

# The Development of a New Quality of Life Questionnaire for Children with Hearing Loss - The Impact of Hearing Loss on Children (IHL-C): Field Testing and Psychometric Evaluation

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## ABSTRACT

**Purpose:** To report the development of user-defined, multidimensional, psychometrically sound Quality of Life questionnaires – Impact of Hearing Loss on Children – IHL-C 69 and Brief IHL-C for children with hearing loss, in two languages -Tamil and English.

**Methods:** 421 problem statements from previous qualitative studies were reduced to a 220-item questionnaire with 7 domains (educational implications, social integration, psycho-social well-being, speech, language and communication, family relationships, leisure time activities and general functioning). After field testing, the domain of leisure time activities was dropped, resulting in a 103-item self-administered questionnaire with 6 domains. This 103-item questionnaire was translated from Tamil to English, and self-administered by children with hearing loss (11-18 years of age) in Special schools (n=100) and Integrated schools (n=100), as well as by normal controls in Integrated schools (n=200). Standard methods were used for item reduction and to evaluate psychometric properties.

**Results:** Psychometric item reduction produced the 69-item IHL-C69 (long version) and 48- item Brief IHL-C (brief version) questionnaires. Psychometric evaluation showed that all the domains of both the questionnaires had good acceptability, high internal consistency (alpha >0.80; intrinsic validity >0.80) and test-retest reliability (0.86). The questionnaires significantly distinguished between the children with hearing loss and the normal controls. The domains of

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*both the questionnaires showed moderate evidence of convergent validity, and discriminant validity derived through hypotheses testing showed mixed results. The translation validity was also determined.*

**Conclusion:** *The IHL-C 69 and Brief IHL-C are reliable and valid user-defined, multidimensional questionnaires, available for the first time in both Tamil and English languages in Tamil Nadu, India. Designed to analyse the impact of hearing loss and to determine the quality of life of children with hearing loss, the questionnaires could be used to prioritise the goals for rehabilitation intervention for these children.*

**Keywords:** *disability, quality of life, deafness, rehabilitation, hearing.*

## INTRODUCTION

This paper describes the development and psychometric evaluation of the Impact of Hearing Loss on Children–IHL-C69 and the Brief IHL-C questionnaires. They are the new user-defined, multi-dimensional quality of life measures that were developed and field-tested in Special and Integrated schools of Madurai and Tiruchirappalli in Tamil Nadu, India. The study was conducted during the years 2013-14. An earlier paper by the authors presented the rationale for the questionnaires and described its content development. In brief, user-defined measures for hearing-related quality of life are hardly available for the population of children with hearing loss in developing countries. The development of the IHL-C69 and the Brief IHL-C questionnaires in both Tamil and English, attempted to fulfil the need. With the current shift in focus from skill acquisition to quality of life, the tool will be of help to parents, service providers, service organisations, policy- makers and researchers.

### Ethics Approval

The research study was approved by the Ethics Committee of the Research Department of Rehabilitation Science and Special Education, Holy Cross College (Autonomous), affiliated to Bharathidasan University, Tiruchirappalli, Tamil Nadu, India. Initially, the Heads of both the Special and Integrated schools were approached and the Research Advisor (second author) discussed the study with them. Participation in the study was voluntary. The purpose of the study was explained to the respondents and verbal consent was obtained before administration of the questionnaire.

## METHODS

### **Instrument development**

The earlier paper (Raj et al, 2014) described how children with hearing loss and other stakeholders participated in the content development of the IHL-C by identifying the impact of the hearing problem on their daily lives and psychosocial well-being. Approximately 421 elicited problem statements, grouped into 7 domain areas, were reduced to 220 statements through a process of merging statements which had similar semantic meaning and context. These 220 statements were in the form of questions which were designed for multichotomous response:1=always, 2=frequently, 3=slightly, 4=seldom and 5=never. This process resulted in the first prototype of the questionnaire. The questionnaire contained a total of 220 questions (in Tamil, the local language).

### **Field Testing and Psychometric Evaluation of the first Prototype of the Questionnaire**

The prototype questionnaire was administered to 50 children with hearing loss (CHL) - 25 from the Special school and 25 from the Integrated school. The purpose of the study was explained to each child and informed consent was obtained before the administration of the questionnaire. The CHL and the researcher were able to establish communication through lip-reading, signs and written scripts. The researcher read the questions to each child. The questionnaire was self-administered by the older students with moderate level of assistance from the researcher. The researcher moved on to the subsequent items after completion of each item. The administration of the questionnaire by the researcher lasted for 50 – 70 minutes. The CHL filled the questionnaire in 30 – 40 minutes.

