Parents’ interpretations of children’s respiratory symptoms on video

R S Cane, S A McKenzie

Abstract

Aims—To investigate how parents report children’s respiratory sounds on video compared to a clinical “gold standard”.

Methods—Five clinicians agreed on 10 video clips of children with audible breathing. These responses were the “gold standard”. The clips were shown to parents of children: (a) with asthma/wheeze; (b) with other respiratory complaints; (c) without respiratory complaints. Parents were asked what they called the sounds, where they originated, and whether their own child made similar sounds.

Results—A total of 190 parents took part. The “correct” labelling of wheeze was 59% (95% confidence interval 52 to 66%) and 47% (95% confidence interval 40 to 54%) for other sounds (stridor, snoring, stertor). Parents were better at locating both sounds than labelling. There were no differences between subject groups. There were more false positive responses to labelling and locating other sounds than for wheeze (27% v 8% and 33% v 10%).

Conclusion—Parents locate sounds better than describing them. At least 30% of all parents use other words for wheeze and 30% labelled other sounds as “wheeze”. This could have important clinical implications.

Keywords: parents’ reports; wheeze; video

A report on medical education in 1968 placed the term “taking the history” in inverted commas. This was to make students aware that vocabulary and cultural attitudes may “impede or distort” communication for both interviewer and interviewee.1 4

Diagnosing childhood asthma is dependent on parental symptom reporting. There are a number of difficulties: some parents confuse respiratory sounds,5 night time symptoms are difficult to quantify,4 recollection of symptoms may change,7 parents’ and children’s reports of symptom frequency may be discordant,9 clinicians’ and parents’ words for symptoms9 and definitions10 may differ and, lastly, “wheeze” does not translate into some languages.11

To address problems of history taking, we wanted to find out whether breathing sounds of children shown on a video could aid diagnosis. The aims were:

(1) To compare responses to children’s respiratory sounds observed on video in the following groups:
  • parents and clinicians
  • parents of children with and without respiratory symptoms
  • parents with and without English as a first language.

(2) To investigate whether videos help parents identify the respiratory sounds of their own children.

Methods

Compilation of video clips

Children aged less than 7 years with audible breathing sounds, attending children’s hospital services were filmed. A hand held Panasonic Movie Camera was used with an additional clip microphone (Monacor ECM-3005). Children were filmed lying, sitting, or standing in the hospital wards or side rooms. Clips with minimal distracting material in the background, showing clear signs, with good acoustic quality were selected from 55 filmed. Fifteen clips were edited for clinicians to view. Parents’ written consent for filming was obtained in all cases.

Clinicians at different levels of training were asked independently to label and locate the breathing sounds on the videos. Only clips showing single clinical features were used. Agreement was reached between five clinicians on 10 of 15 clips. The breathing sounds in the clips were classified as either “wheeze” or “sounds other than wheeze” (stridor, snoring, stertor—referred to here as “other sounds”). Locations were classified as “chest”, “nose”, and “throat” for each type of sound. These were considered the “gold standard” with which parents’ responses were compared.

Three tapes were compiled by age using the 10 agreed clips: <1 year tape showed two infants with wheeze and two with other sounds; 1–4 year tape showed one child with wheeze and two with other sounds; 4–7 year tape showed two children with wheeze and one with another sound. Each clip lasted 80–100 seconds. There are different numbers and combinations of sounds for each age group because it was not possible to get an equal number for each sound for each combination of age, sex, and ethnic origin for which there was clinician agreement. The tapes showed children of each sex and were ethnically representative of the population of east London.

Subjects

Subjects were 190 parents with child patients aged less than 8 years. Videos were shown in quiet areas usually using a 14 inch portable Philips TV Combi, the same monitor that was used to show clinicians these clips.

