

## **Mode of tele-communication and software used by children with hearing impairment.**

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### **Abstract**

**Objective:** The study is being conducted to find out mode of tele-communication and software used by children with hearing impairment.

**Methodology:** This cross-sectional study was done at special education centers and schools in Lahore and Sheikhpura. Data was collected from children with hearing impairment by using a questionnaire of 11 items about the modes of tele-communication and software used by children with hearing impairment. Sample size was 362 which was calculated by using online sample size calculator. The population includes male and female children with mild, moderate, severe and profound hearing impairment studying in special education schools of Lahore and Sheikhpura. All these children use hearing aid and have congenital bilateral hearing loss.

**Results:** This study shows that almost 80% population of children with hearing impairment know about computer and mobile. They also have awareness about the use of computer, Facebook, e-mail etc. In addition, 40 to 50% children with hearing impairment use Skype, Facebook and e-mail as a communication tool.

**Conclusion:** The conclusion from this study is that most of the children use computer and mobile on daily basis in schools and homes for communication. Mild to moderate hearing loss children benefit from these devices between the ages of 10 to 20 y.

**Keywords:** Hearing impaired children (HIC), Tele-communication, Software, Digital devices.

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### **Introduction**

Listening debilitation or listening misfortune happens when an individual get impaired smaller or the greater part of our capacity to listen. Different terms that are utilized to allude to listening weaknesses include terms such as hard of hearing or nearly deaf person with hearing impairment [1].

Hindrances to hearing are grouped according to the seriousness of the listening weakness and the kind of listening impairments. Mild hearing impairment patients have problems with sounds which have frequencies somewhere around 25 and 40 db. People at this level cannot hear delicate commotions and may experience difficulty taking after discussions in uproarious settings. Moderate hearing impairment patients have problems with sounds which have frequencies somewhere around 40 and 70 db. Severe hearing impairment patients have

problems with sounds which have frequencies somewhere around 70 and 95 db. People at this level cannot hear most clamors and may depend on lip perusing and/or sign language even with the utilization of a listening aid. Profound hearing impairment patients have problems with sounds which have frequencies somewhere around 95 db and over [2].

Hearing loss can be classified as conductive, sensorineural and mixed hearing loss. Conductive hearing loss involves the outer and middle ear, wax blockage, punctured eardrum, birth defects ear infection, or heredity, and often can be treated medically or surgically. Sensorineural hearing loss or deafness is related to the auditor nerve of hearing. Age, prenatal, postnatal, bacterial infections, heredity, trauma, exposure to loud noise, fluid and a benign tumor in the inner ear are the major causes of hearing loss. Loss in hearing ability is also observed due to problems related to inner ear damage. Mixed

conductive and sensorineural hearing loss refers to a combination of injury and a problem that relates both to the external and inner ear [3,4].

Different strategies are useful for communication with person having hearing impairment. Most commonly used method is total communication which is the combination of all methods which we are used by hearing impaired patients. However, pictures, signs, spoken language, FM [5]. System, Assistive Listening Devices (ALDs) and Augmentative and Alternative Communication (AAC) help people with communication disorders to express themselves. These devices range from a simple picture board to a computer program that synthesizes speech from text. Alternating devices are connected to doorbells, telephones, or alarms that emit loud sounds or blinking lights to let someone with hearing loss know that an event is taking place [6].

Social networks has been used by many persons with disabilities and among them common users are hearing impaired. It has been proved in an online survey that Facebook is the most favourite and used app among hearing impaired students. Results show that they use Facebook to be in contact with other hearing impaired friends and with those friends who has no disability [7].

All new cordless phones are DECT (Digital Enhanced Cordless Telecommunications) and have better sound quality than analogue cordless phones. ABT Tone Caller makes it easier when phone is ringing, with an extra sound alert to let you know that you have received a call. Text messaging or Short Message Service (SMS) is a quick, cheap and easy way to keep in touch and is very useful if you have a hearing loss or speech impairment [8].

ViBe is a communication Android app that allows users to set vibration patterns for contacts. It is also designed as an accessibility tool for disabled individuals, most notably for the blinds and hearing impaired ones. Camfrog (a video chat client that was created by Camshare LLC). was first launched in 2003. It allows users to send instant messages to each other privately. Users can also interact *via* a private one-on-one audio/video chat. Unlike most instant messaging programs, users can also connect to chat rooms to view other users' text, audio, or video chat. Skype is another software application that allows voice and text communication over the internet and allows free calls to other users within the Skype services. Sky has become popular for its traditional features, which include instant messaging, file transfer, and video conferencing [9].