The psychometric evaluation began with the examination of each question using the item-total correlation test. Table 1 shows the result of the item-correlation test. In the domain Educational Implications, 20 questions out of 38 were retained; in the domain Social Integration, 16 out of 33 were retained; in Psycho-social Well-being, 15 out of 41 were retained; and, in Family Relationships, 20 questions out of 49 were retained. In General Functioning, all the 7 questions were retained. The domains Leisure time Activities and Speech, Language and Communication showed poor correlation. Most of the studies have reported that speech, language and communication ability significantly influence the Quality of Life (QoL) of CHL. Hence it was decided to retain the domain with all the questions. However,

the Leisure time activities domain was dropped altogether as none of the studies found that it had an influence on the QoL. This resulted in the 103-item IHL-C questionnaire with 6 domains. The 103-item questionnaire showed an overall Cronbach's  $\alpha$  value of 0.606 and Intrinsic Validity value of 0.778. (The 220-item questionnaire showed Cronbach's  $\alpha$  value of 0.559 and Intrinsic Validity of 0.748.)

**Table 1: Internal Consistency and Item reduction**

Sl. No.	Domain	220-items (English)			103-items (Tamil)			69-item (Tamil)			Brief 48-item (Tamil)		
		N	Alpha	I V	N	Alpha	I V	N	Alpha	I V	N	Alpha	I V
1.	D1	38	0.581	0.762	20	0.610	0.781	9	0.698	0.835	4	0.797	0.893
2.	D2	33	0.494	0.701	16	0.602	0.776	15	0.669	0.818	6	0.769	0.877
3.	D3	41	0.510	0.714	15	0.604	0.777	11	0.661	0.813	10	0.793	0.891
4.	D4	26	0.545	0.738	25	0.611	0.782	13	0.652	0.807	10	0.814	0.902
5.	D5	49	0.549	0.741	20	0.605	0.778	15	0.684	0.827	12	0.878	0.937
6.	D6	7	0.532	0.729	7	0.609	0.780	6	0.692	0.832	6	0.894	0.946
7.	D7	Dropped completely											
	Total	194	0.559	0.748	103	0.606	0.778	69	0.760	0.872	48	0.845	0.920

The 103-item IHL-C was then administered to a large sample, including children with normal hearing, and subjected to detailed psychometric evaluation. The controls were recruited from Integrated schools and, more importantly, were in the same class as the CHL. Since the 103-item IHL-C cannot be administered to them as it based on the experiences of the CHL, another control version questionnaire was developed using the items of the 103-item IHL-C. The questions were phrased in the following way:

CHL: Do you feel that hearing loss is causing lots of restrictions in life?

Control: Do you feel that hearing loss is causing lots of restrictions in their life?

### Translation Process and Validation of the Quality of Translation

Both the questionnaires (for CHL and control groups) were translated to English from Tamil. The forward and back translations were done initially by the researcher; then, both the Tamil and English versions were revised by an expert and by 2 English language teachers. The translators inserted appropriate comments. The quality of the translation was rated for (i) clarity of translation (use of simple and understandable expressions), (ii) common language use (avoidance of technical terms), and (iii) semantic equivalence (representation of

the content of the original source). After incorporating the recommendations of the translators, the measure was qualitatively tested on a convenience sample of 30 children in the control group -15 boys and 15 girls in Integrated Schools. The 103-item questionnaire (control group version) was administered first in English, and on the following day, in Tamil. The CHL were not included as they could read and write only in one language - Tamil.

The translation validity was studied for each item. Each Tamil item and the corresponding English item were compared using Pearson's Correlation. The translation reliability of the overall questionnaire was found to be 0.85 and the domains showed value > 0.8; hence, the translation of the questionnaire satisfactorily passed the threshold requirement of 0.80 (shown in Table 2).

**Table 2: Translation Validity**

Sl. No.	Factors	Translation Validity (N=30)	
		( r )	Sig
1.	Educational Implications	0.87	p<0.05 sig
2.	Social Integration	0.78	p<0.05 sig
3.	Psycho-social Well-being	0.81	p<0.05 sig
4.	Speech, Language & Communication	0.84	p<0.05 sig
5.	Family Relationship	0.87	p<0.05 sig
6.	General Functioning	0.90	p<0.05 sig
7.	<b>Overall questionnaire</b>	0.85	p<0.05 sig

## Field-Testing of the 103-Item IHL-C Questionnaire

### Study Population

The questionnaires (Tamil) were then self-administered by children with hearing loss (n=200) and children with normal hearing (n=200) in the age group of 11 – 18 years. A total of 400 respondents were thereby enrolled.

Of the 200 CHL, 100 were recruited from Special schools and 100 from the Integrated Education programme. The Doulors School for the Deaf, Tiruchirappalli, and the YMCA Kamat School for the Deaf, Madurai, were approached for the 100 respondents from Special schools. 67 out of 120 children from the Doulars School, and 48 out of 135 children from the YMCA Kamat

School, were enrolled based on the inclusion criteria for self-administration of the 103-item questionnaire. However, 3 students from the Doulars School discontinued during the process and 12 left the questionnaire incomplete. Thus, 100 students were the Special school respondents.

Regular schools with Integrated Education Programme in Madurai and Tiruchirappalli were approached for recruitment of boys and girls with hearing loss. A total of 100 completed questionnaires were collected from 100 CHL. Though more children volunteered to participate, a few left midway and some submitted incomplete questionnaires. 200 children with normal hearing, in the age group of 10 – 16 years, were also enrolled for the study. They were in the same class as CHL in Integrated schools in Tiruchirappalli and Madurai.

