



Direct Medical Cost of Breast Cancer Care in Lome: Case of Sylvanus Olympio University Hospital and International Cancer Centre

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Abstract

Introduction: With 11.7% new cases worldwide in 2020, female breast cancer is not only the first among gynaecological cancers, but also the first cancer worldwide. Beside, the disease stage during diagnosis is an important cost-predicting factor. **Methods:** It was a transversal descriptive study carried out in the Obstetrics and Gynaecology Unit of the Sylvanus Olympio University Hospital (SOUH) and in the International Cancer Centre of Lome (ICCL) during July and August of the year 2022. **Results:** Only 146 patients were enrolled in our study, with a participation rate of 30.87%. The mean age of the patients was 48.9 ± 11.7 years with extremes of 25 and 77 years. Fifty-one patients (39%) were resellers. Sixty-four patients (43.8%) attended secondary education. The median cost of breast cancer diagnosis was 182,080 FCFA with extremes ranging from 55,680 FCFA to 487,680 FCFA. The median cost of chemotherapy was 1,640,790 FCFA with extremes ranging from 199,820 FCFA to 5,208,885 FCFA. The median cost of surgical treatment of breast cancer was 230,320 FCFA with extremes ranging from 135,240 FCFA to 368,060 FCFA. The median cost of hormonal treatment was 206,200 FCFA with extremes ranging from 36,750 FCFA to 494,850 FCFA. The median cost of radiotherapy was 1,765,000 FCFA with extremes ranging from 1,715,000 FCFA to 2,030,000 FCFA. Of the 146 patients, 46 had not undergone any other complementary tests apart from diagnostic tests. The median cost of the tests carried out as part of the pre-therapeutic assessment and follow-up was 21,500 FCFA with ex-

tremes ranging from 0 FCFA to 824,760 FCFA. The direct medical cost of breast cancer management was 119,200 FCFA with extremes ranging from 36,616 FCFA to 1,604,669 FCFA for patients with health insurance (17.1% of patients). **Conclusion:** The direct medical cost of breast cancer treatment is higher than the average household income in Togo. The question of what measures could be taken to increase adherence to treatment by patients living with this cancer and to reduce a large number of long-lost patients is still pending.

Subject Areas

Oncology

Keywords

Breast Cancer, Cost, Treatment, Togo

1. Introduction

Breast cancer is a malignant tumour developing from the mammary gland [1]. With 11.7% new cases worldwide in 2020, female breast cancer is not only the first among gynaecological cancers but also the first cancer worldwide [2]. Early diagnosis and management are the core methods to improve the quality of life and increase the survival of patients [3]. Necessary resources to combat this scourge are lacking in Africa, probably because of the low socioeconomic level and the governments' interest in infectious diseases, considered more severe [4]. Direct costs are the costs of resources directly used in the treatment of a particular disease. Cancer treatment is expensive. The high cost of anti-cancer drugs has a considerable impact on their access in low-income countries; so, cytotoxic molecules remain within the reach of a minority of patients [5]. A World Health Organisation (WHO) report sustains that a standard treatment for an early stage Human Epidermis Receptor 2+ positive breast cancer, with doxorubicin, cyclophosphamide, docetaxel, trastuzumab, might cost the equivalent of 10 years mean salary in South Africa and in India [6]. Also, the disease stage during diagnosis is an important cost-predicting factor [7]. In Togo, breast cancer has a high incidence (17.09%). It is the 1st female cancer (21.2%). It is often diagnosed at advanced stages, and it is the most deadly female cancer [8] [9]. Given these factors, interrogation on what is the mean direct medical cost of breast cancer care in Togo is asked. Motivated by the improvement of cancer care in Togo, our study was aimed at showing that as well as infectious diseases, breast cancer is a major public health issue which also requires financial support. Considering the Gross Domestic Product (GDP) fluctuating between 642 and 2,380,2 \$ (2018 to 2022), and also the minimum wage recently revised to 52,500 FCFA [10]; we had as study hypothesis that "the direct medical cost of breast cancer care was greater than the mean household income in Togo". To confirm or refute this, we had

a General objective:

- To evaluate the direct medical cost of breast cancer care.

