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Perception of primary care physicians about guidelines of bronchial asthma

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KEYWORDS

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Abstract *Background:* Adopting clear guidelines for diagnosis and management of bronchial asthma could improve the medical care services administered to asthmatic patients. This can be reflected on amelioration of manifestations, decrease of attacks of asthma and hence decrease the medical burden of the disease.

Objectives: The current study was designed to evaluate the adherence of primary health care physicians to the recommendations of the National Protocol for Management of Asthma in Kuwait and the factors affecting this adoption, reveal their knowledge, attitude and practices about bronchial asthma, and identify barriers for caring of asthmatic patients.

Subjects and methods: The target population was primary health care physicians. All the primary health care physicians of two randomly selected health districts, out of five, were included. Out of 376 physicians available during the field period, 250 agreed to share in this study with an overall response rate of 66.5%.

Results: The results showed that only 37.2% of the studied primary health care physicians were adhering to asthma guidelines. Level of education, Knowledge about asthma, and clinical practice proved to be significant predictors of adherence to asthma guidelines. Although physicians had a high positive attitude toward asthma yet, they have poor knowledge and practice scores. The most common institutional barriers were improper follow up system and lack of spirometers, while heavy

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workload and lack of training were the main barriers related to health staff. Non compliance of patients to management and follow up schedules were on the top of barriers related to patients.

Conclusion: Physicians at the primary health care centers had a low adherence rate to asthma guidelines. Although they had high positive attitude toward asthma yet their knowledge and practice need improvement. To enhance adequate medical care to asthmatics; focus should be concentrated on increasing awareness and task based on job training of physicians as well as providing lung ventilation measuring equipment and improving the follow up system of bronchial asthma.

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1. Introduction

Bronchial asthma is defined as a chronic inflammatory disease characterized by hyper-responsiveness and hypersensitivity affecting mainly the medium sized and small bronchi. It is considered as one of the most frequent obstructive chronic respiratory conditions that is characterized by a highly recurrent nature. Incidence of bronchial asthma is increasing. Worldwide; an average estimate of 8% of the population are suffering from bronchial asthma.¹ The World Health Organisation estimated that 15 million disability-adjusted life years are lost annually due to bronchial asthma.² In addition, the high prevalence and mortality rates of the disease as well as the heavy social and economic burden need to be carefully addressed.³⁻⁵

Proper diagnosis and management of patients suffering from bronchial asthma can save both suffering and medical cost. However, it has been shown that knowledge and competence of primary care physicians vary among countries and with time in the same country.⁶⁻¹¹ To reduce practice variability and improve the quality of asthma care, the Global Initiative for Asthma (GINA) guidelines had been developed and updated by the World Health Organization in collaboration with the National Heart, Lung and Blood Institute.^{12,13} Kuwait adopted these guidelines with minor modifications. The guidelines include recommendations for diagnosing and monitoring and organize treatment strategies into a stepwise approach in response to the asthma severity along with offering a self-management plan.

Preparation and distribution of the guidelines, alone, do not guarantee efficient medical management of asthmatic patients. To obtain the required data about actual medical management and therapeutic schedules adopted according to asthma guidelines requires investigations of the extent of adoption of these guidelines by primary health physicians. Reviewing the available literature about adherence to asthma guidelines in Kuwait did not reveal any previous studies. Thus, the current study was designed to evaluate the adherence of primary health care physicians to the recommendations of the National Protocol for Management of Asthma in Kuwait and the factors affecting non adoption, estimate their knowledge, attitude and practices about bronchial asthma, and identify barriers for caring of asthmatic patients.

2. Subjects and methods

An observational cross-sectional study design was adopted for this study. The study was carried out in the primary health care centers in Kuwait. Out of the five health districts in Kuwait; two districts were randomly selected to carry out this study.

All physicians available during the field work of the study in the primary health care centers were the target population of this study. The study covered the period between March 2012 to September 2012. Data were collected over three months starting from the May to July, 2012. All selected physicians were directly interviewed, using a structured questionnaire, in their primary health care centers in a specially prepared quiet room that provided privacy. Physicians were interviewed during the working time in response to the coordination suggested by director of the center.

