Original Article

A community-based cross-sectional study on knowledge, attitude, and perceptions about asthma among healthy adults in rural South India

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Abstract

Background: Evidence suggests that proper knowledge and perceptions about asthma result in a positive correlation with compliance with medications and regular medical follow-up. Assessing the level of knowledge, attitude, and perception (KAP) in the community is essential for planning public health interventions. There is a lacuna on community-based KAP study on asthma in rural India, as most of the existing evidence is from hospital-based studies in an urban setting. **Methods:** We interviewed 280 healthy adults from 14 villages in South India using the Chicago community asthma survey-32 (CCAS-32) questionnaire. We noted the frequency distribution of responses to the questions and scored KAP on symptoms, triggers, and treatment, and performed bivariate and multivariate analyses. **Results:** The mean age was 37.7 years ranging from 18 to 62 years. Almost half of them (47%) had primary or middle school education. 40.7% and 57.9% believed severe headache and tightness of chest were symptoms of asthma, respectively. Similarly, 38.2% and 48.4% thought asthma was a hereditary and contagious disease, respectively, whereas 41.8% of perceived asthma medications could be addictive. Having witnessed "patients with asthma" was associated with KAP on symptoms and triggers while younger age and having a relative with asthma were associated with KAP on treatment independently. Participants who had relatives with asthma were three times [(OR 3.04; 95% (1.5–6.1)] more likely to have good KAP compared to their counterparts. **Conclusion:** Asthma knowledge and perceptions are sparse in rural India. Adequate investments in public awareness are the need of the hour.

Keywords: Asthma, community, KAP, perception of asthma

Introduction

Chronic respiratory diseases (CRD), including asthma, is a frequent public health problem with high prevalence and mortality rates across the world, especially in developing countries.[1,2] Worldwide, it is estimated that asthma alone accounts for the loss of approximately 15 million disability-adjusted life years (DALYs) and 180,000 deaths annually, representing about 1% of the total global disease burden; its prevalence has been increasing by approximately 50% every decade.[3] Recent studies in India show a prevalence of 2.38–2.82% among adults, similar rates in rural and urban populations.[4,5] However, the rates are higher among children 2.3–5.14% and adolescents 3.3–13.1%.[6-9] These were similar across age groups when compared with data across the globe.[10,11] Phase 3 of ISAAC study and recent studies revealed

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that the prevalence of asthma among children had reached a plateau phase in western countries compared to African and Asian countries where the numbers are still increasing.[12,13] The plateau phase could be explained by the increasing awareness and knowledge in developed countries compared to other developing countries.

Studies show that proper knowledge and perceptions about asthma positively correlate with compliance with medications, regular medical follow-up, and excellent outcomes.[14] Asthma is better self-managed by people with adequate knowledge and sound perceptions.[15] Studies have shown that proper knowledge and better health literacy in parents reflected on reasonable asthma control in children, a better quality of life, mobility, and decreased emergency room visits for asthma management.[16,17] In a hospital-based study done in a metropolitan city, 39% of parents accepted Asthma diagnosis, but only 3% understood what asthma meant; 26% of them reported asthma as a contagious disease.[18] Most studies done in India were hospital based. We aimed to describe people's perception of asthma and assess the knowledge of symptoms, triggers, and treatment of asthma among the general population in rural areas in Tamil Nadu, India, to plan effective disease management programs.

Methods

Study population

We conducted a cross-sectional survey at the Rural Unit of Health and Social Affairs (RUHSA), Christian Medical College, Vellore, RUHSA is one of the outreach community health divisions of Christian Medical College, located in K. V Kuppam rural development block. It is one of the 21 blocks in Vellore District, Tamil Nadu, India serving a catchment population of approximately 130,000. The study site population was primarily agrarian with an average adult literacy rate of 70%, for males 77% against 63% for females.[19] We recruited men and women more than 18 years of age, excluding those known to have a psychiatric illness, dementia from the sampling frame. The sample size was calculated to be 280, using a relative precision of 20%, a design effect of 1.2, and anticipated adequate knowledge of asthma of 30% among the population.[18] We followed the two-stage cluster sampling method. Of the 90 villages (cluster) in the block, we chose 14 villages purposely within a distance of 10 km from RUHSA health center for easy access. We randomly selected 20 households from every cluster, using the list of households in the population census database maintained by the RUHSA health information system. We interviewed from each household one adult who is more than 18 years of age.

