

Mode of Administration of LittleEARS[®] (MED-EL) Auditory Questionnaire (LEAQ) as a Screening Tool in Ghana: Are there any differences in final test scores between “Self Administration” and “Interview”?

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Abstract

The mode of administration of LittleEARS[®] Auditory Questionnaire (LEAQ) in Ghana, where a Universal Newborn Hearing Screening (UNHS) has not been implemented and in addition about 31% of adults have never been to school was investigated. The original LEAQ English version was adapted into three Akan (Ghanaian) languages using the translation/back-translation procedure recommended by the International Test Commission and validated using data collected for N= 402 children. The effect of administration mode was however, investigated by collecting data from N=152 respondents. Our results show that it does not make any difference in terms of LEAQ scores whether the questionnaire was administered via interview or by self - administration. Results of the study support the position that LEAQ is an appropriate screening tool for children living in developing countries where adult illiteracy rates are high.

1. Introduction

The LittleEARS[®] (MED-EL) Auditory Questionnaire (LEAQ) was designed to monitor pre- and post operative auditory development in children receiving cochlear implants (Weichbold et al, 2005).

The trend toward cochlear implantation at an early age of about 12 months, or even earlier, necessitated the development of the LEAQ (Coninx 2004; Weichbold et al., 2005; Coninx et al., 2009). The LEAQ is designed with an easy “YES” – “NO” format. It is scored in a straightforward manner (Bagatto, Brown, Moodie, & Scollie, 2011) and requires between 5 and 10 minutes to complete.

The psychometric properties of the LEAQ, such as norm data, support its use as a tool for evaluating auditory behaviour in all children and in more than 15 languages (Coninx et al., 2009). Figure1 shows the LEAQ validation data in over 15 languages. Therefore, LEAQ provides a general picture of the auditory behavior and functioning of all children in the age range of 0-24 months. Initial field studies on using the LEAQ as a screening tool have been carried out (Coninx & Schäfer, 2012), and the sensitivity for hearing loss, as assessed so far, is about 0.99 (Neumann, et al., 2012).

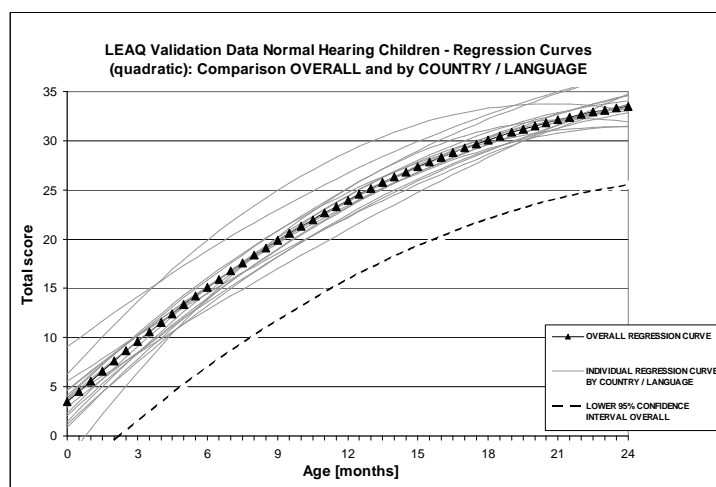


Figure 1: LittleEARS[®] Auditory Questionnaire (LEAQ) validation data.
Source: Coninx et al., (2009).

The impact of the LEAQ as an evaluation tool has been reported in the literature. Bagatto et al. (2011) graded 12

auditory-related subjective paediatric outcome evaluation tools that used either a rating scale or yes/no response format similar to that of the LEAQ for example, the Auditory Behaviour in Everyday Life (ABEL) (Purdy, Farrington, Moran, Chard, & Hodgson, 2002), Early Listening Function (ELF) (Anderson, 2000), Parents' Evaluation of Aural/oral performance of Children (PEACH) (Ching, Hill, & Psarros, 2000) and Functional Auditory Performance Indicators (FAPI) (Stredler-Brown & Johnson, 2001). Bagatto et al. (2011) graded these evaluation tools based on conceptual clarity, norms, measurement model, item/instrument bias, respondent and administrative burden, reliability, different types of validity, responsiveness, alternate/accessible forms and language adaptations scales. They found that the LEAQ received an "A" grade on the conceptual clarity domain and performed very well on the scale of "lack of respondent and administrative burden".

Several applications of the LEAQ have been documented in the literature. For example, May-Mederake et al. (2010) found that LEAQ was a quick and effective tool for assessing the auditory skills of children aged between 6 and 24 months who are living with hearing loss and additional disabilities. Similarly, Schäfer (2013) reported results of an investigation of N=5320 German children who underwent a second hearing screening (SHS) and identified 6 children with permanent hearing loss as well as infants with frequent otitis media and, speech or other developmental dysfunctions like autism and cognitive deficits. Therefore, LEAQ is useful in screening infants and children.

