

General practitioners' knowledge of childhood asthma in Delhi, India

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SUMMARY

OBJECTIVE: To assess knowledge of childhood asthma among general practitioners (GPs) in Delhi, India.

DESIGN: In this cross-sectional study, a total of 157 GPs were interviewed using a validated questionnaire, including six questions of local and social relevance. A response rate of 78.5% was obtained.

RESULTS: Although the GPs who participated in the study had adequate knowledge of the importance of appropriate treatment, the safety of inhalers/oral steroids and the role of medicines in the prevention of frequent asthma attacks, the majority lacked knowledge of symptomatology, exercise-induced asthma and inhaled corticosteroids. GPs with >5 years of practice were more likely to have significantly less knowledge about preven-

tive drugs, certain aspects of treatment of acute asthma and misconceptions, such as 'drinking milk increases mucus production' or 'children with asthma should not consume dairy products, chilled drinks, sour or chilled food'. On the other hand, GPs with ≤5 of practice had misconceptions such as 'children with asthma have abnormally sensitive airways' and 'asthmatic children develop dependence on inhalers'.

CONCLUSIONS: The gaps in knowledge about asthma and its management highlight the need to design well-structured educational strategies for health professionals.

KEY WORDS: knowledge; childhood asthma; questionnaire; general practitioners; India

ASTHMA AFFECTS people of all ages, but is especially common in children and young adults, and it is a major global health problem.¹ It is estimated that approximately 300 million persons suffer from asthma and more than 200 000 die of asthma annually.¹ Although the prevalence of asthma is higher in industrialised countries, the magnitude in absolute numbers is greater in developing countries due to the size of the populations. The burden of asthma in India is believed to be more than 15 million.¹ India previously reported the lowest prevalence of asthma symptoms in the world.^{2–4} However, recent reports suggest an increase in prevalence, particularly in urban areas.^{5,6} A study conducted among schoolchildren in Delhi revealed that 11.6% of children currently had asthma.⁷

Besides affecting sleep patterns and school attendance, childhood asthma impairs a child's ability to enjoy and partake in physical activities.^{8,9} Furthermore, inappropriate management contributes to morbidity and mortality due to asthma.^{10,11} It is estimated that 90% of asthma patients can be successfully managed by primary health care and that only the remaining 10% need secondary care.^{10,11}

With such a huge burden of asthma, it is impera-

tive to enlist the support of private general practitioners (GPs) to achieve appropriate asthma control in India. Studies on this issue from around the world have not shown encouraging results.^{12–16} In view of this, we conducted a study among GPs running private clinics in Delhi to assess both their theoretical as well as their practical knowledge of childhood asthma. The findings of this study can be used in designing continuous education programmes.

METHODOLOGY

This cross-sectional study was conducted in Delhi over a period of 8 months from December 2006 to July 2007. The study involved private GPs only, as they are the single largest category of health service providers used by the people (80% in urban India).¹⁷ The minimal sample size of 74 was reached using the formula, $n = Z^2 PQ/E^2$, taking into account the correct response (26.1%, $P = 0.26$) in a study conducted in Chennai,¹³ a confidence level of 95% ($Z = 0.05$) and an absolute precision of 10% ($E = 0.1$) on either side of the proportion. The authors decided to use at least the twice the size of the calculated sample size for two

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reasons: the sample size taken in the earlier study was not representative, and knowledge of asthma symptoms alone had been studied by Van Sickle.¹³ We therefore decided to interview 200 GPs, bearing in mind that a refusal rate of 25% is usual in such cases.

GPs were initially stratified on the basis of the geographical location of their clinic into five groups, North, East, West, Central and South Delhi, from the list of GPs registered with the Delhi Medical Association. A sample of 40 GPs was then randomly selected from each group to create a total sample size of 200 GPs. Of these, 22 (11%) refused to participate and 21 (10.5%) could not be contacted on a second visit. A total of 157 GPs (response rate of about 78.5%) were interviewed using a validated questionnaire.¹⁸ Six additional questions of local and social relevance were included (Table 1).

