Medicine Section

Influence of Associated Factors in the Prevalence of Asthma: A Community Based Study in Mysore

SHIVANI RAO, SHALINEE RAO, N.C. ASHOK, TIMSI JAIN, ANURADHA R., MURALI DHAR

ABSTRACT

Background: Asthma, with an upward surge world-wide has become a chronic disease that needs more attention. Although a uniform increase has been depicted, statistics show regional differences with respect to its prevalence in India and in different parts of the world.

Aim and Objectives: This study was conducted to estimate the prevalence of known asthmatics in the rural versus urban population of Mysore, India and to identify the factors associated with its prevalence.

Material and Methods: This was a community based, cross-sectional study conducted over a period of 6 months in the rural and urban practice area of JSS Medical College, Mysore, India, to include the total population around two primary health centres (Hadinaru and Suttur) and one urban health centre. The data was collected by trained interns from each household by using a pretested proforma with a questionnaire. The results were subjected to statistical analysis by using the SPSS 12 and Epi info softwares.

Results: A total of 23280 rural subjects were studied, of which 273 were known cases of asthma. Out of 6218 urban subjects, 76 were diagnosed as asthmatics, thus showing a prevalence rate of 1.2% in both the groups. There was a significant association between the occurrence of asthma and age in the rural and urban areas. A statistical association was seen among the asthma cases in the male gender (p < 0.5). A high prevalence of asthma was seen among cigarette smokers in both the rural (4.0%) and urban (3.5%) areas. A significant association was observed between asthma and tobacco usage.

Conclusion: In order to attain a better quality of life in a chronic disease condition like asthma, one needs to be aware of its aggravating factors. The identification of the preventable exacerbating factors of asthma would help in designing control programmes to invoke the awareness on such aspects. Such a study would help in understanding the disease burden, in order to initiate health measures at a community level.

INTRODUCTION

Asthma is a respiratory disease which is caused by the increased responsiveness of the tracheo-bronchial tree to various stimuli, resulting in paroxysmal contraction of the bronchial airways. There has been a noticeable increase in the healthcare burden due to asthma globally. The prevalence and mortality from asthma have shown an upward trend during an era when quality medications are easily available for asthma [1]. The reason for this upward surge could be the role play of several factors which relate to globalization, change in lifestyles and the environment.

While this increase in the prevalence of asthma is rather global in nature, a difference does exist between the epidemiology, clinical spectrum and the management practices in India and those in west [2, 3]. Some of the differences are attributable to differences in the environmental exposures and health care infrastructure in India while others could be truly genetic or ethnic in origin. The review of literature shows a large variation in data with respect to the prevalence of asthma [4-13]. The possible reason could be the inclusion criteria which is used for defining asthma in the study population. A variety of methods have been used in epidemiological surveys to define asthma: the reports of physician diagnosed asthma, the presence of asthma symptoms such as wheezing, the combinations of asthma symptoms, objective measurements like spirometry or the use of metacholine or histamine for testing bronchial responsiveness [14-16].

Clinically diagnosed asthma in adults has been reported to be 2.7 to 4.0% in most of the European countries, while in England and US, it amounts to 12% and 7.1 respectively [4, 9-11]. In Australia, the prevalence is comparatively high (9.5 to 17.9%) [4, 6]. Tristan da Cunha is a distinct example where more than half the population (56%) are asthmatics, thereby supporting a strong genetic association [12]. In a study done by Aggarwal et al the prevalence of asthma was found to vary from 4.3%–6.9% in the Indian population [17].

OBJECTIVES OF THE STUDY

With the above background information, the present study was conducted with the objectives of estimating the prevalence of known asthma in the rural versus urban population of Mysore, India and to study the factors which were associated with its prevalence.

MATERIAL AND METHOD

The present study was a community based, cross- sectional study which was conducted in the rural and urban practice area of JSS Medical College, Mysore, India, which included the total population around two primary health centres

(Hadinaru and Suttur) and one urban health centre. This survey was conducted over a period of 6 months from May 2008 to October 2008.

