



Assessment of Primary Care Doctors' Practice Regarding Asthma Management in Health Centers in Khartoum State, Sudan, 2017

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Authors' contributions

This study was carried out in collaboration between all authors. Author HME designed the study, wrote the protocol and performed the statistical analysis. Author SH wrote the first draft of the manuscript. Authors HA and SAB managed the literature searches. Author OHA revised the final manuscript for scientific and intellectual contents. All authors read and approved the final manuscript.

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ABSTRACT

Background: Primary health care (PHC) is the gateway to the health system, and is expected to resolve up to 85% of health problems in general. Sub-optimal management of asthma can be attributed to patient's, doctor's or health services' factors. The aim of this study was to assess the Primary care doctors' practice regarding asthma management in health centers in Khartoum State, Sudan.

Methods: This is a descriptive cross-sectional health facility based study in which a pre-tested self-administered questionnaire was used to collect information from the primary care doctors regarding their practice in asthma management.

Results: Of 131 primary care doctors (PCDs), covering 29 health centers, 87% of them were

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females and 75.5% were family medicine specialists (registrars and physicians). The majority of PCDs (>90%) identified environmental triggers/inducers of asthma and checked for treatment adherence at each visit. More than half of the PCDs (50%-89%) addressed patients concerns about disease/treatment, provided smoking cessation counseling and/or recommended cessation measures, and prescribed an inhaled corticosteroid (ICS) as initial maintenance therapy. Less than half of them (<50%) provided a written action plan for both exacerbation management and asthma education.

Conclusion: Although the results were acceptable and comparable in most aspects of managing asthma there was a considerable gap between practice and known guidelines on asthma management. There is an urgent need to develop and implement a national protocol on asthma management.

Keywords: Asthma management; health centers; practice; primary care doctors; Khartoum State; Sudan.

1. INTRODUCTION

Asthma is a major health problem in Sudan as it is worldwide. It ranks the third cause of hospital admission in Sudan [1]. The economic burden of asthma is considerable both in terms of direct and indirect medical costs [2].

International guidelines are used to achieve the main goals of asthma management. These goals aim to achieve and maintain control of symptoms, maintain normal activity levels including exercise, maintain pulmonary function as close to normal as possible, prevent asthma exacerbations, avoid adverse effects from asthma medications, and prevent asthma mortality [3]. Diagnosis of asthma is based on recognition of characteristic pattern of symptoms/signs in the absence of an alternative explanation. However, spirometry is the preferred initial test in asthma diagnosis. Peak expiratory flow rate (PEFR) records are more useful for monitoring established asthma. The non-pharmacological measures for asthma treatment include smoking cessation, weight reduction, and allergens avoidance. Currently, physicians use a stepwise, trial-and-error approach to determine the best treatment strategy for asthma patients who are not responding to inhaled corticosteroids (ICS) [4,5]. Most of the primary care physicians agreed that if a controller medication was warranted the emergency department or urgent care staff should initiate treatment [6]. The therapeutic options advocate an addition of a long-acting inhaled beta 2-agonist therapy rather than increasing the dose of inhaled corticosteroids [7]. However, recent studies have shown a better understanding of different pathways and mechanisms of inflammation in asthma, and that targeted therapy (using biomarkers of inflammation) can improve

treatment outcomes in patients with poorly controlled asthma [5].

In addition to the economic burden, there are a lot of asthma management problems. These problems are multi-factorial including doctors, patients, or health service factors, which all together lead to sub-optimal management of asthma. Optimizing management is the key solution as adherence to management guidelines makes a considerable change in outcome. Doctors in Sudan practice managing asthma but they lack a national guideline for asthma management. Spirometry as an initial test for asthma diagnosis is not used at the primary care level in the health centers due to lack of supportive devices. Previous studies on asthma management in Sudan addressed the topic at the tertiary level of care or specialized institutions. They either targeted all asthma patients attending selected hospitals [8], or asthmatic children attending a pediatric emergency department [9] or adult asthma patients attending referred clinics [10]. These studies concluded that the standard case management results of asthma were promising, where there was a decrease in the frequency of emergency visits and hospitalization but a high proportion of patients do not return for long term management [8]; the majority of asthmatic patients were not receiving treatment consistent with the recommendations of the international guidelines for asthma management [10]; and there was a need for a management protocol for acute asthma care [9]. However, no previous study in Sudan assessed the primary care doctors regarding asthma management in the primary level of care. Thus the aim of the current study was to assess the primary care doctors' practice regarding asthma management in health centers in Khartoum State, Sudan, 2017.

2. MATERIALS AND METHODS

2.1 Study Design

A descriptive cross-sectional health facility based design was adopted for this study.

