



Original Article

Availability, cost, and affordability of asthma and chronic obstructive pulmonary disease medications in The Gambia

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ABSTRACT

Objectives: Guidelines for asthma and chronic obstructive pulmonary disease (COPD) have undergone significant changes. Specifically, inhaled corticosteroids (ICSs) either alone or in combination with a long-acting beta2-agonist (LABA) are now first-line treatment for asthma, while long-acting muscarinic antagonists alone or in combination with LABAs are first-line treatment of COPD. Data on local availability, cost, and affordability of these medicines in The Gambia are unknown.

Materials and Methods: We surveyed all registered pharmacists in Gambia and calculated affordability indices relative to the prevailing wage of the lowest government worker.

Results: Eight out of 18 registered pharmacists responded to the survey. Respondents were responsible for stocking 19 out of 26 registered pharmacies in the country, resulting in a response rate of 44%. Salbutamol inhalers were widely available, stocked by the central medical stores and 6 out of 8 surveyed pharmacists. Only one pharmacist reported stocking beclomethasone 50 mcg, budesonide 100 mcg, and fluticasone propionate 125 mcg inhalers. Aminophylline was stocked by 4/8 pharmacists. The price of salbutamol 100 mcg inhaler was Gambian Dalasi (GMD) 200 (US\$ 4, 4 days' wages), while ipratropium bromide 20 mcg cost GMD 675 (US\$ 14, 15 days' wages). ICS maintenance inhalers at private pharmacies cost 15, 26, and 28 days' wages for beclomethasone 50 mcg, fluticasone propionate 125 mcg, and budesonide 100 mcg, respectively. Combination of ICS/LABA inhaler was 26 days' wages while tiotropium bromide 18 mcg affordability was 95 days' wages.

Conclusion: Guideline recommended medications for the management of asthma and COPD in The Gambia are unavailable, expensive, and unaffordable.

Keywords: Asthma, Chronic obstructive pulmonary disease, Bronchodilator, Treatment, Medications

INTRODUCTION

Asthma and chronic obstructive pulmonary disease (COPD) are leading causes of morbidity and mortality globally with a large proportion of deaths occurring in low- and middle-income (LMICs) like The Gambia.^[1-7] Global asthma mortality is estimated at 250,000 deaths annually, while COPD-related mortality is estimated 18/100,000.^[8-10]

Although population prevalence estimates are lacking in Gambia, in 2016, asthma was the third leading cause of outpatient visits and the sixth leading cause of death at public health facilities

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in the Gambian Health Service.^[8,11] Recent studies in Nigeria estimate the prevalence of asthma and COPD at 6.4% and 7%, respectively;^[12] and both conditions account for between 25% and 82% of patients seen at some specialist clinics in Burkina Faso and Senegal.^[13,14] Treatment of both diseases remains a challenge in the region with between 70% and 90% of asthma patients having poor symptom control.^[13-16] Accurate diagnosis is also limited due to a lack of pulmonologists, absence of spirometry, peak expiratory flow (PEF) meters, and a lack of context appropriate evidence-based treatment guidelines.^[17-19]

Data on asthma and COPD medication availability and affordability in Sub-Saharan Africa are sparse, however, two recent studies in Nigeria and Uganda highlight important gaps in access.^[2,12] Out of 128 pharmacies surveyed across a wide geographic area in Nigeria, inhaled corticosteroids (ICSs) were unavailable at any of the surveyed public pharmacies, with other guideline recommended medications including long-acting muscarinic antagonist (LAMA), and ICS – combination inhalers failing to meet an availability threshold of 80%.^[12] Similarly, in Uganda, a nationwide random survey of 130 facilities including a mixture of public and private hospitals and pharmacies found a low availability of asthma and COPD medicines and diagnostic tests.^[2] In both studies, public hospitals had lower availability than private pharmacies.

