Economic burden of HER2+ breast cancer and the targeted therapies epidemiological & economic impact in Trinidad and Tobago

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Introduction

Breast cancer is the most common cancer among women worldwide, with HER2-positive (HER2+) subtypes representing a significant portion of cases. (1) In Trinidad and Tobago, breast cancer constitutes a major health concern (570 new cases for 2022), accounting for over a quarter (29%) of all female cancer diagnoses. (2) Of the total 570 new cases for 2022, 20% correspond to HER2+ breast cancer.

The aggressive nature of HER2+ breast cancer requires the use of targeted therapies following the ESMO guidelines, which come with high costs compared to chemotherapy. This study quantifies the economic burden of HER2+ breast cancer and evaluates the treatment impact of HER2+ targeted therapies in Trinidad and Tobago. (3) Using real-world data and expert opinions, this research aims to provide a comprehensive analysis of the financial impacts of HER2+ breast cancer burden and the impact of use targeted therapies, offering valuable insights for healthcare policy and management in Trinidad and Tobago. This study aims to estimate the economic burden of this type of cancer and analyze the epidemiological and cost impact of HER2+ targeted therapies.

Methods

This study employs a mixed-methods approach to evaluate the economic impact and clinical outcomes of HER2+ breast cancer treatments in Trinidad and Tobago. A Delphi panel, bottom-up cost analysis was conducted with the medical oncologic team of the Cancer Centre of Trinidad and Tobago, to assess real- world HER2+ BC management.

Experts evaluated the probability and frequency of resource use to capture management variations within healthcare systems. Public tender award prices, reports and private sector pricing obtained HER2 + BC management costs (USD2024). A population estimation model was performed to determine the impact of targeted HER2+ therapies in early BC avoided relapses, prevented metastases, life-years gained, quality-adjusted life- years , and metastatic BC cost reduction, comparing a base scenario (chemotherapy alone) vs actual scenario (Chemotherapy and Trastuzumab) vs ideal (Chemotherapy, Trastuzumab, Pertuzumab & Trastuzumab+Emtansine).

To assess the impact of targeted therapies, a population estimation model was utilized. This model calculated the potential number of avoided relapses, prevented metastases, and the consequent economic savings under three scenarios: chemotherapy alone, current treatment regimens including Trastuzumab, and an ideal scenario featuring a combination of Chemotherapy, Trastuzumab, Pertuzumab, and Trastuzumab+Emtansine. The outcomes measured included life years (LYs) gained, quality-adjusted life years (QALYs), and direct cost savings.

Results

The assessment of the economic impact and health outcomes of different treatment strategies for HER2+ breast cancer in Trinidad and Tobago, are: In terms of costs, the management of a HER2+ breast cancer patient varies significantly across different stages. The average-annual-cost of healthcare for a patient with HER2+ BC (actual-scenario) in neoadjuvant, adjuvant, in first and second line metastatic disease are noted as follows USD42,480.14; USD42,715.22, USD62,769.26, USD35,349.80; respectively. This data is shown in figure 1 & 2. The introduction of targeted therapies substantially improved clinical outcomes and economic efficiency. The disease-targeted therapies in the actual and ideal scenario for Trinidad and Tobago in 2024 resulted in 5 & 10 recurrences avoided respectively vs chemotherapy alone. Additionally, this would have resulted in the prevention of 5 cases of metastatic disease in the actual scenario with 9 in the ideal. The actual vs ideal setting would have 133 vs 256 LYs gained and 105 vs 203 QALYs gained respectively. Thus leading to a savings of USD512,209 vs USD989,923, respectively gained. This information could be seen in figure 3-6.