Subject groups were parents of children:
Table 1 Examples of how parents' responses were coded for wheeze clips

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Examples for label</th>
<th>Examples for location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>Wheeze: asthma; whistling</td>
<td>Chest</td>
</tr>
<tr>
<td>Vague</td>
<td>Rapid, shallow breaths; chesty</td>
<td>Chest + nose</td>
</tr>
<tr>
<td>Don't know</td>
<td>Don't know; left blank</td>
<td>—</td>
</tr>
<tr>
<td>Wrong</td>
<td>Normal breathing; snoring</td>
<td>Nose</td>
</tr>
</tbody>
</table>

Table 2 Examples of how parents' responses were coded for other sounds

<table>
<thead>
<tr>
<th>Parents' response</th>
<th>Clinicians' responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>group</td>
<td>Stridor</td>
</tr>
<tr>
<td>Correct</td>
<td>Sucking in and out</td>
</tr>
<tr>
<td>Vague</td>
<td>Snuffy</td>
</tr>
<tr>
<td>Don’t know</td>
<td>Don’t know</td>
</tr>
<tr>
<td>Wrong</td>
<td>Wheeze</td>
</tr>
</tbody>
</table>

For the location question, “throat” would be a “correct” response for each of these three sounds (and/or “nose” also for the snoring and stertor clips) and “chest” a “wrong” response.

Table 3 Example of how final results were derived. Responses from the asthmatic/wheezy group (group A) in correctly describing the sounds in the wheeze and other sounds clips

<table>
<thead>
<tr>
<th>Age group</th>
<th>Wheeze clips</th>
<th>Other sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 1/1</td>
<td>n = 1/2</td>
<td>n = 2/2</td>
</tr>
<tr>
<td>n = 1/1</td>
<td>n = 1/2</td>
<td>n = 2/2</td>
</tr>
<tr>
<td>&lt;1</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>1–4</td>
<td>39</td>
<td>17</td>
</tr>
<tr>
<td>4–7</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>All</td>
<td>82</td>
<td>52</td>
</tr>
</tbody>
</table>

*Total number of parents in each age group.

n = number of correct responses in relation to number of wheeze and other sounds clips seen.

(A) who had been diagnosed with asthma or had been observed by doctors to wheeze
(B) who had other respiratory symptoms
(C) who had no respiratory problems or history of asthma (controls).

Parents watched the video tape of children in the same age group as their own child. An accompanying questionnaire asked two questions for each clip: “what do you call the sounds you hear this child making?” (referred to as the “label question”) and “where do you think the sounds are coming from—the nose, throat, or chest?” (the “location question”).

Responses were open ended so parents used their own words. Finally, parents were asked if any clip resembled the breathing sounds their own child made. Responses were compared to clinicians’ impressions recorded in the child’s medical record. Comparisons were scored as “match” or “mismatch”. Any indication of similarity was then related to the parents’ initial labelling of the sound of clip to investigate whether the video helped parents to communicate their child’s symptoms.

Results

Over a period of 12 months, 294 adults were asked to watch the video; 86 declined (75% female and 55% of south Asian origin or descent) and 18 were not included (communication too problematic).

Of the 190 in the study, 82 belonged to group A, 56 to group B, and 52 to group C. Overall, 74% of respondents were mothers, 11% fathers, 10% of responses were by both parents, and 5% were by relatives of the patient. Fifty seven per cent were British, 25% of south Asian origin or descent, 9% African, 5% Turkish, 3% European, and 1% other.

Parents’ comparison of video sounds with sounds made by their own child

If parents indicated that a child on the video sounded like their own child, this was compared to clinicians’ impressions recorded in the child’s medical record. Comparisons were scored as “match” or “mismatch”. Any indication of similarity was then related to the parents’ initial labelling of the sound of clip to investigate whether the video helped parents to communicate their child’s symptoms.

Table 4 shows the results for an overall comparison between responses from the 190 parents and the gold standard. Parents were more likely to correctly label wheeze than other sounds, but better able to locate other sounds than wheeze.

Wrong labelling of sounds, for example calling wheeze “snoring” or calling snoring...
Correct label versus location for other sounds: \( p < 0.001 \).

Correct label versus location for wheeze: \( p = 0.05 \).