In The Gambia, national treatment guidelines published in 2017 recommend Salbutamol for the treatment of mild asthma; while Salbutamol, Prednisolone, and intravenous Aminophylline are recommended as first-line treatments for acute asthma exacerbations. The guidelines make no recommendation for ICS-based maintenance therapy for asthma; while for COPD, smoking cessation and antibiotic treatment with Amoxicillin and Erythromycin are the only treatment recommendations.^[20]

While smoking cessation and vaccination are important in disease management, pharmacotherapy using a symptom-driven stepwise approach is the mainstay of treatment.^[21,22] This is important because treatment guidelines for both asthma and COPD have undergone significant changes recently.^[23-25] ICSs either alone or in combination with a long-acting beta2-agonist (LABA) are now the first-line treatment for asthma, while short-acting beta2 agonist (SABA) is reserved for rescue therapy.^[23] Updated COPD treatment guidelines also recommend LAMA alone or in combination with LABAs as first-line therapy, while triple therapy (LAMA/LABA/ICS) is reserved for patients with an eosinophilic phenotype or in some patients with advanced disease.^[22]

These changes have significant implications for countries like The Gambia where the burden of respiratory diseases are high, resources are limited, and the government is expanding

access to healthcare in a bid to achieve universal health coverage.^[26] The World Health Organization (WHO) has prioritized the prevention and control of chronic respiratory diseases including asthma and COPD as part of a Global Action Plan with a specific aim of achieving a threshold access of 80% to essential medicines by 2025.^[27] Achieving this objective across Sub-Saharan Africa will require contemporary data on availability, cost, and affordability of medicines to design and implement evidence-based pragmatic treatment guidelines as a cost-effective way of improving patient outcomes.^[28,29] Access as measured by availability and affordability is an established benchmark for developing health priorities in countries like The Gambia.^[30]

In this study, we report findings on the availability, cost, and affordability of asthma and COPD medications in The Gambia.

MATERIALS AND METHODS

Study design

This is a cross-sectional survey conducted in The Gambia, the smallest country on the African mainland with a population of about 2 million. We surveyed the central medical stores (CMSs) responsible for procuring medicines on the essential medicines list (EML) at the Ministry of Health and Social Welfare (MoHSW), and pharmacists registered with the Pharmacy Council of The Gambia (PCG). The PCG is a statutory body established by an Act of The Gambian Parliament and is responsible for licensure and regulation of pharmacists in the country.

In 2019, there were 18 registered pharmacists, in The Gambia, responsible for 16 wholesale and 26 retail pharmacies on the PCG register. Almost all pharmacies are located in urban settlements near the capital city of Banjul.^[31-33] The government procures medications through the CMS based on an assessment of the existing need and an essential list of disease-specific medications compiled in consultation with clinicians and published in the Standard Drug Treatment Guidelines (SDTGs) by the MoHSW.^[20,34]

The Gambia has a three tiered health-care system. The first tier is a primary care system comprised Health Posts and Health Centers which provide ambulatory care including vaccinations, antenatal care, and well-baby clinics. The second tier is comprised Major Health Centers and General Hospitals which provide all tier one services, emergency care, and inpatient services. The third tier is comprised of the only teaching hospital in the country – Edward Francis Small Teaching Hospital which is the flagship teaching institution affiliated with the University of The Gambia School of Medicine and Allied Health Sciences, the only school of medicine in the country.

Government funded health institutions source their medications from the Ministry of Health through the CMS based on the EML. Health care is subsidized by the government, and patients pay a flat prescription fee of Gambian Dalasi (GMD) 25 (US\$ 0.5) which covers all medications prescribed by clinicians which are on the EML and available at the CMS. Medications which are not in the SDTG or CMS EML are not routinely available. Spirometry testing is available at one government hospital – Kanifing General Hospital (KGH) which is working to establish a chest clinic. The cost of spirometry to patients at this clinic is GMD 250 (US\$ 5), charged to replenish disposable mouth pieces used for testing.