Survey instrument

We used a semi-structured questionnaire that contained questions on sociodemographic characteristics and validated the Chicago community asthma survey-32 (CCAS-32) tool to assess KAP on Asthma.[20,21] The CCAS-32 questionnaire consists of 21 dichotomous items ("true/false" or "yes/no") and 11 Likert-scale items (A scale of 1–5, 1 being never true and 5, always true). The CCAS-32 tool throws insight into asthma's various domains, such as asthma symptomatology, diagnosis-related stigma, disease severity, barriers to treatment, concerns regarding the quality of life, using health care facilities, etc. The dichotomous items capture the knowledge levels, and the Likert-scale items obtain attitudes and perceptions.[22] It has an excellent discriminative validity to differentiate between groups with unique asthma-related KAP.[21,23] The principal investigator administered the questionnaire to all the participants at their homes.

Data quality assurance

The tool was modified to be specific to the context and translated into Tamil, the local vernacular language, by two different people well versed with the local dialect. A back translation was done to English to ensure accuracy and piloted. We finalized it after the necessary modifications. The co-investigators supervised a sample of the interviewing process to eliminate interviewer bias.

Statistical analysis

We entered the data into Epi-info version 7.0 developed by Centre for Disease Control and exported it to the Statistical Package for Social Services Version 17.0 for analysis. A frequency count summarized each specific item from the questionnaire. Likert-scale items converted to true/false items are as follows: False (1 - never true; 2 - rarely true; 3 - sometimes true) and True (4 - often true; and 5 - always true). We studied the frequency distribution of responses to questions concerning knowledge, attitude, and asthma perception. We considered KAP of asthma symptoms, triggers, and treatment individually and an overall KAP of Asthma, as outcome variables. The maximum score obtained in each domain was 5, 7, and 10, respectively. The study considered sociodemographic characteristics such as age, occupation, education, proximity to the health center, and having family members with asthma as exposure variables. An independent "*t*" test was performed to look for the mean score difference in these domains. The maximum score obtained on overall KAP on Asthma was 22, and the scores ranged from 0 to22 were classified into three levels based on Bloom's cut off point (High: 80–100%, Moderate: 60–79%), Low: 0–59%). A score above 60% was considered the right level of knowledge, a positive attitude, and good practice. We performed a Chi-square test, to test the significance of the association between good and poor KAP and exposure factors such as age, gender occupation, education, socioeconomic status, proximity to RUHSA, having family members with asthma and having seen a patient with asthma.

We performed a multivariate regression analysis to ascertain the exposure factors independently associated with KAP in different domains (symptoms, triggers, and treatment) of asthma. Variables with a P value ≤ 0.20 in the bivariate analysis entered into the final model were of a significant outcome. Similarly, we performed logistic regression to identify the

factors independently associated with categorized overall KAP of Asthma as a binary variable. The study could find statistical significance at a 95% CI and *P* value < 0.05. We looked at variance inflation factors to assess collinearity between variables. Multicollinearity is presumed if VIF is greater than 10. We used the Hosmer-Lemeshow test to see model fitness at *P* value > 0.05.

Ethical consideration

We conducted this study as a needs assessment for providing service as a part of the ongoing outreach service of RUHSA and approval was obtained from research committee in RUHSA. After informing the purpose, benefits, risks, information confidentiality, and voluntary nature of participation in the study, we obtained community consent before data collection. We took the written informed consent from the participants before the interview. Data was accessed only by the investigators to ensure confidentiality. Respondents were informed that they had the right to refuse or stop at any point in the interview.

Results

Sociodemographic characteristics of the study population

We surveyed 280 participants with a 100% response rate. About 52% of the participants were women. The mean age was 37.7 years and ranged from 18 to 62 years. Almost half of them were only educated until primary or middle school (47%), and 11% did not have any formal education. One third (34.3%) of them were not employed, 14.6% were unskilled workers such as agricultural laborers, construct ruction workers, and few were professionals (3.2%). Thirty-four percent of them belonged to the lower and lower-middle socioeconomic category. Sixteen participants (5.7%) reported that they were either diagnosed with asthma or were currently taking asthma medications. Compared with participants without asthma, individuals with asthma (diagnosed or treated), there was a significant statistical difference in education and occupational status. [Table 1]

