Level of Knowledge, Attitude, and Behavior among Specialists of Otorhinolaryngology-Head and Neck Surgery in West Java Towards Cochlear Implants

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Abstract

Background: Hearing loss and deafness are still an issue in Indonesia, especially in West Java, with a prevalence of 2.5% and 0.06%, respectively. Cochlear implants are intended for patients with severe sensorineural hearing loss to stimulate the remaining auditory nerves. Based on their competency standards, Otorhinolaryngology-Head and Neck Surgery (ORL-HNS) Specialists are expected to be able to inform patients and families about the cochlear implantation procedures. This study aimed to explore the level of knowledge, attitudes, and behavior of ORL-HNS Specialists in West Java towards cochlear implants.

Methods: This study was a descriptive study with a cross-sectional approach. Primary data were collected through a questionnaire filled out by ORL-HNS Specialists who were actively working in West Java in 2021–2022.

Results: Data from 157 specialists showed that 41.4% (n=65) had good knowledge about cochlear implants, and 43.9% (n=69) had adequate knowledge, however, 62.4% (n=98) showed a negative attitude. In addition, 99.3% (n=156) showed good behavior.

Conclusions: ORL-HNS Specialists in West Java have a sufficient level of knowledge, negative attitude, and good behavior towards cochlear Implants. The negative attitude of the specialists need to be bettered, updating their knowledge about how cochlear implants work and their effectiveness for patients with hearing impairments might give them a new perspective and hopefully change their attitude towards cochlear implants.

Keywords: Cochlear implants, hearing loss, ORL-HNS

Introduction

Hearing loss and deafness are experienced by 5.5% of the world's population, or approximately 430 million people.[1,2] The prevalence of hearing loss in Indonesia reaches 2.6%, with a 0.09% prevalence of deafness. The prevalence of hearing loss and deafness in West Java is also close to the national prevalence, which is approximately 2.5% and 0.06%.[3,4]

Normally, humans can hear up to 25 decibels (dB), while hearing loss patients' hearing ability varies depending on the disease's severity.[5] Mild degree of hearing loss was diagnosed when the patient hears sounds in the range of 26–40 dB, moderate degrees within a range of 41–60 dB, severe degrees within a range of 61–80 dB, and very severe hearing loss is when the patient can only hear sounds of 81 dB or more.[6] Hearing loss can also be grouped into conductive, sensorineural and mixed hearing loss.[7]

Hearing loss can affect the "golden period" of hearing and speech development in the first 6 months until 2 years of life. Therefore, it is important to do screening, detection, and treat hearing loss as early as possible.[7–9] Choice of treatment for patients with severe and very severe sensorineural hearing loss is hearing aids or cochlear implants, as an effort to restore hearing.[10,11]

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The cochlear implant is an electronic device containing a current source and an array of electrodes to stimulate functional auditory nerve fibers. A cochlear implant is surgically placed and has two components. The outer component is placed behind the ear, the inner components are implanted under the skin, and the electrode is implanted in the cochlea at the scala tympani.[10,12]

The cochlear implant captures sound from the microphone behind the ear. Then the sound processing section selects and regulates the sound and forwards it to the implant body under the skin, where the sound waves will be converted into electrical impulses by the transmitter and the receiver. Next, the electrical impulses are delivered to the auditory nerves by the electrode array section in the cochlea. Hearing loss patients with cochlear implants cannot hear as clearly as normal people, but this device provides a representation of sound that is expected to help patient understand speech.[12,13]

The installation of cochlear implants in Indonesia is considered to be very low, which only 1,500 users, according to data from the Indonesian Cochlear Implant Family organization (*Keluarga Implan Koklea Indonesia*).[14] Based on the Indonesian National Population and Family Planning Agency (*Badan Kependudukan dan Keluarga Berencana Nasional*) statement, 4.8 million Indonesian children are born each year.[15] Meanwhile, data from the Ministry of Health shows that the proportion of congenital hearing loss reaches 0.11%.[3] Therefore, it can be estimated that approximately 5,000 babies will be born with congenital hearing loss every year in Indonesia.[16]