Informed consent was obtained from all the participants, who were assured of the confidentiality of their responses. Permission from the institutional ethical committee was not necessary as this was a questionnaire-based survey of knowledge about childhood asthma amongst GPs and no intervention was involved.

The questionnaire was analysed on a question-by-question basis and then by total score using Epi Info 3.4.2 (Centers for Disease Control and Prevention, Atlanta, GA, USA).¹⁸ The six additional questions were analysed separately and were not included in the score. χ^2 statistics were used for difference in proportions. The maximum possible score was 31.¹⁸

RESULTS

Of the 157 participants, 138 (87.9%) were male and 19 (12.1%) female. Respondents reported a mean of 11.27 years (range 1–27) in general medical practice. Ninety GPs (57.3%) had completed the basic medical degree. Twenty-four participants (15.3%) had completed an additional 2 years of training for a postgraduate diploma. The remaining 43 GPs (27.4%) had 3 years of training for a postgraduate degree. None reported postgraduate training in respiratory diseases.

Table 1 General practitioners' responses to six additional questions

Question	Correct response <i>n</i> (%)	Incorrect response <i>n</i> (%)
1 Children suffering from asthma should not eat bananas	57 (36.3)	100 (63.7)
2 Children suffering from asthma should not eat chilled food	119 (75.8)	38 (24.2)
3 Children suffering from asthma should not eat sour food	102 (65.0)	55 (35.0)
4 Children suffering from asthma should not drink chilled fluids/liquids	92 (58.6)	65 (41.4)
5 Children suffering from asthma develop dependence on inhalers	105 (66.9)	52 (43.1)
6 Name the medical conditions that you need to look for to reach a diagnosis	54 (34.4)	103 (65.6)

Table 2 General practitioners' responses to the validated questionnaire¹⁴

Question	Correct response <i>n</i> (%)	Incorrect response <i>n</i> (%)
1 Three main symptoms of asthma	54 (34.4)	103 (65.6)
2 More than one in 10 children have asthma	112 (71.3)	45 (28.7)
3 Asthma patients have abnormally sensitive airways	108 (68.8)	49 (31.2)
4 Asthma in a child in the family means asthma in all siblings	131 (83.4)	26 (16.6)
5 Increase in mucus if asthma patients drink milk	95 (60.5)	62 (39.5)
6 Trigger factors for asthma	74 (47.1)	83 (52.9)
7 Wheeze may be due to muscle tightening in the airways	116 (73.9)	41 (26.1)
8 Wheeze may be due to swelling in the lining of the airways	131 (83.4)	26 (16.6)
9 Asthma damages the heart	59 (37.6)	98 (62.4)
10 Two medicines are required to prevent acute attacks	98 (62.4)	59 (37.6)
11 Three treatment methods are required for acute attacks	70 (44.6)	87 (55.4)
12 Antibiotics are an important part of treatment	90 (57.3)	67 (42.7)
13 Children with asthma should not ingest dairy products	74 (47.1)	83 (52.9)
14 Allergy injections cure asthma	134 (85.4)	23 (14.6)
15 Death from an acute attack means that it must have begun quickly	79 (50.3)	78 (49.7)
16 Children with asthma usually have nervous problems	80 (51.0)	77 (49.0)
17 Asthma is infectious	151 (96.2)	6 (3.8)
18 Inhaled medications have fewer side effects than tablets	138 (87.9)	19 (12.1)
19 Short courses of oral steroids cause significant side effects	123 (78.3)	34 (21.7)
20 Some medications (such as salbutamol) damage the heart	135 (86.0)	22 (14.0)
21 A child takes two puffs of salbutamol during an acute attack, after 5 min his condition has not improved. Give reasons	22 (14)	135 (85.9)
22 A child requires nebulisers every 2 h during attacks, benefits from it but is still breathless after 2 h. If the situation does not worsen, it would be acceptable to continue with the 2-hourly treatment	86 (54.8)	71 (45.2)
23 Measures to prevent asthma attacks during exercise	32 (20.4)	125 (79.6)
24 Children with asthma become addicted to their medications	110 (70.1)	47 (29.9)
25 Swimming is the only exercise recommended for asthma patients	126 (80.3)	31 (19.7)
26 Parental smoking may make their child's asthma worse	108 (68.8)	49 (31.2)
27 Most children with asthma lead a normal life with appropriate treatment	139 (88.5)	18 (11.5)
28 The best way to measure asthma severity is by chest auscultation	63 (40.1)	94 (59.9)
29 Asthma is more of a problem at night than during the day	102 (65.0)	55 (35.0)
30 Most children with asthma will have stunted growth	77 (49.0)	80 (51.0)
31 Asthma patients should frequently take preventive medication	123 (78.3)	34 (21.7)