Table 1: Demographic characteristics of all participants and those with asthma

Characters	All (*n*=280) *n* (%)	Diagnosed or treated Asthma (*n*=16) *n* (%)	No asthma (*n*=264) *n* (%)	*P*
Gender				
Male	146 (52.1)	9 (56.2)	125 (47.3)	0.4
Female	134 (47.8)	7 (43.8)	139 (42.7)	
Age				
18-30	98 (35)	5 (31.2)	93 (35.2)	0.73
31-40	70 (25)	4 (25)	66 (25)	
41-50	56 (20)	2 (12.5)	54 (20.4)	
51-60	55 (19.6)	5 (31.2)	50 (18.9)	
>60	1 (0.4)	0	1 (0.4)	
Education				
Not educated	31 (11.0)	1 (6.2)	30 (11.3)	0.03
Primary school	17 (6.0)	4 (25)	13 (4.9)	
Middle school	115 (41.0)	8 (50)	107 (40.5)	
High school	52 (18.5)	2 (12.5)	50 (18.9)	
Diploma	38 (13.5)	0	38 (14.3)	
Graduate/Post graduate	22 (7.8)	1 (6.2)	21 (7.9)	
Professional	5 (1.7)	0	5 (1.8)	
Occupation				
Not employed	96 (34.3)	3 (18.7)	93 (35.2)	0.02*
Unskilled worker	41 (14.6)	3 (18.7)	38 (14.3)	
Semi Skilled	41 (14.6)	7 (43.7)	34 (12.8)	
Skilled	46 (16.4)	0	46 (17.4)	
Clerical, shop keeper, Farmer	32 (12.1)	2 (12.5)	34 (12.8)	
Semi- Professional	13 (4.6)	1 (6.25)	12 (4.5)	
Professional	9 (3.2)	0	9 (3.4)	
Socio economic status				
Lower	8 (2.9)	1 (6.25)	7 (2.65)	0.61
Lower Middle	88 (31.4)	7 (43.7)	81 (30.6)	
Upper lower	97 (34.6)	5 (31.2)	92 (34.8)	
Upper Middle	75 (26.8)	3 918.7)	72 (27.2)	
Upper	12 (4.3)	0	12 (4.5)	
Proximity to the health center				
Far (>5 km)	140 (49)	7 (43.7)	133 (50)	0.62
Near (<5 km)	140 (50)	9 (56.3)	131 (50)	

*Significant *P*.

Knowledge and perception of asthma

A substantial number (40.7%) of participants thought severe headache, and 57.9% believed tightness of chest were asthma symptoms. Ninety-one percent thought shortness of breath was a symptom of asthma. The majority of them (82.1%) believed that people with asthma could not exercise or play hard, 38.2% and 48.4% believed asthma was a hereditary and contagious disease, respectively. More than half of the participants (58.9%) thought asthma is an emotional disease, and there was a statistical difference in this belief among men and women (65% vs. 52.2%). Regarding perceptions about medications, 41.8% of the participants believed that asthma medications could be addictive, with no statistical difference among men and women. [Table 2]

Determinants of KAP about asthma in symptoms, triggers, and treatment domains

The participants had a mean score of 3.4 +/1.1, 3.3 +/1.6, 5.0 +/2.3 in KAP on symptoms, triggers, and treatment domains, respectively. Participants who were highly educated (3.67 vs. 3.34), professionals, or had skilled vocation (3.5 vs. 3.45), those had relatives with asthma (3.83 vs. 3.4) and seen asthma patients (3.7 vs. 3.0) had significantly higher mean scores compared to their counterparts in symptoms domain.

Similarly, socioeconomic status and occupation, having a relative with asthma, and witnessed asthma patients were significantly associated with KAP on triggers, whereas age and having a relative with asthma were significantly associated with KAP on treatment.

In multivariate analysis, having witnessed patients with asthma was independently associated with KAP on symptoms and triggers. Younger age and having a relative with asthma were independently associated with KAP on the treatment of asthma. [Table 3]

Overall KAP about asthma

More than one third (65%) of the participants had a low score in overall KAP on asthma, and very few of them had obtained a high score (6.1%). We dichotomized the scores and found that 35% of the participants had good KAP. Excellent knowledge, positive attitude, and good practices were associated with those who

