The Persian Version of the Auditory Behavior in Everyday Life Questionnaire

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Abstract

Objectives: The auditory behavior in everyday life (ABEL) questionnaire is a valid tool that was translated and adapted to Persian language by Oryadi-Zanjani et al. (2015). This study aimed at establishing the final Persian version of the ABEL questionnaire (ABEL-P).
Methods: This study was a cross-sectional, observational study, conducted during a 12-month period. The questionnaires were completed by 113 mothers of 1- to 6-year-old children with hearing loss using hearing aids or cochlear implants. The subjects were recruited from children studying in a rehabilitation Centre for Persian children with hearing loss in Shiraz, Iran. This study had 4 main aims, including (a) specifying internal consistency of the questionnaire in a larger sample size, (b) comparing the 26-item ABEL-P and the 24-item ABEL-P, (c) factor analysis to examine the factor structure of the ABEL-P, and (d) assessing the capability of the tool in order to determine the auditory development of children with HL during a 12-month period.
Results: Both the 24-item ($\alpha = 0.95$) and the 26-item ($\alpha = 0.96$) ABEL-P had high reliability. There was a good correlation between the items in all the 3 factors. According to the results of factor analysis, all items of the ABEL-P questionnaire had relatively high loadings (0.60 to 0.83) on a single factor. There was a significant difference among the means of the subject's ABEL scores within a 12-month period (P value < 0.001).
Conclusions: The 23-item ABEL-P questionnaire is a valid and reliable assessment tool that could be used to measure the auditory development in Persian-language children.

Keywords: Hearing loss, Children, Development, Questionnaires, Persian language, ABEL-P

1. Background

Recent studies indicated that children, who use hearing aids (HAs) or cochlear implants (CIs), greatly vary in their spoken word and sentence recognition skills depending on their auditory skills development (1, 2). Early diagnosis and hearing aid fitting or cochlear implantation are associated with improved language outcomes for children with a wide range of hearing losses (3). Therefore, specific assessment tools are needed, such as questionnaires for 2 main aims: (a) to diagnose children with hearing loss as soon as possible; and (b) to assess their auditory development during the intervention.

The auditory behavior in everyday life (ABEL) questionnaire is a valid and reliable tool (4) that was translated and adapted to various languages, such as Brazilian Portuguese (5), Hebrew and Arabic (6), and Korean (7) in order to assess auditory development in children with hearing loss (HL). The findings of previous studies have indicated that the

ABEL, as a parental questionnaire, had good internal consistency (5-9). In addition, a correlation was found between the ABEL's score with the degree of HL (5, 9), age at implantation (6), chronological age (8), and duration of HAs or CIs use (5, 7, 8).

Oryadi-Zanjani et al. translated and adapted the ABEL to Persian (8). The study was performed on 43 parents of Persian speaking children with HL. Their findings showed that the Persian version of ABEL questionnaire (ABEL-P) could be used as a valid and reliable tool to evaluate the development of auditory behaviors in Persian children wearing HAs and/or CIs. Thus, they proposed that the ABEL questionnaire could be applied by parents/caregivers, clinicians, and researchers to follow the children's auditory behaviors in everyday life. The original version of the ABEL questionnaire, however, has 26 items categorized to 3 factors, including auditory-oral (11 items), auditory awareness (10 items), and conversational/social skills (5 items). Actu-

ally, items 9 and 11 of the auditory-oral section are repeated in the auditory awareness in items 5 and 8, respectively. According to Oryadi-Zanjani et al.'s study, some parents answered these repeated items differently because they had considered it as a different item (8). Although Purdy et al. did not report the same issue in their study on the original version of the ABEL (4), the findings of Oryadi-Zanjani et al.'s study should be considered due to its potential effect on children's scores. Therefore, the researchers decided to compare the original ABEL-P to a 24-item questionnaire by removing items 5 and 8 from the auditory awareness while their scores were added to the total score of the questionnaire. Overall, the study's aim was to establish the final Persian version of the ABEL.

