Original research article



A study on physicians' knowledge and practices of asthma management in Angola

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Background: Asthma is the most common chronic non-communicable disease in children and one of the most common in adults, and the majority of asthma-related deaths are attributed to middle- and low-income countries. Physicians' knowledge and practice have been recognized as fundamental elements in the approach to the asthmatic patient with an impact on the treatment and control of the disease. This study aimed to assess the knowledge and practice of Angolan physicians in the management of asthma, as well as to identify the main gaps.

Methods: It was a cross-sectional study carried out in Angola. The data were collected through an online questionnaire to assess the knowledge about asthma among the physicians and the Physicians Practice Assessment Questionnaire. Categorical variables were described with frequencies and percentages. All associations between good practice and possible predictors were established with logistic regression analysis. *P*<0.05 was considered statistically significant.

Results: A total of 204 physicians throughout Angola participated; the majority of whom were female, aged between 31 and 40, and from the Luanda province. The average percentage of correct answers for all domains was 65.8% (±SD11.1%). The lowest percentages were in the answers about the diagnosis, drugs, and the signs of an asthma attack. Out of the 204 participants, 81.9% of physicians confirmed seeing patients with asthma. The average percentage of them who reported practicing asthma management based on recommended guidelines was 59.8% (±SD27.8%). More than half of the physicians did not achieve that percentage. The lowest percentages of correct answers concerned assessment of the inhaler technique, provision of a written referral for asthma education, and use of the GINA guidelines to assess the patient's asthma control. Concerning the predictors of best practices, our results showed that being a physician of older age and with more work experience, as well as having the category of specialist were significant predictors of adherence to recommended practices for asthma management.

Conclusions: The physicians' level of knowledge about asthma was moderate, but there are important practical gaps in asthma management regarding standard guidelines.

Key words: knowledge, practice, asthma, Angolan physicians

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Ethics approval and consent to participate: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Ethics Committee of the Angolan Ministry of Health (No 038/C.E.M.S/2023), and informed consent was obtained from all individual participants.

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Introduction

Asthma is the most common chronic noncommunicable disease in children and one of the most common in adults. It is responsible for premature deaths, disabilities, and loss of quality of life, in addition to the negative impacts on families, communities, and society in general [1,2]. Although asthma prevalence is higher in High-Income Countries, the majority of asthma-related deaths are attributed to Low- and Middle-Income Countries (LMICs) [1]. In 2019, asthma accounted for 21.6 million Disability-Adjusted Life Years (DALYs), with 262.4 million prevalent cases, 37.0 million new cases, and 455,000 deaths [1,2]. Asthma accounted for the majority of DALYs in the under-35 age group, with the highest incidence rate in the 1-4-year-old age group worldwide [1,2].

The quality of life of asthma patients depends on the frequency and severity of attacks. Therefore, accurate diagnosis, both clinically and in terms of respiratory function, as well as an effective approach to asthma are fundamental to improving the prognosis and quality of life of asthma patients [3]. The diagnosis and treatment of asthma are well defined in specific guidelines such as the Global Initiative for Asthma (GINA) [3]. These guidelines also include evidencebased medical recommendations and information for a better approach to asthmatic patients [3,4]. However, some studies have shown that malpractice and nonadherence to guidelines also exist and lead to great variation in the approach, follow up, and long-term results of patients with asthma and that the cost of treating patients with asthma is also affected by this lack of standardization in practice [5].

In 2014/2015, the prevalence of asthma in Luanda, Angola was 15.7% in children [6] and 13.4% in adolescents [7]. Studies carried out in African countries [8,9] and in Luanda, Angola [10], showed that asthma was not controlled in most patients. Poor asthma control can be attributed to various factors during diagnosis, treatment, and follow up [11]. The lack of diagnosis, such as spirometry, is the main limitation at the diagnosis stage [12]. On the other hand, limitations in access to drugs and health services, as well as a lack of information and/or communication and the high cost of drugs, are some of the critical challenges in the treatment and follow up phases [12].

Physicians' knowledge and practice have been recognized as fundamental elements in the approach to the asthmatic patient with an impact on treatment and control of the disease, as well as on the quality of life of patients and families [13,14]. We also have evidence to suggest that poor asthma control can be attributed to a lack of knowledge about evidence-based guidelines and practice [15]. It is therefore important to determine physicians' knowledge and practices in the management of asthma as the main contributor to the favorable evolution of the disease. Thus, this study aimed to assess the knowledge and practice of Angolan physicians in the management of asthma, as well as to identify its main gaps.