### Table 4 Number (percentage, 95% CI) of all parents (n = 190) who correctly and wrongly labelled and located both types of sounds at least once

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct</th>
<th>( p ) value</th>
<th>Wrong (false +)</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheeze</td>
<td>113 (59%, 52–66%)</td>
<td>0.02</td>
<td>16 (8%, 4–12%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Other</td>
<td>90 (47%, 40–54%)</td>
<td></td>
<td>51 (27%, 21–33%)</td>
<td></td>
</tr>
<tr>
<td>Locate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheeze</td>
<td>132 (69%, 62–76%)</td>
<td>0.01</td>
<td>19 (10%, 6–14%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Other</td>
<td>154 (81%, 75–87%)</td>
<td></td>
<td>62 (33%, 26–40%)</td>
<td></td>
</tr>
</tbody>
</table>

Correct label versus location for wheeze: \( p = 0.05 \).

Correct label versus location for other sounds: \( p < 0.001 \).

### Table 5 Number (percentage, 95% CI) of parents who correctly and wrongly labelled and located both types of sounds at least once by subject group

### Table 6 Number (percentage, 95% CI) of parents who correctly and wrongly labelled and located both types of sounds at least once by language group

### Discussion

The use of video in research is beneficial. It is relatively free from biases caused by language, culture, literacy, or interviewing technique, and may allow more valid and repeatable recognition of symptoms. It has been used to validate written questionnaires, as an epidemiology tool with older children, to measure night time symptoms, as part of an educational programme with asthmatics, and as “video diaries” showing clinicians the life context for asthmatics managing their symptoms.

To the best of our knowledge, it has not been used to assess parents’ interpretation of children’s respiratory symptoms.

The recording of good quality videos proved difficult and even then agreement between clinicians was unanimous for only 10 of 15 clips. We believe the final selection showed a clear distinction between the sounds. In real life this may not be so evident. Our subjects were parents of children attending children’s services in a general hospital. Two of the three subject groups were parents whose children were known to have asthma or other respiratory problems. It seems reasonable to assume that these groups would be more concordant with clinicians’ interpretations of the video clips than parents of children with no history of respiratory symptoms. However, this was not the case. For this study we deliberately used video clips of children with single auditory sounds. In real life this is often not the case. Upper airway noise, for example related to nasal discharge, may accompany wheeze. Fourteen parents of
wheezy or asthmatic children indicated that their child had both types of sounds. However, as in “real life” we did allow parents to say they “don’t know” to our questions because we felt that demanding a response could skew the data. Often parents responding to epidemiology surveys are not given this option.10 It is also important to acknowledge that our parents watched a sequence of clips which may have had a “carry over” effect on their responses (for example, accumulatting comparisons).

As parents were more concordant with clinicians in locating sounds, especially “other sounds”, this suggests that questions about location may be more helpful than a description, especially where English is not the first language. In 1990–91 the risk of underdiagnosis and undertreatment of asthma was higher in children from minority ethnic groups.18 Rather than analysing responses with respect to ethnicity, we used language instead because some words like “wheeze” do not have exact equivalence in some languages. There was a disproportionate number of Asian parents who refused to take part, possibly because of initial communication difficulties.

By asking parents whether any clip resembled their own child’s symptoms, we could assess the use of audiovisual prompts. For example, a mother may say that her own child was “just like this one” on the video and the medical files confirm this, but in the earlier question when asked to label that clip, she gave a “wrong” response. This was the case in a third of parents with asthmatic or wheezy children who said their child resembled a wheezy child. This suggests that audiovisual aid in consultations could be useful for some parents. However, it was surprising that a fifth of parents of children with asthma or wheeze did not perceive any similarity with our video clips. As perception of similarity is highly subjective, it may be that some parents were more discriminating than others. However, as diagnosis of childhood asthma relies on parentally reported sounds, can we assume “a doctor diagnosis” is correct?10 As already mentioned, real life sounds may not be as clear cut as those we chose.

Parental reports of symptom history are very hard to verify. This study has shown that asking parents to locate children’s breathing sounds is more concordant with clinicians understanding than a description of them, particularly for those whose first language is not English. At least 30% of parents, whether they have wheezy children or not, use other words for wheeze and about the same proportion also falsely label other sounds as wheeze (100% minus the upper confidence limit). An audiovisual presentation from which to select symptom similarity may be more helpful in consultations for some parents than a verbal description. Such a system needs evaluation in the community.

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