Two days after the baseline assessment, the repeat questionnaire was administered to 40 CHL (20 from Special and 20 from Integrated schools) and 40 children with normal hearing. The children were selected at random from the above-mentioned schools.

### Questionnaire Administration

The 103-item IHL-C Questionnaire in Tamil was self-administered by 100 CHL in the Integrated schools and 100 CHL in the Special schools. The children were students from classes VII - XII. They tried their best to complete the questionnaire independently. The special educators along with the researcher helped them in the process. Socio-demographic details for every child were also collected. The questionnaire (control group version) in Tamil was self-administered by children with normal hearing. Appropriate socio-demographic details were also collected for the controls. Tables 3, 4 and 5 give these details.

**Table 3: Socio-demographic details of the CHL and Controls**

Sl. No.	Variables	CHL (200)		Controls (200)		Total		Statistical Reflection
		N	%	N	%	N	%	
1	AGE OF THE CHILD							
	1) 12 – 14 years	82	41.0	128	64.0	210	52.5	X <sup>2</sup> = 25.79 df = 2 p<0.05 sig
	2) 14 – 15 years	67	33.5	29	14.5	96	24.0	
	3) 15 – 18 years	51	25.5	43	21.5	94	23.5	

2	AGE AT ADMISSION 1) Below 5 years 2) 5-6 years 3) 6 years & above	70 111 19	35.0 55.5 9.5	NA	-	70 111 19	35 55.5 9.5	X <sup>2</sup> = 400 df = 3 p<0.05 sig
3.	CLASS 1) Junior 2) Secondary 3) Higher Secondary	126 59 15	63 29.5 7.5	86 61 53	43 30.5 26.5	212 120 68	53 30 17	X <sup>2</sup> = 28.82 df = 2 p<0.05 sig
4.	GENDER 1) Female 2) Male	73 127	36.5 63.5	111 89	55.5 44.5	184 216	46.0 54.0	X <sup>2</sup> = 14.53 df = 1 p<0.05 sig
5.	ORDINAL POSITION 1) First 2) Second 3) Third 4) Fourth	65 105 19 11	32.5 52.5 9.5 5.5	98 82 20 0	49.0 41.0 10.0 0	163 187 39 11	40.8 46.8 9.8 2.8	X <sup>2</sup> = 20.54 df = 3 p<0.05 sig
6.	TYPE OF SCHOOL 1) Integrated 2) Special	100 100	50 50	200	100	300 100	75 25	X <sup>2</sup> =171.42 df = 1 p<0.05 sig

**Table 4: Clinical Characteristics of CHL**

Sl. No.	Variables	CHL (200)		Controls (200)		Total		Statistical Reflection
		N	%	N	%	N	%	
1.	ONSET OF HEARING LOSS 1) Congenital 2) Adventitious	181 19	90.5 9.5	NA	-	181 19	90.5 9.5	X <sup>2</sup> = 400 df = 2 p<0.05 sig
2.	DEGREE OF HEARING LOSS 1) Mild 2) Moderate 3) Severe 4) Profound	20 35 61 84	10.0 17.5 30.5 42.0	NA	-	20 35 61 84	10.0 17.5 30.5 42.0	X <sup>2</sup> = 400 df = 4 p<0.05 sig
3.	AURAL AIDS 1) Cochlear 2) Hearing Aids	198 1.0	99.0	NA	-	2 198	1.0 99.0	X <sup>2</sup> = 400 df = 2 p<0.05 sig

**Table 5: Socio-demographic details of the Families of CHL and Controls**

Sl. No.	Variables	CHL (200)		Controls (200)		Total		Statistical Reflection
		N	%	N	%	N	%	
1.	NUMBER OF SIBLINGS							
	1) Only Child	12	6.0	16	8.0	28	7	X <sup>2</sup> = 40.14 df = 4 p<0.05 sig
	2) One	82	41.0	136	68.0	218	54.5	
	3) Two	79	39.5	43	21.5	122	30.5	
	4) Three	23	11.5	5	2.5	28	7.0	
	5) Four & above	4	2.0	0	0	4	1.0	
2.	HEARING LOSS AMONG SIBLINGS							
	1) No	156	78.0	200	100	356	89.0	X <sup>2</sup> = 49.44 df = 1 p<0.05 sig
	2) Yes	44	22.0	0		44	11.0	
3.	PARENT HEARING STATUS							
	1) Yes	188	94.0	200	100.0	388	97	X <sup>2</sup> = 12.37 df = 1 p<0.05 sig
	2) No	12	6.0	0		12	3.0	
4.	FAMILY HISTORY OF HEARING LOSS							
	1) Yes	23	11.5	1	0.5	24	6.0	X <sup>2</sup> = 21.45 df = 1 p<0.05 sig
	2) No	177	88.5	199	99.5	376	94.0	
5.	EDUCATION OF FATHER							
	1) Below class 8	23	11.5	16	8.0	39	9.8	X <sup>2</sup> = 51.47 df = 3 p<0.05 sig
	2) Secondary	51	25.5	28	14.0	79	19.8	
	3) Higher Secondary	115	57.5	89	44.5	204	51.0	
	4) College	11	5.5	67	33.5	78	19.5	
6.	OCCUPATION OF FATHER							
	1) Skilled	7	3.5	48	24.0	56	13.8	X <sup>2</sup> = 36.85 df = 2 p<0.05 sig
	2) Semi-skilled	79	39.5	72	37.0	151	37.8	
	3) Unskilled	114	57.0	80	48.5	194	48.5	
7.	EDUCATION OF MOTHER							
	1) Below class 8	93	46.5	41	20.5	134	33.5	X <sup>2</sup> = 85.80 df = 3 p<0.05 sig
	2) Secondary	79	39.5	54	27.0	133	33.3	
	3) Higher Secondary	24	12.0	35	17.5	59	14.8	
	4) College	4	2.0	70	35.0	74	18.5	
8.	OCCUPATION OF MOTHER							
	1) Skilled	4	2.0	38	19.0	42	10.5	X <sup>2</sup> = 45.26 df = 3 p<0.05 sig
	2) Semi-skilled	27	13.5	11	5.5	38	9.5	
	3) Unskilled	51	25.5	23	11.5	74	18.5	
	4) Homemaker	118	59.0	128	64.0	246	61.5	
9.	FAMILY TYPE							
	1) Joint	72	36.0	63	31.5	135	33.8	X <sup>2</sup> = 0.91 df = 1 p>0.05 ns
	2) Nuclear	128	64.0	137	68.5	265	66.3	