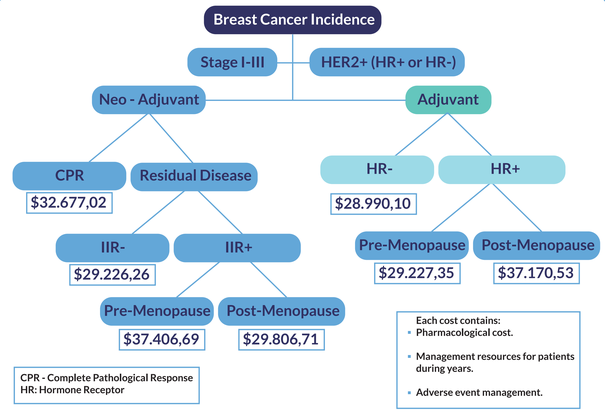

Figure 1. Burden of HER2+ breast cancer management from the perspective of the third-payer in Trinidad and Tobago during 2-year patients' follow-up in adjuvant and neo-adjuvant stage.

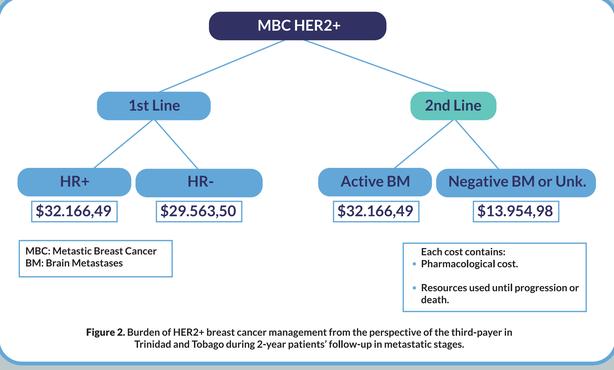

Figure 2. Burden of HER2+ breast cancer management from the perspective of the third-payer in Trinidad and Tobago during 2-year patients' follow-up in metastatic stages.

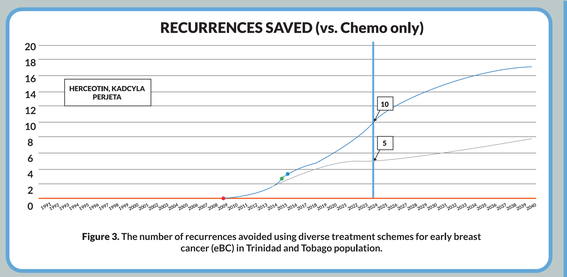

Figure 3. The number of recurrences avoided using diverse treatment schemes for early breast cancer (eBC) in Trinidad and Tobago population.

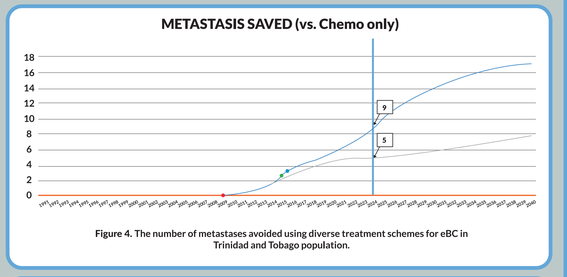

Figure 4. The number of metastases avoided using diverse treatment schemes for eBC in Trinidad and Tobago population.

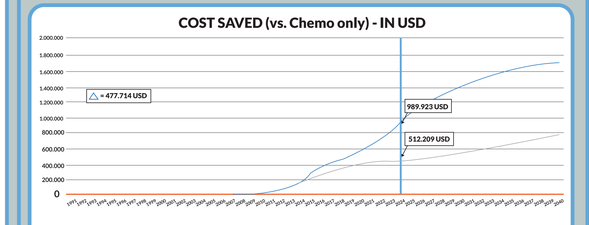

Figure 5. The cost saved due to metastases avoided using diverse treatment schemes for eBC in Trinidad and Tobago population.

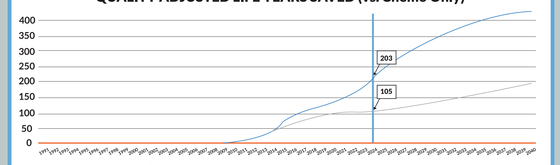

Figure 6. The Quality Adjusted Life Years (QALYs) gained using diverse treatment schemes for eBC in Trinidad and Tobago population.

