



Compliance of Primary Care Doctors with Asthma Guidelines and Related Education Programs: the Employment Factor

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Abstract

Background: Primary care physicians' adherence to accepted asthma guidelines is necessary for the proper care of asthma patients.

Objectives: To investigate the compliance of primary care physicians with clinical guidelines for asthma treatment and their participation in related educational programs, and to evaluate the influence of their employment status.

Methods: A questionnaire was administered to a random sample of 1,000 primary care practitioners (pediatricians and family physicians) in Israel.

Results: The response rate was 64%. Of the physicians who participated, 473 (75%) had read and consulted the guidelines but only 192 (29%) had participated in an educational program on asthma management in the last 12 months. The younger the responding physician (fewer years in practice), the more likely his/her attendance in such a program ($P < 0.0001$). After consulting the guidelines 189 physicians (40%) had modified their treatment strategies. Significantly more self-employed than salaried physicians had read the guidelines and participated in educational programs; physicians who were both self-employed and salaried fell somewhere between these groups. This trend was not influenced by the number of years in practice.

Conclusions: All primary care physicians should update their knowledge more often. The publication of guidelines on asthma must be followed by their proper dissemination and utilization. Our study suggests that major efforts should be directed at the population of employed physicians.

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Asthma is the most common chronic disease of early childhood, affecting an estimated 17 million people in the United States, including 4.8 million children [1]. The number of cases is steadily increasing. Studies from the USA reported that the prevalence of asthma in the general population was 5.4% in 1994 [2]. From 1969 to 1995 the prevalence of asthma-related disability in children increased by 232% [1], and in 1980-87 mortality due to asthma as the first-listed diagnosis increased by 31% [3,4]. Currently, more than 5,000 people die from asthma each year in the U.S. [5].

Good asthma control requires optimal medical treatment in conjunction with appropriate self-management. Aggressive therapy can reduce the likelihood of severe airway narrowing and asthma exacerbations, while early diagnosis and intervention are of utmost importance to mitigate the impact of the disease in later life [6]. To properly care for the asthmatic child, the primary care physician needs both theoretical and practical knowledge. The Expert Panel's Asthma Guidelines [3,4] provide critical background information, reference material, and discussions of specific considerations in the treatment of asthma. In 1998, a panel of Israeli experts released the Israeli Clinical Guidelines and Position for Asthma Treatment [7]. These recommendations were mailed to all primary care physicians in the country by the Department of Quality Assurance of the Scientific Council of the Israel Medical Association.

In Israel, like in many developed countries, medical care is provided by large health maintenance organizations, wherein physicians may be salaried, self-employed, or both. We hypothesized that employment status may play a role in the motivation, requirement and opportunity of primary care physicians to read clinical guidelines and participate in related educational programs, and that this may have repercussions on the quality of care provided to asthma patients.

The present study investigated the compliance of primary care physicians with the Israeli Clinical Guidelines for Asthma Treatment one year after their publication and distribution, and evaluated the effect of physician employment status.

Subjects and Methods

The study population comprised a random computer-selected sample of 1,000 primary care physicians (specialists in pediatrics and family medicine) in Israel who received the Clinical Guidelines for Asthma Treatment according to the list of the Scientific Council of the Israel Medical Association. The minimal sample size needed for the study was calculated on the basis of the 70% positive response to reading the guidelines among 20 Israeli physicians in a pilot study, taking into account a confidence level of 95% ($\alpha = 0.05$) and an absolute precision of 10% on either side of the proportion. Using the formula, $n = Z^2_{1-\alpha/2} P(1-P)/d^2$, we found that a minimum

sample size of 165 was necessary. This figure was multiplied by 3, for the three different categories of physician employment status, and the result was multiplied by 2 to yield a sufficient number of subjects for the statistical analysis of other variables such as age. The final number of 990 was rounded to 1,000.