2. Objectives

This study had 4 main aims, including (a) specifying internal consistency of the questionnaire in a larger sample size, (b) comparing the 26-item ABEL-P and the 24-item ABEL-P, (c) factor analysis to examine the factor structure of the ABEL-P, and (d) assessing the capability of the tool to determine the auditory development of children with HL during a 12-month period.

3. Methods

This study was a cross-sectional and observational study, conducted during a 12-month period. This study was approved by the ethical committee of Shiraz University of Medical Sciences. Informed consent was obtained from parents of patients participating in the study. As the subjects should have the same educational history, the samples had to be recruited from one center. There are only 2 rehabilitation centers for Persian children with hearing loss in Shiraz, Iran. Therefore, the subjects were recruited through the consecutive sampling method from the center with the largest sample size; i.e. Soroush rehabilitation Centre for Persian Children with Hearing Loss. Accordingly, the researchers recruited all the 113 children studying at this center. Therefore, the questionnaires were completed by 113 mothers of 1- to 6-year-old children with HL using HAs or CIs. The reliability of the 2 Persian versions of the ABEL-P (26-items and 24-items) was compared as the second aim. To achieve the fourth aim, 53 mothers filled out the questionnaire 6 times in every 2-month interval. The inclusion criteria for the subjects were bilateral mild-to-profound, congenital sensory-neural hearing loss, use of HAs or CIs, use of oral language as a communication method, same educational history, and no other disabilities. All the subjects had unilateral CIs or bilateral HAs. The

original ABEL questionnaire had a 7-point rating scale, including 0 = never, 1 = hardly ever, 2 = occasionally, 3 = about half the time, 4 = frequently, 5 = almost always, and 6 = always (4). According to a survey on 30 parents, the research found that there was no difference between "hardly ever" and "occasionally" as well as between "frequently" and "almost always" in Persian language and culture. Thus, "occasionally" and "frequently" were chosen in the ABEL-P. As a result, the ABEL-P questionnaire has been modified to a 5-point rating scale, including 0 = never, 1 = occasionally, 2 = about half the time, 3 = frequently, and 4 = always.

Specifically, Cronbach's Alpha was used to determine internal consistency of the 2 versions of the ABEL-P (26 items and 24 items). Furthermore, factor analysis was used to investigate the factor structure of the ABEL-P questionnaire. In addition, repeated measures was used to compare the results of 6 times administration of the questionnaire, and LSD post hoc test was used to determine which times were significantly different. The IBM SPSS statistics software 21 was used to analyze the data.

4. Results

Table 1 displays the distribution of the children with hearing loss based on 3 variables of age, amplification device, and severity of hearing loss.

Table 1. The Distribution of Children Based on Age, Amplification Device, and Severity of Hearing Loss[a]

Variables	Value
Gender	
Girl	48
Boy	65
Age, mo	
Mean	39.48
SD	16.67
Amplification device	
HA	55
CI	58
Severity of hearing loss	
MildI	1
ModerateII	11
Moderately SevereIII	21
SevereIV	67
ProfoundV	13

Abbreviations: CI, Cochlear Implant; HA, Hearing Aid; SD, Standard Deviation;
[a]I, 26 - 40 dB; II, 41 - 55 dB; III, 56 - 70 dB; IV, 71 - 90 dB; V > 91 dB.

Table 2 illustrates the Cronbach's Alpha of the 26-item and the 24-item Persian version of the ABEL-P, when each item was deleted in the 3 factors, including auditory-oral, auditory awareness, and conversational/social skills. Overall, both the 26-item and the 24-item ABEL-P had good internal consistency reliability with Alpha = 0.96 and Alpha = 0.95, respectively.