2. Methods

It was a transversal descriptive study carried out in the Obstetrics and Gynaecology unit of the Sylvanus Olympio University Hospital (SO UH) and in the International Cancer Centre of Lome (ICCL) during July and August of the year 2022. The study involved women with breast cancer diagnosis confirmed histologically from January 2018 to July 2022 and followed up from the date of diagnosis till July, 31st 2022. Patients with incomplete files, or who didn't do any complementary investigation were not included. Informed consent was obtained. Cost calculation was done using the "micro-costing" method and for the consumed resources monetary valuation the "bottom-up" approach was used. Prices of different laboratory investigations and medical acts and drugs were considered according to the Ministry of Health, Public Hygiene and Universal Access to care regulations and pricing. The various expenditure items were classified as follows: diagnosis, other investigations (pre-therapeutic and follow-up), hospitalisation, surgery, chemotherapy, radiotherapy, hormone therapy, additional drugs, and follow-up. To get the total price for each expenditure item, we looked for the unit price of the concerned item and multiplied it by the number of times the item was requested.

Finally, the total medical cost was obtained by summing the cost of the different items, and the following equation was obtained: *direct medical cost = cost of diagnosis + cost of chemotherapy + cost of radiotherapy + cost of surgery + cost of prescribed drugs + cost of other laboratory tests + cost of hospitalisation + cost of follow-up*. For patients with health insurance, a coverage rate of 80% was considered, regardless of the type of insurance used. To facilitate the comparison of costs, the amounts in CFA francs were converted into US dollars with an exchange rate of 1 USD = 697.84 CFA francs on 11 October 2022 at 5h20 min.

A pre-tested survey form was used to collect the data, the latter was then entered and analysed using Epidata 4.6.0.5 and STATA version 15. The comparison of the cost distributions was made using the non-parametric Mann-Whitney and Kruskal Wallis tests, with a p-value ≤ 0.05 considered statistically significant. (The graphs were produced using Microsoft Excel 2021. The study was started after obtaining permission from the directors of the University Hospital SO and the ICCL).

3. Results

3.1. Participation Rate

From 2018 till 2021, 473 cases of breast cancer have been registered at the Obstetrics and Gynaecology Clinic of the Sylvanus Olympio Teaching Hospital. Only 146 patients were enrolled in our study, with a participation rate of 30.87%.

3.2. Sociodemographic Characteristics

The mean age of the patients was 48.9 ± 11.7 years with extremes of 25 and 77 years. The age range [45 - 55[years represented 31.5%. Fifty one patients (39%) were retailers. Sixty four patients (43.8%) attended secondary education (**Table 1**).

3.3. Direct Medical Cost of Breast Cancer Care

- **Cost of diagnosis**

The median cost of breast cancer diagnosis was 182,080 FCFA with extremes ranging from 55,680 FCFA to 487,680 FCFA.

- **Cost of chemotherapy**

The median cost of chemotherapy was 1,640,790 FCFA with extremes ranging from 199,820 FCFA to 208,885 FCFA (**Table 2**).

Table 1. Patients sociodemographic characteristics.

	Effective	Percentage
Age		
[25 - 35[	19	13
[35 - 45[	34	23.4
[45 - 55[	46	31.5
[55 - 65[	32	21.9
[65 - 75[	11	7.5
≥75	4	2.7
Occupation		
Retailer	57	39
Housewives	37	25.3
Seamstress	17	11.6
Others*	14	9.6
Hairdressers	10	6.9
Missionary	5	3.4
Retired	4	2.8
Accountant	2	1.4
Instruction level		
Secondary	64	43.8
Primary	42	28.8
Uneducated	29	19.9
Tertiary	11	7.5

*Others (one of each of the following) = sociologist, teacher, charwoman, development agent, security agent, nurse aid, seamstress apprentice, farmer, pharmacy attendant, midwife, secretary, management assistant, social assistant, trainee.

Table 2. Distribution according to chemotherapy.

	Effective	Percentage
<350,000 FCFA	2	5.3
] 350,000 FCFA; 500,000 FCFA]	4	10.5
] 500,000 FCFA; 1,000,000 FCFA]	2	5.3
] 1,000,000 FCFA; 2,000,000 FCFA[	15	39.5
≥2000,000 FCFA	15	39.5
Total	38	100.0

- **Cost of surgery**

The median cost of surgical treatment of breast cancer was 230,320 FCFA with extremes ranging from 135,240 FCFA to 368,060 FCFA.