The lack of cochlear implantation in Indonesia, especially in West Java, can be influenced by the lack of parents' awareness to immediately check their child with an indication of hearing loss, the inability to pay for the cochlear implants, which is relatively expensive (30 to 50 million rupiahs), or lack of clarity of information given by the doctor regarding the management of congenital deafness and sensorineural hearing loss.[17,18]

Competency of Indonesian Otorhinolaryngology-Head and Neck Surgery (ORL-HNS) Specialists for congenital deafness is at level 3A, meaning that ORL-HNS Specialists are expected to be able to diagnose, provide initial therapy, and make non-emergency referrals. In addition, their competency for perceptive deafness and conductive deafness is at level 4, means that ORL-HNS Specialists are expected to be able to do screening, diagnose, educate, and carry out treatment. Therefore, ORL-HNS Specialists should be able to provide information to patients and their families regarding the cochlear implantation procedure.[19] Therefore, this research was conducted to identify the level of knowledge, attitude, and behavior of ORL-HNS Specialists in West Java towards cochlear implants.

Methods

This study was a descriptive study with a cross-sectional approach that aimed to obtain information and provide an accurate situation profile.[20] Each subject was observed once and the measurement of subject variables was carried out during the examination to obtain the level of knowledge, attitudes, and behavior of ORL-HNS Specialists in West Java towards cochlear implants. Primary data was obtained through a questionnaire. This research was conducted online from July 2021 to January 2022. The subject population of this research was ORL-HNS Specialists who were actively working in West Java 2021–2022. The research sample was taken using the total sampling technique, which means that the entire population was taken as a sample unit.[21]

Data measurement in this study was done using the guttman scale, which is a cumulative scale used to answer questions clearly and consistently. For example, yes or no, agree or disagree, and so on. Each respondent's answer was given the same points.[22] An online questionnaire regarding the level of knowledge, attitudes, and behavior of ORL-HNS Specialists in West Java towards cochlear implants was distributed using a google form. The questionnaire contained research explanation sheets, informed consent forms, characteristics of the respondents (age, education, work experience as a doctor, work institution, and telephone number), 10 knowledge questions, 4 attitude questions, and 4 behavioral questions.

Knowledge questions with correct answers were worth 1 point, and an incorrect answer was worth 0 point with "do not know" answers were entered as incorrect answers. The total score of the knowledge questions ranged from 0 to 10 points. Then categorization was done base on the number of points, 8 to 10 points (76–100%) were categorized as good knowledge, 6 to 7 points (56–75%) were categorized as adequate knowledge, and 0 to 5 points (<56%) categorized as poor knowledge.[22]

On attitude and behavior questions, a positive question with a "Yes" answer was worth 1 point and a "No" answer was worth 0 points. On the other hand, for negative questions, the answer "No" was worth 1 point and the answer "Yes" was worth 0 point. Attitude and behavior questions ranged from 0 to 4 points. Then categorization was done based on the number of points, 3 to 4 points (50–100%) were categorized as positive attitude/good behavior, and 0 to 2 points (<50%) were categorized as negative attitude/poor behavior.[22]

The collected data were then analyzed using descriptive statistics using statistical software (Microsoft® Excel 2016 and IBM® SPSS® version 25).[23] Before the study was conducted, the questionnaire had been tested for validity with Pearson correlation and showed a significance level of 0.01.[24] The reliability test was also carried out using Cronbach's Alpha and showed reliability level of 0.6 which means that the reliability was accepted.[25] Validity and reliability tests were carried out on 50 ORL-HNS Specialists outside West Java.

This study has also received ethical approval from the Research Ethics Committee of Universitas Padjadjaran with reference number 911/UN6.KEP/EC/2021 and registration number 0121090969.

Results

There were 157 respondents (96.3% of total number of ORL-HNS Specialists in West Java) which were dominated by the age group of 36–45 years with a total of 73 respondents (46.5%), education level of master's degree with a total of 145 respondents (92.4%), and work experience of more than 15 years with a total of 78 respondents (49.7%) (Table 1).

Considering that the respondents were ORL-HNS Specialists in West Java, the respondents may work in 2–3 working institutions.[26] Therefore, when the data on work institutions were added up, the result was more than 100%.