Of a possible maximum score of 31, GPs in the current study had a mean score of 19.6 (range 10–27). Study participants scored well in such areas as asthma incidence (75.8%), the role of allergy injections in asthma (85.4%), the importance of appropriate treatment (88.5%), side effects of inhalers or oral steroids (87.9% or 78.3%), misconceptions regarding the need to avoid milk (60.5%), chilled food (75.8%) or sour food (65%) and the role of medicines in the prevention of frequent asthma attacks (78.3%) (Tables 1 and 2).

It was observed that GPs with >5 years of practice were more likely to have significantly less knowledge about preventive drugs, certain aspects of the treatment of acute asthma and misconceptions such as

that 'drinking milk increases mucus production' or 'children with asthma should not consume dairy products, chilled drinks, sour and chilled food' (Table 3). On the other hand, GPs with ≤ 5 years of practice had misconceptions such as 'children with asthma have abnormally sensitive airways', and 'children with asthma develop dependence on inhalers' (Table 3).

A question-by-question analysis revealed that 54 (34.4%) of the GPs knew all clinical features of asthma, with breathlessness being the most commonly mentioned symptom (91.7%) (Table 4). Only 47.1% of participants were familiar with the trigger factors for asthma (Table 4). The most commonly mentioned trigger factors were 'allergens' (67.5%) and 'environmental factors' (61.8%) (Table 4). Thirteen (8.3%)

Table 3 Relationship between GPs' knowledge about childhood asthma and number of years of practice (≤ 5 years, $n = 40$; >5 years, $n = 117$)

Years of practice	Incorrect response	Correct response	P values*
More than one in 10 children have asthma at some time during their childhood			
≤ 5	18 (45.0)	22 (55.0)	0.01
>5	27 (23.1)	90 (76.9)	
Children with asthma have abnormally sensitive airways			
≤ 5	19 (47.5)	21 (52.5)	0.02
>5	30 (25.6)	87 (74.4)	
Most children with asthma have an increase in mucus when they drink milk			
≤ 5	6 (15.0)	34 (85.0)	0.00
>5	56 (47.9)	61 (52.1)	
Write down two asthma drugs that are taken every day on a regular basis to prevent asthma attacks			
≤ 5	5 (12.5)	35 (87.5)	0.00
>5	54 (46.2)	63 (53.8)	
Antibiotics are an important part of treatment for most children with asthma			
≤ 5	10 (25.0)	30 (75.0)	0.01
>5	57 (48.7)	60 (51.3)	
Children with asthma should not ingest dairy products (curd, <i>lassi</i> or ice cream)			
≤ 5	10 (25.0)	30 (75.0)	0.00
>5	73 (62.4)	44 (37.6)	
If a person dies from an asthma attack, this usually means that the attack must have begun so quickly that there was no time to start any treatment			
≤ 5	9 (22.5)	31 (77.5)	0.00
>5	69 (59.0)	48 (41.0)	
A 5-year-old boy has an asthma attack and takes two puffs of salbutamol from a metered dose inhaler. After 5 min, his condition has not improved. Give reasons why this might have happened.			
≤ 5	28 (70.0)	12 (30.0)	0.00
>5	107 (91.5)	10 (8.5)	
Children with asthma should not eat chilled food			
≤ 5	3 (7.5)	37 (92.5)	0.00
>5	35 (29.9)	82 (70.1)	
Children with asthma should not eat sour food			
≤ 5	8 (20.0)	32 (80.0)	0.02
>5	47 (40.2)	70 (59.8)	
Children with asthma should not drink chilled fluids/liquids			
≤ 5	9 (22.5)	31 (77.5)	0.00
>5	56 (47.9)	61 (52.1)	
Children with asthma develop dependence on inhalers			
≤ 5	25 (62.5)	15 (37.5)	0.00
>5	27 (23.1)	90 (76.9)	

* $P < 0.05$ was considered statistically significant.

