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Original Research Article

The language of wheezing children: a study of symptoms described by parents

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ABSTRACT

Background: Respiratory disorders are a leading cause of pediatric hospital admissions. Parental understanding of respiratory sounds, particularly the term "wheeze," is critical for accurate symptom reporting, asthma diagnosis and epidemiological research. In multilingual countries such as India, linguistic diversity may significantly affect how parents perceive and describe such symptoms.
Methods: A single-centre cross-sectional observational study was conducted over 12 months (March 2023-March 2024) enrolling 160 children aged 1 month to 12 years with paediatrician-confirmed wheeze. Parents completed a structured multilingual questionnaire. Statistical analysis was performed using Mann-Whitney U test, Chi-square test, and Fisher's exact test.
Results: Only 9.4% of parents recognized the term "wheeze." The most common sound descriptors were "Khad-Khad" (48.8%) and "Ghar-Ghar" (41.9%). Cough (39.4%) and visual chest movement changes (27.5%) were the predominant identifying cues. Parental awareness was significantly associated with educational status (p=0.001), family history of asthma (p=0.0077), past wheezing history (p=0.0138), and physician-diagnosed asthma (p=0.0086).
Conclusions: Parental awareness of the term "wheeze" is poor in multilingual Indian populations. Clinicians should employ culturally adapted, symptom-focused history-taking to improve diagnostic accuracy in pediatric respiratory illness.

Keywords: Wheeze, Parental awareness, Multilingual, Pediatric, Asthma, Respiratory sounds, India

INTRODUCTION

Respiratory system disorders constitute one of the most frequent causes of admission to pediatric wards worldwide. Respiratory sounds yield valuable clinical information regarding the physiological status of the lung and the degree of airway obstruction, serving as a primary diagnostic tool in pediatric respiratory medicine.[1] Noisy breathing is among the most common presenting symptoms reported by parents in both acute and chronic respiratory illnesses. In a multilingual and multicultural nation such as India, families present from diverse cultural, linguistic, and sociodemographic backgrounds, often employing varied terminology to describe respiratory sounds.[2] Critically, the same word or term used by a parent may carry a wide spectrum of clinical implications, depending upon their literacy level, linguistic background and personal interpretation of the symptom. For instance, terms such as "cough" and "cold" are frequently used interchangeably and loosely by caregivers, yet may clinically correspond to a range of distinct findings including dry cough, nasal obstruction, harsh or noisy breathing, rhinorrhoea or post-tussive vomiting. Similarly, terms commonly reported by parents in Indian regional languages including wheeze, rattle, stridor, snoring, “Varadh” (वराध), “Pasli” (पसली), and “Hafni” (हाफणी) may each carry differing clinical significance depending on context and interpretation.

Accurate identification of these respiratory sounds is of considerable clinical importance, as it aids in localizing the anatomical site of obstruction and determining the most likely underlying etiology.[3] Both congenital and acquired conditions may produce such noises; however, in clinical practice, the majority are attributable to a relatively limited set of common conditions, including asthma, bronchiolitis, acute laryngotracheobronchitis, viral upper respiratory tract infections, pneumonia and the common cold.[4-6]

The presence of reported wheeze is a cornerstone in the diagnosis and management of asthma, particularly in children under five years of age who are unable to articulate their symptoms independently.[2,7] In this age group, parental perception and description of the child's respiratory complaints assume paramount importance in clinical decision-making. Given the wide variation in parental terminology and the frequent disconnect between lay descriptions and their clinical correlates, clinicians must employ targeted, leading questions to accurately interpret reported respiratory sounds and arrive at a correct diagnosis.

From an epidemiological perspective, large-scale studies on asthma prevalence and wheeze-associated outcomes in clinical trials rely heavily on proxy-reported respiratory symptoms via standardized questionnaires.[8-10] Global disparities in asthma prevalence estimates derived from symptom-based surveys continue to fuel ongoing debate regarding the true burden and clinical parameters of the disease.[8] While this issue has been explored in English-speaking countries, data from non-English-speaking populations, particularly those using Indian regional languages, remain sparse. Therefore, the present study was undertaken to assess parental awareness of the term "wheeze" among caregivers of Indian children, and to examine the linguistic variation in terminology used to describe wheeze, along with its clinical relevance in a multilingual Indian context.

