GAPS IN KNOWLEDGE AND CLINICAL PRACTICE IN ASTHMA CARE: A CROSS-SECTIONAL STUDY

Onubogu UC[1*], Chukwuma CA[2], Ekop EE[3], Dimkpa CR[1]

[1]Department of Paediatrics & Child Health, Rivers State University Teaching Hospital, Nigeria
[2]Department of Paediatrics & Child Health, University of Port Harcourt Teaching Hospital, Nigeria
[3]Department of Paediatrics & Child Health, University of Abuja Teaching Hospital, Nigeria Nigeria

*Correspondence: Onubogu, U.C;   **Email:** utchayonubogu@yahoo.co.uk

_____

Abstract

Introduction: Asthma is a leading chronic respiratory disease among adults and children. Care gaps in asthma have been shown to worsen the outcome of patients. This study aimed to identify gaps in asthma care in health facilities, basic knowledge, and clinical practice among healthcare providers.

Methods: This was a cross-sectional study among doctors, nurses, and pharmacists who participated in an asthma workshop in Port Harcourt using self-administered, questionnaires to assess care gaps in asthma management. Logistic regressions were done to assess possible factors influencing clinical practice and the content of asthma consults.

Results: Sixty-two healthcare workers from 25 healthcare facilities participated in the study, consisting of mainly Doctors 47(75.8%). Most facilities had nebulizers 21(84%) while 8(32%) had at least one supportive investigation for asthma diagnosis and management. Half of the participants knew all four cardinal asthma symptoms. Report of management of acute asthma exacerbations among the doctors showed nebulized salbutamol 41(87.2%) was the most common medication used, while intravenous aminophylline 31(66.0%), oral salbutamol 29(61.7%) and antibiotics 24(51.1%), was also reported to be used. Forty-one (87.2%) doctor discharged patients on a treatment plan. Asthma control was assessed adequately by 17(36.2%), while inhaler technique was routinely taught to patients by 29(61.7%) and personalized action plan was given by 21(44.7%).

Conclusion: The study identified gaps in the availability of equipment used for monitoring and diagnosing asthma in health facilities as well as gaps in participants' asthma knowledge and medication use. Training and retraining of healthcare workers as well as the provision of equipment are recommended for improved asthma patient care.

Keywords: Asthma, Quality of care, Control assessment, health care facilities, knowledge

INTRODUCTION

Asthma is a leading chronic respiratory disease among adults and children. Unfortunately, the disease is largely underdiagnosed and poorly treated resulting in increased morbidity and mortality as well as poor quality of life.[1,2] Management of asthma is holistic. It involves access to an equipped healthcare facility, knowledgeable healthcare providers that can render best practices, an organized referral pathway, good patient education, and patient compliance with the recommended treatment plan. [3,4] Gaps at any of these levels would lead to poor outcomes.

The Forum of International Respiratory Societies identified gaps in asthma care to include: inequities in care and access to medications, as well as deficient knowledge and implementation of evidence-based practices among healthcare providers.[5] A survey among physicians in Ondo and Lagos, Nigeria showed that a good knowledge of asthma does not necessarily reflect good quality of asthma care in line with recommended practice guidelines. [6,7] Barriers to asthma management identified by the Lagos study were the unavailability of diagnostic facilities and the high cost of medications.[7]

The surveys done in Nigeria[6,7] assessed gaps in knowledge and practice among only physicians, however, in Nigeria, 70% of health care is rendered by the primary health care centres where the majority of care is given by non-physicians who are made up of nurses and community health extension workers.[8,9] Therefore, knowledge and gaps in care need to be assessed in these groups of health workers as well. There is a severe physician shortage in Nigeria, with a national average of 4 physicians per 100,000 population,[9] non-physicians in the primary health care centers need to be able to identify an acute asthma exacerbation episode and give first aid before referral.[8,9] This study included non-physicians to gain insight into their basic knowledge in identifying acute asthma exacerbation. There has also been no survey to identify gaps in knowledge, clinical practice, and health care facilities for asthma care in our locality, Port Harcourt, Nigeria. Identifying local gaps is necessary to help formulate interventions that will be successful within our locality. It would improve management outcomes and decrease morbidity and mortality among asthma patients. This study aimed to identify gaps in facilities for asthma care, basic knowledge, and clinical practice among healthcare providers in Port Harcourt, Nigeria.

