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Applicability of ICF in hearing impaired population

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ABSTRACT

In order to characterise the extensive effects of a variety of health disorders on people, the International Classification of Functioning Disability and health (ICF) is frequently used in the disability and health sectors. The biopsychosocial model can be employed to explain how an individual interacts with their body's structure, functions and involvement in daily activities. The ICF is also a way to facilitate patient centred care. By applying ICF in audiology, healthcare professionals can interact with one another in both clinical and research contexts. This research mainly focuses on ICF's relevance and application to audiology and provides examples of how it should be used clinically to evaluate and treat adults with hearing loss.

1. Introduction

According to National Sample Survey, hearing loss is the 2^{nd} prevalent cause of disability in India and the leading cause of sensory deficit. A hearing impairment has a great effect on the people. Nearly all facets of life, including cognitive, psycho social, educational, and personality development, are affected. Patients with similar degree of HL usually experience impacts of HL differently. This depends on the kinds of activities individuals engage in, the social roles they perform, and the settings in which they engage.

In order to identify the extensive effects of various health disorders on people, The International Classification of Functioning, Disability and Health (ICF) is used frequently in rehabilitation and medical sectors. One of the foundational ideas of the ICF is that the patient's treatment can be based on the biopsychosocial model, with the functional profile being determined by an audiologist and other health professionals, as the medical diagnosis alone does not provide enough information about the effects of hearing loss and how it affects a person's functionality. (Morettin et. al, 2008). An interactive, biopsychosocial framework called the ICF can be used to define states of health and conditions that are related to health. A person's health is taken into account by the ICF in two different ways: first, through functioning and disability, and second, through environmental factors. Disability and functioning include descriptions of bodily systems, activities, and engagement. The words impairments, activity limitations, and participation restrictions are used to express the corresponding detrimental effects of a health condition (e.g. communication difficulties, forming relationships). Activities are actions or tasks carried out by a person, whereas participation is their involvement in a given circumstance. In the ICF, contextual factors take into account the effects of environmental influences, such as the attitudes of family, friends, and healthcare professionals. The ICF's main objective is to offer a common language and framework for describing states of health and conditions connected to health. [Meyer, C., Grenness, C., Scarinci, N., & Hickson, L. (2016, August)]. [1–5]

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It also facilitates discussion between healthcare professionals with the purpose of offering a broader view of the cases and facilitate patient centered care. Additionally, it encourages conversation among medical experts so as to provide a more comprehensive view of the cases and promote patient-centered care. The ICF places a strong emphasis on how HL affects a person's entire functioning, in addition to physical structure and function. It also emphasizes the significant number of environmental elements that affect how hearing loss is felt. Activity restrictions, participation restrictions, and individual characteristics (such as attitudes toward hearing aids, level of comfort using an aid, and family support) all have a greater impact on hearing rehabilitation outcomes than measured hearing loss alone. Thus, by concentrating on the necessity of the patient and pertinent contextual circumstances, the implementation of the ICF in audiological rehabilitation can aid in facilitating client-centered care. [Meyer, C., Grenness, C., Scarinci, N., & Hickson, L. (2016, August)].[6–8]

2. Biopsychosocial Model

The biopsychosocial model (BSM) proposed by George Engel in 1977 was adapted by WHO in 2002 as a basis for the international classification of function (ICF). This model can be employed to explain how an individual interacts with their body structure, functions and involvement in daily activities in order to determine health related outcomes of HI.

In the biopsychosocial model disease or illness outcome is attributed to the blend of three factors biological, psychological, and social. By taking into account these three variables, the model is able to produce a distinctive portrait of a person, which makes it easier to manage a condition like hearing loss. The clinician becomes aware of the environment the person lives in and how it affects their functioning. This in turn helps in creating patient specific rehabilitation plan.

2.1. Applying the ICF to audiological assessment and management

As HL has wide-ranging impacts, so the audiological treatment should commence with an evaluation of all the ICF framework's elements, including the domains of body structure, body functions, activity limitation and participation, and environmental influences and their unique codes. However, audiologists must also gather data about how hearing loss affects communication, daily activities (such as using the phone or watching television), involvement in educational, occupational, and social settings, in order to evaluate other components of the ICF. Family assistance, client's and their family members attitude towards use of hearing aids and the impact of hearing impairment on one's life are just a few contextual aspects that clinician should ask about. Thus, conducting comprehensive audiological assessment through the application of ICF facilitates patient centred care by focussing on the individual's need of the patient and relevant contextual factors. For example – The appropriate sort of hearing aid may be determined by the audiogram, but the patient's activity limitations and participation restrictions may suggest that an assistive device is more crucial.