Table 2. The Cronbach's Alpha of the 26- and 24-Item Questionnaires Removing Each Item

Factors	26-Item Questionnaire		24-Item Questionnaire	
	Deleted Item	Cronbach's Alpha	Deleted Item	Cronbach's Alpha
Auditory-oral				
	1	0.93	1	0.92
	2	0.92	2	0.91
	3	0.93	3	0.92
	4	0.93	4	0.92
	5	0.93	5	0.92
	6	0.93	6	0.92
	7	0.93	7	0.92
	8	0.93	8	0.91
	9	0.93	9	0.92
	10	0.94	10	0.92
	11	0.93	11	0.92
Auditory awareness				
	1	0.92	1	0.88
	2	0.91	2	0.86
	3	0.91	3	0.87
	4	0.92	4	0.90
	5	0.91	5	0.88
	6	0.92	6	0.87
	7	0.91	7	0.88
	8	0.92	8	0.89
	9	0.92		
	10	0.92		
Conversational/social skills				
	1	0.63	1	0.61
	2	0.64	2	0.59
	3	0.63	3	0.57
	4	0.77	4	0.76
	5	0.66	5	0.59

Principal factor analysis was used to examine the factor structure of the ABEL-P. According to Table 3, the results of factor analysis showed that all items of the ABEL-P questionnaire had relatively high loadings (0.60 to 0.83) on a single factor. The item 4 of the factor 3, however, had low correlation with the other items of this factor including: 4 and 1 = 0.24, 4 and 2 = 0.17, 4 and 3 = 0.08, and 4 and 5 = 0.13. Therefore, Figure 1 displays the scree plot of the ABEL-P after removing item 4. Accordingly, the eigenvalues of the 4 items were more than 1 associated with 68.2% of the variance. In other words, these items had the most important effect in the questionnaire compared to the other items.
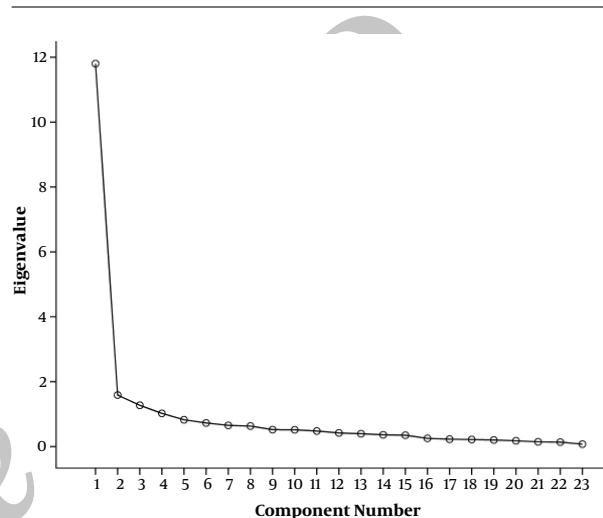

Figure 1. The Scree Plot of the ABEL-p

Based on Figure 2, there was a significant difference among the means of the subject's ABEL-P scores within a 12-month period (df = 5, F = 35.67, P value < 0.001). However, according to the results of LSD post hoc test, there was no significant difference between months 1 and 2 (P > 0.05), and 4 and 5 (P > 0.05).

5. Discussion

Based on the findings, both versions of the ABEL-P had high internal consistency reliability (Alpha for the 26-item = 0.96 and Alpha for the 24-item = 0.95). This finding was congruent with the results provided by Purdy et al. (4), Souza et al. (5), Souza and Iorio (9), Geal-Dor et al. (6), Oryadi-Zanjani et al. (8), and Choi et al. (7).

Besides, internal consistency reliability of the 2 versions was the same. In other words, removing items 5 and 8 from the factor of auditory-awareness had no effect on the subjects' scores. This finding was associated with the results of Purdy et al.'s, which found that the 24-item of ABEL had an excellent overall reliability of 0.95 (4).

