

**A SURVEY ON AWARENESS OF VARIOUS AUDIOLOGICAL
CONDITIONS IN STUDENTS AND THEIR CLASSROOM
MANAGEMENT AMONGST TEACHERS IN KERALA**

(Basic Hearing Sciences)

Anju Sara Eby

19AUD006

A Dissertation Submitted in Part Fulfilment for the degree of

Master of Science (Audiology)

University of Mysore, Mysuru



All India Institute of Speech & Hearing

Manasagangothri, Mysuru-570006

September, 2021

Certificate

This is to certify that this dissertation entitled “*A Survey on Awareness of Various Audiological Conditions in Students and their Classroom Management Amongst Teachers in Kerala*” is a bonafide work submitted in part fulfillment for the degree of Master of Science (Audiology) student with registration number 19AUD006. This has been carried out under the guidance of the faculty of this institute and has not been submitted earlier to any other University for the award of any other diploma or degree.

Mysuru
September, 2021

Dr. M. Pushpavathi
Director
All India Institute of Speech & Hearing
Manasagangothri, Mysuru – 57006

Certificate

This is to certify that this dissertation entitled “*A Survey on Awareness of Various Audiological Conditions in Students and their Classroom Management Amongst Teachers in Kerala*” is bonafide work submitted in part fulfillment for the degree of Master of Science (Audiology) student with registration number 19AUD006. This has been carried out under my supervision and guidance and has not been submitted earlier to any other University for the award of any other diploma or degree.

Mysuru
September, 2021

Dr. Chandni Jain
Guide
Reader in audiology
Department of Audiology
All India Institute of Speech and Hearing
Manasagangothri, Mysuru -575006

Declaration

This is to certify that this dissertation entitled “*A Survey on Awareness of Various Audiological Conditions in Students and their Classroom Management Amongst Teachers in Kerala*” is a result of my own study under the guidance of Dr. Chandni Jain, Reader in Audiology, Department of Audiology, All India Institute of Speech and Hearing, Mysuru and has not been submitted earlier to any other University for the award of any other diploma or degree.

Mysuru

Registration No. 19AUD006

September, 2021

DEDICATED TO

MY

AMMA

Acknowledgement

*I would like to express my heartfelt gratitude to my guide and teacher, **Dr. Chandini Jain**, for constantly supporting and guiding me along the way. Ma'am, I cannot thank you enough for your patience, motivation, insightful suggestions, and prompt responses whenever I needed them.*

*I thank our beloved Director Ma'am, **Dr. M Pushpavathi** for permitting me to carry out the dissertation.*

I thank all the participants of the study for their time and cooperation.

I express my gratitude to all the expert audiologists involved in the content validation of the questionnaire for your time and valuable suggestions.

*I extent my gratitude to **Dr. Vasnthalakhmi** and **Mr. Srinivasa R** for teaching me and helping me out with the stastical analysis of the dissertation.*

*I express my sincere gratitude to **Dr. C. Shijith Kumar** for introducing me to appropriate research tools that made my dissertation work far easier.*

*I thank my beloved teachers **Dr. Animesh Barman, Dr. P Manjula, Dr. Ajith Kumar U, Dr. Sandeep M, Dr. Prashanth Prabhu** and **Dr. Sharath kumar** for always being an inspiration to me.*

I thank my friends for their motivation and support throughout the process.

***Hasla**, my dissertation partner and constant companion in all my productive pursuits, you have helped me more than you realise, Thank you Hasu.*

*I thank my special ones of 'Penguins and Pandas', **Kajol, Shejal, Niranjana, Anshaba, Mansi, Bhagya** and **Shingidipti** for always making it feel at home in Kapila. Kajol you have been my most compassionate friend and the best listener for all my cluttered thoughts, I cannot thank you enough Kajo. Niranjana, you have been such a kind and warm friend to me, Thank you Ninjji. Kasera, thanks for always being there whenever I needed you and for preparing your special tea. And thank you **Rine** for always being that vibe friend to me.*

Surya, it has been wonderful to have a friend like you to count on for everything, I couldn't have asked for a better posting partner. Aman and Gouri, you both will always remain as my special friends. And Ashitha, I cherish all the laughs and silly talks we have. Thank you for constantly supporting me in improving the works I do. Thank you Abhishek for being such an adventurous friend, for all the support and suggestions for improving my dissertation.

Special thanks to my friends Ariya, Swetha, Gowri, Adithya, Shinsi, Saranya, Malavika, Sneha, Shalabha, Nikitha and Albin for helping me out with finding participants and the data collection.

I am grateful to my family for always being there for me. Pappa and Kunjammachi, thank you for all the support and prayers. And amma, am greatly indebted to you for never giving up on me and always pushing me to make the right choices. Akku, you have always been my biggest critic and the best brother I could have ever asked for, Thank you. And Nithin, you have always been my anchor through everything and I owe you big time. Thank you Shiby achacha and Ligy aunty for your encouragement and support since the beginning. Charlie, my baby sister, I know you cannot read this but I should mention that you are the most special.

I also extend my gratitude to all my friends from my batch Renovators, Renovators 2.0 and 'A' Section people for their encouragement and support.

I thank everyone who has been a part of this journey and apologies if I have missed to thank anyone.

Table of Contents

| Sl No. | Particulars | Page No. |
|---------------|-------------------------|-----------------|
| 1. | List of Tables | ii |
| 2. | List of Figures | iii |
| 3. | Abstract | iv |
| 4. | Introduction | 5-12 |
| 5. | Review of Literature | 13-23 |
| 6. | Methods | 24-29 |
| 7. | Results | 30-45 |
| 8. | Discussion | 46-56 |
| 9. | Summary and Conclusions | 57-60 |
| 10. | References | 61-68 |
| 11. | Appendix I | |
| 12. | Appendix II | |

List of Tables

| Table No. | Title | Page No. |
|----------------------|--|---------------------|
| 3.1 | Total number of questions under each domain of the questionnaire | 26 |
| 3.2 | Total number of participants under each teaching level | 27 |
| 3.3 | Total number of schools in each district and total number of participants from each school | 28 |
| 4.1 | Mean and range of age and teaching experience of the participants | 32 |
| 4.2 | Details of gender, highest qualification, teaching level and special training/ orientation program if attended | 32 |
| 4.3 | Response Summary- Audiological Conditions | 33-34 |
| 4.4 | Response Summary- Amplification and Listening Devices | 36-37 |
| 4.5 | Response Summary- Listening Difficulties and Classroom Management Strategies | 39-40 |
| 4.6 | Response Summary- Experience and Attitude | 41-42 |
| 4.7 | Teaching difficulties as reported by the participants | 44 |
| 4.8 | Modifications adopted by the participants for improving the learning experience of students with hearing loss | 45 |
| 4.9 | ICC Scores for each of the four domains of the questionnaire | 46 |

List of Figures

| Figure No. | Title | Page No. |
|-------------------|---------------------------------------|-----------------|
| 3.1 | The framework of the survey procedure | 24 |

Abstract

The current study aimed to determine the level of awareness about various audiological conditions in students and their classroom management amongst regular school teachers in Kerala. To fulfill this aim, questionnaires in both English and Malayalam were developed to determine the awareness level. The newly developed questionnaire consisted of 41 questions under five subsections. Responses were obtained from 101 participants teaching in 40 schools across 11 districts of Kerala. Qualitative analysis of the obtained data was carried out to determine the level of awareness amongst the participants. The current study results indicated that a majority of the participants were aware of one or more potential causes of hearing impairment, tests for evaluating hearing levels, and one or more amplification options available for students with hearing impairment. The participants were well aware of the negative impact of hearing impairment on students' speech and language development and its influence on academic performance. A lack of awareness regarding the different types of hearing aids and assistive listening devices, along with the existing ambiguity amongst the participants on the potential benefit and working of amplification devices, was noted. The role of an Audiologist in evaluating the hearing levels and prescribing or dispensing hearing devices was not well known to the majority of the participants. Potential challenges faced by students with hearing impairment and one or more classroom modification strategies and teaching techniques were reported to be familiar to the majority of the participants. The results of the current study established a positive attitude amongst its participants regarding the accommodation and education of students with hearing impairment in regular schools.

Key words: Teacher's awareness, audiological conditions, classroom management, classroom listening difficulties

Chapter 1

Introduction

“Those who know, do. Those that understand, teach.”

— Aristotle

Education is an act or process of imparting or learning broad knowledge, developing reasoning skills, judgment, and training oneself or others. Under Article 21a of the Indian Constitution, the Right of Children to Free and Compulsory Education Act or Right to Education Act declares education as a fundamental right of every child between the ages of 6 and 14 and specifies minimum norms in elementary schools in the country. The Right to Education of persons with disabilities (PWDs) until 18 years of age is laid down under separate legislation: the Persons with Disabilities Act (RTE, 2009).

Even after several years of implementing Sarva Siksha Abhiyan (SSA), around 70% of children with disabilities have still not been identified (Singh, 2015). The 28 States of the country have appointed 12,629 resource teachers for 2,694,000 children with disabilities in schools, making the average of one resource teacher per 213 children with special needs (MHRD Report, 2010-11; Singh, 2015). Successful inclusive education requires reforms to ensure appropriate inclusion of children with disabilities, keeping the diversity of their needs in focus. This also calls for training all regular school teachers in inclusive educational settings on an urgent basis. It also necessitates the assessment and repeal of any laws, policies, and circulars that forbid, restrict, or obstruct students with disabilities from pursuing their preferred course of

study (Singh, 2015). Improving the health and social functioning of the deprived population should be the primary target of a nation (Jain et al., 2008), and education of individuals with hearing impairment is a major aspect of the same.

1.1 Hearing Impairment

The Individuals with Disabilities Education Act (IDEA) officially defines hearing impairment as “an impairment in hearing, whether permanent or fluctuating, that adversely affects a child’s educational performance but is not included under the definition of ‘deafness’.” Whereas, deafness refers to “a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, that adversely affects a child’s educational performance” (IDEA Sec. 300.8). In India, The Rehabilitation Council of India Act, 1992, defines “hearing handicapped” to be –hearing impairment of 70 dB and above, in better ear or total loss of hearing in both ears (Singh, 2015). According to the Rights of Persons with Disabilities Act, (2016) “person with disability”/ PWD involves “a person with long term standing physical, mental, intellectual or sensory impairment which, in interaction with barriers, hinders his full and effective participation in society equally with others” (RPWD, 2016). The RPWD Act, (2016) also states hearing impairment as a disability and identifies a person to be "deaf" if he/she has a hearing loss of 70 dB in the speech frequencies in both the ears and "hard of hearing" if the person has a hearing loss of 60 dB to 70 dB in speech frequencies in both ears (RPWD, 2016).

Hearing impairment is one of the most prevalent congenital disabilities in infants worldwide (Bell, 2013). Studies reveal that five to six infants out of 1000 neonates are hearing impaired (Garg et al., 2015). It affects the general behavior and

the social functioning of individuals (Jain et al., 2008) and can cause a huge impact on an individual's educational and economic well-being (Garget al., 2015). Hearing impairment can result in the inability to perceive speech sounds and impaired communication abilities, language development delays, economic and scholastic backwardness, social isolation, and stigmatization (Singh, 2015).

According to the WHO survey, the most common cause of reversible hearing loss in India is ear wax (15.9%), which is followed by other non-infectious causes such as ageing (10.3%) along with middle ear infections such as CSOM (5.2%) and serous otitis media (3%), dry perforation of the tympanic membrane (0.5%) and bilateral genetic and congenital deafness (0.2%). Environmental factors such as congenital hyperbilirubinemia, ototoxic medication exposure, neonatal hypoxia, viral infections, and meningitis contribute to 50% of congenital hearing impairment while the other 50% involve genetic causes (Singh, 2015).

Among the population of children with disability in the world, children with hearing impairment contribute a considerable majority (Jain et al., 2008). The World Health Organization, WHO (2020) estimates that among the 466 million people (5% of the world's population) with disabling hearing impairment, 34 million are children indicating their high risk. The WHO statistics also reveal that 60% of childhood hearing impairment occurs due to preventable causes. In India, the population-based surveys estimated the prevalence of hearing impairment to be 6.3% (63 million) (Garg et al., 2009). Four out of a 1000 children suffer from severe to profound hearing impairment in the country (Varshney, 2016).

The sense of audition is crucial for a child's overall development, and half of the above mentioned causes resulting in hearing impairment are avoidable through

prevention, early diagnosis, and management (Garg et al., 2015). Without undertaking appropriate measures to ensure the complete inclusion of students with hearing impairment, there is a risk that they will be excluded from the teaching and the learning that goes on (Gudyanga et al., 2014). However, there is an increase in the number of students with hearing impairment gaining access to higher education in the country with the current reforms and laws in recent years.

1.2 Impact of Hearing Impairment on Academics and Classroom Listening

As a large part of learning in a typical classroom involves listening, lack of access to spoken information either from the teacher or peers can hinder the learning of students who do not possess complete access to the same, resulting in their slower rate of learning (Nelson & Soli, 2000). Also, the presence of background noise and reverberation makes the acoustics of a typical classroom less than ideal, making the children's learning at risk more complex (Nelson & Soli, 2000). According to Palmer (1997), six major factors determines the accessibility of auditory information by every student in the class, including the teacher's delivery, the level of noise in the room, the reverberation in the room, the distance from the teacher, the hearing ability and the linguistic experience of the student. Typical classrooms are primarily auditory learning environments; several environmental and student factors interfere with listening (Palmer, 1997). Regular classrooms with many hard and reflective surfaces and high levels of background noise act as sub-optimal listening environments (Toe, 2008) and can have a huge impact on a student's ability to discriminate and understand speech, in turn affecting their academic performance and achievements (Shield & Dockrell, 2008).

Though the general educational environment requires students to multitask, such as listening to the teacher while taking notes or consolidating the taught information, the listening environment may not be optimal (Howard, Munro & Plack, 2010). A high prevalence of mild hearing impairment has been documented among elementary school children, which may impact their academic performance. As a result, every child, particularly those with poor academic achievement, should have their hearing assessed (Daud et al., 2010).