Data of this study were collected through a specially designed questionnaire. This questionnaire consisted of several sections. The first section covered socio-demographic characteristics, including age, sex, nationality, marital status, educational qualification, and current job. The main outcome variable of this study is adherence to asthma guidelines thus, strict adherence to these guidelines was used to classify physicians as adherent and non adherent to guidelines. One question dealt with prevalence of asthma in Kuwait. The attitude scale consisted of ten questions (importance of asthma inside and outside Kuwait, impact of asthma on quality of life and welfare, economic and emotional impacts, while the remaining four questions covered medical burden, resources and the multidisciplinary approach for asthma management). A five point Likert scale (1-5) was utilized to score each question of the attitude scale (total score = 50), while dichotomous questions (yes or no) were used for knowledge and practice scores. The knowledge domain consisted of four sub-domains (diagnostic tools, predisposing factors, asthma medicines, and ways of drug use). The first sub-domain dealt with diagnostic tools of asthma (history taking, spirometry, and chest imaging, total score = 5), while the second sub-domain (common predisposing factors for asthma) consisted of seven factors, namely air temperature, humidity, pollution, dust, pollen grains, animal products, and foods/medicines, with a total score of 7. The third sub-domain included the common groups of asthma drugs (short and long acting beta 2 adrenoceptor agonists, anticholinergics, glucocorticoids, ketotifen, adrenoceptors, leukotriene antagonists, and mast cell stabilizers, total score = 8), while the last sub-domain dealt with the common ways for administering asthma drugs (metered dose inhalation, powder inhalation, nebulisers, oral, and injections, total score = 5). Asthma guidelines were enquired about using four questions (existence of the guidelines, keeping a copy of the guidelines, receiving training on implementation, and strict adherence to the guidelines). In addition, one question about causes of non adherence to asthma guidelines was included. Another section dealt with the adopted practices about asthma. This section consisted of four questions (use and interpretation of asthma diagnostic and management methods), in

addition to a question about availability of diagnostic measures for asthma. One question dealt with sources of knowledge of physicians about asthma. Barriers for adherence to asthma guidelines were classified into three parts: institutional barriers (ten questions), factors related to the health staff (five questions), and barriers related to asthmatic patients (five questions).

A pilot study was carried out on 25 physicians (not included in the final study). This study was formulated with the following objectives: test the clarity, applicability of the study tools (including mainly validity and reliability of the used scales), accommodate the aim of the work to actual feasibility, identify the difficulties that may be faced during the application, as well as study all the procedures and activities of the administrative aspects. Also, the time of interviewing the health staff was estimated during this pilot study. The necessary modifications according to the results obtained were done, so some statements were reworded. Also, the structure of the questionnaire sheet was reformatted to facilitate data collection. The average interviewing time was 15 min. Reliability analysis showed that all the studied 4 knowledge sub-domains had a Kronbach alpha of 0.742, 0.853, 0.896, and 0.781, respectively, while such values for the attitude scale and practice scale were 0.764 and 0.723.

3. Statistical analysis

The Excel program was used for data entry. A file for data entry was prepared and structured according to the variables in the questionnaire. After data were fed to the Excel program; several methods were used to verify data entry. These methods included the following: simple frequency, cross-tabulation, as well as manual revision of entered data. Percent scores were calculated for knowledge total score and its constituent domains, as well as the total attitude and practice score. Negative questions were reversed to add in the positive direction before inclusion in the percent score. Percent score was calculated for each domain using the following formula: $(\text{Actual calculated score} - \text{Minimum expected score}) \times 100 / (\text{Maximum expected score} - \text{Minimum expected score})$.

Before analysis; data were imported to the Statistical Package for Social Sciences (SPSS) which was used for both data analysis and tabular presentation. The following statistical measures were utilized:

3.1. Descriptive Measures

Count, percentage, minimum, maximum, arithmetic mean, and standard deviation.

3.2. Analytic measures

Chi square, Fisher exact test (for qualitative variables) and Student's *t* test (for normally distributed quantitative variables) were used. Mann-Whitney test was used for non parametric variables. Forward likelihood multiple logistic regression was used to identify significant predictors of adhering to asthma guidelines after controlling for the confounding effect of other variables. Selection of variables for

forward likelihood multiple logistic regression was based on forced entry multiple logistic regression. Variables having a significance level of 0.10 or less were included in the forward likelihood model.

The level of significance selected for this study was $P \leq 0.05$.

All the necessary approvals for carrying out the research were obtained. The Ethics Committee of the Kuwaiti Ministry of Health approved the research. A written format explaining the purpose of the research was prepared and signed by the physician before starting the interview. In addition, the purpose and importance of the research were discussed with the director of the health center.