Consent was obtained from the participating subjects after the purpose of the study was explained to them. The data was collected by trained interns from each household by using a pretested proforma. The questionnaire was aimed at collecting information on known cases of asthma and also on the demographical and environmental exposure factors which influence the prevalence of asthma.

The collected data was subjected to statistical analysis by the use of the SPSS for Windows, version 12 and Epi info softwares.

RESULTS

The population covered was 29,498, out of which 23,280 subjects belonged to rural areas and 6218 were from urban areas. There were 15103 males, of which 11983 belonged to rural areas and 3120 were from urban areas. Out of 14399 females, 11299 were from rural areas and the rest of the 3100 were urbanites. Out of the 23280 total rural subjects, the known cases of asthma were 273 and out of the 6218 urban subjects, 76 were diagnosed as asthmatics, which reflected a prevalence rate of 1.2% in both the groups as shown in [Table/Fig-1].

The prevalence of known asthmatics was found to increase as the age increased, in both the rural and urban areas. Out of the 3028 rural subjects, 166 (5.5%) and out of the 587 urban subjects, 33 (5.6%) were asthmatics and they were above 55 years of age. There was a significant association between the occurrence of asthma and increasing age in the rural and urban areas, as shown in [Table/Fig-2].

Among the 11983 males in the rural areas, 170(1.4%) were known asthmatics, while 40(1.3%) of the 3120 males in the urban areas were asthmatics. The prevalence was lower among rural females in both the urban and rural areas. Out of the 11299 females in the rural areas, about 103(0.9%) suffered from asthma, whereas out of the 3100 females in the urban areas, 36(1.2%) were known asthmatics. A statistical association was seen among the asthma cases with respect to gender in the rural areas (p < 0.5), as shown in [Table/Fig-3].

A high prevalence of asthma was seen among cigarette smokers in both the rural and urban areas. Out of the 2105 rural subjects, 84 (4.0%) were asthmatics and out of the 549 urban subjects, 19 (3.5%) were known asthmatics. When assessed according to the occupation, the prevalence was found to be high among retired personnel, which was 6.3% among the rural subjects and it was 5.3% in the urban retired groups, as shown in [Table/Fig-4].

The prevalence of asthma with respect to the usage of tobacco among the 2105 rural subjects showed 84 (4.0%) of them to be asthmatics and out of the 549 urban subjects, 19 (3.5%) were affected by the disease. There was a significant association between asthma and tobacco usage (p<0.5), as shown in [Table/Fig-5].

DISCUSSION

Asthma has been recognized lately as a disease which results in increased morbidity and mortality. The magnitude of the problem of asthma has not been defined with certainty, in spite of several epidemiological studies conducted in various regions the world over. Indeed, studies on the prevalence of bronchial asthma lack consistency, possibly because of ill-defined diagnostic criteria, non-standardized study protocols, different methodologies, environmental exposures and the healthcare infrastructure. These

| Residence | No. of subjects | Asthmatics | |
		Number	Prevalence rate (%)
Rural	23280	272	1.2
Urban	6218	76	1.2
Total	29498	349	1.2

[Table/Fig-1]: Prevalence rate (%) of known asthma according to residence (urban/rural)

| Age (years) | Rural | | | Urban | | |
	Total no of subjects	Total no of asthmatics	%	Total no of subjects	Total no of asthmatics	%
0-14	5160	5	0.1	1510	3	0.2
15-34	8938	18	0.2	2598	12	0.5
35-54	6208	84	1.4	1523	28	1.8
55 & above	3028	166	5.5	587	33	5.6
p value	<.05			<.05		

