

Training Teachers and Parents on Verbal Communication among Children with Hearing Impairment: Preliminary Results from Schools in Kenya

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Abstract

Purpose: We sought to assess the outcome of training parents and teachers on verbal communication with children that have hearing impairment in selected schools in Kenya.

Methods: Four schools with 100 students; aged 5- 18 years were selected for the pilot. Teachers and parents were trained on the use of verbal communication with children with hearing impairment. We utilized a pre-post design and used validated questionnaires for data collection.

Results: The proportion of parents that responded that their children could respond to environmental sounds significantly increased from 15.6% (95% CI 6.7, 24.5), to 87.5% (95% CI 79.4, 95.6) ($p < 0.05$). A significant increase in the proportion of those that responded their children could vocalize was observed: 17.2% (CI 7.9, 26.4), to 87.5% (CI 79.4, 95.6) ($P < 0.05$). Furthermore, 90.6% (95% CI 83.5, 97.8) ($P < 0.05$) of parents perceived their children could talk more post-intervention. Approximately 50% of the teachers also observed much increase in the vocalization of the students.

Conclusions: Result suggests a perception of increased environmental sounds awareness, vocalization and increased/improved speech due to the intervention. However, this result cannot demonstrate the long-term impact of the intervention on the quality of lives of the participants.

Keywords: Hearing impairment; Verbal communication; Training; Children

Introduction

Improvement of social development and integration of every child, including those with disabilities, is recognized as a key human right by United Nation Convention on the Right of People with Disabilities [1]. According to UNCRPD (2008: Article, 24), inclusive education is key for children with disabilities to develop holistically. Inclusion implies that learners with different special needs are accommodated in regular schools [2].

Most children with hearing impairment (HI, henceforth) have potential to acquire and better their levels of spoken language [3]. In developed countries such as the United States of America (USA), there are well-documented gains on the use of auditory-based intervention which would increase verbal communication [4,5]. This has not been well documented in developing countries. Auditory-oral approach, where verbal communication plays a key role, has been promoted in education in the USA [6]. Moog asserts that when the teachers, parents, and children with HI are involved, it is a very successful method. Therefore, it is clear that integrating spoken language in

teaching children with HI to complement other teaching approaches is important. Furthermore, a Joint Committee of the American Speech-Language-Hearing Association and the Council on Education of the Deaf provides useful practical guidelines of what should be considered by speech and language pathologists and teachers in integrating spoken language for the deaf [23].

In Zimbabwe, just like in many developing countries, children who are deaf do not develop competence in any language by the time they start school [7]. It is almost the same case in South Africa where schools for the deaf have not addressed the barriers to learning [8]. According to the South African Department of Education [9], non-recognition and non-involvement of parents is a major barrier to learning and development of the deaf. According to the Kenyan Ministry of Education report, parents are not provided with clear information especially what it means to deprive a child of an accessible language. However, some schools have multi-disciplinary teams (audiologist, speech therapist and educators) that work together with teachers [10] where learners with HI are in inclusive settings, they are able to interact and cope with hearing environment. This study notes that educators should help learners with HI to establish communication in their environment and expand their knowledge on teaching of verbal communication

The Kenya National Survey for Persons with Disability 2008 revealed that; only about 39% of persons with disabilities are mainstreamed in regular schools. This is because inclusive education poses a big challenge especially for the deaf learners in Kenya. Only a few hearing impaired are mainstreamed in regular schools [11]. According to Odoyo, one of the main barriers to inclusion in regular schools and integration in community is lack of or limited verbal communication in children with hearing impairment [11].

According to Namukoa, bilingual modes are used in Kenya. However, as noted in Namukoa's study, this approach in Kenyan education curriculum still pose a challenge due to limited evidence based research [12]. Two of the main stakeholders are teachers and parents of children with HI. However, teachers of learners with HI in Kenya are not properly trained in teaching verbal communication [13].