METHODS

Study design and setting

This was a single-centre, cross-sectional observational study conducted at a tertiary care teaching hospital. The study was time-bound, spanning a period of 12 months from March 2023 to March 2024.

Sample size

A total of 160 children were enrolled during the study period based on the predefined inclusion criteria and the feasibility of recruitment within the allotted timeframe.

Inclusion and exclusion criteria

Children aged between 1 month and 12 years presenting to the outpatient department (OPD), inpatient ward or emergency department with respiratory complaints, and in whom wheeze was subsequently confirmed by a paediatrician, were eligible for inclusion. Children not accompanied by their primary caretaker at the time of enrolment were excluded from the study.

Ethical considerations

The study was initiated following approval of the study protocol by the Institutional Review Board (IRB) of the institution. Written informed consent was obtained from all participating parents or caretakers prior to enrolment, in their preferred local language. Confidentiality of all participant data was strictly maintained throughout the study. Data collected were used solely for academic and research purposes.

Data collection procedure

Parents or primary caretakers of eligible children were identified and approached for participation. Those accompanying children who fulfilled the inclusion criteria were enrolled. Participants were requested to respond to a structured questionnaire in the language they were most comfortable with English, Hindi, or Gujarati to minimize linguistic barriers and ensure accurate self-expression.

The questionnaire comprised both open-ended and closed-ended questions pertaining to respiratory sounds and wheezing. Open-ended questions elicited spontaneous parental descriptions of the child's respiratory complaints, while closed-ended questions provided structured prompts to assess specific cues used by parents to identify wheeze and respiratory exacerbations. Sociodemographic data including parental age, educational qualification, first language, and family history of asthma were also recorded. The correlation between the final clinical diagnosis, as established by the attending paediatrician and the parental description of wheeze was subsequently analysed.

Operational definitions

Illiterate individuals were defined as those unable to read or write in any language. Individuals with formal education were those who had completed schooling up to the 12th standard. University education referred to individuals who had completed graduate or postgraduate studies.

Statistical analysis

Data were entered and managed in Microsoft Excel and analysed using jamovi (version 2.3.28). The Mann-Whitney U test was applied for non-parametric ordinal data. Categorical variables were analysed using the Chi-square test, with Fisher's exact test applied where cell frequencies were small. A p value of less than 0.05 was considered statistically significant for all comparisons.

RESULTS

Demographic profile of children

A total of 160 children were enrolled in the study. The largest proportion 50 children (31.2%) belonged to the 1-5 years age group, followed by 49 children (30.6%) aged ≤6 months, and 36 children (22.5%) in the 6 months 1 year group. Children aged 5-10 years accounted for 10.6% (n=17), while only 8 children (5%) were above 10 years of age. Wheezing in the ≤6 months group was predominantly attributable to bronchiolitis, whereas in the 1-5 years group, wheeze-associated lower respiratory illness (WALRI) and hyperreactive airways disease (HRAD) were the predominant diagnoses, consistent with the well-established higher prevalence of wheezing in younger children. Male children comprised 62.5% (n=100) of the study population and females 37.5% (n=60), indicating a male preponderance in wheezing presentations.

Table 1: Presents the association between children's characteristics and parental awareness of the term "wheeze."

Characteristics of children	Parents who knew (n=15)	Parents who did not know (n=145)	P value
Age distribution of children			
≤6 months	2	47	0.0214*
6 months-1 year	1	35	
1-5 years	7	43	
5-10 years	2	15	
≥10 years	3	5	
First age of symptom onset			
≤6 months	4	78	0.0949*
6 months-1 year	2	25	
1-5 years	7	31	
5-10 years	2	10	
>10 years	0	1	
Past history of wheezing			
Yes	12	66	0.0138**
No	3	79	
Physician-diagnosed asthma			
Yes	5	11	0.0086**
No	10	134	

*Mann-Whitney U test; **Fisher's exact test; p<0.05 considered significant.

