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Original Research Article

Questionnaire to assess the significance of history taking in assessment of otitis media with effusion in children

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ABSTRACT

Background: There is a high prevalence of Otitis media with effusion (OME) with diagnoses of least 50% of children under the age of one, and 60% of children under the age of two. Complications have a significant impact on a child's quality of life including hearing impairment, language acquisition delay, declining school performance, and behavioral problems. The objective of the study is to develop and test the reliability of a simple questionnaire based on common complaints given by caregivers of children with OME.
Methods: 100 patients were included from the ENT Clinic at King Hamad University Hospital and categorized into preschool age (1-4 years) and School age (5-15 years). A bilingual binary questionnaire was developed (Cronbach's Alpha: 0.89).
Results: There were 22 preschool age patients, and 78 school age patients. Six complaints were significant where the child does not respond to name calling (p=0.031), needs to raise the TV volume (p=0.000), occasionally talks loudly (p=0.003), uses verbal communication for their needs (p=0.000), has episodes of clumsiness and dizziness (p=0.000), and doesn't pronounce words correctly according to their age (p=0.008).
Conclusions: Questionnaires based on complaints can aid the diagnosis of OME as caregiver's assessment is often limited.

Keywords: Otitis media, Otitis media with effusion, Pediatric, School age, Preschool age

INTRODUCTION

Otitis media is one of the most common pediatric illnesses requiring doctor visits worldwide. It can be categorized into several types, such as acute otitis media, otitis media with effusion, and chronic suppurative otitis media. Otitis media with effusion (OME) is characterized by the presence of inflammation and subsequent exudate in the middle ear, in the absence of acute infection.[1] There is a high prevalence, with at least 50% of children under the age of one year old, and 60% of children under the age of two being diagnosed worldwide.[2] OME and its complications can have a significant impact on a child's quality of life.[3] It is the most common cause of hearing impairment in developed nations, which subsequently may lead to delay of language acquisition, declining school performance, behavioral problems, and poor sleep.[4,5] The diagnosis is confirmed on the basis of clinical presentation, with the aid of otoscopy and tympanometry. Otoscopy allows for visualization of the tympanic membrane, whilst a tympanogram assesses the mobility of the middle ear.[6] Tympanometry is required for chronic OME, in order to quantify a child's hearing impairment prior to making a decision on treatment.[2] Conservative management is favored for those with no complications and a short disease course. However, in

patients with documented hearing loss persisting more than 3 months, ventilation tubes are the ideal choice of management.[1]

As signs and symptoms can be quite subtle, thorough history-taking is paramount. Parents and caregivers may not be aware of what to look for, and therefore may not offer all of the relevant information. Clinicians must be able to cover all pertinent issues whilst focusing their history. There are many questionnaires that exist to aid in the diagnosis of OME. Some focus exclusively on history-taking of OME patients, such as the Otitis Media 6 (OM-6)[7] and Quality of Life in Children's Ear Problems (OMQ-14). Other questionnaires target symptoms of hearing loss in children, such as the Evaluation of Children's Listening and Processing Skills (ECLiPS), or LittlEARS Auditory Questionnaire.[8-12] Whilst there is a multitude of questionnaires that may prove useful, each focus on a targeted aspect of the disease. The aim of this study is to develop and assess the reliability of a simple questionnaire based on the most common complaints parents and caregivers generally present with in children with OME, as well as to educate caregivers about the most concerning signs and symptoms they should be aware of.

METHODS

This study followed a cross-sectional design with random sampling through a paper-based questionnaire. A list of 17 questions were devised based on frequent observations and complaints by caregivers in children with OME. Although this study commenced in 2019, it was put off due to the COVID-19 pandemic and ethical approval was re-granted in 2021. Only 20 samples were collected prior to March 2019 and 80 were collected from September 2021 till April 2022. One hundred patients were randomly sampled from the ENT Clinic in King Hamad University Hospital (Kingdom of Bahrain) over the course of two months. Inclusion criteria include those between the ages of 1 to 15 years old and a confirmed diagnosis of OME by both clinical examination and tympanometry.

The questionnaire was designed in two languages, English and Arabic, and was administered to caregivers of the patients in accordance with their native language. The questionnaire was tested for its reliability and found to have a Cronbach's Alpha value of 0.89. Consent was obtained verbally from the parent or caregiver prior to the participation of their child in the study. The study was approved by the Institutional Review Board of King Hamad University Hospital Ref #22-537.