MATERIALS AND METHODS

Study design: This was a cross-sectional study carried out amongst healthcare providers who attended an Asthma training workshop to mark the May 2022 World Asthma Day themed "Closing the Gap in Asthma Care." It was organized by specialists in Paediatric respiratory medicine from Rivers State University Teaching Hospital, Port Harcourt, and the University of Port Harcourt Teaching Hospital Nigeria

Setting: The study was carried out at the workshop venue in Golden Tulip Hotel, Port Harcourt as part of the Pretest for workshop training.

Participants and Sample Size: Non-pulmonology specialists in tertiary hospitals, primary healthcare centres, general hospitals, and some private hospitals were invited for the training. The program was also advertised on doctors' social media platforms. All healthcare providers who attended the workshop as delegates were eligible to be enrolled, however, only those who gave written informed consent to participate and complete the self-administered questionnaire were recruited for the study.

Data sources / Measurement: A pretested Questionnaire was used for collecting data. The questionnaire was developed by the researchers and pretested on doctors and nurses in the hospital before the workshop to assess the clarity, ease of answering questions, and duration for completion. It was then adjusted accordingly with some questions rephrased. The questionnaire's Cronbach's alpha test was 0.89 indicating good internal consistency in the responses. The pretests were not included in the study. The information obtained from the questionnaire included health worker and health facility identifier information, presence of facilities/equipment for asthma care (nebulizer, electricity, allergic skin test, and diagnostic tests such as spirometer, peak expiratory flow meter (PEFMr), methacholine challenge test, fractional exhaled nitric oxide test.), basic knowledge of symptoms of asthma, clinical management of acute asthma exacerbation, quality of chronic asthma care concerning scheduling follow-up visits, regular interval assessment of asthma control and inhaler techniques, use of personalized asthma action plans, medication adjustments based on Global Initiative for Asthma (GINA) guidelines and current clinical status.[3]

Statistical methods: Data entry and analysis were done using SPSS software version 23.0 (IBM Corporation, Atlanta, GA, USA). Data distribution was presented in percentages and tables. The response from only one representative from each health facility was analysed for the section concerning facilities for asthma care, while the basic knowledge of asthma symptoms was assessed for all participating healthcare workers. The asthma symptoms assessed were cough, chest tightness, difficulty in breathing, and wheezing, knowledge of all four symptoms was described as good basic knowledge. Management of acute asthma exacerbation and follow-up clinical care was assessed for only the doctors. The variables were dichotomized, and a test of association was done using the Chi-square test with logistic regression, fisher exact test was done for frequencies ≤ 5. The level of statistical significance was set at a p-value of < 0.05 while odds ratios were expressed with a 95% confidence interval. Ethical clearance for the study was obtained from Rivers State University Teaching Hospital's ethical committee: RSUTH/REC/2023293.

RESULTS

Seventy-one healthcare workers from 25 healthcare facilities attended the training, while 62(87.3%) gave consent. The majority of health workers were females giving an F: M ratio of 1.7:1, mostly doctors 47(75.8%), and mainly health workers who had been practising their profession for 10 to < 15 years, 20(32.3%). Most worked in tertiary hospitals 27(43.5%) and general hospitals, 19(30.6%). Of the 47 doctors, the majority 24(51.1%) worked in tertiary hospitals see Table 1.

Table 1: Characteristics of the study population

Variable	Frequency (n= 62) (%)
Age in years	
25 - 34	15(24.2)
>34 – 44	26(41.9)
> 45	21(33.9)
Gender	
Female	39(62.9)
Male	23(37.1)
Category of health workers	
Doctors:	47(75.8)
Consultants	8
Residents in training	7
Medical officers	10
Doctor (cadre unspecified)	22
Nurses	13(21.0)
Pharmacists	2(3.2)
Years of practice	
1 - <5	8(12.9)
5 - <10	11(17.9)
10 - <15	20(32.3)
15 - < 20	8(12.9)
> 20	15(24.2)
Type of health facility	
Tertiary Hospital	27(43.5)
Secondary healthcare centre	19(30.6)
Private owned Hospital	10(16.1)
Primary health care centre	6(9.7)

Health facility assessment

The 25 healthcare facilities represented were General hospitals 10(40%), Primary health care centres 6(24%), private hospitals 6(24%), and Tertiary hospitals 3(12%). Most of the health facilities 21(84%) had Nebulizers, which was present in all the tertiary hospitals 3(100%), and all the Primary health care centres 6(100%) as reported by their representatives at the training. Electricity with generator backup was present in 24(96%) of the healthcare facilities represented. A spirometer was present in only 4(16%) and a Peak expiratory flow meter (PEFMr) was present in 5(20%) of the health facilities. No centre reported that they had a facility for a methacholine challenge test, Fractional exhaled nitric oxide test (FENO), or Allergic skin test. Tertiary hospitals were significantly more likely to have a spirometer (OR:20, 95% CI: 1.2, 330, P: 0.01), see Table 2.

