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Development of pediatric vestibular symptom questionnaire in malayalam language for children aged 3-6 years

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ABSTRACT

Vestibular disorders are the leading cause of dizziness in children. Vestibular disorders in youngsters with and due to Otitis Media Effusion have recently gained attention. The best way to identify vestibular disorders in youngsters is to use crude methods. The majority of the time, the parents' history is used to form the view. As a result, questionnaires are the finest tool for estimating children. The Pediatric Vestibular Symptom Questionnaire was created and validated to measure children's private vestibular symptom inflexibility (i.e. dizziness, shakiness), as a reliable and valid tool for assessing the presence and inflexibility of private vestibular symptoms in children with vestibular diseases or concussion provides a tool for assessing the presence and inflexibility of private vestibular symptoms in children with vestibular diseases or concussion. The questionnaire was used to distinguish between children with vestibular symptoms and healthy controls, and it should be used to detect and quantify vestibular symptoms that require further examination and treatment. The adaptation of the same in Malayalam Language among the natives of Kerala, the Southern Indian states were used widely to evaluate and identify the vestibular symptoms among the children for the effective treatment and better prognosis. Based on the statistics and analysis obtained the questionnaire demonstrated robust reliability, construct and discriminate validity.

1. Introduction

Vestibular disorders are the leading cause of dizziness in children. Although these disorders are usually diagnosed in children, they can still be difficult to treat (Riina et al., 2005). A child's dizziness is most likely caused by a vestibular disorder, which includes benign paroxysmal vertigo, vestibular migraine, and post-concussion dizziness (Niemensivu et al., 2007). Medical professionals may attribute symptoms to a behavioral disorder or "clumsiness" (McCaslin et al., 2011). It is possible that children with vestibular disorders are more prone to exhibiting secondary psychological symptoms than those with other disorders. A child's medical history is often the first step in the diagnostic process. It is also important to help children explain their symptoms in order to establish a diagnosis (Wiener &Vacher SR, 2008). Although some of questionnaires exist to evaluate the presence, severity, and effect of vestibular symptoms in adults, there are presently none to be had for the pediatric population (Jahn et al., 2011). Vestibular deficits, vertigo, and dizziness in toddler- hood can also result in not on time postural control, lack of coordination, and the improvement of paroxysmal head tilt in young patients. It is once in a while difficult to make the best prognosis because of the reality children are often now not capable of describe their vestibular court cases. They can also locate it hard to say how lengthy attacks closing and what provokes or accompanies them.

A correct diagnosis, but, not handiest obviates pointless investigations and alleviates parental issues but is also

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the prerequisite for a fulfillment remedy. Posterior fossa intracranial tumors are frequently considered in the differential diagnosis, but such severe causes are happily uncommon. Careful clinical examination of ocular-motor and vestibular feature lets in an correct prognosis. This evaluates focuses on 3 'warm' topics discussed inside the present day literature: the diagnostic spectrum, laboratory checks, and migraine-associated syndromes. [1–8]

There are forms of chronic centre ear infections, particularly, the mucoid or nonsuppurative and the suppurative otitis media. It is the continual suppurative otitis media that is a purpose of vertigo in a few patients. The nonsuppurative shape of persistent suppurative otitis media is typically a mucosal sickness, involving the mucosa of the mesotympanum and hypotympanum. It does no longer generally result in headaches which include labyrinthitis. [9–11]

Parmar et al.,(2018) reported the prevalence of CSOM in urban school children to be 2.32%, while for rural children, it was 5.11%. The tubotympanic disease was present in 87.18% of CSOM cases while 12.82% had atticoantral disease. Active CSOM was found amongst 37.18% while 62.82% had inactive disease. Considering the high prevalence of the middle ear disorder, vestibular symptoms may not be as uncommon as thought of.Labyrinthitis is a known problem of CSOM. Cholesteatoma actually erodes away the otic capsule to reason the signs and symptoms of acute occasionally chronic relapsing vertigo. In reality, if a affected person with recognized history of chronic discharging ear begins to expand vertigo, it's miles an absolute indicator that there can be extra than the superficial mucosal disorder in the centre ear. [12–18]