Data collection and questionnaire

Data collection was conducted during the spring of 2000 to avoid the possible bias of physician workload in the winter season. A two-part questionnaire was sent to all the physicians selected, together with an explanation of the study. Part 1 of the questionnaire contained items pertaining to compliance with the Israeli Clinical Guidelines: namely, if the physician had read and consulted the guidelines since receiving them, had participated during the last 12 months in related educational activities (courses, seminars, etc.) on the management of asthmatic patients as stipulated by the guidelines, and had modified his/her mode of management of asthma patients on the basis of the guidelines. Part 2 contained items on demographic data: physician's age, gender, working status (salaried only, salaried and self-employed, or self-employed only), HMO, years of practice since graduation from medical school, country of medical school, and work setting (hospital or community). The questionnaire was completed anonymously.

Analysis

Survey responses were analyzed with the SPSSWIN, Version 9.01b. Chi-square test for trends was used to compare responses by employment status since employment status is a progressive variable. Comparisons of the other, non-progressive categorical variables were done with chi-square or Fisher's exact test. Comparisons of continuous data with a non-normal distribution were performed with analysis of variance with repeated measures and paired two-tailed *t*-test. A *P* value of 0.05 defined the statistical significance of differences between groups and was used to calculate confidence intervals around differences in sample means and odds ratios.

Results

Nineteen questionnaires did not reach the recipients because of incorrect addresses. Of the remaining 981, 630 were completed and returned, yielding a response rate of 64.2%. The mean age of the responders was 46.5 years and the average number of years of medical practice was 19.6. We found that 473 physicians (75.3%) had read and consulted the guidelines, but only 192 (30.7%) had attended courses or workshops on asthma treatment or control. After consult-

ing the guidelines, 189 physicians (40%) had modified their treatment strategies, whereas 284 (60%) had not.

Tables 1 and 2 show the distribution of answers to Part 1 of the questionnaire by employment status. Salaried-only physicians tended to consult the guidelines less ($P < 0.01$) and to participate less in educational programs ($P = 0.015$) compared to self-employed physicians. The rate for physicians who were both salaried and self-employed fell between these two groups. According to Table 2, the physicians' tendency to modify their treatment strategy after consulting the guidelines shows a similar significant difference by employment status. Almost half of the self-employed physicians changed their way of management compared to only 33% of the salaried-only physicians and 44% of the salaried/self-employed physicians. We did not find a significant correlation of either consultation of asthma guidelines or modification of treatment with years of medical practice or with country of medical school. There was also no statistically significant difference between physicians who had or had not participated in educational activities with regard to work setting or country of medical school. Table 3 shows that the less the medical experience of the responding physician, the more likely his/her participation in educational activities on the management of asthmatic patients ($P < 0.0001$).

Table 1. Consultation of asthma guidelines and participation in educational programs by employment status

Employment status	Total	Consulted guidelines			Attended programs		
		Yes (%)	No (%)	Total (%)	Yes (%)	No (%)	Total (%)
Salaried only	268	189 (70.8)	78 (29.2)	267 (100)	73 (27.4)	193 (72.6)	266 (100)
Salaried and self-employed	183	134 (73.6)	48 (26.4)	182 (100)	50 (27.5)	132 (72.5)	182 (100)
Self-employed only	179	150 (83.8)	29 (16.2)	179 (100)	69 (39.0)	108 (61.0)	177 (100)
Total	630	473 (75.3)	155 (24.7)	628* (100)	192 (30.7)	433 (69.3)	625** (100)
Chi-square for trend			9.217			5.939	
P value		0.0024			0.015		

* Two missing answers

** Five missing answers

Table 2. Modification of asthma treatment strategy after consulting guidelines by employment status

Employment status	Read guidelines		Modified treatment		
	(total)	Yes	(%)	No	(%)
Salaried only	189	59	(31.2)	130	(68.8)
Salaried and self-employed	134	59	(44.0)	75	(56.0)
Self-employed only	150	71	(47.3)	79	(60.0)
Total	473	189	(40.0)	284	(60.0)
Chi-square for trend					9.425
P value					0.0021