Knowledge and Clinical practices of emergency hospital management of asthma exacerbation among doctors

Table 3 shows the basic knowledge and clinical practices of hospital management of asthma exacerbation among the doctors who participated in the conference pretest. The most common symptom of asthma reported by the health workers was wheezing 56(90.3%) followed by cough 54(87.1%), difficulty breathing 53(85.5%), and chest tightness 40(64.5%). Twenty-four (51.1%) of all the health workers knew the 4 symptoms of asthma. Forty-two (89.4%) out of the 47 doctors reported cough, chest tightness, and wheezing were symptoms of asthma, while 31(66.0%) reported chest tightness as a symptom of asthma. All doctors reported to have managed an acute asthma exacerbation in the past 1 year with 22 (46.8%) of them having done so at least once a week. The majority of the patients treated were within the > 12-to-65-year category as reported by 32 (68.1%) of the respondents. The most common medication used for the hospital management of asthma exacerbation was nebulized Salbutamol 41(87.2%) while the least used was Ipratropium bromide pMDI 3(6.5%). Intravenous Aminophylline was used as a medication for the management of asthma exacerbation by 31(66.0%), while antibiotics were used by 24(51.1%), and oral salbutamol was used by 29(61.7%). Forty-one (87.2%) doctors reported that they discharged a patient on a treatment plan after managing asthma exacerbation in the hospital emergency care unit.

Table 2: Health facility amenities for asthma management

Variable	No n (%)	Yes n (%)	Total →	Odds ratio	95% CI Lower	Upper	*P-value*
Presence of a nebulizer							
Primary health care centre	0(0)	6(100)	6	-	-	-	0.22
General Hospital	3(30)	7(70)	10	0.16	0.14	1.9	0.11
Private Hospital	1(16.7)	5(83.3)	6	0.93	0.07	11.1	0.95
Tertiary Hospital	0(0)	3(100)	3	-	-	-	0.42
Total	4(10)	21(84)	25				
Presence of electricity with generator backup							
Primary health care centre	1(16.7)	5(83.3)	6	-	-	-	0.69
General Hospital	0(0)	10(100)	10	-	-	-	0.4
Private Hospital	0(0)	6(6)	6	-	-	-	0.56
Tertiary Hospital	0(0)	3(100)	3	-	-	-	0.7
Total	1(4)	24(96)	25				
Presence of spirometer							
Primary health care centre	5(83.3)	1(16.7)	6	1.06	0.89	12.6	0.95
General Hospital	9(90)	1(10)	10	0.44	0.03	5.01	0.5
Private Hospital	6(100)	0(0)	6	-	-	-	0.22
Tertiary Hospital	1(33.3)	2(66.7)	3	20	1.2	330	0.01
Total	21(84)	4(16)	25				
Presence of PEFMr							
Primary health care centre	5(83.3)	1(16.7)	6	0.75	0.06	8.3	0.3
General Hospital	9(90)	1910)	10	0.3	0.02	3.2	0.3
Private Hospital	3(50)	3(50)	6	8.5	0.97	74.4	0.06
Tertiary Hospital	3(100)	0(0)	3	-	-	-	0.35
Total	20(80)	5(20)	25				

CI: Confidence interval

Table 3: Doctors' knowledge and emergency hospital management of asthma exacerbation