The data showed that most of the respondents worked in Class B General Hospital with a total of 89 respondents (56.7%), followed by Class C General Hospital with 60 respondents (38.2%), Class A General Hospital with 20 respondents (12.7%), and Class D General Hospital with 7 respondents (4.5%). Four respondents (2.5%) also worked in Private Clinics/Public Health Center, and there was 1 respondent (0.6%) in each Class A, B, and C Specialist Hospital (Table 1).

Data on knowledge, attitudes, and behavior based on the distribution of questionnaire questions were listed in Table 2, Table 3,

Table 1 Demographic Characteristics of ORL-HNS Specialists in West Java (n=157)

Variable	Frequency (n)	Percentage (%)
Age (Years old)		
25–35	22	14.0
36–45	73	46.5
>45	62	39.5
Educational Degree		
Master's	145	92.4
Doctorate	12	7.6
Work Experience (Years)		
0–5	19	12.1
5–10	22	14.0
10–15	38	24.2
>15	78	49.7
Work Institution		
Class A General Hospital	20	12.7
Class B General Hospital	89	56.7
Class C General Hospital	60	38.2
Class D General Hospital	7	4.5
Class A Specialist Hospital	1	0.6
Class B Specialist Hospital	1	0.6
Class C Specialist Hospital	1	0.6
Private Clinic / Public Health Center	4	2.5

Table 2 Assessment of Knowledge Level Based on Questions Distribution

No	Knowledge Questions	N= 157			Level of Knowledge n (%)
		True n (%)	False n (%)	Do not Know n (%)	
1.	The prevalence of congenital hearing loss in Indonesia reaches 1 permille.	108 (68.8)	20 (12.7)	29 (18.5)	108 (68.8)
2.	In very severe sensorineural hearing loss, the auditory nerve does not function at all.	81 (51.6)	75 (47.8)	1 (0.6)	75 (47.8)
3.	All people with congenital hearing loss are candidates for cochlear implants.	55 (35)	101 (64.3)	1 (0.6)	101 (64.3)
4.	Cochlear implants are only suitable for hearing loss in children.	15 (9.6)	142 (90.4)	0 (0)	142 (90.4)
5.	Cochlear implants may be indicated for single-sided deafness.	101 (64.3)	52 (33.1)	4 (2.5)	101 (64.3)
6.	Cochlear implants work by amplifying sound.	49 (31.2)	105 (66.9)	3 (1.9)	105 (66.9)
7.	Cochlear implants work by stimulating the median nerve.	57 (36.3)	92 (58.6)	8 (5.1)	92 (58.6)
8.	A cochlear implant consists of two main components, external and internal component.	145 (92.4)	6 (3.8%)	6 (3.8)	145 (92.4)
9.	Cochlear implantation is done in several stages (candidacy, surgery, and habilitation).	152 (96.8)	5 (3.2)	0 (0)	152 (96.8)
10.	Cochlear implants must be replaced within a certain period of time.	42 (26.8)	103 (65.6)	12 (7.6)	103 (65.6)

and Table 4, whereas Table 5 showed the cumulative results of the level of knowledge, attitudes, and behavior of respondents towards cochlear implants.

Respondent's level of knowledge about cochlear implants was assessed from 10 questions. The results showed that 9 out of 10 questions were answered well by the majority of respondents (Table 2). Meanwhile, the level of attitude assessed from 4 questions. Only 2 out of 4 questions given were successfully answered by the majority of respondents (Table 3). As for the level of behavior, which was also assessed from the 4 questions, all questions were answered well by most of the respondents (Table 4).

The results showed that 65 respondents (41.4%) had good knowledge, 69 respondents (43.9%) had adequate knowledge (10.4%), and 23 respondents (14.6%) had poor knowledge regarding cochlear implants. It also showed that 59 respondents (37.5%) had a positive attitude and the another 98 respondents (62.4%) had a negative attitude towards cochlear implants. However, 156 respondents (99.3%) had good behavior towards cochlear implants, and the another 1 respondent (0.6%) still had poor behavior (Table 5).