4. Results

The total number of primary health care physicians was 453; out of these 376 were available during the study period, only 250 agreed to share in the study with a response rate of 66.5%.

Table 1 shows socio-demographic characteristics of studied primary health care physicians. The majority of the interviewed physicians were married non Kuwaiti males with age ranging from 25 up till 65 years. Less than half (44.0%) the physicians were general practitioners, and almost an equal percent (44.8%) were registrars. Almost half (50.4%) the physicians spent 5–10 years at work, while 15.2% of them spent less than 5 years, and 5.6% spent more than 25 years at work. Those adhering to asthma guidelines were 93 physicians, while the rest (157 physicians) did not strictly adhere to these guidelines. The results showed that only 37.2% of the studied primary health care physicians were adhering to asthma guidelines. Only 7.6% of those not adhering to asthma guidelines knew about it while 27.4% of them had a copy of the guidelines. Higher percentages of those adhering to asthma guidelines tended to have higher age than those not adhering, they also tended to spend more years at the current job yet, and these differences were not statistically significant. Also no significant differences were noticed with nationality, marital status or gender. The only significant difference was the level of education as 14% of the adhering group had a doctorate or board certificate compared with only 4.5% of those not adhering.

Table 2 shows knowledge, attitude, and practice of primary health care physicians about asthma guidelines. Those adhering to guidelines had a significantly higher mean percent overall knowledge score ($79.0 \pm 13.5\%$ compared with $55.3 \pm 12.2\%$) and practice ($34.4 \pm 25.5\%$ compared with $21.8 \pm 24.8\%$), while both groups had similar attitude score ($84.1 \pm 11.9\%$ compared with $83.8 \pm 10.5\%$). The main reason for not adopting the asthma guidelines was its difficulty to the patients (49%) followed by its incompleteness (24.2%) in their opinion.

Table 3 reveals the sources of knowledge about bronchial asthma for physicians adhering and not adhering to asthma guidelines. The most common source for both groups is practical experience (25.8% and 35.7%) followed by literature and textbooks (24.7% and 24.2%). The least mentioned sources were mass media (1.1% and 0.6%) and colleagues (1.1% and 0.6%).

Table 4 portrays barriers for administering sufficient health care for asthmatic patients by primary health care physicians.

Table 1 Sociodemographic characteristics of physicians adhering and not adhering to asthma guidelines.

| Characteristic | Not adhering No (%) | Adhering No (%) | Total No (%) | Chi square test ² (P) |
|--------------------------------|---------------------|-----------------|--------------|----------------------------------|
| <i>Age (years)</i> | | | | |
| < 30 | 6 (3.8) | 3 (3.2) | 9 (3.6) | 5.121 (0.163) |
| 30– | 63 (40.2) | 25 (26.9) | 88 (35.2) | |
| 40– | 58 (36.9) | 40 (43.0) | 98 (39.2) | |
| 50+ | 30 (19.1) | 25 (26.9) | 55 (22.0) | |
| <i>Gender</i> | | | | |
| Male | 100 (63.7) | 64 (68.8) | 164 (65.6) | 0.679 (0.410) |
| Female | 57 (36.3) | 29 (31.2) | 86 (34.4) | |
| <i>Marital status</i> | | | | |
| Married | 142 (90.4) | 87 (93.5) | 229 (91.6) | 0.731 (0.393) |
| Single | 15 (9.6) | 6 (6.5) | 21 (8.4) | |
| <i>Nationality</i> | | | | |
| Kuwaiti | 17 (10.8) | 15 (16.1) | 32 (8.8) | 1.47 (0.225) |
| Non Kuwaiti | 140 (89.2) | 78 (83.9) | 218 (91.2) | |
| <i>Educational certificate</i> | | | | |
| Bachelor | 39 (24.8) | 14 (15.0) | 53 (21.2) | 9.256 (0.010) |
| Master | 111 (70.7) | 66 (71.0) | 177 (70.8) | |
| PhD/Board | 7 (4.5) | 13 (14.0) | 20 (8.0) | |
| <i>Specialty</i> | | | | |
| Family physicians | 18 (11.5) | 16 (17.2) | 34 (13.6) | 2.206 (0.363) |
| General practitioner | 73 (46.5) | 37 (39.8) | 110 (44.0) | |
| Others | 66 (42.0) | 40 (43.0) | 106 (42.4) | |
| <i>Job</i> | | | | |
| Assistant registrar | 51 (32.5) | 18 (19.4) | 69 (27.6) | 6.586 (0.086) |
| Registrar | 69 (43.9) | 43 (46.2) | 112 (44.8) | |
| Senior registrar | 31 (19.7) | 25 (26.9) | 56 (22.4) | |
| Specialist/consultant | 6 (3.8) | 7 (7.5) | 13 (5.2) | |
| <i>Years at work</i> | | | | |
| < 5 | 29 (18.5) | 9 (9.7) | 38 (15.2) | 5.486 (0.139) |
| 5– | 78 (49.7) | 48 (51.6) | 126 (50.4) | |
| 15– | 44 (28.0) | 28 (30.1) | 72 (28.8) | |
| 25+ | 6 (3.8) | 8 (8.6) | 14 (5.6) | |