Table 2: Knowledge on symptoms, beliefs and perception of asthma

	All	Male (146)	Female (134)	*P*
Symptoms - Is this a sign of asthma?				
Shortness of breath	255 (91.1)	134 (91.7)	121 (90.2)	0.59
Tightness of chest	162 (57.9)	82 (56.1)	80 (59.7)	0.54
Cough at night	237 (84.6)	121 (90.2)	116 (92)	0.39
Wheezing after exercise	243 (86.8)	128 (87.6)	115 (85.8)	0.64
Severe headache	114 (40.7)	58 (39.7)	56 (41.7)	0.4
Beliefs and perceptions				
Asthma can be cured	202 (72.1)	108 (73.9)	94 (70.1)	0.4
Asthma is a hereditary disease	107 (38.2)	51 (34.9)	56 (41.7)	0.23
Asthma is a contagious disease	135 (48.4)	77 (52.7)	58 (43.2)	0.1
People with Asthma can't exercise or play hard	230 (82.1)	120 (82.1)	110 (82)	0.9
Asthma is mainly an emotional disease	165 (58.9)	95 (65)	70 (52.2)	0.02*
Asthma is an important reason for school absences	96 (34.2)	59 (40.4)	37 (27.6)	0.02*
Asthma is a serious health problem in India	166 (59.3)	94 (64.3)	72 (53.7)	0.21
Asthma care is expensive	155 (55.4)	78 (53.4)	77 (57.4)	0.3
Asthma medications could be addictive	117 (41.8)	61 (41.7)	56 (41.7)	0.7

*Significant *P*.

Table 3: Multivariate regression analysis on factors associated with knowledge, attitude and practice on symptoms, triggers and treatment

Variable	KAP on symptoms			KAP on triggers			KAP on treatment		
	Parameter estimate	95% CI	*P*	Parameter estimate	95% CI	*P*	Parameter estimate	95% CI	*P*
Intercept	1.92			1.18			2.90		
Age							-0.68	-1.22, -0.13	0.01*
Gender							0.31	-0.20, 0.84	0.2
Education	0.22	-0.06, 0.51	0.12						
Occupation	-0.10	-0.39, 0.19	0.5	-0.21	-0.63, 0.2	0.31			
Socio economic status	0.32	-0.02,0.66	0.06	0.53	0.08, 0.99	0.02*			
Distance	-0.11	-0.37, 0.15	0.4				0.45	-0.70, 0.98	0.09
Having seen asthma	0.61	0.33, 0.89	<0.001*	0.77	0.37,1.17	<0.001*	0.18	-0.38, 0.75	0.51
Relatives with asthma	0.12	-0.23, 0.48	0.4	0.46	-0.44, 0.97	0.07	1.36	0.65, 2.07	<0.001*
Model R^2	0.097			0.09			0.07		

*Significant *P* value

witnessed patients with asthma first hand and having asthmatic relatives in bivariate analysis. Patients who had relatives with asthma were three times [OR 3.04; 95% (1.5–6.1)] more likely to have good knowledge, positive attitude, and good practice on asthma when compared to their counterparts [Table 4].

Discussion

Studies published so far, about the knowledge and perceptions of asthma and epidemiology from India, were all single tertiary care center-based studies mostly done among patients with asthma or family members.[5,7,18] To our knowledge, there are no community-based KAP studies from India to date. Based on the earlier hospital-based KAP studies, it is evident that the knowledge about asthma is generally poor.[5,18] It is surprising that one-third of our study population had poor knowledge, negative attitudes, and bad asthma perceptions. This finding corroborates with the evidence from a population-based study done in Zambia.[24]

We also found that many of our participants had several misconceptions. We found that one in 10 person did not think wheezing, chest tightness, or shortness of breath were Asthma symptoms. Only two of the entire study population did not know what asthma was, suggesting that most of our patients have heard the term "asthma." Although these findings do not appear alarming, few other findings were a cause for concern. Many of our participants had few misconceptions that asthma was contagious (48%) and that asthma was an emotional disease (58.9%). This finding concorded with a study done in Chennai among parents of asthmatics in 2005, which showed that only 35% of parents thought asthma was hereditary. However, only a quarter of them thought asthma was contagious as against the majority in our study. The possible reason for less proportion of them having a misconception on asthma could be the study was done in a metropolitan city in a hospital setting and involved parents with an asthmatic child. Although this study did not mention those participants' educational status, we could assume it is probably high considering the urban setting.[1] A study done in Chandigarh among parents of asthmatic children in 1995 showed that 34.1% thought asthma was contagious, which was still lower than in our population.[25] The disparity in knowledge has remained the same over 25 years, although the former was an urban population with exposure to asthma patients. Poor knowledge and negative attitude can affect suboptimal management of the disease and impact the quality of life.[22,26]