HMO = health maintenance organization

Table 3. Correlation between years in practice and participation in educational programs

Attended programs	Duration of experience (yr)				Total (%)	P
	≤ 10 (%)	11–15 (%)	16–20 (%)	≥ 21 (%)		
Yes	43 (48.3)	47 (38.2)	34 (19)	68 (28.4)	192 (30.5)	< 0.0001
No	46 (51.7)	76 (61.8)	145 (81)	171 (71.6)	438 (69.5)	< 0.0001
Total	89 (100)	123 (100)	179 (100)	239 (100)	630 (100)	

Discussion

Our study demonstrates that one year after the Israeli Clinical Guidelines for Asthma Treatment were published and distributed, 75% of the primary care physicians had read and consulted them but less than 25% had participated in educational programs on the management of asthma. Furthermore, only 40% of the physicians who had read the guidelines changed their management strategies accordingly. This response may have a repercussion on the quality of care provided to asthma patients. Self-employed physicians had higher rates for both reading the guidelines and participating in educational programs than salaried physicians, with physicians who work on a combined basis having rates between the two, as expected. This trend was not influenced by years of medical experience or by work setting. However, since the majority of the self-employed physicians did not participate in any educational programs and did not change their treatment plan, we cannot conclude that self-employed doctors may possess more up-to-date knowledge than their salaried counterparts. Luskin [8] asserted that "Good asthma control is possible in almost all children. But the way that we currently manage this disease, the way we deliver care, is substandard." Furthermore, asthma knowledge and compliance with national asthma management guidelines is paramount to proper medical care. With an optional asthma management plan and the proper treatment and education, nearly all asthma patients can have a better quality of life. By applying vigorous medical regimens and attending intensive educational programs, physicians can reduce hospital readmissions, non-emergency office visits, and overall healthcare utilization [9,10]. The insufficient adoption of clinical guidelines may lead to less than adequate care [11].

Similar results to ours were noted by other investigators in the U.S. who surveyed primary care physicians and internal medicine residents about their knowledge of asthma: 51% of the physicians failed to obtain a score of 70% or more [5,12,13]. Furthermore, surveys on the application of asthma guidelines showed that only 50–66% of the pediatricians questioned were even aware of the existence of the guidelines. In their present form, clinical practice guidelines are not perceived as a very helpful tool by most practitioners [5,13,14].

Although anonymous questionnaires, which tend to produce low response rates, are a limitation of survey studies, our rate of 64% is quite satisfactory as compared to other related studies [15].

Healthcare providers' insufficient knowledge and lack of proficiency have a direct impact on patient knowledge, and in turn, on hospitalization and morbidity [14]. Adverse outcomes account

for almost 75% of the direct cost of asthma. Studies have shown that a low level of parental confidence in the efficacy of the treatment prescribed and failure to apply proper criteria are associated both with over-utilization of the emergency room by asthmatic children and with compliance failure [16,17]. Both these factors may derive from poor conveyance of the proper information from physician to parent or patient. Indeed, the success of patient compliance with medical care was found to increase

severalfold after physicians were formally taught the proper use of inhalers [8,18]. Evans et al. [19] reported that the *patients* of physicians who attended education seminars on inhaler use made more appropriate management decisions regarding their asthma, leading to reductions in healthcare utilization. These authors suggested that educational outreach (i.e., use of trained medical personnel to meet the educational needs in professional health-care) and peer pressure might be superior to prescribing guidelines. The effectiveness of guidelines can be increased by extensive dissemination programs involving repeated mailings, targeted discussions of the guideline recommendations, medical publications, and summary charts for the workplace [18]. Effectiveness evaluation of asthma care in individual practices seems to have a better impact than even small-group education [20], as seen in Israel among family physicians, because this group is three times more likely than general practitioner non-specialists to treat asthmatic patients themselves [21].

