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# Assessment of Health Literacy of Adolescents with Hearing Impairment

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**KEY WORDS**

Assessment, Communication and language barriers, Functional health literacy (HL), Hearing Impairment, Interactive and critical health literacy, School-based health literacy intervention, Sign Language

**ABSTRACT**

Communication and language barriers isolate hearing impaired individuals by depriving them of the opportunities of getting knowledge through different forms of health-related messages and healthcare communication. This put them at higher risk of getting affected by different diseases due to inadequate health literacy (HL). The objective of the study was to assess the existing level of health literacy of adolescent age hearing impaired individuals, along-with to identify the major deficit areas of health literacy. The theoretical framework of the study is based on Nutbeam's model of health literacy, which divides the HL into three major domains, (i) functional, (ii) interactive, and (iii) critical. It was a cross sectional study, in which data were collected from 299 hearing impaired students (both male and female) studying at Intermediate classes of five public colleges of special education. An adapted instrument of health literacy was used for the data collection purpose, adapted from HELMA (health literacy measure for adolescents). Moreover, to address the unique needs of hearing impaired individuals many statements were included in the instrument through an extensive review of related literature. The final

instrument was bilingual (English and Urdu) and named as Health Literacy Assessment Tool for Hearing Impaired (HLAT-HI). The instrument contained major three sections having sub-sections as per the levels of health literacy. Data was collected by face to face component and through correspondence. During data collection, necessary guidelines were provided to respondents in written form and sign language. The results of the study highlighted the major deficit areas of health literacy of hearing impaired students. Their health literacy has been identified as low including major deficit areas of reading, writing, knowledge, understanding, communication, management, and decision making skills. To promote their health literacy it is recommended to use school based health literacy intervention. Moreover, community based health literacy programs for out of school hearing impaired individuals can also be started, to empower them with the latest health related knowlege and skills. It is also recommended to provide training to teachers of special needs children along-with the healthcare professionals.

## Introduction

Health literacy is a set of skills necessary to function adequately in the healthcare environment. It has been defined as the capacity to obtain, process, and understand health information and services needed to make appropriate health decisions (Sorensen, Broucke, Fullam, Doyle, Peisken, & Slonska, 2015). So, an individual can get information, derived exact meaning and develop self-management and decision-making skills in health-related areas. Health literacy has a greater impact on the use of health-related knowledge in practical life (Broder et al, 2017). Sorensen and his colleagues also explained that health literacy develops throughout the lifespan of people, along-with the psychological and cognitive capabilities development. Specifically, an individual learns new knowledge and skills while navigating the healthcare system. Sorensen also discussed that health literacy skills initially developed earlier in life. However, adolescence age is significantly marked as the most important phase of human life in which cognitive capacity building is enhanced and helped regarding health-related decision making. So, adolescence is a salient period for developing and using health

literacy skills (Manganello, 2008).

Hearing impaired individuals have limited vocabulary and communications skills due to their disability, hence they are unable to develop necessary useful information regarding health preservation and health promotion. Moreover, they have to face problems in accessing medical professionals and interpreting their health issues (McKee et al, 2011). The major cause of the lack of health knowledge among hearing impaired individuals is the communication barrier (Kuenburg, 2016). Lack of education, lack of communication, and lack of access to different health related information are the major causes of poor health literacy among hearing impaired individuals. Moreover, the failure of various healthcare professionals in understanding deaf culture and the necessary communication skills for a more comprehensive interaction is also an underlying factor for deaf and dumb individual's failure in approaching health facilities (McKee et al, 2015).

Adolescents who are deaf or hard of hearing have significantly lower levels of health literacy as compared to their hearing counterparts (Anast, Estarziau, & Kaufman, 2006). In a study conducted by McKee and his fellows in the year 2015, it was reported that the health literacy ratio of hearing-impaired individuals was 6.9 times lower than that of their hearing counterparts. That's why it has created greater differences in the utilization of health-related services for individuals with and without hearing loss. For instance, the ratio of utilization of emergency services by hearing impaired individuals is higher than that of their hearing counterparts. In a review study, Kuenberg and his fellows reported that almost in forty-one countries, hearing impaired persons are affected by life threatening diseases like HIV/AIDS (McKee et al, 2011). A study was conducted in the United States in which it was concluded that more than 60 percent of the total of 203 hearing individuals were unable to tell the signs of a heart attack, and only 40 percent were able to tell the pain in the chest can be a sign of the heart stroke (Naseribooriabadi, Sadoughi & Sheikhtaheri, 2017). Another study reported that among hearing impaired individuals, health issues are more than that of their hearing counterparts, including suicidal attempts and domestic violence (Kuenberg et al, 2016).

In short, we can conclude hearing impaired individuals have to face many preventable diseases as a result of their insufficient health literacy. Their health literacy skills are different from their hearing counterparts, and that ultimately leads to differences in their health outcomes. Many International studies focused on the fact that there is a greater need to explore and evaluate the health literacy skills of hearing-impaired individuals.

## 1. Literature Review

Health literacy is the capability of any individual to process any health-related information and apply it in practical life. It also referred to the ability to find and locate the best health related services and procedures to follow the medical treatment accordingly. Health literacy is not the sole property of any particular individual, but each individual must get awareness about it and develop certain health literacy skills which are needed to survive in society. The importance of health literacy is equal for both individuals with and without disabilities. Particularly, if we talk about the individuals with deafness or hearing impairment, the possession of basic health literacy skills like reading, writing, understanding, communicating, and decision making is very critical for them to make sure their survival in society. Deaf and dumb or hearing-impaired individuals have to face serious communication issues due to their impairment in hearing. Data from the World Health Organisation indicates that in 2018, 466 million people (6.1% of the world's population) had a hearing loss; a figure expected to rise to 630 million by 2030 (Grote, Izagaren, & O'Brien, 2021). So, with such a high percentage of hearing-impaired individuals every country needs to plan effectively for them, especially in the fields of education and health. As per the statement of Helen Keller about hearing impairment, communication development is very important for deaf and dumb individuals (Meador & Zazove, 2005).

Hearing impaired individuals have limited health literacy skills and poor health status as well. It's all due to their low health literacy and disability. Communication and language barriers isolate hearing-impaired individuals and these barriers have been recognized as the biggest cause of the gap in health knowledge and health status (Kuenberg, Fillinger P & Fillenger J, 2016). Various studies have been conducted at different times concluded that Deaf sign language users struggle with a variety of communication barriers that ultimately reduce their chances to develop knowledge from media and other forms of health related messages (Tamaskar et al., 2000), they are also unable to communicate with healthcare professionals (McKee, Barnett, Block, & Pearson, 2011; McKee, Schlehofer, et al., 2011). Resultantly they have lower health related knowledge and understanding (Heuttel & Rothstein, 2001; Wollin & Elder, 2003; & Zazove, 2009), besides that they have to face serious issues and disparities in approaching health related services (Barnett, Klein, et al., 2011; McKee, Barnett, et al., 2011). Moreover, hearing impaired individuals develop their learning through visual cues like pictures and videos. They may lack excellence in writing English language due to their disability (Traxler, 2000), which when coupled with social marginalization, places them at potential risk for inadequate health literacy. Hearing impaired individuals communicate through sign language, hence they entirely depend upon visual language. The abstract ideas are very difficult to understand for them. So, to address their health disparities and for providing them with opportunities to develop health literacy, we have to provide them with more visual cues and graphical information (Mackert, Champlin, Pasch, & Weiss, 2013). In recent times, many researchers concluded that the prevalence of low health literacy among hearing impaired individuals is higher in adolescence age.