Hearing impairment in children can be particularly complex to tackle in the classroom, presenting as a lack of attention, disruptive behavior, lack of focus, and speech deficits, and even a unilateral hearing impairment can cause a long-term cognitive impairment (Purcell et al., 2016; Shinn et al., 2019). The number of students with hearing impairment who receive their education in general education classrooms and normal hearing students has increased rapidly (Eriks-Brophy & Whittingham, 2013). Furthermore, many hearing-impaired students continue to attend special schools meant for hearing impaired students (Alasim, 2018). It is predicted that with early identification and intervention techniques, such as cochlear implants, the percentage of students with hearing impairment in the general education classroom will increase (Antia et al., 2009). Other factors such as financial pressures, parental expectations, and technological developments can also contribute (Angelides & Aravi, 2007).

The development of the legislation (IDEA) that supports inclusive education for students with disabilities is the major contributing factor for students with hearing impairment in the general education system (Stinson & Antia, 1999). Despite an increase in the participation of students with hearing impairment in general education classrooms in many countries, it has been noticed that these students face difficulty

engaging in and interacting with regular school teachers and peers who have normal hearing (Stinson & Liu, 1999). Many factors may limit the participation and interaction of students with hearing impairment in general education classrooms, including communication barriers, teacher attitudes and knowledge about inclusion and disabilities, normal hearing students' awareness of deafness, and classroom organization. This points towards the importance of awareness and support from all the school staffs, particularly the classroom teachers (Alasim, 2018).

1.3 Need for the study

In this modern world, education plays a crucial role in determining the future of an individual. Gaining an appropriate level of education is one of the significant challenges faced by a child with hearing impairment. A teacher is a common element in all aspects of a hearing-impaired child's educational preparation, and they play a principal role in their classroom accomplishments. The listening difficulties faced by students in the classroom demand collaboration between audiologists and educators. Teachers might benefit from educational audiologists' assistance by raising knowledge regarding hearing impairment, amplification devices, and suitable modifications (Hayes, 2014).

A majority of regular school teachers do not receive any formal training regarding the classroom management of students with special needs. Students face difficulties in a classroom environment with a higher degree of hearing impairment and individuals with a lesser degree of impairment. Along with hearing aids and cochlear implants, assistive listening technology such as FM systems can enhance the auditory signal by improving the signal to noise ratio (SNR) (Anderson & Goldstein, 2004), thus improving the ability to participate in a regular educational system

(Hayes, 2014). Even with an appropriate amplification device and adequate speech and language skills, children with hearing impairment tend to show poor academic performance if the classroom teachers do not adopt adequate strategies. Generally, as regular classrooms teachers do not receive any training on hearing impairment, they may not be familiar with its negative educational impact and the strategies to accommodate them (Hayes, 2014). To assist classroom teachers in such vital areas, audiologists need to have a clear idea of teacher's understanding of the same for effective integration of students with various audiological conditions into the general education system. Therefore, the current study aims to determine the awareness level among teachers in Kerala about different audiological conditions and their effective classroom management.

1.4 Aim of the Study

To determine the level of awareness about various audiological conditions in students and their classroom management amongst the regular school teachers in Kerala.

1.5 Objectives of the Study

- To develop and validate a questionnaire in English and Malayalam to determine the awareness level amongst school teachers about various audiological conditions in students and their classroom management.
- To determine the awareness level amongst regular school teachers in Kerala about various audiological conditions in students using the developed questionnaire.

- To determine the awareness level amongst regular school teachers in Kerala about the classroom management of students with hearing impairment using the developed questionnaire.
- To establish the test-retest reliability of the responses obtained using the developed questionnaire.

Chapter 2

Review of Literature

The auditory pathway acts as the predominant sensory pathway for acquiring speech and language and the overall development of communication skills in individuals. It also influences learning and maturation substantially. Consequently, amongst the group of individuals with hearing impairment, the most significant impact is on the young children as they are at their critical period of development. Hence the identification and intervention at this stage can be highly advantageous. In a typical classroom, recognition of children with hearing impairment can be challenging. Communication is one of the significant challenges faced by students with hearing impairment in a general classroom setup. This might interfere with the child's ability to learn and, if not detected and intervened on time, can result in poor scholastic performance or academic failure (Kiliyayil, 2008).

The potential academic challenges that students can experience with hearing impairment during their education, demand additional support in a typical classroom setting. The provision of a least restrictive learning environment that is acoustically favorable for children with hearing impairment should be prioritized since the listening environment can adversely affect speech understanding, especially in a typical mainstream classroom (Hayes, 2014). Additionally, they may also demonstrate negative behavior related to the impairment, including lack of attention, interrupting others, inappropriate response to verbal instructions, or lack of any response. The acceptance and understanding of the school administrators and regular classroom teachers are amongst the major aspects which determine the successful

implementation of the integrated education plan for students with hearing impairment (Kiliyayil, 2008).

2.1 Common Audiological Conditions amongst Students and the Role of School Teachers in their Management

Hearing impairment in children can occur mainly due to perinatal complications, infectious conditions, ototoxic drug intake, genetic conditions, or loud and prolonged noise exposure (WHO, 2020). Hearing impairment can affect children regardless of the severity, even though the impact is more pronounced with increased severity, late identification and intervention, and poor speech and language outcomes (Taha et al., 2010). In the present world, children spend a crucial amount of their formative years in school. Hence, teachers have a significant part in identifying auditory deficits and further referrals for hearing evaluation (Shinn et al., 2019). In the year 2006, the Government of India launched the National Program for Prevention and Control of Deafness (NPPCD) with the long term goal of bringing down the total disease burden of hearing impairment and deafness. For the use of services planned under the program, the involvement of the community stakeholders is indispensable such as primary school teachers and parents of children with speech or hearing deficits. Teachers are educated on ear care interventions and are also trained to assist in the execution of school-based hearing screening camps. The program also proposes that teachers be trained and inducted to carry out speech and hearing rehabilitation of children at the district level to acquire adequate language and communication skills in children with hearing impairment (Garg et al., 2009).

Gudyanga et al. (2014) identified that the listening requirements of students with hearing impairment who wear hearing aids might require backup support from a

special teacher in an inclusive educational setting. The National Council of Teachers (NCT) and the District Institute of Education Training (DIET) proposes the need for exposure to children with special needs during teacher training to generate adequate awareness as well as to develop a positive attitude towards them (Verma et al., 2017). Based on the feedback from learners with hearing impairment, teachers should be willing to alter their plans and practices of teaching (Gudyanga et al., 2014).

Although the primary consequence of hearing impairment is the inability to perceive some or all conversational speech, its negative influence on communication development significantly impacts the acquisition of pragmatic and academic skills. Professionals in regular education, special education, and support services are expected to adapt intervention strategies to meet the specific requirements of students with hearing impairment (Brackett, 1997). Teachers could also supplement audiometry and in better detection of hearing impairment than screening. However, a lack of awareness regarding hearing impairment and its effective classroom management strategies among teachers: thus, the speech, language, learning, or physical indications of hearing impairment in children are often unidentified at school by teachers (Nodar, 1978). Nodar (1978) reported that despite the significance of teachers in identifying and managing audiological disorders effectively in classrooms, there is limited research targeting their role. Hence, a teacher's inability to provide the necessary classroom modifications and accommodate the students with special needs should be considered (Hayes, 2014).

2.2 Use of Amplification and Assistive Listening Devices in classroom

Typical classroom learning environments involve background noise and excessive room reverberation (Sanders, 1965). There has been a heightened awareness

of the consequences of background noise and reverberation on students' perception of speech and learning with ANSI, 2002 standards. ANSI (2002) has also provided criteria for appropriate classroom acoustics. The students with hearing impairment and their peers with normal hearing are affected by the poor listening conditions. It also increases the time and effort required to learn and influences the operation of other cognitive functions (Anderson & Goldstein, 2004).

The fundamental goal of fitting children with amplification is to make the long-term average speech spectrum available throughout the frequency range so that a child can perceive speech sounds (Anderson & Goldstein, 2004). The use of amplification devices brings the hearing to a nearly normal level in individuals with hearing impairment. Even though hearing impairment is a fundamental educational handicap (as it interferes with normal linguistic and intellectual development) with proper support, most students with hearing impairment succeed in school with the appropriate assistance, eliminating the associated stereotypes (Gudyanga et al., 2014).

Amplification devices can be beneficial to both students and teachers, and they are a prominent and cost-effective option to boost classroom SNRs. However, because of the acoustic filter effect, which occurs when hearing aids do not amplify the entire speech signal into their comfortable listening range, children with hearing impairment perceive speech in fragments (Smaldino & Crandell, 2000). Additionally, as hearing aids can amplify both background noise and teacher's voices, the benefits of personal hearing aids to students in classroom listening settings can be constrained (Nabelek, Donahue & Letowski, 1986; Anderson & Goldstein, 2004). Hence despite digital or programmable analog hearing aids, children with hearing impairment demonstrate better speech recognition with SNR enhancing devices (Assistive

listening devices, ALDs) when listening in a relatively noisy and reverberant classroom listening environment (Anderson & Goldstein, 2004).

The term ALD includes any device other than hearing aids or cochlear implants that assist individuals in detecting environmental sounds (Dillon, 2001). These include sound field amplification systems, personal listening devices or remote microphones, and induction loop systems that enhance environmental sounds (Dillon, 2001). Students wearing hearing aids or cochlear implants possess a considerable disadvantage in communication abilities in the typical classroom environment. The use of ALDs results in significant improvement in speech perception ability (Zanin & Rance, 2016). Berg (1993) reported that sound field equalization systems are the most cost-effective and acceptable technology for facilitating classroom listening. Using a wireless microphone by the teacher and loudspeakers strategically positioned in the classroom will reduce student fatigue and teacher vocal fatigue and improve the student's attention and classroom management (Palmer, 1997).

According to Anderson and Goldstein (2004), desktop and personal frequency modulated (FM) systems and personal hearing aids can significantly increase speech recognition. The study also revealed that sound field amplification with speakers placed adjacent to the ceiling in a reverberant and noisy classroom does not improve speech perception performance over the use of hearing aids alone. FM technology in classrooms allows students with hearing impairment to gain equal access to verbal instruction as that of their normal hearing peers as it minimizes the background noise and reverberation interference with speech perception. Students with sensorineural hearing impairment often require an SNR $> +15$ dB; more potent SNR-enhancing devices need to be considered beyond FM sound field amplification. However, FM

systems dominate and are commonly used in the classroom setting (Anderson & Goldstein, 2004).

Although the educators are wholly accountable for using the ALDs such as FM system, teachers will require particular training in how to operate and care for the devices to guarantee that it is used correctly and appropriately. Additionally, the classroom teacher may require particular guidance on how to implement acoustic improvement techniques in the classroom. It is within the scope of practice of an educational audiologist to educate the teachers in traditional classrooms. (Hayes, 2014).

2.3 Listening Difficulties by Students and available Classroom Management Strategies

A major prerequisite for children to learn in any typical classroom environment is their ability to clearly and precisely listen to the teacher's directions (Hayes, 2014). The degraded classroom listening situation can be challenging for all children, though they can majorly affect those with hearing impairment, and enhancing the classroom acoustics can markedly minimize the negative educational impact of auditory disorders (Nelson & Soli, 2000). Booth and Ainscow (2003) reported that in a noisier environment, it is more likely that the undesired noises will be amplified to hamper the perception of important sounds such as the teacher's voice. School buildings and classrooms should be designed to be compatible with the personal and educational requirements of the students they are to accommodate (Kapp, 1991).

The acoustic characteristics of typical school classrooms can cause barriers to both listening and learning for children at risk. With the identification of these

acoustical barriers, removing these barriers will require a multidimensional approach. Though SLPs and audiologists can take a major role, other professionals, including architects and acoustical consultants, play vital roles in reducing the magnitude of these acoustical barriers for students with special needs and teachers (Smaldino & Crandell, 2000). The existing infrastructure at regular schools incorporating inclusive education needs to be modified to accommodate the need of all the learners. The rooms should be acoustically treated with carpets, double glazing windows, and soundproof doors to minimize reverberations (Gudyanga et al., 2014).

The majority of learning in a conventional classroom occurs through speaking and listening. Teachers do most of their teaching through talking, students asking questions, and hence, they have to listen to both the teacher and other students. As a result, a student must be able to listen to all auditory information to perform well in school. Amplification devices or special assistance can facilitate the audibility of acoustic signals in students with hearing impairment. However, due to poor classroom acoustics, students in the regular classroom get limited spoken information (Palmer, 1997). In children with normal hearing, background noise disrupts any tasks involving high levels of attention and cognitive processing, as well as short-term memory and recall of auditory information (Klatte et al., 2010; Ljung et al., 2011), along with increasing the listening effort (Howard, Munro & Plack, 2010). Noise-related consequences can be accentuated in students with hearing impairment more than those with normal hearing (Crandell & Smaldino, 2000).

Hicks and Tharpe (2002) reported that higher listening effort in background noise is needed for students with hearing impairment than their normally hearing peers. SNR has the most significant effect on audibility and hence in the perception of speech (Crandell & Smaldino, 2000). SNRs in acoustically untreated classrooms can

range from -7 to +6dB (Larsen & Blair, 2008). The optimal SNR for speech perception is at least +6 dB for normal hearing children; at least +15 dB is required for children with hearing impairment (Crandell & Smaldino, 2000).

Reverberation is another factor that affects speech perception along with SNR (Crandell & Smaldino, 2000). Longer reverberation times (RTs) can smear speech's temporal and spectral cues, affecting speech intelligibility (Nabelek, 1993). Classrooms can be highly reverberant with RTs of 0.35 to 1.2 s (Knecht et al., 2002), and degradation in speech intelligibility occurs with RTs of >0.4–0.5s for both normal hearing as well as hearing impaired students (Reinhart et al., 2016). Consequently, classrooms often have challenging listening environments for students with hearing impairment due to these factors (Finitzo-Hieber & Tillman, 1978). Distance between the listener and the source also determines the extent to which both RTs and background noise degrade speech intelligibility. The distance between the teacher and student and the intensity of the target signal are inversely related (Crandell & Smaldino, 2000). According to Neuman et al. (2012), the effect of reverberation can be reduced by reducing the distance between the student and the source of the target signal (5.3–4 meters). There exists a need for creative and inventive solutions, including amplification, architectural changes, and HVAC (heating, ventilation, and air conditioning) changes for better listening conditions as the lack of access to appropriate auditory signals in regular classrooms have a significant impact on learning and attention (Nelson & Soli, 2000).