Table 4 Knowledge about 'main symptoms of asthma' (Q1) and 'trigger factors for asthma' (Q6)

	Responses* n (%)
Q1 Main symptoms of asthma	
All three symptoms (breathlessness, dry cough and wheezing)	54 (34.4)
Breathlessness and dry cough or wheezing	45 (28.8)
Breathlessness	144 (91.7)
Dry cough	95 (60.5)
Wheezing	61 (38.9)
Chest pain	22 (14.0)
Difficulty in breathing	13 (8.3)
Cough with expectoration	4 (2.6)
Q6 Trigger factors for asthma	
Three trigger factors	74 (47.1)
Viral infections	65 (41.4)
Exercise	23 (14.7)
Allergens	106 (67.5)
Emotions	5 (3.2)
Environment	97 (61.8)
Drugs	5 (3.2)
Food	30 (19.1)
Medical problems (cardiac, pneumonia, tropical pulmonary eosinophilia)	16 (10.2)

* Responses were not mutually exclusive.

GPs mentioned medical conditions such as 'pleurisy', 'heart disease' and 'chronic obstructive pulmonary disease' as trigger factors.

Two medicines required on a daily basis to prevent acute asthma were known to 98 (62.4%) GPs. The majority of the GPs (113, 72%) reported salbutamol followed by steroids (48.4%) (Table 5). Only 39 (24.84%) GPs mentioned inhaled medicines (Table 5). The correct treatment for acute asthma attacks was known to only 44.6% of the GPs, while 25 (15.9%) mentioned medicines that have little or no role in the management of an acute asthma attack

Very few GPs (32, 20.4%) knew how to prevent

Table 5 Knowledge about 'preventive medicines' (Q10) and 'treatment for acute attacks' (Q11)

Medicine	Responses to Q10* n (%)	Responses to Q11* n (%)
Salbutamol	113 (71.9)	119 (75.8)
Steroids	76 (48.4)	98 (62.4)
Ketotifen	2 (1.3)	0 (0.0)
Sodium chromoglycate	10 (6.4)	6 (3.8)
Antihistamines	30 (19.1)	4 (2.5)
Montelukast	2 (1.3)	0 (0.0)
Deriphylline	42 (26.8)	60 (38.2)
Anxiolytics	0 (0.0)	4 (2.6)
Oxygen	0 (0.0)	88 (56.1)
NSAIDS	0 (0.0)	4 (2.6)
Inhaled medicines	39 (24.8)	0 (0.0)
Steam inhalation/muscle relaxants/antibiotics	0 (0.0)	25 (15.9)

* Responses are not mutually exclusive.
NSAIDS = non-steroidal anti-inflammatory drugs.

exercise-induced asthma. However, respectively 27.4%, 24.2%, 20.4% and 17.8% cited measures such as 'doing mild or warm-up exercises', 'avoiding trigger factors', 'taking medicines before exercises' and 'doing respiratory exercises'. In addition, 60 (38.2%) GPs reported incorrect measures such as 'avoiding exercise'.

Participants were questioned about the following problem situation: a 5-year-old boy has an asthma attack and takes two puffs of salbutamol from a metered dose inhaler, but after 5 min he is no better. When asked to give reasons why this may have happened, 86 (54.8%) responded with at least two correct answers; 56 (35.7%) GPs gave at least one of the following correct reasons for patient non-responsiveness: 'incorrect inhalation technique', 'severe attack' or 'inadequate dose'.

