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Research Article

Prevalence and risk factors for respiratory morbidity, among high school students of South India

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ABSTRACT

Background: The prevalence of asthma and other respiratory diseases among children and adolescents has been on the rise in recent years and this can affect the quality of life and scholastic performance of school students. Therefore, it is essential to find out the actual prevalence of respiratory morbidity among high school students so that we can plan early interventions against this problem.
Methods: A cross sectional study was conducted among the students from classes 8 to 10, from a public school in Pathanamthitta district of Kerala state, using a modified American Thoracic Society Questionnaire (ATS-DLD-78-A) to assess respiratory symptoms among general population.
Results: The prevalence of cough was 40.8% (95% CI 34.8% to 46.9%) and that of wheeze was found to be 19.6% (95% CI 15.1% to 24.9%). Among the possible risk factors for developing respiratory diseases, it was found that only family history of respiratory problems had a significant association with symptoms of respiratory disease (P = 0.002).
Conclusion: The very high prevalence of respiratory symptoms in the study may be due to the fact that the study was conducted during the rainy season in which there is a higher incidence of respiratory infections. But these findings point towards the need to conduct more comprehensive and objective studies on the subject.

Keywords: Adolescent health, School students, Respiratory morbidity, Asthma

INTRODUCTION

Asthma and other respiratory diseases are becoming significant causes of school absence and this can lead to a reduction in scholastic performance. This trend has been seen both in western nations and in India. In a study done in Nottingham, England, it was found that 7% of the students missed school due to wheezing episodes and the median school absence was 7 days.[1] Similar figures has been observed in studies done in India.[2] An even more worrying fact is that up to 58% of the children with wheezing had history of school absence in the previous one year, as per a study done in London, England.[3] All this points towards the need for early diagnosis of chronic respiratory morbidity in children and its appropriate medical management, so that the quality of life and scholastic performance of the children is not affected in the course of their life as a student. The respiratory illnesses during childhood can also cause strain on the healthcare systems of the state, as a result of frequent hospital visits and cost of treatment.[4]

Review of literature

The prevalence of asthma and other respiratory morbidity among children is increasing worldwide. A study which analysed the temporal trends of wheezing in children living in the United States, showed that the prevalence of asthma increased by over 33% in a 7 year window.[5] Among studies done in India the prevalence estimates of

respiratory morbidity among children has varied widely. In a study done in Delhi the prevalence of current asthma was estimated to be 11.9% while past asthma was reported by 3.4% of children. Boys had a higher prevalence of respiratory morbidity as compared with girls (12.8% and 10.7%, respectively).[2]

Another study done in Tamil Nadu state of India revealed that the overall prevalence of breathing difficulty was 18%. Twenty-two per cent of urban and 9% of rural children 6-12 years of age reported breathing difficulty 'at any time in the past. More than 20% of the children reported persistent nocturnal cough, which is indicative of an underlying respiratory illness. All the symptoms of respiratory morbidity were higher among children living in urban areas, when compared to their counterparts from rural areas.[6]

Hospital based studies have shown that there is a significant increase in the proportion of children with respiratory complaints coming to the outpatient departments. A study done in a city hospital in Bangalore demonstrated this increasing trend remarkably. The study based on 20,000 children under the age of 18 years from 1979,1984,1989,1994 and 1999 in the city of Bangalore showed a proportion of 9%, 10.5%,18.5%, 24.5% and 29.5% respectively, as having respiratory symptoms among the total outpatient visits.[7]

There have been extensive studies to determine the possible risk factors of respiratory morbidity among children and school students. One such study done in Pennsylvania, United States, showed that male sex, parental history, parental smoking and chest illness before 2 years of age were significant risk factors for respiratory morbidity in children.[8]

Another study from Saudi Arabia revealed that urban residence, higher socio-economic status and Arab ethnicity were significant risk factors, apart from male sex and passive smoking.[9]

A similar study done in Haryana showed that passive smoking, pets at home and inadequate ventilation at home were risk factors for developing respiratory illness among school going children.[10] Another important risk factor for development of respiratory illness is exposure to significant levels of air pollution. In a study done in schools situated in the Indonesian city of Jakarta, it was found that respiratory morbidity among school students was significantly associated with exposure to air pollution, which was measured using Nitrogen dioxide as a surrogate.[11]

A study done in Liverpool, England showed that the children whose homes or schools were near coal mines and who were exposed to coal dust had a higher of risk of respiratory morbidity when compared to other children. The study also demonstrated significant school absenteeism among children exposed to coal dust.[12]

METHODS

A cross sectional study was done in the month of October 2014, to find out the prevalence of respiratory morbidity among high school children of South India and to analyse the possible risk factors for the same.

Two hundred and fifty students from classes 8 to 10, of a public school in Pathanamthitta district of Kerala state were enrolled into the study after taking due permissions from the school management and the parent teacher association.

The local language translation of a modified American Thoracic Society Questionnaire (ATS-DLD-78-A) was administered to the participants, following all norms of privacy and confidentiality.

The modified (ATS-DLD-78-A) questionnaire was pilot tested before the start of the study. The data entry and analysis was done using Epi-Info 7.0, a free software designed for the purpose by Centre for Disease Control (CDC), Atlanta, USA.

