Economic Impact of the Introduction of Combined Triple Therapy "Budesonide-Glycopyrronium-Formoterol" in the continuous Treatment of Chronic Obstructive Pulmonary Disease in Algeria

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ABSTRACT

OBJECTIVES: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death worldwide. For severe cases, a combined tritherapy (CTT) with a long-acting β2 agonist (LABA), an inhaled corticosteroid (ICS), and an antimuscarinic (LAMA) is recommended. This study aims to evaluate the economic impact of introducing the CTT in the continuous treatment of moderate to severe COPD in adults in Algeria. **METHODS:** A Budget Impact Analysis (BIA) was conducted from the payer's perspective over a 5-year time horizon. The study population included patients with moderate to severe COPD not controlled with a combination BALA/AMLA or BALA/CSI at the pulmonary department of University Hospital of Beni Messous. The model compared annual costs of acquisition, monitoring, and management of exacerbations for each treatment in each scenario. In Scenario 1 (without CTT): the treatments considered in this model are those already registered, marketed, and reimbursed in Algeria until 2023. In scenario 2 (with CTT): a portion of study population is placed on CTT with a reallocation of market shares. (50% CTT the rst year and 10% annual increase in CTT adoption the following four years). **RESULTS:** Over the ve years, the number of patients eligible for CTT is estimated at 5,125 patients. In Scenario 1, 4,014 patients would be treated with open triple therapy (OTT). In Scenario 2; 989 patients would be treated with OTT, while 3,604 patients would be treated with CTT. The remaining patients would stay on dual therapy. With a cost of USD 2,267.03 per patient per year, the scenario including CTT results in a reduction of the budgetary impact by USD 13,566.63 for 3604 patients treated over a 5-year time horizon. This reduction is directly related to the decreased rate exacerbations.
CONCLUSIONS: COPD imposes a heavy economic burden. Combined triple therapy could reduce this burden by decreasing exacerbations and improving adherence

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death worldwide, causing 3.23 million deaths in 2019 **[1]**. Nearly 4% of the Algerian population over the age of 40 is thought to be affected by COPD **[2]**. COPD patients are often prone to frequent lower respiratory tract infections. These recurrent infections, known as exacerbations, worsen the symptoms and progression of COPD **[3]**. The economic burden of COPD is high due to the costs associated with managing the disease, as well as the impact on patients' productivity and quality of life.

The aim of COPD treatment is to reduce the symptoms of the disease and the frequency and severity of exacerbations. These include long-acting muscarinic antagonists (LAMAs), long-acting β2-agonists (LABAs) and inhaled corticosteroids (ICSs). Budesonide, Glycopyrronium and Formoterol combined in a single device or combined tritherapy (CTT), have shown advantages over dual therapy with a BALA/AMLA or BALA/CSI **[4]**. As this treatment is not available in Algeria, clinicians combine these three therapeutic classes separately (Open tritherapy or OTT).

OBJECTIVE

This study aims to evaluate the economic impact of the introduction of "Budesonide-Glycopyrronium-Formoterol" CTT in the continuous treatment of moderate to severe COPD in Algeria.

METHOD

A Budget Impact Analysis (BIA) was carried out using a Budget Impact Model (BIM) developed in line with the ISPOR good practice guidelines **[5]**, using Microsoft Office Excel 2019.

The total annual costs were estimated according to two scenarios, before and after the introduction of TCT in the continuous treatment of moderate to severe COPD in adults not satisfactorily treated with the combination BALA/AMLA or BALA/CSI in Algeria.

The budgetary impact was estimated as the difference in total healthcare costs for the target population between the two scenarios for each year over a five-year horizon, from the perspective of Algerian payers.

Scenario 1 (without Combination Therapy)

Treatments are those already registered, marketed and reimbursed in Algeria until 2023, according to current practice for patients with moderate or severe COPD who have failed dual BALA/ICS or BALA/LAMA therapy (exacerbations).

Scenario 2 (with Combination Therapy)

Some patients with moderate or severe COPD who have failed dual therapy with BALA/ICS or BALA/LAMA are put on CTT, with a reshuffling of market shares.

RESULTS and DISCUSSION

Study population: An investigation was carried out in the Pneumology Department of the University Hospital Centre of Beni Messous (Algiers- Algeria). The study included the records of **88 adult patients** recruited over a 5-year period, from 1 January 2019 to 31 December 2023, with a history of moderate or severe exacerbations.

a. Survey results

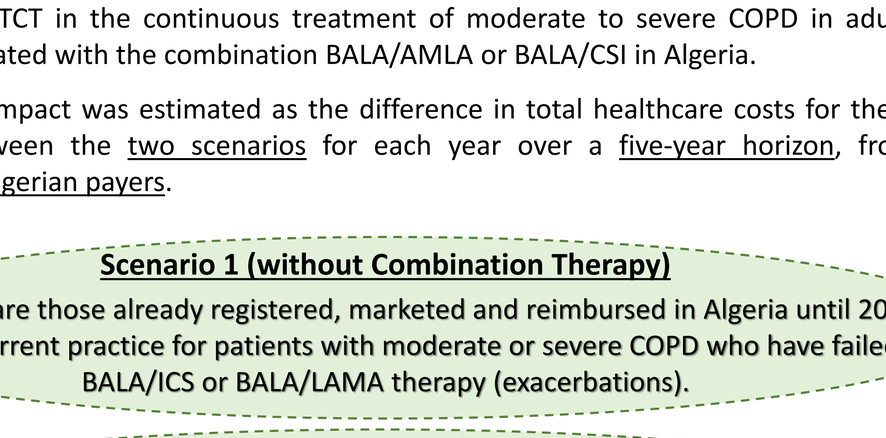
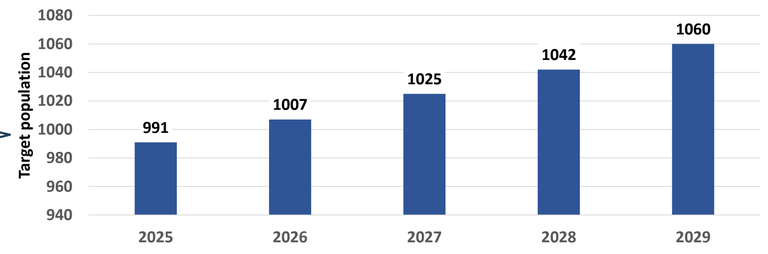


