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THE DIFFERENCES IN MODALITIES OF COMMUNICATION IN HEARING IMPAIRED PERSONS

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Hearing impairment compromises or prevents verbal communication, which is why hearing impaired people use the various available communication modalities available and their combinations, depending on the extent of the consequences of hearing impairment, and for the purpose of communicating as effectively as possible
Objective: to register the differences in communication modalities between prelingually and postlingually deaf people.
Methods: The study was conducted on a sample of two groups (prelingually and postlingually deaf persons) from a total of 50 deaf subjects of both sexes with a median age of 55 years. The data were collected through an anonymous questionnaire constructed for the purposes of this research and structured from closed-ended questions, after which they were statistically processed in the SPSS computer program (SPSS Inc. 13.0, Chicago, USA) using appropriate statistical methods.
Results: showed the most common use of a combination of sign language, lipreading and speech with a predominant use of sign language in the prelingually deaf, and the advantage of interpreter assistance over other available aids and technology.
Conclusion: Different approaches to communicating with deaf people are necessary to make their communication with the environment accessible and effective, and the most important thing is to ensure that a sufficient number of sign language interpreters are available.
Keywords: Deafness; Croatian Sign Language; Communication; Hearing IMPAIRMENT

INTRODUCTION

By definition, hearing impairment is characterized by the reduced ability or inability to receive, conduct, register, and process auditory stimuli due to congenital or acquired impairments, underdevelopment, or dysfunction of the auditory organ, auditory nerve, or central auditory centers. The extent of the consequences of impaired hearing depends on the cause of the impairment, the time of its occurrence, the severity of the impairment, the psychophysical structure of the person and the impact of the social environment [1]. It can be said with certainty that the time of onset and the degree of hearing impairment play the most significant role in the communication of hearing impaired people [2, 3]. Hearing impairments are classified according to audiological criteria based on different medical parameters and according to surdopedagogical criteria based on the severity and timing of the occurrence of the impairment and its consequences on speech development [4]. The ratio is proportional - the earlier the hearing impairment has occurred and the greater the degree, in general, the communication is more impeded with a significant reduction in a person's speech intelligibility, while those with acquired hearing impairment who, while being properly audible, have adopted a language and developed a speech, have a small reduction in speech intelligibility, but it is difficult or impossible for them to understand someone else's speech [5]. Also, people with severe hearing impairment primarily use the sense of sight to receive communication information and to perceive the environment and environmental conditions [6, 7]. Perception of speech by sight refers to the lipreading, although most voices are poorly visible on the lips, so it is important to emphasize that, regardless of hearing impairment, hearing on hearing residues contributes to receiving information. People who attended the so-called "Oral schools" (which prohibited the use of sign language) are less used to using sign language because of their lower mastery of it. Prelingually deaf people are often linguistically compromised in comparison to the hearing community and express a preference for sign language communication using the one-handed or two-letter alphabet when the phonological structure of the word needs to be registered in detail. Hearing persons prefer simultaneous communication when communicating with postlingually deaf and hard of hearing persons. When it comes to the use of sign language, it is necessary to distinguish simultaneous communication, in which language is simultaneously signed and spoken, from the "true" sign language, in which it is exclusively signed, whereby the sign language has its own linguistic features and linguistic components and as such is independent of the standard language of hearing persons [8,9].