Variable	Study population (n= 47) (%)
What are the cardinal symptoms of asthma?	
Cough	42(89.4)
Wheeze	42(89.4)
Difficulty breathing	42(89.4)
Chest tightness	31(66.0)
The proportion of four cardinal symptoms known by a doctor	
All four symptoms (100%)	24(51.1)
Three symptoms (75%)	16(34.0)
Two symptoms (50%)	6(12.8)
One Symptom (25%)	1(2.1)
None of the symptoms (0%)	0(0)
How often do you see patients with asthma in your place of practice?	
At least once a week (Frequent)	22(46.8)
At least once a month but < weekly (Occasionally)	25(53.2)
Less than once a month (Rarely)	0(0)
Have you managed a patient with acute asthma symptom flare-ups?	
Yes	47(100)
No	0(0)
The age bracket of patients you have managed with acute asthma	
< 6 years	30(48.9)
6 – 12 years	30(63.8)
> 12 to < 65years	32(68.1)
≥ 65years	12(25.5)
All Ages	1(2.1)
Which drugs have you used in the management of acute asthma?	
Nebulized Salbutamol	41(87.2)
IV Hydrocortisone	40(85.1)
Salbutamol pMDI	37(78.7)
Tabs Prednisolone	35(74.5)
IV Aminophylline	31(66.0)
Syrup Salbutamol	29(61.7)
Antibiotics	24(51.1)
Fluticasone / Salmeterol	10(21.3)
Nebulized Ipratropium bromide	10(21.3)
Nebulized Budesonide	5(10.6)
Fluticasone pMDI	5(10.6)
Budesonide pMDI	4(8.5)
Budesonide/ Formoterol	3(6.4))
Ipratropium bromide pMDI	3(6.4)
Discharged patient home on an asthma treatment plan	
Yes	41(78.8)

Clinical practice peculiarities of doctors when managing acute asthma exacerbation in the hospital emergency care, showed that doctors managing children aged between 6 to 12 years for asthma exacerbation were significantly more likely to use oral salbutamol when compared to those managing patients from other age groups (OR:6.02, 95% CI: 1.63, 22.3, P:0.006). Those who practice in tertiary hospitals were significantly more likely to use nebulized ipratropium bromide for asthma exacerbation when compared to those practising in non-tertiary health institutions (OR:5.25, 95% CI: 1.01, 39.1, P: 0.003). Doctors practising in Private hospitals were significantly more likely to use Fluticasone /Salmeterol when compared to doctors in government hospitals (OR: 7.5, 95% CI: 1.05, 53.4, P: 0.03). Inhaled budesonide was significantly more commonly used among doctors who had been practising for ≤ 5 years (OR: 9.7, 95% CI: 1.06, 89.2, P: 0.02) when compared to those who have been practising for > 5 years, see Table 4

Table 4: Significant Associations in emergency hospital management of asthma exacerbation.

Variable	No n (%)	Yes n (%)	Total	Odds ratio	95% CI Lower	Upper	*P-value*
Use of Oral salbutamol							
Patients aged 6 to 12yrs	7(23.3)	23(76.7)	30	6.02	1.63	22.3	0.006
Patients not 6 to 12yrs	11(64.7)	6(35.3)	17				
Use of nebulized ipratropium bromide							
Tertiary Hospital	16(66.7)	8(33.4)	24	5.25	1.01	39.1	0.003
Primary/Secondary HC	21(91.3)	2(8.7)	23				
Use of fluticasone /salmeterol							
Private owned Hospital	2(40)	3(60)	5	7.5	1.05	53.4	0.025
Government-owned Hospital	35(83.3)	7(16.7)	42				
Use of Inhaled Budesonide							
≤ 5 years Clinical practice	4(66.7)	2(33.3)	6	9.7	1.06	89.2	0.02
> 5 years Clinical practice	39((95.1)	2(4.9)	41				

CI: Confidence interval

Clinical decisions in chronic asthma management among doctors

Thirty-four (72.3%) doctors have had scheduled follow-up asthma consults. The most commonly evaluated index for assessing symptom control was asking questions about daytime symptoms 30(63.8%) while asking for frequency of SABA use 18(38.3%) was the least evaluated index for symptom control assessment. Overall, only 17(36.2%) doctors asked all the required questions for a complete symptom control assessment according to recommended guidelines. Inhaler technique was taught to patients after consultation by 29(61.7%) doctors, a personalized action plan was given by 21(44.7%), and a follow-up appointment was given by 39(83%). Less than half of the doctors reported that were very confident in managing asthma in children 19(40.4%) and adults 22(46.8%), see Table 5.