Treatment of Audiological Disorders through the implementation of ICF framework to audiological rehabilitation can aid in client- centered care by concentrating on the specific demands of the client and applicable environmental factors. There are two reasons why this is crucial. First, in qualitative research studies on individuals with hearing impairment, the significance of individualised hearing treatment is frequently emphasized. Additionally, the evidence has long supported the use of client and family orientated practises for young patients with hearing impairment. Second, there is strong support for the idea that personal factors, such as attitudes toward hearing aids, self-confidence in using them, and family support, have a significant influence on the results of hearing rehabilitation than do activity restrictions (like perceived communication challenges) or participation restrictions (like perceived hearing impairments), or both.

Audiologists should offer client's with a variety of treatment options after determining pertinent objectives for the hearing-impaired person and his or her family. Only a few viable interventions include hearing aids, implantable devices, assistive listening devices or listening training. It's also critical to acknowledge any additional assistance that individuals with hearing impairment and their families might need. For instance, a school going patient would want the audiologist to communicate with the teacher of the class to verify that the atmosphere is favourable for learning. Additional training may significantly help those individuals who are less efficient in using hearing aids. A patient who claims to have depression, anxiety, or both may gain from being referred to a psychologist.[Meyer, C., Grenness, C., Scarinci, N., & Hickson, L. (2016, August)]

3. Objective

The objective of this research is to gain knowledge on how individual's internal and external environment affects the three elements (body function, body structure and activity limitation, participation) through the application of ICF and to present a rationale for the ICF's relevance and application to audiology.

4. Materials and Methods

The study was conducted using analytical study design. The data collection was done through tertiary care hospital

settings and other clinical settings. The method of sampling used was purposive sampling. The inclusion criteria were that all hearing impaired individuals were between 3 – 10 years of age and all the children were prelingually deafened. The stratified sample used in this analysis consisted of 23 hearing impaired children. The ICF checklist (version 2.1a, clinical form) was used.

The study was conducted in two phases-data collection and collating, summarizing and reporting results.

Based on 23 HI individual's observation and their parent's response to close ended questions in ICF checklist the outcomes were evaluated based on the scores in 4 WHO – ICF model categories – body functions, body structures, activity limitation and participation restrictions and environmental factors.

5. Results

After evaluating 23 hearing impaired patients using ICF checklist, the following domains were found to be impacted.

Table 1: Impacted domains in ICF checklist

Domain	Codes	Area of difficulty
1) Body Function	b140	Attention
	b164	Higher level cognitive function
	b167	Language
	b230	Hearing
	b310	Voice
2) Body Ssructure	S2	Eye, ear and related structures
3) Activity limitation and participation restriction	d115	Listening
	d140	Learning to read
	d145	Learning to write
	d150	Arithmetic
	d175	Solving problems
	d220	Undertaking multiple tasks
	d310	Communication with receiving spoken messages
	d330	Speaking
	d350	Conversation
	d820	School education
	d910	Community life
	d920	Recreation and leisure
4) Environmental Factors	e3	Support and relationship
	e4	Attitudes

The frequency of ICF codes within each domain was counted for each patient and the codes which were found to be problematic in each individual were as follows.

Table 2: Frequency of impacted codes in domain body function

Domain-Body Functions Code	Individual	First qualifier (extent of impairment)
1) Attention (b140)	14	3(severe, >50%)
	7	2(moderate, <50%)
	2	1(mild, <25%)
2) Higher level cognitive functions(b164)	21	4(complete, >95%)
	2	3(severe, >50%)
3) Language (b167)	17	4(complete, >95%)
	4	3(severe, >50%)
	2	2(moderate, < 50%)
4) Hearing (b230)	12	4(complete, >95 %)
	9	3(severe, >50%)
	2	2(moderate, <50%)
5) Voice (b310)	17	3(severe, >50%)
	6	2(moderate, <50%)

The results collected from 23 HI patients suggest that hearing loss is experienced by each individual differently. The difference accounts not only due to body structure and functions but also due to activity limitations and participation restrictions and also significantly by environmental factors. For the management of hearing loss patient specific rehabilitation plan should be made by considering all the affected domains in the ICF checklist. Applying ICF framework in assessment and management of individuals with HI will guide audiological assistance in individual's with hearing impairment and will help in organizing individualized counselling programs for providing informational and supportive counselling to children and their parents.

As a result, the inclusion of ICF can aid audiologists in determining the impacted domain in children with HI, enabling them to provide each patient with individualized services that acknowledges environmental factors in addition to body functions and structures. In this way, audiologists can use the ICF framework to promote the implementation of patient-centered treatment, which will ultimately lead to better patient outcomes. Its implementation has other, perhaps more significant benefits beyond just delivering patient-centered treatment. First, ICF enables in developing informational content, thus creating a common language for exchange of information amongst

Table 3: Frequency of impacted codes in domain body structures

Domain – Activity Limitations & Participation Restriction				
Domain	**Code**	**Individual**	**first qualifier (extent of Impairment)**	**Second qualifier (nature of change)**
Body structure	Eye, Ear and related structures (s2)	12	3 (severe, >50%)	2(moderate, <50%)
		11	2(moderate, <50%)	0(no impairment)