2.4 Awareness, Experience and Attitude of School Teachers towards Hearing impairment and Classroom Management

Inclusion of students with hearing impairment in regular classrooms involves

enabling the education structures, systems, and learning methodologies to meet their individualized needs (Chakuchichi et al., 2003). As teachers are the most effective variable to influence students' performance in the classroom, the influence of teacher attitude is of primary importance (Gudyanga et al., 2014). The inclusion of children with hearing impairment depends not only on the degree of hearing impairment or the level of intelligence or lip-read capability, language development, or resource availability but also on the teacher's attitude (Booth and Ainscow, 2003).

According to Chadha (1999), in India, regular school teachers do not favor inclusion and believe they lack the required competency to teach students with special needs adequately. However, the study also revealed that teachers believed that the student's special needs could be adequately met in a regular classroom environment. Therefore the acceptance or resistance of teachers to the inclusion of students with disabilities into general education classrooms is dependent on the knowledge base and experiences of teachers (Sacks, 2001). However, the roles and responsibilities of regular school teachers in the management of children with special needs are never clearly defined (Gudyanga et al., 2014).

Sacks (2001) investigated and found out that the regular teachers were least prepared for inclusive education of children with disabilities and that the teachers received limited training regarding the management of students with special needs. Ward et al. (2015) studied the awareness among educators on the effects of hearing impairment, its classroom management, and available rehabilitation options. Results revealed a lack of awareness among half of the respondents about the amplification options available for children with hearing impairment. At the same time, one third showed no awareness regarding the basic classroom modifications to enhance the listening environment. The findings indicated the need to create supplementary

knowledge among teachers regarding various audiological conditions and their impact, along with various amplification options.

Prabha and Vijetha (2015) surveyed to understand the awareness among 100 regular school teachers regarding hearing impairment and referral practices in Ooty, Tamil Nadu. Their study highlighted the absence of knowledge regarding hearing impairment amongst more than half (53%) of their participants. Teachers with increased work experience had better knowledge about hearing impairment. Lack of technical knowledge regarding hearing impairment was also reported. However, the majority of the participants showed a positive attitude towards educating and making appropriate referrals. The findings also indicated the insufficiency of training in teaching children with hearing impairment and a variation in awareness level based on educational qualification. While 73% of teachers agreed that children with hearing impairment could be educated if aided appropriately, 69% of teachers did not answer questions related to SLPs or audiologists.

Verma et al. (2017) explored the awareness, knowledge, and attitude in 100 regular school teachers of Hyderabad about hearing impairment using a five point rating questionnaire. The results of their study revealed the teacher's lack of awareness about hearing impairment and their negative attitude. Studies investigating the teacher's attitude towards inclusion of students with hearing impairment reveal results that are dicey and shrouded with discrepancies (Gudyanga et al., 2014), pointing towards the need to investigate the same further.

From the findings of previous researchers, it can be implied that despite possessing a positive attitude towards the inclusion of students with special needs in regular classrooms, the lack of adequate skills and appropriate training serves as a

major barrier (Prabha & Vijetha, 2015; Hayes, 2014). Hayes (2014) reported that to ensure a least restrictive classroom environment for students with hearing impairment, teachers' existing lack of awareness and skill regarding various audiological conditions and classroom management strategies must be minimized. Hence, the need to create awareness regarding hearing impairment and training school teachers on the requirements and accommodation of students with hearing impairment can be further emphasized.

Chapter 3

Methods

The current study was conducted to determine the level of awareness about various audiological conditions in students and their classroom management amongst the regular school teachers in Kerala. A cross-sectional questionnaire-based survey design was used in the present study. The study was planned in three stages:

- Stage 1: Development of the questionnaire
- Stage 2: Administration of the developed questionnaire
- Stage 3: Analysis of response and its implications

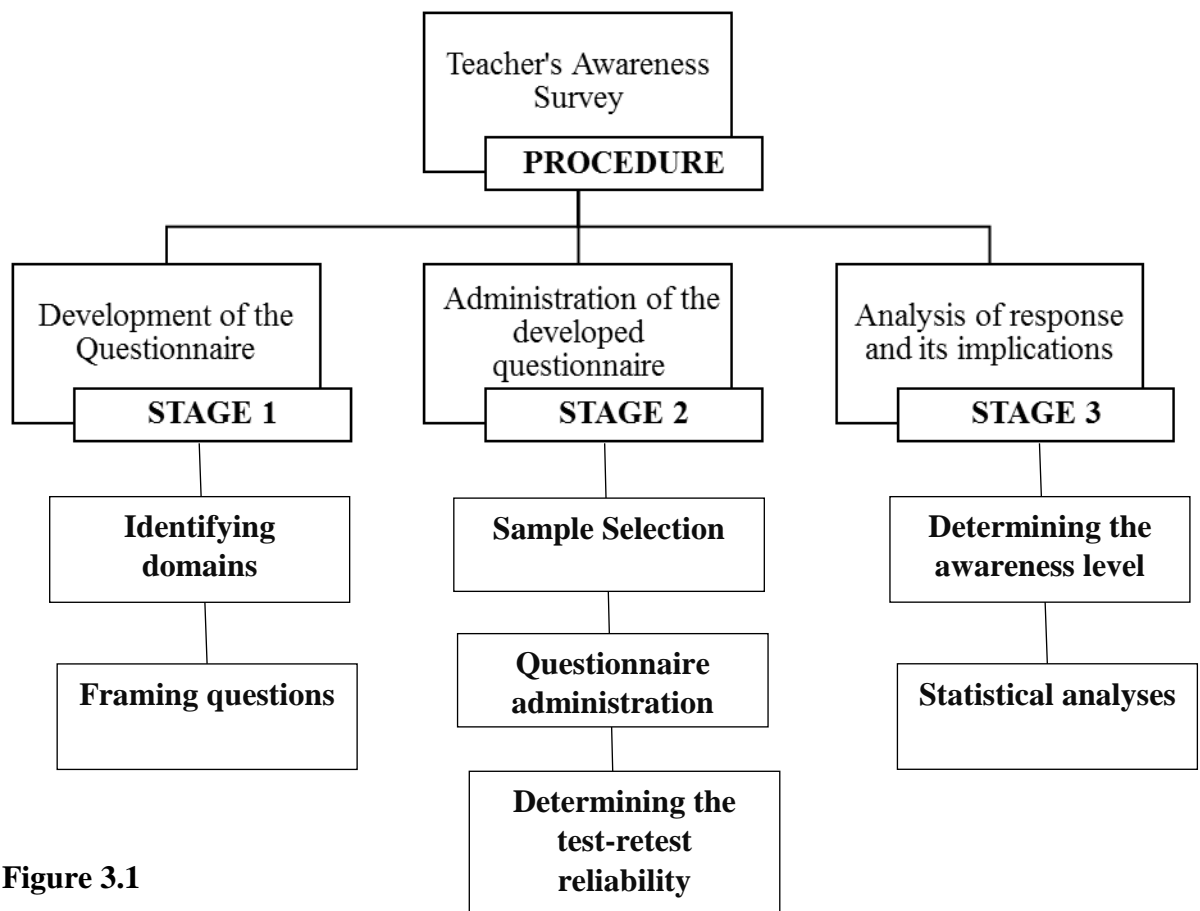


Figure 3.1

The framework of the survey procedure

Stage 1: Development of the Questionnaire

Identifying domains

The survey aimed to assess the awareness among teachers about various audiological conditions and their classroom management. Based on literature review and relevance to the purpose of the study, five major domains were considered for framing the questions, and they were:

- Demographic details and background information
- Audiological conditions
- Amplification and assistive listening devices
- Listening difficulties and classroom management strategies
- Experience and attitude

Framing questions

The questions were prepared in English based on the pool of potential survey items, literature review, and discussion with experienced audiologists. A total of five expert audiologists carried out the content analysis of the framed questions in English for content validity. The questions were modified based on the feedback from the experts, and the final questionnaire was prepared. The final questionnaire prepared in English was translated to Malayalam, and content analysis of the framed Malayalam questions was carried out by two expert audiologists who were native Malayalam speakers. The final questionnaire in both languages consisted of 41 questions and included multiple-choice and short answer-based questions (Appendix I and II). Table 3.1 provides the details of the number of questions under each domain in the final questionnaire.

Table 3.1

Total number of questions under each domain of the questionnaire

| Sl No. | Domains | No. of Questions |
|---------------|--|-------------------------|
| 1 | Demographic details and background information | 13 |
| 2 | Audiological conditions | 6 |
| 3 | Amplification and assistive listening devices | 5 |
| 4 | Listening difficulties and classroom management strategies | 5 |
| 5 | Experience and attitude | 12 |
| Total | | 41 |

Stage 2: Administration of the developed questionnaire

The questionnaires were sent to the participants as Google forms via email and social media platforms. An explanation preceded the survey form regarding the purpose of the survey, and the confidentiality of the data was ensured to the participants. Informed consent was taken from all the participants of the survey. A follow-up procedure was followed to ensure maximum participation. The survey method also followed an offline mode of data collection (while following the Covid-19 safety protocol) to ensure maximum participation.

Responses were collected from 103 regular school teachers of varying teaching experience from 11 districts of Kerala for the study. The age of the participants ranged between 23 years to 65 years, with the group mean value of 43.77

years. Responses obtained included participants from 40 schools across Kerala. Only 101 responses were considered for the study. Amongst the two rejected responses, one was received from outside the state of Kerala, and several particulars were missing in the other rejected response sheet. The collected sample involved a total of 20 participants or more in each of the four teaching levels, including:

- Pre-primary and lower primary
- Upper primary
- High school
- Higher secondary

Amongst the total 101 participants, nine participants reported to be teaching/ to have taught in more than one or two teaching levels. The total number of participants under the four teaching levels is given in Table 3.2. Table 3.3 provides the details regarding the districts from which the data were collected along with the count of a total number of schools and the total number of participants from each school.

Table 3.2

Total number of participants under each teaching level

| Pre and Lower Primary | Upper Primary | High School | Higher Secondary |
|------------------------------|----------------------|--------------------|-------------------------|
| 20 | 27 | 39 | 28 |

Note. A total of 10 participants reported to be teaching/ to have taught in more than one or two teaching levels (two levels-seven participants, three levels-three participants).

Table 3.3

Total number of schools in each district and total number of participants from each district

| District | Number of Schools | No. of Participants |
|--------------------|------------------------------|--------------------------------|
| Alappuzha | 5 | 11 |
| Ernakulum | 1* | 1 |
| Kannur | 1 | 1 |
| Kollam | 1+ 1* | 2 |
| Kottayam | 1 | 2 |
| Kozhikode | 2+1* | 3 |
| Malappuram | 5 | 9 |
| Palakkad | 1 | 2 |
| Pathanamthitta | 1 | 1 |
| Thiruvananthapuram | 21+3* | 65 |
| Trissur | 2 | 4 |
| Total | 40 | 101 |

Note.*Number of responses with school names not disclosed by participants

Determining the test-retest reliability

The test-retest reliability of the responses obtained through the developed questionnaire was assessed by re-administration of the questionnaire on 10% of the total sample population at a different time point after the initial administration of the questionnaire. The cumulative scores were formulated for each of the four domains (sections) separately and the test-retest reliability for each section of the questionnaire

was analyzed using an Interclass correlation test. The test-retest reliability analysis was carried out using Statistical Package for Social Service (SPSS) Version 20.

Stage 3: Analysis of response and its implications

Determining the awareness level

The obtained responses were analyzed qualitatively. The response percentage was calculated to determine the awareness level among teachers regarding various audiological conditions in students and their classroom management.

Chapter 4

Results

The current study aimed to determine the level of awareness about various audiological conditions in students and their classroom management amongst the regular school teachers in Kerala. Responses were received from 103 teachers, out of which 101 responses that fit the criteria for participation were considered for evaluation. The obtained responses were qualitatively analyzed, and response percentages were calculated to determine the awareness level among the participants. The study sample included participants from 40 schools across the 11 districts of Kerala. The participants of the survey were informed and encouraged to opt for as many options as they were aware of and were not restricted to choose one answer wherever applicable. The participants were also given the choice to answer the questionnaire in either English or in their native language (Malayalam) as per their convenience irrespective of the questionnaire they received. The results of the data are represented under the following headings:

- **Demographic details and background information**
- **Audiological condition**
- **Amplification and assistive listening devices**
- **Listening difficulties and classroom management strategies**
- **Experience and attitude**

4.1 Demographic details and background information

The first section of the questionnaire consisted of 13 questions intended to collect particulars on the participants' demographic details and background information. Table 4.1 and 4.2 provides details on the demographic and background information of the participants. From Table 4.1, it can be noted that the mean age of the participants was 43.77 years and the average teaching experience was 16.2 years. Though all the participants were given the choice of keeping their identity anonymous, apart from the 5.94% of participants, the remaining participants (94.06%) revealed their names in the survey. Female teachers constituted 86.13% of the study population, while 13.86% were male teachers. Participants were given the choice of keeping the identity of their school anonymous, and the majority of participants (94.06%) revealed the name of the school. In contrast, few participants (5.94%) chose to keep the school name anonymous.

Responses were received from 11 districts across Kerala. The majority of the participants (60.39%) reported possessing a postgraduate degree as their highest educational qualification. The participants of the study belonged to either government school (16.83%), private school (20.79%), aided school (51.48%), or unaided school (10.89%). The survey results ensure participation from teachers of all the levels of teaching from preprimary and lower primary (17.54%), upper primary (23.68%), high school (34.21%), and higher secondary (24.56%). Nine participants reported to be teaching in more than one or two levels. The collected data represented teachers from all subjects as few of the participants reported to be teaching all subjects while others reported to be teaching a specific subject such as Science, Social science, Mathematics, Physics, Biology, Zoology, Botany, Economics, EVS, Computer Science, English, Malayalam, Hindi, Arabic, French, German, Sanskrit or Physical

Science. The teaching experience of the participants varied widely, with a group average of 16.2 years. A total of 14 participants reported having attended orientation program/ training in the form of lecture, vocational/ IED (Inclusive Education for the Disabled) training at BRC (Block Resource Center), and CSWN (Children with Special Needs) workshop.

Table 4.1.

