



## Prevalence of childhood asthma among 3 – 6 years old children, Udupi Taluk, Karnataka , India

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### ABSTRACT

#### Aims and Objectives

To find the prevalence of asthma and associated factors for asthma among 3-6 years old children.

#### Methods

A community based cross-sectional study was conducted between February-July 2013 in Udupi Taluk, Karnataka. Total of 337 participants were included in the study. A semi-structured questionnaire was used to collect the data from parents and guardians of 3-6 years old children. Univariate and multivariate logistic methods were used to calculate adjusted and unadjusted odds ratio.

#### Results

Based on the symptoms reported, the prevalence of asthma in children was found to be 9.2% in this study. Family history of Asthma, monthly income and history of allergy were reported as significant ( $P < 0.05$ ) associated factors of asthma among 3-6 years children.

#### Conclusions

A continuous surveillance for identification of asthma related symptoms and associated risk factors among children through field level health workers would facilitate in early diagnosis and treatment of children with asthma in appropriate healthcare facilities.

**Keywords:** Asthma, Preschool, Children, Prevalence

**Key Message:** Parents and guardians should be educated on childhood asthma

### INTRODUCTION

Asthma is a global health problem affecting around 300 million individuals of all ages, ethnic groups and countries. It is estimated that around 250,000 people die prematurely each year as a result of asthma.<sup>1</sup> In India, an estimated 57,000 deaths were attributed to

asthma in 2004 and it was seen as one of the leading causes of morbidity and mortality in rural India.<sup>2</sup>

Asthma in children is a chronic disease which is characterized by repeated attacks of breathlessness and wheezing, that vary in severity and frequency from children to children.<sup>3</sup> The most common

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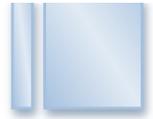
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presenting symptom in a very young child is wheeze. Wheezing generally abates during the first years of life, enabling a clearer diagnosis in later childhood.<sup>4</sup> Asthma in children is a leading cause of activity limitation, hospitalizations, with 80% of children aged 5 to 18 years having symptoms before 5 years of age. Compared with older children with Asthma, young children have greater risk, this is evidenced by the increased health care use and mortality, and experience less favourable responses to asthma management strategies.<sup>5</sup>

There are very few studies on prevalence of asthma among preschool children. A hospital-based cross sectional study was conducted among 2-59 months children between August 2011 and June 2012 in Mulago hospital, Kampala Uganda.<sup>6</sup> Another prevalence study of wheezing and risk factor of asthma among  $\geq 2$  years of age children was conducted in Jincheon of South Korea in 2011.<sup>7</sup> Cross sectional study was conducted to ascertain the presence of asthma and various risk factors for asthma in children aged 3-5 years in two cities (Lismore, WaggaWagga) in New South Wales, Australia.<sup>8</sup> Cross sectional study was conducted to ascertain the prevalence of asthma and related symptoms in children younger than 5 years in 6 health centres of south of Tehran, Iran.<sup>9</sup>

## SUBJECTS AND METHODS

The present study was carried out in Udupi Taluk in Karnataka with an aim to investigate the prevalence of asthma and its associated factors among 3-6 years children registered at Anganwad centres in Udupi Taluk. Institutional ethics committee approval was taken before starting the study. Informed written

consent was taken from parents and guardians of the children in the age group of 3-6 years. Assuming the prevalence of asthma to be 12.5% at 95% confidence interval (C.I.) and relative precision of 40% of the prevalence the sample size was calculated 168. Adapting cluster sampling design effect to be 2, required sample size is 337.

Modified International Study on asthma and Allergy in Children (ISAAC) questionnaire was used to interview the parents and guardians of 337 children aged 3-6 years. The questionnaire consisted of three domains namely general demographic questions, associated factors questions for asthma and core questions for asthma. A questionnaire was translated to the local language Kannada and translated back into English to ensure feasibility of administration of questionnaire. The questionnaire administered by a trained investigator.

To recruit the required study sample, a cluster sampling technique was used. Out of 531 Anganwadi centres in Udupi taluk, 26 Anganwadi centres were selected randomly by using SPSS software. Children were selected randomly from these AWCs. The details and address of children were retrieved from these AWCs. House to house visits was done to collect the data. Three attempts were made to recruit children who were absent on a particular day.

The data analysis was done using statistical software, SPSS Version 15.0. Univariate and multivariate logistic regression are used to test the significance of the factors associated with asthma symptoms.

## RESULTS

Table 1 shows baseline characteristics of children.



