

Resurvey of symptomatics of the Jaipur district population and suggestion for alternative diagnostic criteria of asthma for epidemiological surveys

Prahlad Rai Gupta, Ankit Bansal¹, Anupam Singh

Department of Respiratory Medicine, NIMS Medical College and Hospital, ¹Consultant, Respiratory Medicine, Fortis Hospital, Jaipur, Rajasthan, India

ABSTRACT

Introduction: The prevalence of asthma in Jaipur district of Rajasthan was reported as 0.96% in an earlier survey. It was far below the national average of 2.38%. It was reasoned then that this could be due to under diagnosis of asthma in the Jaipur population. **Material and Methods:** A resurvey of the symptomatics, not diagnosed as asthma at time of the original survey was, therefore, undertaken. The resurvey data were analysed and those who now fulfilled the twin criteria for diagnosis of asthma, as used in the original survey, were diagnosed as having asthma. The original data of these newly diagnosed asthma patients were reanalyzed in search for an alternative diagnostic criterion. **Results:** Of the 382 symptomatics, 344 (90%) could be resurveyed and of them, 85 now fulfilled the twin diagnostic criteria for asthma. The reanalysis of the original survey data of these patients revealed that presence of shortness of breath (SOB) had the highest sensitivity, the presence of allergic symptoms in self or the family had the highest specificity and the presence of wheezing had the highest odds ratio (OR) for diagnosing asthma. Further, the OR for diagnosing asthma increased further and was highest with the presence of SOB and 2 additional symptoms. With the use of the “symptom criteria” for diagnosis of asthma i.e. the presence of SOB with 2 additional symptoms, it would have been possible to diagnose majority of the missed cases at the time of the original survey itself. **Conclusions:** Based on this study data it can be concluded that (a) the twin criteria for diagnosing asthma as used in earlier surveys led to under diagnosis of asthma and (b) the use of symptom criteria alone effectively checks the problem of under diagnosis of asthma. The symptom criteria are being suggested as an alternative method for use in future epidemiological surveys on asthma.

KEY WORDS: Asthma, resurvey, symptomatics

Address for correspondence: Dr. Prahlad Rai Gupta, A-66, Subhash Nagar Shopping Centre, Jaipur - 302 016, Rajasthan, India.
E-mail: drprgupta52@hotmail.com

INTRODUCTION

A nationwide survey has revealed that about 2.38% of Indians suffer from asthma.^[1] However, in a simultaneously conducted field study, using the same methodology and criteria for diagnosing asthma, Gupta and Mangal^[2] found that the prevalence of asthma was only 0.96% in Jaipur district of Rajasthan, far below the national average. This

was in spite of the fact that the prevalence of one or more respiratory symptoms in the Jaipur study population was similar to the national figures (5.3% V/S 4.3-6.9%). It was then reasoned that the difference in asthma prevalence in the two parallel studies could be due to under diagnosis of asthma in the Jaipur population.^[2] Longitudinal surveys are the most effective epidemiological tools to solve such issues.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Gupta PR, Bansal A, Singh A. Resurvey of symptomatics of the Jaipur district population and suggestion for alternative diagnostic criteria of asthma for epidemiological surveys. Lung India 2016;33:32-5.

Access this article online	
Quick Response Code: 	Website: www.lungindia.com
	DOI: 10.4103/0970-2113.173053

Further, Gupta *et al.*,^[3] in a recent study have exploited the natural history of asthma, albeit in a different context and have reported that asthma can be safely diagnosed if a respondent answers affirmatively, both to the presence of (a) shortness of breath at any time and (b) at least 2 of the other symptoms namely: i) Wheezing, ii) Chest tightness, iii) Seasonal variation, iv) Dust allergy, v) skin allergy, vi) nasal allergy, vii) eye allergy and viii) family H/O allergy/asthma.

This study was, therefore, undertaken to find out whether asthma was actually under diagnosed in Jaipur district population, in the form of a resurvey of symptomatics of the original survey while using the twin criteria for diagnosis of asthma^[1,2] and also to find out whether the problem of underdiagnosis, if any, could have been checked with the use of symptom criteria as suggested by Gupta *et al.*,^[3] in the form of a reanalysis of original survey data. The findings of the resurvey and reanalysis of the original survey data are being presented in this paper.

MATERIALS AND METHODS

The resurvey of the symptomatics not diagnosed as asthma in the original survey was carried out in the year 2013. The material and methods used in the resurvey were essentially similar to those used in the nationwide study and the Jaipur survey.^[1,2] It consisted of the following steps:

1. The filled in questionnaire forms of the symptomatics of the original survey, not diagnosed as asthma, were sorted out.
2. A field worker, initially trained in data collection, visited the house holds of these subjects along with the old filled in questionnaire form.
3. Interview was conducted face to face in privacy and in the homes of the respondent.
4. The data of the resurvey were filled in at the side of the original data in the same form by the field worker, but now in red ink.
5. Randomly, about 5% of the subjects of these re-filled in forms were re-interviewed telephonically by a supervisor, to verify the data collected by the field worker. In case of discrepancy, the supervisor visited the subject for a face to face interview for the final data collection.

