



Malay Version of Nijmegen Cochlear Implant Questionnaire and Quality of Life of Patients with Post-lingual Deafness

Nijmegen Koklear İmplant Anketinin Malay Versiyonu ve Post-lingual İşitme Kaybı Olan Hastaların Yaşam Kalitesi

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ABSTRACT

Objective: The Nijmegen Cochlear Implant questionnaire (NCIQ) was used to gauge the quality of life (QOL) improvement among cochlear implant (CI) users who suffered from post-lingual deafness. This study aimed to determine the consistency and reliability of the Malay version of the Nijmegen Cochlear Implant questionnaire (NCIQ-M) and to report the QOL of patients using NCIQ-M.

Methods: This study has two phases: Phase I involves the translation of the NCIQ from English to Malay, followed by internal consistency and test-retest reliability assessment of the final version of NCIQ-M. Phase II involves QOL assessment of post-lingual deafness using NCIQ-M.

Results: Twenty CI users and 20 non-CI users answered the NCIQ-M. Test-retest reliability analysis of the NCIQ-M was performed using an intraclass correlation coefficient, achieving scores of more than 0.85. Internal consistency was analysed with Cronbach α of more than 0.70 in all subdomains. Scores between the two groups of subjects were analyzed using an independent sample t-test. Good internal consistency, intraclass correlation, and test-retest reliability were obtained. Scores in all six subdomains of the NCIQ-M are significantly higher in the CI user group than in the non-CI user group.

Conclusions: The NCIQ-M is a consistent and reliable subjective questionnaire to determine the QOL of CI users concerning physical, psychological, and social functioning.

Keywords: Cochlear implant, quality of life, hearing loss, sensorineural

ÖZ

Amaç: Nijmegen Koklear İmplant anketi (NCIQ), post-lingual işitme kaybı olan koklear implant (Kİ) kullanıcıları arasında yaşam kalitesindeki (YK) iyileşmeyi ölçmek için kullanıldı. Bu çalışma, NCIQ'nun Malay versiyonunun (NCIQ-M) tutarlılığını ve güvenilirliğini belirlemeyi ve NCIQ-M kullanarak hastaların YK'sini ortaya koymayı amaçladı.

Yöntemler: Bu çalışma iki aşamada yapıldı. Birinci aşamada NCIQ İngilizceden Malaycaya çevrildi ve ardından NCIQ-M'nin son sürümünün iç tutarlılığı ve test-tekrar test güvenilirlik değerlendirmesi yapıldı. İkinci aşamada, NCIQ-M kullanılarak post-lingual işitme kaybının YK değerlendirilmesi yapıldı.

Bulgular: Yirmi Kİ kullanıcısı ve 20 Kİ olmayan kullanıcı NCIQ-M'yi yanıtladı. NCIQ-M'nin test-tekrar test güvenilirlik analizi, 0,85'in üzerinde puanlar elde edilerek, bir sınıf içi korelasyon katsayısı kullanılarak yapıldı. İç tutarlılık, tüm alt alanlarda Cronbach α 0,70'in üzerinde olacak şekilde analiz edildi. İki denek grubu arasındaki puanlar, bağımsız bir örneklem t-testi kullanılarak analiz edildi. İyi iç tutarlılık, sınıf içi korelasyon ve test-tekrar test güvenilirliği elde edildi. NCIQ-M'nin altı alt alanındaki puanlar, Kİ kullanıcı grubunda Kİ olmayan kullanıcı grubuna göre önemli ölçüde daha yüksekti.

Sonuçlar: NCIQ-M, Kİ kullanıcılarının fiziksel, psikolojik ve sosyal işlevsellik ile ilgili YK'lerini belirlemek için tutarlı ve güvenilir bir özlentir.