Mean and Range of age and teaching experience of the participants

| Demographic/ Background information | Mean | Range |
|--|-------------|---------------|
| Age | 43.77 years | 23 – 65 years |
| Total teaching experience | 16.2 years | 1 – 35 years |

Table 4.2

Details of gender, highest qualification, teaching level, and special training/ orientation program attended

| Demographic/ Background information | | No. of participants |
|--|-----------------------|----------------------------|
| Gender | Male | 14 |
| | Female | 87 |
| Highest qualification | Higher Secondary | 2 |
| | Undergraduate degree | 38 |
| | Postgraduate degree | 61 |
| Teaching level | Pre and Lower Primary | 20 |
| | Upper Primary | 28 |
| | High School | 35 |
| | Higher Secondary | 30 |
| Special training/ orientation program | Attended | 14 |
| | Not attended | 87 |

4.2 Audiological Condition

The level of awareness amongst regular classroom teachers regarding various audiological conditions such as the major causes of hearing impairment, hearing assessment related, and the expected impact of hearing impairment on students were investigated, and the responses were recorded. A total of six multiple choice questions intended to determine the awareness level of various audiological conditions were included in this section. The pattern of response by participants for various questions under this section can be noted from Table 4.3.

Table 4.3

Response Summary-Audiological Conditions

| Sl No. | Questions | Options | No. of responses obtained |
|---------------|---|--|----------------------------------|
| 1 | Which among the following conditions that causes hearing loss are you aware of? | Ear infection/ discharge (Otitis media), | 79 (78.2%) |
| | | Age related hearing loss (Presbycusis) | 85 (84.2%) |
| | | Noise Induced Hearing Loss(NIHL) | 67 (66.3%) |
| | | Hearing loss due to a medicine (Ototoxicity) | 23 (22.8%) |
| | | Central Auditory Processing disorder (CAPD) | 32 (31.7%) |
| | | Not aware of any | 5 (5%) |
| 2 | Are you aware of hearing testing for identifying hearing loss? | Yes | 79 (78.2%) |
| | | No | 22 (21.8%) |

| | | | |
|---|--|-------------------------------------|------------|
| 3 | Who amongst the | General Physician | 2 (2%) |
| | following professionals | ENT Doctor | 72 (71.3%) |
| | checks your hearing | Audiologist | 36 (35.6%) |
| | level and | Not aware of it | 10 (9.9%) |
| | prescribes/dispenses hearing devices? | | |
| 4 | Can hearing loss affect | Yes | 84 (83.2%) |
| | the speech and language | No | 3 (3%) |
| | development of an | Maybe | 14 (13.9%) |
| | individual? | Not aware | 0 (0%) |
| 5 | Do you think that even | Yes | 55 (54.5%) |
| | the slightest hearing loss | No | 79 (12.9%) |
| | can affect a student's | Maybe | 33 (32.7%) |
| | academic performance? | Not aware | 0 (0%) |
| 6 | Which among the | Inattentiveness | 61 (60.4%) |
| | following do you expect | Frequent need for repetition | 85 (84.2%) |
| | to see in a student with | Impaired emotional and social skill | 33 (32.7%) |
| | unidentified hearing | Improper response to questions | 66 (65.3%) |
| | loss? | Not aware of any | 3 (3%) |

Presbycusis ranked as the most known cause of hearing loss (84.2%), while Ototoxicity ranked as the least known cause of hearing loss (22.8%) amongst the participants (see Table 4.3). The majority of participants (78.2%) reported to be aware of the tests for evaluating hearing impairment. Most participants reported that ENT doctors assess the hearing level and prescribe or dispense hearing devices (71.3%), followed by audiologists (35.6%).

The results also revealed that more than 80% of the participants were aware that hearing loss could affect an individual's speech and language development. Nearly 55% of the participants agreed that even the slightest degree of hearing loss might impact the academic performance of a student. Frequent need for repetition (84.2%) followed by an improper response to questions (65.3%) were amongst the most chosen responses by the participants to be expected in a student with unidentified hearing loss (see Table 4.3).

4.3 Amplification and Assistive Listening Devices

The awareness level amongst regular school teachers regarding various types of hearing devices and ALDs used by individuals with hearing impairment was determined with a total of five multiple choice questions in the questionnaire. The pattern of response by participants for various questions under this section can be noted in Table 4.4.

Hearing aids ranked as the most known device to benefit people with hearing loss (93.1%), followed by cochlear implant (46.5%) (See Table 4.4). The study also investigated the hearing aid that was predominantly familiar amongst the participants. Table 4.4 shows that 46.5% of the participants were not aware of any of the types of hearing aids. Behind the Ear, (BTE) hearing aids were the most familiar type of hearing aid reported by the participants (38.6%).

Table 4.4*Response Summary-Amplification and Listening Devices*

| Sl No. | Questions | Options | No. of responses obtained |
|---------------|---|----------------------------------|----------------------------------|
| 1. | Which among the following hearing devices that benefit people with hearing loss are you aware of? | Hearing Aid | 94 (93.1%) |
| | | Cochlear Implant (CI) | 47 (46.5%) |
| | | Bone Conduction Hearing Aids | 6 (5.9%) |
| | | Middle Ear Implant | 9 (8.9%) |
| | | Auditory Brainstem Implant (ABI) | 3 (3%) |
| | | Not aware of any | 4 (4%) |
| 2. | Which among the following types of hearing aids that are used by people with hearing loss are you aware of? | Body level hearing aid | 17 (16.8%) |
| | | Behind the Ear(BTE) | 39 (38.6%) |
| | | Receiver in the Canal (RIC) | 21 (20.8%) |
| | | Completely in the Canal (CIC) | 4 (4%) |
| | | Not aware of any | 47 (46.5%) |
| 3. | Do you think that students using hearing devices start hearing and speaking immediately after fitting them? | Yes | 19 (18.8%) |
| | | No | 17 (16.8%) |
| | | Maybe | 32 (31.7%) |
| | | Not aware | 33 (32.7%) |

| | | | |
|----|------------------------------|-----------------------------------|------------|
| 4. | Do you think that ENT | Yes | 30 (29.7%) |
| | doctors evaluate hearing | No | 21 (20.8%) |
| | levels and prescribe/ | Maybe | 27 (26.7%) |
| | dispense hearing devices | Not aware | 23 (22.8%) |
| | such as hearing aids? | | |
| 5. | Which assistive listening | Personal FM system, | 13 (12.9%) |
| | devices are used by students | Induction loop | 7 (6.9%) |
| | with hearing loss to enhance | Sound field amplification devices | 11 (10.9%) |
| | listening are you aware of? | Infrared system | 3 (3%) |
| | | Not aware of any | 75 (74.3%) |

Findings on whether students using hearing devices would start listening and speaking immediately after fitting with a hearing device established the existing ambiguity. More than 60% of participants were either not aware or unsure of the outcome. However, 16.8% reported “no” as the answer. Similarly, the question targeted to find if the participants believed that ENT doctors were the professionals involved in evaluating the hearing levels and prescribing or dispensing hearing devices revealed that 20.8% of the participants reported “no” while others were unsure or unaware. Also, from Table 4.4, it can be noted that most of the participants (74.3%) were not aware of different ALDs used by students with hearing loss to enhance listening.

4.4 Listening Difficulties and Classroom Management Strategies

The questionnaire consisted of five multiple choice questions to determine the awareness level amongst regular school teachers regarding the various listening difficulties faced by students with hearing loss and the appropriate modifications required. The pattern of response by each participant for various questions under this section can be noted from Table 4.5

The majority of the participants (71.3%) reported that students with hearing impairment struggle in the classroom while following instructions, participating in group discussions, or noting down oral lectures. Amongst the total participants, 24.8% reported that students fitted with hearing aids could listen well with regular classroom noise levels, while majority of participants were either doubtful or unaware regarding the same. A small percentage of participants (9.9%) reported that hearing impairment does not affect communication abilities and, thereby, students' academic performance. However, most of the participants reported being aware of the adverse effect of hearing impairment on students and their academic abilities. Appropriate seating arrangements to improve auditory and visual access ranked amongst the most aware (70.3%) classroom modification strategies for hearing-impaired students (see Table 4.5). It can also be noted from Table 4.5 that repeat (73.3%) and simplify (40.6%) were amongst the most familiar teaching techniques for students with hearing impairment, as reported by the participants.

Table 4.5*Response Summary- Listening Difficulties and Classroom Management Strategies*

| Sl No. | Questions | Options | No. of responses obtained |
|---------------|--|---|----------------------------------|
| 1. | Are you aware if students with hearing loss face difficulties in following classroom instructions, group discussions, or while noting oral lectures? | Yes | 72 (71.3%) |
| | | No | 6 (5.9%) |
| | | Maybe | 18 (17.8%) |
| | | Not aware | 5 (5%) |
| 2. | Do you feel that students fitted with hearing aids can listen well with regular classroom noise levels? | Yes | 30 (29.7%) |
| | | No | 25 (24.8%) |
| | | Maybe | 28 (27.7%) |
| | | Not aware | 18 (17.8%) |
| 3. | Do you think that hearing loss affects the communication abilities and hence the academic performance of students? | Yes | 67 (66.3%) |
| | | No | 10 (9.9%) |
| | | Maybe | 22 (21.8%) |
| | | Not aware | 2 (2%) |
| 4. | Which among the following classroom modifications for students with hearing loss are you aware of? | The use of sound absorbing materials/ curtains | 29 (28.7%) |
| | | Providing adequate lighting | 7 (6.9%) |

| | | |
|----|--|------------|
| | Appropriate seating arrangement to improve the auditory and visual access | 71 (70.3%) |
| | Reducing the level of noise and echo in the classroom | 60 (59.4%) |
| | Not aware of any | 12 (11.9%) |
| 5. | Which among the following teaching strategies for students with hearing loss are you aware of? | |
| | Repeat | 74 (73.3%) |
| | Rephrase | 36 (35.6%) |
| | Elaborate | 23 (22.8%) |
| | Simplify | 41 (40.6%) |
| | Not aware of any | 15 (14.9%) |

4.5 Experience and Attitude

Experience and attitude of regular school teachers regarding the inclusion and education of students with hearing were determined. This section involved a total of twelve questions in the questionnaire, in which nine were multiple choices along with three open ended questions. The open-ended questions were targeted to determine the participants' level of experience with students with special needs (duration of teaching and number of students), difficulties faced while teaching them, and the modifications that were undertaken for their benefit. A positive attitude towards the education of students with hearing impairment in regular schools was represented in the results.

The pattern of response obtained for various questions under this section can be noted from Table 4.6.

The majority of the participants (78.2%) reported that students with hearing loss should be taught in regular schools when fitted with appropriate hearing devices and disagreed with the statement that students with hearing impairment using hearing aid should be enrolled only in special schools instead of regular schools (70.3%). A large percentage of the participants (72.3%) reported to believe that a normal hearing child will accept to have a peer who has a hearing impairment.

Table 4.6

Response Summary- Experience and Attitude

| Sl No. | Questions | Options | No. of responses obtained |
|---------------|---|----------------|----------------------------------|
| 1. | Can students with hearing loss be taught in regular school if fitted with hearing devices? | Yes | 79 (78.2%) |
| | | No | 4 (4%) |
| | | Maybe | 15 (14.9%) |
| | | Not aware | 3 (3%) |
| 2. | Do you think that students with hearing impairment using hearing aid should be enrolled only in special schools instead of regular schools? | Yes | 12 (11.9%) |
| | | No | 71 (70.3%) |
| | | Maybe | 10 (9.9%) |
| | | Not aware | 8 (7.9%) |

| | | | |
|----|---|-----------|--------------|
| 3. | Do you think that a normal hearing child will accept to have a peer who has hearing loss? | Yes | 73 (72.3%) |
| | | No | 4 (4%) |
| | | Maybe | 21 (20.8%) |
| | | Not aware | 3 (3%) |
| 4. | Do you think that classroom teachers have a major role in identifying hearing loss amongst students? | Yes | 94 (93.1%) |
| | | No | 2 (2%) |
| | | Maybe | 3 (3%) |
| | | Not aware | 2 (2%) |
| 5. | Have you ever suspected hearing loss in students with poor academic and classroom performance? | Yes | 54 (53.5%) |
| | | No | 47 (46.5%) |
| 6. | Do you feel that regular school teachers need to be trained or given awareness about hearing loss and classroom management of students with hearing loss? | Yes | 83 (82.2%) |
| | | No | 7 (6.9%) |
| | | Maybe | 9 (8.9%) |
| | | Not aware | 2 (2%) |
| 7. | Have you ever taught any student with hearing loss in school? | Yes | 38 (37.6%) |
| | | No | 63 (62.4%) |
| 8. | Have you experienced any difficulties while teaching students with hearing loss? | Yes | 19 (51.35%)* |
| | | No | 18 (48.64%)* |
| 9. | Are you happy to teach students with hearing loss in your regular classroom and make necessary modifications if needed? | Yes | 98 (97%) |
| | | No | 3 (3%) |

Note.*Calculated for the total number of participants (37) having experience of teaching students with hearing loss.

Classroom teachers have a major role in identifying hearing impairment amongst students, as reported by 93.1% of the participants. Nearly half of the participants reported to have suspected hearing impairment in students with poor academic and classroom performance. A total of 82.2% of the participants expressed the view that regular school teachers needs to be trained or provided awareness related to hearing impairment and classroom management of students with hearing impairment.

A total of 38 participants reported to have taught students with hearing impairment for a period between 1-4 years with a minimum of one student to a maximum of four students with a mean of 2.04 years of teaching experience and 1.81 students, respectively. Amongst the participants (36.63%) who reported having experience with hearing impaired children, nearly half of them (48.64%) reported having faced difficulties while teaching the students with hearing impairment. Table 4.7 represents the teaching difficulties as reported by the participants. Nearly all the participants (97%) expressed being happy to teach students with hearing impairment in the regular classroom and make necessary modifications. Several modifications adopted by the participants to improve the learning experience of students with hearing impairment can be inferred from Table 4.8.