Discussion

A cochlear implant is a procedure that aims to help people with hearing loss understand speech, thereby facilitating communication in daily activities.[10,12,15,27] Cochlear implantation is expected to help increase user productivity, considering that the highest prevalence of hearing loss patients is found in groups of people who are not in school, do not work, and have low economic level.[4,27]

As ORL-HNS Specialists, respondents have a 3A competency level in the congenital deafness management and level 4 competency in the perceptive and conductive deafness management. Thus, respondents are expected to have good knowledge, attitudes, and behaviors regarding cochlear implants in order to be able to screen, diagnose, and

Table 3 Assessment of Attitude Level Based on Questions Distribution

No	Attitude Questions	N= 157		Level of Attitude n (%)
		Yes n (%)	No n (%)	
1.	I believe that screening for hearing loss in infants should be carried out in a fully-equipped health facilities	115 (73.2)	42 (26.8)	42 (26.8)
2.	I believe that after a cochlear implant, the patient's hearing will be as good as a normal person's.	104 (66.2)	53 (33.8)	53 (33.8)
3.	I agree that the patient's age at surgery does not contribute to a successful perception of hearing and speech.	45 (28.7)	112 (71.3)	112 (71.3)
4.	I agree if the cost of cochlear implant equipment and surgery are fully covered by the government.	142 (90.4)	15 (9.6)	142 (90.4)

educate patients and their families about cochlear implants.[21]

Knowledge is information obtained by a person after sensing an object, through sight, hearing, smell, taste and touch. Knowledge is influenced by internal factors such as education and age. The higher a person's education, the higher his knowledge is expected to be, while increasing age is often associated with increasing the maturity of a person's soul, as well as the experience he has. Knowledge is also influenced by external factors such as the work environment. Therefore, the background characteristics of the respondents will affect their level of knowledge.[24]

A person's knowledge will affect his attitude and behavior, so that these three things are interrelated. Attitude is a view of an object or stimulus based on convictions and beliefs that can be positive or negative. Meanwhile, behavior is a response or action taken against an object or stimulus.[24]

The relationship between knowledge, attitudes, and behavior can be found in this research result. As an ORL-HNS Specialist, the respondent should have good knowledge about cochlear implants. Nevertheless, data from a total of 157 respondents showed that the highest level of knowledge, namely 69 respondents (43.9%) had adequate knowledge, while only 65 respondents (41.4%) had good knowledge. In addition, the other 23 respondents (14.6%) had poor knowledge.

From this level of knowledge, the majority of respondents have good behavior towards cochlear implants, namely 156 respondents

Table 4 Assessment of Behavior Level Based on Questions Distribution

No	Behavior Questions	N= 157		Level of Behavior n (%)
		Yes n (%)	No n (%)	
1.	I would suggest hearing aids for patients with very severe sensorineural hearing loss while checking the patient's eligibility for cochlear implants.	152 (96.8)	5 (3.2)	152 (96.8)
2.	I will examine the hearing of a 2 year old child who cannot yet form simple words.	155 (98.7%)	2 (1.3%)	155 (98.7)
3.	I will do a hearing screening on babies before they reach 3 months of age.	150 (95.5)	7 (4.5)	150 (95.5)
4.	I will perform cochlear implantation for all hearing-impaired patients.	16 (10.2)	141 (89.8)	141 (89.8)

Table 5 Level of Knowledge, Attitude, and Behavior of ORL-HNS Specialists in West Java towards Cochlear Implants (n=157)

Variable	Frequency (n)	Percentage (%)
Knowledge		
Good	65	41.4
Adequate	69	43.9
Poor	23	14.6
Attitude		
Positive	59	37.5
Negative	98	62.4
Behavior		
Good	156	99.3
Poor	1	0.6

(99.3%). Unfortunately, the results of the respondents' attitude assessment showed that more respondents had a negative attitude, namely 98 respondents (62.4%), compared to the other 59 respondents (37.5%) who had a positive attitude.

The relationship between respondents' characteristics and the results of the study can also be seen from the age range and the average score obtained. Respondents with an age range of 25–35 years had an average score of 14 out of 18 total questions, with an average knowledge score 7.4 out of 10 questions, attitude 2.2 out of 4 questions, and behavior 3.8 out of 4 questions. Meanwhile, respondents with an age range of 35-45 years old had an average score of 13 out of 18 total questions, with an average knowledge score of 7.2 out of 10 questions, attitude 2.3 out of 4 questions, and behavior 3.8 out of 4 questions. Then, respondents aged over 45 years had an average score of 13 out of 18 total questions, with an average value of knowledge 6.9 out of 10 questions, attitude 2 out of 4 questions, and behavior 3.7 out of 4 questions.

