD; the total was 1,700 USD. The total radiation cost was 9,660 USD. The total direct cost borne by provider was 13,100 USD for breast cancer treatment. Interestingly, the major cost was driven by radiation therapy, although there were only 7 patients.

The total indirect costs borne by provider was 1,400 USD. It was found that the staff costs were higher than the food costs in the indirect cost borne by provider.

The total provider costs of the breast cancer treatment were 14,500 USD. It also found that direct costs represented as highest costs component 13,100 USD (90.4%) while the indirect costs were the lowest 1,400 USD (9.6%) in provider. The detail data was shown in Table 2.

### **Costs incurred by the patient's side**

Result from the analysis of patients self-reported data, total direct medical cost was 269 USD and direct non-medical costs was 494 USD, the total direct cost incurred by patients was 763 USD. The result also showed that direct non-medical costs such as food and transportation contributed the major cost component of patients' expenses. The food and travel costs for caregiver and general expenses of the caregiver were calculated as indirect costs. Food and general expenses of caregiver was 264 USD and the travel cost was 161 USD, the total indirect cost was 425 USD. It was found that the total expenses by patients was 1,188 USD. From this data, it can be profound that the patient's expenses were high in direct costs compared with indirect costs. the detail data was mentioned in the Table 3.

### **Unit cost of breast cancer**

The total cost borne by the provider was 14,500 USD and the total cost incurred by the patient was 1,188 USD. Thus, the total cost for treating breast cancer was 15,689



USD. It was found that, the costs borne by the provider contributed 92.4%, while the costs incurred by the patients was 7.6% of the total. It was clearly seen that almost all of the breast cancer treatment cost was shared by provider. As a result, the unit cost per patient for treating breast cancer was 474 USD. The detail data was shown in the Table 4.

#### Unit cost of radiation therapy

In this study, 33 patients were receiving treatment for breast cancer. Among them, only 7 patients were taking radiation therapy. The total cost of radiation therapy was 10,510 USD and the unit cost per patient was 1,501 USD. The total provider cost for radiation therapy was 10257 USD, and the unit cost was 1,465 USD. The total cost

reported by patient was 253 USD with a unit cost of 36 USD. The result obtained from the unit cost of provider and patients showed that the provider driven almost all costs for radiation therapy. It can be seen in Table 5.

#### Unit cost of chemotherapy

In calculating unit cost for chemotherapy, there were 26 patients who undergoing chemotherapy treatment during the data collection period. The total cost borne by the provider and patient were 4,244 USD and 935 USD respectively while the unit cost were 163 USD and 36 USD. It represented that the provider contributed the most unit costs (82%) than the patient (18%). The total cost for chemotherapy treatment was 5,179 USD and the unit cost per patient was 199 USD.

**Table 4: Total cost and unit cost of breast cancer (n=33).**

| Cost items               | Total cost (MMK)     | Total cost (USD) | Unit cost (MMK)   | Unit cost (USD) | Percentage (%) |
|--------------------------|----------------------|------------------|-------------------|-----------------|----------------|
| <b>Provider costs</b>    |                      |                  |                   |                 |                |
| Direct costs             | 27,511,564.00        | 13,100           | 833,683.76        | 397             |                |
| Indirect costs           | 2,939,671.33         | 1,400            | 89,081.95         | 42              |                |
| Total provider costs     | 30,451,235.33        | 14,500           | 922,764.71        | 439             | 92.4%          |
| <b>Patient costs</b>     |                      |                  |                   |                 |                |
| Direct medical costs     | 564,300.00           | 269              | 25,650.00         | 12              |                |
| Direct non-medical costs | 10,37,850.00         | 494              | 33,479.03         | 16              |                |
| Indirect costs           | 892,850.00           | 425              | 42,516.67         | 20              |                |
| Total patient costs      | 2,495,000.00         | 1,188            | 73,969.70         | 35              | 7.6%           |
| <b>Total costs</b>       | <b>32,946,235.33</b> | <b>15,689</b>    | <b>998,370.88</b> | <b>474</b>      | <b>100%</b>    |

Currency exchange rate was 1USD = 2100 MMK (17th November, 2023).

**Table 5: Unit cost of radiation therapy and chemotherapy.**

| Types of costs                 | Total cost (MMK) | Total cost (USD) | Unit cost (MMK) | Unit cost (USD) | Percent (%) |
|--------------------------------|------------------|------------------|-----------------|-----------------|-------------|
| <b>Radiation therapy (n=7)</b> |                  |                  |                 |                 |             |
| Provider                       | 21,539,195.40    | 10,257           | 3,077,027.91    | 1,465           | 97.6        |
| Patient                        | 531,300.00       | 253              | 75,900.00       | 36              | 2.4         |
| Total                          | 22,070,495.40    | 10,509           | 3,152,927.91    | 1,501           | 100.0       |
| <b>Chemotherapy (n=26)</b>     |                  |                  |                 |                 |             |
| Provider                       | 8,912,043.73     | 4,244            | 342,770.91      | 163             | 81.9        |
| Patients                       | 1,963,700.00     | 935              | 75,526.92       | 36              | 18.1        |
| Total                          | 10,875,743.73    | 5,179            | 418,297.84      | 199             | 100.0       |

## DISCUSSION

In this study, the total cost of provider and patients for treating breast cancer was 15,689 USD (32,946,235.33 MMK). By comparing with total provider and patient cost from adjuvant treatment of breast cancer, it was found that the direct cost in provider side was the higher than the patient side. As the provider side expensed direct costs such as drugs cost for chemotherapy, laboratory investigation cost and radiation costs. Moreover, the capital assets such as radiation machine, CT simulator, MRI were already fixed up as a hospital infrastructure to provide comprehensive oncology services for all patient.