Generally, no significant differences were revealed between the two groups except for non adherence of asthmatic patients to follow up schedules (45.2% compared with 30.6%). The most frequently stated institutional barrier by both groups is improper follow up system (38.7% compared with 31.8%). Heavy workload was the most frequent barrier among barriers related to the health staff (32.3% compared with 31.2%).

Studying the simultaneous effect of predictors of adhering to asthma guidelines with controlling for the confounding effect by the multiple logistic model revealed that educational certificate, asthma knowledge and practice scores proved to be significant predictors (Table 5).

5. Discussion

The high burden and cost of bronchial asthma in Kuwait^{14–17} combined with lack of proven diagnostic and monitoring facilities, inadequate knowledge of current management of asthma, and poor compliance of patients encouraged the primary health care administrators to adopt national asthma guidelines to improve the medical care administered to asthmatics and decrease the disease burden.

A poor adherence to the National Asthma Management Guidelines was revealed with only 37.2% of them strictly adhering to it. Poor compliance to asthma guidelines was also demonstrated by many other studies.^{18–22} Although the studied physicians were aware about the existence of asthma guidelines, it seems that casual awareness may not guarantee familiarity of the guidelines.

It is really hard to identify definite reasons for this poor adherence. The current study revealed that 49% of physicians attributed their non adherence to the patients, while about one quarter (24.2%) stated that the guidelines are not complete. Those who admitted that it is difficult for them to stick to the guidelines constituted 22.3%, while 15.9% stated that the guidelines are not suitable to be applied in Kuwait. Previous studies revealed that poor understanding for estimating severity of asthma,^{23,24} underutilization of inhaled corticosteroids,²⁵ difficult implementation,^{19,26} difficult dissemination,²⁷ and shortage of staff,^{28–30} were the main reasons for non adherence to asthma guidelines.

The role of the primary health care in asthma management demands that the health professional that provides comprehensive medical care should be adequately equipped with positive attitude, sound knowledge, and adequate practices.^{31,32}

Table 2 Knowledge, attitude, and practice (KAP) of primary health care physicians adhering and not adhering to asthma guidelines.

| KAP domains | Not adhering (n = 157) | Adhering (n = 93) | Mann Whitney test (P) |
|-------------------------------------|------------------------|-------------------|-----------------------|
| <i>Diagnostic methods (k1)</i> | | | |
| Min–Max | 40–100 | 40–100 | 1.128 (0.259) |
| Mean + SD | 81.5 + 16.7 | 83.9 + 17.0 | |
| Median | 80.0 | 80.0 | |
| <i>Predisposing factors (k2)</i> | | | |
| Min–Max | 0.0–100 | 0.0–100 | 1.923 (0.055) |
| Mean + SD | 55.9 + 27.7 | 61.4 + 28.0 | |
| Median | 57.1 | 71.4 | |
| <i>Asthma drugs (k3)</i> | | | |
| Min–Max | 0.0–87.5 | 12.5–100.0 | 0.605 (0.545) |
| Mean + SD | 41.0 + 17.3 | 43.4 + 22.6 | |
| Median | 37.5 | 37.5 | |
| <i>Administering medicines (k4)</i> | | | |
| Min–Max | 0.0–80.0 | 20.0–80.0 | 2.969 (0.003) |
| Mean + SD | 42.9 + 14.1 | 47.1 + 12.0 | |
| Median | 40.0 | 40.0 | |
| <i>Total knowledge score (k)</i> | | | |
| Min–Max | 26.7–85.2 | 28.1–80.2 | 2.676 (0.007) |
| Mean + SD | 55.3 + 12.2 | 59.0 + 13.5 | |
| Median | 56.8 | 62.2 | |
| <i>Attitude score</i> | | | |
| Min–Max | 45.0–100.0 | 57.5–100.0 | 0.05 (0.960) |
| Mean + SD | 83.8 + 10.5 | 84.1 + 11.9 | |
| Median | 82.5 | 82.5 | |
| <i>Practice score</i> | | | |
| Min–Max | 0.0–100.0 | 0.0–100.0 | 4.211 (<0.001) |
| Mean + SD | 21.8 + 24.8 | 34.4 + 25.5 | |
| Median | 25.0 | 25.0 | |
| <i>Causes of non adhering</i> | | | |
| Difficult to adopt | 35 (22.3%) | – | |
| Incomplete | 38 (24.2%) | – | |
| Not suitable in Kuwait | 25 (15.9%) | – | |
| Difficult to be adopted by patients | 77 (49.0%) | – | |