Table 4.7

Teaching difficulties faced by the participants while teaching students with hearing impairment in regular school.

| Sl No. | Teaching difficulties faced |
|---------------|---|
| 1. | Need for frequent repetition and more explanation |
| 2. | Difficulty while noting down notes |
| 3. | Minimal participation in classroom activities |
| 4. | Poor understanding ability |
| 5. | Lack of listening and attention |
| 6. | Poor sitting behavior |
| 7. | Difficulty in following sign language used by students |
| 8. | Ambiguity regarding the understanding or the response of the students |

Table 4.8

Modifications adopted by the participants for improving the learning experience of students with hearing impairment

| Sl No. | Adopted Modifications |
|---------------|---|
| 1. | Providing assistance using mobile videos |
| 2. | Simplifying the topic |
| 3. | Repetition |
| 4. | Modified seating arrangement |
| 5. | Speaking closer |
| 6. | Explanation with visual assistance |
| 7. | Providing more illustrations and hands on activities |
| 8. | Providing special attention/ teaching alone |
| 9. | Involving in simple works to build confidence and inclusion |
| 10. | Providing extended time for understanding |
| 11. | Focusing on primary topics |
| 12. | Ensuring peer support |
| 13. | Use of signs to communicate |
| 14. | Talk loud |

Test-retest Reliability of the Developed Questionnaire

The test-retest reliability for the newly developed questionnaire was analyzed using an Interclass correlation test. The Intraclass correlation coefficient (ICC) values for each of the domain of the questionnaire are depicted in Table 4.9. From the table, it can be inferred that the test-retest reliability of different domains of the questionnaire is between moderate and good (ICC ranging from 0.58 to 0.81) (Koo & Li, 2016).

Table 4.9

ICC Scores for each of the four domains of the questionnaire.

| SI No. | Domains | Intraclass Correlation | Reliability outcome |
|---------------|---|-----------------------------------|--------------------------------|
| 1. | Audiological conditions | 0.64 | Moderate |
| 2. | Amplification and assistive listening devices | 0.81 | Good |
| 3. | Listening difficulties and classroom management strategies | 0.77 | Good |
| 4. | Experience and attitude | 0.58 | Moderate |

Chapter 5

Discussion

The current study aimed to determine the level of awareness among regular school teachers of Kerala regarding various audiological conditions in students and their classroom management strategies. The developed questionnaire consisted of 41 questions under five subsections, and responses were obtained from 101 participants teaching across various schools from 11 districts of Kerala. Qualitative analysis of the obtained data was carried out using descriptive statistics, and the level of awareness amongst the participants were determined. The results of the study are as discussed below:

5.1 Audiological Condition

5.2 Amplification and Assistive Listening Devices

5.3 Listening Difficulties and Classroom Management Strategies

5.4 Experience and Attitude

5.1 Audiological Condition

One among the primary objectives of the current study was to determine the level of awareness amongst the participants regarding various aspects associated with audiological conditions such as the major causes of hearing impairment, awareness related to hearing evaluation and the expected impact of hearing impairment on students, using a total of six multiple choice questions. The pattern of response by each participant for various questions can be noted from Table 4.3.

The current study results indicated that most of the participants were aware of one or more than one of the conditions listed in the questionnaire to cause hearing impairment. The findings of the current study are in congruence with previous research by Hayes (2014), with the primary aim to determine the experience of teachers with hearing impairment, educating students with hearing impairment, and their readiness to teach students with hearing impairment. A significant majority of teachers (77%) reported to be familiar with the potential causes of hearing loss (Hayes, 2014).

Amongst the various conditions that were listed as the causes of hearing loss in the current study, the results indicated that presbycusis was the most known cause of hearing loss (84.2%) followed by ear infection/ discharge (otitis media) (78.2%), noise induced hearing loss (NIHL) (66.3%) and central auditory processing disorder (CAPD) (31.7%). Ototoxicity was the least known cause of hearing loss amongst the participants studied (22.8%). Amongst the diverse causes of hearing loss, the WHO survey (2012) identified non-infectious causes such as presbycusis as the second major cause for hearing loss in India after ear wax (Garg et al., 2009).

The study results also revealed that most of the participants (78.2%) reported being aware of the tests for evaluating hearing impairment. However, the findings revealed that most of the participants were unaware that audiologists are involved in assessing the hearing level of individuals and prescribing or dispensing hearing devices. The majority of the participants (71.3%) reported ENT doctors to be the professionals for the same. The current study results are comparable with the findings of Ward et al. (2015) on educators to determine the awareness on the effects of hearing loss, accommodations, and amplification devices. It was found that the

majority of the participants (88%) reported seeking the assistance of professionals other than audiologists for any necessary assistance with amplification devices.

The results indicated that participants of the current research were well aware that hearing loss could affect the speech and language development of students as the majority of the participants (83.2%) agreed to the same. More than half of the participants of the current investigation agreed that even the slightest degree of hearing loss might impact the academic performance of a student. The awareness amongst school teachers regarding the presence of speech sound disorder and the potential need for speech and language therapy for students with hearing impairment was also reported by previous researchers (Verma et al., 2017). The current study's findings also agree with the results of the previous investigation on teachers (Richburg & Goldberg, 2005). Richburg and Goldberg (2005) reported that a large majority of their participants (82.2%) believed that children with minimal hearing loss remain at risk for learning difficulties in the classroom, despite passing hearing screening.

The results of the current study also revealed that frequent need for repetition and improper response to questions were amongst the most aware behavioral signs most likely to be exhibited by a student with hearing impairment as reported by the participants. Furthermore, from the results, it can be inferred that there is a lack of awareness amongst the participants regarding the potential impairment of emotional and social skills amongst students with hearing loss. Similar results have been reported in previous literature (Dodd-murphy & Mamlin, 2002). The various behavioral signs of hearing impairment include the lack of attention, need for frequent repetition, social withdrawal, unsuitable response to directions or questions, and rhyming word confusions (Dodd-murphy & Mamlin, 2002).

5.2 Amplification and Assistive Listening Devices

The current study investigated the awareness level amongst regular school teachers regarding various types of hearing devices and ALDs used by individuals with hearing impairment. The current study results showed that the majority of the participants were aware of one or more of the amplification options available for students with hearing impairment. This is in agreement with the previous literature (Hayes, 2014). Hayes (2014) reported that most school teachers (77% of participants) were aware of the amplification devices used by students with hearing impairment.

Among the various types of amplification devices listed in the current study, hearing aid was the device most known to benefit people with hearing loss, followed by cochlear implant, middle ear implant, bone conduction hearing aid, and auditory brainstem implant reported by the participants. Behind the ear (BTE) hearing aids were the most known device by the participants available for individuals with hearing impairment, followed by receiver in the canal (RIC) hearing aids, body level hearing aids, and completely in the canal (CIC) hearing aids. Also, it can be noted from the results that there exists a lack of awareness amongst the participants regarding the different types of hearing aids as nearly half of the participants reported to be unaware of the same. Previous research on school teachers yielded similar results wherein half the study participants reported to be unaware of the amplification options available for children with hearing loss (Ward et al., 2015).

The study results also established the existing ambiguity amongst the participants on the potential benefit and working of amplification devices based on whether students using hearing devices start listening and speaking immediately after

fitting with a hearing device. The majority of the participants reported to be unaware (22.8%) or unsure (26.7%) about the same. The lack of awareness amongst the participants regarding the role of an audiologist in evaluating the hearing levels and prescribing or dispensing hearing devices was also revealed in the current study. Also, there is ambiguity regarding ENT doctors' role in evaluating the hearing levels and prescribing or dispensing hearing devices, as it can be inferred from the study results (see Table 4.4).

The unfavorable listening environment of a regular classroom demands the use of ALDs such as an FM device, induction loop, or personal amplification system to ensure favorable SNRs amongst students using hearing aids. This requires cooperation and awareness amongst classroom teachers regarding the same. However, from the current study results, it can be inferred that there exists a gap that needs to be bridged regarding the potential use of different ALDs used by students with hearing loss to enhance listening as the majority of the participants reported to be unaware of the same.

5.3 Listening Difficulties and Classroom Management Strategies

The newly developed questionnaire of the current study consisted of five multiple choice questions to determine the awareness level amongst regular school teachers regarding the listening difficulties faced by students with hearing loss and the appropriate modifications required. Previous literature reports that teachers' lack of voluntary help can be a major factor contributing to the listening or learning difficulties faced by children with hearing impairment in regular classrooms. And this would essentially hinder the generation of an independent learning environment for the students (Alwis, 2005) as a least restrictive environment aids the acquisition of

knowledge and skills (Gudyanga et al., 2014). The results of the current study indicated the awareness amongst the majority of its participants (71.3%) regarding the potential challenges faced by students with hearing impairment. The participants reported that students with hearing loss struggle in the classroom while following instructions, participating in group discussions, or noting down oral lectures. Regardless of the degree of hearing loss, accessibility to acoustic information exists as a major challenge for mainstreamed students in schools. This lack of input can serve as a major reason for speech and language deficits requiring constant intervention. Amongst the diverse reasons that contribute to their difficulty, the listening environment, visual access to the speaker, and condition of the listening device is of prime significance (Brackett, 1997).

The existing ambiguity amongst the participants on the potential benefit and working of amplification devices can be inferred from the results as a proportion of the participants (29.7%) reported that students fitted with hearing aids could listen well with regular classroom noise levels. In comparison, most participants were either doubtful (27.7%) or unaware (17.8%) regarding the same. However, the negative impact of hearing impairment on the communication abilities and hence the academic performance of students was well known to the majority of participants (66.3%) in the current study. The lack of awareness amongst teachers regarding several aspects of classroom listening, such as the impact of classroom acoustics on listening, the concept of SNR and RT, has been well established (Hayes, 2014). Hayes (2014) reported that more than half of the participants in their study lacked awareness regarding the necessary classroom modifications for accommodating students with hearing impairment. The study also showed that preferential seating was the most used strategy amongst the known modifications.

The current study results indicated that appropriate seating arrangements to improve auditory and visual access were among the most known classroom modification strategies for hearing loss students. The other modification strategies suggested were to reduce noise and echo in the class using sound absorbing materials/curtains and provide adequate lighting. (see Table 4.5). Ward et al. (2015) revealed awareness amongst teachers (67% of the participants studied) regarding the basic necessary physical classroom accommodations or modifications required by students with hearing loss for optimum classroom performance. However, McCormick Richburg & Goldberg (2005) reported a lack of awareness amongst teachers that the common solution of appropriate seating arrangement is insufficient to fulfill the requirements of students with hearing loss in a regular classroom environment. Along with seating modifications, other listening aspects such as the classroom noise level (SNR), reverberation, lighting, and other classroom accommodations should be given significant weightage.

From the current study results, it can be noted though a minority of participants (14.9%) reported to be unaware of any teaching strategies targeting students with hearing impairment. Repeat and simplify were among the most familiar teaching techniques for hearing loss students, as reported by the participants, followed by rephrasing and elaborate (see Table 4.5). Strategies such as the use of clear and loud voice by the teachers, repetition of information, appropriate seating arrangement with proximity to the teacher, and access to visual information were reported to be crucial to ensure appropriate listening and optimum learning by students with hearing impairment in regular classrooms (Alvis, 2005).

5.4 Experience and Attitude

The current research results established a positive attitude amongst its participants regarding the accommodation and education of students with hearing impairment amongst its participants. The study determined the level of experience amongst regular school teachers on teaching students with hearing impairment and their attitude towards the same using a total of twelve questions in the questionnaire.

From the current study's findings, it can be inferred that the majority of the participants (78.2%) believed that students with hearing loss should be taught in regular schools when fitted with appropriate hearing devices. Also, a significant number of participants disagreed (70.3%) with the statement that students with hearing impairment using hearing aid should be enrolled only in special schools instead of regular schools. The results of the current study contradicted the findings of previous literature (Verma et al., 2017), which reported that the majority of participants strongly agreed that students with hearing impairment should always attend special schools.

When asked if a normal hearing child will accept to have a peer who has hearing loss, a large percentage of the participants (72.3%) reported positively for the same. The findings of the current investigation agree with the result of a case study by Alwis (2005). It was found that peers displayed acceptance of the hearing impaired students and the use of special strategies to assist the learning of children with hearing impairment. Normal hearing peers are highly beneficial for the learning of students with hearing impairment in the classroom.

Based on the current study results, it can be inferred that the majority of the participants (93.1%) are well aware of their role in identifying hearing loss amongst

students. Nearly half of the participants reported having suspected hearing loss amongst their students based on their poor academic and classroom performance. The role of regular classroom teachers in identifying and referring students with hearing impairment has been well established (Nodar, 1978). Shinn et al. (2021) conducted research to delineate the potential of teachers to recognize school children at the risk of hearing impairment to optimize the efficacy of hearing screening, especially with limited resources. They found that school teachers could precisely identify children at the highest risk of hearing loss. And based on the results, the authors concluded that school teachers are an indispensable part of a sustainable hearing screening program.

In the current study, a significant majority of the participants (82.2%) expressed that regular school teachers need to be trained or provided awareness related to hearing loss and classroom management of students with hearing loss. The current study's findings are in congruence with the results of previous research by Hayes (2014), where the need and advantage of in-service training for regular school teachers on hearing loss and the classroom management strategies were reported by the majority of the participants (85%). Alwis (2005) also report the need for awareness programs on special education for school teachers to alter and adapt their role and modify the classroom settings to accommodate students with hearing loss optimally.

Based on the current study results, it can be understood that regular classroom teachers encounter several difficulties while teaching students with hearing impairment in regular classrooms. Need for frequent repetition and more explanation, difficulty in understanding and taking notes, minimal participation in classroom activities, poor listening/ attention, and sitting behavior were amongst the several difficulties as reported by the participants of the current study (see Table 4.7).

However, nearly all the participants expressed being happy to teach students with hearing loss in the regular classroom and make necessary modifications. Similar results were obtained by Hayes (2014), where the majority of the participants (91%) expressed their willingness to work with students with hearing impairment.

The current study participants also reported diverse modifications adopted by them to accommodate and improve the learning experience of students with hearing loss in their classrooms (see Table 4.8). And this included teaching modifications and strategies such as talking loud, simplification, repetition, modified seating arrangement, closer speaking approach, explanation with visual assistance, or the use of mobile videos and ensuring peer support, to name a few. Alwis (2005) reported several other teaching strategies that teachers utilize for teaching students with hearing impairment, such as grouping the class, peer tutoring, providing close supervision, involving in play activities, and allotting assignments along with aids such as handbooks, visual materials, textbooks, science equipment, and the blackboard

Determining teachers' knowledge of and experience with students with hearing loss is pivotal for the effective integration of students with hearing loss into general education or mainstream classes (Richburg & Goldberg, 2005). Previous literature reported that the attitude toward hearing impairment is influenced by several factors, including socioeconomic status, awareness and understanding of the real nature of the condition, and myths regarding the cause of hearing loss (Tucci et al., 2010). When empowered with adequate information and knowledge, teachers will be better prepared to adapt and provide the necessary modifications for students with hearing impairment and thus assist in their scholastic performance (Hayes, 2014). Hence, based on the current study's findings, the major areas that lack awareness and

information amongst regular school teachers can be established. The current study's findings also emphasize the need for conducting orientation or awareness programs in areas that teachers lack knowledge. Teachers can play a pivotal role in the early identification of hearing impairment in students and their classroom accommodation. Hence providing adequate training targeting regular school teachers can also be emphasized.