Smith, Kushalnagar, and Hauser (2015) conducted a study in this regard and concluded that adolescent age deaf and hard of hearing individuals have low health literacy in the cardiovascular area. They were also lag behind than that of their hearing counterparts in the acquisition of the key medical terms like cholesterol and diabetes. The study also concluded that no particular research has systematically quantified D/HH adolescents' health literacy and general knowledge.

The other important underlying factor for hearing impaired individuals is to address their unique needs for assessment of health literacy with a reliable and valid instrument. But, there is no particular instrument that can address the needs of the hearing-impaired population. A study conducted in the United States explored the fact that despite the 376 languages being in application all over the country, there were few known health literacy assessment tools available in other languages except English and Spanish languages (McKee & Paasche-Orlow, 2012). So, in the scenario where no particular assessment tools are available in other languages, then how can we imagine the availability of any particular instrument in sign language or any such instrument which may be specially developed for hearing impaired individuals? Health literacy is a broader concept and a multidimensional concept, hence it is considered as challenging to measure (Nutbeam, 2008), specifically for those people who are not 1st speakers of the English language (McKee & Paasche-Orlow, 2012; Sentell & Braun, 2012).

There are various instruments that exist internationally to test all three levels of health literacy. In the United States, functional health literacy is referred to as an individual's capability to read and write health related information and perform numerical tasks related to health. For that purpose, different instruments used like the Rapid Estimate of Adult Literacy in Medicine, the Short Form of the Test of Functional Health Literacy (Baker, Williams, Parker, Gazmararian, & Nurss, 1999), Newest Vital Sign (Weiss et al., 2005), and Medical Term Recognition Test (Rawson et al., 2010). All these instruments provide accurate information about the health literacy of any individual (Marrie, Salter, Tyry, Fox, & Cutter, 2014; Sharif & Blank, 2010), but represent health literacy constructs biased toward printed and spoken literacy (Chinn & McCarthy, 2012; Berkman, Davis, & McCormack, 2010; Nutbeam, 2009; Nutbeam, 2008).

In addition to the instruments that measure functional health literacy, there are several tools to measure the interactive and critical levels of health literacy, and these two levels provide more meaningful and comprehensive information and health related aptitude of an individual (Al Sayah, Majumdar, Egede, & Johnson, 2015). These two measures also provide a detailed analysis of the health literacy skills of the individuals who have not proficient in the English language also (Haun, Valerio, McCormack, Sorensen, & Paasche-Orlow, 2014). As explained in the theoretical framework of the study, interactive health literacy measures an individual's capacity to access the healthcare systems and professional,

communicate own health related issue, and seek social support. Interactive health literacy was also named Communicative health literacy at times. Meanwhile, Critical health literacy referred to more advanced cognitive functioning, i-e, to do health management and health related decision making (Nutbeam, 2008). Likewise, functional health literacy, various instruments measure the interactive and critical health literacy skills known as, the E-Health Literacy Scale; Communicative and Critical Health Literacy Measure; Media Health Literacy; and All Aspects of Health Literacy Scale (AAHLS). Then other instruments covered the overall elements of health literacy, likewise Health Literacy Skills Instrument. Similarly, for adolescent age individuals several instruments were developed and validated like Adolescent Health Literacy, Adolescent Media Health Literacy; e-Health Literacy Scale, and REALM-Teen. But the major drawback of all these instruments was that none of these has been adapted or translated into sign language for individuals with hearing impairment.

Assessing or measuring the health literacy skills of any individual itself a challenging task, especially for those who have hearing loss. The functional health literacy part of any instrument measures an individual's capacity to read the written instruments and answer accordingly, but hearing-impaired individuals are unable to perform because of their limited reading capacities. Moreover, those individuals who have not proficiency in the English language, so may not be able to perform accurately in these types of instruments. Hence these types of instruments developed in the English language might not reflect their true health related functional skills (Fang & Schleppegrell, 2010). Similarly, interactive and critical health literacy instruments are also developed in the English language, and hearing-impaired individuals who have not language proficiency, are unable to perform the required tasks. Hence their performance is underrated. So, the instruments and measures developed purely in English languages are not considered reliable for hearing impaired individuals in the United States (Pollard & Barnett, 2009). So, to measure the health literacy skills of individuals who are hearing impaired, there must be a bilingual test (in English as well as the native language of the respondents). Furthermore, the instrument should encompass the visual cues and sign language directions for the respondent's ease and understanding. During administration of the instrument and data collection, the test taker should also provide the directions in writing and with the help of sign language. So, the appropriate adapted instrument that encompasses the quality of bilingual written text along-with the visual cues and sign language directions can prove very effective in terms of measuring the health literacy skills of individuals with hearing impairment.

This paper describes the assessment of health literacy skills of adolescents with hearing impairment. For that purpose, an adapted tool was used and finalized in bilingual form for the purpose of data collection. The tool was divided into three sections comprised of further sub-sections. The conclusion drawn based on the findings is that hearing-impaired adolescent age students have low health literacy including functional, interactive, and critical domains.

## 2. Theoretical Framework

The theoretical framework of the study is based on Nutbeam's health literacy model that is now widely cited in the professional literature and is useful in analyzing the literacy abilities required in various health situations. This model includes three sequential levels of health literacy. Level I, called functional literacy, refers to the ability to apply basic literacy skills to health-related materials, such as reading the label on a pill bottle. Level II, called interactive literacy, focuses on the development of advanced cognitive skills and the ability to operate in a social environment. It relies on a solid foundation of functional health literacy. Level III, called critical literacy, builds on functional and interactive literacy. It includes an analysis of skills that allow individual and group empowerment that supports social action participation in health-related issues. In general, people with level III health literacy can facilitate community development (Nutbeam, 2000).