- **Cost of hormonotherapy**

The median cost of hormonal treatment was 206,200 FCFA with extremes ranging from 36,750 to 494,850 FCFA. The treatment with aromatase inhibitors was more expensive than that of oestrogen inhibitors (**Table 3**). There was no statistical significance ($P = 0.308$).

- **Cost of radiotherapy**

The median cost of radiotherapy was 1,765,000 FCFA with extremes ranging from 1,715,000 to 2,030,000 FCFA.

- **Cost of other laboratory investigations performed**

Of the 146 patients, 46 had not undergone any other complementary tests apart from diagnostic tests. The median cost of the tests carried out as part of the pre-therapeutic assessment and follow-up was 21,500 FCFA with extremes ranging from 0 FCFA to 824,760 FCFA.

- **Other costs**

- **Cost of prescription drugs**

The median cost of prescription drugs was 12,500 FCFA with extremes ranging from 6,000 to FCFA 590,310 FCFA (**Figure 1**).

- **Cost of hospitalisation**

Seventy-seven patients did not incur any additional hospitalization costs. The median cost of hospitalization for the remaining 69 patients was 15,000 FCFA with extremes ranging from 5,000 FCFA to 105,000 FCFA.

- **Cost of follow-up**

The median cost of follow-up was 13,500 FCFA with extremes ranging from 3,000 FCFA to 42,000 FCFA.

3.4. Direct Medical Cost of Breast Cancer

The median direct medical cost was 4,086,890 FCFA with extremes ranging from 2,156,490 to 10,111,545 FCFA. Five patients (3.4%) spent at least 5 million for the management of their breast cancer (**Figure 2**).

Table 3. Cost of hormone therapy according to the type of molecule used (FCFA).

	Drugs	
	Aromatase antagonists	Oestrogen inhibitors
Effective	8	4
Median	230,805	144,375
Interquartile range	[119,405; 388,100]	[62,375; 326,750]
Minimum	63,240	36,750
Maximum	494,850	452,750

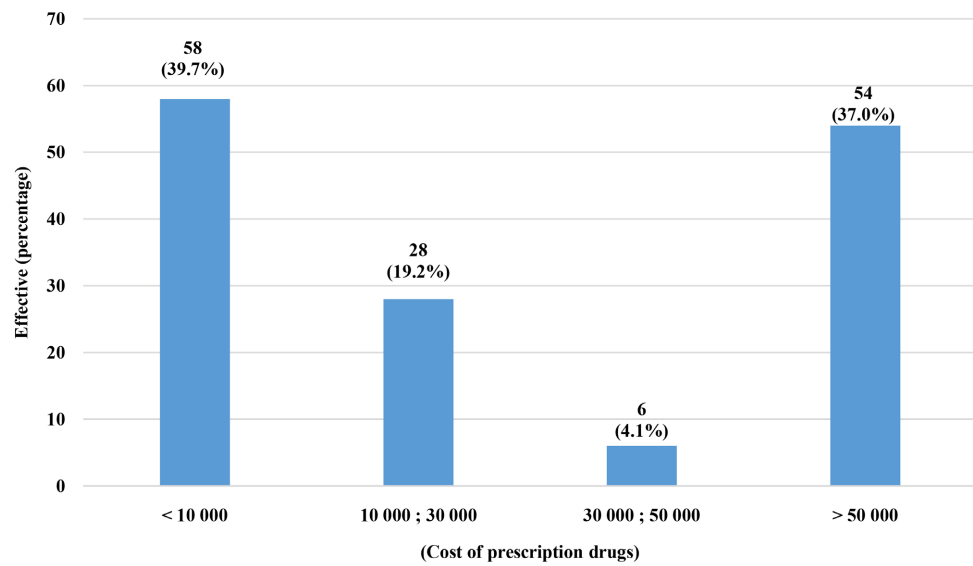


Figure 1. Distribution of patients by prescription drug costs.