Table 3 Sources of knowledge about asthma of primary health care physicians adhering and not adhering to asthma guidelines.

| Source of knowledge | Not adhering No (%) | Adhering No (%) | Fisher exact test |
|---------------------------|---------------------|-----------------|-------------------|
| Medical school | 29 (18.5) | 17 (18.3) | 1.00 |
| Practice | 56 (35.7) | 24 (25.8) | 0.123 |
| On job training workshops | 20 (12.7) | 15 (16.1) | 0.457 |
| Colleagues | 1 (0.6) | 1 (1.1) | 1.00 |
| Conferences | 12 (7.6) | 12 (12.9) | 0.188 |
| Literature and textbooks | 38 (24.2) | 23 (24.7) | 1.00 |
| Mass media | 1 (0.6) | 1 (1.1) | 1.00 |

The results of the current study revealed that both the adherent and non adherent groups of physicians had high positive attitude score ($84.1 \pm 11.9\%$ and $83.8 + 10.5\%$, $P = 0.96$) yet, both groups had low knowledge ($59.0 + 13.5\%$ and $55.3 + 12.2\%$, $P = 0.007$) and practice ($34.4 + 25.5\%$ and $21.8 + 24.8\%$, $P < 0.001$) scores. One Australian study revealed both poor knowledge and management of bronchial asthma by general practitioners.⁹ Another study among pri-

mary health care physicians in Saudi Arabia revealed a low mean total score of knowledge (37.7%) about the National Protocol for Asthma Management.³³ A consistent pattern to the current study was revealed by Bhulani and his associates³⁴ who showed that 28.6% of the general practitioners had adequate knowledge about concepts of asthma while only 10.4% had adequate practice in asthma management. One main finding of this study is that both knowledge and practice

Table 4 Barriers for administering primary health care services for asthmatic patients stated by physicians adhering and not adhering to asthma guidelines.

| Barriers | Not adhering No (%) | Adhering No (%) | Fisher exact test |
|--|---------------------|-----------------|-------------------|
| <i>Institutional barriers (B1)</i> | | | |
| Lack of interviewing place | 10 (6.4) | 8 (8.6) | 0.614 |
| Lack of multidisciplinary approach | 20 (12.7) | 11 (11.8) | 1.00 |
| Lack of spirometers | 35 (22.3) | 12 (12.9) | 0.093 |
| Lack of required medications | 13 (8.3) | 6 (6.5) | 0.806 |
| Lack of procedures | 5 (3.2) | 2 (2.2) | 1.00 |
| Lack of staff | 8 (5.1) | 9 (9.7) | 0.196 |
| Lack of printed asthma plans | 9 (5.7) | 5 (5.4) | 1.00 |
| Defective referral system | 1 (0.6) | 2 (2.2) | 0.557 |
| Lack of asthma records | 7 (4.5) | 2 (2.2) | 0.491 |
| Improper follow up system | 50 (31.8) | 36 (38.7) | 0.274 |
| <i>Barriers related to Health staff (B2)</i> | | | |
| Lack of training | 43 (27.4) | 20 (21.5) | 0.366 |
| Lack of knowledge | 7 (4.5) | 10 (10.8) | 0.070 |
| Time constraints | 34 (21.7) | 20 (21.5) | 1.00 |
| Heavy workload | 49 (31.2) | 30 (32.3) | 0.889 |
| Health staff cannot help | 25 (15.9) | 13 (14.0) | 0.719 |
| <i>Barriers related to patients (B3)</i> | | | |
| Non complying with management | 64 (40.8) | 30 (32.3) | 0.224 |
| Not adhering to follow up schedules | 48 (30.6) | 42 (45.2) | 0.029 |
| Time constraints | 12 (7.6) | 7 (7.5) | 1.00 |
| Hiding the disease | 14 (8.9) | 3 (3.2) | 0.118 |
| Use of traditional prescriptions | 19 (12.1) | 10 (10.8) | 0.840 |