10.	BACKGROUND 1) Rural 2) Urban	87 113	43.5 56.5	26 174	13.0 87.0	113 287	28.3 71.8	X <sup>2</sup> = 45.89 df = 1 p<0.05 sig
11.	RELIGION 1) Hindu 2) Muslim 3) Christian	135 27 38	67.5 13.5 19.0	147 32 21	73.5 16.0 10.5	282 59 59	70.5 14.8 14.8	X <sup>2</sup> = 5.83 df = 2 p>0.05 ns

### Psychometric Evaluation

All the data was entered and subjected to verification and cleansing. KOLOMOGOROV–SMIRNOV test was performed on the dataset and normalcy was verified. The 20 socio-demographic characteristics of the CHL and control children were consolidated using Pearson’s Chi-Square test and the significance was determined for each variable. All psychometric analyses were performed on the pooled dataset of CHL. The reliability of the questionnaires was determined by item reduction and internal consistency. The Item structure/Internal consistency was determined using Item Discriminatory Index which consisted of Cronbach’s Alpha – a super-correlation of all the items on the questionnaire. The item was retained if the score was .70 or higher. The context, along with scores of internal consistency, determined whether to retain or drop an item. Stability is often measured by test / retest reliability. A high correlation between the two test scores implies that the test is reliable. In most circumstances a correlation of at least .70 is considered acceptable. The construct validity was examined, both within the scale and against external criteria. Known-groups differences between the CHL and controls were evaluated with chi-square tests for categorical variables and Analysis of Variance (ANOVA) for continuous variables. Differences in IHL-C between children with and without hearing loss were performed using t-test and ANOVA. The t-test scores were determined using Levene's Test for Equality of Variances. Convergent validity was determined by a multivariable, hierarchical linear regression analysis with independent variables, considering degree of hearing loss as an independent variable and domains and overall quality of life as dependent variables. To determine the discriminant validity, further investigations were carried out on the existing independent variables and how they correlate to dependent variables without manipulation (discriminant validity). Hypotheses were framed and each domain was analysed against the various socio-demographic factors. These investigations were done only for the responses of the CHL.

Statistical analysis was done using Statistical Package for Social Sciences (SPSS 14.1). Table 6 presents the entire process.

**Table 6: Psychometric Tests and Criteria (adapted from Lamping et al 2002)**

1. Item reduction	Identify items for possible elimination	Applied to each of the 220 items Item discriminatory index >1.96 ( 't' value)
2. Acceptability	Completeness of data and score distributions	Applied to each of the 69 items
3. Reliability 3.1 Internal consistency	The extent to which items comprising a scale measure the same construct	Cronbach $\alpha$ coefficients for summary scores .0.70 Item-discriminatory index >1.96
3.2 Test-retest reliability	The stability of a questionnaire assessed by administering the questionnaire to respondents on two separate occasions	Pearson/Spearman correlations .0.80
4. Validity 4.1 Content validity	Extent to which content of questionnaire or scale is representative of intended conceptual domain	Content derived from focus groups and field testing
4.2 Construct validity 4.2.1 Within scale analyses	Evidence that a single construct is being measured	Internal consistency Cronbach $\alpha$ coefficient .0.70 Item-discriminatory index >1.96
4.2.2 Analyses against external criteria 4.2.2.1 Known group differences	Evidence that the questionnaire differentiates between groups who are known to differ—e.g., by presence or severity of disease	Differences in the QoL of CHL as perceived by themselves and as perceived by the normal controls
4.2.2.2 Convergent validity	Evidence that the questionnaire correlates with measures of the same or a similar construct	Expected correlation with degree of hearing loss
4.2.2.3 Discriminant validity	Evidence that the questionnaire is not correlated with measures of different constructs	Hypothesis generation and testing

## RESULTS

### Item Reduction

The items in the 103-item questionnaire were further reduced. Every item in each domain passed the item discriminatory index of  $>1.96$ . This left 69 items in the questionnaire. The researcher decided to have IHL-C with 69 items and 6 domains as the final version of the questionnaire. This resulted in IHL-C 69 questionnaire (long version). In addition, a brief version was also developed with 48 items. The Brief IHL-C questionnaire contained items that had the highest item discriminatory index.