Table 2: Presents the association between parental characteristics and awareness of the term "wheeze."

Parental characteristics	Parents who knew (n=15)	Parents who did not know (n=145)	P value
Educational qualification			
Illiterate	0	27	0.001**
Formal education	9	114	
University education	6	4	
Family history of asthma			
No	11	139	0.0077*
Yes	4	6	
Sound localization			
Chest	12	110	0.72**
Nose	1	16	
Mouth	0	8	
Throat	0	6	
Chest and nose	2	2	
Nose and throat	0	2	
Back	0	1	

*Fisher's exact test; **Chi-square test; p<0.05 considered significant.

Caregiver profile

The questionnaire was most frequently answered by mothers (78.7%, n=126), followed by fathers (16.8%, n=27), with grandmothers, aunts, and uncles accounting for the remainder. Regarding educational background, the majority of respondents had formal education up to the 12th standard (76.9%, n=123), while 16.9% (n=27) were illiterate and only 6.2% (n=10) had attained university-

level education, reflecting the sociodemographic profile of the catchment area. Hindi was the primary language of 68.8% (n=110) of parents, while 31.2% (n=50) were Gujarati speakers.

Clinical profile

The most common provisional diagnosis at the time of enrolment was bronchiolitis (n=75), followed by WALRI (n=31), pneumonia (n=21), asthma (n=16), HRAD (n=12), URTI (n=4), and LRTI (n=1). Family history of asthma was present in only 10 children (6.2%); of these, 7 had a first-degree relative a parent or sibling with asthma.

Parental awareness of the term "wheeze"

Only 15 parents (9.4%) were aware of the term "wheeze," while the overwhelming majority 145 parents (90.6%) had no prior knowledge of the term. This low awareness is likely attributable to the lower educational status of parents enrolled in this study and insufficient counselling by healthcare providers.

Past wheezing history and age of symptom onset

The majority of children (51.2%, n=82) first experienced wheezing symptoms within the first 6 months of life, followed by onset between 1-5 years in 23.7% (n=38), and between 6 months-1 year in 16.8% (n=27). Past history of similar wheezing complaints was documented in 48.7% (n=78) of children. Sibling history of similar respiratory complaints was reported in 14.3% (n=23) of cases, while 28.1% (n=45) had no siblings.

Chief presenting complaints

All 160 parents (100%) reported perceiving some form of respiratory sound in their child. Beyond this, the most frequently reported primary complaint was the presence of more than one symptom simultaneously (32.5%, n=52), followed by fast breathing (28.8%, n=46) and cough (25.6%, n=41). Difficulty in breathing was reported by 10% (n=16), while fever, cold and nasal obstruction were infrequently cited as isolated primary complaints.

Parental description of respiratory sounds

The most commonly used term to describe the respiratory sound was "Khad-Khad" (48.8%, n=78), followed by "Ghar-Ghar" (41.9%, n=67). A whistle-like sound was described by 5.6% (n=9), a vibration-like quality by 2.5% (n=4) and noisy breathing by 1.3% (n=2).

Cues used by parents to identify wheezing

When presented with a structured closed questionnaire, cough was the most frequently selected cue to identify wheezing (39.4%, n=63), followed by visual cues such as differences in chest movement (27.5%, n=44) and auditory cues what parents could hear (21.9%, n=35). More than one cue was selected by 10.6% (n=17) of parents. Notably, tactile cues and the child's general appearance were not selected by any parent, and fever was identified as a cue by only one parent (0.6%).

Localization of respiratory sound

The majority of parents (76.2%, n=122) correctly localized the respiratory sound to the chest. Other sites of localization included the nose (10.6%, n=17), mouth (5%, n=8), throat (3.7%, n=6), combined chest and nose (2.5%, n=4), combined nose and throat (1.2%, n=2) and the back (0.6%, n=1).

Home nebulization

Of the 160 enrolled cases, 33 parents (20.6%) reported administering home nebulization, of whom 31 had been advised to do so by a doctor and 2 initiated it on their own. Among those who administered home nebulization, respiratory sound served as the primary trigger in 75.7% (n=25), while breathlessness was the trigger in 24.2% (n=8). Following nebulization, 87.9% (n=29) of parents reported a perceived decrease in the respiratory sound intensity, while 12.1% (n=4) noted no improvement.