Table 5 Significant predictors for adhering to asthma guidelines revealed by forward likelihood multiple logistic regression model.

| Factors | β | Significance | Exp β | 95% CI for Exp β |
|-------------------------|---------|--------------|-------------|------------------------|
| Educational certificate | 0.796 | 0.004 | 2.217 | 1.281–3.838 |
| Knowledge score | 0.024 | 0.031 | 1.025 | 1.002–1.048 |
| Practice score | 0.020 | <0.001 | 1.020 | 1.009–1.031 |
| Constant | -3.968 | <0.001 | - | - |

The model succeeded to successfully predict 84.1% of non adherent and 38.7% of adherent groups with an overall accuracy of 67.2%.

scores in addition to level of education proved to be significant predictors of adherence to asthma guidelines. A finding that confirms the importance of these factors as under-diagnosis and inappropriate treatment has been found as major factors contributing to morbidity and mortality attributed to asthma.⁹

Adequate medical care of asthmatic patients can play an important role in reducing suffering of patients and controlling severity of attacks of bronchial asthma. Multiple barriers can intervene with proper administration of the required medical care to asthmatics. This study revealed both adherent and non adherent group agreed on the most common barriers that impede adequate caring of asthmatics. Improper follow up system and lack of spirometers were the main selected institutional barriers. Further investigations showed a complex follow up system with emergency treatment in hospitals, admission in a specialized single center, adequate therapy only in special clinics, and regular management in primary health care centers. Lack of spirometers is a real administrative (availability) and technical (proper use and interpretation) problem.

Inquiring about availability of spirometers in the studied health care centers showed that only 17.2% of physicians admitted that they are aware about its availability. Although most cases of asthma can be diagnosed by detailed history and examination alone, classification of severity and further monitoring require the measurement of ventilatory function.³⁵ Several studies revealed lack of spirometers/peak flow meters, especially in developing countries.³⁶ Lack of medication was also stated as a barrier for medical care of asthmatics by 8.3% of non adherent and 6.5% of adherent physicians. A previous Kuwaiti study in 2002 revealed lack of essential medication of asthma in primary health care centers.³⁷

Heavy workload and lack of training were the main barriers related to health staff for administering medical care to asthmatics revealed by this study. One more important finding revealed by this is the main source of knowledge about asthma for the studied physicians. Practice as a source of knowledge was stated by 25.8% of those adherent to guidelines and 35.7% of those not adhering to asthma guidelines. Practice, although is considered as a source of knowledge yet, it is neither sufficient nor standardized. Primary care studies concluded that guidelines can be readily accepted if they are combined with task based training.³⁷ A Canadian study revealed that well trained physicians were more likely to assess and manage asthmatic patients.³⁸

Patient compliance is a corner stone in the success of medical care especially for a chronic disease like asthma.¹⁹ The current study revealed that the main barriers related to patients were non compliance with follow up schedules and management. Patient barriers revealed by other studies included presence of co-morbidities,³⁹ non adherence to treatment,⁴⁰ shortage of time,^{41,42} improper use of peak flow meters,⁴³ and errors in using inhalers.^{44,45}

Although the primary health care physicians of this study had a positive attitude toward the outcome of adherence to asthma guidelines yet, they had a low actual adherence rate, low knowledge and practice scores. To enhance adequate medical care to asthmatics, focus should be concentrated upon increasing awareness and task based on job training of physicians as well as providing spirometers and improving the follow up system of bronchial asthma.

Conflict of interest

None declared.

