Economic Burden of Short-Acting Beta-2 Agonist Overuse Among Asthma Patients in Türkiye: A Cost Analysis with Respect to Updated Recommendations of the Global Initiative for Asthma

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INTRODUCTION

- The short-acting β2-agonist (SABA) overuse was associated with poor clinical outcomes across a broad range of countries, healthcare settings and asthma severities in the global SABINA III study (1).
- Data from the Türkiye arm of the SABINA III study also indicated SABA overuse in nearly a quarter of the patients (2), providing support for initiatives to improve asthma morbidity by reducing SABA overreliance (1,3).
- Although several studies indicated the relationship between SABA overuse and adverse clinical outcomes (i.e., poor asthma control, exacerbations and mortality) and the consequent increase in health care resource utility, there is limited number of studies specifically addressing the cost burden of SABA overuse (4,5).
- This study aimed to determine economic burden of SABA overuse in asthma patients in Türkiye from payer perspective with respect to the latest GINA treatment recommendations (6).

METHODS

This cost of illness study was based on identification of cost burden (severe exacerbations and drug cost) related to SABA overuse in Türkiye.
A total of **3,034,879 asthma patients** comprised the study population, via estimations extrapolated from the Türkiye arm of the global SABINA III study (1,2):

- **525,034 (17.3%) mild asthma patients** (0.3 severe exacerbations per year, GINA step 1: 208,963 [39.8%] patients, GINA step 2: 316,071 [60.2%] patients) and
- **2,509,845 (82.7%) moderate-severe asthma patients** (1.3 severe exacerbations per year, GINA step 3: 559,696 [22.3%] patients, GINA step 4: 981,350 [39.1%] patients, GINA step 5: 968,799 [38.6%])

SABA overuse was defined as the use of ≥3 SABA canisters/year. The economic burden (costs related to the drug and severe exacerbations) was compared in subgroups below:

- **overall (≥0 canisters/y) vs. GINA-recommended use (0-2 canisters/y)**
- **appropriate use (0-2 canisters/y) vs. overuse (≥3 canisters/y)**

Direct medical cost was based on cost items related to severe exacerbations (healthcare resource use during emergency or outpatient admission and hospitalization) and drug costs from payer perspective. Monetary results were converted by using CBRT March 2023 effective buying rate (20.27 TL/€).

RESULTS

I - The cost burden of not applying GINA-recommended SABA use

- Overall, recommended SABA use was predicted to **prevent 127,505 (80.9%) of 157,512 severe exacerbations per year** in mild asthma patients **and 2,668,916 (81.8%) of 3,262,800 severe exacerbations per year** in moderate-severe asthma patients **(Table 1)**.
- The cost burden of "not applying recommended SABA use" in mild asthma and moderate-severe asthma patients was calculated to be **€20.43 million and €427.65 million in terms of severe exacerbations, and to be €829,352 and €7.20 million in terms of drug costs**, respectively **(Table 1)**.
- **The total economic burden arising from "not applying recommended SABA use" was estimated to be €456.11 million**

II - The cost burden of SABA overuse (≥3 canisters per year)

- Appropriate use vs. overuse of SABA was associated **with decreased frequency of severe exacerbations per year** by 78.7% in mild asthma and by 84.9% in moderate-severe asthma **(Table 2)**.
- SABA overuse in mild and moderate-severe asthma patients was estimated to yield **an additional cost of €16.38 million and €385.59 million,** respectively in terms of severe exacerbations, and a total **€11.30 million additional drug cost (Table 2)**.
- **The overall economic burden arising from "SABA overuse" was estimated to be €413.27 million.**

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Table 1. The direct (drug and severe exacerbations) costs in subgroups of overall vs. GINA-recommended (0-2 canisters per year) SABA use: Burden of not applying recommended use

	SABA usage		Burden of not applying recommended use		
	Overall (≥0 canisters/year)[a]	GINA-recommended (0-2 canisters/year)[b]	SABA canisters	Severe exacerbation frequency	Cost burden (€)
Mild asthma					
Number of patients (n)	525,034	525,034		-	
Severe exacerbation frequency	157,512	30,007		127,505	
Cost of severe exacerbation (€)	**25,238,605**	**4,808,109**			**20,430,496**
Number of SABA canisters	669,420	420,553	248,867		
SABA drug cost (€)	**2,230,850**	**1,401,498**			**829,352**
Moderate-severe asthma					
Number of patients (n)	2,509,845	2,509,845		-	
Severe exacerbation frequency	3,262,800	593,884		2,668,916	
Cost of severe exacerbation (€)	**522,807,882**	**95,159,749**			**427,648,133**
Number of SABA canisters	3,502,028	1,340,710	2,161,318		
SABA drug cost (€)	**11,670,547**	**4,467,931**			**7,202,616**
				Total cost burden (€)	**456,110,597**

SABINA III Türkiye data on [a]overall SABA use of (≥0 canisters/year) and [b]GINA-recommended SABA use of (0-2 canisters/year) were extrapolated to overall Türkiye population.

Table 2. The direct (drug and severe exacerbations) costs in subgroups of appropriate use (0-2 canisters per year) vs. overuse (≥3 canisters per year) of SABA: Burden of SABA overuse

	SABA usage		Burden of SABA overuse		
	Appropriate use (0-2 canisters per year)[a]	Overuse (≥3 canisters per year)[b]	SABA canisters	Severe exacerbation frequency	Cost burden (€)
Mild asthma					
Number of patients (n)	483,557	41,477	-		
Severe exacerbation frequency	27,634	129,878		102,244	
Cost of severe exacerbation (€)	**4,427,783**	**20,810,581**			**16,382,798**
Number of SABA canisters	358,336	311,083	-47,253		
SABA drug cost (€)	**1,194,159**	**1,036,688**			**-157,471**
Moderate-severe asthma					
Number of patients (n)	1,809,598	700,247	-		
Severe exacerbation frequency	428,189	2,834,611		2,406,422	
Cost of severe exacerbation (€)	**68,609,958**	**454,197,924**			**385,587,965**
Number of SABA canisters	1,133,195	4,570,426	3,437,231		
SABA drug cost (€)	**3,776,385**	**15,230,995**			**11,454,610**
SABA drug cost-overall (€)					**11,297,139**
				Total cost burden (€)	**413,267,903**

SABINA III Türkiye data on [a]appropriate use (0-2 canisters per year) and [b]overuse (≥3 canisters per year) were extrapolated to overall Türkiye population.

CONCLUSIONS

- The **estimated total economic burden arising from not applying recommended SABA use (€456.11 million) and the SABA overuse (€413.27 million)** with respect to the latest GINA treatment recommendations in the present cost analysis indicates the **substantial cost burden of SABA overuse to the Turkish National Health System, corresponding up to 26% of the total direct cost of asthma** reported in our country.
- **The prevalence of SABA overuse was approximately 3.5 times greater in patients with moderate-severe asthma than in those with mild asthma.**
- The **cost burden attributable to SABA overuse** was particularly relevant for the **moderate-to-severe asthma** (representing the majority of asthma population) and the healthcare resource utilization related to **severe exacerbations** (average severe exacerbation cost was calculated to be €160.23).
- Nonetheless, appropriate SABA usage was effective **in decreasing the annual severe exacerbation frequency by >80% in our asthma patients, regardless of the disease severity**.
- The initiatives with the collaborative efforts between policymakers and healthcare professionals that address reducing the progressive SABA overreliance with improved adherence to the latest evidence-based recommendations are necessary to reduce the asthma morbidity and the cost burden related to this public health concern.

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