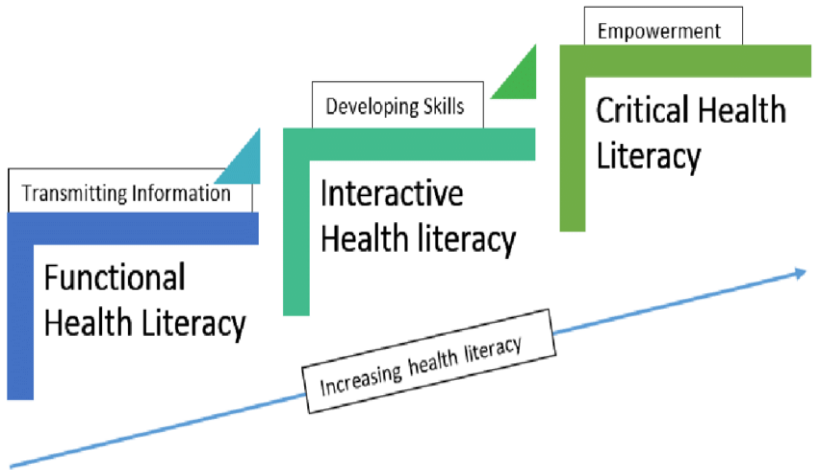


**Figure 1***: Levels of Health Literacy*

The above figure explained a shift from one level of health literacy to another. As functional health literacy depends upon the self-acquisition and processing of health-related information. In simple words, we can refer to it as a baseline of health literacy. In the second phase, interactive health literacy is an advanced level in which an individual develops the skills like interaction with the community regarding health-related information and approaching the healthcare service providers as well. The third level of health literacy is a more advanced level in which more advanced cognitive functioning is involved and an individual possesses empowerment skills like the ability to do management of health and decision-making skills.

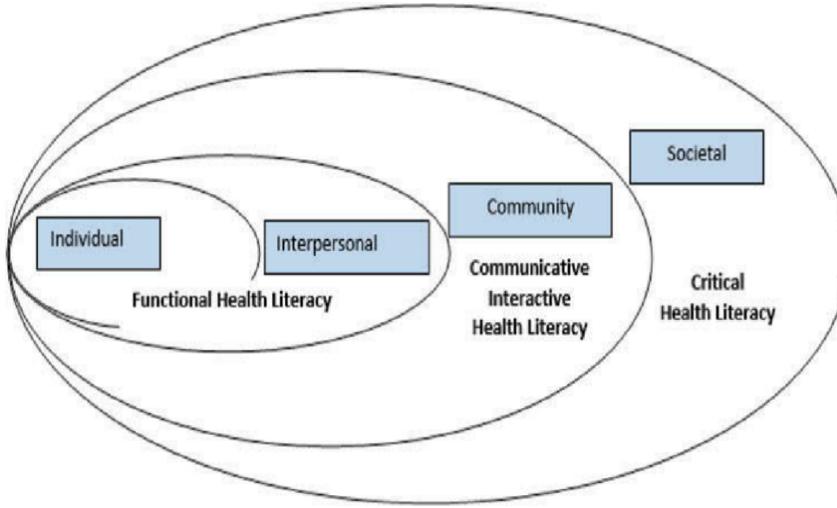


**Figure 2:** *Model of Health Literacy (Nutbeam, 2000).*

## 3. Research Objectives

1. To assess the existing level of health literacy (functional, interactive, and critical) among adolescents with hearing impairment.
2. To analyze the health-related reading and writing skills of adolescents.
3. To explore the knowledge and understanding of adolescents with hearing impairment about health-related areas.
4. To identify the communication issues of health-related information to others faced by adolescents.
5. To evaluate the health-related decision-making skills of adolescents.

## 4. Research Questions

In the light of research objectives, the following research questions were formulated:

1. What is the current level of health literacy (functional, interactive, and critical) of adolescents with hearing impairment?
2. Which area of health literacy among all three levels (functional, interactive, and critical) is more deficient?
3. What is the existing level of reading, writing and numeracy skills?
4. What is the existing level of knowledge and understanding of health-related areas?
5. What are the issues in accessing health related information faced by adolescents with hearing impairment?
6. How do the service providers disseminate health and disability-related information to adolescents with hearing impairment?

7. What is the existing level of health-related decision making and self-management skills of hearing-impaired adolescents?

## 6. Significance of the Study

Health literacy is the most important area which never had been addressed in previous studies conducted for the hearing-impaired persons in Pakistan. This study will be a pioneer in this regard. Moreover, it also aligned with the sustainable development goals (goal number 3). It will assess the most deficient area of health literacy of hearing-impaired individuals. It will also highlight the problems of hearing-impaired adolescents while approaching medical facilities.

## 7. Research Methodology

### A. *Design of Research and Respondents*

It was a descriptive cross-sactional study, conducted in five public sector colleges of Special Education in Punjab province. The study sample was comprised of all the students with hearing impairment enrolled in 1st year classes in five public sector colleges of special education situated in Punjab province. Sampling was done through a multistage sampling technique. In the first stage, five colleges were selected using a lottery method from a list of public sector special education colleges situated in Punjab province. In the second stage, adolescents were selected by simple random sampling in each college. A total number of 299 students were accessed for data collection. Both male and female students with hearing impairments were approached for data collection. Among the students 185 (61.9%) were male and 114 (38.1%) were female.

### B. *Research Tool, Validity and Reliability*

For survey purpose, to assess the current level of health literacy of the target population an adapted tool was used named HLAT-HI (health literacy assessment tool for the hearing impaired). The tool was adapted from HELMA (Health Literacy Measure for Adolescents), a standardized tool. HELMA was primarily used for assessing the health literacy of adolescents. It was adapted with permission from its authors. Through an extensive review of related literature, more statements were included in the adapted tool as per the unique characteristics of hearing-impaired adolescents. The adapted tool was validated by six experts from the field of Education and Special Education. After their valuable suggestions, the tool was finalized. Then it was translated into Urdu language and also validated by four Urdu language experts.

The final bilingual tool of assessment has consisted of 50 statements. The bilingual questionnaire designed for the study included 2 sections. First, a section focusing on demographic information such as gender, age, degree of hearing loss, parental education, parental hearing status, and use of hearing aid etc. The second part was intended to assess health literacy and was subdivided into 11 domains. These included functional (reading, writing, numeracy), interactive (knowledge,

access & social support, ability to engage with healthcare provider, understanding), and critical health literacy (judgment, management of health, decision making). All these levels were evaluated through different statements given in the tool. The scale was five-point Likert scale (Always, Often, Sometimes, Rarely, Never). While adapting the tool, it was considered carefully to include all constructs under the major three levels of health literacy. So, an adapted tool was finally used for survey purpose. In the first part of the tool, demographical variables were also included to determine the level of health literacy and its relation to various demographics, i-e, the relationship of low health literacy skills with a degree of hearing loss and parental education etc.

A pilot study was conducted among forty students (both male and female) with hearing impairment from a private sector college in Lahore city to check the accuracy and content of the tool. These students were selected from 1st year class. After that Cronbach's alpha value was calculated and it was found to be 0.93 for the tool which is considered a good indication for determining the reliability.

### C. *Collection of Data and Analysis*

After getting approval from the concerned administration, the colleges situated in Lahore, Faisalabad, Rawalpindi, Multan and Bahawalpur were accessed for data collection. The students with hearing impairment studying in 1st year classes in these colleges were taken for the study. The data was collected from September 2022 to November 2022. All the adolescents' age students from 1st year classes were approached for filling out the questionnaires. Students' consent was also taken before the data collection. Guidelines for filling of the questionnaires were prepared in sign language. For this purpose, videos in sign languages were created and sent to the respondents. The researchers collected data from Lahore, Faisalabad, and Rawalpindi. For Multan and Bahawalpur colleges, correspondence mode was used and questionnaires were sent to these two colleges along with the sign language videos.