Questionnaire design and data collection

We used a survey instrument designed and locally adapted to the Gambian context for data collection (see online supplement). The instrument was piloted by having a pharmacist (EJ) and physician (BS) at a public institution respond to the survey questions from March 28, 2019, to June 13, 2019. Feedback from this pilot was incorporated into the final version of the survey instrument. The survey period lasted from July 1, 2019, to August 30, 2019.

Medications of interest in this study included rescue inhalers (salbutamol, ipratropium bromide, and salbutamol/ipratropium combination inhalers), ICS (beclomethasone and fluticasone propionate), LAMA inhalers (tiotropium bromide), and fixed-dose combination inhalers (fluticasone-salmeterol, formoterol-budesonide, olodaterol-tiotropium, and glycopyrrolate-formoterol). We also inquired about the availability of spacer devices, nebulizers, and peak flow meters.

All pharmacists listed on the PCG register were approached. We obtained retail prices in GMD which was converted to the US dollars (US \$) using the exchange rate at the time of data collection (1 US\$ ~ 50 GMD).

Next, we used 2019 data from the Ministry of Finance and Economic Affairs to calculate the median annual salary of the lowest paid Gambian civil servant. Government salaries are on a scale of 1–12. The lowest paid government worker at Grade 1 is paid an annual salary of GMD 16,395 (US\$ 328) which corresponds to a monthly salary of GMD 1366 (US\$ 27). The highest paid government civil servant employed at salary Grade 12 received a median annual salary of GMD 120,896 (US\$ 2418) or a monthly salary of GMD 10,075 (US\$ 202).

The estimated daily wage of the lowest paid Gambian civil servant in 2019 was GMD 46 (US\$ 0.92), while the corresponding estimate for the highest paid civil servant was GMD 336 (US\$ 6.72).

Affordability is defined as a medication with a monthly cost in US\$ that is < or equal to GMD 138 (\$ 2.76) which is equivalent to 3 days' wages of the lowest paid Gambian civil servant in Grade 1 as previously described.^[2,35]

Statistics and data analysis

Availability at the CMS is reported as binary response (yes/no) while responses from private pharmacists are reported as the number of pharmacists stocking each medication at their respective pharmacies expressed as a percentage. Unit prices are reported in GMD and converted to United States Dollars and then converted to a median price ratio (MPR) by dividing the median local price in US dollars by an International Reference Price (IRP). The IRP is obtained from the Management Sciences for Health International Drug Price Indicator Guide which reports median prices of medicines offered to LMICs countries by different suppliers.^[36] The MPR is a metric describing how much greater or less the median local medicine price is than the IRP. An MPR of 3 implies that the local medicine price is 3 times greater than the IRP.

This survey was conducted in the context of an approved by the Ministry of Health as part of a project on Emergency Medical Care in The Gambia (Ref: AD241/01/SLC).

RESULTS

All 18 pharmacists listed on the PCG register were sent an electronic or printed copy of the questionnaire. There were responses from eight pharmacists, resulting in a response rate of 44%. The respondents who completed the questionnaire were responsible for stocking 19 of the 26 registered pharmacies in the country.

Availability of SABA and short-acting muscarinic antagonist (SAMA) inhalers

Salbutamol 100 mcg metered dose inhaler (MDI) was the most available inhaler in the country with the CMS and six of the eight pharmacists (75%) surveyed indicating that they stocked this [Table 1]. Salbutamol nebulizer formulation was the next most available medication (stocked by three pharmacists, 38%) and the CMS; while ipratropium bromide as an MDI or nebulizer formulation alone or in combination with Salbutamol was only stocked by one private pharmacist (13%). Combination of SABA/SAMA inhalers was not available at the CMS and at private pharmacies.

Availability of ICS monotherapy, fixed-dose combination inhalers, and oral leukotriene receptor antagonists (LTRAs)

Beclomethasone 50 mcg MDI was the only ICS available at the CMS. Budesonide 50 mcg/100 mcg dose and Fluticasone

Table 1: Availability of asthma and COPD medications at the central medical stores and private pharmacies in The Gambia.