In the IHL-C 69 questionnaire, the domain Educational Implications retained 9 items out of 20 from the 103-item questionnaire; Social Integration was left with 15 out of 16 items; Psycho-social Well-being with 11 out of 15 items; Speech, Language and Communication had 13 out of 25 items; Family Relationship retained 15 out of 20 items; and, General Functioning was left with 6 out of 7 items (Table 1).

Apart from the item discriminatory index, the items for the Brief IHL-C were confirmed based on their positivity and their negativity, and an equal number of positive and negative items were maintained across all the domains. To start with, the positive and negative items in each domain of the IHL-C 69 were identified and then, through item discriminatory index, items were eliminated from each domain. In order to maintain equal number of positive and negative items, the items were either converted from negative to positive, or were dropped on the basis of content and comparatively lower item discriminatory index. In this way, the brief version contained 48 items and 6 domains. The Internal consistency and Item reduction scores of the Brief IHL-C are described in Table 1. The domain Educational Implications was left with 4 items out of 9 from the IHL-C 69 questionnaire; Social Integration with 6 items out of 15; Psycho-social Well-being with 10 items out of 11; Speech, Language and Communication with 10 items out of 13; Family Relationship with 12 items out of 15; and General Functioning retained 6 items out of 7 (shown in Table 1).

### Psychometric Evaluation

On examination of the reliability, Cronbach's Alpha coefficients indicated high internal consistency for the both the questionnaires, across all the domains. All values exceeded the minimum criterion of 0.70 in total and for the domains.

Table 1 shows the internal consistency of each of the domains and 4 versions of the whole questionnaire (220-item, 103-item, 69-item and 48-item). The internal consistency of the IHL-C 69 questionnaire (shown in Table 2) showed Cronbach's  $\alpha$  of 0.760 and Intrinsic Validity of 0.872. The overall Cronbach's  $\alpha$  value of 0.845 and Intrinsic Validity of 0.920 shows that the Brief IHL-C has high internal consistency.

The test-retest reliability of the overall questionnaire was found to be 0.86. Pearson's correlation coefficients for all domains and the overall questionnaire were  $>0.80$  and it satisfactorily passed the threshold requirement of 0.80 (shown in Table 7).

**Table 7: Test-retest Reliability**

Sl. No.	Factors	Test-Retest (N=80)	Validity
		( r )	Sig
1.	Educational Implications	0.80	p<0.05 sig
2.	Social Integration	0.81	p<0.05 sig
3.	Psycho-social Well-being	0.85	p<0.05 sig
4.	Speech, Language & Communication	0.89	p<0.05 sig
5.	Family Relationship	0.83	p<0.05 sig
6.	General Functioning	0.85	p<0.05 sig
7.	Overall Questionnaire	0.86	p<0.05 sig

The content of the questionnaire was derived from the qualitative analysis – focus group discussions and interview data from CHL, special educators, parents, institution Heads and rehabilitation professionals. In this way, exclusive dependence on proxy opinions was avoided. The content of the questionnaire is representative of the targeted population. Furthermore, the items were confirmed after field testing. Hence both the questionnaires, IHL-C69 and the Brief IHL-C, satisfied the criteria of content validity.

Construct validity was examined, both within scale and in comparison with other measures. The 69-item IHL-C69 showed good internal consistency as demonstrated by high item-discriminatory index, high alpha coefficients (0.762) and Intrinsic Validity (0.872), as shown in Table 1. The Brief IHL-C too demonstrated high internal consistency (Cronbach's  $\alpha$  value – 0.845 and Intrinsic

Validity – 0.920) indicating that a single entity i.e., Quality of life, is being measured and that items can be combined to form summary scores.

In both the questionnaires, all the domains and the overall quality of life differed significantly between the CHL and normal controls (known group differences), providing support for construct validity. IHL-C 69 and the Brief IHL-C concluded that the CHL's perception of their own quality of life was lower than what their classmates, the controls, perceived it to be. The controls felt that the CHL had a better quality of life. Similar perceptions existed in all the other domains except for the domain General Functioning. In this domain, in both the questionnaires, there were no differences; the perceptions of CHL and the controls were the same (Tables 8 and 9).