2.2 Study Area

The study was carried out in the primary health care centers in Khartoum State. Khartoum State has 232 health centers that provide health services in a ratio of one health center to every 13300 citizen, 80% of them have their health centers within 5 kilometers. Khartoum state is divided administratively into seven localities. Three localities were randomly selected to carry out the study. These were Khartoum, Bahri, and Shargalneel localities.

2.3 Study Population

This included all the primary care doctors covering the thirty randomly selected health care centers in Khartoum State. They include family medicine registrars (FMRs) enrolled in a master or doctorate degree of Family medicine; family physicians (FPs) who already finished their master or doctorate degree in family medicine and medical officers who are on service after completing their internship period after graduation.

2.4 Sampling and Sample Size

Thirty health centers covered by 145 primary care doctors were selected through a 3-steps multistage cluster sampling. The first stage was random selection of three localities out of seven; these were Khartoum, Bahri (Khartoum North) and Shargalneel localities. The second stage was selection of 10 health centers in each locality by equal allocation using simple random sampling (total of 30 health centers). The third stage was total coverage of all doctors (145) in the thirty randomly selected health centers.

2.5 Tools and Data Collection

Data were collected from September to November 2017. Total coverage of all primary health care doctors in 29 randomly selected health centers who work at both morning and evening shifts was done using a validated self-administered questionnaire. The questionnaire used consisted of two sections. The first section covered the socio-demographic characteristics including age, sex, medical specialty and years of experience. The second section based on the

physician practice assessment questionnaire (PPAQ) for asthma developed by the Global Initiative for Asthma (GINA) [11] and consists of 15 self-administered questions pertaining to different aspects of asthma management e.g. providing written information for asthma education, checking symptoms since last seen and assessing and revising inhaler technique.

2.6 Data Analysis

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics in form of percentages of socio-demographic data and adherence to standards of asthma management was done. Based on a classification by Tan and his colleagues [12], the 15 affirmative answers of the different PCDs to the main aspects of asthma management were ranked and classified into three groups: $\geq 90\%$, 50% - 89% and $\leq 50\%$. The chi-square test was used to test for possible associations between asthma management practice factors and specialty of the primary care doctors.

2.7 Ethical Considerations

Written ethical clearance and approval for conducting this research was obtained from the University of Gazira Ethical Committee and Khartoum State Ministry of Health Research Department. Informed consent was taken from the participants.

3. RESULTS

Personal characteristics of participants: Out of 145 questionnaires, 131 were filled by PCDs from 29 health centers giving a response rate of 90.3%. The minimum age of the participants was 25 years, the maximum age was 60 years and the mean age was 35 ± 6.3 years, most of the PCDs 114(87%) were females with a statistically significant difference ($p < 0.05$). PCDs from Khartoum locality were 57(43.5%), more than half 81(61.8%) of the PCDs were Family medicine registrars (FMRs), and 89(67.9%) of them have an experience below 5 years.

According to Tan classification [12] as mentioned earlier the 15 affirmative responses of PCDs practice regarding asthma management were arbitrary classified into three groups:

Group A (Table 1): Ranking responses with affirmative answers of PCDs to

statements in the questionnaire equal and above 90%.

Group B (Table 2): Ranking responses with affirmative answers of PCDs to statements in the questionnaire between 50 % and 89%.

Group C (Table 3): Ranking responses with affirmative answers of PCDs to statements in the questionnaire of less than 50%.

Family doctors surpassed medical officers in scheduling regular follow up ($p = 0.035$) (Table 2) and providing written action plan for asthma education ($p < 0.05$)(Table 3).

4. DISCUSSION

In this study the primary care doctors' practice regarding asthma management in health centers was assessed. The mean age of primary care doctors was 35 years. Females occupied 87% of primary care doctors (PCDs). This might be due to the relatively comfortable training program of family medicine. More than two thirds of PCDs (70%) were family doctors and 67.9% of them with less than 5 years' experience. This is most probable due to the mass new implementation of family medicine programs sponsored by the Ministry of Health as scholarship.

Table 1. Group A: Ranking responses of doctors' practice regarding asthma management ($\geq 90\%$)

| Rank | Q. no | Question | % Yes | FMR | FP | MO |
|------|-------|--|-------|-----|-----|----|
| 1 | 6 | Do you Identify environmental triggers/ inducers if possible? | 94.7 | 96 | 100 | 88 |
| 2 | 10 | Do you check for treatment adherence at each visit? | 93.9 | 98 | 100 | 81 |
| 3 | 5 | Do you assess and revise inhaler technique? | 93.1 | 98 | 94 | 81 |
| 4 | 3 | Do you check symptoms since last seen? | 91.6 | 90 | 94 | 94 |
| 5 | 14 | Do you refer to a specialist if the asthma diagnosis is uncertain? | 91.6 | 98 | 72 | 88 |

FMR= Family medicine registrar, FP= Family physician, MO= Medical officer.