Pharmacologic category	Availability	
	Private pharmacists (n=8) (%)	Central medical stores (Yes/No)
Inhaled SABA monotherapy		
Salbutamol 100 mcg/dose inhaler	6 (75)	Yes
Salbutamol 5 mg/ml nebule	3 (38)	Yes
Inhaled SAMA monotherapy		
Ipratropium bromide 20 mcg/dose inhaler	1 (13)	No
Ipratropium bromide 250 mcg/ml nebule	1 (13)	No
Inhaled SABA/SAMA combinations		
Salbutamol/ipratropium 100/20 mcg	0 (0)	No
ICS monotherapy		
Beclomethasone 50 mcg/dose	1 (13)	Yes
Beclomethasone 100 mcg/dose	0 (0)	No
Budesonide 100 mcg/dose	1 (13)	No
Budesonide 200 mcg/dose	0 (0)	No
Fluticasone propionate inhaler 125 mcg/dose	1 (13)	No
Fixed-dose combination inhalers		
Fluticasone-salmeterol 125/25 mcg/dose	0 (0)	No
Formoterol-budesonide 4.5/160 mcg/dose	1 (13)	No
Olodaterol-tiotropium 5/5 mcg	0 (0)	No
Glycopyrrolate-formoterol 9/4.8 mcg	0 (0)	No
LAMA monotherapy		
Tiotropium bromide 18 mcg/dose inhaler	1 (13)	No
Oral methylxanthines		
Aminophylline 100 mg tablets	4 (50)	Yes
Theophylline 100 mg tablets	1 (13)	No
Oral LTRA		
Montelukast	1 (13)	No
Macrolide antibiotics		
Azithromycin 250 mg tablet	5 (63)	No
Clarithromycin 500 mg tablet	4 (50)	No
Erythromycin 250 mg tablet	8 (100)	Yes
Prednisone 5 mg tablet	6 (75)	Yes
Methylprednisolone 40 mg vial	1 (13)	No
Hydrocortisone 100 mg vial	5 (63)	Yes
Ancillary devices		
Spacer device	1 (13)	No
Nebulizer	1 (13)	No
Peak flow meter	1 (13)	No

COPD: Chronic obstructive pulmonary disease, SABA: Short-acting beta2 agonist, SAMA: Short-acting muscarinic antagonist, ICS: Inhaled corticosteroid, LTRA: Leukotriene receptor antagonist, LAMA: Long-acting muscarinic antagonist

propionate 125 mcg were stocked by only one private pharmacist, at the time of the survey [Table 1].

Similarly, only one private pharmacist reported stocking fixed-dose combination inhalers (formoterol-budesonide 4.5/160 mcg/dose MDI) and tiotropium bromide 18 mcg/dose inhalers. There were no LAMA/LABA fixed-dose combination inhalers.

Aminophylline (100 mg tablets) was stocked by the CMS and half of the private pharmacists surveyed while only one private pharmacist had theophylline (100 mg tablets). Only one private pharmacist stocked montelukast 10 mg tablets and it was not available at the CMS.

Availability of systemic glucocorticoids and macrolide antibiotics

Prednisone 5 mg tablets were widely available both at the CMS and private pharmacies with 75% of surveyed pharmacist reporting that they stocked this medication. Similarly, hydrocortisone 100 mg vials were stocked at the CMS and by most pharmacists surveyed (5/8, 63%).

Erythromycin was the most common macrolide stocked by the CMS and all pharmacists who responded to the survey followed by azithromycin 250 mg tablets (5/8, 63%) and clarithromycin 500 mg tablets (4/8, 50%).

Spacers and peak flow meters were not available at the CMS, but were available at one private pharmacy [Table 2].

Affordability and pricing of medications

[Table 3] illustrates the median prices of various medications for maintenance therapy and management of acute exacerbations of asthma and COPD as reported by private pharmacists.