The patient expensed only 8% of the total cost of treating breast cancer. Rohani et al, also estimated the cancer treatment cost for five common types of cancer with separating out-of-pocket and governmental costs in Afghanistan. In contrary to present study, it was found that the mount of breast cancer treatment services costs was highest and followed by lung cancer in the Jamhuriyat hospital. The total cost of cancer treatment is 590,662.98 USD in which patients paid 82,537 USD of it out-of-pocket. There was a considerable amount of portion that was paid by the patient in this study. This is because, the Jamhuriyat hospital did not provide the services for MRI, CT scan and mammograms for the

patients. The patients spent their own expenses for these services.<sup>12</sup> The direct medical services and the diagnostic services were provided by the hospital in the present study. Thus, patients with breast cancer did not need to pay for medical and diagnostic investigations, their expenses were high in direct non-medical costs (food and travel cost). There was the main difference of the patient out-of-pocket expenses between these two studies.

This study found that the radiation therapy was the highest cost component in treating breast cancer and then followed by chemotherapy. Similar result was found in Demeke et al which was studied on health system cost of breast cancer treatment in Addis Ababa, Ethiopia. In the current study, the patients taking chemotherapy were the highest was 6 cycles and the lowest in above 19 cycles with the mean chemotherapy cycles was  $7 \pm 6$ .<sup>13</sup> In the present study, the patients who were undergoing chemotherapy during the study period were calculated, the previous cycles were not taken into accounts. While the patients taking radiotherapy were obtained complete treatment. So, among the direct cost of the provider, radiation therapy cost was increased with the use of patient per capital item.

In the current study, radiation therapy was the greatest cost consuming element in the provider direct costs, followed by drug cost. This showed that the hospital was build up with specialized diagnostic and therapeutic equipment, facilities to provide quality oncology care services including chemotherapy, radiation therapy and hormonal therapy for every patient. Food costs was the least cost component of the provider indirect costs. Conversely, the patient's biggest expense component was food and transportation, followed by direct medical costs. This was because all military hospitals cannot offer oncology care services. Consequently, patients had to cover their healthcare expenses regardless of the distance to tertiary hospitals. Moreover, some patients spent money for their preference food and drinks to improve good appetite. In which, although the drugs cost, laboratory investigation costs and food costs were the same cost items in the both provider and patient sides, the provider expenses were significantly higher than the patient.

However, the cost of breast cancer screening and surgical procedures were not taken into account in this study. Furthermore, this study did not describe the costs with stages and the particular chemotherapy regimens. Thus, there was needed to conduct further cost studies in order to capture the complete picture of treatment patterns and outcomes across different stages of breast cancer.

## CONCLUSION

These findings have significant implications for the understanding of how contribution from both provider and patient. Indeed, this study highlights the fact that the cost of breast cancer treatment was costly as four times

higher than the mean family income. The patient out-of-pocket costs will be extremely burdensome relative to the mean family income, if the majority of the costs were not borne by the provider. Therefore, this cost analysis demonstrates the substantial amount of patient's out-of-pocket expenses even in fully supported setting, and can inform interventions to improve equal access in Myanmar medical context.

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## REFERENCES

1. Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, et al. Current and future burden of breast cancer: Global statistics for 2020 and 2040. *The Breast*. 2022;66:15-23.
2. Pegram MD. Breast Cancer. In Chmielowski B, & Territo, M, eds. *Manual of Clinical Oncology*. Wolters Kluwer; 2017:427-478.
3. Giordano SH, Niu J, Gregor MC, Zhao H, Zorzi D, Shih YC, et al. Estimating regimen-specific costs of chemotherapy for breast cancer: Observational cohort study. *CA: A Cancer Journal for Clinicians* 2018;122(22):3447-55.
4. Sun L, Cromwell D, Dodwell D. Costs of early invasive breast cancer in England using national patient-level data. *Value Health*. 2020;23(10):1316-23.
5. World Health Organization. Myanmar: Cancer country profile. Available at: <https://www.who.int/publications/m/item/cancer-mm-2020>. Assessed on 2 April 2023.
6. Medical Oncology Ward. Admission and discharge records of No. (2) Military Hospital (500-Bedded), 2022. Unpublished document.
7. Medical Oncology Ward. Admission and discharge records of No. (2) Military Hospital (700-Bedded), 2022. Unpublished document.
8. Min-Thein. Cost analysis of medical cases in a medical unit of Defence Services General Hospital [Unpublished master's thesis]. Defence Services Medical Academy. 2014.
9. Central Bank Myanmar. Reference Foreign Exchange Rates as of 16th November 2023. Available at: <https://www.cbm.gov.mm/>. Assessed 16 November 2023.

10. Creese A, Parker D. Cost analysis in primary healthcare: A training manual for programme managers. WHO: Geneva; 1994.
11. Shepard DS, Hodgkin D, Anthony YE. Analysis of hospital costs: A manual for managers. World Health Organization; 2000.
12. Rohani H, Mousavi SH, Hashemy SM. Estimating the cancer treatment cost for 5 common types of cancer with separating out-of-pocket and governmental costs in Afghanistan, 2020. *Asian Pac J Cancer Prev*. 2022;23(10):3273-9.
13. Demeke T, Ayele W, Mariam DH, Wienke A. Health system cost of breast cancer treatment in Addis Ababa, Ethiopia. *PLoS ONE*. 2022;17(10):e0275171.

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