At this time of existence vestibular disorder may additionally result in not on time postural control, episodic vertigo, loss of coordination, and the improvement of paroxysmal head tilt in younger patients. It is sometimes difficult to make the correct diagnosis because kids are often inexperienced in describing their vestibular proceedings as dizziness or vertigo. They may additionally locate it tough to say how long attacks ultimate and what provokes or accompanies them. A correct analysis, however, is the prerequisite for successful remedy. History taking must focus on differentiating rotatory and to-and-fro vertigo in addition to episodic and sustained vertigo. Relevant provoking factors encompass trade of frame and/or head function, urgent, coughing, sneezing, sleep deprivation, and psychosocial pressure. Patients should continually be asked about any headache and cochlear symptoms (hearing loss, tinnitus). Hence the current study focuses on the development of a questionnaire to assess the vestibular symptoms in children.

Dizziness and strength difficulties are common in children, according to Jahan et al. (2011). The prevalence of vestibular dizziness in 10-year-olds is estimated to be 7%. The most common reason is vestibular headache, which accounts for about 40% of all studies. Somatoform dizziness problems are more common in children. The apex drive check for vestibulo-visual reflex component, visual engine supplying a shot of the fundamental vestibular machine, and soundness assessments for vestibulospinal function may all be done at the bedside to test vestibular capability. Vestibular headaches are treated with a behavior's guidance and medication. Cerebrum imaging is demonstrated in individuals who have subacute vestibular side effects, symptoms, and presentations. The majorities of diseases have a successful examination and may be appropriately treated. [19,20]

Vertigo and dizziness occur with full-size frequency in early infancy and early life (Klaus et al.,2015). The majority of the causes are harmless and curable. The goal of this test is to make doctors better aware of the frequent causes of dizziness in children and teenagers. Migraine-related disorders are the most prevalent cause of vertigo in children, according to epidemiological data. The International Classification of Headache Disorders has now defined vestibular migraine and benign paroxysmal vertigo.

Psychiatric comorbidity and somatization are present in around half of the youth with vertigo and dizziness. Vestibular paroxysmia has been identified as a novel entity in children that can be treated with carbamazepine at modest dosages. Video head impulses (for the semi-circular canals) and vestibular-evoked myogenic potentials (for the otoliths) are increasingly being employed to assess vestibular abnormalities. The whole range of causes of vertigo and dizziness in children and adolescents must be understood by pediatricians and neuro-otologists. Vestibular characteristics may now be tested with confidence. Although therapy for the most frequent migraine-related symptoms may be done similarly to migraine treatment in modern times, somatoform vertigo, the most prevalent outcome in teenage women, necessitates specific techniques.

Helen et al.,(1997) studied the occurrence of balance abnormalities in 25 young children aged 13 to 57 months who had been diagnosed with otitis media with effusion and had been diagnosed with otitis media with effusion (OME). The children were evaluated using the gross motor subtest of the Peabody Developmental Motor Scales, a well-established standardized test of motor development. In addition, parents were asked to complete surveys about their children's balance abilities. Participants with bilateral complaints were significantly bloodied compared to normal and unilateral patients on balance, movement, and total score. The results of the test did not correspond to the mothers' opinions of their children's balance. These findings suggest that early babies with Bilateral OME struggle to develop motor abilities that allow them to maintain dynamic balance. Regardless of a history of balance disorders, croakers should consider balance

performance while developing a therapeutic approach. Children with balance disorders may benefit from more intense intervention. According to Snashall (1987), half of all children with severe otitis have a balance issue. In the late 1980s, experimental tests were added to the assessment of balance function in children with OME. The impact of middle ear issues on vestibulospinal revulsions is clear. Using stabilometry, Wojciech et al., (2004) evaluated postural stability and the influence of middle observance drainage on vestibulo-spinal revulsions in 15 children with OME (5–14 years old). Children with bilateral draining of the middle observance were given names when conventional treatment failed. The presence of fluid in the middle observation, according to the research, impairs the functioning of the balancing system in children. Postural stability and the degree of vestibulo-spinal revulsions seem to be influenced by the functioning condition of the middle observance. A child's motor development might be clogged by dragging cases of OME.