Conclusions

The initiative to develop and publish guidelines on asthma must be followed by their effective dissemination and implementation. Our study suggests that in Israel, and perhaps in other countries where patients are insured by HMOs, major efforts should be directed at the population of salaried physicians.

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References

- Centers for Disease Control. Forecast of state-specific estimates of self-reported asthma prevalence – United States. *MMWR* 1998;47:1022–5.
- Sly RM. Changing prevalence of allergic rhinitis and asthma. *Ann Allergy Asthma Immunol* 1999;82:233–48.
- Richman E. Expert Panel Report II. Guidelines for Diagnosis and Management of Asthma. National Asthma Education and Prevention Program, 1997. National Institutes of Health, Bethesda, MD.
- National Asthma Education Program. Expert Panel Report. Executive Summary: Guidelines for Diagnosis and Management of Asthma. National Institutes of Health, Bethesda, MD. Publication No. 91-3042A, 1991.
- Alicea E, Casal J, Nazario S, Rodriguez W. Asthma knowledge among internal medicine residents. *PR Health Sci J* 1999;18:19–21.

6. Lange P, Partner J, Vestbo J, et al. A 15-year follow-up study of ventilation function in adults with asthma. *N Engl J Med* 1998;339:1194–2000.
 7. Department of Quality Assurance of the Scientific Council of the Israel Medical Association. Clinical Guidelines and Position for Asthma Treatment. 1998 (Hebrew).
 8. Luskin A. Shared decision making between patient and physician: an opportunity to improve patient adherence and self management of asthma. Presented at the Gateway to the 21st Century Meeting of the American Collage of Allergy, Asthma and Immunology. Philadelphia, 1998.
 9. Christakis DA, River FP. Pediatricians' awareness of and attitudes about four clinical practice guidelines. *Pediatrics* 1998;101:825–30.
 10. Homer JH, Szilagyi P, Rodewald L, et al. Does quality care affect rate of hospitalization for childhood asthma? *Pediatrics* 1996;98:18–23.
 11. Hilton S, Sibbald B, Anderson HR, Freeling P. Controlled evaluation of the effects of patient education on asthma morbidity in general practice. *Lancet* 1986;i:26–9.
 12. Legorrata AP, Christian-Herman J, O'Connor RD, Hasan NM, Evans R, Leung KM. Compliance with national asthma guidelines and specialty care: a health maintenance organization experience. *Arch Intern Med* 1998;158:457–64.
 13. Baeza B, Fernandez R. Development of questionnaire to assess the knowledge in infantile asthma. *Rev Alerg Mex* 1998;45:49–53.
 14. Amirav I, Goren A, Pawlowski AN. What do pediatricians in training know about correct use of inhalers and spacer devices? *J Allergy Clin Immunol* 1994;94:669–75.
 15. Asch DA, Jedrzewski MK, Christakis NA, et al. Response rate to mail surveys in medical journals. *J Clin Epidemiol* 1997;50:1129–36.
 16. Minkovitz CS, Andrews JS, Serwint JR. Rehospitalization of children with asthma. *Arch Pediatr Adolesc Med* 1999;153:727–30.
 17. Wasielewski Y, Clark NM, Evans D, et al. Factors associated with emergency department visits by children with asthma: implications for health education. *Am J Public Health* 1996;86:1410–15.
 18. Clark NM, Gong M, Schork MA, et al. Impact of education for physicians on patient outcome. *Pediatrics* 1998;101:831–6.
 19. Evans D, Mellins R, Lobach K, et al. Improving care for minority children with asthma: professional education in public health clinics. *Pediatrics* 1997;99:157–64.
 20. Doeschug KC, Peterson MW, Dayton CH, et al. Asthma guidelines. An assessment of physician understanding and practice. *Am J Crit Care Med* 1999;159:1735–41.
 21. Kahan E, Weingarten MA, Applebaum T. Attitudes of primary care physicians to the management of asthma and their perception of its relationship to patients' work. *Isr J Med Sci* 1996;32:757–62.
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