There are many products and technologies which help deaf persons at schools and homes for socializing with friends [10]. Hearing impaired people are employed in every occupational field, so most HI people tend to have special electronics and telecommunications equipment at homes. One technique which is employed utilizes a teletype machine by HIC person to transmit and receive messages and can also communicate easily because of the effective connection directly between them. This teletype machine effectively understands written information received from HIC people [11]. Hearing impaired

persons are well schooled in sign language to express themselves with facial expression and body motion. A written message received by a teletype machine or computer may not convey any emotional content that are present in voice of person [12-14].

Internet provides an alternative way for social environment. The process of communication among hearing impaired children is also improving rapidly due to the use of internet. Software that makes use of voice and video channels have become more common these days [15].

Hearing impaired persons are motivated to use the internet especially for interpersonal contacts with persons having no hearing loss. Deaf people have initiated a range of specialist websites which provide information aimed at fulfilling their communication needs and providing them opportunities to connect with other deaf people. Deaf people are active users of the internet due to which new telecommunication modes and software are specially designed for the deaf [16]. Hearing-impaired persons are motivated to use the internet more than their hearing counterparts. This use of internet by the hearing-impaired people is characterized by lengthier time spent on the internet and more solitary activities. Hearing-impaired persons are although using internet software (e.g., search engines) in similar fashion to their hearing counterparts such as both of them uses personal and group-communication tools [10,17].

### **Methodology**

This cross sectional study was done at special education centers and schools for children with hearing impairment in Lahore and Sheikhpura. Study was completed within 6 months (July 2016 to Dec 2016). Convenient sampling technique was used for the purpose of data collection. Sample size was calculated 362, by using online sample size calculator. Inclusion criteria includes those children with hearing impairment who had normal IQ and with moderate to severe hearing loss and they were able to communicate face to face by using sign language. The age of participants was 10 to 20 y. All children with hearing impairment who had any co morbid conditions were excluded from the study (congenital and chronic systematic diseases). Questionnaire was comprised of 11 items about the tele-communication modes and software used by children with hearing impairment. The first part of the questionnaire consisted of demographic information (e.g. gender, age, qualification severity level, etc.) and the second part of the questionnaire consisted of 11 statements. These statements were related to the mode of tele-communication and software used by children with hearing impairment. The four options were given to reply included never, sometime, always and don't know in front of each statement. The content of questionnaire was validated through literature and Lynn method. Different Special education centers and schools for the children with hearing impairment were visited to collect the data after taking the permission of the principal and informed consent of the participant. The results were extracted by using SPSS 16, conclusions were drawn, suggestions and recommendations were also made.

## Results












**Table 1.** Frequency distribution of children with Hearing Impairment on the basis of gender.

Gender	Frequency	Percentage
Male	144	39.8
Female	218	60.2
Total	362	100

**Table 2.** Class wise frequency and percentage of children with hearing impairment.

Class	Frequency	Percentage
5 <sup>th</sup> to 6 <sup>th</sup>	101	27.9

**Table 4.** Use of the software and tele-communication modes.

Statements	Symbols	Never	Always	Sometime	Don't know
1. I use computer or laptop for communication		9.10%	38.80%	51.10%	1%
2. I use mobile messages for communication		0.60%	78.60%	19.90%	1%
3. I use IMO software for communication		71.70%	1%	0.30%	27.10%
4. I use Facebook for communication		29.30%	1.90%	68.50%	0.30%
5. I use Face E-mail for communication		3.60%	49.40%	46.70%	0.30%
6. I use Whatsapp software for communication		56.90%	4.70%	37.80%	0.60%
7. I use Viber software for communication		53.00%	0.80%	45.90%	0.30%
8. I use Skype software for communication		19.60%	24.90%	50.80%	4.70%
9. I use Line software for communication		78.50%	1.40%	14.40%	5.80%
10. I use Twitter software for communication		56.90%	1.70%	34.80%	6.60%
11. I use Camfrog software for communication		20.30%	1%	1%	77.70%

This study shows that almost 80% population of children with hearing impairment knows about computer and mobile. They also have awareness about the use of computer, mobile, face book, e-mail etc. In addition, 40 to 50% children with hearing impairment use Skype, Facebook and e-mail as a communication tool (Tables 1-4).