The median price for rescue salbutamol 100 mcg inhaler was GMD 200 (\$ 4) and GMD 675 (\$ 14) for ipratropium bromide 20 mcg. Neither inhaler was affordable with salbutamol 100 mcg costing 4 days’ wages and ipratropium bromide 20 mcg costing 15 days’ wages. Although the salbutamol 5 mg/ml nebulizer was within the affordable range (3 days’ wages), small volume nebulizers required for the delivery of this medication cost 163 days’ wages.

ICS monotherapy maintenance inhalers at private pharmacies cost 15, 26, and 28 days’ wages for beclomethasone 50 mcg

MDI, fluticasone propionate 125 mcg MDI, and budesonide 100 mcg, respectively. Combination of ICS/LABA inhaler was 26 days’ wages while LAMA maintenance inhaler affordability was 95 days’ wages (tiotropium bromide 18 mcg).

DISCUSSION

To the best of our knowledge, this is the first study that looked at the availability, cost, and affordability of medicines for asthma and COPD in The Gambia. Key findings of this survey are that Salbutamol and low-dose beclomethasone 50 mcg are available in the CMS responsible for national procurement for public health facilities, while high-dose ICS inhalers, combination of ICS/LABA, LAMA, and LAMA/LABA inhalers are neither available nor affordable both in the public and private sector. Medications that are not available at government health facilities must be purchased out of pocket by patients at private pharmacies, putting it out of the reach of most Gambians.

Our findings are similar to those of a multinational drug pricing survey including 52 LMICs (excluding The Gambia) by Babar *et al.*^[37] In that survey, beclomethasone 100 mcg inhaler was available in 41% of private pharmacies and 17% of national procurement centers. Using the same affordability criteria employed in the present study, Babar *et al.* found that affordability of a single beclomethasone 100 mcg inhaler ranged from 0.5 days’ to 14 days’ wages. In the present study, however, the lower dose formulation (beclomethasone 50 mcg)

Table 2: Cost of ancillary diagnostic and monitoring equipment.

Equipment	Median price in GMD	Median local price in US\$	Days wages***
Spacer device	1500	\$30	32.6
Small volume nebulizer	7500	\$150	163.0
Peak flow meter	1250	\$25	27.2

***Days wages are calculate by dividing the monthly cost of inhalers in US\$ by the daily wage of the lowest paid Gambian civil servant at Grade 1 estimated at US\$ 0.92

Table 3: Median local prices (Gambian Dalasi) and affordability of inhaled asthma and chronic obstructive pulmonary disease in private pharmacies.

Drug	Median (IQR) local price in GMD	Median local price in US\$	International reference price in US\$	Median price ratio	Monthly cost US\$	Days wages***
Salbutamol 100 mcg	200 (200–210)	\$4	0.0114	351	4	4
Salbutamol 5 mg/ml	125 (70–325)	\$2.5	0.1499	17	3	3*
Ipratropium bromide 20 mcg	675	\$13.5	0.0220	614	14	15
Ipratropium bromide 250 mcg	500	\$10	0.1159	86	10	11
Beclomethasone 50 mcg	700	\$14	0.0164	854	14	15
Fluticasone propionate 125 mcg	1200	\$24	0.0630	381	24	26
Budesonide 100 mcg	1300	\$26	0.0270	963	26	28
Tiotropium bromide 18 mcg	4350	\$87	-	-	87	95
Formoterol-budesonide 4.5/160 mcg	1200	\$24	-	-	24	26
Montelukast tablets 10 mg	600	\$12	-	-	12	13
Aminophylline 100 mg	63 (44–210)	\$1.3	0.0059	220	1	1
Theophylline 100 mg	60	\$1.2	0.0124	97	1	1
Azithromycin 250 mg tablet ^β	12 (5.83–15.83)	\$0.24	0.2100	1.14	-	-
Clarithromycin 500 mg tablet ^β	14.4 (10.2–18.33)	\$0.29	0.2571	1.12	-	-
Erythromycin 500 mg tablets ^β	1.7 (1.3–2.3)	\$0.03	0.1811	0.03	-	-
Methylprednisolone 40 mg vial	775	\$15.5	1.2650	12.3	-	-
Hydrocortisone 100 mg vial	100 (95–100)	\$2.0	0.5245	3.8	-	-