In response to the question 'what other medical conditions should be excluded in each suspected case of asthma', respectively 87.9%, 52.2%, 34.4%, 27.4% and 10.2% of GPs mentioned 'respiratory problems other than asthma', 'cardiac problems', 'atopic conditions', 'tuberculosis' and 'drug allergies'.

Common misconceptions included the 'need to avoid bananas' (63.7%) and the 'need to avoid dairy products' (52.9%) and that children with asthma usually have 'nervous problems' (49.0%) and 'stunted growth' (51.0%) (Tables 1 and 2). Knowledge about the effects of parental smoking on their child's asthma was also poor: only 68.8% thought that parental smoking aggravated their children's asthma. Participants also tended to overestimate the value of chest auscultation in assessing the severity of asthma (59.9%) (Table 2).

DISCUSSION

It is clear from the results of the present study that the overall knowledge of asthma among GPs is inadequate. Unlike the findings of Henry et al., the mean score in the study was remarkably low, and GPs had no problem in distinguishing preventive treatment from medication for relief of symptoms.¹² As reported by Van Sickle, the majority (65.6%) of GPs were not familiar with the symptoms of asthma.¹³

As indicated by Coates et al. (62%), only 56.1% GPs reported the use of oxygen in acute asthma attacks.¹⁴ This is of major concern, as oxygen administration is very important during the period between the onset of an asthma attack and the appearance of bronchodilation after the start of treatment. In addition, none of the respondents mentioned that inhaled medications are required in the treatment of acute asthma. This could be due to the fact that episodes of acute asthma are generally managed at the secondary level of health care.

In the current study, only a small percentage of GPs (26.8%) reported the use of theophyllines in the prevention of acute attacks, contrary to the observations made by Coates et al. and Moy et al.^{14,15} This

finding is important, in view of the fact that theophylline intake among children causes behavioural disturbances. Although 62.4% responded correctly to the question about medicines required to prevent acute attacks, only 48.4% of GPs knew that corticosteroids are needed in the prevention of acute asthma. The level of belief about the safety of inhaled medications was comparable to that reported by Moy et al., but only 39 (24.8%) GPs reported that they were likely to prescribe inhaled medications for the prevention of an acute asthma attack in the current study as compared to nearly all practitioners in the study by Moy et al.¹⁵ This suggests that in the current study GPs did not know of the importance of inhaled corticosteroids in the prevention of acute asthma. This is another area of concern, as inhaled corticosteroids are the mainstay of preventive therapy for asthma. GPs with >5 years of practice had significantly poorer knowledge about preventive medication.

A very small proportion of GPs (14%) could give at least two correct reasons for non-response to inhalation treatment. This may be ascribed to the low rate of inhalers prescribed by GPs. GPs with >5 years of practice had significantly less knowledge of certain aspects of asthma treatment; however, there was no difference in the knowledge about the treatment of asthma between those who had ≤ 5 and those with >5 years of practice.

Knowledge about exercise-induced asthma was also poor, with very few (28.7%) GPs knowing how it could be prevented. This is further supported by the fact that 38.2% recommended measures that were incorrect.

It was disappointing to note that a very low proportion of GPs knew the importance of obtaining the history of cardiac asthma (52.2%), atopic conditions (34.4%) and tuberculosis (27.4%). This finding is important in view of the fact that, in primary care settings, asthma is primarily a clinical diagnosis based on history, including a personal or family history of atopic conditions after the exclusion of other respiratory conditions, such as tuberculosis and cardiac asthma.¹⁹

As reported by Ricci et al., <50% of GPs believed that the best way to measure the severity of asthma in children was auscultation of the chest.¹⁶ This over-reliance on chest auscultation to measure asthma severity only leads to its underestimation and suboptimal management. Some beliefs, such as the 'need to avoid bananas' (63.7%), the 'need to avoid dairy products' (52.9%), that 'children with asthma usually have nervous problems' (49.0%) and 'stunted growth' (51.0%) have been circulating for 30 years, and are still prevalent.²⁰ These misconceptions were equally common among GPs who had <5 years and >5 years of practice, except for the misconception regarding the 'need to avoid dairy products', which was significantly more common among GPs with >5 years of practice.