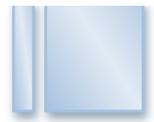
Table 1 Baseline Characteristics of Children (n=337)

Variable	Category	Frequency (%)
Gender	Male	158 (46.9)
	Female	179 (53.1)
Age (Years)	6	7 (2.1)
	5	60 (17.8)
	4	115 (34.1)
	3	155 (46)
Birth order	Third	13 (3.9)
	Second	117 (34.7)
	First	207 (61.4)
The child had an allergy in last 12 months	Yes	34 (10.1)
	No	303 (89.9)
Family history of asthma	Yes	41 (12.2)
	No	296 (87.8)
Hay in the house	Yes	67 (19.9)
	No	270 (80.1)
Cooking facility	Inside the house	306 (90.8)
	Outside the house	31 (9.2)
Monthly income of the house	≥ 5000 INR	248 (73.6)
	< 5000 INR	89 (26.4)

All 337 respondents were included in the final data analysis. Literacy status among respondents was 93.5%. The majority 297 (88.1%) of respondents, belonged to the Hindu religion. One hundred fifty eight (46.9%) children were males and one hundred seventy nine (53.1%) were females. Two hundred seven (61.4%) Children were belongs to first number birth order. Two hundred twelve (62.9%) respondents were living in mix (Kutchha and

Pukka)type of houses. One hundred fifty three (45.4%) respondents used firewood as a fuel for cooking, while 101 (30%) used LPG gas and 5 (1.5%) used electricity as a fuel for cooking. Majority of respondents 146 (43.3%) were using burning method as a household waste disposal. Sixty seven (19.9%) respondents were having hay in their houses.

Table2 shows Prevalence of childhood asthma symptoms.The prevalence of asthma (wheezing) in



our study is 9.2%. Seventeen (5%) children's had symptoms of wheezy during or after exercise and 72

(21.4%) children had nocturnal dry cough.

**Table 2 Prevalence of Childhood Asthma Symptoms (n=337)**

Symptoms of Asthma	Prevalence	
	N	Frequency (%)
Wheezing or whistling in the chest in the past 12 months	337	31 (9.2)
Child's chest sounded wheezy during or after exercise	337	17 (5)
Nocturnal dry cough	337	72 (21.4)
Frequency of wheezing >4 episodes in the past 12 months	31	7 (22.5)
Sleep disturbance > one night week due to wheezing	31	5 (16.1)
Speech disturbance during wheezing	31	5 (16.1)

Factors associated with asthma symptom analysis showed, children with a family history of asthma were 4.45 (1.71- 11.60) times more likely to get the disease compared to those who did not have a family history of Asthma. Children who belonged to families with monthly income of the house less than 5000 Indian Rupees (INR) were 3.39 (1.42- 8.05) times more likely to get the disease compared to those who had

monthly income of the house more than or equal to 5000 INR. Children who had an allergy in the last 12 months were 3.50 (1.25- 9.83) times more likely to get disease compared to those did not have an allergy. Table3 shows Univariate and multivariate logistic regression analysis of the factors associated with asthma symptoms.

**Table 3 Univariate and Multivariate Logistic Regression Analysis of the factors associated with asthma symptoms (n=337)**

Variables	Category	OR (Un Adjusted) (95% C.I.)	P- Value	OR (Adjusted) (95% C.I.)	P- Value
Gender of child	Female	Reference		Reference	
	Male	2.32 (1.035-5.201)	<b>0.041*</b>	0.51 (0.21-1.23)	0.134
Family history of asthma	No	Reference		Reference	
	Yes	0.166 (.073- .376)	<b>0.000**</b>	4.45 (1.71- 11.60)	<b>0.002*</b>
Monthly income of the house (INR*)	≥ 5000 INR	Reference		Reference	
	< 5000 INR	0.568 (.227- 1.421)	0.227	3.39 (1.42- 8.05)	<b>0.006*</b>
Cooking facility	Outside the house	Reference		Reference	
	Inside the house	2.69 (1.012- 7.191)	<b>0.047*</b>	0.46 (0.15- 1.41)	0.180
Hay in house	No	Reference		Reference	
	Yes	0.297 (.137- .642)	<b>0.002*</b>	2.32 (0.97- 5.52)	0.057
The child had an allergy in last 12 months	No	Reference		Reference	
	Yes	0.179 (.076- .423)	<b>0.000**</b>	3.50 (1.25- 9.83)	<b>0.017</b>

\*P<0.05, \*\*P=0.001, statistically significant



\* Indian rupees.

## DISCUSSION

The prevalence of wheezing in the present study was 9.2% and other studies done for approximately similar age groups (2-59 months, 2-6 years, 3-5 years, and < 5 years respectively), Studies done by Nanatanda R et al<sup>6</sup>, Woo<sup>7</sup>, Haby M M et al<sup>8</sup>, Tootoonchi P<sup>9</sup> reported the prevalence of asthma to be 20.8, 29.4, 22, 19.4 respectively. However these studies were conducted in different geographical locations and differed in their methodology or the tools used to collect prevalence of asthma.