The researchers visited personally the three colleges situated in Lahore, Faisalabad, and Rawalpindi divisions. Two days for each college were allocated for data collection. The researchers along-with class teachers of the students interpreted the directions for filling the questionnaires in sign language. After that demographic variables were asked to fill with the help of a whiteboard and verbal sign language demonstration of instructions. For section 2 of the questionnaires, students were asked to take a break and after 45 minutes they were given the instructions regarding the five-point Likert scale. After that, the statements under each domain of health literacy were translated into sign language one by one. Students were asked to tick the most appropriate answer against each statement. A whiteboard was used for their understanding of English and Urdu words given in the questionnaire. While translating any particular situation like visiting to a healthcare professional or handling of an emergency, relevant pictures were shown by using a laptop. As hearing-impaired individuals understand better through visual cues so pictures played an important role in understanding of the

statement of the questionnaire. All fifty statements were asked to fill by the students. For the remaining two colleges (Multan and Bahawalpur), detailed videos were prepared along-with the written guidelines for the teachers of hearing-impaired students. Videos were sent by using google drive and questionnaires were sent by post. After getting back all the questionnaires, data were entered for results preparation. Data were analyzed by using descriptive statistics. The mean and percentages were computed as a measure of descriptive statistics. To explore the existing level of health literacy of hearing-impaired adolescents mean scores were calculated and the most deficient areas of health literacy were identified.

## 8. Results

In response to the objectives and questions of the study, the following sub-section presents the results. (Explain all sections)

### A. *Respondents Characteristics*

The majority of respondents were from Lahore city (n=88) and most were male (n=189). The majority of the respondents were age range 18-19 years old (n=157). Most respondents' father's education was primary level (n=64) and the mother's education was matriculation level (n=89). Most respondents' father's occupation was a private job (n=106) and the mother's occupation was housewife (n=197).

**Table 1**
*Distribution of Respondents on the basis of Demographic Variables (n=299)*

| **Variables** | ***n*** | ***%*** |
|---|---|---|
| **Name of College** | | |
| Govt. Degree College of Special Education, Lahore | 88 | 29.4 |
| Govt. Degree College of Special Education, Rawalpindi | 52 | 17.4 |
| Govt. Degree College of Special Education, Faisalabad | 37 | 12.4 |
| Govt. Degree College of Special Education, Multan | 67 | 22.4 |
| Govt. Degree College of Special Education, Bahawalpur | 55 | 18.4 |
| **Gender** | | |
| Male | 185 | 61.9 |
| Female | 114 | 38.1 |
| Total | 299 | 100.0 |
| **Age** | | |
| 14-15 | 55 | 18.4 |
| 16-17 | 87 | 29.1 |

| Variables | *n* | *%* |
|---|---|---|
| 18-19 | 157 | 52.5 |
| Total | 299 | 100.0 |
| **Father's Education** | | |
| Illiterate | 36 | 12.0 |
| Primary | 64 | 21.4 |
| Middle | 55 | 18.4 |
| Matric | 61 | 20.4 |
| Intermediate | 50 | 16.7 |
| Graduation & Above | 33 | 11.0 |
| Total | 299 | 100.0 |
| **Mother's Education** | | |
| Illiterate | 54 | 18.1 |
| Primary | 48 | 16.1 |
| Middle | 59 | 19.7 |
| Matric | 89 | 29.8 |
| Intermediate | 26 | 8.7 |
| Graduation & Above | 23 | 7.7 |
| Total | 299 | 100.0 |
| **Father's Occupation** | | |
| Private Job | 106 | 35.5 |
| Govt. Job | 68 | 22.7 |
| Self-Business | 79 | 26.4 |
| Unemployed | 36 | 12.0 |
| Deceased | 10 | 3.3 |
| Total | 299 | 100.0 |
| **Mother's Occupation** | | |
| Housewife | 197 | 65.9 |
| Private Job | 87 | 29.1 |
| Govt. Job | 10 | 3.3 |
| Deceased | 5 | 1.7 |
| Total | 299 | 100.0 |

**B.** ***Disability related Characteristics***

Moreover, the majority of respondents stated that they were diagnosed as hearing impaired by birth (n=133) showing a failure to reveal the possible causes of their disability. It's a clear indication of their lack of awareness about self-disability.

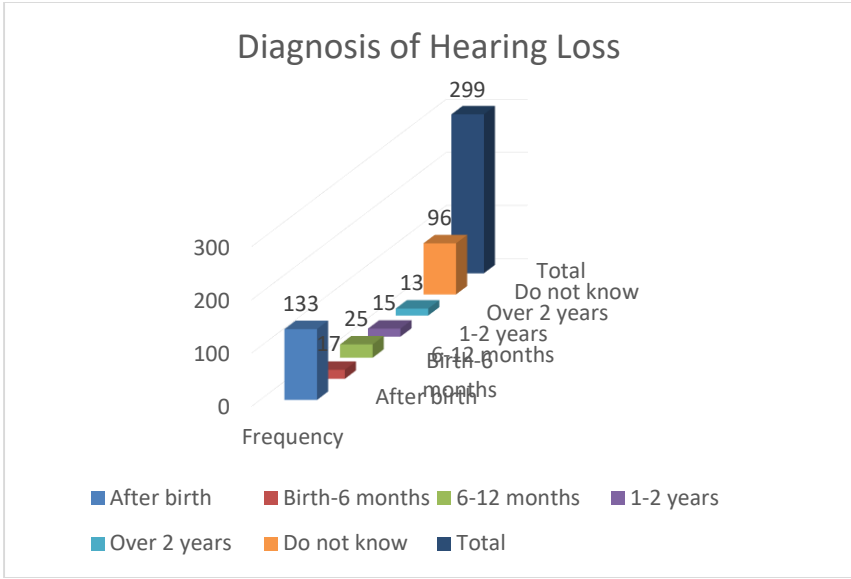


**Figure 3:** *Diagnosis of hearing loss of Respondents in terms of age*

As referred to the degree of hearing loss, most respondents' hearing loss was of the severe category (n=143), whereas at the second the hearing loss range was profound (n=123). We can conclude the majority of adolescent's age students studying in public sector colleges have hearing loss ranging from severe to profound. Research shows that the degree of hearing loss has strong relation with the acquisition of language, the highest the hearing loss the lowest the speech and language development. Hence, the individuals with highest degrees of hearing loss are unable to develop their health literacy skills.