Methods

Study area

This study was carried out in Angola, a country located in Sub-Saharan Africa with an estimated population of 35,000,000 inhabitants, with a ratio of 1.8 physicians per 10,000 inhabitants [16,17]. The country has eighteen provinces, with Luanda as its capital, which is the province with the largest number of healthcare units and the highest concentration of physicians [16,17].

Study design and study population

This was a cross-sectional study, that took place from September to November 2023, including all physicians, from the various public and private healthcare units in the country, working in an Angolan healthcare unit and who agreed to participate in the study.

Sampling strategy

A convenience sampling technique was applied to invite the physicians to this study. The online link was shared across several social networking groups. Invitations to take part in the study were sent to physicians' email addresses and/or by individual messages to WhatsApp numbers obtained from medical societies, healthcare units, and the Angolan Medical Association.

The questionnaire contained a brief introduction, the aim of the study, inclusion criteria, and the voluntary nature of participation, as well as the guarantee of anonymity and confidentiality, and was designed to prevent the submission of incomplete forms, hence there was no missing data.

Data collection

The data were collected through an online Google Docs questionnaire (https://docs.google.com) following the Checklist for Reporting Results of Internet E-Survey (CHERRIES guidelines) [18].

A Portuguese version of the questionnaire to assess knowledge about asthma among the physicians [19] and the Physicians Practice Assessment Questionnaire (PPAQ) [20] was used, after translation, backtranslation, and validation following the recommended guidelines [21].

The assessment questionnaire consists of three parts. The first one part consists of demographic questions (gender, age, province of work, work experience, professional category, and specialty) followed by questions about the average number of patients per appointment day and the average number of patients with asthma, that the physician seen per appointment day. The second part consists of questions related to assessing knowledge about asthma. Each correct answer received one point. We summarized in percentages, the number of correct answers for individual questions for the physicians. Since asthma is a common condition with which physicians should be familiar, an overall score of 75% and above was defined as the threshold for high knowledge, as previously reported [19,22]. In addition, we rated scores between 50% and 75% as moderate knowledge [23], and scores below 50 as poor knowledge [24].

The third part is based on the PPAQ [20], which was designed to conduct physician self-assessments in implementing asthma management guidelines. The PPAQ contains fourteen questions, which follow international guidelines [20,25], about clinical practice and are related to the diagnosis, evaluation, treatment, and follow up of asthmatic patients. Physicians not seeing any asthmatic patients were excluded from the PPAQ.

Statistical analysis

The data were analyzed using the statistical program IBM SPSS, version 29.0.1. Categorical variables were described with frequencies and percentages. Continuous variables were described with mean and standard deviation. All associations between good practice and possible predictors were established with logistic regression analysis (univariate analysis). We defined "good practice" as reaching at least the mean number of "YES" answers in the Physicians' Practice Assessment Questionnaire for the whole sample of physicians (the mean value was 8.38 which was therefore used to define the dependent variable of the logistic regression). P<0.05 was considered statistically significant.

Results

General characteristics of the study participants

Out of a total of 3,086 eligible physicians, invitations were sent to 2,300 (available contacts). Only 402 physicians answered the questionnaire, resulting in an adherence rate of 8.9%, the majority of whom were female (62.7%), aged between 31 and 40 (45.6%), and from Luanda province (83.3%). Most of the physicians (37.3%) had six to ten years of work experience, 32.4% saw an average of eleven to 20 and more than 20 patients per day, and 68.6% saw an average of one to five asthma patients per day (Table 1).

Knowledge about asthma

Table 2 describes the physicians' knowledge of asthma in the different domains. In general, most physicians answered the questions correctly. The average percentage of correct answers for all domains was 65.8% (±SD11.1%). The lowest percentages were in the answers about the diagnosis of asthma (54.4%), drugs for the management of asthma (56.5%), and the signs of an asthma attack (60.3%).