SUBJECTS AND METHODS

The study was conducted at the University Hospital Center Osijek at the Department of Otorhinolaryngology and Head and Neck Surgery. The study included 50 deaf subjects of both sexes (30 (60%) men and 20 (40%) women) with a median age of 55 years. The subjects were divided into two groups depending on the occurence time of the hearing impairment. The first group consisted of 38 (76%) prelingually deaf persons and the second group consisted of 12 (24%) postlingually deaf persons. The study inclusion criterion was 90 dB hearing impairment and more, verified by audiologic processing. Exclusion criteria were mild hearing impairment, comorbidities in the form of impaired cognitive and intellectual functioning, significant visual impairment, and neurological ailments combined with hearing impairment. All respondents were explained in detail the manner and purpose of the research, they voluntarily gave their consent to participate in the research and they signed an informed consent. The data were collected individually through a questionnaire constructed for the purposes of this research and structured from ten closed-ended questions. The questions were related to the differential variable (age of hearing loss) and to the examined variables (mode of education, education degree, sign language' knowledge, modality of communication with family/household, modality of communication with others, use of communication aids, social contact, primary modality of communication) with predefined answers for easier statistical processing. Each deaf person had the help of a sign language interpreter when completing the questionnaire. The collected data were statistically processed in the SPSS (SPSS Inc. 13.0., Chicago, USA) computer program. Categorical data are presented by frequencies and percentages. Distribution normality was tested by the Kolmogorov - Smirnov test. Numerical data were described by the median and interquartile ranges, and differences in numerical variables between the two independent groups were tested by Mann - Whitney U test, since the distribution did not follow the normal one. The direction of the statistically significant difference was determined using the z value, and the magnitude of the difference effect was determined using the r value according to the Koen criterion. All p values are two sided. The significance level was set at $\alpha = 0.05$.

RESULTS

According to the collected and analyzed dana by the total number of respondents, the youngest respondent was 24 years old and the oldest respondent was 80 years old, with a median age of 55 years. According to the gender, the youngest female respondent was 24 years old and the oldest was 72 years old, while the youngest male respondent was 26 years old and the oldest was 80 years old. Most of the respondents, 74%, have adopted Croatian sign language, 24% use it in communication with family, 16% use it in communication with other people, and 32% of respondents stated that their sign language is the primary form of communication. 12% of respondents have a partial knowledge of sign language and 14% of respondents do not know it.

Table1 shows the overall results in frequencies and percentages on individual variables by category.

Table 1*: Frequency and percentile representation by individual variables*

Variable	Category	Frequencies	Percentages
Age of hearing loss	Since birth By age 5 From the age of 5	25 13 12	50 26 24
School	SUVAG Slava Raškaj Both schools Other (Regular school)	3 26 1 20	6 52 2 40
Education degree	Low-skilled education High school education University degree	14 35 1	28 70 2
Croatian Sign Language	Knows Does not know Knows partially	37 7 6	74 14 12
Communication with parents/household members	Speech / lip reading Croatian Sign Language Both	15 12 23	30 24 46
Communication with others	Speech / lip reading Croatian Sign Language Both	13 8 29	26 16 58
Communication aids/ Assisted communication	Phone for the deaf / minitel /fax Computer / cell phone Both Sign language interpreter	5 10 2 33	10 20 4 66

Social contact	With hearing people With deaf people With everyone	5 16 29	10 32 58
Primary modality of communication	Lipreading / speech Croatian Sign Language Both	10 16 24	20 32 48

In communication, both groups of respondents mostly use the combination of sign language, lipreading and speech, but receive the most information through sign language. Prelingually deaf persons always communicate in manual forms when they have an interlocutor with whom they can, and use lip eading and partly speaking exclusively in communication with hearing persons who do not know sign language. The results of the study presented in Table 2 show statistically significant differences in the mode of communication on some variables between prelingually and postlingually deaf persons ($p = 0.001$), with a direction towards the prelingually deaf and with a large influence of registered differences in communication ($r = 0.459$).

Table 2: Analysis of differences on variables between groups

	Median (interquartile range)	
Variable	Prelingually deaf	Postlingually deaf
Croatian Sign Language	1 (1-2)	2 (2-3)
Communication with parents/ household members	2 (1-2)	1 (1-3)
Communication with others	3 (1-3)	3 (1-3)
Communication aids/Assisted communication	3 (1-3)	3 (1-3)
Social contact	2 (2-3)	3 (1-3)
Primary modality of		
communication	2 (2-3)	3 (1-3)
School	2 (1-2)	3 (3-3)
Education degree	2 (2-2)	2 (2-3)
Total	17,00	10,00