References

- Bronchial Asthma: Clinical Practice Guideline for General Practitioners. American International Health Alliance, Washington, DC 20,005.
- Masoli M, Fabian D, Holt S, Beasley R. Global Initiative for Asthma (GINA) Program. The global burden of asthma: executive summary of the GINA dissemination committee report. *Allergy* 2004;**59**:469–78.
- Ohta K, Yamaguchi M, Akiyama K, Adachi M, Ichinose M, Takahashi K, et al. Japanese guideline for adult asthma. *Allergol Int* 2011;**60**:115–45.
- Lai CK, De Guia TS, Kim YY, Kuo SH, Mukhopadhyay A, Soriano JB, et al. Asthma insights and reality in Asia-Pacific steering committee. Asthma control in the Asia-Pacific region: the asthma insights and reality in Asia-Pacific study. *J Allergy Clin Immunol* 2003;**111**:263–8.
- Weiss KB, Sullivan SD. The economic costs of asthma: a review and conceptual model. *Pharmacoeconomics* 1993;**41**:14–30.
- Fardy HJ, Jeffs D. Assessment of general practitioners' asthma knowledge. *Aust Fam Physician* 1991;**20**:1143–4.
- Lagerlov P, Veninga CC, Muskova M, Hummers-Pradier E, Stalsby Lundborg C, Andrew M, et al. Asthma management in five European countries: doctors' knowledge, attitudes and prescribing behaviour. Drug Education Project (DEP) group. *Eur Respir J* 2000;**15**:25–9.
- Collins S, Beilby J, Fardy J, Burgess T, Johns R, Booth B. The national asthma audit. Bridging the gap between guidelines and practice. *Aust Fam Physician* 1998;**27**:907–13.
- Coates JR, Steven IUD, Beilby J, Coffey G, Litt JC, Wagner C. Knowledge of and reported asthma management among South Australian general practitioners. *Br J Gen Pract* 1994;**44**:123–6.
- Tomson Y, Hasselstrom J, Tomson G, Aberg H. Asthma education for Swedish primary care physicians – a study on the effects of “academic detailing” on practice and patient knowledge. *Eur J Clin Pharmacol* 1997;**53**:191–6.
- Barker BH. Last breath. A general practice study of asthma knowledge. *Aust Fam Physician* 1987;**6**:548–58.
- Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. NHLBI/WHO workshop report 1995.
- Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. NHLBI/WHO workshop report revised 2002.
- Behbehani NA, Abal A, Syabbalo NC. Prevalence of asthma, allergic rhinitis, and eczema in 13–14 years old children in Kuwait. *Ann Allergy Asthma Immunol* 2000;**85**:58–63.
- Ellul-Micallef R, Al-Ali S. The spectrum of bronchial asthma in Kuwait. *Clin Allergy* 1984;**14**:509–17.
- Behbehani NA, AL-Yousifi K. Lack of essential asthma medications in primary care in Kuwait. *Int J Tuberc Lung Dis* 2003;**7**:422–5.
- Abul AT, Nair PC, Behbehanei NA, Sharma PN. Hospital admissions and death rates from asthma in Kuwait during pre- and post-Gulf War periods. *Ann. Allergy Asthma Immunol* 2001;**86**:465–8.
- Grant EN, Moy HN, Turner-Roan K, Daugherty SR, Weiss KB. Asthma care practices, perceptions, and beliefs of Chicago-area primary-care physicians. *Chest* 1999;**116**:145S–54S.
- Abudahish A, Bella H. Adherence of primary care physicians in Aseer region, Saudi Arabia to the National protocol for the management of asthma. *EMHJ* 2010;**16**:171–5.
- Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999;**282**:1458–65.
- Sun YH, Eun BW, Sim SY, Cho KH, Ryoo E, Cho DY, et al. Poor adherence and reasons for nonadherence to the asthma guidelines among pediatricians in Korea. *Asian Pac J Allergy Immunol* 2010;**28**:147–54.
- Scribano PV, Lerer T, Kennedy D, Cloutier M. Provider adherence to a clinical practice guideline for acute asthma in a pediatric emergency department. *Acad Emerg Med* 2001;**8**:1147–52.
- Finkelstein JA, Lozano P, Shulruff R, Inui TS, Soumerai SB, Ng M, et al. Self-reported physician practices for children with asthma: are national guidelines followed? *Pediatrics* 2000;**106**:886–96.
- Doerschug KC, Peterson MW, Dayton CS, Kline JN. Asthma guidelines: an assessment of physician understanding and practice. *Am J Respir Crit Care Med* 1999;**159**:1735–41.
- Ait-Khaled N, Enarson DA, Bencharif N, Boulahdib F, Camara E, Dagli E, et al. Implementation of asthma guidelines in health centres of several developing countries. *Int J Tuberc Lung Dis* 2006;**10**:104–9.
- Greco PH, Eisenberg JM. Changing physicians' practices. *N Engl J Med* 1993;**329**:1271–8.
- Oxman AD, Thomson MA, Davis DA, Haynes RB. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995;**153**:1423–31.
- Bradley EH, Holmboe ESW, Mattern JA, Roumanis SA, Radford AM, Krumholz AM. A qualitative study of increasing beta blocker use after myocardial infarction: why do some hospitals succeed? *JAMA* 2001;**285**:2604–11.
- Graff L, Stevens C, Spaite D, Foody JA. Measuring and improving quality in emergency medicine. *Acad Emerg Med* 2002;**9**:1091–107.
- Balas EA, Austin SM, Mitchell J, Ewigman BG, Bopp KD, Brown GD. The clinical value of computerized information services: a review of 98 randomized clinical trials. *Arch Fam Med* 1996;**5**:271–8.
- Braido F, Baiardini I, Stagi E, Piroddi MG, Balestracci S, Canonica GW. Unsatisfactory asthma control: astonishing evidence from general practitioners and respiratory medicine specialists. *J Investig Allergol Clin Immunol* 2010;**20**:9–12.
- Rovithis E, Lionis C, Schiza SE, Bouros D, Karokis A, Vlachonikolis I, et al. Assessing the knowledge of bronchial asthma among primary health care physicians in Crete: a pre- and post-test following an educational course. *BMC Med Educ* 2001;**1**:2–6.
- Abudahish A, Bella H. Primary care physicians' perceptions and practices on asthma care in Aseer region Saudi Arabia. *Saudi Med J* 2006;**27**:333–7.
- Bhulani N, Lalani S, Ahmed A, Jan Y, Faheem U, Khan A, et al. Knowledge of asthma management by general practitioners in Karachi, Pakistan: comparison with international guidelines. *Prim Care Respir J* 2011;**20**:448–51.
- Rabe KF, Vermeire PA, Soriano JB, Maier WC. Clinical management of asthma in 1999: the Asthma Insights and Reality in Europe (AIRE) study. *Eur Respir J* 2000;**16**:802–7.
- Nguyena VN, Chavannesb N, Le LT, Priced D. The Asthma Control Test (ACT) as an alternative tool to Global Initiative for