**Table 8: Known group differences between CHL and Control (IHL-C 69)**

Sl. No.	Factors	CHL (N=200)		Control (N=200)		't' value	Statistical Significance
		Mean	SD	Mean	SD		
1.	Educational Implications	59.744	13.82	66.589	11.93	-5.302	p<0.05 sig
2.	Social Integration	50.773	12.51	62.947	11.61	-10.086	p<0.05 sig
3.	Psycho-social Well-being	52.800	13.49	61.463	13.62	-6.392	p<0.05 sig
4.	Speech, Language & Communication	56.169	9.23	60.369	8.20	-4.811	p<0.05 sig
5.	Family Relationship	61.160	9.17	64.013	8.52	-3.222	p<0.05 sig
6.	General Functioning	61.633	14.61	63.133	12.17	-1.096	p>0.05 ns
7.	Overall Quality of Life	56.486	7.82	62.947	6.54	-8.962	p<0.05 sig

**Table 9: Known group differences (Brief IHL-C)**

Sl. No.	Factors	CHL (N=200)		Control (N=200)		't' value	Statistical Significance
		Mean	SD	Mean	SD		
1.	Educational Implications	67.750	18.52	68.925	14.38	-2.518	p<0.05 sig
2.	Social Integration	55.883	16.33	63.183	14.91	-4.669	p<0.05 sig
3.	Psycho-social Well-being	53.580	14.27	60.670	14.30	-4.963	p<0.05 sig

4.	Speech, Language & Communication	59.350	9.07	61.770	8.59	-2.740	p<0.05 sig
5.	Family Relationship	62.108	11.08	64.050	9.21	-1.906	p>0.05 ns
6.	General Functioning	61.633	14.61	63.133	12.17	-1.096	p>0.05 ns
7.	Overall Quality of Life	59.140	8.93	63.054	6.50	-5.011	p<0.05 sig

The IHL-C69 and Brief IHL-C show moderate convergent validity when compared on degrees of hearing loss. The degree of hearing loss was seen to influence the domains of Educational Implications, and Speech, Language and Communication. The other domains had no relationship with the degree of hearing loss.

Results for discriminant validity were mixed when judged against socio-demographic measures. For the analyses, the socioeconomic factors were taken as independent variables, and the domains and the overall QoL as dependent variables. Detailed analysis with the domains was done only with IHL-C69. The overall Quality of Life analysis was done in both the questionnaires.

**Educational Implications:** QoL showed differences with respect to educational implications, due to the age at school admission, ordinal position, degree of hearing loss and type of school. Children who began schooling before 5 years of age were well-adjusted and able to participate effectively in all the school activities, as compared to children admitted after 5 years of age. The CHL who were firstborn children also demonstrated better adjustment in school than children born in other ordinal positions. Good adjustment in school and its activities was demonstrated by children with severe hearing loss, followed by children with profound hearing loss. Also, children in Special schools were more attuned to school requirements than children in the Integrated schools. This could primarily be because the Special schools are completely adapted to cater to the needs of CHL, from having Amplification systems, 1:8 teacher-student ratio, modified instructions, and the like; whereas, in Integrated schools, the children are in an environment which is least adapted to the needs and restrictions imposed by their hearing loss.

**Social Integration:** Present age of the CHL, age at the time of school admission, ordinal position, onset of hearing loss and type of family were found to influence

the aspect of social integration. Children in the age group of 12 -14 years were socially better integrated than those who were older. The least integrated were children in the age group of 15 – 18 years. Children who joined school before 5 years of age, also demonstrated good social integration compared to the others. Firstborn CHL too showed better social adjustment. Children with congenital hearing loss had accepted their loss and hence were shown to be socially better integrated than those with adventitious hearing loss. Further, CHL in the Special schools showed good social integration compared to their counterparts in the Integrated schools. CHL from nuclear families were also socially better integrated than those who came from joint families.

**Psycho-social Well-being:** Present age, age at the time of school admission, ordinal position, onset of hearing loss, type of school and type of family were seen to influence the psycho-social well-being of children with hearing loss. Children in the age group of 12 -14 years exhibited good psycho-social well-being compared to children between 14 -15 years and between 15–18 years of age. Again, the psycho-social well-being of children admitted in school before the age of 5 was better than that of children admitted later. The psycho-social well-being of firstborn children was better than that of children in other ordinal positions. The onset of hearing loss was responsible for differences among the children. Those who had congenital onset showed better psycho-social well-being than those who had adventitious hearing loss. Similarly, CHL in Special schools had superior psycho-social well-being compared to CHL in Integrated schools. Further, children hailing from nuclear families also showed better psycho-social well-being than children from joint families.

**Speech, Language and Communication:** Skills in speech, language and communication were influenced by the CHL's age, background, onset of hearing loss, degree of hearing loss, type of school, education of father and mother, and religion. Children in the age group of 15 -18 years were rated superior to children in the age groups of 12 -14 years and 14 -15 years, in terms of their skills in speech, language and communication. Children with urban background had superior skills than those from rural settings. As proved in many earlier studies, children who had adventitious hearing loss possessed better skills in speech, language and communication than those with congenital hearing loss. Also, children with moderate hearing loss demonstrated better skills in speech, language and communication than children with mild, severe and profound hearing loss. The CHL in Integrated schools were more skilled in speech, language and

communication than those who were in Special schools. Children whose fathers had collegiate education, and children whose mothers had collegiate education, possessed good skills in speech, language and communication. Further, Christian children had better skills in speech, language and communication than Hindu and Muslim children.