The data so collected were analyzed. Asthma was diagnosed if the respondent answered affirmatively, both to (a) wheezing or whistling sound from chest or chest tightness or breathlessness in morning and (b) having suffered from asthma or having an attack of asthma in the past or using inhaled or oral bronchodilators, as was done at the time of the original survey.

The original survey data of the symptomatics not diagnosed as asthma, were simultaneously re-analysed in lieu of the resurvey data and suggestions made by Gupta *et al.*^[3]

Student's *t* test, χ^2 test and univariate analysis was applied to confirm statistical significance of the data analysis.

Multivariate regression analysis was also performed as and when required.

RESULTS

The original survey was carried out in the year 2002-03 and data of 8863 adult respondents (5010 men, 3853 women) were presented.^[2] One or more respiratory symptoms were present in 467 (5.3%) of these subjects but asthma was diagnosed only in 85 (0.96%). This left 382 symptomatics, not diagnosed as asthma at the time of the original survey. Out of these 382 symptomatics, as many as 344 (90%) could be interviewed again in the resurvey. The rest 38 were not available for resurvey for various reasons.

Of the total 344 symptomatics thus resurveyed, 85 now fulfilled the asthma diagnostic criteria as used in the national survey. Tables 1-4 shows the original survey data of these newly diagnosed asthma patients as compared to the rest.

Age and sex were insignificant risk factors but rural domicile continued to be an important risk factor for asthma. Officials were least affected but labors were more likely to have asthma [Table 1].

The highest sensitivity for diagnosing asthma for any symptom was found for the presence of shortness of breath (SOB) and the highest specificity, for the presence of allergic symptoms in self or the family but the highest odds ratio (OR) for diagnosing asthma was found for the presence of wheezing [Table 2].

Since SOB was the most sensitive symptom for the diagnosis of asthma, an analysis was carried out whether the presence of an additional symptom/parameter along with SOB increases the chances of diagnosing asthma. The OR for diagnosing asthma increased in the presence of most other symptoms/parameters along with SOB but the highest OR for diagnosing asthma was seen for the presence of wheezing along with SOB [Table 3].

An analysis was also carried out to find out the highest OR for diagnosing asthma in relation to the number of additional symptoms/parameters along with SOB. The OR for diagnosing asthma was highest for the presence of 2 additional symptoms/parameters along with SOB, as compared to the rest [Table 4].

DISCUSSION

Gupta and Mangal^[2] while presenting the original survey data had discussed that the prevalence of asthma in the Jaipur population as compared to the national average^[1] could be genuinely low but could also be due to under diagnosis of the disease for different reasons namely: a) Subjects might not be knowing of their asthma due to ignorance or lack of knowledge, b) General practitioners

Table 1: Demographic profile of symptomatics after the resurvey

Factors	Asthma	Other symptomatics	χ^2	P value
Age				
<40 years	28	107	1.55	0.213
>40 years	57	152		
Sex				
Male	56	155	0.75	0.386
Female	29	104		
Domicile				
Rural	36	53	14.87	0.000
Urban	49	206		
Occupation				
Self employed	09	38	0.59	0.441
Unemployed	30	67	2.36	0.124
Housewife	19	76	1.23	0.267
Officer	0	33	10.56	0.001
Labour	17	21	8.04	0.004
Farmer	10	16	2.12	0.145
Supervisor	0	3	F	0.577
Skilled	0	5	F	0.338

F: Fisher exact test

Table 2: Asthma and various symptoms/parameters in symptomatics after resurvey

Symptom/parameter	Asthma (N=85)	Others (N=259)	OR	C.I.	Sensitivity	Specificity
SOB	80	81	35.2	13.1-102.6	94.1	68.7
Wheeze	74	18	90.1	38.3-218.0	87.1	93.1
Chest tightness	68	14	84.3	28.5-174.4	80.5	94.7
Dust allergy	41	19	11.8	6.0-23.3	48.2	92.7
Skin allergy	14	03	16.8	4.4-76.0	16.5	98.8
Nasal allergy	26	05	22.3	7.7-69.6	30.6	98.1
Eye allergy	10	02	17.1	3.4-115.9	11.8	99.2
Family H/O allergy	44	12	22.1	10.2-48.5	51.8	95.4

OR: Odds ratio, C.I.: Confidence interval, SOB: Shortness of breath, H/O: History of

Table 3: Asthma and presence of any other parameter along with SOB

Symptom/parameter	Asthma (N=85)	Others (N=259)	OR	C.I.	Sensitivity	Specificity
Wheeze	69	8	135.3	51.7-368.8	81.2	96.9
Chest tightness	63	9	114.5	43.5-234.5	78.6	95.7
Dust allergy	39	4	54.0	17.3-187.8	45.9	98.5
Skin allergy	13	0	-	-	-	-
Nasal allergy	24	2	50.5	11.1-318.5	28.2	99.2
Eye allergy	10	0	-	-	-	-
Family H/O allergy/Asthma	42	2	125.5	28.2-779.5	49.4	99.2

