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Interest of ADIP beneficiaries in terms of body worn hearing aid towards behind the ear hearing aid: A camp based cohort survey

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Abstract

Hearing aids (HAs) provide the basis for improving audibility and minimising developmental delays in children and reduces the problem in communication with respect to adults. Multiple guidelines exist to recommend methods for optimising amplification for people whether be a child or adult. The present study sought to evaluate the interest of people with respect to fitting of behind the ear (BTE) hearing aids than body worn hearing aids which are being given to the patients with hearing loss with poor economic background under ADIP scheme by the Government of India. The main aim of the study is to develop a questionnaire so as to make the people aware regarding the various amplification devices and their benefits. Near about 2000 participants were considered in a camp who were given the questionnaire which consisted of a set of 10 questions based upon the cost, cosmetic and performance of hearing aids. Data collected was further analysed by using SPSS version 11.5 and other correlation test in which chi-square test was conducted between the responses of the participants from the pretest1 questionnaire and post-test questionnaire in which p-value was found to be 0.001 ($p < 0.05$) indicating rejection of null hypothesis and no correlation between the pre-test and post-test. This further indicates that the participants are benefited more after the usage of the behind the ear hearing aid in all the three aspects cosmetic, cost and hearing performance. Approximately 86% of the participants in the study has shown their interest towards Behind the Ear (BTE) hearing aids compared to body worn hearing aids which are being dispensed to the people with hearing impairment under ADIP scheme. Thus, if the government of India implements the dispensing of Behind the ear hearing aids to the patients rather than body worn hearing aids than it would be a good option for leading a perfect life for a person belonging from poor economic background.

Keywords: Behind the ear, ADIP, hearing aid, hearing impairment

Introduction

The sense of hearing provides a background which assures a normal person a feeling of security and active participation in life. It plays a crucial role in proper acquisition of speech and language skills and also in monitoring one's own speech. Hearing loss is one of the most challenging problems confronting medicine, not only because there are some 18.49 millions Indians with hearing loss, but because it can severely affect a person's socio-economic background. A person who is not able to hear is said to have hearing loss. Hearing loss may be mild, moderate, severe or profound. It can affect one ear or both ears, and leads to difficulty in hearing conversational speech or loud sounds. Hearing impairment a generic term referring to a deviation or change for the worse in either auditory mechanism or auditory functions, usually outside the range of the normal hearing sensitivity. Census, 2011 states that there are 2.68 crore Persons with Disabilities (PwDs) in the country. In India as on 1st March 2001, India's population stood at 1,027,015,247 and projected population in 2016 would be 1,263,543,000 (Census of India, 2001) [2]. With the present set of concept of hearing disability, the Census of India, 2001 counted 1,261,722 people in whom hearing disability existed (Males 53.4% and Females 46.59%).

To overcome this problem hearing aid came into existence. The history of hearing aids may be divided into five eras: acoustic, carbon, vacuum-tube, transistor, and digital (Dillon, 1985). By 21st century the biggest change to hearing aids is that they are now becoming smaller in size with more sophisticated features and better options so as to cope with today's

fastest growing technology. Hearing aids partially overcome the deficits associated with a hearing loss. For, a sensorineural hearing loss, there are several deficits to be overcome which when taken into consideration reveals that the auditory deficits which are faced by a person with a sensorineural hearing loss needs a signal-to-noise ratio greater than normal in order to communicate effectively, even when sounds have been amplified by a hearing aid. Taking such factors into consideration various types of hearing aids are available to provide better amplification to the user. Hearing aids are described according to where they are worn. In order of decreasing size these categories are: body, spectacle, behind-the ear, in the ear, in the canal and completely in the canal (Gelfand, 1979) [3]. With the advancement of technology the quality of hearing aids have been increased in all aspects like nowadays hearing aids are now available with Bluetooth facility which is very easily feasible with a smart phone and is very comfortable. Thus, with fast development in the field of hearing aids awareness among the common mass have also been increased which in result gives various options to choose better amplification for a person with hearing impairment depending on his or her type of loss.