*Mann-Whitney U test

DISCUSSION

The most frequent communication modality of the deaf in use has been the combination of speech, lipreading, and sign language, which can be interpreted as a natural human response in given circumstances. Even the orderly hearing population unknowingly or consciously uses all available communication modalities in optimal communication conditions, and especially when these conditions are not optimal. If there is an ambient noise greater than 40 dB, the hearing person will automatically rely more on the visual channel of communication than on the auditory channel. When noise is significant, the hearing person will transmit a part of the message using mimics and gestures for the purpose of more effective communication. In exactly the same way, hearing impaired people use all available communication modalities for the purpose of successful transmittion of messages, except the difference in modalities is more emphasized when one communication channel is dysfunctional. It is necessary to take into account the fact which contributes to this result, the majority of the hearing population do not know sign language. When looking at the preferences of the deaf modality, sign language is prefered, because it is the most natural, fastest and most effective way of communication for them. This is supported by the results of psycholinguistic studies of the developmental process of the sign language acquisition in deaf children, which show that this process is the same as the acquisition of spoken language in hearing children [10-15]. Also, studies in the field of neurolinguistics show activation of the primary visual and auditory cortex in perception, and activation of the primary motor cortex, Broca's area, Wernicke's area and premotor area in the production of both spoken and sign language, confirming the verbal-linguistic status of sign language [16-19]. On the other hand, the importance of proper functioning of insula for all aspects of speech and language behavior has been demonstrated, as it contains cortical and subcortical connections [20], and published educational-rehabilitation studies [21, 22] show the benefits of deaf parents' deaf children in the results on variables of non-verbal intelligence, emotional maturity, independence, pragmatics of the language of the hearing environment, school achievement, self-esteem, and have less frequent behavioral disorders compared to the deaf children of the hearing parents. These facts support the thesis that sign

language has multiple benefits, both in the developmental stage and later in the life of a deaf person [23]. However, most deaf children are educated in schools where only the language of the hearing environment is used and where teachers are not competent for manual communication with deaf students. The deaf child then adopts the language of the hearing environment with the help of the residual hearing, and receiving new information in these circumstances is significantly impeded and reduced. Cochlear implants facilitate the rehabilitation of hearing and speech, but it is important to note that part of children with cochlear implants fail to develop speech and acquire the language of the hearing environment, so such children are left with only the possibility of learning sign language. Quite logically, according to the results, deaf people use sign language to communicate with deaf parents and families, mainly lipreading and speech and simultaneous communication for communication with the hearing environment, and with very few hearing persons who know sign language they communicate with manual modality. Some respondents use available aids and current technology in communication, but regardless of sophisticated apparatus, the majority of respondents rely on a sign language interpreter. This can be partly explained by the fact that more than half of the respondents were aged 51 and over, and with the trust created between the deaf person and the interpreter, but nevertheless, this result confirms the already known degree of impairment that deafness brings with it and the presence of its limiting consequences in daily functioning, as well as the irreplaceability of a living person, or interpreter, in real-life situations. Deaf people have social contacts with hearing and deaf people, because they are surrounded by both communities, but when looking at their preferences, they rather have contacts with other deaf people because their communication is facilitated and they have a sense of acceptance and belonging, which results from their long-standing aspirations for recognition of their own Deaf culture. Kushalnagar et al [24] report that the preferred mode of communication for the deaf was not related to the assessment of environmental comprehension but to the perceived stigma associated with hearing impairment and they conclude that sign language in everyday communication of deaf persons has a beneficial effect in reducing the stigma of youth perceived and associated with hearing loss. The affirmation of sign language as the real language, the exercise of the rights of the deaf, and the recognition of the Deaf culture resulted in the substitution of a medico-pathological deafness model with a socio-cultural deafness model with positive effects in the essential spheres of life of the deaf person [10, 25, 26]. Accordingly, there is a need for different approaches in communicating with deaf people in order to make communication with the hearing environment accessible and effective, and the most important aspect of this is providing a sufficient number of sign language interpreters.

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