Anahtar kelimeler: Koklear implant, yaşam kalitesi, işitme kaybı, sensorinöral

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INTRODUCTION

The first cochlear implant (CI) was implanted in 1977, and it has tremendously evolved concerning technology and sound quality since then. It has changed the lives of many deaf individuals. Early CI surgery has been well documented to improve speech development and the learning process in patients with congenital hearing loss¹. Thus, it has increasingly received acceptance and recognition by the global population over the past decades as a treatment for congenital hearing impairment in children. In Southeast Asia, Universiti Kebangsaan Malaysia (UKM) pioneered the CI program in 1995. Local series have fortified the paramount role of CI in speech and language development in these children directly affecting their communication development, educational institution placements, and future achievements^{2,3}.

Questions have been raised regarding the overall benefits and efficacy of CI in patients with post-lingual deafness. Thus, many countries have explored the feasibility and outcomes of CI in these patients. Their results collectively show that CI improves the quality of life (QOL) about sound perception, speech production, and psychosocial development⁴⁻¹⁰. A significant gap in CI surgery is observed between individuals with post-lingual deafness and children with congenital hearing loss¹¹. In Belgium, 78% of these children are implanted with CI, whereas only 6.6% of adult CI candidates are implanted because of awareness level and acceptance factors¹¹.

Self-esteem, activities and social functioning are the components that are negatively affected by profound sensorineural hearing loss, causing impaired hearing and speech production¹². Depression, social isolation and subjective decrease in well-being are the outcomes of neglected chronic hearing loss¹³. In general, adults are more sensitive about emotional and psychosocial aspects, thereby affecting their livelihoods compared with children. Hence, various investigative and assessment tools, such as questionnaires, have been developed over the years to categorically gauge audiological outcome, mental health, and home-workplace interactions.

Health Utilities index (HUI-Mark III), Quality of Well-being (QWB) scale, visual analog scale (VAS), Center of Epidemiologic Studies Depression scale, Satisfaction with Life Areas scale, and Glasgow Health Status inventory are some of the questionnaires previously utilized to evaluate the QOL outcome of CI¹⁴⁻¹⁶. Many of these are not specifically tailored for this purpose as they are general questionnaires.

The Nijmegen Cochlear Implant questionnaire (NCIQ), which was developed in the Netherlands, is a subjective self-assessment tool to quantify the outcome of post-lingual CI patients concerning physical, social, and psychological functioning cumulatively under the health-related QOL umbrella¹⁷. Physical functioning consists of three subdomains: basic sound perception, advanced sound perception, and speech production. These three subdomains feature items that are integral parts of our Activities of Daily Living (ADL). Social functioning encompasses two subdomains, namely activity limitation and social interaction, which have a direct causal relationship with the former subdomains. Psychological functioning governs the self-esteem subdomain. These six comprehensive subdomains are included in a dynamically interactive model by negative feedback and chain reaction mechanisms.

NCIQ has been adapted into several major languages globally: Italian, Brazilian Portuguese, Spanish and Chinese¹⁸⁻²¹. These adapted NCIQ versions are reliable and valid QOL assessments among post-lingual CI users¹⁸⁻²². Therefore, this study aims to determine the consistency and reliability of the Malay version of NCIQ (NCIQ-M).

MATERIALS and METHODS

All subjects were recruited from Hospital Canselor Tuanku Muhriz, and their consent was obtained. The study group comprised 20 candidates with post-lingual hearing impairment on either single (18 candidates) or bilateral CI (2 candidates) with a minimum usage of 6 months. The control group comprised 20 candidates with post-lingual hearing loss and bilateral severe-to-profound hearing impairment that were either newly presented to our audiology department or already being considered for CI. All control group candidates used bilateral hearing aids for at least more than 8 hours (h) per day. Non-compliant and non-consented CI users were excluded from the study. Those candidates who were not able to complete the questionnaire were excluded. Epidemiological data of each candidate were obtained. These data included age, gender, education level, employment, living situation, age of deafness onset, age at CI surgery, and duration of daily CI usage. This study has been approved by the Ethics Committee of UKM (UKM PPI/111/8/JEP-2019-096, date: March 17, 2023).