2. Materials and Methods

Thirty native Malayalam speaking children with good academic performance aged 3 to 6 years who were diagnosed to have middle ear disorders from the clinics across Kerala participated in the study. Age and gender-matched children with no reported middle ear history formed the control group which was also had 30 participants. The audiologist at various centre administered the developed questionnaire. The children having any neurological or cognitive impairment and history of abnormal drug reactions were excluded from the study.

The controlled group against were the children without middle ear pathology and any kind of conductive hearing loss and cognitive or neurological impairment.

All subjects irrespective in both the group underwent middle ear analysis on Tympanometry. Children who were included in the study group had a B type tympanogram, and those in the control group had an A-type tympanogram.

This study aimed to develop and validate a questionnaire, the Pediatric Vestibular Symptom Questionnaire in Malayalam (PVSQ), to identify and quantify subjective vestibular symptoms (i.e. dizziness, imbalance) in children between 3-6 years of age. A secondary study aim was to investigate the relationship between vestibular symptoms and behaviors indicative of psychological problems in healthy children and those with a vestibular disorder or concussion.

A questionnaire consisting 20 questions was developed by considering the vestibular symptoms that the children might exhibit. The developed questionnaires were forwarded to 5 audiologists working predominantly with pediatric population for validating the contents in the questionnaire. Upon receiving the suggestions, the same were incorporated and the revised version of the questionnaire was sent to another 5 audiologists. The audiologists were asked to rate the questions on a scale of five where 1 meant irrelevant and 5 meant highly relevant. Questions with a rating of 4 and above were considered.

The proposed questionnaire was first developed in English. The questionnaire was translated to Malayalam. The original version and translated version were sent to 5 professionals to compare and comment. They were asked to rate the translated questionnaire on a scale of five where 1 meant no match with the original five meant it matched perfectly. Upon receiving the rating the questions with rating 4 and below were rephrased. A "back-translation" method was used to assure identical or highly similar meanings between the original and translated versions. The "back-translation" approach entails translating the original language into the target language, then doing a "back-translation" from the target language back to the original language, and lastly comparing the back-translation to the original version. This entails three crucial steps: (a) the original version is first translated into the target language; (b) this first translation is then translated back into the original language; and (c) the two versions of the test in the original language the first version (English to Malayalam) and the second version (Malayalam to English) are finally combined.

The developed questionnaire was administered for the children in the presence of his/ her parents. Those questions that the children were unable to answer were passed on to their parents. The sections where the items are to the parents for reporting their observation was noted by the audiologist or the parent themselves. All questions had options namely.

1. Yes
2. No
3. At Times
4. Not Sure

3. Results & Discussion

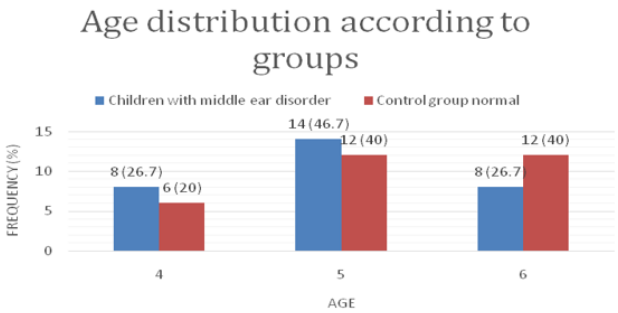
Considering middle ear infection is a common condition to induce vestibular symptoms, the children with middle ear history formed the study group and children who had no middle ear infections formed the control group. To the maximum possible extent the age and gender ratio was matched between the study and control group. Also, homogeneity was maintained throughout the study. All the required analysis for statistics was carried out using the SPSSv.28 (IBM Corp., Armonk, NY) software.

3.1. Descriptive statistics

Table 1 Shows the descriptive statistics for the participants in this study. There were 16 females (53.3%) and 14 males (46.7%) in the experimental. While in the control group, there were 17 (53.3%) males and 13 (43.3%) females.