***Days wages are calculate by dividing the monthly cost of inhalers in US\$ by the daily wage of the lowest paid Gambian civil servant at Grade 1 estimated at US\$ 0.92. ^βPrice listed for each tablet

was available at the national procurement facility (CMS) and at one private pharmacy, at an unaffordable cost of 15 days' wages. Similarly, Babar *et al.* reported a Budesonide 200 mcg affordability of 0.5–107 days' wages, while the present survey reports a Budesonide 100 mcg inhaler affordability of 28 days' wages.

In Uganda, Kibirige *et al.* reported similar SABA monotherapy availability to the present study (75%), but significantly higher availability for ICS monotherapy, ICS/LABA, and oral LTRA (45.4%, 46.9%, and 60.8%, respectively, compared to 13% for each drug class in the current study).^[2] Fixed-dose combination ICS/LABA inhaler affordability data were not reported in the study by Babar *et al.*, however, in Uganda, Kibirige *et al.* reported affordability ranging from 6.4 days' to 17.1 days' wages compared to 26 days' wages in the present study.

The unavailability and prohibitive cost of ICS and ICS/LABA containing inhalers in The Gambia can be attributed to several factors. First, the Gambian SDTGs do not emphasize the primary role of ICS (either alone or as a fixed-dose combination with a LABA) as the first-line treatment for asthma. The same holds true for COPD, where LAMA inhalers (alone or combination with a LABA) are not in the treatment guidelines. Failure to include these medications in treatment guidelines leads to their absence on the EML at the Ministry of Health, resulting in their exclusion in procurement by government at the national level. Private pharmacies do not stock maintenance inhalers in part because they are not regularly prescribed by clinicians (personal communication), indicating a knowledge gap among providers in the health system who have a preference for oral Salbutamol over ICS-containing maintenance inhalers.^[38] A similar knowledge gap in guideline concordant management was reported by among Nigerian physicians, where a majority of surveyed doctors were not familiar with guideline recommended use of ICS in the management of asthma.^[18,19,39] Fawibe *et al.* also reported a low level of awareness among general practitioners across several states in Nigeria, with only 16.4% of being able to correctly state guideline consistent asthma treatment.^[40]

Another important factor is an inefficient supply chain for the delivery of medications from the CMS to government health facilities at the periphery. Even when medications are available at the CMS, delivery to, and storage at health facilities can be challenging. The lack of updated evidence-based guidelines is not unique to The Gambia. A recent systematic review of national COPD guidelines found that 30% of people residing in LMICs did not have guidelines and where guidelines were available, they were targeted to fewer healthcare professional groups, and less often addressed important aspects of diagnosis, comorbidity management, and smoking cessation.^[19,40,41]

Medications for the management of acute exacerbations of asthma and COPD are generally available and affordable. This is to a large extent attributable to their inclusion in both the SDTGs and EML. Long-term macrolide therapy has been shown to reduce the risk of exacerbations in high-risk patients and it is also recommended for the management of acute exacerbations.^[21-25] One agent in this drug class – erythromycin was widely available, affordable and recommended in the SDTG for the management of acute exacerbations.

PEF meters were unavailable at the CMS and only one private pharmacy had this device at an unaffordable cost of 27 days' wages. Similarly, spacers were not available at the CMS, and the cost at private pharmacies was unaffordable. Patients use improvised spacers made from plastic bottles (personal communication).

The low availability of asthma and COPD medications is indicative of a series of challenges in the health system. As stated earlier, there are currently no trained specialists in pulmonology, and medical officers may not be familiar with the updated treatment guidelines. The SDTG is also outdated as it does not stipulate the primary role of maintenance (preventative) inhalers in the treatment of asthma and COPD. The local guidelines, however, include the recommendation for the use of aminophylline for the treatment of acute asthma exacerbation, in contravention with Global Initiative for Asthma (GINA) guidelines. This has also been reported in other parts of West Africa where more than half of physicians surveyed (59.4%) considered aminophylline as the first-line medication in exacerbation.^[19] The consequences of the aforementioned deficiencies in patient care among patients with asthma and COPD in The Gambia include poor quality of life, frequent acute pulmonary exacerbations, an over reliance on SABA, long-term use of corticosteroids, and increased mortality.