**Family Relationships:** It was seen that family relationships were influenced by the degree of hearing loss, type of school and the type of family. Children with moderate hearing loss had benefitted greatly from their families. Children from integrated schools valued family as essential for better quality of life. Likewise, children from nuclear families were at an advantage in enjoying better quality of life.

**General Functioning:** Native background, degree of hearing loss, education of mother and type of family were found to influence the general functioning of the CHL. Children from urban backgrounds showed more independence in general functioning than their counterparts from rural settings. Similarly, independence in general functioning was strong among the children with severe hearing loss. College-educated mothers had raised CHL with better skills in general functioning. Nuclear family system also contributed to better general functioning among CHL.

**Overall Quality of life:** With IHL-C 69 and the Brief IHL-C questionnaires, the age of admission at school, ordinal position, degree of hearing loss and type of family were shown to have greater influence on the quality of life. Children who started schooling before they were 5 years old enjoyed good quality of life compared to those who were admitted later. Likewise, the children with moderate hearing loss demonstrated better life adjustment and quality of life than children with mild, severe and profound hearing loss. Firstborn children enjoyed good quality of life as well. Children from nuclear families too were satisfied with life and had good QoL scores compared to children from joint families.



**Table 10: Impact of Hearing Loss on Children - IHL-C69****Instructions:**

- The purpose of this scale is to find how your hearing loss is affecting you.
- Of the choice of five answers, please tick the one you feel describes you the BEST.
- We are only interested in how you feel about your life IN GENERAL.

		Always	Frequently	Slightly	Seldom	Never
<b>A. Educational Implications</b>						
1.	Do you feel that because of hearing problem your language skills are less?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Do you ask doubts in the class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Do you feel that you learn only to get good marks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Do the teachers give time for you to copy from the blackboard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Do you have difficulty in understanding the instructions in games and sports?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Do you feel that you are allowed to take part only in some competitions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Does your hearing problem stop you from learning new skills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Do you prefer studying only with children with hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Do you feel that because of hearing problem you are not able to get more information?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B. Social Integration</b>						
10.	Do you avoid talking to strangers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Do you feel left out when you are with hearing people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Do you feel that the hearing people have a bad opinion about you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Do you feel that unknown people are not able to understand what you speak?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14.	Do the children in the neighbourhood involve you in their discussions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	In family gatherings and public places, do you prefer to be with your parents only?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Do you fear what people will think about you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	Do you want some known people to tell what you speak when talking with strangers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	Do you have difficulty in following the conversations in a group?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Do you prefer talking to known people only?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	Do you talk only to people who are caring for you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	Do you feel shy to talk in restaurants?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	When people ask about hearing aids, do you become irritated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	Do you feel that it is better to keep quiet so that nobody knows that you have a problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	Do you feel that hearing aids are showing others that you have hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C. Psycho-social Well-being</b>						
25.	Do you feel that others are staring at you in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	Do you feel that hearing loss is stopping you from doing some things that you would like to do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	Do you feel that because of your hearing loss your future is limited?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	Do you feel that opportunities are less because of hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	Do you feel bad when others comment about your hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30.	Do you feel the people around you think that you are not talented enough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	Do you feel that your skills and talents are less recognised because of your hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	Are you feeling shy to wear hearing aids in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	Do your parents allow you talk to others in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	Do you need somebody to be behind you to guide you always?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	Are your parents and your siblings the only hearing people you talk to?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D. Speech, Language and Communication</b>						
36.	Do you feel that lip-reading is helping you to understand what is spoken to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37.	Do you feel that others understand what you say?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38.	Do you prefer others to sign rather than talk to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39.	When you are talking to others, do they ask you to repeat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40.	Do you need to sign to make others understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41.	Do you get irritated when you do not respond correctly to a question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42.	Do your parents allow you to speak or sign in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43.	Do you have difficulty in concentrating on lip- reading for a longer time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44.	Do you have problems when people speak in a different accent?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	Do you need signs in addition to lip-reading to understand what is spoken to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

46.	Do your hearing aids help you to understand speech on TV?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	When you talk to others do you feel that they are using words that you do not know at all?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48.	Are you satisfied with the way you communicate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E. Family Relationships</b>						
49.	Do your brothers / sisters take you to their school functions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50.	Do you wear hearing aids when guests come home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	Do your parents insist that you speak and not sign?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	Do your parents let you to do only some things because of hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53.	Does your family involve you in their discussions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54.	Do you feel that your parents are worrying too much about you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55.	Do your siblings take time to explain things that you do not understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56.	Do you interact less with your relatives because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57.	Are you jealous of your brothers / sisters because they are able to talk?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	Do your siblings take time to explain things that you do not understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59.	Do they try to hide from others that you have a hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	Are parents too worried about your safety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61.	Are you always accompanied by somebody wherever you go?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

62.	Does your family encourage you to study well?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63.	Do your parents prefer you to study in a special school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>F. General Functioning</b>						
64.	Do you feel that you are independent in all activities in daily life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65.	Do you ridecycles on roads?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66.	Do you use public transport?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67.	Do you feel that parents are not allowing you to do something because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68.	Do you talk less on phone because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69.	Do you feel that hearing loss is causing lots of restrictions in life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Table 11: Impact of Hearing Loss on Children - Brief IHL-C**

**Instructions:**

- The purpose of this scale is to find how your hearing loss is affecting you.
- Of the choice of five answers, please tick the one you feel describes you the BEST.
- We are only interested in how you feel about your life IN GENERAL.