OR: Odds ratio, C.I.: Confidence interval, SOB: Shortness of breath, H/O: History of

Table 4: Asthma and presence of number of other parameters along with SOB

Symptom/parameter	Asthma (N=85)	Others (N=259)	OR	C.I.	Sensitivity	Specificity
Any one	80	16	243	79.8-799.0	94.1	93.8
Any two	76	03	435	123.4-987.4	89.2	98.9
Any three	33	02	81.5	18.2-508.0	38.8	99.2
>three	09	01	30.5	3.87-654.2	10.6	99.6

OR: Odds ratio, C.I.: Confidence interval, SOB: Shortness of breath

might not be using inhalers to treat asthma due to fear of loss of faith and c) Patients might not be disclosing the diagnosis of asthma to the interviewer at time of administration of the questionnaire due to stigma attached to the disease.

The coverage of the symptomatics in the resurvey (90%) was adequate. It revealed 85 new patients of asthma. These newly diagnosed patients, in all probabilities, represent the underdiagnosed asthma patients of the original survey. Further, if these findings are extrapolated to the remaining 10% of the symptomatics who could not be resurveyed, the figure rises to about 92. That being so, the total asthma prevalence in Jaipur district should be about 2% (85 + 92 = 177 out of the 8863 adult respondents) and not 0.96, as was reported at the time of the initial survey.

From the above our initial assumption that asthma is under diagnosed in some population groups with the use of twin criteria for diagnosing asthma as used in national survey, is confirmed and that the prevalence of asthma in Jaipur population is nearly similar to the national figures. The key question that still remains unresolved is: How to check the problem of under diagnosis of asthma in such surveys?

It was reasoned that the answer to the problem might lie in reanalysis of the initial survey data, in light of the observations made by Gupta *et al.*^[3] Such a reanalysis indeed revealed that as many as 76 additional cases of asthma could have been picked up at that time itself without a significant risk of over diagnosis (84, if extrapolated to all the symptomatics), as they had SOB along with 2 additional symptoms at the time of the original survey itself. This was in spite of the fact that seasonal variation of symptoms in the respondents was not recorded at the time of the original survey. Had it been done, the outcome would have been still better. Several others have also observed that some symptoms/group of symptoms are highly suggestive of asthma,^[4-8] but none of them have used it in diagnosing asthma in epidemiological surveys.

Based on this study data it can be concluded that (a) The twin criteria for diagnosing asthma as used in earlier surveys,^[1,2] led to under diagnosis of asthma in Jaipur district population, in all likelihood, due to the fact that these criteria required a person to admit that he had suffered from asthma and (b) The use of symptom criteria as suggested by Gupta *et al.*^[3] could have effectively checked the problem of underdiagnosis in Jaipur district population.

A resurvey of the symptomatics of the national survey population and reanalysis of its original^[1] on the lines of the present study will, in all probabilities, clarify whether the observations made out of this paper are universally applicable or are limited to certain population groups, where the disease might be a social taboo.

Financial support and sponsorship

The study was financially supported by M/S Sun Pharma-Radiant Division.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Aggarwal AN, Chaudhry K, Chhabra SK, D'Souza GA, Gupta D, Jindal SK, *et al.* Prevalence and risk factors for bronchial asthma in Indian adults: A multicentre study. *Indian J Chest Dis Allied Sci* 2006;48:13-22.
2. Gupta PR, Mangal DK. Prevalence and risk factors for bronchial asthma in adults in Jaipur district of Rajasthan (India). *Lung India* 2006;23:53-8.
3. Gupta PR, Anupam, Mehrotra AK, Khublani TK, Soni S, Feroz A. Value of past clinical history in differentiating bronchial asthma from COPD in male smokers presenting with SOB and fixed airway obstruction. *Lung India* 2015;32:20-3.
4. Bousquet J, Jeffery PK, Busse WW, Johnson M, Vignola AM. Asthma. From bronchoconstriction to airways inflammation and remodeling. *Am J Respir Crit Care Med* 2000;161:1720-45.
5. Sistek D, Tschopp JM, Schindler C, Brutsche M, Ackermann-Liebrich U, Perruchoud AP, *et al.* Clinical diagnosis of current asthma: Predicted value of respiratory symptoms in the SAPALDIA study. *Swiss Study on Air Pollution and Lung Diseases in Adults. Eur Respir J* 2001;17:214-9.
6. Burke W, Fesinmeyer M, Reed K, Hampson L, Carlsten C. Family history as a predictor of asthma risk. *Am J Prev Med* 2003;24:160-9.
7. Nystad W, Meyer HE, Nafstad P, Tverdal A, Engeland A. Body mass index in relation to adult asthma among 135,000 Norwegian men and women. *Am J Epidemiol* 2004;160:969-76.
8. Zedan M, Settin A, Farag M, Ezz-Elregal M, Osman E, Fouda A. Prevalence of bronchial asthma among Egyptian school children. *Egypt J Bronchol* 2009;3:124-30.