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Table 3. Factor Analysis of the ABEL-P

Items	Components		
	1[a]	2[b]	3[c]
Initiates spoken conversations with familiar people	0.81	-0.10	-0.12
Says a person's name to gain their attention	0.82	0.00	-0.01
Says "please" or "thank you" without being reminded	0.75	-0.33	0.06
Responds verbally to greeting from familiar people	0.79	-0.26	-0.20
Asks for help in situations where it is needed	0.76	0.32	-0.17
Shows interest in spoken conversations around him/her	0.80	0.06	-0.17
Responds verbally to greeting from unfamiliar person(s)	0.78	-0.35	-0.04
Says the names of siblings, family members, classmates	0.81	0.05	-0.15
Asks about sounds heard around him/her (e.g., planes, trucks, animals)	0.83	0.08	-0.14
Plays cooperatively in a small group without adult supervision	0.63	-0.06	-0.05
Sings	0.75	0.01	0.56
Answers telephone appropriately	0.78	-0.28	0.02
Responds to own name spoken in the same room	0.73	0.30	0.12
Responds to a door bell or knock	0.76	0.32	-0.11
Will whisper a personal message	0.74	-0.14	0.32
Knows when making loud sounds (e.g., slamming doors, stomping)	0.67	0.39	-0.05
Is aware when telephone is ringing	0.70	0.43	0.02
Knows when hearing aid(s) or cochlear implant(s) are not working	0.60	0.31	0.17
Experiments with newly discovered sounds	0.69	0.11	-0.08
Initiates spoken conversations with unfamiliar people	0.79	-0.26	0.09
Takes turns in conversations	0.72	-0.34	0.11
Talks using a normal voice level	0.77	-0.14	-0.24
Quietens activity when asked to do so	0.68	-0.10	-0.15

[a]Auditory-oral.
[b]Auditory awareness.
[c]Conversational/social skills.

On one hand, according to the results of factor analysis, all the items of the ABEL-P had relatively high loadings (0.60 - 0.83) on just a single factor (Table 3). In other words, it was not possible to arrange the items of the Persian version of the ABEL questionnaire to 3 factors. Consequently, the ABEL-P could be used to assess the development of auditory behavior in Persian children. However, further studies with a larger sample size on the Persian version of the ABEL questionnaire may reveal three factors similar to the original questionnaire.

On the other hand, it was decided to remove item 4 from factor 3 in the original questionnaire, because of low loadings of this item with the other items of the factor. To sum up, the final ABEL-P includes 23 items due to removal of repeated items 5 and 8 of factor 1 and item 4 of factor 3

in the original 26-item questionnaire.

The administration of ABEL-P on children with HL within a 12-month period at 2-month intervals indicated that this assessment tool is sensitive to developmental changes of auditory behaviors in children that are speakers of the Persian language. Therefore, it is important to point out that the 23-item version of the ABEL-P questionnaire is qualified to be used for the assessment of auditory development in Persian speakers.

6. Conclusion

The 23-item Persian version of the ABEL is a strong valid and reliable assessment tool that can be used to mea-
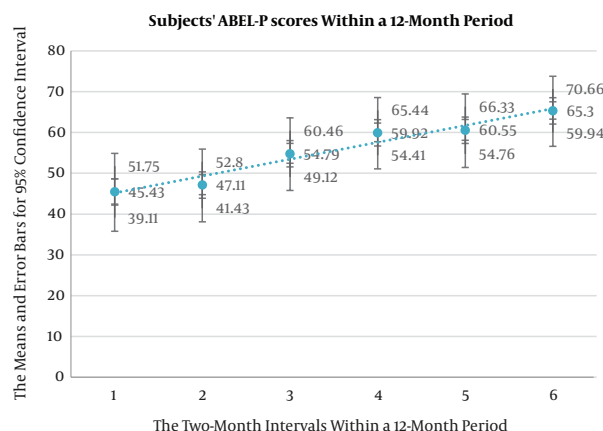
Figure 2. The Means and 95% Confidence Interval of the Subjects' ABEL-P Scores Within a 12-Month Period

sure the development of auditory behaviors in Persian-language speakers.

Acknowledgments

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