Two age groups were identified in order to assess the difference between the most relevant questions. Studies in the 90's chose to split the cohort into preschool and school age children and compare the characteristics of OME between the two.[13–15] The abundance of literature henceforth and in recent past, focuses more on either of these cohorts exclusively or the effects in preschoolers that linger in the school age.[9-12] Our study preferred to study both sectors of children, to allow for a broader viewpoint and the possible difference in history taking between the two.

Preschool was defined as ages 1 to 4, and school age was defined as ages 5 to 15. Binary questions were utilized to keep the process simple for the caregiver. Descriptive statistics were obtained, as well as calculating the Chi-square value for each to determine if the difference between age groups was statistically significant.

RESULTS

Out of a total of 100 patients, 22 of them were of preschool age, and 78 were school age children. Of all children in the study, 81% had frequent upper respiratory tract infections (URTIs) with nasal blockage. Across the age groups, 90.9% of preschool children had frequent URTIs, while for school age children it was 78.2%. Only 12% of children complained of ear blockage or fullness, and 38% of children complained of otalgia. 40.9% of preschool children had episodes of clumsiness or dizziness, while for school age children it was only 1.3%.

Three of the questions were asked only to the caregivers of school age children, as they were inapplicable for preschool children. 11.5% of school age children had professionals concerned about their language development and academic performance. 7.7% of caregivers noticed fluctuating academic performance themselves. 10.3% of school age children had told their caregivers at least once that they couldn't understand what was being said.

When comparing across age groups, 44.9% of school age children needed to raise the volume of the TV, while for preschool children it was 0%. Similarly, 37.2% of school age children were talking louder than usual according to their caregivers, while for preschool children it was 0%. On the other hand, 65.4% in school age group respond to name call while it was 90.9% in preschool age.

All the above questions were statistically significant with (p value of 0.000, 0.003 and 0.031) respectively.

In addition, three more question had also significant results. They are episodes of clumsiness and dizziness compared to school age children (p=0.000), using verbal communication for his\her needs (p=0.000) and pronouncing words correctly according to his\her age (p=0.008) (Table 1).

Table 1: Caregiver responses to questionnaire across age groups, with Chi-square values.

Question	Preschool (yes)	Preschool (no)	School (yes)	School (no)	All (yes)	All (no)	Chi-square (P value)
Have you noticed the child tugging or rubbing the ears?	14/22 (63.6%)	8/22 (36.4%)	35/78 (44.9%)	43/78 (55.1%)	49/100 (49.0%)	51/100 (51.0%)	0.150
Does the child respond to name call?	20/22 (90.9%)	2/22 (9.1%)	51/78 (65.4%)	27/78 (34.6%)	71/100 (71.0%)	29/100 (29.0%)	0.031
Does the child pay attention?	18/22 (81.8%)	4/22 (18.2%)	52/78 (66.7%)	26/78 (33.3%)	70/100 (70.0%)	30/100 (30.0%)	0.199
Does the child need to raise the volume of the TV?	0/22 (0%)	22/22 (100%)	35/78 (44.9%)	43/78 (55.1%)	35/100 (35.0%)	65/100 (65.0%)	0.000
Does the child follow simple verbal instructions?	18/22 (81.8%)	4/22 (18.2%)	73/78 (93.6%)	5/78 (6.4%)	91/100 (91.0%)	9/100 (9.0%)	0.104
Have you noticed the child occasionally talking loudly?	0/22 (0%)	22/22 (100%)	29/78 (37.2%)	49/78 (62.8%)	29/100 (29.0%)	71/100 (71.0%)	0.003
Has there been any concern from other professionals about the language development and academic performance of the child?	N/A	N/A	9/78 (11.5%)	69/78 (88.5%)	-	-	-
Does the child use verbal communication for his/her needs?	11/22 (50.0%)	11/22 (50.0%)	70/78 (89.7%)	8/78 (10.3%)	81/100 (81.0%)	19/100 (19.0%)	0.000
Have you noticed any fluctuations in hearing or behavior?	6/22 (27.3%)	16/22 (72.7%)	28/78 (35.9%)	50/78 (64.1%)	34/100 (34.0%)	66/100 (66.0%)	0.611
Does the child get URTIs often associated with nasal blockage?	20/22 (90.9%)	2/22 (9.1%)	61/78 (78.2%)	17/78 (21.8%)	81/100 (81.0%)	19/100 (19.0%)	0.230
Are there any episodes of clumsiness and dizziness?	9/22 (40.9%)	13/22 (59.1%)	1/78 (1.3%)	77/78 (98.7%)	10/100 (10.0%)	90/100 (90.0%)	0.000
Does the child complain of blockage or fullness of the ears?	1/22 (4.5%)	21/22 (95.5%)	11/78 (14.1%)	67/78 (85.9%)	12/100 (12.0%)	88/100 (88.0%)	0.293
Does the child occasionally complain of a popping sensation?	0/22 (0%)	22/22 (100%)	3/78 (3.8%)	75/78 (96.2%)	3/100 (3.0%)	97/100 (97.0%)	1.00
Does the child complain of ear pain?	7/22 (31.8%)	15/22 (68.2%)	31/78 (39.7%)	47/78 (60.3%)	38/100 (38.0%)	62/100 (62.0%)	0.621
Can the child pronounce words correctly according to his/her age?	10/22 (45.5%)	12/22 (54.5%)	60/78 (76.9%)	18/78 (23.1%)	70/100 (70.0%)	30/100 (30.0%)	0.008
Has the child ever said that he/she cannot understand what is being said?	N/A	N/A	8/78 (10.3%)	70/78 (89.7%)	-	-	-
Have you noticed fluctuating academic performance throughout the year?	N/A	N/A	6/78 (7.7%)	72/78 (92.3%)	-	-	-