A study done among the general public of Punjab confirmed that 84% of people consider using inhalers to be a social stigma, and 93% preferred oral medications to inhalers.[27] Similarly, a study done in Kerala found that more than 48% of asthma patients do not prefer inhalers because of stigma and addictive nature. Most people prefer home-based natural remedies for asthma.[28,29] Our findings again similar to evidence from Kerala as we found more than 41% of the participants felt asthma medicines were addictive

Almost three fourth of our population thought asthma was curable, compared to 30% in Chandigarh. This wide variability was probably because of a general awareness of the fact that asthma symptoms are only intermittent. In current literature, there is a considerable disparity of correct knowledge between cities and villages; between hospital visiting crowd and the community.[5,18,26] This concurs with our findings. A significant proportion of our population thought asthma medications were addictive. Using the same instrument (CCAS 32), a study done in Zambia found that 37% of respondents thought MDIs were addictive.[24] An Indian study from Patiala reported that 38% of the participants thought inhalers were addictive.[30]

A lower proportion (31%) of our study patients thought inhalers are the mainstay treatment for asthma compared to 46% in the Zambia study and 74%. However, the Zambia study was a hospital-based study done among bystanders. There is a chance they could have had better health awareness because of hospital exposure. The educational status of our population was comparable to the Zambia population.[24]

A multicenter asthma KAP study done in China among parents of asthma children revealed a significant association between parents' education and asthma KAP.[14] Our study showed a significant association between asthma KAP on triggers and socioeconomic status. This finding suggests that better socioeconomic status can lead to better knowledge acquirement and, eventually, a healthy family.

A US-based study among asthmatics revealed that younger and more educated patients had higher asthma knowledge. Also, more the knowledge, they had a better quality of life than those who had poor knowledge.[17] In our study, we found similar results in KAP related to treatment. This association is a promising finding for the future as the KAP may improve when the current younger generation becomes a significant part of society.

We had exciting findings that having seen asthma was independently associated with better KAP scores related to symptoms and triggers. Similarly, having an asthmatic relative significantly increased the overall KAP and KAP on treatment. This improvement could be because of better knowledge attained by close observation. Asthma is a common disease, and people may come across asthmatics in their daily life. There is a good chance of better knowledge of asthma if an immediate family member has asthma. Inhalers are considered costly and are not available in most state-run hospitals. Most patients choose tablets and other remedies for this reason. This pattern is also reflected in our study in that most patients consider other forms of medications better than MDIs for treatment.

Table 4: Independent factors associated with overall KAP on Asthma

Factors	Adjusted OR	95% CI	*P*
Socio economic status (Low*/High)	1.33	0.78-2.2	0.28
Have seen asthma (No*/Yes)	1.57	0.93-2.65	0.08
Relatives with asthma (No*/Yes)	3.04	1.51-6.1	0.002**

*Reference value, **Significant *P*.

While most of our findings regarding knowledge and perception are comparable with studies across the globe, we found something unique that was participants with asthmatic relatives had higher odds of having good KAP compared to their counterparts.

The strength of our study was that it was done directly in the community among the general public. Our study was the first-of-its-kind on this topic in India. It has highlighted that there is very little change in the prevalence of good asthma KAP scores over the years compared to some of the earlier Indian studies. Directly witnessing an asthma patient or relative and interacting with them seem to improve the community's asthma knowledge. However, the lack of prior data from our study population made the comparison less accurate, as to the extent of improvement since before, within our population. The vernacular (Tamil) version of the study tool was not validated, which could have led to information bias.

Most of the rural population live in India and primary care physicians are the backbone of public health, especially in the rural setting. It is essential that primary care physicians are equipped with right information regarding asthma and disseminate the same in the community. They should utilize every encounter with a patient for such health education sessions. We also believe that findings our study will also help the primary care physicians in counselling a patient regarding prevention and appropriate treatment regimen for asthma.

Conclusion

Our study shows that asthma knowledge and perceptions are still inappropriate in India, despite improved literacy and health care availability across the country. Knowing a person with diagnosed asthma had led to better knowledge and correct perceptions of the disease. Many people from the rural population still have wrong perceptions about inhalers, that they are addictive. Such wrong perceptions could lead to poor medication compliance and inappropriate preference for oral or parenteral steroids. Better investments in health education in school curriculums and public awareness campaigns are the need of the hour to improve knowledge, attitude, and perception in the future.

Compliance with ethical standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

All Informed consent was obtained from all individual participants included in the study

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Conflicts of interest

Jefferson J Leeberk R, Sam Jenkins, Prashanth HR, Rita Isaac do not declare that they have no conflict of interest.

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