Doctors who practice in general hospitals and primary health care centres were significantly less likely to have scheduled asthma consults for asthmatic patients who did not have an acute symptom flare-up when compared to those practising in tertiary hospitals (OR: 0.16, 95% CI: 0.03, 0.65 P: 0.02), See Table 6. On the other hand, doctors practising in a tertiary centre were significantly more likely to do full asthma symptom control assessment when compared to those in the other hospitals (OR: 3.6, 95% CI: 1.007, 12.86, P: 0.04), while doctors who also cared for elderly people with asthma were significantly more likely to feel very confident to manage asthma in children(OR: 4.36 95% CI: 1.08, 17.6, P: 0.03) and adults (OR: 5.07, 95% CI: 1.16, 22.05, P: 0.04), when compared to those who cared for adults and young children, see Table 6.

Table 5: Clinical actions/ decisions in chronic asthma management among doctors

Variable	(n= 47) (%)
Have had a scheduled clinic consult with a patient who is known to be asthmatic but does not have acute symptoms:	
Yes	34(72.3)
Assessment of asthma control	
Daytime symptoms frequency	30(63.8)
Night-time symptoms frequency	29(61.7)
Absenteeism from work or school	26(55.3)
Frequency of SABA use	18(38.3)
The proportion of control assessment questions asked (%)	
100	17(36.2)
75	10(21.3)
50	2(2.1)
25	3(6.4)
0	16(34)
Inhaler technique taught to patients	
Yes	29(61.7)
Inhaler technique demonstrated by patients after consult	
Yes	26(55.6)
An Asthma Action plan is given to patients after consults.	
Yes	21(44.7)
Controller medications adjusted after consult	
Yes	25(53.2)
Gave a patient a follow-up appointment after consult/emergency care	
Yes	39(83)
Referred for specialist care	
Yes	16(34)
Level of confidence in the management of children with asthma	
Very confident	19(40.4)
Slightly confident	27(57.4)
Not confident at all	1(2.1)
Level of confidence in the management of adults with asthma	
Very confident	22(46.8)
Slightly confident	22(46.8)
Not confident at all	3(6.4)

Table 6: Significant associations of some variables and content of doctors' asthma consult

Variable	No n (%)	Yes n (%)	Total	Odds ratio	95% confidence interval		*P-value*
					Lower	Upper	
Scheduled consult for non-acute asthma							
	Scheduled consult: No	Scheduled consult: Yes					
Practice in Tertiary Hospital							
Yes	3(12.5)	21(87.5)	24	5.3	1.24	23.4	0.024
No	10(43.5)	13(56.5)	23				
Control Assessment							
	100% Control Assessment: No	100% Control assessment: Yes					
Tertiary Hospital							
Yes	12(50)	12(50)	24	3.6	1.007	12.86	0.04
No	18(78.3)	5(21.7)	23				
	Inhaler canister use Qty assessed: No	Inhaler canister use Qty assessed: Yes					
Tertiary Hospital							
Yes	11(45.8)	13(54.2)	24	4.25	1.18	15.23	0.02
No	18(78.3)	5(21.7)	23				
Physicians perceived confidence in Asthma management							
	Very confident Child asthma Mgt: No	Very confident Child asthma Mgt: Yes					
Care for elderly patients							
Yes	4(33.3)	8(66.7)	12	4.36	1.08	17.6	0.03
No	24(68.6)	11(31.4)	35				
	Very confident adult asthma Mgt: No	Very confident adult asthma Mgt: Yes					
Care for elderly patients							
Yes	3(25)	9(75)	12	5.07	1.16	22.05	0.04
No	22(62.9)	13(37.1)	35				

DISCUSSION

This study found that although nebulizers were readily available in hospitals with adequate electricity supply to ensure their availability for use, spirometers and PEFMr were not adequately available in the hospitals. There was also inadequate knowledge in identifying all the cardinal symptoms of asthma by all the health workers who attended the training. There were deficiencies among the doctors in the management of acute asthma exacerbation due to incorrect use of antibiotics, oral salbutamol, intravenous aminophylline, and failure to discharge asthma patients from emergency care with a discharge plan. A significant number of the doctors also did not schedule follow-up consults for asthma and when they had scheduled consults, asthma control assessment, inhaler technique training, and drafting of a personalized asthma action plan were not done. There was a limitation in the range of available tests to confirm or support asthma diagnosis and management with a few centres reporting that they had spirometer or PEFMr.