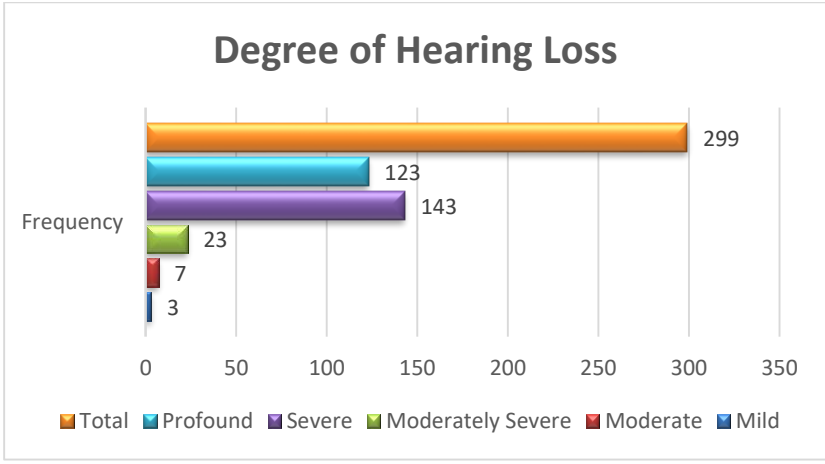


**Figure 4:** *Degree of hearing loss of Respondents*

The most important finding of the study was that almost one third of the respondents have hearing impaired persons in their families (n=83), in many cases as hearing impaired parents and siblings. It's a high number of disability prevalence in families. Parental hearing status is critical for children's language development as well as mental, social, and emotional stability. The deaf population experiences significant health disparities–such as increased obesity, poorer mental health status (e.g., suicidal ideations, intimate partner violence, and interpersonal trauma), and increased use of the emergency departments, among others (Barnett el al, 2011). One possible underlying factor of these disparities and general deaf population health outcomes may be parental hearing status, moderated by parents' developmental language and communication choices for their deaf child (McKee et al, 2015).

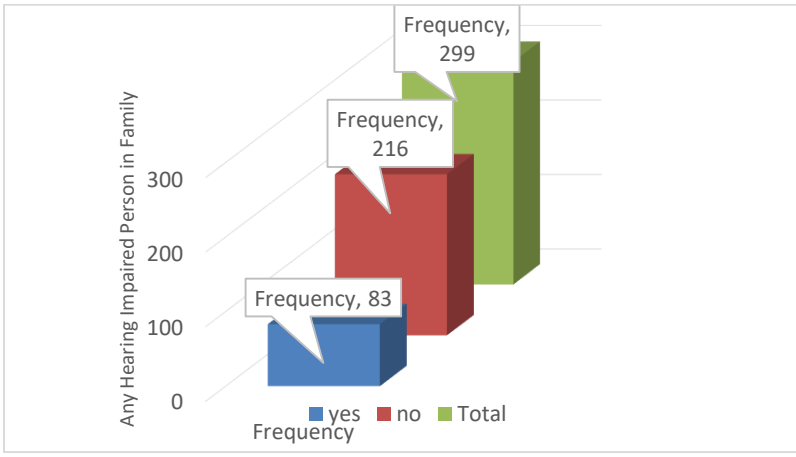


**Figure 5:** *Any other Hearing-Impaired Person in Family*

### C. *Scale and sub-scale Analysis*

To evaluate the health literacy among adolescents with hearing impairment, the students were asked about three questions regarding the reading of health literacy (functional level). About 148 (49.5%) students reported that they cannot read the health-related material in a print format rarely, whereas 81 (27.1%) reported it as rarely and 29 (9.7%) reported it as sometimes. About 153 (51.2%) students reported that they cannot comprehend the written information from doctors, 60 (20.1%) reported it as rarely and 44 (14.7%) reported as sometimes. About 91 (30.4%) students reported that reading instructions regarding ingredients of any food item is easy for them in rare situations as they found it a tough task, whereas 75 (25.1%) students reported it as never, and 66 (22.1%) reported as sometimes. Similarly, students were asked two writing questions about health literacy (functional level). About 119 (39.8%) students reported that they cannot write to convey any health-related issue/problem to others if required, while 74 (24.7%)

reported it as rarely, and 42 (14.0%) reported as sometimes. Additionally, when surveyed students were asked about whether they can fill medical forms by filling demographic and disease related information, about 132 (44.1%) reported it as rarely, whereas 55 (18.4%) reported as never and 72 (24.1%) reported it as sometimes. Similarly, to evaluate the second domain of health literacy (interactive level), students were asked different questions regarding the following areas.

To assess the knowledge of the students, they were asked three questions. About 121 (40.5%) reported that they do not know the right hospital or doctor's clinic for treating any of their health-related problems, while 58 (18.7%) reported it as rarely, it means they have to depend on others. About 113 (37.8%) students reported that they sometimes have awareness about traffic safety rules, while 60 (20.1%) reported it as never. About 111 (37.1%) students reported that they have information about the harms of drugs rarely, while 64 (21.4%) reported it as never. Similarly, students were asked the two questions regarding access to healthcare. About 157 (52.5%) students reported that they cannot get information about mental health (such as depression), whereas 49 (16.4%) reported it as rarely. Meanwhile, when students were asked whether they can find health related information through social media or the internet, about 112 (37.5%) reported it as never, and 64 (21.4%) reported it as rarely. When students were asked questions regarding communicating with healthcare providers, almost one third of the respondents 99 (33.1%) reported that they do not feel comfortable to discuss their health-related issues with healthcare professionals, while 60 (20.1%) reported as rarely and 53 (17.7%) reported as sometimes. Furthermore, when they were asked about whether healthcare professionals can understand sign language or not, almost one third of the respondents 133 (44.5%) reported as never, while 47 (15.7%) reported as rarely. Similarly, students were asked different questions regarding the understanding of health-related information. About 111 (37.1%) students reported that they cannot understand the potency of any medicine, while 61 (20.4%) reported as sometimes they can understand. About 129 (43.1%) reported that they are not able to understand and follow the instructions written on the medicine bottle, whereas 77 (25.8%) reported as they can understand these instructions rarely. Furthermore, when they were asked about understanding of the guidelines of the doctor about their illness, about 136 (45.5%) reported as never, while 58 (19.4%) reported as rarely. Almost 157 (52.5%) students reported that they are unable to understand the meanings of words written on medical forms, whereas 55 (18.4%) reported as they can understand these words rarely.

To evaluate the health literacy (critical level) of students, questions regarding the following domains were asked. When students were asked about the questions regarding management of health, about 121 (40.5%) reported that they did have not enough information to manage their health-related issues, whereas 62 (20.7%) reported it as rarely. Similarly, about 95 (31.8%) reported that they can follow the procedure of medical treatment rarely, while 85 (28.4%) reported as they are not capable to follow the medical treatment procedure. Similarly, students were asked three questions regarding health-related decision making. About 91 (30.4%)

students reported that cannot compare health information for making the best choice for maintaining a healthy life, while 89 (29.8%) reported that they can compare health information for maintain healthy life rarely. About 133 (44.5%) students reported that they do not consider the effect of eatable things on blood pressure, while 57 (19.1%) reported as sometimes they consider eating such things which do not increase blood pressure. About 126 (42.1%) students reported that they do not go for regular medical check-ups for maintaining a healthy life, whereas 64 (21.4%) reported that they go for regular medical check-ups rarely, while 54 (18.1%) reported as they sometimes go for medical check-ups.