This study consisted of two phases: Phase I and phase II. Phase I involves the translation of the NCIQ from English to Malay, followed by internal consistency and test-retest reliability assessment of the final version of the NCIQ-M.

Phase I: The Translation of the NCIQ from English to Malay

Translation and the cross-cultural adaptation processes to produce NCIQ-M from NCIQ were in accordance with the standard cross-cultural adaptation measures¹. The entire original NCIQ was translated independently to Malay by two independent bilingual professional translators, one of whom has medical knowledge and the other is a layperson. This forward translation process will produce two separate versions in Malay. These two versions were analysed thoroughly, and each of the issues was addressed, refined, and resolved on the basis of the consensus of both translators, producing a single interim version of NCIQ-M. This version was translated back to English and compared with the original NCIQ to ascertain whether both English versions have the same literal meaning and context.

This pilot study involved 10 post-lingual CI patients and 10 candidates from the control group during the first phase to fill out the interim NCIQ-M. They provided feedback regarding wording and context suitability. These 20 candidates answered the NCIQ-M again after 1-2 months to assess the internal consistency and test-retest reliability of the NCIQ-M. The determined duration eliminated the memory factor in filling out the NCIQ-M as they were not granted access to the previously administered questionnaire.

Phase II: QOL Assessment of Post-lingual Deafness Using the NCIQ-M

This phase involved 20 candidates in the test group and another 20 candidates in the control group. These sample populations included candidates who were enrolled in phase 1 of this study. Overall QOL of the subjects was ensured to be not significantly affected by any change such as detection or deterioration of medical pathologies and life events as this poses a risk of confounding data inaccuracy.

NCIQ-M has the same number of questions, domains, subdomains, and items as in the original NCIQ. The questions were evenly coded into six subdomains. Answers to each of the first 55 questions were in a scale ladder format: never, sometimes, regularly, usually, always and not applicable. In addition, the last five questions were also in the same manner: no, poor, fair, good, quite well, and not applicable. These terms have been translated to Malay appropriately and correspondingly in phase 1 of the study. The answers were then coded in scores in accordance with the mentioned scale ladder model and subsequently transformed as per the original NCIQ: 1=0, 2=25, 3=50, 4=75 and 5=100. Specific questions

in each subdomain were inversely recoded as mentioned in the code book. Scores were proportionate to the QOL, and higher scores indicated better QOL. The total scores of each question under the respective sub-domains were then divided by the number of completed items in each sub-domain to yield an average score.

Statistical Analysis

The statistical tests were performed using SPSS version 26.0. The internal consistency of NCIQ-M was determined using a Cronbach α coefficient. A score of more than 0.7 was considered reliable. Intraclass correlation coefficient (ICC) enables test-retest reliability determination as the questionnaire consists of several sub-domains. ICC scores of 0.75 to 0.9 indicate good reliability, whereas of more than 0.9 indicate excellent reliability. The NCIQ-M scores between the CI and control groups were compared using independent sample t-tests, where a p-value of <0.05 was considered statistically significant.

RESULTS

Table 1 shows that NCIQ-M has good internal consistency in the CI group and control groups, as indicated by a Cronbach α score of >0.7 in each sub-domain. In the CI users group, the Cronbach α score of the self-esteem subdomain was an outlier at 0.71 as the other subdomains were above 0.85. Table 2 demonstrates the mean, standard deviation, and ICC scores of test-retest reliability determination of the six subdomains of the NCIQ-M. The mean values of both groups were similar despite answering the questionnaire 1-2 months apart. ICC scores of both groups and all subdomains were more than 0.85, which indicates good and excellent reliability.

Table 3 summarizes the demographic and clinical characteristics of the patients in this study. The mean age of the 20 CI users in this study is 40.2±13.2 years (ranging from 20 to 70 years old), whereas that of 20 patients in the control group is 44.6±15.4 years (ranging from 22 to 79 years old). The onset of deafness ranges from 10 to 45 years with a mean of 19.4 years. The average CI surgery age is 35.5 years, in which the youngest CI user is 18 years old and the oldest is 65 years old. The usage of CI of individual peaks at 9 to 16 h per day. Candidates in both groups mostly had secondary school education levels. Table 4 demonstrates that scores in all subdomains are significantly higher in the CI user group than in the control group. The significant finding is further supported by a p-value of <0.001 in our study.