Obrycka, (2010) has observed that using a structured questionnaire to obtain parents' or other caregivers' view about their child's behaviour is a useful way to identify hearing losses among pre-verbal children. In addition, parental questionnaires could complement professional assessments that are carried out before and after cochlear implantation. In this way parents' reports have been shown to be a reliable way of assessing child development (May-Mederake et al., 2010).

Coninx et al., 2009, and Bagatto et al., (2011) concluded that LEAQ is a good outcome evaluation tool. A criterion for a good evaluation tool is that it must have alternative ways of administration. In addition, an outcome evaluation tool must not have any biases either within the items or the instrument, the responses must not be contaminated by cultural differences or social circumstances and the tool should have good test-retest reliability, internal consistency, validity, and responsivity. Furthermore, the length and the content of the tool must be acceptable to the respondent and should be designed in such a way that it can be reasonably administered, scored, and interpreted by the clinician (Bagatto et al, 2011). Also, a good outcome evaluation tool must be useable in clinical practice (Andresen, 2000; Graham et al, 2006).

Bagatto et al. (2011) therefore, support the use of parents' questionnaires to evaluate the auditory ability of their children. In their view, subjective measures focus on the child's responses to various sounds in real-life situations, as these are reported by the caregiver. Furthermore, questionnaires provide important information which supports the objective tests performed by clinicians.

However, Johnson and Danhauer (2002) have warned about possible administrative barriers that could emerge with caregiver reports. For example, questionnaires are more appropriately administered in the native language of the family, and there may be challenges for caregivers who have literacy issues. This situation is particularly applicable in Ghana, a middle income country with over 100 ethnic groups and immense multi-cultural diversity (Dolphyne, 2006; Osam, 2004). Also in Ghana, about 30% of the adult population has never been to school and about 17% have been to school but do not have any qualification (Ghana Living Standards Survey, 2008). These challenges could be overcome when questionnaires are administered in various languages or when the questionnaire is administered as a person-to-person interview rather than in a written format. This has been an issue for research in Ghana and raises important questions.

Infants and children are generally difficult to test. However, methods for testing children in developing countries such as otoacoustic emission (OAE), Auditory brainstem audiometry (ABR) or visual reinforcement audiometry (VRA) are either minimal or nonexistent. Additionally, there is no newborn hearing screening (NHS) in Ghana therefore alternatives such as LEAQ are required.

Generally, LEAQ is administered via self-administration which means that the parent or other significant adult who lives with the child and knows him/her well is given the questionnaire to answer. However, in Ghana where over 60% of the adult population cannot read, the application of LEAQ in a self-administration mode poses a severe challenge. What this means is that in a developing country such as Ghana, the use of an alternative mode of LEAQ administration such as interview must be investigated and used. Our study therefore, investigated whether the mode of LEAQ administration affects the final test scores when it is used on Ghanaian children.

2. Methods

Descriptive statistics were used to describe demographic statistics and baseline characteristics such as age and gender. Quantitative data were presented as mean (M) and standard deviation (SD), and quantitative data such as respondents and locations for LEAQ data were reported as absolute and relative frequencies (May-Mederake et al., 2010). Statistical analysis included a one-way ANOVA to test mean group differences based on mode of questionnaire administration and level of education of the respondents. All the data that were analyzed with SPSS IBM version 20 and statistical significance was set to $p < 0.05$.

The original LEAQ English version was adapted into 3 Ghanaian (Akan) languages using the translation/back-translation procedure recommended by the International Test Commission (Obrycka et al., 2010). For validation purposes, norm data were collected for $N = 402$ children. Results were consistent with previous adaptation data (Coninx et al 2009). However, the effect of administration mode was investigated by collecting data from $N = 152$ parents of Ghanaian speaking children comprising 74 (48.68%) females and 78 (51.31%) males, with their ages ranging from 4 – 18 months (mean age = 10.8 months; $SD = 4.2$).

Table 1 shows the locations where data were collected. More than 60% of the data were collected in the homes of the respondents and 26% of data were collected from respondents during church service.

Table 1: Locations for LEAQ data collection

<i>Location</i>	<i>Frequency</i>	<i>%</i>
Church	39	25.7
Post natal clinic	14	9.2
Office	4	2.6
Home	93	61.2
Audiology Centre	2	1.3
Total	152	100

Source: Field data, 2013

Results and Discussion

We placed respondents into 5 groups for our study. In groups 1 to 4, respondents completed one half (part) of the questionnaire independently (self-administration) and completed the other half through an interview. However, in group 5 respondents answered all of the questions via interview only. A total of 34 out of 35 items in the original LEAQ were used in this study in order to ensure that each one half consisted of 17 items.

An ANOVA to test the mean group differences based on method of completing LEAQ was not significant $F(4,147) = .196$ $p = .940$. The results support the hypothesis that there is no significant mean difference between scores based on method of completing LEAQ (“self-administration” or “interview”). What this result shows is that it does not make any difference whether LEAQ is administered via self-administration or by interview. This has implications for parents and respondents in developing countries where the levels of illiteracy are high. What this means is that a significant percentage of Ghanaian parents cannot read and would therefore be unable to respond independently to a questionnaire.