Study done for children in the age group of 6-15 years Jain A et al<sup>10</sup>, reported prevalence of wheezing to be 10.3%. Another study by Kuehniet al<sup>11</sup> reported higher prevalence of current wheeze (12 - 26%) for Caucasian children aged 1-5 years residing in Leicestershire County, UK. However, Yolsal. et al<sup>12</sup> reported a lower prevalence of asthma (8.6%) in Edirne's city center, which was nearly consistent with our study. In Karnataka, India, a study conducted in Dakshina Kannada District of Karnataka by Narayan PP et al<sup>13</sup> reported a lower prevalence (5.2%) among school children of 10-18 years compared to our study. Another study done by Kumar S G et al<sup>14</sup> also found a lower overall prevalence of bronchial asthma (8.7%) for 12-15 years age groups.

This study revealed that, 5% of children reported with wheezy sound from chest during or after exercise; and, 21.4% children had nocturnal dry cough. However in Kumar S G et al<sup>14</sup> study about 37.5% children had aggravated symptoms of asthma during or after exercise and 54.2% children had nocturnal dry cough.

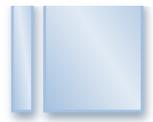
The gender of the child was not found to be associated with asthma symptoms after adjusting with other variables. Male children had an Odds Ratio of 0.51 (0.21-1.23) which was not statistically significant.

The Odds of getting disease among the exposed group was 2.32 (0.97- 5.52) compared to those who did not have hay in their house; however this result was also not statistically significant. Kumar S G et al<sup>14</sup> study done in Pondicherry, India also observed that the presence of hay in house to be an associated factor for asthma with an Odds Ratio of 9.79 (3.196-30.002). Kahwa EK et al<sup>15</sup> also identified the same among 2-17 years Jamaican children with an Odds Ratio of 4.82 (3.62 to 6.41).

Family history of asthma was found to be an associated factor for asthma symptoms among preschool children of 3-6 years age group. Children having a family history of asthma were 4.45 (1.71-11.60) times more likely to get the disease compared to those who did not have a family history of Asthma. This finding was consistent with the study by Kumar S G et al<sup>14</sup> [Odds Ratio 6.639 (1.757-25.09)]. Kahwa EK et al<sup>15</sup> also identified parental history of asthma to be an associated factor for asthma among 2-17 years Jamaican children with Odds Ratio of 4.19 (2.8 to 6.08). Nanatanda R et al<sup>6</sup> also reported similarly for 2-59 months children in Uganda with an Odds Ratio of 2.4 (1.2-4.6).

The current study pointed out that monthly income of house was an associated risk factor for asthma symptoms among preschool children of 3-6 years age group. Children of families with monthly income less than 5000 Indian Rupees (INR) were more likely to get the disease compared to those who had monthly income more than or equal to 5000 INR [Odds Ratio 3.39 (1.42- 8.05)].

Preschool children with a history of allergy in the last 12 months were also found to be at a risk of suffering from asthma symptoms. Children who had allergy in the last 12 months were 3.50 (1.25- 9.83) times more likely to get disease compared to those did not have an allergy. Similarly a study done by Nanatanda R et al<sup>6</sup> also found history of allergy in children to be an associated factor for asthma among 2-59 months



children in Uganda with an Odds Ratio of 2.6 (1.2–5.4). Gao et al<sup>16</sup> Canada, 2008 also established history of allergy as an associated risk factor for asthma [Odds Ratio 4.2 (2.9 to 6.1)]. Kahwa EK et al<sup>15</sup> identified rhinitis in the last 12 months to be an associated factor for asthma among 2-17 years Jamaican children [OR 6.92 (5.16 to 9.29)].

## CONCLUSION

The prevalence of asthma (Wheezing) was 9.2% in the past 12 months. Prevalence of asthma was found higher among 4 years age of children. There was no any significant linear association with increasing or decreasing of age and asthma symptoms. Asthma symptoms were found higher among females compared to male children. Prevalence of asthma symptoms were higher among those children who have family history of asthma, children belong to family having less household income and children having allergy in the last 12 months.

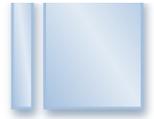
Based on our present study findings we suggest that asthma surveillance should be strengthened to map the magnitude of asthma, with emphasis on poor and disadvantaged populations. A program of continuing parent and guardians' education on childhood asthma is required. Intervention can be planned to reduce the exposure of factors associated of asthma symptoms like allergens, passive smoking, and hay in the house.

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