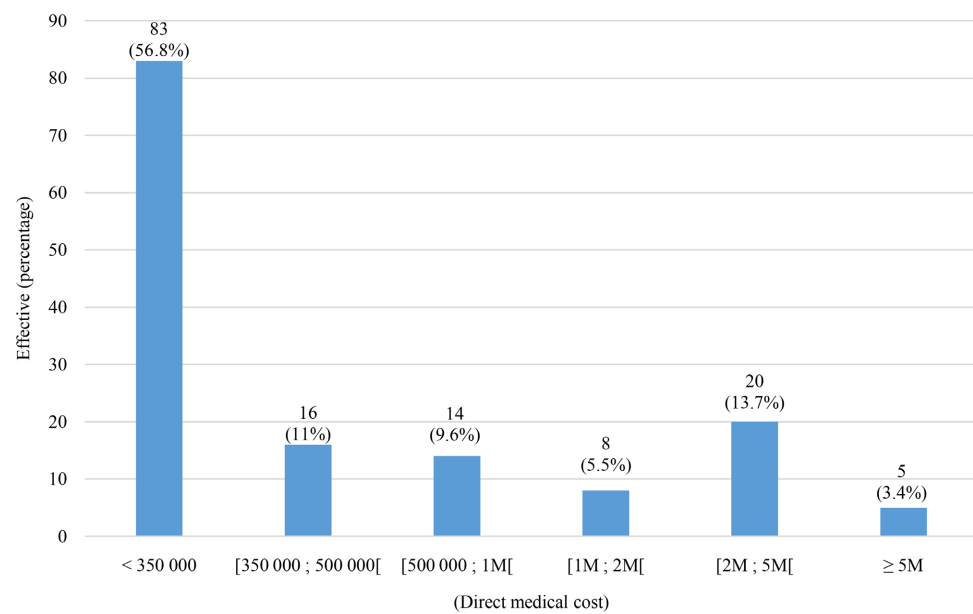


Figure 2. Distribution by direct medical cost of breast cancer.

3.5. Direct Medical Cost and Level of Instruction

The direct medical cost was higher for patients with higher levels of education (1,907,619 FCFA) compared to uneducated patients (666722.8 FCFA). Direct medical cost was statistically associated with education level (**Table 4**).

3.6. Direct Medical Cost and Stage of Breast Cancer

The median direct medical cost of managing stage I cancer was higher than that of higher stage cancer. However, some stage IV patients spent more than stage I patients. This observed difference was not statistically significant (**Table 5**).

3.7. Direct Medical Cost of Breast Cancer Management and Health Insurance

The direct medical cost of breast cancer management was 119,200 FCFA with extremes ranging from 36,616 to 1,604,669 FCFA for patients with health insurance (17.1% of patients).

4. Discussion

The mean age of the patients in our series was 48.9 ± 11.7 years. The age group [45 - 55] represented 31.5%. The results of this study are in line with those reported by Diallo *et al.* in Senegal in 2022 [11], where the average age of patients was 48 years. This could be due to the fact that young people make up the majority of the population. In addition, this category of the population is more familiar with modern communication tools (social networks and others), which gives them greater access to information about the disease. In 39% of cases, they were shopkeepers and in 25.3% of cases, housewives. Only 25 patients (17.1%) had health insurance.

These figures may be due to the fact that the main centre of our study, the CHU-SO, is a public medical centre with a social vocation; as a result, healthcare services there are relatively cheaper than in private medical structures. Thus, patients who are financially better off seek medical assistance from private medical centres, hoping to have access to better follow-up conditions. The direct medical cost of breast cancer care at the CHU-SO and ICCL was very high. The estimated median direct medical cost was 4,086,890 FCFA (\$5856.49) with a minimum

Table 4. Direct medical cost and level of instruction.

	Level of instruction		P value
	<Secondary	≥Secondary	
Effective	71	75	
Median	271,180	341,320	
Interquartile interval	[185,480 - 515,350]	[191,580 - 2,008,630]	0.0410
Minimum	161,580	175,580	
Maximum	6,532,315	8,023,345	

Table 5. Direct medical costs according to breast cancer stage (FCFA).

	Stage of breast cancer				P value
	Stage I	Stage II	Stage III	Stage IV	
Effective	2	26	52	66	
Median	1,478,370	289,205	279,680	281,305	
Interquartile interval	[1,296,580 - 1,660,160]	[185,680 - 6,641,640]	[192,580 - 603,050]	[188,680 - 706,800]	0.4712
Minimum	1,296,580	175,580	161,580	168,600	
Maximum	1,660,160	8,023,345	6,906,060	6,724,290	