In India the Government has implemented schemes to help the people with disabilities who can't afford to buy the expensive devices, so that they can lead an easy life. In the light of the Government's growing stress on helping disabled persons and in bringing the aids and appliances within their reach, it has been decided to continue the ADIP (assistance to disabled persons for purchase/fitting of aids/appliances) Scheme and modify it in such a way that it becomes more user-friendly and the needy are not deprived of aids/appliances, which are essential for their social, economic and vocational rehabilitation. If they can, thereby, become earning members they would be much closer to achieve economic self-dependence and also be able to live and pursue their activities dignity.

Eligibility of the Beneficiaries

A person with disabilities fulfilling following conditions would be eligible for assistance under ADIP Scheme.

- i) An Indian citizen of any age.
- ii) Holds a 40% Disablement Certificate.
- iii) Has monthly income from all sources not exceeding Rs. 20,000/- per month.
- iv) In case of dependents, the income of parents/guardians should not exceed Rs. 20,000 per month.
- v) Who have not received assistance during the last 3 years for the same purpose from any source. However, for children below 12 years of age, this limit would be one year.

Note: Income certificate of beneficiaries staying in orphanages and half-way homes etc. may be accepted on certification of District Collector or Head of the organization concerned. Such beneficiaries will be provided aids & appliances under this Scheme by ALIMCO. (Scheme of assistance to disabled persons for purchase/fitting of aids/appliances (ADIP SCHEME) applicable w.e.f. 1st April, 2014, Govt. of India Ministry of Social Justice and Empowerment)

Objectives

Aim of the study

The present study aims at developing a questionnaire which is at first developed in English and later transadapted (Guideline D1, ITC, 2001; Hambleton, 2005) [4] to Bengali language, and then validate to see the internal consistency of the questionnaire followed by regular monitoring and comparing the interest in screening sessions and follow up sessions.

Need

From the time of implementation of ADIP scheme till the present period Government has considered to deliver body worn hearing aids for the people with hearing loss. But in today's fastest growing technology better options should be provided for the people with hearing impaired so, that they can also get benefitted with better amplification options available in today's scientific technology and thus, keeping in view the present condition Government of India is now a step ahead to initiate and include behind the ear (BTE) hearing aids in the ADIP beneficiaries which in upcoming days can get replaced against body level hearing aid provided to the people with hearing impairment under this scheme.

Thus, this camp study is a field trial survey of the outcome measures of behind the ear hearing aid usage which can work as directives to consider behind the ear (BTE) hearing aid as a better amplification option in comparison to body worn hearing aids and hence, recommend in revised ADIP scheme which has been implemented from 1st April 2014.

Methodology

Participants

The study included 2000 participants were taken. Each of the participant was using body level hearing aid which was being delivered to them under ADIP scheme for a couple of years but now they want to switch over to better amplification options than their present device.

Tool

The tool used for our study was a questionnaire which was first developed in English and later on transadapted (Guideline D1., ITC, 2001; Hambleton, 2005) [4] to Bengali language.

Questionnaire development and Standardisation:

A questionnaire was constructed keeping in mind 3 areas namely cost, cosmetic and hearing performance of hearing aids and the questions were randomly placed in questionnaire so as to avoid biasness. Initially the questionnaire consisted of 15 questions and among those 10 questions were selected, standardized and validated through judgment by 5 audiologists. The internal consistency and inter item correlation in between the questions was checked by cronbach's alpha method and the score was found to be 65% indicating acceptable correlation.

The pretest1 consists of scores that were provided to the participants when they first came for audiometric testing, pretest2 consists of scores of the same questionnaire that were provided to participants who came for the hearing aid trial after 7 days and the post test scores consists of the responses that were obtained after the participants used the aid and came back to the camp after 30 days.

Procedure

A questionnaire which consisting off a set of 10 questions was being developed which was validated under the judgements by 5 renowned audiologists and was then distributed to the participants who were taken into consideration for this study. Questionnaire was provided to the participants who came for audiometric testing in a camp. Proper instructions were given to the participants regarding how to mark the response in the questionnaire i.e., they were told to mark ‘Y’ if the answer is to be “yes”, mark ‘N’ if the answer is to be “no” or else mark ‘D.K’ in case if the patient “don’t know the answer” or “not sure about the answer”. The participants were provided 15 minutes for their responses. Before providing the questionnaire the participants were asked about the language which would be comfortable for them to read and respond. The survey was then carried out three times each time for two consecutive days and 1000 participants were allowed per day. Four testers were involved for the distribution and collection of questionnaire. The test was administered in three phases In pretest1 scores were obtained by analysing data on the basis of the responses being obtained from the participants who just simply first to the camp for audiometric testing and pretest2 consisted of the data which was collected from the participants who came to the camp for hearing aid trial after 7 days. And at last post test scores were analysed from the data obtained based upon the responses by the clients who were using the aid being dispensed from the camp after 30 days.