Children's characteristics by parental knowledge of the term "wheeze"

A statistically significant difference was observed in the age distribution of children between parents who knew the term "wheeze" and those who did not (p=0.0214), suggesting that parents of older children were more likely to be familiar with the term. No significant association was found between the age of first symptom onset and parental knowledge of the term (p=0.0949). A statistically significant association was observed between a past history of wheezing in the child and parental awareness (p=0.0138), indicating that repeated exposure to wheezing episodes improves parental familiarity with the term. Similarly, parents of physician-diagnosed asthmatic children were significantly more likely to know the term "wheeze" (p=0.0086) (Table 1).

Parental characteristics by knowledge of the term "wheeze"

Educational level was significantly associated with parental awareness of the term "wheeze" (p=0.001); notably, none of the illiterate parents knew the term, while awareness was concentrated among those with formal or university-level education. Family history of asthma was also significantly associated with parental awareness of the term (p=0.0077), suggesting that direct household experience with the condition increases familiarity with its clinical terminology. No statistically significant association was found between parental awareness of "wheeze" and the ability to localize the

respiratory sound to the chest (p=0.72); even among parents unaware of the term, the majority correctly localized the sound to the chest (Table 2).

DISCUSSION

The present study examined parental awareness of the term "wheeze" and the linguistic and perceptual cues used by caregivers to identify wheezing in their children, in a multilingual Indian setting. The findings highlight a significant gap between clinical terminology and lay understanding, with important implications for asthma diagnosis, epidemiological research and parental health education.

Parental awareness of the term "wheeze"

The most striking finding of this study was the remarkably low parental awareness of the term "wheeze," with only 9.4% of parents recognizing the term. This is considerably lower than figures reported from other parts of India and the world. Paranjpe MD et al, in a study conducted among 101 parents of wheezing children at a tertiary care hospital in India, found that 47 parents (46.5%) recognized the term "wheeze," and of these, only 19 parents (18.8%) correctly localized it to the chest as per the epidemiological definition.[3] The markedly lower awareness in the present study likely reflects the higher proportion of illiterate and low-formally-educated parents in our catchment area. In a population-based study of 4,236 children in Europe, 83.5% of parents correctly identified the definition of wheeze as a "whistling or squeaking" sound, a proportion much higher than observed in our cohort, underscoring the influence of health literacy and population context on symptom recognition.[11] In another cross-sectional study conducted by Shanmugam et al, only 38.5% of parents correctly labelled wheeze, and parents were significantly better at locating the origin of the sound than labelling it (OR: 2.4), echoing a similar pattern observed in our study.[1]

Demographic predictors of awareness

In the present study, parental educational level was significantly associated with awareness of the term "wheeze" (p=0.001). None of the illiterate parents in our cohort recognized the term, while awareness was concentrated among those with formal or university education. This finding is clinically relevant, as it suggests that educational counselling by healthcare providers is essential for low-literacy populations. Interestingly, however, Paranjpe MD et al did not find a significant association between parental education and correct identification of wheeze, a discrepancy that may reflect differences in the baseline literacy levels and the nature of questions asked across both studies.[3] The significant association between paediatrician-diagnosed asthma in the child and parental awareness of the term (p=0.0086) in our study is consistent with the existing evidence that repeated clinical exposure and physician counselling regarding symptom recognition, inhaler use, and asthma action plans significantly improves parental understanding of respiratory terminology. Family history of asthma was also a significant predictor of awareness (p=0.0077). This aligns with observations by Paranjpe MD et al, wherein children with a family history of asthma were more likely to have parents who correctly defined wheezing (p=0.006).[3] Prior studies have demonstrated that parents with personal or family experience of asthma are more attentive to wheezing episodes in their children and are more likely to recall and report them accurately.[12,13]

Age of onset and past history

In our study, 51.2% of children experienced their first wheezing episode within the first 6 months of life, consistent with the widely cited observation that approximately 50% of children experience at least one wheezing episode in the first year of life.[14] Furthermore, a statistically significant association was found between the child's age distribution and parental awareness of the term (p=0.0214), suggesting that parents of older children who have had more prolonged exposure to healthcare interactions are more likely to have encountered and internalized the clinical vocabulary. Past history of wheezing in the child was also significantly associated with parental awareness (p=0.0138), reinforcing that repeated clinical encounters enhance parental familiarity with respiratory terminology.