of 2,156,490 FCFA (\$3992.66) and a maximum of 10,111,545 FCFA (\$12446.14) for an average duration of 22.5 months. These values are much higher than those of Diallo who found 2,051,855 FCFA over an average period of 31 months [11] and Hughes G. in Ghana in 2012 who found GH¢ 2070 (\$358.19) per year and GH¢ 6008.09 (\$1039.62) for the period under consideration [12]. These cost differences would partly reflect differences in the stage of the disease at the time of diagnosis as well as variations in the availability of and access to appropriate treatments, in our context treatment was not performed by the majority of patients. We did not find a statistically significant association between the FIGO stage of disease and the medical cost of breast cancer management. However, we did note that treatment costs differed according to the stage of diagnosis. This is similar to the results of Diallo in Senegal in 2022 [11]. For Mahantshetty, the stage of the disease at diagnosis is an important predictor of treatment costs [7]. Despite the fact that some stage IV patients, having undergone a large part of the proposed treatment, spent more than stage I patients (6,724,290 FCFA \neq 1,660,160 FCFA), it was still found that the medical cost was higher in patients diagnosed at stage I than in those with more advanced stages of the disease. Thus, cancer management according to stage cost on average respectively 1,478,370 FCFA; 289,205 FCFA; 279,680 FCFA; and 281,305 FCFA for stages I; II; III and IV. This is in contradiction with all the literature that argues that breast cancer treatment costs generally increase with increasing stage of the disease at diagnosis [13]. This glaring contradiction could be explained by greater adherence to treatment in stage I patients, but also by the fact that because of the high cost of treatment, the families of many patients with advanced disease would prefer to keep them at home in order to minimise “wasted” expenses and allocate the funds to their future funerals, especially since cancer is considered a “death sentence” in our circles. For the average cost of treatment by expenditure item, the following results were obtained: radiotherapy at 1,765,000 FCFA (\$2529.30), chemotherapy is estimated at 1,640,790 FCFA (\$2351.31) and surgery at 231345.1 FCFA (\$33,152). These results differ from those of Diallo in Senegal in 2022 where the costs were distributed as follows: chemotherapy \$1274.92, surgery \$642.31 and radiotherapy \$583.18 [11]. This variation could be due to the difference in prices for dif-

ferent medical procedures between countries; but also to the variations of health policies in each country. Senegal, for example, has opted to subsidise chemotherapy for breast and cervical cancer. Given that a large proportion (39%) of our respondents were low-income commercial vendors and another 25.3% were not engaged in income-generating activities, and comparing the direct medical cost of breast cancer treatment (\$5856.49) to the recently revalued (SMIG) of 52,500 FCFA [10], we can not only state that the average cost of breast cancer treatment far exceeded the household income [14]; but also highlight the financial burden of cancer care. A Pakistani study showed that the financial burden of cancer care was substantial and mainly borne by the patient or her family [14] and another multi-centre study found that in Haiti two-thirds of women with breast cancer faced financial catastrophe due to treatment costs [15]. All these arguments could explain the large number of patients lost to follow-up, which cannot afford adequate treatment and are forced to rely on God through prayer. This treatment remains inaccessible to the average Togolese, especially since 74% of the patients in this sample stated that they were engaged in a very low-paid informal activity; and also that many of these patients had to pay for the treatment out of their own pockets, hence the very low rate of adherence to treatment.

5. Conclusion

The direct medical cost of breast cancer treatment is higher than the average household income in Togo. The implementation of various supportive measures in some neighboring countries, including the subsidy of cytotoxic molecules in Senegal and Ghana, would help to reduce these costs and make treatment more accessible. In Togo, the question of what measures could be taken to increase adherence to treatment by patients living with this cancer and to reduce the large number of long-lost patients is still pending.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Delavell, B. (2016) Étude du coût de la prise en charge du cancer du sein métastatique: exemple dans un centre de lutte contre le cancer durant la période 2008 à 2015. *Médecine humaine et pathologie*. <https://dumas.ccsd.cnrs.fr/dumas-01583378/document>
- [2] Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A., *et al.* (2021) Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*, **71**, 209-249. <https://doi.org/10.3322/caac.21660>
- [3] Harizi, C., Bellali, H., Hchaichi, A., Hamzaoui, A. and Chahed, M.H. (2018) Estimation du coût de la prise en charge du cancer broncho-pulmonaire en Tunisie. *Eastern Mediterranean Health Journal*, **24**, 988-993. <https://doi.org/10.26719/2018.24.10.988>
- [4] Brahmi, S.A., Zahra, Z.F., Seddik, Y. and Afqir, Y. (2016) La problématique du coût