[Table/Fig-2]: Prevalence rate (%) of known Asthma according to age

| Sex | Rural | | | Urban | | |
	Total no. of subjects	No. of asthmatics	%	Total no. of subjects	No. of asthmatics	%
Male	11983	170	1.4	3120	40	1.3
Female	1129	103	0.9	3100	36	1.2
pvalue	<.05			>0.5		

[Table/Fig-3]: Prevalence rate (%) of known asthma cases with respect to gender

Occupation	Total No.	No. of asthmatic rural	%	Total No.	No. of asthmatic urban	%
Farmer	3534	72	2.0	34	1	2.9
Labourer	4539	62	1.4	1010	13	1.3
Office job	739	6	0.8	623	9	1.4
Shop keeper	241	4	1.7	320	3	0.9
Vendor, driver	724	12	1.7	593	11	1.9
Student	5465	7	0.1	1624	2	0.1
Housewife	5970	62	1.0	1401	20	1.4

[Table/Fig-4]: Prevalence rate (%) of known Asthma according to occupation

| Tobacco use | Rural | | | Urban | | |
	Total no. of subjects	No. of asthmatics	%	Total no. of subjects	No. of asthmatics	%
Yes	2105	84	4.0	549	19	3.5
No	21177	189	0.9	5671	57	1.0
p-value	<.05			>.05		

[Table/Fig-5]: Prevalence rate (%) of asthma and its association with tobacco usage

have made international and even national comparisons difficult, which incidentally also has significant ethnic and regional variations. In fact, even our study was questionnaire based and not a clinical examination to assess the nature of asthma, as to whether it was bronchial or cardiac in nature. We included all known cases of asthma and no work-up was done to subcategorize the disease.

In the present study, there was no significant difference in the rural and urban populations, which was 1.2% in both the groups, a value which was lower than the documented national prevalence of 4.3-6.9% as was reported by Aggarwal et al in their study [17]. However, our assessment rate was close to an earlier estimate of 2.78% which was reported three decades ago in an urban population of India [18]. A similar study which was done among adults in Jaipur district of Rajasthan (region in northern India) on 8863 respondents found 0.96% of them to be asthmatics [19]. Aggarwal et al highlighted regional differences with respect to the prevalence of asthma in their study. In their study, the prevalence was lower in Delhi (1.69%) as compared to Bangalore (3.4%) [17].

Few studies on asthma which were conducted in few districts of Karnataka showed a relatively high prevalence rate. In a study which was conducted in three schools in Subramanya, a rural district of Karnataka, the prevalence of ever wheezers was found to be 8.4% [20]. Paramesh et al did a hospital based study in the city of Bangalore on 20,000 children under the age of 18 years, for the specific years 1979,1984,1989,1994 and 1999, which showed an upward trend in the prevalence (9%, 10.5%, 18.5%, 24.5% and 29.5% respectively). The increased prevalence correlated well with the demographic changes of the city. Other causative agents which are implicated are pollen grains, fungal spores, dust mites, insect debris,animal epithelia and several environmental factors like poor housing conditions, dust mite and bed dust allergy. Unfavourable occupations can be a high risk factor for asthma, such as stone crushing. A high asthma rate was found among children who worked in the Sivakasi fire works industry [21-22].

Variations in the prevalence rates, which are reported by different studies, are often due to the differences in the methodologies which are employed, the definitions which are used for the diagnosis of asthma and environmental factors. The other possible reason for the low prevalence in our study could be that the subjects were not disclosing the true facts. Some respondents probably had the disease and were taking medication for it but probably did not know the actual name of the illness. In fact, a similar study which was conducted in the United Arab Emirates (UAE), found that the patients were not aware of the true name of the disease and only knew it as allergy, as the term "asthma", which in Arabic meant acute severe problem. Hence, in the UAE, clinicians prefer to use the term 'allergy', to make it more suitable for the patients [23]. Since the present study was based only on known cases of asthma, our data included patients who were aware of and gave information that they were clinically diagnosed and were started on the treatment for asthma. Though the industralization in Mysore may not be similar to that of Bangalore, the climatic conditions of Mysore and Bangalore are almost similar. Hence, we had expected a higher rate of prevalence as shown by Aggarwal et al in their study [17]. This low prevalence (1.2%) which was projected in our study suggests that several other measures also need to be implemented to screen and diagnose the asthma cases in the community, in order to reflect a true burden of the disease.