Practice in asthma management

Out of the 204 participants, 167 (81.9%) physicians confirmed seeing patients with asthma. The average percentage of them who reported practicing asthma management based on recommended guidelines was 59.8% (±SD27.8%). More than half of the physicians did not achieve that percentage, i.e. of the fourteen items related to clinical practice, in eight items this percentage was lower than 59.8%. The lowest percentages were 25.7% of physicians assessing inhaler technique at each visit, 28.1% providing written referral for asthma education, and 28.7% using the Canadian Thoracic Society (CTS) control criteria or the Global Initiative for Asthma (GINA) guidelines to assess patient's asthma control. The highest percentages were to identify environmental triggers and address patient's concerns about disease and treatment (95.2%) (Table 3).

Predictors of better asthma practice

Concerning the predictors of best practices in the care of asthmatic patients, our results showed that being a physician of older age (over 40 years) (OR 4.38; 95% CI: 1.43 to 13.41; P=0.010), having more work

Table 1. Demographic and clinical prac	tice characteristics
of study participants (N = 204).	

Variable	N (%)
Gender	
Female	128 (62.7)
Male	76 (37.3)
Age range (years)	
≤ 30	34 (16.7)
31-40	93 (45.6)
41-50	44 (21.6)
51-60	28 (13.7)
> 60	5 (2.5)
Age Mean ± SD	39.52 ± 10.016
Province	
Luanda	170 (83.3)
Other provinces	34 (16.7)
Work experience (years)	
< 5	53 (26.0)
6-10	76 (37.3)
11-15	29 (14.2)
16-20	19 (9.3)
> 20	27 (13.2)
Professional category	
Specialist	91 (44.6)
Resident	92 (45.1)
General practitioner	21 (10.3)
Specialty	
None	21 (10.3)
Pulmonology	27 (13.2)
Internal medicine	34 (16.7)
Pediatrics	34 (16.7)
General and family medicine	10 (4.9)
Other specialty	78 (38.2)
Average number of patients seen per day	
1-10	29 (14.2)
11-20	66 (32.4)
21-30	43 (21.1)
> 30	66 (32.4)
Average number of asthma cases seen per day	7
Zero	37 (18.1)
1-5	140 (68.6)
6-10	18 (8.8)
11-20	7 (3.4)
> 20	2 (1.0)
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Table 2. Frequency of correct answers regarding knowledge of asthma (N = 204).

N٥	Knowledge item	N (%)
	Nature of disease	
1	Asthma is not a chronic inflammatory disease of the airways [#]	153 (75.0)
2	Symptoms of asthma occur or worsen at night, awakening the patient	173 (84.8)
3	Symptoms of asthma do not have a seasonal pattern [#]	160 (78.4)
4	In asthma family history is not relevant [#]	174 (85.3)
5	Asthmatic chronically inflamed airways are usually hyperresponsive.	196 (96.1)
	Average percentage	83.9%
6	Which of the following is/are symptoms of asthma? (more than one answer is possible)	
	Cough (worse particularly at night)	125 (61.3)
	Recurrent wheeze	142 (69.6)
	Recurrent difficulty with breathing	182 (89.2)
	Recurrent chest tightness is possible	110 (53.9)
	Average percentage	68.5%
7	Which of the following is a trigger of asthma? (more than one answer is possible)	
	Animal fur	186 (91.2)
	Aerosol	115 (56.4)
	Changes in temperature	142 (69.6)
	Domestic dust	196 (96.1)
	Drugs	89 (43.6)
	Exercise chemicals	121 (59.3)
	Pollens	168 (82.4)
	Respiratory (viral) infections	156 (76.5)
	Smoke	188 (92.2)
	Strong emotional expression	94 (46.1)
	Average percentage	71.3%
8	Which of the following is used in diagnosing asthma? (more than one answer is possible)	
	Spirometry	197 (96.6)
	Peak flow meter	69 (33.8)
	Chest radiography	65 (31.9)
	Average percentage	54.4%
9	Which of the following is a sign of an asthma attack? (more than one answer is possible)	
	Cyanosis	173 (84.8)
	Fast pulse rate	97 (47.5)
	Duration of attack	99 (48.5)
	Average percentage	60.3%
10	Which of the following is/are drugs for the management of asthma? (more than one answer is possible)	
	Oral prednisolone	165 (80.9)
	Salbutamol	201 (98.5)
	Adrenaline	48 (23.5)
	Cromolyn	35 (17.2)

N٥	Knowledge item	N (%)
	Antibiotics	17 (8.3)
	Intravenous hydrocortisone	167 (81.9)
	Intravenous aminophylline	123 (60.3)
	Ipratropium bromide	154 (75.5)
	Intranasal oxygen	128 (62.7)
	Average percentage	56.5%
#		

[#]The correct answer to this question is "NO".