Improving asthma and COPD outcomes in The Gambia can be achieved through a multifaceted approach. First, the national SDTG needs to be updated to reflect current evidence, especially in regard to the use of ICS as the mainstay for asthma management, and LAMA (either alone or in combination with long acting beta agonists) for preventative disease management in COPD. Updated GINA asthma guidelines also provide an opportunity to improve asthma treatment with the advent of single maintenance and reliever therapy, a simplified regimen in which an ICS (alone or in combination with a LABA) is used simultaneously as both a maintenance and rescue inhaler. This approach is simpler compared to prior recommendations where patients are required to use two inhalers.^[42,43] The prohibitive cost of preventative inhalers can be mitigated by government funded procurement through the Asthma Drug Facility, a project of the International Union Against Tuberculosis and Lung

Disease (The Union), which helps LMICs obtain quality-assured essential medicines at affordable prices.^[44]

Second, there is an urgent need to train pulmonary specialists as The Gambia currently has no pulmonologists. Medical officers and other clinicians can be trained on the correct diagnosis and management of asthma and COPD, emphasizing the central role of spirometry and PEF measurements as required diagnostic and monitoring tests. Although some progress has been made in Gambia with spirometry training of health care workers at KGH, more training targeting health care workers at primary health facilities are needed as most patients will initially present at such facilities. Doing so will facilitate referrals to dedicated chest clinics for evaluation of such patients. The cost of single-use mouth pieces is a significant barrier to making spirometry widely available as to the best of our knowledge; this is not subsidized for LMICs. An alternative and more environmentally friendly approach is the manufacture of reusable mouth pieces as most spirometers on the market today have plastic single-use mouth pieces. Standardization of asthma management can be achieved by adopting a Practical Approach to Lung Health which is a primary health-care strategy for the integrated management of respiratory conditions developed by the WHO and has been pilot tested in four West African countries with positive outcomes demonstrating feasibility, cost-effectiveness, and a reduction in asthma severity in patients after implementation of this program.^[45,46]

Third, disease monitoring and data capture of patients with asthma and COPD will enable the study of the epidemiology and clinical outcomes of patients with these diseases, leading to a better understanding of the true burden of respiratory illnesses in the country.

This study has several limitations. First, the response rate was low, among pharmacists surveyed, and drug stock records were not assessed to confirm availability of drugs reported by the pharmacists surveyed; however, because most medications were unavailable, it is less likely that respondents will report that a medication is absent when it is actually stocked. Second, availability is relevant to the day on which each facility was surveyed, without accounting for stockouts. Third, using the calculated daily wage of the lowest paid government civil servant will result in an overestimation of affordability as more than 70% of the Gambian population is employed in the informal sector and earn less than government civil servants. These limitations notwithstanding, this study employed similar validated methods used in other countries in Sub-Saharan Africa which can facilitate cross-country comparisons across the region. Finally, we did not survey the UK – Medical Research Council Clinical Services department which offers free health care to many Gambians.

CONCLUSION

This survey found that medications for the management of asthma and COPD in The Gambia are unavailable, expensive, and unaffordable, due to outdated standard treatment guidelines, absence of maintenance ICS and LAMA/LABA inhalers on the EML. Recent updates in asthma and COPD treatment guidelines provide a unique opportunity to improve patient outcomes through a simplified treatment regime.

Authors' contributions

ST conceived the study, designed the survey instrument, analyzed the survey data, and wrote the first draft of the manuscript. BS, NS, and EJ developed the survey instrument, conducted the survey, contributed, and edited the subsequent versions of the manuscript. All authors read and approved the final manuscript.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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