A positive association was seen between asthma and increasing age in the rural and urban areas. The data of the present study showed an increased prevalence of asthma in subjects who were aged 55 years and above. The finding was similar to the result obtained by Aggarwal et al in their study [17]. Though our study did not differentiate between bronchial asthma and cardiac asthma, cardiac asthma was found to be more common in the older age group. So, probably there might have been few patients who had

been suffering from cardiac asthma which might have increased the overall prevalence of asthma in this age group. As compared to the rural areas, the prevalence was higher among the urban educated class, either due to a better awareness of the disease or pollution in urbanized environment. A gender difference was noticed in this study, with males being affected more than the females. Since this was a questionnaire based survey, it was important that the individual subject be aware of the disease and gave the right information. Ignorance about the disease could result in the missing out of the true cases and it could falsely project a low prevalence rate in such questionnaire based studies. The prevalence of asthma was low among rural women (0.96%) as compared to the men (1.4%), probably due to the lack of knowledge regarding the presence of the disease.

Tobacco smoking emerged as a significant risk factor in our study population. There are conflicting data with regards to the relationship between tobacco and asthma. Active smoking was observed to have an association with bronchial asthma by few studies, while other studies showed no correlation [4, 23,24, 25, 26, 27]. Few studies have demonstrated environmental tobacco and smoke exposure as the reasons for the development of asthma, as well as for the aggravation of its symptoms [28, 29].

Asthma has affected about 300 million people worldwide. It can largely affect the physical, social, emotional, and professional lives of asthmatics and their families [29]. Regardless of the region/ country, to address this problem, the identification of individuals with asthma has to be done first. A fully focused study with well-equipped infrastructure would further help in assessing the prevalence of the two distinct subgroups of asthma, bronchial and cardiac. The education of the patients and community based interventions constitute important tools in asthma control. Adequate information on the avoidance of the risk/triggering factors is an important subject that needs to be discussed with the patients.

CONCLUSION

The present study is the first epidemiological study on this subject in Mysore. This study highlights that it is essential to expand the health care services and the screening process for the diagnosis and treatment of asthma. Undiagnosed asthma may pose a considerable health burden to the community. Community asthma control programme should be provided to highlight the role of tobacco smoking and its occurrence and also to create an awareness about the diagnosis of asthma and its treatment. A better level of awareness in the community regarding the symptoms of asthma and its aggravating factors and its complications, would result in a better quality of life in patients with a chronic disease like asthma. This study lays the foundation for future research in asthma in the region of Mysore.

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AUTHOR(S):

1. Dr. Shivani Rao
2. Dr. Shalinee Rao
3. Dr. N.C. Ashok
4. Dr. Timsi Jain
5. Dr. Anuradha R.
6. Dr. Murali Dhar

6. Assistant Professor (Biostatisttics),
   Department of Community Medicine,
   JSS Medical College, Mysore, India

PARTICULARS OF CONTRIBUTORS:

1. Corresponding Author.
2. Associate Professor, Dept of Pathology,
   SRMC & RI Chennai, India.
3. Professor and Head, Department of Community Medicine,
   JSS Medical College, Mysore, India.
4. Assistant Professor, Dept of Community Medicine,
   Saveetha Medical College, Chennai, India.
5. Assistant Professor, Dept of Community Medicine,
   Saveetha Medical College, Chennai, India.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr . Shivani Rao
Assistant Professor, Dept of Community Medicine,
Saveetha Medical College, Chennai
Email: docshivani@sify.com
Phone: 08144365176