Table 3. Characteristics of the clinical practice of the participants, who care for patients with asthma (N = 167).

broncho-provocation)	59 (35.3)
Provide written referral for asthma education	47 (28.1)
Provide a written action plan for exacerbation management	95 (56.9)
Assess inhaler technique (or refer to asthma education) at each visit	43 (25.7)
Identify environmental triggers/inducers	159 (95.2)
Provide smoking cessation counseling and/or recommend cessation measures	153 (91.6)
Prescribe an inhaled corticosteroid (ICS) as initial maintenance therapy	80 (47.9)
Prescribe an inhaled ICS and a long-acting beta-2-agonist (LABA) when asthma is not controlled by ICS low dose alone	53 (31.7)
Check for treatment adherence at each visit	108 (64.7)
Use the Canadian Thoracic Society (CTS) control criteria or the Global Initiative for Asthma (GINA) guidelines to assess patient's asthma control	48 (28.7)
Address patient's concerns about disease/treatment	159 (95.2)
Refer to a specialist because asthma is difficult to control	151 (90.4)
Refer to a specialist if the asthma diagnosis is uncertain	149 (89.2)
Schedule regular follow up appointments	95 (56.9)
Average	59.8%
	Confirm diagnosis by pulmonary function tests (spirometry and bronchodilator reversibility or broncho-provocation) Provide written referral for asthma education Provide a written action plan for exacerbation management Assess inhaler technique (or refer to asthma education) at each visit Identify environmental triggers/inducers Provide smoking cessation counseling and/or recommend cessation measures Prescribe an inhaled corticosteroid (ICS) as initial maintenance therapy Prescribe an inhaled ICS and a long-acting beta-2-agonist (LABA) when asthma is not controlled by ICS low dose alone Check for treatment adherence at each visit Use the Canadian Thoracic Society (CTS) control criteria or the Global Initiative for Asthma (GINA) guidelines to assess patient's asthma control Address patient's concerns about disease/treatment Refer to a specialist because asthma is difficult to control Refer to a specialist if the asthma diagnosis is uncertain Schedule regular follow up appointments Average

experience (over five years) (OR 3.27; 95% CI: 1.29 to 8.24; P=0.012), having the category of specialist (OR 27.93; 95% CI: 3.54 to 220.70; P=0.002) and seeing an average of six to ten asthma patients per day (OR 6.30; 95% CI: 1.97 to 20.17; P=0.002) were significant predictors of adherence to asthma recommended practices (Table 4).

Finally, at the end of the questionnaire, we asked the physicians to leave any comments they might have. Sixtyone (30%) physicians answered. The main comments were related to the existing limitations in the approach to asthmatic patients, such as the lack of spirometry in the public healthcare unit (29% of answers); the lack of leaflets for asthma education (22% of answers); the high cost of inhaled drugs for the treatment of asthma and for this reason most patients are unable to purchase them (30% of answers); not being able to refer patients to a specialist because there is no specialist in the province of work (28% of answers); and not following the guidelines due to these limitations (29% of answers).

Discussion

This study was carried out in Angola, a country in sub-Saharan Africa, with a ratio of 1.8 physicians per

Variable	Odds ratio (95% CI)	Р
Gender		
Female	1.41 (0.74–2.69)	0.304
Male	1	
Age range (years)		
≤ 30	1	
31-40	1.53 (0.54–4.33)	0.419
41-50	4.38 (1.43–13.41)	0.010
51-60	5.33 (1.60–17.83)	0.007
> 60	13.33 (1.24–143.15)	0.032
Province		
Luanda	3.70 (1.43–9.60)	0.007
Other provinces	1	
Work experience (years)		
< 5	1	
6-10	3.27 (1.29–8.24)	0.012
11-15	5.09 (1.61–16.03)	0.005
16-20	6.36 (1.94–20.88)	0.002
> 20	9.25 (2.95–28.98)	<0.001
Professional category		
Specialist	27.93 (3.54–220.70)	0.002
Resident	8.64 (1.09–68.58)	0.041
General practitioner	1	
Specialty		
None	1	
Pulmonology	468.00 (27.45–7979.87)	<0.001
Internal medicine	8.18 (0.96–70.10)	0.055
General and family medicine	12.00 (1.11–129.42)	0.041
Pediatrics	33.00 (3.91–278.52)	0.001
Other specialty	3.32 (0.38–29.01)	0.279
Average number of patients seen per day		
1-10	2.23 (0.85–5.86)	0.105
11-20	3.10 (1.39–6.92)	0.006
21-30	1.54 (0.64–3.69)	0.338
> 30	1	
Average number of asthma cases seen per day		
1-5	1	
6-10	6.30 (1.97–20.17)	0.002
11-20	4.50 (0.84–24.05)	0.079
> 20	1.80 (0.11–29.40)	0.680