Around 96% of children with HI are born to parents with normal hearing [14]. These parents need a lot of information on hearing impairment [15]. This should include training them on communication with their children. Also, teacher-parent collaboration should be key in increase of verbal communication of children with HI. If the parents understand verbal communication strategies taught in school, they can complement by doing more practice at home. Therefore, this paper sought to:

Assess the outcome of parents and teachers training on increase and improvement of verbal communication of children with hearing impairment in selected schools in Kenya.

Method

Four schools, Kerugoya School for the Deaf, Machakos School for the Deaf, Humble Hearts, and Martin Luther were identified and selected to participate in a pilot project. The inclusion criteria were willingness to incorporate speech into their classrooms and incorporate the use of hearing aids. New students in these schools were fit with hearing aids. Trainings were then held for both the teachers and parents of the selected schools respectively.

Participants

Students were chosen from four different schools in Kenya, one each from central and lower Eastern, and 2 from Nairobi. Two schools were schools for the deaf (Machakos and Kerugoya) and two other schools were normal hearing schools with a hearing impaired unit in one classroom. Within the schools for the deaf, there were two classes identified to be part of the pilot, the nursery and infant class. From all four schools, 100 students participated in the pilot. Of these 100 students 49 were male and 51 were female. Ages of the students ranged from 5 years of age to 18 years of age.

Participants had varying degrees of hearing loss from mild to profound. The vast majority of children in the 4 schools have severe-to-profound hearing loss. Audiometric data was collected and the average values are reported in Figure 1. The error bars represent plus or minus one standard deviation from the mean. Data for 46 children are represented in the graph. Only children who were able to respond at all frequencies for each threshold measurement were included in this data set. Aided thresholds (sometimes referred to as functional gain) were obtained using a loudspeaker connected to the audiometer and the calibration point was 1 meter in front of the loudspeaker. The severe-to-profound average thresholds and the moderately-severe aided thresholds show that the children are benefiting from their hearing

aids but will still need loud speech to be able to gain access to speech signals. Because all the children fit in this study are new to amplification (all were fit with hearing aids within the past 6 months), it is expected that the children will adjust to their current hearing aids and tolerate more amplification within the next year.

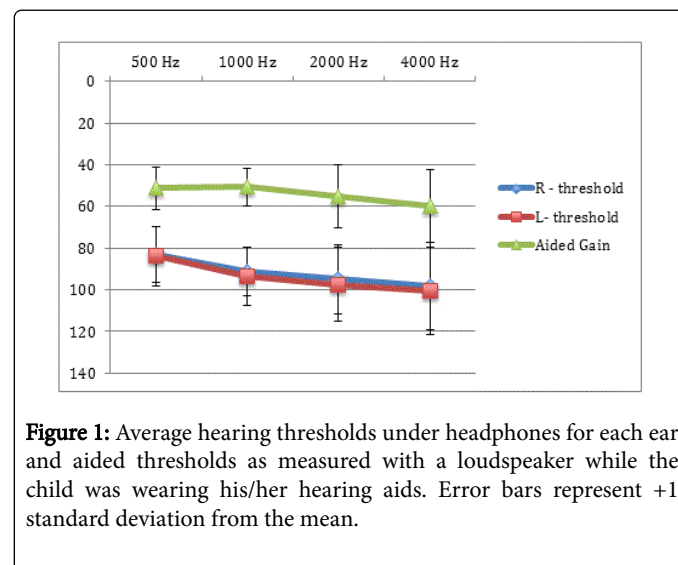


Figure 1: Average hearing thresholds under headphones for each ear and aided thresholds as measured with a loudspeaker while the child was wearing his/her hearing aids. Error bars represent +1 standard deviation from the mean.

Participants also had various causes of their hearing loss. Many students had congenital hearing loss, while others had hearing loss due to illnesses or ototoxic medication. A large number of the students included in this pilot had only recently (within the last month) been fit with hearing aids. Thus "hearing age" for many children was less than one month. Of those who had been fit with hearing aids previously, few were wearing them consistently before starting the pilot.