DISCUSSION

This study successfully produced the NCIQ-M (Appendix A). The NCIQ-M has excellent internal consistency in the social interaction subdomain of the CI user group, whereas the rest demonstrated good internal consistency with Cronbach α scores of >0.7 . The Spanish, Brazilian Portuguese, and Italian versions also had similar internal consistencies¹⁸⁻²⁰. In the CI group, the Cronbach α score of the self-esteem subdomain was an outlier at 0.71. A similar result was also found in the Italian study, but this irregularity was insignificant¹⁸. The ICC score, which represented the test-retest reliability of the NCIQ-M, was >0.9 for all sub-domains of the test group, indicating excellent reliability. ICC scores of all sub-domains in the control group were >0.76 , indicating good test-retest reliability. Mean scores, standard deviations, and range of scores are similar in the test and retest sets of the NCIQ-M for both groups of patients. These findings indicate that NCIQ-M has a high degree of reproducibility by the same individual if repeated over a certain duration without the emergence of new confounding significant life events.

The NCIQ-M assesses QOL among patients with post-lingual deafness using CI and hearing aids. In this study, candidates in both groups were similar with regard to age, onset of deafness, and gender distribution. This factor enables significant comparison. Most of the candidates used CI for more than 9 h a day as it improved their ADL and QOL. Comparatively, this result is less than that of the original study where CI usage was mostly more than 12 h per day per candidate¹⁷. Two candidates used CI 7 to 8 h a day as they were retired individuals who stayed only with a spouse and only used CI when hearing demand was required such as in events and public places. One candidate in the control group stayed alone, being unable to hear phone, doorbell, and alarm ringing has caused distress in her social relationships and mental health. Vision impairment in the same patient rendered inability to perceive lighting or physical cues and gestures properly. Therefore, hearing restoration is vital in such patients to facilitate ADLs and improve QOL.

Compared with the control group, the CI user group had significantly higher scores. The range of mean scores

Table 1. Cronbach α scores for internal consistency.

NCIQ-M subdomains	CI users group	Control group
Basic sound perception	0.86	0.89
Advance sound perception	0.88	0.86
Speech perception	0.87	0.72
Self-esteem	0.71	0.79
Activity limitations	0.92	0.88
Social interaction	0.94	0.91

NCIQ-M: Malay version of the Nijmegen Cochlear Implant questionnaire, CI: Cochlear implant

Table 2. Mean, standard deviation, range (min-max), ICC score and 95% confidence interval of phase 1 pilot study.

NCIQ-M subdomains	Test mean value CI user	Retest mean value CI user	ICC	95% confidence interval (upper, lower)	Test mean value control	Retest mean value control	ICC	95% confidence interval (upper, lower)
Basic sound perception	79.0 \pm 9.6 (57.5-90.0)	77.5 \pm 7.7 (60-87.5)	0.91	82.0, 74.5	20.5 \pm 8.8 (10-37.5)	23.5 \pm 7.6 (12.5-35)	0.84	25.6, 18.4
Advance sound perception	73.8 \pm 9.5 (57.5-95)	73.8 \pm 8.8 (57.5-92.5)	0.95	77.8, 69.7	28.0 \pm 7.1 (12.5-40)	30.0 \pm 5.4 (22.5-42.5)	0.76	31.7, 26.3
Speech perception	85.0 \pm 14.9 (52.5-97.5)	82.5 \pm 11.2 (60-92.5)	0.96	89.5, 78.0	34.3 \pm 4.3 (30-42.5)	32.3 \pm 6.4 (25-42.5)	0.84	35.6, 30.9
Self-esteem	76.5 \pm 9.5 (62.5-100)	74.8 \pm 9.6 (60-97.5)	0.95	79.8, 71.4	33.8 \pm 7.2 (17.5-42.5)	32.3 \pm 6.4 (20-42.5)	0.80	36.0, 30.0
Activity limitations	85.0 \pm 11.1 (57.5-95)	81.3 \pm 9.1 (60-90)	0.94	87.5, 78.7	28.3 \pm 12.2 (0-45)	31.0 \pm 10.6 (5-45)	0.92	34.6, 24.6
Social interaction	77.8 \pm 13.6 (52.5-92.5)	76.5 \pm 12.8 (50-90)	0.94	82.9, 71.3	33.8 \pm 13 (12.5-55)	32.8 \pm 6.9 (20-47.5)	0.76	37.6, 28.9