Chapter 6

Summary and Conclusions

The current study aimed to determine the level of awareness about various audiological conditions in students and their classroom management amongst regular school teachers in Kerala. A cross-sectional questionnaire-based survey design was used in the present study. It was conducted in three stages, including the development of the questionnaire, administration of the developed questionnaire, and the analysis of the response and its implications. The newly developed questionnaire consisted of 41 questions under five subsections: demographic details and background information, audiological condition amplification and ALDs, listening difficulties, classroom management strategies, experience, and attitude. Responses were obtained from 101 participants teaching in 40 schools across 11 districts of Kerala. Qualitative analysis of the obtained data was carried out, and the level of awareness amongst the participants was determined.

The results of the current study indicated that:

- A majority of the participants were aware of one or more potential causes of hearing loss, tests for evaluating hearing levels, and one or more amplification options available for students with hearing impairment.
- The participants were well aware of the negative impact of hearing loss on students' speech and language development and its influence on academic performance.

- The participants were not aware of the different types of hearing aids and ALDs.
- The existing ambiguity amongst the participants on the potential benefit and working of amplification devices was also reflected in the findings.
- The role of an Audiologist in evaluating the hearing levels and prescribing or dispensing hearing devices were not well known to the majority of the participants.
- Potential challenges faced by students with hearing impairment and one or more classroom modification strategies and teaching techniques were reported to be familiar to the majority of the participants.
- The current research results established a positive attitude amongst its participants regarding the accommodation and education of students with hearing impairment in regular schools.
- Based on the current study results, it can be inferred that a majority of the participants were well aware of their role in identifying hearing loss amongst students.
- The majority of the participants expressed that regular school teachers need to be trained or provided awareness related to hearing loss and classroom management strategies.
- All the participants expressed to be happy to teach students with hearing loss in the regular classroom and make necessary modifications.
- The test-retest reliability of the four domains of questionnaire ranged between moderate and good (ICC ranging from 0.58 to 0.81).

The findings of the current study thus provide a perspective into the major areas about which regular school teachers in Kerala are unaware of and require to be educated about. The current results also highlight the importance of conducting orientation or awareness programs and providing adequate training to regular school teachers, given their critical role.

6.1 Implications of the Study

- The present study's findings contributed to determining the current awareness level about audiological conditions and classroom management amongst school teachers of Kerala.
- The findings could help audiologists identify the areas that majorly require their focus to create necessary awareness amongst teachers.
- The questionnaire developed as a part of the study could be further translated to and validated in other Indian languages to determine the awareness level amongst school teachers in other states of the country.

6.2 Future Directions

- The questionnaire developed as a part of the study can be further translated to other Indian languages. And the study can be further extended to find out the awareness level amongst regular school teachers regarding various audiological conditions amongst students and their classroom management strategies in other states of the country.
- Any potential influence of various factors such as age, gender, teaching experience, teaching level, type of school, and so on the awareness level amongst regular school teachers can be explored.

- Public education material targeting school teachers can be developed based on the findings to create awareness regarding various audiological conditions and classroom management strategies.

6.3 Limitations of the Study

- The study's sample size could have been expanded considering the proportion of the surveyed population of regular school teachers of Kerala.

References

- Alasim, K. N. (2018). Participation and interaction of deaf and hard-of-hearing students in inclusion classroom. *International Journal of Special Education*, 33(2), 493–506.
- Alwis, K. A. C. (2005). Children with hearing impairment in the regular classroom. *Sri Lankan Journal of Educational Research*, 9(1), 45-69.
- Anderson, K. L., & Goldstein, H. (2004). Speech perception benefits of FM and infrared devices to children with hearing aids in a typical classroom. *Language, Speech, and Hearing Services in Schools*, 35(2), 169–184.
[https://doi.org/10.1044/0161-1461\(2004/017\)](https://doi.org/10.1044/0161-1461(2004/017))
- Angelides, P., & Aravi, C. (2007). The development of inclusive practices as a result of the process of integrating deaf/hard of hearing students. *European Journal of Special Needs Education*, 22(1), 63–74.
<https://doi.org/10.1080/08856250601082299>
- Antia, S. D., Jones, P. B., Reed, S., & Kreimeyer, K. H. (2009). Academic status and progress of deaf and hard-of-hearing students in general education classrooms. *Journal of Deaf Studies and Deaf Education*, 14(3), 293–311.
<https://doi.org/10.1093/deafed/enp009>
- Bell, D. (2013). *Investigating teaching and learning support for students with hearing impairment at a university in the Western Cape* [Doctoral dissertation, Stellenbosch University Stellenbosch].
- Berg, F. S. (1993). *Acoustics and sound systems in schools*. Singular Publishing Group.

- Booth, T., & Ainscow, M. (2003). *The index for Inclusion* (2nd ed.). Bristol: Centre for studies on Linguistic Education.
- Brackett, D. (1997). Intervention for children with hearing impairment in general education settings. *Language, Speech, and Hearing Services in Schools*, 28(4), 355–361. <https://doi.org/10.1044/0161-1461.2804.355>
- Chadha, A. (1999). The inclusive initiative in India. *Journal-International Association of Special Education*, 3(1), 31-34.
- Chakuchichi, D. D., Chimedza, R. M., Chiinze, M. M., & Kaputa, T. M. (2003). Including the excluded issues in disability and inclusion. *Harare, Zimbabwe Open University*
- Crandell, C. C., & Smaldino, J. J. (2000). Classroom Acoustics for Children With Normal Hearing and With Hearing Impairment. *Language, speech, and hearing services in schools*, 31(4), 362–370. <https://doi.org/10.1044/0161-1461.3104.362>
- Daud, K. M., Noor, R. M., Rahman, N. A., Sidek, D. S., & Mohamad, A. (2010). The effect of mild hearing loss on academic performance in primary school children. *International Journal of Pediatric Otorhinolaryngology*, 74(1), 67–70. <https://doi.org/10.1016/j.ijporl.2009.10.013>
- Dillon, H. (2001). *Hearing Aid Systems* (2nd ed.). *Hear Aids*. Singular Publishing Group.
- Dodd-murphy, J., & Mamlin, N. (2002). Minimizing Minimal Hearing Loss in the Schools: What Every Classroom Teacher Should Know. *Preventing School Failure: Alternative Education for Children and Youth*, 46(2), 86–92. <https://doi.org/10.1080/10459880209603352>
- Eriks-Brophy, A., & Whittingham, J. A. (2013). Teachers' perceptions of the

- inclusion of children with hearing loss in general education settings. *American Annals of the Deaf*, 158(1), 63–97. <https://doi.org/10.1353/aad.2013.0009>
- Finitzo-Hieber, T., & Tillman, T. W. (1978). Room acoustics effects on monosyllabic word discrimination ability for normal and hearing-impaired children. *Journal of Speech and Hearing Research*, 21(3), 440–458.
<https://doi.org/10.1044/jshr.2103.440>
- Garg, S., Chadha, S., Malhotra, S., & Agarwal, A. K. (2009). Deafness: burden, prevention and control in India. *The National medical journal of India*, 22(2), 79–81.
- Garg, S., Singh, R., & Khurana, D. (2015). Infant Hearing Screening in India: Current Status and Way Forward. *International journal of preventive medicine*, 113(6).
<https://doi.org/10.4103/2008-7802.170027>
- Gudyanga, E., Wadesango, N., Hove, E., & Gudyanga, A. (2014). Challenges faced by students with hearing impairment in bulawayo urban regular schools. *Mediterranean Journal of Social Sciences*, 5(9), 445–451.
<https://doi.org/10.5901/mjss.2014.v5n9p445>
- Hayes, D. N. (2014). *Survey on Knowledge and Attitudes of Hearing Loss and Assistive Listening Technology with Children* [Degree Project, [The Ohio State University Columbus].
- Hicks, C. B., & Tharpe, A. M. (2002). Listening Effort and Fatigue in School-Age Children With and Without Hearing Loss. *Journal of Speech, Language, and Hearing Research*, 45(3), 573–584. [https://doi.org/10.1044/1092-4388\(2002/046\)](https://doi.org/10.1044/1092-4388(2002/046))
- Howard, C. S., Munro, K. J., & Plack, C. J. (2010). Listening effort at signal-to-noise ratios that are typical of the school classroom. *International Journal of*

Audiology, 49(12), 928–932. <https://doi.org/10.3109/14992027.2010.520036>

IDEA. (2018, May 25). Sec. 300.8 Child with a disability.

<https://sites.ed.gov/idea/regs/b/a/300.8>

Jain, M., Mathur, A., Kumar, S., Dagli, R. J., Duraiswamy, P., & Kulkarni, S. (2008).

Dentition status and treatment needs among children with impaired hearing attending a special school for the deaf and mute in Udaipur, India. *Journal of Oral Science*, 50(2), 161–165. <https://doi.org/10.2334/josnugd.50.161>

Kapp, J. A. (1991). *Children with problems: an orthopedagogical perspective* (2nd ed.). Pretoria: Van Schaick.

Kiliyayil, R. K. (2008). *Attitude of teachers, heads of schools, hearing impaired children and normal children towards integrated education programme and challenges encountered by the groups regarding the implementation of the programme* [Doctoral thesis, University of CalicutKozhikode].

Klatte, M., Hellbrück, J., Seidel, J., & Leistner, P. (2010). Effects of classroom acoustics on performance and well-being in elementary school children: A field study. *Environment and Behavior*, 42(5), 659-692.

DOI:[10.1177/0013916509336813](https://doi.org/10.1177/0013916509336813)

Knecht, H. A., Nelson, P. B., Whitelaw, G. M., & Feth, L. L. (2002). Background noise levels and reverberation times in unoccupied classrooms: predictions and measurements. *American journal of audiology*, 11(2), 65–71.

[https://doi.org/10.1044/1059-0889\(2002/009\)](https://doi.org/10.1044/1059-0889(2002/009))

Koo, T. K., & Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *Journal of chiropractic medicine*, 15(2), 155–163. <https://doi.org/10.1016/j.jcm.2016.02.012>

- Larsen, J. B., & Blair, J. C. (2008). The effect of classroom amplification on the signal-to-noise ratio in classrooms while class is in session. *Language, speech, and hearing services in schools*, 39(4), 451–460. [https://doi.org/10.1044/0161-1461\(2008/07-0032\)](https://doi.org/10.1044/0161-1461(2008/07-0032))
- Ljung, R., Soërqvist, P., Kjellberg, A. & Green, A. M. (2011). Poor listening conditions impair memory for intelligible lectures: Implications for acoustic classroom standards. *Noise Notes*, 10(2), 39–46. <http://dx.doi.org/10.1260/1475-4738.10.2.39>
- Ministry of Human Recourse Development. (2011). Annual Report 2010-11.
<http://14.139.60.153/handle/123456789/107>
- Ministry of law and justice. (2018, September 24). The rights of persons with disabilities act, 2016. <https://legislative.gov.in/actsofparliamentfromtheyear/rights-persons-disabilities-act-2016>
- Nabelek, A. K. (1993). Communication in noisy and reverberant environments. *Acoustical factors affecting hearing aid performance*, 4, 15-28.
- Nabelek, A. K., & Donahue, A. (1986). Comparison of amplification systems in an auditorium. *Journal of the Acoustical Society of America*, 79(6), 2078–2082. <https://doi.org/10.1121/1.393167>
- Nelson, P. B., & Soli, S. (2000). Acoustical barriers to learning: Children at risk in every classroom. *Language, Speech, and Hearing Services in Schools*, 31(4), 356–361. <https://doi.org/10.1044/0161-1461.3104.356>
- Neuman, A. C., Wroblewski, M., Hajicek, J., & Rubinstein, A. (2012). Measuring speech recognition in children with cochlear implants in a virtual classroom. *Journal of speech, language, and hearing research : JSLHR*, 55(2),

532–540. [https://doi.org/10.1044/1092-4388\(2011/11-0058\)](https://doi.org/10.1044/1092-4388(2011/11-0058))

- Nodar, R. H. (1978). Teacher Identification of Elementary School Children with Hearing Loss. *Language, Speech, and Hearing Services in Schools*, 9(1), 24-28. <https://doi:10.1044/0161-1461.0901.24>
- Palmer, C. V. (1997). Hearing and listening in a typical classroom. *Language, Speech, and Hearing Services in Schools*, 28(3), 213–218. <https://doi.org/10.1044/0161-1461.2803.213>
- Prabha, J. K.L.,&Vijetha, P. (2015). *A Survey of Teachers Knowledge about Hearing Impairment and Referral Services* [Master’s dissertation, Mysore UniversityMysore].
- Purcell, P. L., Shinn, J. R., Davis, G. E., & Sie, K. C. Y. (2016). Children with unilateral hearing loss may have lower intelligence quotient scores: A meta-analysis. *Laryngoscope*, 126(3), 746–754. <https://doi.org/10.1002/lary.25524>
- Reinhart, P. N., Souza, P. E., Srinivasan, N. K., & Gallun, F. J. (2016). Effects of Reverberation and Compression on Consonant Identification in Individuals with Hearing Impairment. *Ear and hearing*, 37(2), 144–152. <https://doi.org/10.1097/AUD.0000000000000229>
- Richburg, M. C., & Goldberg, L. R. (2005). Teachers’ Perceptions About Minimal Hearing Loss: A Role for Educational Audiologists. *Communication Disorders Quarterly*, 27(1), 4–19. <https://doi.org/10.1177/15257401050270010301>
- RightToEducation.in. (2013). Know your RTE. <https://righttoeducation.in/know-your-rte/about>
- Sacks, A. (2001). *Special Education: Contemporary Education Issues*.Oxford:ABC-Clio,Inc.