- des nouvelles thérapeutiques en oncologie: Qu'En-est-il du Maroc? *Pan African Medical Journal*, **24**, Article 51. <https://doi.org/10.11604/pamj.2016.24.51.9512>
- [5] Mattila, P.O., Babar, Z.U.D. and Suleman, F. (2021) Assessing the Prices and Affordability of Oncology Medicines for Three Common Cancers within the Private Sector of South Africa. *BMC Health Services Research*, **21**, Article No. 661. <https://doi.org/10.1186/s12913-021-06627-6>
- [6] Organisation mondiale de la Santé, Organisation mondiale du commerce and Organisation mondiale de la propriété intellectuelle (2021) Promouvoir l'accès aux technologies médicales et l'innovation: Intersections entre la santé publique, la propriété intellectuelle et le commerce. 2e ed. Organisation mondiale de la Santé, Genève. https://www.wto.org/french/res_f/publications_f/who-wipo-wto_2020_f.htm
- [7] Mahantshetty, U.M. (2019) Scale-Up of Radiotherapy for Cervical Cancer. *Lancet Oncology*, **20**, 888-889. [https://doi.org/10.1016/S1470-2045\(19\)30376-6](https://doi.org/10.1016/S1470-2045(19)30376-6)
- [8] Amégbor, K., Darre, T., Ayéna, K.D., Padaro, E., Tengué, K., Abalo, A., et al. (2011) Cancers in Togo from 1984 to 2008: Epidemiological and Pathological Aspects of 5251 Cases. *Journal of Cancer Epidemiology*, **2011**, Article ID: 319872. <https://doi.org/10.1155/2011/319872>
- [9] Bassowa, A., Ketevi, A., Douaguibe, B., Fiagnon, K., Sedoh, T., Ajavon, D. et al. (2018) Décès par cancer du sein au CHU Sylvanus Olympio de Lomé: Plaidoyer pour un dépistage systématique chez les patientes à risques au Togo. *Journal de la Recherche Scientifique de l'Université de Lomé*, **20**, 271-276.
- [10] Gnassingbé, F. (2023) Message à la nation. Au Togo, le SMIG revalorisé à 52.500 FCFA à partir de ce 1er janvier 2023. Portail officiel de la république togolaise. Publié le dimanche, 01 janvier 2023 09h: 21. Consulté le 11 mars 2023 à 20h40. Disponible sur: Togo Officiel. <https://www.republiquetogolaise.com/gestion-publique/0101-7601-au-togo-le-smig-revalorise-a-52-500-fcfa-a-partir-de-ce-1er-janvier-2023>
- [11] Diallo, M., Fall, D., Mballo, I., Niang, C.I. and Charfi, M.E. (2022) Coûts médicaux directs de traitement du cancer du sein à l'Institut Joliot Curie de l'Hôpital Aristide Le Dantec de Dakar, Sénégal [Direct Medical Costs of Breast Cancer Treatment at the Joliot Curie Institute of the Aristide Le Dantec Hospital in Dakar, Senegal]. *The Pan African Medical Journal*, **42**, Article 266.
- [12] Hughes, G., Amoah, A., Ahiabor, G. and Awoah, B. (2013) Economic Cost of Breast Cancer in Ghana: The Komfo Anokye Teaching Hospital Experience. *Journal of Business Research*, **6**, 86-104.
- [13] Sun, L., Legood, R., Dos-Santos-Silva, I., Gaiha, S.M. and Sadique, Z. (2018) Global Treatment Costs of Breast Cancer by Stage: A Systematic Review. *PLOS ONE*, **13**, e0207993. <https://doi.org/10.1371/journal.pone.0207993>
- [14] O'Neill, K.M., Mandigo, M., Pyda, J., Nazaire, Y., Greenberg, S.L., Gillies, R., et al. (2015) Out-of-Pocket Expenses Incurred by Patients Obtaining Free Breast Cancer Care in Haiti: A Pilot Study. *Surgery*, **158**, 747-755. <https://doi.org/10.1016/j.surg.2015.04.040>
- [15] Xu, K., Evans, D.B., Kawabata, K., Zeramdini, R., Klavus, J. and Murray, C.J. (2003) Household Catastrophic Health Expenditure: A Multicountry Analysis. *Lancet*, **362**, 111-117. [https://doi.org/10.1016/S0140-6736\(03\)13861-5](https://doi.org/10.1016/S0140-6736(03)13861-5)