This study has several limitations: first, respondents included only a small number of women. Second, re-

spondents may have reported what they believed to be acceptable, instead of what they actually practised in their clinics. This study nevertheless helps us gain an insight into many aspects of asthma care as provided by GPs in an urban environment. It would also be of great value if further studies were conducted to ascertain the reasons for not prescribing inhaled medicines and gaps in the knowledge about childhood asthma among GPs in other parts of India and other developing countries.

In conclusion, the overall data suggest that there are substantial variations and deficiencies in the knowledge about childhood asthma among GPs. This poor knowledge on the part of health care providers may contribute to morbidity and mortality. There is therefore an urgent need to sensitise policy makers, non-governmental organisations and professional bodies to the role of primary care for asthma in this part of the world. The organisation of workshops at regular intervals or short certification courses for GPs to train them in the diagnosis and management of childhood asthma, or the distribution of summary charts for use in the workplace, would go a long way in improving the care of asthma patients.

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R É S U M É

OBJECTIF : Evaluer les connaissances des médecins généralistes (GP) à Delhi, Inde, concernant l'asthme infantile.

SCHEMA : Dans cette étude transversale, on a interviewé au total 157 GP par un questionnaire validé qui incluait un total de six questions ayant une pertinence locale et sociale. On a obtenu un taux de réponse de 78,5%.

RÉSULTATS : Globalement, les GP avaient des connaissances adéquates au sujet de l'importance d'un traitement approprié, de la sécurité des stéroïdes inhalés ou pris par voie orale et du rôle des médicaments dans la prévention des crises d'asthme fréquentes, mais la majorité d'entre eux avaient des connaissances insuffisantes concernant la symptomatologie, l'asthme induit par l'effort et les corticostéroïdes inhalés. Les GP ayant >5 ans de pratique avaient significativement moins de connais-

sances au sujet des médicaments préventifs, de certains aspects du traitement de l'asthme aigu et quelques erreurs de conception comme « boire du lait augmente la production du mucus » et « les enfants atteints d'asthme ne devraient pas consommer des produits laitiers, des boissons glacées et des aliments acides et réfrigérés ». D'autre part, des GP ayant ≤5 ans de pratique avaient des erreurs de conception comme « les enfants atteints d'asthme ont des voies aériennes anormalement sensibles » et « les enfants asthmatiques développent une dépendance à l'égard des inhalateurs ».

CONCLUSIONS : Les failles dans les connaissances concernant l'asthme et sa prise en charge renforcent la nécessité d'élaborer des stratégies bien structurées d'éducation pour les professionnels de santé.

R E S U M E N

OBJETIVO : Evaluar el conocimiento de los médicos generales (GP) en Delhi, India, sobre el asma en la infancia.

MÉTODOS : En este estudio transversal, se entrevistaron 157 GP mediante un cuestionario validado incluyendo además seis preguntas de interés local y social. Se obtuvo un índice de respuesta del 78,5%.

RESULTADOS : Si bien los GP contaban con un conocimiento adecuado sobre la importancia del tratamiento, la seguridad de los corticoesteroides inhalados y por vía oral y sobre la función de los medicamentos en la prevención de las crisis frecuentes de asma, la mayoría presentó lagunas en cuanto a la sintomatología, el asma inducida por el ejercicio y los corticoesteroides inhalados. Aquellos con >5 años de práctica presentaron mayor

probabilidad de tener menor conocimiento sobre los medicamentos preventivos, sobre algunos aspectos del tratamiento del asma agudo e ideas equivocadas como 'tomar leche aumenta la producción de moco' o 'los niños con asma no deben consumir productos lácteos, bebidas ni alimentos fríos ni alimentos ácidos'. Los GP con ≤5 años de práctica expresaron ideas equivocadas como 'los niños con asma tienen vías aéreas anormalmente sensibles' y 'los niños asmáticos se hacen dependientes de los inhaladores'.

CONCLUSIÓN : Estas lagunas en los conocimientos sobre el asma y su tratamiento reiteran la necesidad de concebir estrategias educativas bien estructuradas para los trabajadores de salud.