The literacy level of respondents was investigated as part of the study. Results show that out of the $N = 152$ respondents, 90 (59.2%) had attained basic level of education, 43 (28.3%) had attained secondary level education while only 19 (12.5%) had attained tertiary level education. A one-way between subjects ANOVA was conducted to compare the effect of academic level on LEAQ scores in basic, secondary and tertiary conditions. No statistically significant difference was evident at the $p < 0.05$ level for the three conditions [$F(2,149) = 0.309$ $p = 0.734$].

Sixteen out of the $N = 152$ respondents involved in our investigation responded only via the interview approach. These $N = 16$ respondents were asked to provide reasons why they chose to respond only through interview but not self-administration. In response, $N = 2$ of the respondents claimed that they were illiterate, whilst $N = 1$ respondent said “I have forgotten how to read”. The rest did not respond. Although these responses may sound interesting they nevertheless, emphasize the need for different approaches to questionnaire administration, such as interview and self-administration to be made available. Such diverse approaches are needed in order to meet the needs of respondents who cannot or would not want to respond to a questionnaire independently and also, encourage parents to provide relevant information concerning their children freely.

These findings have profound implications for the education of children future because, by using both interview and self-administration modes of questionnaire administration, many children can be screened for hearing loss, irrespective of their parents' literacy, economic, social or educational circumstances. When screening services are made available to a wider group it means that significantly more relevant data on the state of childhood

disabilities can be gathered. Relevant data would by implication, provide a platform for educating parents and other stakeholders on issues concerning disabilities such as, their causes and management.

More importantly, with increased amounts of relevant data it is possible to make a strong case for specific legislation to be enacted on early identification and intervention of infants and children with educationally significant disabilities. Thus, relevant data about the state of disabilities among children is more likely to initiate the performance of pilot studies to provide further empirical evidence which would engage relevant government ministries (education, health and social welfare) in establishing appropriate provisions for early hearing detection, and other interventions within the context of overall early childhood development in current health and education policies (Olusanya, 2008). This will have a positive impact on the educational inclusion of all children with disabilities in Ghana.

Put into context, data on prevalence is important when obtaining legislative support. Unfortunately, it appears the insufficient data in Ghana has made it difficult to gain legislative support for initiatives related to early identification and intervention of disabilities such as the universal new-born hearing screening (UNHS). Therefore, most children born in Ghana currently have little prospect of having their hearing screened.

The results of our study show that more than 60% of the LEAQ data were collected from the respondents in their homes. This finding is important and has implications for models for the provision of screening services for children. One important advantage of using a questionnaire as a screening tool is that it enables screening services to be provided to several people in a variety of informal settings and situations including homes. This provides respondents with a relaxed atmosphere within which they could freely participate in the screening process.

Another advantage is that when screening services are provided at the doorstep of parents they would not have any excuse not to get their children screened. Many parents in developing countries proffer numerous reasons why they would not send their children to be screened. For example, some parents who do not see anything physically wrong with their children's hearing would not feel any need to invest their time, energy and scanty financial resources to send their children to screening centres to be evaluated for problems which, in their view, their children do not have.

In addition, Ghanaian culture has a strong association with negative superstitious beliefs toward disabilities such as hearing impairment. This creates a situation where some mothers may be reluctant to volunteer information on risk factors for screening purposes, as this could unduly stigmatize or label their apparently 'normal' babies (Olusanya et al., 2009, p. 184). This might well be the case especially, when screening is being done in public. The use of a questionnaire which can be completed in private therefore makes it possible to widen the scope of screening services to enable as many children as possible to be identified for intervention.

Conclusion

Our study shows that LEAQ is an appropriate screening tool that can be used in diverse groups of children particularly, those who live in developing countries where adult illiteracy rates are relatively high, such as Ghana. Also, our study shows that, LEAQ scores do not change significantly, based on the mode of administration. Specifically, what this means is that it does not make any difference in terms of LEAQ scores whether the questionnaire was administered via interview or by self administration. Furthermore, our findings support the proposition that questionnaires are more appropriately administered in the native language of the family mainly because of the potential challenges they might pose for caregivers who cannot read. Our findings therefore, have implications for the language that is used in the interview, as well as the ability of the caregiver to observe their child. Ching et al. (2000) investigated the significant variations in the caregiver's ability to observe their child and concluded that the variation may be limited by competing factors in the household, such as number of children and their health, as well as the lifestyle of the family.

The findings of our study also have significant implications for the competence of the personnel carrying out the testing, because an inexperienced interviewer may have difficulty extracting useful examples from the parents even when the interviewer has been instructed on how to administer a questionnaire (Bagatto et al., 2011). This implies that the interviewers must be given sufficient training prior to questionnaire administration because, interview-based scoring contributes to administration and respondent burden which results in variability with scores (Bagatto et al., 2011).

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