**Table 2**

*Distribution of Students Responses towards Reading, Writing, Knowledge, Access, Ability to engage with Healthcare providers, Understanding, Health management and Decision-making Skills (n=299).*

| **Health Literacy Variables** | **1 (n, %)** | **2 (n, %)** | **3 (n, %)** | **4 (n, %)** | **5 (n, %)** |
|---|---|---|---|---|---|
| **Reading** | | | | | |
| Can read health related information in print form. | 148 (49.5%) | 81 (27.1%) | 29 (9.7%) | 27 (9.0%) | 14 (4.7%) |
| Can comprehend the written information from doctors. | 153 (51.2%) | 60 (20.1%) | 44 (14.7%) | 32 (10.7%) | 10 (3.3%) |
| Reading instructions regarding ingredients of any food item is easy for me. | 75 (25.1%) | 91 (30.4%) | 66 (22.1%) | 41 (13.7%) | 26 (8.7%) |
| **Writing** | | | | | |
| Can write to convey my health-related issue to others if required. | 119 (39.8%) | 74 (24.7%) | 42 (14.0%) | 29 (9.7%) | 35 (11.7%) |
| Can fill medical forms (writing name, age, disease) etc. | 55 (18.4%) | 132 (44.1%) | 72 (24.1%) | 19 (6.4%) | 21 (7.0%) |
| **Knowledge** | | | | | |
| Know the right hospital/doctor's clinic for my health-related issues. | 121 (40.5%) | 58 (18.7%) | 74 (24.7%) | 23 (7.7%) | 25 (8.4%) |
| Know about traffic safety rules. | 60 (20.1%) | 41 (13.7%) | 113 (37.8%) | 42 (14.0%) | 43 (14.4%) |
| Have information about the harms of drugs. | 64 (21.4%) | 111 (37.1%) | 48 (16.1%) | 44 (14.7%) | 31 (10.4%) |
| **Access** | 157 | 49 | 49 | 24 | 20 |
| Can get information on | (52.5%) | (16.4%) | (16.4%) | (8.0%) | (6.7%) |

| Health Literacy Variables | 1 (n, %) | 2 (n, %) | 3 (n, %) | 4 (n, %) | 5 (n, %) |
|---|---|---|---|---|---|
| mental health such as depression. | | | | | |
| Ability to find the health-related information through multiple media i-e; television, internet and social media etc. | 112 (37.5%) | 64 (21.4%) | 44 (14.7%) | 38 (12.7%) | 41 (13.7%) |
| **Ability to engage with Healthcare providers** | | | | | |
| Feel comfortable to discuss health-related issues with healthcare providers. | 99 (33.1%) | 60 (20.1%) | 53 (17.7%) | 46 (15.4%) | 40 (13.4%) |
| Find it easy for healthcare professionals to understand my issue in sign language. | 133 (44.5%) | 47 (15.7%) | 47 (15.7%) | 42 (14.0%) | 30 (10.0%) |
| **Understanding** | | | | | |
| Understand the potency of any medicine. | 111 (37.1%) | 59 (19.7%) | 61 (20.4%) | 46 (15.4%) | 22 (7.4%) |
| Understand the instructions on the label of medicine bottle. | 129 (43.1%) | 77 (25.8%) | 36 (12.0%) | 38 (12.7%) | 19 (6.4%) |
| Can understand the doctor's guidelines about my illness. | 136 (45.5%) | 58 (19.4%) | 38 (12.7%) | 25 (8.4%) | 42 (14.0%) |
| Understand the meanings of the words written on medical forms. | 157 (52.5%) | 55 (18.4%) | 42 (14.0%) | 25 (8.4%) | 19 (6.4%) |
| **Management of Health** | | | | | |
| Have enough information to manage health related issues. | 121 (40.5%) | 62 (20.7%) | 35 (11.7) | 52 (17.4) | 29 (9.7%) |
| Can follow the procedure of getting medical treatment. | 85 (28.4%) | 95 (31.8%) | 50 (16.7%) | 38 (12.7%) | 28 (9.4%) |
| **Decision Making** | 91 | 89 | 53 | 38 | 28 |
| I compare health | (30.4%) | (29.8%) | (17.7%) | (12.7%) | (9.4%) |

| Health Literacy Variables | 1 (n, %) | 2 (n, %) | 3 (n, %) | 4 (n, %) | 5 (n, %) |
|---|---|---|---|---|---|
| information for making best choices for my healthy life. | | | | | |
| Prefer to eat those things which do not increase my blood pressure. | 133 (44.5%) | 40 (13.4%) | 57 (19.1%) | 37 (12.4%) | 32 (10.7%) |
| For maintaining the healthy life, I go to the doctor for regular check-ups. | 126 (42.1%) | 64 (21.4%) | 54 (18.1%) | 35 (11.7%) | 20 (6.7%) |

### D. *Analysis of Mean Scores of Levels of Health Literacy*

An analysis was done to determine the current level of functioning of respondents regarding three domains of health literacy. The total scores and mean scores were calculated. As shown in the figure, there is a slight difference in functional and interactive scores of students, but as referred to the critical level of health literacy, their average mean scores were significantly low. So, the results highlighted that hearing-impaired students' scores were better in functional and interactive areas of health literacy as compared to the critical level of health literacy. Overall the scores were higher in the interactive area of health literacy, but in functional and critical areas they scored low. As functional HL involves reading and writing skills, so they are unable to fulfill due to communication and language barriers. Similarly, the critical level of HL involves higher order cognitive functioning, which they are unable to perform due to insufficient concrete learning opportunities. As referred to the interactive health literacy, although the students have not scored very well as compared to the other two levels, the bar in the following graph shows better average mean scores.

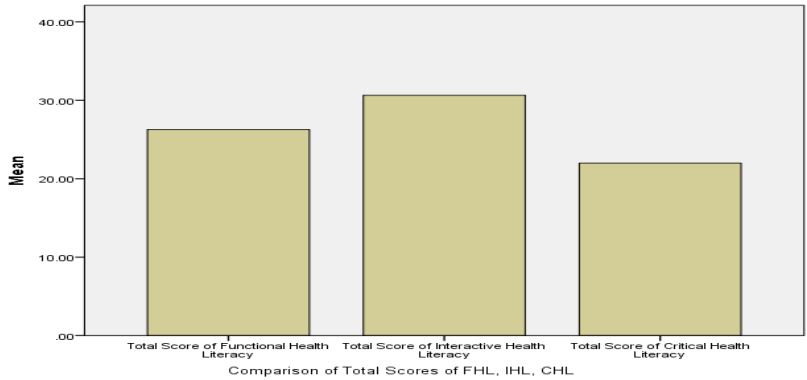


**Figure 6:** *Comparison of Total Scores of Levels of Health Literacy*

## 9. Discussion

Health literacy is an important health related concept. Without sufficient knowledge and understanding of health literacy skills, any individual hence failed to achieve a healthy lifestyle. Specifically, with low health literacy any individual might have to face serious health problems. Health literacy is important for every individual's quality of life maintenance, especially for those who have any type of disability. As per the report of the World Health Organization, due to prevailing healthcare disparities and lack of health literacy, many individuals with disabilities die up to 20 years earlier than those without disabilities. Furthermore, W.H.O. stated that people with disabilities have twice the risk of developing conditions like depression, asthma, stroke, or heart disease. W.H.O. also reported that health inequalities arise from unfair conditions faced by people with disabilities including stigma, exclusion from education, discrimination, and lack of access to healthcare facilities.