Table 2. Group B: Ranking responses of doctors' practice regarding asthma management (between 50% and 89%)

| Rank | Q No | Question | % Yes | FMR | FP | MO |
|------|------|---|-------|-----|----|----|
| 6 | 12 | Do you address patients concerns about disease/treatment? | 87.0 | 93 | 78 | 78 |
| 7 | 7 | Do you provide smoking cessation counseling and/or recommend cessation measures? | 85.5 | 93 | 89 | 66 |
| 8 | 8 | Do you prescribe an inhaled corticosteroid (ICS) as initial maintenance therapy (at step 2)? | 80.9 | 86 | 78 | 69 |
| 9 | 11 | Do you check medication side effects? | 79.4 | 83 | 83 | 22 |
| 10 | 13 | Do you refer to specialist because asthma is difficult to control?* | 75.5 | 82 | 67 | 21 |
| 11 | 9 | Do you prescribe an ICS and long-beta 2-agonist (LABA) when asthma is not controlled by ICS low dose alone? | 71.0 | 70 | 89 | 63 |
| 12 | 4 | Do you record any exacerbations/acute attacks? | 69.5 | 74 | 61 | 20 |
| 13 | 15 | Do you schedule regular follow-up?* | 59.5 | 64 | 72 | 41 |

* $p < 0.05$. ** $p > 0.05$

Table 3. Group C: Ranking responses of doctors practice regarding asthma management (< 50%)

| Rank | Q No | Question | % Yes | FMR | FP | MO |
|------|------|--|-------|-----|----|----|
| 14 | 2 | Do you provide written action plan for exacerbation management?* | 42.0 | 46 | 44 | 31 |
| 15 | 1 | Do you provide written information for asthma education?* | 32.8 | 35 | 39 | 25 |

* $p < 0.05$. ** $p > 0.05$

Regarding the practice of PCDs towards asthma management, Tan and his colleagues' classification of responses with affirmative answers to the statements was used, because it is simple, clear and easy to understand and the gaps in PCDs practice in asthma management can easily be identified [12].

4.1 Group A (above 90 %)

The questions ranked one to five in Table 1 all have affirmative responses in excess of 90%. The PCDs focused to check symptoms since the patient last seen, checked for treatment adherence, identified environmental triggers, assessed and revised inhaler technique and referred patients to the specialist when asthma diagnosis was uncertain. 91.6% of the PCDs checked symptoms since the patient last seen compared to 98.8% in a study in Singapore [12]. Assessing and revising inhaler technique was practiced by 93.1% of doctors, this expresses an odd high result especially when compared to a local study in Sudan in Wad Madani which revealed a 0.0% and showed that no records confirmed that patients were taught device technique assessment, though the study was done in a specialized tertiary level setting [9]. Other international studies showed various results, in Canada (<50%) [11], Singapore (84.8%) [12] and Nigeria (73.5%) [13]. There is marked diversity in results between countries and this might be due to different factors related to service delivery or training. 94.7% of doctors identified environmental triggers/inducers, a little bit high result when compared with 86% in another study in Singapore [12]. In a study targeting asthma patients in Sudan 77.6% of them identified asthma trigger factors [8], this showed that this aspect of asthma management was frequently assessed by doctors. Checking for treatment adherence was adopted by 93.3% of PCDs compared to 97.7% by Singapore PCDs [12], 91.6% referred to a specialist if the asthma diagnosis was uncertain, compared to <50% in a study in Canada [11]. The high referral rate may be due to lack or shortage of supportive equipment in the health centers. This high percentage of affirmative answers by PCDs is considered to conform to the guidelines almost totally [12] although these guidelines were lacking in the health centers covered by these doctors. This might reflect an adequate training PCDs received in Sudan regarding these group aspects of asthma management.