NCIQ-M: Malay version of the Nijmegen Cochlear Implant questionnaire, CI: Cochlear implant, ICC: Intraclass correlation coefficient, min-max: Minimum-maximum

in the CI user group was 73.8-85, whereas that in the control group was 20.5-34.3. P-value of <0.001 further indicated the significant difference in the scores of each subdomain, establishing significant improvement

concerning the QOL of patients with post-lingual hearing loss after CI activation. This corresponds to the results obtained in the other versions of the adapted NCIQ¹⁷⁻²¹. Candidates expressed interest in bilateral

Table 3. Demographic and clinical characteristics.		
Demographics	CI users (n=20)	Control group (n=20)
Age	40.2±13.2 (range 20-70 years)	44.6±15.4 (range 22-79 years)
Age of onset deafness	19.4±11.3 (range 10-45 years)	25.0±14.0 (range 9-50 years)
Age at CI surgery	35.5±14.2 (range 18-65 years)	-
CI usage duration (hours per day)		
A: less than 4 hours	0	-
B: 4-less than 9 hours	2 (10%)	-
C: 9-less than 12 hours	10 (50%)	-
D: 12-less than 16 hours	8 (40%)	-
E: more than 16 hours	0	-
Gender		
Male	9 (45%)	7 (35%)
Female	11 (55%)	13 (65%)
Education		
Lower	2 (10%)	8 (40%)
Secondary	12 (60%)	12 (60%)
Higher	6 (30%)	0
Paid employment		
Yes	14 (70%)	9 (45%)
No	6 (30%)	11 (55%)
Living situation		
Alone	0	1 (5%)
Family	18 (90%)	17 (85%)
Friends	2 (10%)	2 (10%)
CI: Cochlear implant		

Table 4. Mean, standard deviation and range (min-max) of the NCIQ-M scores in CI users and non CI users.			
NCIQ-M subdomains	CI users	Control group	Independent samples t-test
Basic sound perception	75.6±14.1 (40-100)	22.1±9.5 (5-37.5)	p<0.001
Advance sound perception	73.6±13.5 (47.5-100)	27.9±6.8 (12.5-40)	p<0.001
Speech perception	83.3±14.1 (52.5-100)	31.1±6.0 (15-42.5)	p<0.001
Self-esteem	76.3±8.4 (62.5-100)	31.4±8.8 (5-42.5)	p<0.001
Activity limitations	81.4±15.3 (45-100)	27.6±11.0 (0-45)	p<0.001
Social interaction	77.4±15.1 (47.5-95)	33.5±10.6 (12.5-55)	p<0.001
NCIQ-M: Malay version of the Nijmegen Cochlear Implant questionnaire, CI: Cochlear implant, min-max: Minimum-maximum			

CI after experiencing the benefits and improvements of unilateral CI. Complete scores were not obtained possibly because of ongoing rehabilitation and single-sided CI usage.