Table 4: Frequency of impacted codes in domain activity limitations and participation restriction

Code	**Performance (first** Individual	**Qualifier Qualifier)** score	**Capicity- (second** individual	**Ualifier Qualifier)** score
1)listening	12	4(complete,>95%)	21	4(complete,>95%)
	9	3(severe,>50%)	2	2(moderate,<50%)
	2	2(moderate, <50%)	_	_
2) learning to read	18	4(complete >95%)	21	4(complete,>95%)
	3	3(severe,>50%)	2	2(moderate, <50%)
	2	1(mild, <25%)	_	_
3) learning to write	12	3 (severe,>50%)	21	3 (severe,>50%)
	8	2 (moderate 50%)	2	1 (mild<25%)
	3	1 (mild<25%)	_	_
4) listening to Calculate	17	3 (severe,>50%)	21	3 (severe,>50%)
	2	2 (moderate, <50%)	2	1 (mild, <25%)
	4	1 (mild, <25%)	_	_
5)solving problems	8	3(severe,>50%)	21	3 (severe,>50%)
	13	2 (moderate, <50%)	2	2 (moderate, <50%)
6)undertaking multiple tasks	19	3 (severe,>50%)	21	4 (complete,>95%)
	2	2 (moderate, <50%)	2	3 (severe,>50%)
7)communication With receiving messages	21	4(complete, >95%)	21	4 complete,>95%)
	2	1(mild, <25%)	2	2(moderate, <50%)
8)speaking	21	4(complete,>95%)	21	4(complete,>95%)
	2	0(no impairment)	2	2(moderate, <50%)
9)conversation	19	4(complete, >95%)	21	4(complete,>95%)
	2	0(no impairment)	2	2(moderate, <50%)
	13	2(moderate, <50%)	2	2(moderate, 50%)
10)school education	21	4(complete, >95%)	21	4(complete, >95%)
	2	2(moderate, <50%)	2	3(severe, >50%)
11)community life	21	3(severe, >50%)	21	4(complete, >95%)
	2	2(moderate, <50%)	2	3(severe, >50%)
12) recreation And leisure	21	3(severe, > 50%)	21	4(complete, >95%)
	2	1(mild, <25%)	2	3(severe, >50%)

Table 5: Frequency of impacted codes in domain environmental factors

Domain – environmental factors		
Code	**Individual**	**Qualifier (barrier or facilitator)**
1) support and relationship	21	3 (severe barrier)
	2	1 (mild barrier)
2) attitude	16	3 (severe barrier)
	5	2 (moderate barrier)
	2	(mild barrier)

other health care experts. It is reasonable to assume that since the ICF has been used extensively in a variety of fields—including speech pathology, physiotherapy, occupational therapy, social work, and more—meaningful interprofessional talks will take place. To see the relevance of this, remember that involvement for a person with hearing loss is not likely to be altered just by changes to the auditory system (body function and structure). A child may be unable to socialize due to hearing impairment, mobility issues, and absence of parental assistance. Therefore, it is essential to use an interdisciplinary approach while treating patients. Second, if the ICF is included in clinical and research settings to identify the consequences of a health disorder, it will be viable and convenient to correlate data across various disorders, rehabilitation programs and nations.

6. Discussion

This study rationalizes the applicability of ICF framework in HI individuals. In this article, it is emphasised that ICF enables the provision of tailored services that take into account not only the bodily functions and structures of each patient, but also any pertinent activity restriction and participation restriction in light of environmental and individual circumstances. The ICF framework can be used to alter an individual's personal traits (e.g., by teaching them how to use effective communication techniques, lowering their expectations of hearing aids, or adopting an affirmative communication style) or to change the environment (e.g., modifying acoustic and optical properties of the environment in which communication takes place). The inclusion of the ICF framework in their treatment will ultimately result in a more tailored and suitable outcome with high levels of satisfaction for the person with hearing impairment and the family member.

The results obtained from our study were quite like the study conducted by Carly Meyer et.al., in Australia in 2016, which focussed on the relevance of ICF to audiology. There they concluded that ICF can and should be used to guide audiological services for children and adults with hearing loss.

In another study by Collen Prarros, who described the role of WHO – ICF in models of infant CI management, also concluded that the use of ICF enabled a more tailored and holistic approach to remove the barriers required to achieve function.

In another example by Mead N, Bower P. The ICF was used as an example of how senior audiological rehabilitation can be carried out while focusing on the needs of the patient and their family.

7. Conclusion

The research mainly focuses the ICF's relevance and application to audiology and how it should be used clinically to evaluate and treat patients with HL. This article's goal is to explain why the ICF framework should be used in the audiological examination and treatment of individuals with hearing loss. ICF checklist was applied to patients HI to show the utility and applicability of ICF in audiological rehabilitation. In treating children and adults with hearing impairment, audiologists can use ICF to provide patient- and family-centered treatment.

8. Source of Funding

None.

9. Conflict of Interest

None.

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