Table 1: Descriptive statistics of the participants

		Children with middle ear disorder		Control group normal	
		Frequency	%	Frequency	%
Age	4	8	26.7	6	20
	5	14	46.7	12	40
	6	8	26.7	12	40
Sex	Female	16	53.3	13	43.3
	Male	14	46.7	17	56.7



Graph 1: Descriptive statistics of the participants

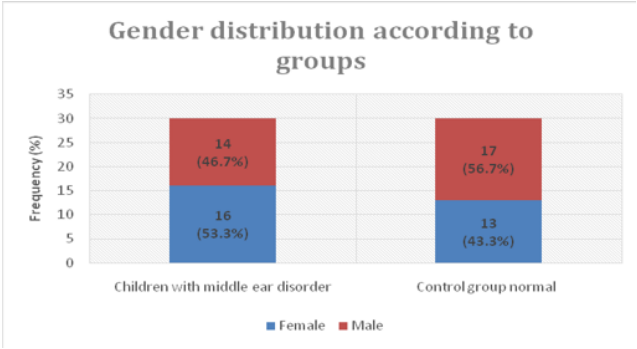
The age distribution of the experimental and control groups are depicted in the bar graph above. The graph shows 26.7 % in the age group of 4 years for children with middle ear disorder, while 20 percent for the control group. Children under the age group of 5 and 6 showed 40% of the participants in the control group. While in the experimental group, the percentage of participants aged 5 years was 46.7 %, and for aged 6 years was 26.7 %.

3.2. Gender distribution

Though efforts were made to maintain the gender ratio to the maximum possible extent, due to the prevailing pandemic it could not be achieved. The Graph 2 shows the gender distribution among each group. In children with middle ear disorder 53.3% of the participants were females while 46.7% were males. Contrary to that, the control group showed 43.3% females 56.7% males.

3.3. Response distribution

The frequency and percentage of the participants response is depicted below. People in the experimental group who answered 'Yes' to the first question made up 23.3 %; those who answered 'No' made up 33.3 %, and those who answered 'At Times' made up 43.3 %. In response to the second question, 26.7 % said "Yes,"6.7% said "No," and 66.7 % said "At Times". Similarly, in the third questions, the answers were 'At Times' and 'NO,' and the answer 'Yes' was not obtained, the percentage obtained was 40% for 'No,' and 60% for 'At Times.' Similarly, the answers to



Graph 2: Gender distribution for the groups

questions 4 and 5 were "At Times" and "NO," respectively. The percentage for "No" was 83.3 %, and the percentage for "At Times" was 16.7 %. Question 5 had only one correct answer of 'No,' which was 100%. Only "No" and "At the time" responses were obtained for questions 6 through 9. It was 36.7 percent for 'No,' 63.3 percent for 'At Time,' for question 6 and 50 percent for both 'No' and 'At Times' for question 7. Question 8 and 9 received similar responses, with 56.7 % saying "At Times" and 43.3 % saying "No." The percentages for "Yes" and "At Time" for question 10 was 46.7 percent and 6.7 percent, respectively. It was a 30% response for 'At Time' and a 70% response for the 'No' option for question 11. The participants only answered "No" to all 12 questions, resulting in a 100% response rate. For the 13^{th} question the percentage are as follows for the option 'At Times' it was 56.7%, for 'Yes' it was 10% and for 'No' was 33.3%. Now for the 14 question the responses that they obtained was 43.3% for 'At Times' and 'No' and for the Yes it was 13.3%. For the 15 question the participants opted for 'No' which was 100%. For the 16 questions, 13.3 percent of participants chose 'At Times,' 86.7 % chose 'No,' and no one opted 'Yes.' Moving on to the 17 questions, the participants chose one of three answers: 'Yes,' 'No,' or 'At Times.' The percentages are 53.3 %, 3.3 %, and 43.3 %, respectively. Let's take a look at how the 18 questions were answered by the participants. 73.3 % said "occasionally," while 26.7 % said "never." Moving on to the final question, 30 participants only chose the option 'No.' Moving on to the final question, 76.7 percent of those surveyed said 'At Times,' while 23.3 % said 'No.' In the Control group all the 30 participants opted for the option 'No' for all the 20 question in the paediatric vestibular symptoms questionnaire.

Reliability of each question was tested using the Cronbach alpha score for total of 20 question of the paediatric vestibular symptoms questionnaire in Malayalam. So the analysis of the Cronbach's alpha obtained coefficient was 0.739 and hence the paediatric vestibular symptoms questionnaire in Malayalam was reliable. Table 2 depicts the distribution of participant responses to each question.