The CI user group recorded higher mean scores for four domains, namely, speech, self-esteem, activity limitation, and social interaction, compared with their Italian, Brazilian, and Spanish counterparts¹⁸⁻²⁰. For the basic and advanced sound perception domains, our corresponding score was low¹⁸⁻²⁰. Our mean scores in CI users are higher in all subdomains when compared correspondingly with the original Nijmegen study. In contrast, mean scores amongst the social subdomains of the control group were inverted¹⁷. These data indicate that CI remarkably improves the QOL of these patients with regard to the social and psychological function domains. The range of subdomain mean scores in the control group was 20.5-34.5 compared with the Italian and Nijmegen studies of 31.5-42.4 and 19.3-48.6, respectively^{18,19}. Slightly lower local scores in this aspect may indicate that the local population has higher susceptibility and lower threshold to psychosocial stress compared with its western counterparts in the context of hearing impairment.

Melody and music appreciation was found to be slightly less satisfactory compared with the other subdomains of the questionnaire, as reflected by the low score of the advanced sound perception subdomain compared with the other subdomains. Some CI users reported less satisfactory speech perception and music appreciation, particularly when background music is present, but this outcome varies considerably across patients^{23,24}. The variable degree of satisfaction is influenced by personal expectations and priorities across CI users²⁴. CI users could recognize tones of musical instruments, but they may face a varying degree of difficulty in distinguishing songs played with the same rhythm and pitch^{24,25}. Rehabilitation improves this CI limitation, but it eventually depends on the priority and level of commitment of CI users^{23,24}. Bilateral CI, the latest version of the sound processor and implant electrode, might improve hearing. Bilateral hearing provides directional and better sound quality. In the past decades, new complex technology innovations have produced significant sound processor upgrades that enable better hearing in almost any environment.

The mean income of Malaysian households in 2019 was RM 7901, whereas the median income was RM 5873, according to the Department of Statistics Malaysia²⁶. The cost of a single CI in Malaysia and surrounding countries, excluding surgery, ranges from RM 80,000

to RM 95,000. Single CI for children in Malaysia is fully subsidized by the Ministry of Health upon fulfilling a criteria checklist, but not for individuals who suffer from post-lingual hearing loss. An average patient would face difficulties making such an exorbitant purchase. Cost-effective and cost-utility analyses performed in the UK, Australia, and Canada have shown that adult CI is cost-effective based on the quality-adjusted life year (QALY) results despite its high cost²⁷⁻²⁹. In Korea, cost-utility analysis incorporated various QOL assessment measures including VAS, HUI, QWB, and EuroQol (EQ-5D) into QALY calculation and yielded positive results corresponding to the results of the above-mentioned western countries³⁰. Malaysian life expectancy in 2020 is 74.5 years compared with 72.6 years in 2000³¹. Increasing lifespan indicates increased productivity and enhanced QALY. The QOL results obtained using the positive cost-effective and cost-utility analysis data further support CI utilization amongst adults with post-lingual deafness.

This study also has some limitations. First, the current NCIQ-M has 60 questions to be answered. The time is taken to fill out the NCIQ-M may cause inconvenience to patients and accompanying family members. Moreover, the time taken to fill out the questionnaire ranged from 15 to 30 min. The proposal of a mini version of NCIQ-M can be completed more rapidly by patients during clinic visits.

CONCLUSION

NCIQ-M is a reliable and consistent questionnaire that serves as a comprehensive assessment instrument for evaluating the QOL of post-lingual deaf individuals with CI and HA. This instrument empowers professionals within the region to assess the importance of CI from a CI user viewpoint. This study also demonstrates the significant benefits of CI in patients with post-lingual deafness, particularly those with concomitant physical disabilities.

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Ethics

Ethics Committee Approval: This study has been approved by the Ethics Committee of UKM (UKM PPI/111/8/JEP-2019-096, date: March 17, 2023).

Informed Consent: All subjects were recruited from Hospital Canselor Tuanku Muhriz, and their consent was obtained.

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Author Contributions

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Appendix A.**NIJMEGEN COCHLEAR IMPLANT QUESTIONNAIRE (NCIQ-BM)**

Sila jawab 60 soalan berkaitan situasi implan koklear di bawah (gunakan "tidak berkaitan" hanya jika tiada kemungkinan boleh digunakan).