Results and Discussion

Statistical Analysis

The basic raw data that was obtained from the subjects was fed to Microsoft Office Excel 2007 and to SPSS version 11.5 for Windows for further analysis. In order to evaluate the responses of the questionnaire both pre-term and post-term with respect to the usage of behind the ear hearing aids were calculated using the non parametric Chi square (X^2) and other correlation tests.

Data Analysis

Subjective data obtained from the case history performa

A total of 2000 subjects, who were using body-worn hearing aid for a couple of years taken from camp were included for the study. It was observed that overall all the 2000 were body-worn users and were not exposed to any kind of digital hearing aids and every participant had hearing loss with no significant history of any pathological symptoms.

Otosopic Examination

The external auditory canal was clear and the tympanic membrane was visible in all the cases.

Objective data obtained from Audiological Evaluations

Pure Tone Audiometry: In the pure tone audiometry, the pure-tone average was calculated by taking the means of 0.5Hz, 1 KHz, 2 KHz and 4 KHz for the left and right ear separately. All the subjects had sensorineural hearing impairment, of which 40% had mild degree, 27% had moderate degree, 10% had moderately severe degree, 13% had severe degree, and 10% had profound degree of hearing loss.

The reliability of the questionnaire was tested using cronbach’s alpha revealing the value to be 0.981 indicating

highly reliable. Correlation between the three sub scales was found out using cronbach’s alpha in which the value between cosmetic and cost was 0.976, cost and performance was 0.997 and between performance and cosmetic was 0.992 indicating good correlation. The scores of pretest1 was compared with the scores of pretest2 using kendall’s tau b (as shown in Table 1) to see the correlation and the value was found to be 0.889 indicating high correlation.

Table 1: Kendall’s tau b correlation

			Pre	Post
Kendall's tau_b	Pre	Correlation Coefficient	1.000	.889**
		Sig. (2-tailed)	.	.001
		N	9	9
	Post	Correlation Coefficient	.889**	1.000
		Sig. (2-tailed)	.001	.
		N	9	9

A chi-square test was conducted between the responses of the participants from the pretest1 questionnaire and post-test questionnaire in which p-value was found to be 0.001 (<p=0.05) indicating rejection of null hypothesis and no correlation between the pre-test and post-test. This further indicates that the participants are benefited more after the usage of the behind the ear hearing aid in all the three aspects cosmetic, cost and hearing performance.

Discussion: The purpose of this study to standardise a questionnaire in order to evaluate the characteristics of BTE hearing aids with that of body worn hearing aids in young children to adults with mild to profound hearing loss. Some patients are poor users of hearing aids and cochlear implants, others achieve variable improvement in hearing sensitivity with assistive device use (Santeralli *et al.*, 2013) [5]. The present study showed that people who were using body worn hearing aids showed a significant interest in switching over to BTE hearing aids. The outcome of different rehabilitative options in patients with hearing loss shows a wide range of variability. Hence, there is a need to implement BTE hearing aid in ADIP scheme by the government so that the patients with hearing loss can at least get possible amplification which can help them to uplift their lifestyle by making them more independent and more reliable towards the fast growing scientific world. Thus, we as audiologists should broaden the views of the Government so that there is a turning point in the ADIP Scheme which can occur by accepting and dispensing BTE hearing aids rather than body worn hearing aids under ADIP scheme by providing better rehabilitative options to the patients with hearing loss only after a proper audiological assessment by a renowned audiologist and then providing the best amplification option based upon the type of hearing loss.

Conclusion

Behind the ear hearing aids have proved to be better in terms of hearing as well as cosmetic aspect. People who were previously wearing body worn hearing aids are now showing interest in switching over to behind the ear as they are getting facilitated from government. The poor people who were longing for a better hearing aid in terms of cost, hearing as well as cosmetic for their children or even for themselves will highly be benefited. This is an excellent step towards the empowerment of the Persons with Disability (PWD).

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