Table 4. Logistic regression analysis to identify factors affecting asthma good practices.

10,000 inhabitants, where we assessed the knowledge and practice of physicians in the approach to asthma, through an online questionnaire that was shared on social networks. A total of 204 physicians participated, most of them women, aged between 31 and 40, and from Luanda, the capital city of Angola. Our results showed that physicians' knowledge of asthma was moderate, with the lowest percentages relating to diagnosis, drugs used in treatment, and signs of asthma attacks, while concerning practices, most physicians did not follow the international guidelines for asthma management. Older physicians, with more work experience and specialists, especially pulmonologists, had greater adherence to the recommended practices.

Physicians' knowledge of asthma

Adequate knowledge on the part of physicians and adherence to international guidelines are crucial when approaching asthma patients, to guarantee asthma control and a better quality of life for patients [26]. Our study showed a general level of knowledge of physicians about asthma of 66%. The majority of physicians correctly answered the questions relating to the nature of asthma, knowing the main triggers of asthma and the main symptoms of asthma (over 83%, 71%, and 68% respectively). The main gaps were related to asthma diagnostic tools, where only 34% of physicians consider that peak flow measurement can be used to diagnose asthma and 32% of physicians consider chest X-rays. The World Health Organization recommends that in countries with limited resources and when spirometry is not possible, peak flow measurement can serve as a tool for diagnosing asthma [27], while chest X-rays should be used to exclude comorbidities or assess complications [3]. The lack of knowledge of the importance of peak flow in the diagnosis and monitoring of asthma may also be related to the lack of this equipment in our healthcare units, as reported in some studies [28]. Another gap is related to the drugs used to treat asthma, where more than half of physicians (60%) still consider the use of aminophylline, and although few, some physicians consider adrenaline (24%) and antibiotics (8%) for the treatment of

asthma, although international guidelines do not recommend it [3]. Finally, a pertinent gap in our findings is that more than half of physicians (52%) do not recognize fast pulse rate or the duration of the attack as important signs of an asthma attack. Similar results were found in other studies where, despite a moderate or even good level of knowledge, gaps were identified concerning diagnostic tools, signs of asthma severity, and the drugs used to treat asthma [19,22,23,29]. A study carried out in China with around 5,000 participants reported that the level of knowledge of primary care physicians about the most common respiratory diseases, including asthma, was poor [24]. This lack of knowledge and failure to follow the guidelines leads to uncontrolled asthma and unfavorable outcomes, especially exacerbations [3]. Uncontrolled asthma is associated with high social and economic costs, particularly hospitalizations, medication, DALYs, and premature deaths, especially in LMICs [2,12]. For this reason, knowledge of and adherence to asthma management guidelines is mandatory.

Asthma management practices

In Angola there are no national guidelines for managing asthmatic patients, and therefore physicians are instructed to follow international guidelines such as GINA [26]. However, many physicians do not have access to them and some are not even aware of their existence. On the other hand, because there are few pulmonologists in the country, most asthma patients are followed by physicians from other specialties or general practitioners. In our study, 167 (82%) of the 204 participants confirmed that they follow asthma patients. Almost all the physicians identified the environmental triggers/inducers for asthma, addressed patients' concerns about the disease/treatment, provided smoking cessation counseling and/or recommended cessation measures, and referred them to a specialist when asthma is difficult to control (95%, 95%, 92%, 90%, respectively). Adherence to these practices was also reported in a study carried out in Nigeria [30], while in other studies the percentage of physicians who adhered to these practices was lower [22,23], than in our study.