		Always	Frequently	Slightly	Seldom	Never
<b>A. Educational Implications</b>						
1.	Do you ask doubts and answer questions in the class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Do you have difficulty in understanding the instructions in games and sports?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Do you prefer studying only with children with hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Do you feel that because of hearing problem you are not able to get more information?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>B. Social Integration</b>						
5.	Do you feel that you are included when you are with hearing people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Do the children in the neighbourhood involve you in their discussions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Do you prefer talking to known people only?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Do you feel comfortable to explain when people ask about your hearing aids?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Do you feel that it is better to keep quiet so that nobody knows that you have a problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Do you feel that hearing aids are showing others that you have hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C. Psycho-social Well-being</b>						
11.	Do you feel that hearing loss is not stopping you from doing some things that you would like to do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Do you feel that because of hearing loss your future is limited?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Do you feel that opportunities are less because of hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Do you feel bad when others comment about your hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Do you feel the people around you think that you are not talented enough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Do you feel that your skills and talents are well recognised despite your hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	Are you feeling shy to wear hearing aids in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	Do your parents allow you talk to others in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Do you need somebody to be behind you to guide you always?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20.	Are your parents and your siblings the only hearing people you talk to?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D. Speech, Language and Communication</b>						
21.	Do you feel that lip-reading is helping you to understand what is spoken to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Do you feel that others understand what you say?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	When you are talking to others do they ask you to repeat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	Do you need to sign to make others understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	Do you get irritated when you do not respond correctly to a question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	Do your parents allow you to speak and sign in public places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	Do you have difficulty in concentrating on lip-reading for a longer time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	Do you have problems when people speak in a different accent?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	Do your hearing aids help you to understand speech on TV?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30.	Are you satisfied with the way you communicate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E. Family Relationships</b>						
31.	Do your brothers / sisters take you to their school functions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	Do your parents insist that you speak and not sign?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	Do your parents let you to do only some things because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	Does your family involve you in their discussions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	Do you feel that your parents are worrying too much about you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36.	Do you interact less with your relatives because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

37.	Are you jealous of your brothers / sisters because they are able to talk?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38.	Do your siblings take time to explain things that you do not understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39.	Do they try to hide from others that you have a hearing problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40.	Are parents too worried about your safety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41.	Are you always accompanied by somebody wherever you go?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42.	Does your family encourage you to study well?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>F. General Functioning</b>						
43.	Do you feel that you are independent in all activities in daily life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44.	Do you ride cycles on roads?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	Do you use public transport?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46.	Do you feel that parents are not allowing you to do something because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	Do you talk less on phone because of your hearing loss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48.	Do you feel that hearing loss is causing lots of restrictions in life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## DISCUSSION

The psychometric evaluation found the IHL-C69 and Brief IHL-C to be acceptable, reliable and valid measures of QoL of children with hearing loss. Although the questionnaires show satisfactory psychometric properties, there are a few of limitations to be considered.

Firstly, as the test-retest (stability) interval for determining questionnaires' reliability was 1–2 days, respondents' recall of their answers from the initial questionnaire administration may have led to an overestimation of test-retest reliability.

Secondly, although the questionnaires demonstrated good convergent validity when compared to degree of hearing loss and, importantly, distinguished



between CHL and the children with normal hearing, it was not possible to undertake a comparison with other measures of quality of life because of the limited availability of such questionnaires validated for use in India.

Thirdly, the responsiveness of the questionnaires could not be determined. Responsiveness is the ability of a scale to detect significant change following interventions of known efficacy. The process of intervention needed some level of standardisation as the interventions varied between schools and between teachers. The nature of instructions and interventions needed to be revamped to include aspects such as psycho-social well-being, social integration and the like, apart from education and speech, language and communication development.

The new quality of life questionnaires - IHL-C 69 and Brief IHL-C are the first of their kind in Tamil Nadu and in India, to be available in two languages -Tamil and English- for measuring the impact of hearing loss and determining the QoL. The questionnaires thus validated possess acceptable psychometric properties of the target population. They are designed to capture the varied aspects that go into quality of life, from education through social integration to family relationships and general functioning. The content of the new questionnaires also reflect the areas of importance targeted by the various stakeholders.

## CONCLUSION

In conclusion, the impact of hearing loss will be viewed from different dimensions so as to ensure holistic outcomes in the habilitation and rehabilitation of children with hearing loss. The questionnaires should be able to provide multidimensional perspectives of the impact of hearing loss in children, and the results should thereafter serve as a frame of reference for developing quality interventions for children with hearing loss.

## REFERENCES

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