- Sanders, D. A. (1965). Noise conditions in normal school classrooms. *Exceptional children*, 31(7), 344-353. <https://doi.org/10.1177/001440296503100703>
- Shield, B. M., & Dockrell, J. E. (2008). The effects of environmental and classroom noise on the academic attainments of primary school children. *The Journal of the Acoustical Society of America*, 123(1), 133-144.
<https://doi.org/10.1121/1.2812596>
- Shinn, J. R., Jayawardena, A., Patro, A., Zuniga, M. G., & Netterville, J. L. (2019). Teacher Prescreening for Hearing Loss in the Developing World. *Ear, Nose, and Throat Journal*, 100(3), 1-4.
<https://doi.org/10.1177/0145561319880388>
- Singh, V. (2015). Hearing in India: All aspects. *Otolaryngology Online Journal*, 5(1), 1–31. http://jorl.net/index.php/jorl/article/viewFile/342/pdf_132
- Smaldino, J. J., & Crandell, C. C. (2000). Classroom amplification technology: Theory and practice. *Language, Speech, and Hearing Services in Schools*, 31(4), 371–375. <https://doi.org/10.1044/0161-1461.3104.371>
- Stinson, M., & Antia, S. (1999). Considerations in educating deaf and hard-of-hearing students in inclusive settings. *Journal of deaf studies and deaf education*, 4(3), 163–175. <https://doi.org/10.1093/deafed/4.3.163>
- Stinson, M., & Liu, Y. (1999). Participation of deaf and hard-of-hearing students in classes with hearing students. *Journal of deaf studies and deaf education*, 4(3), 191-202. <https://doi.org/10.1093/deafed/4.3.191>
- Taha, A. A., Pratt, S. R., Farahat, T. M., Abdel-Rasoul, G. M., Albtanony, M. A., Elrashiedy, A. L. E., Alwakeel, H. R., & Zein, A. (2010). Prevalence and risk factors of hearing impairment among primary-school children in Shebin El-Kom District, Egypt. *American Journal of Audiology*, 19(1), 46–60.

[https://doi.org/10.1044/1059-0889\(2010/09-0030\)](https://doi.org/10.1044/1059-0889(2010/09-0030))

- Toe, D. (2008). Managing the listening environment: classroom acoustics and assistive listening devices. *Paediatric Audiological Medicine*, 372.
- Tucci, D. L., Merson, M. H., & Wilson, B. S. (2010). A summary of the literature on global hearing impairment: Current status and priorities for action. *Otology and Neurotology*, 31(1), 31–41.
- <https://doi.org/10.1097/MAO.0b013e3181c0eaeac>
- Varshney, S. (2016). Deafness in India. *Indian Journal of Otology*, 22(2), 73-76.
- <https://doi:10.4103/0971-7749.182281>
- Verma, H., B, Janki., & Ravichandran, A. (2017). Awareness, Attitude and Knowledge about Hearing Impairment among Regular School Teacher: Survey across Hyderabad. *Amity International Journal of Teacher Education*, 3(1).
- Ward, K. W., Marx, C. G., Goshorn, E., Turner, C. G., & Bell, K. (2015). *A Survey of K-12 Educators Regarding Awareness of Hearing Loss , Devices and Resources . 1(1), 9–11.*
- WHO. (2020, March 1). Deafness and hearing loss. <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- Zanin, J., & Rance, G. (2016). Functional hearing in the classroom: assistive listening devices for students with hearing impairment in a mainstream school setting. *International Journal of Audiology*, 55(12), 723–729.
- <https://doi.org/10.1080/14992027.2016.1225991>

Appendix I

TEACHER'S AWARENESS SURVEY ON AUDIOLOGICAL CONDITIONS AMONGST STUDENTS & CLASSROOM MANAGEMENT STRATEGIES

Respected Sir/ Madam,

This questionnaire has been developed as a part of a study titled "A Survey on Awareness of Various Audiological Conditions in Students and their Classroom Management amongst Teachers in Kerala" by myself Anju Sara Eby, a postgraduate student for the partial fulfillment of the requirements for degree in MSc. Audiology. The survey aims to investigate and document the level of awareness among regular school teachers regarding various audiological conditions amongst students and their classroom management strategies. The questionnaire consists of 41 questions and will take around 15 minutes to complete answering them. Kindly answer all the questions. Your participation in the research is voluntary. All the data that you provide will be utilized for research purpose only and will be kept confidential and anonymous.

Thank you

I agree that my participation in this survey is voluntary and I am aware that my participation do not fetch me any direct benefit.

- i) Yes
- ii) No

I. DEMOGRAPHIC DETAILS & BACKGROUND INFORMATION

(You can answer in either English or Malayalam as per your convenience
You can select more than one option if required)

1. Name:
2. Age
3. Gender:
4. Name of School:
5. District of School :
6. Highest Degree:
7. Type of school:
 - a. Government
 - b. Private
 - c. Aided
 - d. Unaided
8. Level teaching/taught:
 - a. Pre-primary
 - b. Lower Primary
 - c. Upper Primary
 - d. High school
 - e. Higher Secondary
9. Subjects taught:
10. Total teaching experience:
11. Any special training/Orientation program attended on children with hearing loss:
 - a. Yes
 - b. No
12. If yes, specify the details of the special training/ orientation program attended

13. Contact details- Phone Number: Mail ID :

II. AUDIOLOGICAL CONDITIONS

(You can select more than one option if required)

1. Which among the following conditions that causes hearing loss are you aware of?
 - a. Ear infection/ discharge (Otitis media),
 - b. Age related hearing loss (Presbycusis)
 - c. Noise Induced Hearing Loss(NIHL),
 - d. Hearing loss due to a medicine (Ototoxicity)
 - e. Central Auditory Processing disorder (CAPD)
 - f. Not aware of any
2. Are you aware of hearing testing for identifying hearing loss?
 - a. Yes
 - b. No
3. Who amongst the following professionals check your hearing level and prescribe/ dispense hearing devices?
 - a. General Physician
 - b. ENT Doctor
 - c. Audiologist
 - d. Not aware of it
4. Can hearing loss affect the speech and language development of an individual?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware
5. Do you think that even the slightest hearing loss can affect a student's academic performance?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware
6. Which among the following do you expect to see in a student with unidentified hearing loss?
 - a. Inattentiveness
 - b. Frequent need for repetition
 - c. Impaired emotional and social skill
 - d. Improper response to questions
 - e. Not aware of any

III. AMPLIFICATION & ASSISTIVE LISTENING DEVICES

(You can select more than one option if required)

1. Which among the following hearing devices that benefit people with hearing loss are you aware of?
 - a. Hearing Aid,
 - b. Cochlear Implant (CI)
 - c. Bone Conduction Hearing Aids
 - d. Middle Ear Implant
 - e. Auditory Brainstem Implant(ABI)
 - f. Not aware of any

2. Which among the following types of hearing aids that are used by people with hearing loss are you aware of?
 - a. Body level hearing aid
 - b. Behind the Ear(BTE)
 - c. Receiver in the Canal (RIC)
 - d. Completely in the Canal (CIC)
 - e. Not aware of any

3. Do you think that students using hearing devices start hearing and speaking immediately after fitting them?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

4. Do you think that ENT doctors evaluate hearing levels & prescribe/ dispense hearing devices such as hearing aids?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

5. Which among the following assistive listening devices that are used by students with hearing loss to enhance listening are you aware of?
 - a. Personal FM system,
 - b. Induction loop
 - c. Sound field amplification devices
 - d. Infrared system
 - e. Not aware of any

IV. LISTENING DIFFICULTIES & CLASSROOM MANAGEMENT STRATEGIES

(You can select more than one option if required)

1. Are you aware if students with hearing loss face difficulties in following classroom instructions, group discussions or while noting oral lectures?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

2. Do you feel that students fitted with hearing aids can listen well with regular classroom noise level?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

3. Do you think that hearing loss affects the communication abilities and hence the academic performance of students?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

4. Which among the following classroom modifications for students with hearing loss are you aware of?
 - a. The use of sound absorbing materials/ curtains
 - b. Providing adequate lighting
 - c. Appropriate seating arrangement to improve the auditory & visual access
 - d. Reducing the level of noise and echo in the classroom
 - e. Not aware of any

5. Which among the following teaching strategies for students with hearing loss are you aware of?
 - a. Repeat,
 - b. Rephrase,
 - c. Elaborate,
 - d. Simplify
 - e. Not aware of any

V. EXPERINECE & ATTITUDE

(You can answer in either English or Malayalam as per your convenience)

1. Can students with hearing loss be taught in regular school if fitted with hearing devices?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

2. Do you think that students with hearing impairment using hearing aid should be enrolled only in special schools instead of regular schools?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

3. Do you think that a normal hearing child will accept to have a peer who has hearing loss?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

4. Do you think that classroom teachers have a major role in identifying hearing loss amongst students?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

5. Have you ever suspected hearing loss in students with poor academic and classroom performance?
 - a. Yes
 - b. No

6. Do you feel that regular school teachers' needs to be trained or given awareness related to hearing loss and classroom management of students with hearing loss?
 - a. Yes
 - b. No
 - c. Maybe
 - d. Not aware

7. Have you ever taught any student with hearing loss in school?
 - a. Yes
 - b. No

8. If yes, specify the duration of teaching & the total number of students with hearing loss taught by you

9. Have you experienced any difficulties while teaching students with hearing loss?
 - a. Yes
 - b. No

10. If yes, specify the difficulties faced while teaching students with hearing loss

11. Are you happy to teach students with hearing loss in your regular classroom and make necessary modifications if needed?
 - a. Yes
 - b. No

12. Mention if you have ever made any such modifications for the benefit of students with hearing loss.

Appendix II

വിദ്യാർത്ഥികൾക്കിടയിലെ കേൾവി സംബന്ധമായ ബുദ്ധിമുട്ടുകളെയും ക്ലാസ്സ് മുറിയിലെ മാനേജ്മെന്റ് രീതികളെയും കുറിച്ച് അധ്യാപകരിൽ നടത്തുന്ന സർവ്വേ

ബഹുമാനപ്പെട്ട സർ / മാഡം,

ഈ ചോദ്യാവലി "കേരളത്തിലെ അധ്യാപകർക്കിടയിൽ വിദ്യാർത്ഥികളിലെ വിവിധ ഓഡിയോളജിക്കൽ അവസ്ഥകളെക്കുറിച്ചും അവരുടെ ക്ലാസ് റൂം മാനേജ്മെന്റിനെക്കുറിച്ചും ഒരു സർവ്വേ" എന്ന ഒരു പഠനത്തിന്റെ ഭാഗമായി വികസിപ്പിച്ചെടുത്തതാണ്. എം.എ.സ്സി ഓഡിയോളജി ബിരുദ പൂർത്തീകരിക്കുന്നതിന്റെ ഭാഗികമായി ബിരുദാനന്തര ബിരുദ വിദ്യാർത്ഥിനിയായ അഞ്ചു സാരാ എബിയാണ് ഈ പഠനം നടത്തുന്നത്. വിദ്യാർത്ഥികൾക്കിടയിലെ വിവിധ ഓഡിയോളജിക്കൽ അവസ്ഥകളെക്കുറിച്ചും അവരുടെ ക്ലാസ് റൂം മാനേജ്മെന്റ് രീതികളെക്കുറിച്ചും സാധാരണ സ്കൂൾ അധ്യാപകരിലെ അവബോധം കണ്ടെത്തി രേഖപ്പെടുത്തുകയാണ് ഈ സർവ്വേ ലക്ഷ്യമിടുന്നത്. ചോദ്യാവലിയിൽ 41 ചോദ്യങ്ങളാണുള്ളത്, അവയ്ക്ക് ഉത്തരം നൽകാൻ 15 മിനിറ്റിൽ താഴെ സമയം എടുക്കുകയുള്ളൂ. എല്ലാ ചോദ്യങ്ങൾക്കും ദയവായി ഉത്തരം നൽകുക. ഗവേഷണത്തിലെ നിങ്ങളുടെ പങ്കാളിത്തം സ്വമേധയാ ഉള്ളതാണ്. നിങ്ങൾ നൽകുന്ന എല്ലാ ഡാറ്റയും ഗവേഷണ ആവശ്യങ്ങൾക്കായി മാത്രം ഉപയോഗിക്കുകയും, രഹസ്യാത്മകവും അജ്ഞാതവുമായി സൂക്ഷിക്കുകയും ചെയ്യുന്നതാണ്.

നന്ദി

ഈ സർവ്വേയിലെ എന്റെ പങ്കാളിത്തം സ്വമേധയാ ഉള്ളതാണെന്ന് ഞാൻ സമ്മതിക്കുന്നു, എന്റെ പങ്കാളിത്തം എനിക്ക് നേരിട്ടുള്ള പ്രതിഫലമൊന്നും നൽകുന്നില്ലെന്ന് എനിക്കറിയാം.