As per the analysis of the demographic variables of respondents of the study, it was observed that the majority of hearing-impaired students have server to profound level hearing loss with no hearing aid usage. The degree of hearing loss ultimately has a greater impact on language acquisition, as the severity of hearing loss leads to loss of speech. So, the higher degree of hearing loss also leads to low health literacy.

The study highlighted the key domains of health literacy and explore the level of hearing-impaired adolescent age students in all these areas (functional, interactive, and critical). The findings revealed that the majority of the respondents found difficult to read the health-related content and to understand the written directions of the healthcare professionals as well. Similar findings were reported by Folkins et al, 2005 that the deaf community have limited access to health information due to communication barriers and Jones (2005) reported that deaf individuals face printed and oral language barrier. The study also highlighted that hearing-impaired individuals are unable to understand the written guidelines and recommendations of healthcare professionals. Meanwhile, they are unable to understand the verbal guidelines, and they also reported the fact that healthcare professionals do have not an understanding of sign language. So, they have to rely on others to go with them for medical treatment. Similar findings were reported by various researchers in the past, Chilton (1996) reported that the deaf face difficulties in medical facilities due to either no adequate policies of providing SLI's (sign language interpreters) or their reluctance to direct pay for this service, Steinberg (1998) stated that mistrust of healthcare professionals and communication problems are the biggest challenges deaf people face in mental healthcare, Witte and Kuzel (2000) reported that deaf community have difficulty in scheduling the medical appointment and communication barriers have been identified as significant challenges, Bat-Chava reported and highlighted the fact that Deaf individuals are unable to communicate with healthcare providers, and Scheier (2009) reported that many healthcare

providers do not know how to improve communication with deaf patients. The study also reported the possession of insufficient information about different areas of healthcare specifically, they do not have enough awareness about mental illnesses like depression. Mallinson (2004) reported that the deaf more suffer from physical and mental consequences owing to the lack of deaf-friendly health services.

The study reported that hearing impaired individuals have lack of knowledge about healthcare and different preventive measures for any disease. Similar results reported by various International researchers at different times. Wei et al (2012) reported that deaf students had poor knowledge and practice of oral health, Napier and Kidd (2013) reported that the deaf community had limited access to preventive and ongoing health information due to limited English literacy, and McKee et al (2015) stated that researchers reported the high prevalence of low health literacy among the deaf is 6.9 times more than the hearing people. The current study concluded that owing to lack of health literacy skills hearing impaired individuals have more chances to get affected by different diseases. Similar findings were reported by different research studies in the past. McKee, Winters & Sen (2015) stated that deaf usage of emergency services were more than that the hearing people, Smith, Kushalnagar & Hauser (2015) reported that there is a high rate of catching cardiovascular disease among the deaf due to poor health related knowledge, and Mallinson (2004) reported that deaf youth is at a higher risk of catching of HIV due to the language barrier, stigma and disparities faced in the healthcare settings. The study also highlighted that hearing-impaired individuals faced difficulties in health-related management and decision making. They are unable to decide which particular thing is important for their maintenance of good health. Similar findings reported by various studies, likewise Orsi el al (2007) reported that low awareness of screening tests has been reported indicating uninformed decision making in the deaf.

## 10. Conclusion

The study aimed to assess the existing level of health literacy of adolescent age hearing impaired students. The adapted tool of the study HLAT-HI (health literacy assessment tool for the hearing impaired) was the first ever tool adapted in the context of special education in Pakistan. Before that, no particular study addressed this area of research. Hence, the study proved as a pioneer to assess the health literacy skills of hearing-impaired individuals in Pakistan. The adapted tool used in the study was bilingual (English and Urdu) in nature and this particular feature worked best for the respondents to identify the keywords of English and Urdu as well. The results of the study indicated that adolescent age hearing impaired students have low levels of health literacy skills. They have to face challenges in accessing health related facilities and are unable to follow the complicated procedures of medical treatment. From functional level to interactive, and from interactive to critical

level of health literacy, the hearing-impaired students are unable to understand the health-related written information. The study highlighted the key factor that the scores of interactive and critical level of health literacy of hearing-impaired students were lower than the scores of functional level of health literacy. It's because interactive and critical levels of health literacy involve higher order cognitive functioning and abstract reasoning too, and hearing-impaired individuals lag behind in that tasks due to communication difficulties and reduced learning experiences. Furthermore, the study highlighted the communication difficulties of hearing-impaired individuals. They are unable to communicate with healthcare professionals and due to reduced forms of learning opportunities they have inadequate health literacy, poor health related outcomes, and social exclusion in health-related settings. In short, hearing impaired individuals have to face many barriers in accessing health related facilities and information as well. If we want to overcome these difficulties and promote their health literacy skills, then there should be sign language interpreter facilities in all health-related settings. We should promote health literacy inside the educational settings and planned programs should be implemented in different institutes of hearing-impaired students. Moreover, the involvement of healthcare professionals can enhance the effectiveness of these programs.

## 11. Recommendations

he following recommendations have been given based on the study results:

1. There is a greater need to provide health literacy planned intervention to those hearing impaired individuals who have low health literacy skills.
2. Schools are basic entities to provide health related knowledge to hearing impaired individuals, so there is a dire need to plan such kinds of programs along-with the compulsory education.
3. There should be planned training programs for the teachers of hearing impaired students, healthcare professionals, and other para-medical staff, so that they can understand the importance of sign language and the needs of those individuals as well.
4. To overcome the biggest barrier to communication for healthcare professionals, there should be one post of sign language interpreter in every hospital, so that hearing impaired individuals can also get equal access to medical facilities besides their hearing counterparts.
5. There is a greater need to organize health literacy programs for adults and out of school individuals with hearing impairment so that we can empower them with sufficient health related knowledge and information.
6. The role of parents is very important in any context of education and training. So, parental training regarding the importance of health literacy skills development for hearing impaired individuals is also necessary.

## 12. Ethical Considerations

Ethical issues including (prior permission for data collection, and maintaining confidentiality regarding respondent's data) have been completely observed by the authors.

## References

Al Sayah, F., Majumdar, S. R., Egede, L. E., & Johnson, J. A. (2015). Associations between health literacy and health outcomes in a predominantly low-income African American population with type 2 diabetes. *Journal of Health Communication, 20*(5), 581–588.