		Tidak pernah	Kadang-kadang	Kerap	Biasa	Sentiasa	Tidak berkaitan
1.	Bolehkah anda mendengar bunyi latar belakang (pam air tandas, penyedut hampagas)?						
2.	Adakah masalah pendengaran anda merupakan satu masalah yang besar semasa anda berinteraksi dengan orang yang mempunyai pendengaran yang normal?						
3.	Bolehkah anda berbisik jika perlu?						
4.	Adakah anda selesa berada dengan sekumpulan orang walaupun anda mempunyai masalah pendengaran?						
5.	Bolehkah anda berbual (dengan atau tanpa bacaan bibir) dengan seseorang di persekitaran yang senyap?						
6.	Adakah masalah pendengaran anda suatu masalah yang serius semasa anda bekerja atau belajar?						
7.	Bolehkah anda mendengar derap kaki orang lain di rumah anda (contoh: di ruang tamu atau tangga)?						
8.	Adakah masalah pendengaran anda masalah serius dalam interaksi anda dengan orang yang pekak?						
9.	Bolehkah anda menjerit jika perlu?						
10.	Adakah kesukaran mendengar mengganggu anda?						
11.	Adakah anda mampu berbual dengan 2 atau lebih individu di persekitaran yang senyap (dengan atau tanpa bacaan bibir)?						
12.	Adakah masalah pendengaran anda menimbulkan masalah serius semasa berada di laluan trafik?						
13.	Bolehkah anda mendengar deringan telefon atau loceng pintu anda?						
14.	Adakah masalah pendengaran anda menimbulkan masalah serius semasa bergaul dengan sekumpulan orang (hobi, sukan, bercuti)?						
15.	Adakah anda mampu membuat diri anda difahami oleh orang yang tidak dikenali tanpa menggunakan isyarat tangan?						

16.	Adakah anda tidak puas hati jika tidak dapat mengikuti sesuatu perbualan?						
17.	Bolehkah anda memahami pembantu kedai ketika berada di dalam sebuah kedai yang sibuk?						
18.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika menjalani aktiviti masa lapang?						
19.	Bolehkah anda mendengar (bukan merasa) pintu depan ditutup dengan kuat ketika sibuk di rumah?						
20.	Adakah gangguan pendengaran anda menimbulkan masalah serius dalam interaksi dengan orang yang tinggal bersama anda (keluarga/pasangan)?						
21.	Bolehkah anda menyesuaikan suara anda dalam situasi yang berbeza (persekitaran yang bising, persekitaran yang sunyi)?						
22.	Adakah anda mengelakkan diri daripada bercakap dengan orang yang tidak dikenali?						
23.	Adakah anda dapat menikmati muzik?						
24.	Adakah masalah pendengaran anda menimbulkan masalah serius dalam aktiviti harian di rumah?						
25.	Adakah anda dapat mendengar bunyi kereta mendekati anda semasa di jalan raya?						
26.	Adakah anda diketepikan daripada kumpulan kerana masalah pendengaran anda?						
27.	Bolehkah orang yang tidak dikenali tahu bahawa anda pekak atau mempunyai masalah pendengaran berdasarkan suara anda?						
28.	Adakah anda meminta orang lain bercakap lebih kuat atau jelas jika mereka bercakap terlalu perlahan atau tidak jelas?						
29.	Adakah anda mampu mengenali melodi tertentu dalam muzik?						
30.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika membeli-belah?						
31.	Bolehkah anda mendengar bunyi yang perlahan (kunci terjatuh, bunyi isyarat ketuhar gelombang mikro)?						
32.	Adakah anda akan pergi ke tempat di mana masalah pendengaran anda mungkin menimbulkan masalah atau ketidakselesaan yang serius?						
33.	Bolehkah anda membuat diri anda difahami oleh orang lain tanpa menggunakan isyarat tangan?						