The absence of spirometer and PEFMr in the hospitals suggests that confirmatory diagnosis for asthma may be delayed in these facilities and this could delay the commencement of definitive treatment. Also, clinical judgment decisions during the management of acute asthma exacerbation in these hospitals may be delayed due to the absence of an objective baseline measurement of lung function as recommended by practice guidelines.[3,10] Similar to our finding, low access to spirometry in Nigerian hospitals has been reported in a survey that involved hospitals in all six geopolitical zones in Nigeria.[11] No centre in this study reported having a methacholine challenge test, FENO test, or allergic skin test. Although these tests are supposed to be available in specialist centres, the 3 tertiary hospitals in our study lacked them, showing that there is a need to improve equipment in the hospitals and step up the level of healthcare obtainable in our hospitals. A high proportion of the health facilities represented had a nebulizer for acute asthma care. This finding is reassuring, as treatment of acute asthma via nebulizers is safe, effective, and reliable.[12]

Only half of all the respondents had good basic knowledge of the symptoms of asthma, the proportion was not significantly different when sub-group analysis for only doctors was considered. The knowledge level in our study was still higher than that reported by other Nigerian studies[6,7] where less than half of the respondents had good knowledge of asthma. The disparity in both studies could be from the fact that this study only assessed basic symptoms of asthma while the other Nigerian studies[6,7] assessed broader knowledge with questions that span through pathophysiology, aetiology, clinical presentation, and management.

Inappropriately prescribing antibiotics routinely for the management of acute asthma exacerbation was seen in our study. This is in contrast with the recommendation by GINA guidelines.[3] The use of oral antibiotics is not recommended for routine treatment of asthma exacerbation[3] in the absence of evidence of lung infection, can lead to antibiotic resistance, increase treatment costs, and even delay appropriate interventions.[13] A similar finding among general practitioners in Nigeria was reported where about a quarter of them prescribed other non-recommended medications inclusive of antibiotics for the management of asthma.[13] Similarly, an evaluation of the quality of management of acute asthma in a tertiary institution also showed that antibiotics were prescribed in approximately 30% of the patients with 10% of the prescriptions not justifiable.[14]

About two-thirds of respondents used oral salbutamol as a reliever medication, for acute asthma care. Oral salbutamol causes more systemic side effects when compared to the inhaled form which also has a rapid onset of action. The use of oral salbutamol may be largely attributed to the convenience of administration, and inadequate knowledge on the part of the health workers.[15] This study also revealed that the likelihood of using oral salbutamol in the management of acute asthma was significantly higher among doctors managing children with acute asthma. The reason for this finding could be because the recommended way to use salbutamol in the management of asthma in children younger than 6 years is by inhalational method[3] which requires a spacer device for dispensing it. Commercially manufactured spacers are however not readily available in Nigeria and when available could be expensive, also knowledge of how to use these spacers has been reported to be suboptimal among Nigerian healthcare workers.[16] As a result, health workers use the easier option of parenteral salbutamol which is cheaper, accessible, and very easy to administer. There is a need to teach healthcare workers how to make improvised spacers that are easily available, so that barriers to the prescription of inhalation salbutamol due to the non-availability of spacers can be overcome. Improvised spacers have been reported to be efficient in delivering aerosolized beta-agonists in the management of acute asthma.[17]

A high proportion of respondents used intravenous aminophylline for the treatment of acute asthma. The use of Aminophylline in the management of acute asthma is no longer recommended because of its potential side effects and poor efficiency[3] The reported use of antibiotics, oral salbutamol, and intravenous methyl xanthine in acute asthma care highlights a major practice gap. This gap could be attributed to inadequate medical education activities for doctors practising in non-academic health institutions. Such doctors need to be targeted for constant training and re-training as key measures to ensure optimal patient care in the community.[18] This is in contrast to tertiary hospitals where regular postgraduate education occurs and may be the plausible reason why more of their health workers used nebulized ipratropium bromide as an adjunct to salbutamol in line with GINA guidelines,[3] in the management of moderate to severe asthma exacerbations in the hospital. Regular training would boost confidence in management and update practice guidelines among doctors which seem to be suboptimal among the doctors in our study.

