Assessing dizziness-related quality of life in the paediatric population

BY DEVIN MCCASLIN AND GARY JACOBSON

In this article, **Devin McCaslin** and **Gary Jacobson** share their experience of assessing dizziness-related quality of life in paediatric patients, and demonstrate that the involvement of care-givers is vital in ensuring the most appropriate assessment and treatment for this particular group of patients.

Introduction

Adults are not the only ones affected by dizziness disorders. However, the incidence of dizziness varies in the paediatric population in relation to the research methods utilised for accumulating data. Prevalence of dizziness in children is likely higher than what has been reported as many incidences of dizziness are missed, unreported, or misdiagnosed. That is, parents may not report any concerns with a child having significant dizziness or imbalance since the issue may be misjudged for clumsiness, be ignored, or missed due to lack of complaint by the child [1].

The problem of paediatric dizziness

In 2010, O'Reilly and colleagues retrospectively examined 561,151 electronic hospital medical records (ICD-9 codes) looking for cases where the primary complaint was related to balance [2]. Approximately 1% of their cohort had the primary complaint of dizziness. It is for these patients that conventional electroneurodiagnostic techniques (e.g. vestibular evoked myogenic potentials, videonystagmography) for assessing dizziness have been modified to be less intimidating for paediatric patients. It is worth noting that whereas 11% of dizziness in adults can be traced to central origins that number is quite a bit larger for paediatric patients [3]. In this regard it has been reported that up to 40% of paediatric vertigo and dizziness is connected to headache [4]. These are patients that often demonstrate a case history that is positive for motion intolerance and night terrors. This means that ~60% of paediatric patients have vertigo that has its origins in disorders affecting the peripheral vestibular system. For these paediatric patients a bout of vertigo is as frightening as it is to adult patients.

Assessing dizziness handicap in dizzy patients

It has become standard practice to assess not only the magnitude of dizziness impairment (e.g. how large is the caloric asymmetry) but also the impact of the impairment on the patient's (a child in this case) ability to carry on in a manner considered normal for a person of that age. For adults there are a number of modality-specific dizziness handicap indices including the Dizziness Handicap Inventory and the Vertigo Handicap Questionnaire [5]. The materials developed for adults are usually administered in a paper-pencil format. They are usually brief (i.e. can be completed in five minutes or less) and are psychometrically robust. That is, they can be administered in a test-retest format and determine the extent that a vestibulopathy has an effect on self-reported dizziness disability or handicap. This means it is possible for a clinician to administer a handicap measure to a patient, intervene with a treatment designed to mitigate the origin of the dizziness and then re-measure dizziness handicap after treatment. The psychometric investigations have determined what critical amount of change in the total score must occur for the change in score to be statistically significant. One reason why these measures have become so popular is that there are no semi-objective measures of vestibular impairment that are predictive of dizziness disability and / or handicap.

Development of the paediatric dizziness handicap inventory for patient caregivers (pDHI-PC)

A few years ago we endeavoured to develop a dizziness handicap assessment

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Table 1: Final version of the pDHI-PC and **Table 2:** Phase 2 Pediatric Dizziness Handicap Inventory for caregivers with item-total correlation coefficients cients can be viewed online at **http://is.gd/McCaslinJacobsonTables**

"We have developed a paediatric caregiver version of the DHI (pDHI-PC) that is reliable, requires little time to administer, and is easy to score and interpret"

device for use with a young paediatric population. This device is called the paediatric Dizziness Handicap Inventory for Patient Caregivers pDHI-PC [5]. It is designed for use with patients from 5-12 years of age. The final form of the device is shown in Table 1. The device emanated from a three-part study, the purpose of which was to create a measure that would give patient caregivers a method to measure and report the impact that a dizziness disease has on a child's everyday life. The items comprising the paediatric DHI were written in such a way that they would be completed by the child's proxy (i.e. the caregiver). Part 1 of the study represented our efforts to generate items that would be administered to patient caregivers. The subject matter of the items centred on physical (e.g. "Because of his / her problem does your child have difficulty walking up and down stairs?"), functional (e.g. "Because of his / her problem does your child have difficulty reading or doing schoolwork?") and emotional factors (e.g. "Because of his / her problem, does your child feel frustrated?") that impact dizziness disability handicap. You may have noticed the phrase "his / her problem" replaced the more common phrase "his / her dizziness". This was a convention that we used in the development of the Dizziness Handicap Inventory in hopes that the device would have greater appeal and generalisability to patients who were dizzy (not vertiginous) or unsteady. As with the adult version of the DHI, patient caregivers were requested to answer each item by responding "yes", "sometimes" or "no." The "yes," response was awarded four points, the "sometimes" response was awarded two points, and the "no" response was awarded zero points. The original 40 item device was administered to 86 caregivers.

Results of the pDHI-PC study

The results of the analysis of the initial device showed that many of the items did not contribute significantly to the task of quantifying dizziness disability handicap. Additionally, attempts were made to identify latent signs of a subscale structure using statistical techniques. None was found to exist.

The initial 40 item version of the pDHI-PC was winnowed down to a 25 item device which was administered to 56 caregivers. Results of the second administration showed that Phase 2 device had strong internal consistency reliability. Further, we found that an additional four items required elimination because they demonstrated low item total correlations. This left us with a 21 item final version of the pDHI-PC (see Table 2). This final version was administered two times to a subset of 10 caregivers so that we could assess test-retest reliability. Test-retest reliability was found to be strong (r = 0.97). From this analysis we found that a significant change from test-retest of 18 points or more represents a statistically significant change at the 0.05 level of significance.

Conclusions

In conclusion, we have developed a paediatric caregiver version of the DHI (pDHI-PC) that is reliable, requires little time to administer, and is easy to score and interpret. It has the potential to provide information about a child's disability / handicap and may be helpful in assessing the efficacy of a dizziness treatment plan.

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