7 <sup>th</sup> to 8 <sup>th</sup>	159	43.9
9 <sup>th</sup> to 10 <sup>th</sup>	102	28.2
Total	362	100

**Table 3.** Frequency distribution of children with hearing impairment on the basis of age.

Age	Frequency	Percentage
10 to 12	135	37.3
13 to 15	138	38.1
16 to 18	89	24.6
Total	362	100

## Discussion

This study shows that majority of the hearing impaired children (80% population of children with hearing impairment). know about computer and mobile. Most of them have awareness about the use of computer, mobile, Facebook, e-mail etc. In addition, reasonable number of these children (40 to 50%). Use Skype, Facebook and e-mailing as a

communication tool [18]. As for as the use of Twitter is concerned almost 56.9% children never used it 1% always and 34 % used it sometimes. In this connection, 78.5% children never used Line software for communication, 1.4% always used it and 14.4% sometimes used it. SMS and Emails are found to be the most common and frequent modes used by the children for communication purposes. On the other hand, Camfrog is found to be the least known software in this research. In addition, 37.8% children with hearing impairment sometimes used Whatsapp for communication, 4.7% children with hearing impairment always use Whatsapp software as a communication tool, 45.9% children with hearing impairment sometime used Viber software for communication, 53.0% children with hearing impairment never used Viber software for communication, 50.8% children with hearing impairment sometimes used Skype software for communication and 24.9% children with hearing impairment always used Skype for communication.

Comparison with other researches in this area also shows that SMS is the most frequent method used by the hearing impaired children. This study shows that 72.7% children with hearing impairment never used IMO software for communication. 27.1% children with hearing impairment do not know about IMO software and have never used it. Whereas in 2004, the UWC BANG conducted a research on children having age-group between the age of 15 to 24 in which 20% deaf children used IMO software for communication. As for as the use of Facebook for communicative purposes is concerned, this research shows that 68.5% children with hearing impairment used Facebook for communication sometimes while 7% always used Facebook as a communication tool. However, the UWC BANG research conducted in 2004, on children having age-group between the age of 15 to 24, shows that 50% deaf used Facebook in this regard [18]. In addition, 49.4% children with hearing impairment always used e-mail for communication, 46.7% children with hearing impairment used e-mail sometimes whereas in UWC BANG research 70% deaf used e-mail for communication. In relation to the use of computers, 51.1% children with hearing impairment, in this research, used computer sometimes for communication whereas in UWC BANG's research 39.8% children with hearing impairment always used computer for communication. Moreover, 79.6% children with hearing impairment always used mobiles for communication in this research and in UWC BANG's research, 19.9% children with hearing impairment use mobiles sometimes as a communication tool.

The Universal Service Agency (USA) conducted a survey in 1996, in which out of a sample of 47 children with hearing impairment only 23% actually used mobile for communication [19]. In August, 2012 University of the Western Cape, South Africa conducted a survey in which 81.25% deaf participant used mobile phone for SMS and video-messaging service. According to results only 14% of teachers in deaf schools can communicate through mobile with deaf for communication [20].

In 2009, the Australian Association of the Deaf, surveyed people who identify themselves as deaf by mail. Results showed that Short Message Service (SMS), telephone typewriters (TTY), voice/TTY relay services, fax, and e-mail were used regularly. Deaf users are discerning of the purposes for which they use each method for instance: SMS for social and personal interactions, TTY for longer communications and (*via* the relay service). with people and services without TTYS, fax for business and social contact, and computers for personal and business e-mails as well as Web browsing, accessing chat rooms, word processing, games, and study. Literature has supported that deaf community used social apps usually and its use is common among them [21].

A deaf communications technology study done by Wang at the DCCT indicated that even though 90% deaf people in the DCCT used SMS to communicate, they were very concerned about the cost of using the technology. This study indicated that they used other text messaging communication tools to communicate as well: 40% used Mxit, 26% used e-mail, and 28% had a Facebook account. Wang further indicated that 87% of deaf mobile phone users would be interested in using video communication systems for mobile phones and over 58% of them indicated that they would like to try using mobile video communication applications if they are free and this study correlates with our results [5].

A study done by Pilling and Barret in 2007 indicated that, in general, deaf people used several forms of text communication, but they selected each for a specific purpose, e.g. SMS for communication with family and friends, and e-mail for communication and sending files. In the United Kingdom, e-mail and SMS were the most widely used forms of text communication among deaf users, but SMS was mostly used by younger deaf users [22].

In an Australian study, several trials of different communication methods were conducted with deaf (hard of hearing or deaf) participants who mainly used sign language to communicate and it was found that SMS became the most frequently used means of communication when people were given a mobile phone that they had not used before [3].

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