Care beyond the emergency room setting is integral to achieving control in asthmatic patients. Similar to our findings, a systematic review[18] showed that doctors practising in tertiary hospitals were more likely to schedule follow-up visits and do a full asthma control assessment based on symptoms, compared to those practising outside tertiary facilities. This may be because the clinics in the tertiary facilities are run by specialists who are required to provide comprehensive care to patients with asthma and also know the importance of follow-up visits. This finding was similar to that of Price et al.[4] A significant proportion of the doctors in our study did not teach their patients inhaler techniques nor give them action plans. This may be due to a lack of awareness of the importance of proper inhaler technique and self-management in patients with asthma by the participating doctors. The importance of verifying inhaler technique cannot be over-emphasized,[19] as proper inhaler technique ensures delivery of adequate drug doses which is necessary to achieving asthma control.[20] Active participation of patients in their management,

through the use of an action plan, has been shown to avert exacerbations, reduce hospital visits, and improve quality of life.[21]

Physicians who care for elderly patients reported having more perceived confidence in managing both adults and children with asthma. While perceived confidence does not necessarily equate to more knowledge, an increased scope of practice can increase physician confidence[22] which may be the case in doctors who care for elderly persons as they may have to manage a wide range of diseases considering the wide range of patients that are classified as elderly from 65years and above.

Conclusion

Gaps in asthma care were identified in the availability of equipment for diagnosing and monitoring asthma in health facilities, as well as in having basic knowledge of asthma, and management of acute asthma exacerbations according to recommended guidelines for the use of antibiotics, oral salbutamol, and intravenous aminophylline. There was also inadequate scheduling of follow-up care, sub-optimal asthma control assessment, and inhaler technique training for long-term management of asthma.

Recommendation

It is recommended that spirometers, and PEFMr be provided at primary and secondary health centres to enable objective monitoring of asthma patients and provision of other diagnostic and supportive tests at the tertiary health centres. There is also a need to organize regular training that would include doctors in non-academic institutions, to update their knowledge and practice guidelines in line with current recommendations.

Limitations of the study

This was a self-reported practice survey with limitations on the comprehensiveness of asthma management that can be studied. The fact that the survey was carried out in a location that pulled the doctors out of their hospital means that evaluation of the amenities of the health facilities was limited to recall, and doctors practising in hard-to-reach areas who could not attend were also excluded from the study. This could affect the generalizability of the study findings.

Conflict of interest: Authors declare no conflict of interest.

REFERENCES

1. García-Marcos L, Asher MI, Pearce N, Ellwood E, Bissell K, Chiang CY, et al. The burden of asthma, hay fever and eczema in children in 25 countries: GAN Phase I study. Eur Respir J. 2022 Sep 15;60(3):2102866. Doi: 10.1183/13993003.02866-2021. PMID: 35144987; PMCID: PMC9474895.

2. Mortimer K, Lesosky M, García-Marcos L, Asher MI, Pearce N, Ellwood E, et al. The burden of asthma, hay fever and eczema in adults in 17 countries: GAN Phase I study. Eur Respir J. 2022 Sep 15;60(3):2102865. doi: 10.1183/13993003.02865-2021. PMID: 35210319; PMCID: PMC9474894.

3. Global Initiative for Asthma. GINA report, global strategy for asthma management and prevention. 2022; Global Initiative for Asthma:10th October 2022.

4. Price C, Agarwal G, Chan D, Goel S, Kaplan AG, Boulet LP, et al. Large care gaps in primary care management of asthma: a longitudinal practice audit. BMJ Open. 2019 Jan 29;9(1): e022506. doi: 10.1136/bmjopen-2018-022506. PMID: 30696669; PMCID: PMC6352804.

5. The Forum of International Respiratory Societies (FIRS). Closing-gaps-in-asthma-care. https://www.chestnet.org/Newsroom/Press-Releases/2022/05/Closing-gaps-in-asthma-care. Updated 2022. Accessed October, 10th, 2022.

6. Adeniyi B, Ilesanmi O, Obaseki D, Desalu O, Betiku B, Erhabor G. Relationship between knowledge and quality of asthma care among physicians in south-west Nigeria. Niger J Clin Pract. 2017;20(5):566-572. doi: 10.4103/1119-3077.206363.

7. Ozoh OB, Ndukwu CI, Desalu OO, Adeyeye OO, Adeniyi B. Knowledge and practice assessment, and self-reported barriers to guideline-based asthma management among doctors in Nigeria. Niger J Clin Pract. 2019;22(5):692-700. doi: 10.4103/njcp.njcp_569_18.