Table 2: Distribution of responses

SL No.	Children with middle ear disorder						Control group normal	
	At Times		Yes		No		No	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Q_1	13	43.3	7	23.3	10	33.3	30	100
Q_2	20	66.7	8	26.7	2	6.7	30	100
Q_3	18	60	- -	- -	12	40	30	100
Q_4	5	16.7	- -	- -	25	83.3	30	100
Q_5	- -	- -	- -	- -	30	100	30	100
Q_6	19	63.3	- -	- -	11	36.7	30	100
Q_7	15	50	- -	- -	15	50	30	100
Q_8	17	56.7	- -	- -	13	43.3	30	100
Q_9	17	56.7	- -	- -	13	43.3	30	100
Q_{10}	14	46.7	14	46.7	2	6.7	30	100
Q_{11}	9	30	- -	- -	21	70	30	100
Q_{12}	- -	- -	- -	- -	30	100	30	100
Q_{13}	17	56.7	3	10	10	33.3	30	100
Q_{14}	13	43.3	4	13.3	13	43.3	30	100
Q_{15}	- -	- -	- -	- -	30	100	30	100
Q_{16}	4	13.3	- -	- -	26	86.7	30	100
Q_{17}	16	53.3	1	3.3	13	43.3	30	100
Q_{18}	22	73.3	- -	- -	8	26.7	30	100
Q_{19}	- -	- -	- -	- -	30	100	30	100
Q_{20}	23	76.7	- -	- -	7	23.3	30	100

As you can see, this study has two groups: control and experimental. As a result, the twenty questions in this table were examined.

4. Discussion

The vestibular system is involved in key functions such as gaze stabilization, balance, postural orientation, and spatial navigation. Thus, a dysfunction of the vestibular system can be very debilitating, hindering the completion of activities of daily living and necessitating medical attention. Across the different studies conducted in the adult population, the prevalence of vestibular disorders is relatively well-documented using either vestibular symptoms such as vertigo, balance tests or the prevalence of specific vestibular disorders. In fact, vestibular disorders would affect almost 6.5–7.4% of individuals in their adulthood, with a larger prevalence in older adults whereas, the prevalence of vestibular disorders in childhood, however, is not as well documented (Shashank et al, 2019). Clinicians often rely on parent's inputs to screen for vestibular dysfunction, especially when the child is too young to verbalize their symptoms.

Though claimed Vertigo and dizziness are not common in childhood, but are probably present more often than was formerly thought. These symptoms caused mainly by otitis media and middle ear effusion, two of the most common diseases in children. Manche et al, 2016 reported CSOM as one of the most common inflammatory disorders of middle ear and has an important health concern in children. Considering the huge number of children being infected with middle ear disorders, it is very likely that these children will exhibit some sort of vestibular disturbances. Some may be transient conditions while the others may of serious conditions.

A validated questionnaire in the native language would consider various factors which would give a comprehensive evaluation and results. The present study aimed at developing a pediatric assessment questionnaire in Malayalam. Based on the statistics and analysis obtained the questionnaire demonstrated robust reliability, construct and discriminate validity.

In our study the 56.7 % of children had problem in the frequent headache and vomiting in most of the time. These children will further need detailed assessment to assess their vestibular system and intervene as needed.

5. Summary & Conclusion

The Pediatric Vestibular Symptoms Questionnaire was found to be a reliable and accurate tool for evaluating the existence and severity of subjective vestibular symptoms in children with vestibular disorders. The reliability of the questionnaire as obtained by Cronbach's alpha coefficient was 0.739 which suggest that the questionnaire is acceptable for the assessment.

Children with vestibular symptoms fail to explain their symptoms as compared to adults. Hence intervening

parents with children with suspected disorders that might cause vestibular dysfunction need to be assessed. In this perspective, the present questionnaire aims to elicit the information from the parents that can subsequently lead the clinician to suspect if the child has any vestibular symptoms.

The present study also throws light on the importance of assessing children with middle ear disorders for vestibular dysfunction. The most common kind of infection in children is the middle ear infection. The results from the questionnaire shows that nearly 50% of the children showed some kind of vestibular symptoms. The results imply that all children with middle ear disorder should be screened for their vestibular symptoms. The vestibular assessment questionnaire should be part of the test battery used to assess children with middle ear disorder.

6. Source of Funding

None.

7. Conflict of Interest

None.

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