Parental description of respiratory sounds

A notable finding was that all 160 parents (100%) could perceive and report a respiratory sound in their child, yet the majority described it using regional vernacular terms "Khad-Khad" (48.8%) and "Ghar-Ghar" (41.9%) rather than the medical term "wheeze." This illustrates the fundamental disconnect between lay perception and medical language in a multilingual setting. Similar observations were made by Paranjpe MD et al, in which comparable onomatopoeic terminology was used by a substantial proportion of Indian parents to describe the sound.[3] These findings collectively emphasize the need for clinicians practicing in linguistically diverse regions to actively probe with culturally adapted, region-specific terminology when eliciting respiratory symptoms.

Cues used to identify wheezing

The most frequently used cue in our study was cough (39.4%), followed by visual chest movement changes (27.5%) and auditory cues (21.9%). Notably, tactile cues were not used by any parent in our cohort. This predominance of non-auditory cues mirrors findings from Paranjpe MD et al, in which 89% of parents used non-auditory cues to identify wheeze.[3] Brick T et al similarly reported that "what you hear" was not selected by 23% of parents and when asked to identify their primary cue, only 40% selected auditory identification, while 41%

relied on non-auditory means.[13] Fernandes RM et al reported that 41% of parents used visual cues and 35% used tactile cues with 50% utilizing more than one cue simultaneously.[8] The absence of tactile cue usage in the current study stands in contrast to these Western studies and may be attributable to cultural differences in the physical handling of sick children or lower health-seeking experience among the enrolled population.

Localization of respiratory sound

The majority of parents in our study (76.2%) correctly localized the respiratory sound to the chest, which is notably higher than the 60% chest localization reported by Paranjpe MD et al and 60.5% reported by Shanmugam S et al and Fernandes RM et al found 69% chest localization.[1,3,8] Importantly, no significant statistical association was found between parental awareness of the term "wheeze" and chest localization (p=0.72), suggesting that the perceptual ability to locate a respiratory sound is independent of medical terminology knowledge.

Male predominance

A male predominance was observed in this study, with 62.5% of enrolled children being male. This is consistent with established epidemiological data demonstrating male preponderance in pediatric wheezing and bronchiolitis. Sanghvi B et al confirmed male predominance in a clinical profile study of bronchiolitis, reporting a male-to-female ratio of approximately 1.7:1, attributed to narrower airways in male infants and gender-specific immunological responses to respiratory syncytial virus infection.[15]

Limitations

This study has several limitations. First, being a single-centre study conducted at a government tertiary care hospital, the findings may not be generalizable to the wider Indian population or private healthcare settings. Second, the sample was predominantly composed of low-literacy, Hindi and Gujarati-speaking caregivers, limiting representation of other linguistic groups. Third, the relatively small sample size of 160 participants may reduce statistical power for subgroup analyses. Fourth, recall bias may have influenced parental responses regarding past wheezing episodes and age of symptom onset. Finally, the questionnaire-based design precluded objective verification of the respiratory sounds perceived by parents.

CONCLUSION

Parental understanding of the term "wheeze" was poor in this cohort of Indian caregivers despite universal recognition of abnormal respiratory sounds. Parents more commonly relied on vernacular descriptors such as "Khad-Khad" and "Ghar-Ghar" and on cues like cough and visible chest movement rather than formal terminology. Awareness of the term was significantly associated with parental education, family history of asthma, past wheezing episodes in the child and physician-diagnosed asthma. These findings suggest that clinicians should use culturally appropriate, symptom-focused questioning rather than depending solely on the term "wheeze" during pediatric respiratory assessment. They also indicate that epidemiological studies based on parent-reported wheeze should account for linguistic comprehension to avoid misclassification.

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