8. Onyebuchi Ezigbo. 70% of Nigeria's population rely on primary healthcare facilities. This Day. Thursday, 16th February 2023. Available from: https://www.thisdaylive.com/index.php/2022/12/16/70-of-nigerias-population-rely-on-primary-healthcare-facilities/.

9. Uzochukwu BSC. Primary health care systems (PRIMASYS): Case study from Nigeria. Geneva:

World Health Organization press; 2017.Chapter 1, Overview of health care system1; p. 3-6.

10. Schull MJ, Ferris LE, Tu JV, Hux JE, Redelmeier DA. Problems for clinical judgement: 3. thinking clearly in an emergency. CMAJ. 2001;164(8):1170-1175.

11. Desalu OO, Busari OA, Onyedum CC, Salawu FK, Obateru OO, Nwogu KC, et al. Evaluation of current knowledge, awareness and practice of spirometry among hospital -based NJ igerian doctors. BMC Pulmonary Medicine. 2009;9(1):50. https://doi.org/10.1186/1471-2466-9-50. doi: 10.1186/1471-2466-9-50.

12. Chinese College of Emergency Physicians (CCEP); Emergency Committee of PLA; Beijing Society for Emergency Medicine; Chinese Emergency Medicine. Expert consensus on nebulization therapy in pre-hospital and in-hospital emergency care. Ann Transl Med. 2019 Sep;7(18):487. doi: 10.21037/atm.2019.09.44. PMID: 31700923; PMCID: PMC6803223.

13. Fawibe AE, Onyedum CC, Sogaolu OM, Ajayi AO, Fasae AJ. Drug prescription pattern for asthma among Nigerian doctors in general practice: A cross-sectional survey. Ann Thorac Med. 2012;7(2):78-83. doi: 10.4103/1817-1737.94524.

14. Desalu O, Adeoti A, Ogunmola O, Fadare J, Kolawole T. Quality of acute asthma care in two tertiary hospitals in a state in south western nigeria: A report of clinical audit. - Niger Med J. 2016; - 57(- 6): - 339-- 346. doi: 10.4103/0300-1652.193860.

15. Amin S, Soliman M, McIvor A, Cave A, Cabrera C. Understanding Patient Perspectives on Medication Adherence in Asthma: A Targeted Review of Qualitative Studies. Patient Prefer Adherence. 2020 Mar 10; 14:541-551. doi: 10.2147/PPA.S234651. PMID: 32210541; PMCID: PMC7071882.

16. Adeniyi BO, Adebayo AM, Ilesanmi OS, Obaseki DO, Akinwalere OO, Erhabor GE. Knowledge of spacer device, peak flow meter and inhaler technique (MDIs) among health care providers: An evaluation of doctors and nurses. Ghana Med J. 2018;52(1):15-21. doi: 10.4314/gmj.v52i1.4.

17. Panicker J, Sethi GR, Sehgal V. Comparative efficiency of commercial and improvised spacer device in acute bronchial asthma. Indian Pediatric. 2001;38(4):340-348.

18. Mphahlele RE, Kitchin O, Masekela R. Barriers and determinants of asthma control in children and adolescents in Africa: A systematic review. BMJ Open. 2021;11(10): e053100-2021-053100. doi: 10.1136/bmjopen-2021-053100 [doi].

19. Wu TD, Brigham EP, McCormack MC. Asthma in the primary care setting. Med Clin North Am. 2019;103(3):435-452. doi: S0025-7125(18)30169-X [pii].

20. Sanchis J, Gich I, Pedersen S, Aerosol Drug Management Improvement Team (ADMIT). Systematic review of errors in inhaler use: Has patient technique improved over time? Chest. 2016;150(2):394-406.

21. Gibson PG, Powell H, Coughlan J, Wilson AJ, Abramson M, Haywood P, et al. Self-management education and regular practitioner review for adults with asthma. Cochrane Database Syst Rev. 2003;(1):CD001117. doi: 10.1002/14651858.CD001117. PMID: 12535399.

22. Kim M, Arsenault C, Atuyambe LM, Macwan'gi M, Kruk ME. Determinants of healthcare providers' confidence in their clinical skills to deliver quality obstetric and newborn care in Uganda and Zambia. BMC Health Serv Res 20, 539 (2020). https://doi.org/10.1186/s12913-020-05410-3

.