Anast, H. M., Estarziau, M., & Kaufman, G. (2006, March). Cardiovascular Disease Knowledge among Culturally Deaf Patients in Chicago. Preventive Medicine, 42(3), 235-239. doi:https://doi.org/10.1016/j.ypmed.2005.12.012

Baker, D. W., Williams, M. V., Parker, R. M., Gazmararian, J. A., & Nurss, J. (1999). Development of a brief test to measure functional health literacy. *Patient Education and Counselling, 38(1), 33–42.*

Barnett, S., Klein, J.D., Pollard, R. Q., Jr, Samar. V., Schlehofer, D., Starr, M., & Pearson, T.A. (2011). Community participatory research with deaf sign language users to identify health inequities. *American Journal of Public Health, 101*(12), 2235–2238.

Broder J, Okan O, Bauer U, Bruland D, Schlupp S, Bollweg TM, et al. (2017). Health literacy in childhood and youth: A systematic review of definitions and models. *BMC Public Health*, 17(1), 361.

Fang, Z., & Schleppegrell, M. J. (2010). Disciplinary literacies across content areas: Supporting secondary reading through functional language analysis. *Journal of Adolescent and Adult Literacy*, *53*(7), 587–597.

Grote, H., Izagaren, F., & O'Brien, V. (2021, June). How to Communicate with Patients who are D/deaf or have Hearing Loss. The British Medical Journal. doi:10.1136/bmj.n1382

Haun, J. N., Valerio, M. A., McCormack, L. A., Sorensen, K, & Paasche-Orlow, M. K. (2014). Health literacy measurement: an inventory and descriptive summary of 51 instruments. *Journal of Health Communication, 19*(2), 302–333.

Heuttel K.L., Rothstein W.G. (2001). HIV/AIDS knowledge and information sources among deaf and hearing college students. *American Annals of the Deaf, 146*(3), 280–286.

Kuenburg, A., Fellinger, P., & Fellinger. J. (2016). Health care access among deaf people. *Journal of Deaf Students Deaf Education*, *21*(1), 1-10. https://doi.org/10.1093/deafed/env042

Mackert M, Champlin SE, Pasch KE, Weiss BD. (2013). Understanding health literacy measurement through eye tracking. *Journal of Health Communication, 18*(1), 185–196. doi: 10.1080/10810730.2013.825666.

Mallinson, R. K. (2004). Perceptions of HIV/AIDS by deaf men & women. *Journal of Association of Nurses in AIDS Care*, *15*(1), 27–36.

Manganello, J. A. (2008). Health literacy and adolescents: A framework and agenda for future research. *Health Education Res, 23*(5), 840–7.

Marrie, R. A., Salter, A., Tyry, T., Fox, R. J., & Cutter, G. R. (2013). Health literacy association with health behaviors and health care utilization in multiple sclerosis: A cross-sectional study. Interactive *Journal of Medical Research, 3*(1), e3.

McKee, M., Paasche-Orlow, M. (2012). Health literacy and the disenfranchised: The importance of collaboration between limited English proficiency and health literacy researchers. *Journal of Health Communication, 17*, 7–12.

McKee, M., Schlehofer, D., Cuculick, J., Starr, M., Smith, S., & Chin, N, P. (2011). Perceptions of cardiovascular health in an underserved community of deaf adults using American Sign Language. *Disability Health Journal, 4*(3), 192–197

McKee, M. M., Barnett, S. L., Block, R. C., & Pearson, T. A. (2011). Impact of communication on preventive services among deaf American Sign Language users. *American Journal of Preventive Medicine*, *41*(1), 75-79. https://doi.org/10.1016/j.amepre.2011.03.004

McKee, M. M., Passche-Orlow, M., Winters, P. C., Fiscella, K., Zazove, P., Sen, A., & Pearson, T. (2015). Assessing health literacy in deaf American sign language users. *Journal of Health Communicayion*, *2*(2), 92-100. https://dx.doi.org/10.1080%2F10810730.2015.1066468

Meador, H. E., & Zazove, P. (2005). Health care interactions with deaf culture. *Journal of American Board of Family Practice*, *18*(3), 218-222. https://doi.org/10.3122/jabfm.18.3.218

Naseribooriabadi T, Sadoughi F, Sheikhtaheri A. Barriers and Facilitators of Health Literacy among D/deaf Individuals: A Review Article. (2017). *Iranian Journal of Public Health*, *46*(11), 1465-1474.

Nutbeam D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International, 15* (3), 259–67.

Nutbeam D. (2008). The evolving concept of health literacy. *Social Science and Medicine, 67*(12), 2072–2078.

Nutbeam, D. (2009). Defining and measuring health literacy: What can we learn from literacy studies? *International Journal of Public Health, 54*(5), 303–305.

*Rawson KA, Gunstad* J, Hughes J, Spitznagel MB, Potter V, Waechter D, Rosneck J. The METER: a brief, self-administered measure of health literacy. Journal of General Internal Medicine. 2010;25(1):67–71.

Sentell T, Braun KL. (2012). Low health literacy, limited English proficiency, and health status in Asians, Latinos, and other racial/ethnic groups in California. *Journal of Health Communication, 17*(3), 82–99.

Sharif, I., & Blank, A. E. (2010). Relationship between child health literacy and body mass index in overweight children. *Patient Education and Counselling, 79*(1), 43–48.

Smith S.R, Kushalnagar P, Hauser PC. (2015). Deaf adolescents' learning of cardiovascular health information: sources and access challenges. *Journal of Deaf Studies and Deaf Education, 20*(4), 408–418.

Sorensen, K., Broucke, S. V.-d., Fullam, J., Doyle, G., Peliken, J., Slonska, Z., & Brand, H. (2015). Health literacy and public health: A systematic review and integration of definitions and models. *Biomed-central Public Health, 12*, Article 80.

Tamaskar P, Malia T, Stern C, Gorenflo D, Meador H, Zazove P. (2000). Preventive attitudes and beliefs of deaf and hard-of-hearing individuals. *Archives of Family Medicine, 9*(6), 518–525.

Traxler C. (2000). Measuring up to performance standards in reading and mathematics: Achievement of selected Deaf and hard-of-hearing students in the national norming of the 9th Edition Stanford Achievement Test. *Journal of Deaf Studies and Deaf Education, 5*, 337–348.

Weiss, B. D., Mays, M. Z., Martz, W., Castro, K. M., DeWalt, D. A., Pignone, M. P., Mockbee, J., & Hale, F. A. (2005). Quick assessment of literacy in primary care: The newest vital sign. *Annals of Family Medicine, 3*(6), 514–522.

Wollin J, Elder R. (2003). Mammograms and pap smears for Australian deaf women. *Cancer Nursing, 26*(5), 405–409.

Zazove, P. (2009). Cancer prevention knowledge of people with profound hearing loss. *Journal of General Internal Medicine, 24*(3), 320–326.

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