34.	Adakah anda berasa cemas ketika bercakap dengan orang yang tidak dikenali?						
35.	Bolehkah anda mengenali irama tertentu dalam muzik?						
36.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika menonton televisyen?						
37.	Bolehkah anda dengar (bukan merasa) seseorang menghampiri anda dari belakang?						
38.	Adakah masalah pendengaran anda menimbulkan halangan dalam interaksi dengan individu yang tinggal di kawasan kejiranan anda?						
39.	Sekerap manakah anda berasa menjengkelkan jika orang lain yang dapat mengetahui bahawa anda mempunyai masalah pendengaran melalui percakapan/ suara anda?						
40.	Bolehkah anda memahami orang yang tidak dikenali tanpa bacaan bibir?						
41.	Adakah masalah pendengaran anda menimbulkan masalah serius semasa berada di majlis (contoh: majlis hari jadi)?						
42.	Bolehkah anda mendengar (tidak perlu memahami) percakapan siaran radio?						
43.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika bersama dengan kawan anda?						
44.	Adakah anda senang berinteraksi dengan orang lain walaupun anda mempunyai masalah pendengaran?						
45.	Adakah anda dapat membezakan suara seorang lelaki, perempuan dan kanak-kanak?						
46.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika mengendalikan urusan rasmi (insurans, peguamcara, pejabat perbandaran)?						
47.	Bolehkah anda mendengar seseorang memanggil anda?						
48.	Adakah masalah pendengaran anda menimbulkan masalah serius semasa berinteraksi dengan keluarga?						
49.	Adakah terdapat situasi di mana anda akan berasa lebih gembira jika anda tidak mengalami masalah pendengaran?						
50.	Adakah anda berasa penat dengan cubaan mendengar (dengan atau tanpa bacaan bibir)?						
51.	Adakah masalah pendengaran anda menimbulkan masalah serius ketika berada di luar atau melancong?						

52.	Bolehkah anda mendengar suara dari bilik lain (contoh: kanak-kanak sedang bermain, bayi menangis)?						
53.	Apabila anda berada dalam suatu kumpulan, adakah anda merasa masalah pendengaran anda menyebabkan orang lain tidak ambil serius tentang anda?						
54.	Adakah masalah pendengaran anda mengurangkan keyakinan diri anda?						
55.	Adakah masalah pendengaran anda menyebabkan anda tidak dapat menegaskan pendirian/prinsip sendiri (semasa bekerja, dalam hubungan)?						

Sila ambil perhatian: kategori jawapan untuk 5 soalan di bawah adalah berlainan daripada sebelum ini.

		Tidak	Kurang memuaskan	Memuaskan	Baik	Sangat Baik	Tidak Berkaitan
56.	Bolehkah anda membuat suara marah, ramah, atau sedih?						
57.	Bolehkah anda mengawal nada suara (tinggi, rendah)?						
58.	Bolehkah anda mengawal kelantangan suara?						
59.	Bolehkah anda membuat suara anda kedengaran biasa/normal (supaya tidak kedengaran seperti suara individu bermasalah pendengaran)?						
60.	Adakah anda dapat membuat perbualan telefon yang mudah?						

Code Book		
Domain	Question	Recoding (6 score)
Physical		
Basic sound perception	1, 7, 13, 19, 25, 31, 37, 42, 47, 52	
Advance sound perception	5, 11, 17, 23, 29, 35, 40, 45, 50, 60	50
Speech perception	3, 9, 15, 21, 27, 33, 56, 57, 58, 59	27
Psychosocial		
Self-esteem	4, 10, 16, 22, 28, 34, 39, 44, 49, 54	10, 16, 22, 34, 39, 49, 54
Social		
Activity limitations	6, 12, 18, 24, 30, 36, 41, 46, 51, 55	6, 12, 18, 24, 30, 36, 41, 46, 51, 55
Social interaction	2, 8, 14, 20, 26, 32, 38, 43, 48, 53	2, 8, 14, 20, 26, 38, 43, 48, 53