Figure 1. Distribution of patients according to COPD clinic and therapy. ER=Exacerbation rate.

b. Targeted population :

Represented by patients with moderate to severe COPD (1⁄3 of COPD patients) **[6]** with dual therapy failure expressed by recurrence of exacerbations (1⁄3 of patients according to our survey sample). An extrapolation of the results of our investigation coupled with the results of the bibliographic research made it possible to determine it as represented in **Figure 2**.

Figure 2. Targeted population over 5 years



c. Distribution of market share

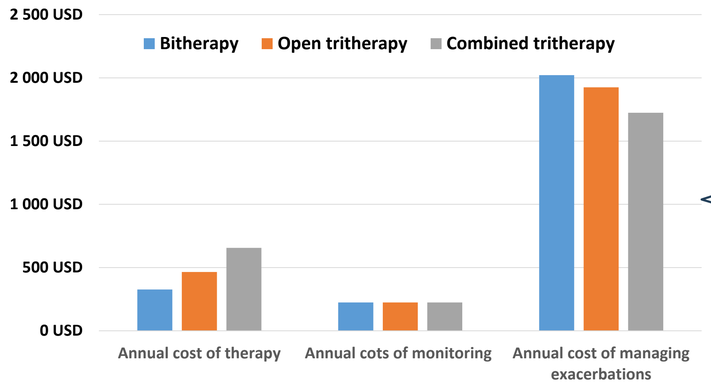


Figure 3. Cost of each item per therapy per patient per year.

The market shares for the current scenario (**scenario 1**) are based on the survey carried out. A reorientation of the patients with failure of the bitherapy towards the OTT was modelized with a progressive increase by stage of 10% each year.

The future scenario (**scenario 2**) was constructed on the basis of hypothetical market shares to be acquired by CTT as follows: a market share of 50% in the first year of marketing, followed by a stepwise increase of 10% each year. The market share distribution for each scenario is shown in **Table 1**.

Table 1. Distribution of the market share.
(OTT: open tritherapy; CTT: combined tritherapy)

	2025	2026	2027	2028	2029
	Scenario 1				
Bitherapy	42%	32%	22%	12%	2%
OTT	58%	68%	78%	88%	98%
	Scenario 2				
Bitherapy	20%	15%	10%	5%	2,5%
OTT	30%	25%	20%	15%	7,5%
CTT	50%	60%	70%	80%	90%

The budgetary impact was calculated as the difference between **scenario 1** and **2** of the sum of the total costs of each therapy. Thus, savings are made from the 3rd year (2027) of the introduction of the CTT, amounting to **USD 2,362.4**, and increase progressively with savings of **USD 5,722.5** in 2028 and **USD 10,323.3** in 2029. The cumulative budgetary impact has also been calculated and shows that the CTT reduces the budgetary impact of COPD management by **USD 13,566.63** for 3,604 patients treated over 5 years. The evolution of the budget impact over 5 years is shown in **Figure 4**.

The cost-effectiveness study of CTT versus Bitherapy conducted in the UK demonstrated that the costs associated with exacerbations were reduced by **USD 2180.82**. This **33%** reduction is greater than that found in our study, and may be linked to the higher costs of treatment in developed countries.

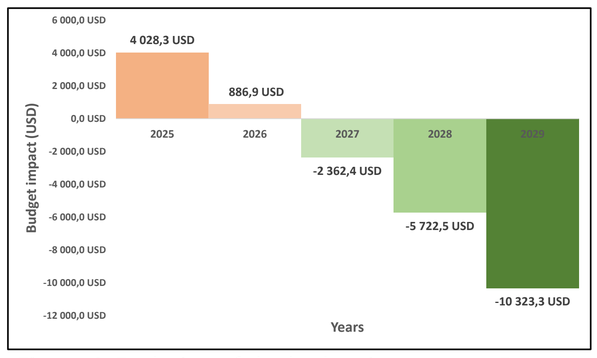


Figure 4. Evolution of the budget impact over 5 years.

A cost minimization analysis comparing the 1-year costs of CTT versus OTT was also performed and estimated total 1-year costs at **USD 2328.18** for CTT and **USD 2505.79** for OTT, which translates into a saving of **USD 177.62** per patient per year with CTT, i.e. 7% less. **[7, 8]**

CONCLUSION

COPD represents a considerable economic burden which requires the implementation of appropriate measures to prevent a continuing increase in expenditure. The introduction of a triple therapy **'Budesonide/Glycopyrronium/Formoterol'** combined in a single inhaler device to be a **promising solution** to reduce this economic burden by allowing a decrease in the exacerbation rate and better compliance. It is suggested to complement the results of this study with other types of pharmaco-economic evaluations such as a cost-effectiveness model.

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CONTACT

REFERENCES