This relationship indicates that younger respondents tend to have better knowledge. This kind of phenomenon may occur due to the development of medical science, especially in the field of ORL-HNS. The world's first cochlear implantation in children was performed in 1983.[28] Meanwhile in Indonesia, cochlear implantation was first performed in 2002, so information and practice of cochlear implants were still relatively new at that time.[29] Cochlear implantation at that time also prompted a reform of the teaching system during the medical residency program (*Program Pendidikan Dokter Spesialis,* PPDS), which would affect the current level of knowledge of the respondents..

Based on the level of education, respondents with a doctoral degree (S3) also have a slightly better average score than respondents with a master's degree (S2), namely 14 points out of a total of 18 questions, with a knowledge score of 8 points out of 10 questions, attitude 2.3 points out of 10 questions., and behavior 3.9 points out of 4 questions. Meanwhile, respondents with a master's degree (S2) have an average score of 13 points out of a total of 18 questions, with details of the average knowledge value being 7 points out of 10 questions, attitude 2.2 points out of 4 questions, and behavior 3.8 points out of 4 questions.

It is unfortunate that not all respondents have good knowledge of cochlear implants, even some respondents show a concerning level of knowledge and attitude , namely 2 points out of 10 questions, and 0 points out of 4 questions.

Even during the study, the ORL-HNS Specialist in West Java showed a lack of concern for Cochlear Implants, as evidenced by the many subjects who needed to be contacted repeatedly and subjects who refused to participate in the study by ignoring suggestions from the researcher and the Head of the Association of Otolaryngology Head and Neck Surgery Specialists in West Java (*Perhimpunan Dokter Spesialis Telinga, Hidung Tenggorok, Bedah Kepala Leher*, PERHATI-KL Jabar).

Efforts that can be made to improve this situation are to increase the knowledge of ORL-HNS Specialists regarding cochlear implants, especially those who are actively working in West Java. These efforts may be in the form of evaluating and improving the quality of the PPDS in the ORL-HNS diseases

study program, especially regarding cochlear implant procedures.

As a doctor, the principle of lifelong learning must also be maintained by the ORL-HNS Specialists to keep up with developments in medical science from time to time.[30] Thus, to increase the knowledge of ORL-HNS Specialists who are actively working, especially in West Java, about cochlear implants, this can be done through briefings such as socialization, seminars, workshops, symposia, as well as discussions among colleagues or with experts in cochlear implants field. This study also aims to remind ORL-HNS Specialists to always seek the latest information regarding disease management, especially cochlear implants.

Practical and theoretical constraints took part in this study's limitations. The practical constraint of this study was the number of participants. Authors collaborated with PERHATI-KL Jabar to obtain respondents' data and distribute the research questionnaires. However, not all members of PERHATI-KL Jabar were willing to take part in this study, so the findings might not accurately describe the population of interest. As for the theoretical constraints, this study cannot be used to establish cause and effect relationships considering its design as a descriptive study. Therefore, this study has limitations in concluding why respondents have such knowledge, attitudes, and behaviors. Not to mention that respondents might also be dishonest or otherwise provide socially desirable responses. However, this study can be used as a foundation for other studies and to deal with the possible biased responses, respondents were told that their answers would be kept confidential and anonymous. Therefore, they fill ou the questionnaire independently.

Although this study has certain limitations, it is hoped that the results of this study can be used as input and basic data in the field of medical science regarding the level of knowledge, attitudes, and behavior of ORL-HNS Specialists in West Java towards cochlear implants, as well as being considered for efforts to improve knowledge or competence level of the ORL-HNS Specialists towards cochlear implants.

In conclusion, ORL-HNS Specialists in West Java have an adequate level of knowledge and good behavior regarding cochlear implants. However, their attitude was not as expected. Most of the ORL-HNS Specialists in West Java have negative attitude towards cochlear implants. Hopefully, the result of this study can be taken into consideration so that ORL-HNS Specialists are interested in broadening their horizons and learning more about cochlear implants.

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