RESULTS

A total of 250 students from classes 8 to 10, of a public school in Pathanamthitta district of Kerala state were included in the study. The participants were aged between 13 and 17 years, with a mean age of 14.72 years (SD-0.667 years). Most (158, 63.2%) of the study participants were boys and 94(37.6%) reported history of passive smoking. A majority (128, 51.2%) of them had exposure to household animals/pets, while 84 (33.6%) had indoor ‘chulahs’ at home. Sixty participants (24%) said that they have some immediate relative with respiratory problems and 20 (8%) reported that they themselves had some significant respiratory problems in the past (Table 1).

Among the study participants, the prevalence of cough was found to be 40.8% (95% CI 34.8% to 46.9%). Among those participants reporting cough, 24.5% responded that they have it more than 3 to 4 times a week and 3.9% said that the total duration of cough is more than 3 months. The prevalence of wheeze was found to be 19.6% (95% CI 15.1% to 24.9%) and that of breathlessness was estimated as 23.2% (95% CI 18.3% to 28.8%) (Table 2).

When the data was analysed to look for association of symptoms with possible risk factors, it was found that wheeze had a significant association with family history of respiratory problems (P = 0.002). No statistically significant association was found between possible risk factors like history of passive smoking, overcrowding in the household, exposure to indoor ‘Chulah’, exposure to household animals/pets with symptoms of respiratory illness like cough and wheeze (Table 3).

Table 1: Baseline characteristics of the study participants (n=250).

Baseline characteristics of the study participants		
Sex	Male	158 (63.2%)
	Female	92 (36.8%)
Passive smoking	Present	94 (37.6%)
	Absent	156 (62.4%)
Overcrowding in the household	Present	38 (15.2%)
	Absent	212 (84.8%)
Household animals/pets	Present	128 (51.2%)
	Absent	122 (48.8%)
Exposure to indoor 'Chulah'	Present	84 (33.6%)
	Absent	166 (66.4%)
Family history of respiratory problems	Present	60 (24%)
	Absent	190 (76%)
Past history of respiratory problems	Present	20 (8%)
	Absent	230 (92%)

Table 2: Prevalence of respiratory symptoms among study participants (n=250).

Symptom	Attribute	Number (Percentage)
Cough	Present	102 (40.8%)
	Absent	148 (59.2%)
Frequency of cough (Among those reporting cough)	More than 3-4 times a week	25 (24.5%)
	Less than 3-4 times a week	77 (75.5%)
Duration of cough (Among those reporting cough)	More than 3 months	4 (3.9%)
	Less than 3 months	98 (96.1%)
Wheeze	Present	49 (19.6%)
	Absent	201 (80.4%)
Breathlessness	Present	58 (23.2%)
	Absent	192 (76.8%)

Table 3: Association of symptoms with possible risk factors.

Exposure	Symptom	Chi-square	P value	OR (95% CI)
Family history of respiratory problems	Cough	0.025	0.875	1.04 (0.58 to 1.88)
History of passive smoking		0.390	0.532	0.84 (0.50 to 1.42)
Overcrowding in the household		0.033	0.857	0.93 (0.46 to 1.89)
Exposure to indoor 'Chulah'		0.795	0.373	1.13 (0.66 to 1.93)
Exposure to household animals/pets		0.040	0.842	0.95 (0.57 to 1.58)
Family history of respiratory problems	Wheeze	9.449	0.002*	2.77* (1.42 to 5.40)
History of passive smoking		0.036	0.850	0.99 (0.51 to 1.91)
Overcrowding in the household		0.413	0.521	0.73 (0.28 to 1.87)
Exposure to indoor 'Chulah'		1.365	0.543	1.46 (0.75 to 2.86)
Household animals/pets		0.371	0.542	0.89 (0.48 to 1.65)

*Statistically significant

DISCUSSION

The prevalence of cough, wheeze and breathlessness in the study was much higher than estimates from other similar studies done elsewhere.[2,6,7] This may be partly due to the fact that the survey was conducted during the month of October 2014, which is season for North-East monsoon in this part of the country and is usually associated with a high incidence of respiratory tract infections. Also, a school based survey where students in a class interact closely with each other, may artificially push up the prevalence estimates.

When analysed to look for possible risk factors for respiratory symptoms, it was found that a family history of respiratory problems was significantly associated with wheeze and this finding is in coherence with findings of other similar studies.[8,10] Other possible risk factors, as found out from previous studies, were not found significantly associated with respiratory symptoms. The limited size of the study and the data collection done using questionnaires administered to high school students who are as young as 13, may be the reason for this.

This research study was done as an exploratory study, to estimate the prevalence of respiratory symptoms among high school children. The data was meant to plan for interventions to address the issue of respiratory morbidity in this adolescent age group, so that quality of life and scholastic performance is not affected. The high prevalence of respiratory symptoms in this study indicates the need for conducting in-depth studies to generate more data on prevalence and risk factors of respiratory morbidity, using objective methods like pulmonary function tests.

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Ethical approval: The study was approved by the institutional ethics committee

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