- i) അതെ
- ii) ഇല്ല

I. പങ്കെടുക്കുന്ന ആളുടെ വിവരങ്ങൾ

(ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഉത്തരം ഇംഗ്ലീഷിലോ മലയാളത്തിലോ നൽകാം;

ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഒന്നിലധികം ഓപ്ഷനുകൾ തിരഞ്ഞെടുക്കാം)

1. പേര്:
2. വയസ്സ്:
3. സ്ത്രീ / പുരുഷൻ
4. വിദ്യാലയത്തിന്റെ പേര്:
5. വിദ്യാലയത്തിന്റെ ജില്ല:
6. ഉയർന്ന ബിരുദം:
7. ജോലി ചെയ്യുന്ന വിദ്യാലയത്തിന്റെ തരം:
 - a. സർക്കാർ
 - b. സ്വകാര്യം
 - c. എയ്ഡഡ്
 - d. അൺ-എയ്ഡഡ്
8. പഠിപ്പിക്കുന്ന വിഭാഗം:
 - a. പ്രീ പ്രൈമറി
 - b. ലോവർ പ്രൈമറി
 - c. അപ്പർ പ്രൈമറി
 - d. ഹൈ സ്കൂൾ
 - e. ഹൈർ സെക്കൻഡറി
9. പഠിപ്പിക്കുന്ന വിഷയം:
10. പ്രവർത്തി പരിചയം: വർഷം
11. കേൾവിക്കുറവിനെ സംബന്ധിച്ച ഏതെങ്കിലും ബോധവത്കരണ ക്ലാസ്സിൽ പങ്കെടുത്തിട്ടുണ്ടോ:
 - a. ഉണ്ട്
 - b. ഇല്ല
12. ബോധവത്കരണ ക്ലാസ്സിൽ പങ്കെടുത്തിട്ടുണ്ടെങ്കിൽ ഏതെന്ന് വ്യക്തമാക്കുക:
13. ബന്ധപ്പെടേണ്ട ഫോൺ നമ്പർ: മെയിൽ ഐ ഡി:

II. കേൾവിയുമായി ബന്ധപ്പെട്ട അറിവ്

(ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഒന്നിലധികം ഓപ്ഷനുകൾ തിരഞ്ഞെടുക്കാം)

1. താഴെ പറയുന്ന കേൾവിക്കുറവിനു കാരണമാകാവുന്ന ഏതെല്ലാം അവസ്ഥകളെ പറ്റി താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ചെവിയിലെ അണുബാധ/ ഡിസ് ചാർജ്ജ് (ഒട്ടിറ്റിസ് മീഡിയാ)
 - b. വാർധക്യ സംബന്ധമായ കേൾവിക്കുറവ് (പ്രെസ്ബൈക്യൂസിസ്)
 - c. ശബ്ദമൂലമുള്ള ശ്രവണ നഷ്ടം (നോയ്സ് ഇൻഡ്യൂസ്ഡ് ഹിയറിംഗ് ലോസ്)
 - d. മരുന്ന് മൂലമുള്ള ശബ്ദ നഷ്ടം (ഓട്ടോടോക്സിസിറ്റി)
 - e. തലച്ചോറുമായി ബന്ധപ്പെട്ട ശബ്ദ വിശകലനത്തിലെ ബുദ്ധിമുട്ട് (സെൻട്രൽ ഓഡിറ്റോറി പ്രോസസ്സിംഗ് ഡിസോർഡർ)
 - f. അറിയില്ല

2. കേൾവിക്കുറവ് കണ്ടു പിടിക്കാനുള്ള ശ്രവണ പരിശോധനയെ പറ്റി താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ഉണ്ട്
 - b. ഇല്ല

3. താഴെ പറയുന്നവരിൽ ആരാണ് നിങ്ങളുടെ/ വിദ്യാർത്ഥികളുടെ കേൾവി ശക്തി പരിശോധിക്കുകയും, ശ്രവണ സഹായി (ഹിയറിംഗ് എയ്ഡ്) നൽകുകയും ചെയ്യുന്നത്?
 - a. ജനറൽ ഫിസീഷ്യൻ
 - b. ഇ. എൻ. ടി ഡോക്ടർ
 - c. ഓഡിയോളജിസ്റ്റ്
 - d. അറിയില്ല

4. കേൾവിക്കുറവ് വിദ്യാർത്ഥികളിലെ ഭാഷാവളർച്ചയെയും സംസാരത്തെയും ബാധിക്കുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

5. ചെറിയ കേൾവിക്കുറവ് വിദ്യാർത്ഥികളിലെ അക്കാഡമിക് പ്രകടനത്തെ ബാധിക്കുമോ
 - a. അതെ

- b. ഇല്ല
- c. ചിലപ്പോൾ
- d. അറിയില്ല

6. കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികളിൽ താഴെ കൊടുത്തിരിക്കുന്ന ഏതെല്ലാം ലക്ഷണങ്ങൾ ആണ് കാണാൻ കഴിയുക?
- a. ശ്രദ്ധക്കുറവ്
 - b. നിരന്തരമായ ആവർത്തനങ്ങളുടെ ആവശ്യം
 - c. സാമൂഹികവും വൈകാരികവുമായ പെരുമാറ്റത്തിലെ വൈരുദ്ധ്യം
 - d. ചോദ്യങ്ങൾക്ക് അനുയോജ്യമല്ലാത്ത ഉത്തരം നൽകൽ
 - e. അറിയില്ല

III. ശ്രവണ സഹായയന്ത്രങ്ങൾ സംബന്ധിച്ചത്

(ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഒന്നിലധികം ഓപ്ഷനുകൾ തിരഞ്ഞെടുക്കാം)

1. കേൾവിക്കുറവുള്ളവർ കേൾക്കാനായി ഉപയോഗിക്കുന്ന താഴെ പറയുന്നതിൽ ഏതെല്ലാം ശ്രവണ ഉപകരണങ്ങൾ താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ഹിയറിങ് എയ്ഡ് (ശ്രവണ സഹായി)
 - b. കോക്ളിയർ ഇംപ്ലാന്റ് (സി. ഐ)
 - c. ബോൺ കണ്ടക്ഷൻ ഹിയറിങ് എയ്ഡ്
 - d. മിഡിൽ ഇയർ ഇംപ്ലാന്റ്
 - e. ഓഡിറ്ററി ബ്രെയിൻ സ്റ്റേജ് ഇംപ്ലാന്റ് (എ. ബി. ഐ)
 - f. അറിയില്ല

2. കേൾവിക്കുറവുള്ളവർ കേൾക്കാനായി ഉപയോഗിക്കുന്ന താഴെ പറയുന്നതിൽ ഏതെല്ലാം തരം ഹിയറിങ് എയ്ഡുകളെ പറ്റി താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ബോഡി ലെവൽ ഹിയറിങ് എയ്ഡ്
 - b. ബിഹൈൻറ്റ് ദി ഇയർ ഹിയറിങ് (ബി. ടി. ഇ)
 - c. റിസീവർ ഇൻ ദി ഇയർ ഹിയറിങ് എയ്ഡ് (ആർ.ഐ.സി)
 - d. കമ്പ്ലീറ്റ്ലി ഇൻ ദി കനാൽ ഹിയറിങ് എയ്ഡ് (സി. ഐ. സി)
 - e. അറിയില്ല

3. ഹിയറിങ് എയ്ഡ്/ ശ്രവണ സഹായി ധരിച്ച ഉടനേതന്നെ കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികൾക്ക് കേൾക്കാനും സംസാരിക്കാനും സാധിക്കുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ആയിരിക്കാം

- d. അറിയില്ല
4. ശ്രവണ സഹായി/ ഹിയറിങ് എയ്ഡ് പ്രിസ്ക്രയിബ്/ ഡിസ്പെൻസ് ചെയ്യുന്നത് ഇ. എൻ. ടി ഡോക്ടർ ആണോ?
 - a. അതെ
 - b. അല്ല
 - c. ആയിരിക്കാം
 - d. അറിയില്ല
 5. കേൾവി ശക്തി കുറഞ്ഞവർ അത് മെച്ചപ്പെടുത്താനായി ഉപയോഗിക്കുന്ന താഴെ പറയുന്ന ഉപകരണങ്ങളിൽ (അസിസ്റ്റീവ് ലിസ്റ്റണിങ് ഡിവൈസസ്) ഏതെല്ലാം താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. പേർസണൽ എഫ്. എം. സിസ്റ്റം
 - b. ഇൻറക്ഷൻ ലൂപ്പ്
 - c. സൗണ്ട് ഫീൽഡ് ആംപ്ലിഫിക്കേഷൻ ഡിവൈസസ്
 - d. ഇൻഫ്രാറെഡ് സിസ്റ്റം
 - e. അറിയില്ല

IV ക്ലാസ് മുറിയിൽ കേൾക്കാനുള്ള ബുദ്ധിമുട്ടുകളും, മാനേജ്മെന്റ് രീതികളും

(ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഒന്നിലധികം ഓപ്ഷനുകൾ തിരഞ്ഞെടുക്കാം)

1. കേൾവി കുറവുള്ള വിദ്യാർത്ഥികൾക്ക് ക്ലാസ് മുറിയിലെ നിർദ്ദേശങ്ങൾ പാലിക്കുവാനും, ഗ്രൂപ്പ് ചർച്ചകളിൽ പങ്കെടുക്കുവാനും, വാക്കാലുള്ള പ്രഭാഷണങ്ങൾ എഴുതിയെടുക്കുവാനും ബുദ്ധിമുട്ട് അനുഭവപ്പെടുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല
2. ക്ലാസ് മുറിയിലെ അനാവശ്യമായ പശ്ചാത്തല ശബ്ദത്തിൽ കേൾവി കുറവുള്ള, ഹിയറിങ് എയ്ഡ് ധരിക്കുന്ന വിദ്യാർത്ഥികൾക്ക് നന്നായി കേൾക്കാൻ സാധിക്കുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

3. വിദ്യാർത്ഥികളിലെ ആശയ വിനിമയ കഴിവിനെ കേൾവിക്കുറവ് ബാധിക്കുകയും അതിലൂടെ അക്കാഡമിക് പ്രകടനത്തെ മോശമായി ബാധിക്കുകയും ചെയ്യുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

4. കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികൾക്കുള്ള ക്ലാസ് മുറിയിലെ ഏതെല്ലാം മാറ്റങ്ങൾ/ മെച്ചപ്പെടുത്തലുകൾ കുറിച്ച് താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ശബ്ദം ആഗിരണം ചെയ്യുന്ന വസ്തുക്കൾ ഉപയോഗിക്കുക- കർട്ടനുകളുടെ ഉപയോഗം
 - b. മതിയായ പ്രകാശം നൽകുക
 - c. മതിയായ ഇരിപ്പിട ക്രമീകരണങ്ങൾ വരുത്തുക- കൃത്യമായി ഓഡിറ്ററി & വിഷ്വൽ ലഭ്യത ഉറപ്പാക്കാൻ
 - d. ക്ലാസ് മുറിയിലെ അനാവശ്യ ശബ്ദങ്ങളും പ്രതിധ്വനിയും കുറയ്ക്കുക
 - e. അറിയില്ല

5. കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികൾക്കുള്ള താഴെ പറയുന്ന ഏതെല്ലാം അധ്യാപന രീതികളെ പറ്റി താങ്കൾ കേട്ടിട്ടുണ്ട്?
 - a. ആവർത്തനം
 - b. വ്യക്തതക്ക് വേണ്ടി മറ്റു വാക്കുകളിൽ അവതരിപ്പിക്കുക
 - c. വിശദമായി പറയുക
 - d. ലളിതമാക്കുക
 - e. അറിയില്ല

v അനുഭവവും മനോഭാവവും

(ആവശ്യമുള്ളിടത്ത് നിങ്ങൾക്ക് ഉത്തരം ഇംഗ്ലീഷിലോ മലയാളത്തിലോ നൽകാം)

1. ശ്രവണ സഹായി ഉപയോഗിക്കുന്ന കേൾവിക്കുറവുള്ള ഒരു വിദ്യാർത്ഥിയെ സാധാരണ വിദ്യാലയങ്ങളിൽ പഠിപ്പിക്കാൻ സാധിക്കുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

2. കേൾവികുറവുള്ള വിദ്യാർത്ഥികളെ സാധാരണ വിദ്യാലയങ്ങൾക്ക് പകരം ഭിന്നശേഷിക്കാർ പഠിക്കുന്ന വിദ്യാലയങ്ങളിൽ ചേർക്കുന്നതാണോ അനുയോജ്യം?
 - a. അതെ
 - b. അല്ല
 - c. ആയിരിക്കാം
 - d. അറിയില്ല

3. കേൾവികുറവുള്ള വിദ്യാർത്ഥികളെ അവരുടെ സമപ്രായമുള്ള കുട്ടികൾ സ്വീകരിക്കുമോ?
 - a. അതെ
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

4. വിദ്യാർത്ഥികളിലെ കേൾവികുറവ് കണ്ടെത്തുന്നതിൽ അധ്യാപകർക്ക് ഒരു പ്രധാന പങ്ക് ഉണ്ടെന്ന് താങ്കൾക്ക് തോന്നുന്നുണ്ടോ?
 - a. ഉണ്ട്
 - b. ഇല്ല
 - c. ചിലപ്പോൾ
 - d. അറിയില്ല

5. ഏതെങ്കിലും വിദ്യാർത്ഥികളെ മോശമായ അക്കാഡമിക്സും ക്ലാസ്റൂം പ്രകടനവും കണ്ട് താങ്കൾ കേൾവികുറവ് സംശയിച്ചിട്ടുണ്ടോ?
 - a. ഉണ്ട്
 - b. ഇല്ല

6. വിദ്യാർത്ഥികൾക്കിടയിലെ കേൾവികുറവിനേയും അതിന്റെ ക്ലാസ്സും മാനേജ്മെന്റ് രീതിയെയും പറ്റിയുള്ള പരിശീലനമോ ബോധവൽക്കരണ ക്ലാസ്സോ സാധാരണ സ്കൂൾ അധ്യാപകർക്ക് നൽകേണ്ടതാണോ?
 - a. അതെ
 - b. അല്ല
 - c. ആയിരിക്കാം
 - d. അറിയില്ല

7. താങ്കൾ എപ്പോഴെങ്കിലും കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികളെ പഠിപ്പിച്ചിട്ടുണ്ടോ?
 - a. ഉണ്ട്
 - b. ഇല്ല

8. ഉണ്ടെങ്കിൽ, അധ്യാപനത്തിന്റെ കാലാവധിയും, നിങ്ങൾ പഠിപ്പിച്ച കേൾവിക്കുറവുള്ള മൊത്തം വിദ്യാർത്ഥികളുടെ എണ്ണവും വ്യക്തമാക്കുക

9. കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികളെ പഠിപ്പിക്കുന്നതിൽ താങ്കൾക്ക് എന്തെങ്കിലും ബുദ്ധിമുട്ട് നേരിട്ടിട്ടുണ്ടോ?
 - a. ഉണ്ട്
 - b. ഇല്ല

10. ഉണ്ടെങ്കിൽ, കേൾവിക്കുറവുള്ള വിദ്യാർത്ഥികളെ പഠിപ്പിച്ചപ്പോൾ നേരിട്ട ബുദ്ധിമുട്ടുകൾ വ്യക്തമാക്കുക

11. കേൾവിക്കുറവുള്ള ഒരു വിദ്യാർത്ഥിയെ സാധാരണ ക്ലാസ്സുമുറിയിൽ പഠിപ്പിക്കാനും അവർക്ക് അനുയോജ്യമായ മാറ്റങ്ങൾ/ മെച്ചപ്പെടുത്തലുകൾ വരുത്താനും താങ്കൾ തയ്യാറാണോ?
 - a. അതെ
 - b. അല്ല

12. മുൻപ് ഇത്തരത്തിൽ എന്തെങ്കിലും മാറ്റങ്ങൾ/ മെച്ചപ്പെടുത്തലുകൾ വരുത്തിയിട്ടുണ്ടെങ്കിൽ വിവരിക്കുക