- Asthma (GINA) guideline criteria for assessing asthma control in Vietnamese outpatients. *Prim Care Respir J* 2012;**21**:85–9.
37. Al-Kanderi BM, Al-Muhaileej FA, Al-Khalaf T. Evaluation of asthma clinics in primary care in Kuwait. *Eur J Gen Med* 2006;**3**:159–66.
 38. Grunfeld A, Beveridge RC, Berkowitz J, FitzGerald JM. Management of acute asthma in Canada: an assessment of emergency physician behavior. *J Emerg Med* 1997;**15**:547–56.
 39. Thomas M, McKinley RK, Freeman E, Foy C, Prodger P, Price D. Breathing retraining for dysfunctional breathing in asthma: a randomised controlled trial. *Thorax* 2003;**58**:110–5.
 40. Corsico AG, Cazzoletti L, de Marco R, Janson C, Jarvis D, Zoia MC, et al. Factors affecting adherence to asthma treatment in an international cohort of young and middle-aged adults. *Respir Med* 2007;**101**:1363–7.
 41. Putnam W, Burge F, Tatemichi S, Twohig P. Asthma in primary care: making guidelines work. *Can Respir J* 2001;**8**(8 Suppl):29A–34A.
 42. Wiener-Ogilvie S, Huby G, Pinnock H, Gillies J, Sheikh A. Practice organizational characteristics can impact on compliance with the BTS/SIGN asthma guideline: qualitative comparative case study in primary care. *BMC Fam Pract* 2008;**9**:32–7.
 43. Crompton GK, Barnes PJ, Broeders M, Corrigan C, Corbetta L, Dekhuijzen R, et al. The need to improve inhalation technique in Europe: a report from the aerosol drug management improvement team. *Respir Med* 2006;**100**:1479–94.
 44. Newman SP, Weisz AW, Talace N, Clarke SW. Improvement of drug delivery with a breath actuated pressurized aerosol for patients with poor inhaler technique. *Thorax* 1991;**46**:712–6.
 45. Al-Showair RA, Pearson SB, Chrystyn H. The potential of a 2T one trainer to help patients use their metered-dose inhalers. *Chest* 2007;**131**:1776–82.