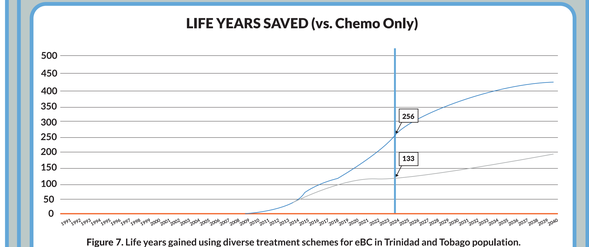

Figure 7. Life years gained using diverse treatment schemes for eBC in Trinidad and Tobago population.

Discussion

The study highlight the critical importance of early intervention in the treatment of HER2+ breast cancer, particularly with the implementation of targeted therapies. Early treatment not only improves clinical outcomes but also significantly reduces the economic burden associated with the management of metastatic disease. By administering targeted therapies during the neoadjuvant and adjuvant stages, the progression to more costly metastatic care can be decreased. This approach conserves valuable healthcare resources and enhances patient prognosis by avoiding the escalation of care required for more advanced disease states. Moreover, the study illustrates the detrimental effects of delayed access to these advanced therapies. Each year of delay in making targeted therapy regimens available (such as those including Chemotherapy, Trastuzumab, Pertuzumab, and Trastuzumab+Emtansine) results in clinical and economic losses. Specifically, the absence of these treatments leads to higher recurrence rates, more cases of metastasis, and a significant increase in healthcare costs due to the need for more intensive and prolonged treatment of advanced disease stages. Financially, this translates into dozens or millions of dollars in lost savings that could have been avoided with earlier treatment intervention.

Conclusion

Metastatic HER2+ BC management incurs higher costs than neoadjuvant or adjuvant stages. Targeted therapies improve patient outcomes by preventing metastases, increasing LY's and QALY's, and reducing costs associated with advanced disease.

References

1. Zaidi, Z., & Cherif, M. H. (2019). The worldwide female breast cancer incidence and survival, 2018. Pan Arab Journal of Oncology, 12(2).
2. Globocan. (2020). Breast cancer incidence, mortality and prevalence in the Republic of Trinidad and Tobago for 2020 [Data set]. International Agency for Research on Cancer. https://gco.iarc.fr/today/data/factsheets/populations/780-trinidad-and-tobago-fact-sheets.pdf
3. Cardoso, F., Kyriakides, S., Ohno, S., Penault-Llorca, F., Poortmans, P., Rubio, I. T., & Senkus, E. (2019). Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of oncology, 30(8), 1194-1220.
4. Conway, BR & Ren, S. (2021).Economic evaluation of health interventions: applications of treatment impact models.Health Economics Journal, 14(4), 456-468. DOI: 10.1007 /HEJ -2021-05678
5. Denis, P., & Walker, D. (2015).Frameworks for pharmacoeconomic modelling: standardization and use of disease-specific models. Pharmacoeconomics, 33(10), 1017-1025.DOI: [10.1007/s40273-015-0274-y](https ://doi.org /10.1007 /s
6. Cunha, A. (2023). Hospital capacity tool to assess the potential impact of using a fixed dose combination of pertuzumab/trastuzumab for subcutaneous injection versus intravenous pertuzumab/trastuzumab in HER2+ breast cancer. ISPOR Europe 2023. https://www.ispor.org/docs/default-source/euro2023/isporeurope23cunhahsd11poster129659-pdf.pdf?sfvrsn=b77bf50b_0
7. Kommandantvold, G., & Langer, I. (2024). Cost-Effectiveness Analysis (CEA) of Pertuzumab and Trastuzumab in Combination with Chemotherapy in the Adjuvant Treatment of HER2-Positive Early Breast Cancer. ISPOR Europe 2024. https://www.ispor.org/docs/default-source/euro2024/kommandantvoldispor-eu-2024-aphinity-cost-effectiveness-posterfinal144769-pdf.pdf?sfvrsn=f1feda32_0
8. Kaushik, A., Dasgupta, A., Singh, B., Sharma, A., & Baio, G. (2024). Bayesian IPD Meta-Analysis of Time-to-Event Data in Metastatic Breast Cancer. ISPOR Europe 2024. https://www.ispor.org/docs/default-source/euro2024/bayesian-ipd-ma-ispor-eu9-oct-2024142728-pdf.pdf?sfvrsn=1799f9ee_0