4.2 Group B (50 to 89%)

The questions ranked six to thirteen in Table 2 all have affirmative responses between 50% and 89%. They cover more than half 8(53%) of the practices of asthma management in this study which include e.g. addressing patients concerns about disease/treatment, checking medication side effects and scheduling regular follow up. However, all these practices covered important aspects of asthma management that should be checked by PCDs. Of the primary care doctors 85.5% provided smoking cessation counseling and/or recommended cessation measures, which is an acceptable result compared to 98.2% in Singapore [12]. Prescription of an inhaled corticosteroid (ICS) as initial maintenance therapy was practiced by 80.9% of the PCDs, when compared to test retest study after implementation of guidelines in Hartford where it was 38% before and 96% after guidelines implementation [14]. Prescribing an inhaled ICS and long-acting beta 2-agonist (LABA) when asthma was not controlled by ICS low dose alone scored 71 % while 97.1% of Singapore PCDs practiced that [12]. On the other hand another study in Vietnam revealed a 70% prescription of LABA alone, that some drugs with high risk of side effects were still being prescribed, and there was a need to improve both knowledge and daily practice [15]. In one study in Sudan, a quarter of patients (26.6%) used ICS in a tertiary asthma management setting in Khartoum and that was highly related to the clinical stage of severity [10]. The same study showed that more than half (57.1%) of the patients were not receiving medications consistent with recommendations of international guidelines of asthma management [10]. However, the gap in prescription of both ICS and LABA might be partly due to the adverse economic conditions of some Sudanese asthma patients which might bar them from receiving asthma medications. Our results about the PCDs use of ICS and LABA in the absence of guidelines in Sudan to follow might again reflect an adequate of both knowledge and training of the PCDs on asthma management. More than half (59.5%) of primary care doctors scheduled regular follow-up appointments compared to three studies in Sudan and a fourth one in South-east Nigeria, where the follow up rates were 43.7%, 0.0%, 31.6%, and 41.4% respectively [8,9,10,16]. This result is an acceptable one since these studies targeted asthma patients attending tertiary level settings of care and the primary level of care is more appropriate for follow up of asthma patients. Establishing and

implementing national guidelines on asthma management may shift the performance of PCDs on the practices in this intermediary group to the first group above leading to better asthma care.

4.3 Group C (less than 50%)

The two questions ranked 14 and 15 in Table 3 fall in this group, focused on the issues of planning for exacerbation management and asthma education. 42% of PCDs provided a written action plan for exacerbation management, a similar result to that was seen in France (42%) [17], but more than the results of studies in Sudan, Singapore, Nigeria and South-east Nigeria which were 0.0%, 53.2%, 14.5% and 19.8% respectively [9,12,13,16]. One third of doctors provided asthma education compared to other studies this was 0.0% in Sudan [9] and less than 50% in Canada [11]. This again emphasizes the need for the adoption of a national management protocol for acute asthma care in the primary level of care at health centers, based on published international guidelines and that protocol should be implemented to improve asthma patients' care [9]. In addition the low agreement rate of the PCDs on planning for asthma exacerbation management and providing asthma education might be due to time constraints in busy and overcrowded clinics.

Tests of association were statistically significant only for providing written action plan for asthma education ($p < 0.05$) and scheduling regular follow up ($p = 0.035$) with family doctors surpassing medical officers, which might reflect the difference in knowledge, training and experience between the two groups.

However, qualifications do not equal clinical knowledge and clinical knowledge often fails to translate into clinical practice [18]. There are basic professional needs for health care workers to function efficiently, which include: Skills, Equipment, Information, Structural support, Medicines, Incentives and Communication facilities (referred to with the acronym SEISMIC) - a seismic shift is essential to address the needs of first level health care providers especially in low-income countries [19]. Written action plans are of great importance since they were associated with a 70% reduction in the risk of asthma deaths according to an Australian study [12,20] and patient education and involvement

are essential for successful management of asthma [21].

There were some limitations to this study. The study did not include the level of knowledge and attitude of doctors. In addition the assessment of practice was based on a self-administered questionnaire, which might not reflect actual practice and which might result in an overestimated or underestimated actual practice. However, in spite of these limitations, we think our study results could be generalized to the health centers in Khartoum State because both the localities and the health centers were randomly selected.

5. CONCLUSION

Most primary care doctors at the health centers in Khartoum were female doctors with less than 5 years' experience. There is no national protocol with clear guidelines to be followed on asthma management. However, in practice the various aspects of the international guidelines were followed by PCDs with varying levels. This was seen in the high percentage of affirmative answers to statements in the questionnaire in Group A, intermediary percentage of responses in Group B and low percentage of responses in Group C.

6. RECOMMENDATIONS

There is an urgent need to establish asthma management guidelines, train health workers on them, especially primary care doctors and ensure that they are followed. Enhance family medicine program as it seems to be promising in improving primary care services. More research is needed in asthma management in primary care at the level of health centers to improve the care provided.

CONSENT

Informed consent was taken from the participants.

ETHICAL CONSIDERATIONS

Written ethical clearance and approval for conducting this research was obtained from University of Gazira Ethical Committee and Khartoum State Ministry of Health Research Department.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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