DISCUSSION

Being able to take an effective history and ask relevant questions is a necessary skill for a clinician. As OME has a variety of complications impacting the quality of a child's life, an appropriately comprehensive history is required to reflect that. Signs and symptoms of OME can vary, from hearing difficulties, ear pain and nasal blockage, to behavioral problems and poor school performance. By gauging the most relevant questions to ask caregivers, clinicians can assess and manage children with OME much more effectively.

In this study, the frequency of clinical features such as ear fullness, nasal blockage, ear pain, and having a

popping sensation were not particularly high compared to changes in a child's development and quality of life when taking a history. Questions targeting a change in language, behavior, and school performance may unearth significant findings. Teele et al concluded that there was a correlation between the time spent with OME in children and decreasing speech, language, reading comprehension, and cognitive ability. However, those differences were found to be significant only amongst children under the age of 3.[9]

When considering varying age groups, for most questions in this study there was no statistically significant difference, which suggests that standardized questionnaires may be applicable across ages in children and teenagers. Certain questions had a statistically significant difference, such as the need for a higher volume of the TV and talking louder than usual amongst school age children as compared to preschool. Another question with a statistically significant difference was episodes of clumsiness and dizziness, with preschool children having a higher frequency compared to school age children. Casselbrant et al found that vestibular and/or balance function could remain impaired in children with a history of recurrent OME, despite resolution of the disease.[10]

Relying on a caregiver's assessment of their child's signs and symptoms alone may have some limitations. Rosenfeld et al found that caregivers weren't able to accurately predict their child's hearing up until they considered it to be an 'extreme problem'. Therefore, even if relevant questions are being asked during clinical encounters, the importance of objective tests such as tympanometry and audiometry cannot be denied.[11] Another factor to consider is whether signs and symptoms can be attributed solely to OME, rather than any underlying language and behavioral problems the child may have.[8] Utilizing a variety of questionnaires with varying outcomes in conjunction with objective tests may be beneficial in this regard.[12]

In terms of the limitations of this study, a longer time frame and subsequently larger sample size would have been valuable. Not having an even number of preschool and school age children may have implications for any perceived differences between age groups. In addition, some of the questions were inapplicable to preschool children. Subdividing further age groups or adding more questions may allow for further analysis in the future. Children at high risk of complications from OME include those with bilateral otitis media with effusion, and those with recurrent disease.[13] Marchant et al determined that infants under 2 months of age make up a significant proportion of those at higher risk. As this study only includes children over 1 year of age, it would be beneficial to take those younger into account in future studies as well.

CONCLUSION

Awareness of OME can enhance caregivers' assessments and lead to early recognition, however, it cannot act as a definitive judgement. As such, questionnaires can aid the diagnosis of OME as caregivers' assessment is often limited to their knowledge. The study concluded that there aren't differences in answers from various age groups and hence, this questionnaire can be standardized across the spectrum. Further research is needed to determine validity of the questionnaire using a larger sample size and different age groups.

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