We think that our physicians find it easy to adhere to these practices, because they only depend on the physician's conduct, and no means or materials are needed.

However, we found that more than half of physicians do not adhere to practices related to the diagnosis and treatment of asthma, as well as to following asthma guidelines.

Sixty-five percent of physicians do not confirm the diagnosis of asthma by pulmonary function tests. Spirometry is essential not only to confirm the diagnosis but also to monitor treatment [3]. This gap has also been reported in other studies and is mostly due to the absence of spirometers in health facilities [19,30] as commented by some of our physicians.

Asthma education as well as training/verification of inhaler technique are fundamental pillars for controlling the disease and should be carried out at each visit [3,31,32], but 72% of our physicians do not provide written information for asthma education and 74% do not assess inhaler technique (or refer to asthma educator) at each visit. A study carried out in Luanda, Angola with asthmatics followed up in a pulmonology clinic showed that poor asthma control was associated with incorrect inhaler technique, among other factors [10].

Seventy-one percent of our physicians do not follow the GINA guidelines, and more than half (52% and 68% respectively) do not prescribe inhaled corticosteroids (ICS) as initial maintenance therapy or ICS and long-acting beta-2-agonist (LABA) when asthma is not controlled by low dose ICS alone. Guidelines for the management of asthma are updated regularly and their use is recommended to improve the approach to patients [3,4]. Low adherence by physicians to asthma guidelines has been reported in several studies [22,29,30,33,34] and is one of the causes of asthma noncontrol and increased mortality, especially in LMICs [2].

Predictors of best practice in asthma management

Our results showed that age and work experience influence adherence to recommended practices. Physicians over 40 years-old, and with more than five years of work experience adhere significantly more to best practices, compared with younger physicians, and with less work experience. Other studies have reported similar findings [22,30], but contradictory results have been found in other studies, where the trend of adherence to best practices was significant in younger physicians and those with less work experience [23,35]. The authors justified their results with the fact that older physicians with more work experience are more resistant to changes in clinical practice, are skeptical about adopting new guidelines, have difficulty applying them, and often do not have the time to apply them, while younger physicians adhere better to new guidelines and are more willing to apply them [23,35].

Regarding medical specialties, our study showed that being a specialist, and especially a pulmonologist, is significantly associated with adherence to best practices. This result shows us how important postgraduate education is for improving compliance with guidelines and adherence to best practices, as reported in other studies [28,36]. As for the other specialties, our results showed that pediatricians and then general and family medicine specialists adhere better to the practices compared with internal medicine specialists. Similar data has been reported in other studies [19,28,34].

Finally, our study showed that physicians who see between six and ten patients a day adhere to the best practices, which did not happen with physicians who see more than ten patients. Some studies have shown that seeing a high number of asthma patients per day was a predictor of non-adherence to best practices, indicating that physicians who see many patients are under pressure, which impairs the level of care provided to their patients and adherence to best practices, due to their high workload [19,22].

Strengths and limitations

Our study has some limitations, among them the small sample size, probably due to the nature of the questionnaire that was shared online, where we may have lost part of the target population because they were not active on social networks and other platforms, as well as limited access to the internet, especially in the other provinces of Angola. This is an additional limitation since our study is biased toward those physicians who are using digital platforms, and who are mostly younger, and urban. The cross-sectional study design also limited our ability to identify causality between the study variables. The questionnaires used were developed and validated in English, and have been used in various studies. However, despite having been translated into Portuguese, they have not been formally validated in our environment. Despite these limitations, our study also has some strengths, namely it provides relevant data on the level of asthma knowledge and practice of Angolan physicians. This is relevant because there are few similar studies in Africa. In addition, our results highlight the absence of an association between the level of knowledge and best practices in the approach to asthma and show the existence of barriers to good practices that go beyond the level of knowledge of physicians.

Conclusions

Angolan physicians' knowledge of asthma was moderate but there are important practical gaps in asthma management regarding standard guidelines. Strategies must be implemented to improve the management and follow up of asthma patients. National guidelines for asthma management are needed, and as they have not yet been implemented, physicians should follow international recommendations such as those of GINA. Future studies with greater breadth and depth are needed to assess physicians' adherence to evidence-based recommendations and evaluate the impact of training on the approach to Angolan asthmatic patients.

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