Teacher training

We provided a three-day training with a wealth of information presented promoting hearing and speech in the classroom. A Doctor of Education specialized in speech and languages alongside an audiologist provided the training for the teachers of the children with HI.

Teachers were taught to implement spoken language alongside Kenyan Sign Language (KSL) into their everyday lessons. It is important to note that the training was not meant to provide a new curriculum or to discontinue the use of KSL, but to give teachers knowledge on how to incorporate new methods that promote listening and verbal communication in conjunction with KSL. With this, the children are also required to use their voices to reply to questions, alongside the use of KSL.

Teachers were trained on specific activities they could use in their classrooms to promote listening. An example of an activity that was taught is, while teaching math, saying a number without using sign language and asking the children to write the number on the blackboard. Teachers were given a few basic materials to help facilitate teaching in their classrooms. Materials were selected based off of a previously determined structure for teaching certain sounds of speech. An example of the material given can be seen in Appendix 1.

A follow-up training was provided by the local speech language pathologists at the end of the term to give teachers more in-depth training based on observations made during weekly school visits

discussed below. This training included in-depth information on teaching the children to listen, along with activities to incorporate speech and listening as a whole instead of as separate activities, i.e. verbally telling the child a word and asking them to pick out a word amongst a set of words laid out on a table. Once the child picked out the word they were then required to say the word individually, followed by the entire class verbalizing the word.

School visits

School visits were made to each school once per week to assist the teachers in implementing the techniques that were taught during the trainings. School visits commenced a month after the initial training due to a nationwide strike of teachers. Weekly visits included a local SLP, audiologist, and two local Hearing Care Coordinators. During the visits, the SLPs and the staff worked with the teachers to give them ideas regarding what they could change in their teaching to implement the content that was taught during the training. The audiologist, Hearing Care Coordinators, and teachers made sure the hearing aids were working each week.

Parent training

The SLP, audiologist, and Hearing Care Coordinators conducted three parent-training sessions and the content used in the trainings was the same as the teacher training. Some training took place in the school while others took place in a central location.

Parent trainings were conducted to teach parents more about hearing loss, hearing aids, and how to use more effective verbal communication at home. Parents were given materials, which they could use to work with their children at home. These materials included information on hearing aids and speech and included some handouts for information the teachers were working on in class so there was continuous learning of the same concepts at home (see Appendix 2).

Materials

The instruments used to collect information for this study were different for parents and teachers. Both qualitative measures and quantitative measures were developed, validated, and used to assess our research questions.

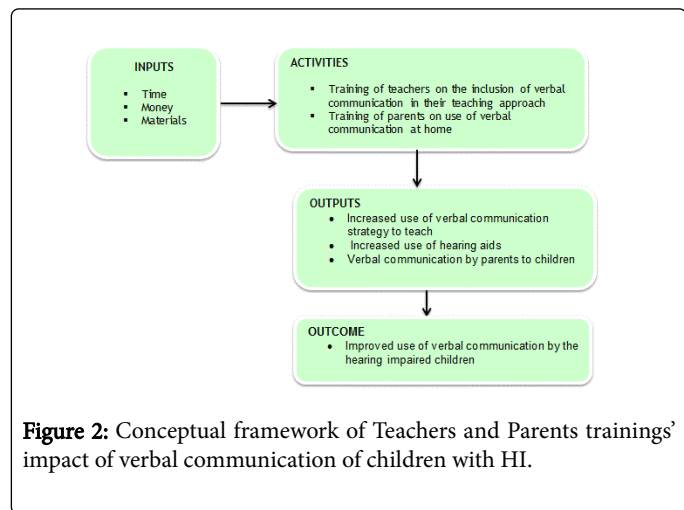


Figure 2: Conceptual framework of Teachers and Parents trainings' impact of verbal communication of children with HI.

Potential pathway for outcome in children with HI is as highlighted in Figure 2.

Teacher and parent assessment

A teacher questionnaire was constructed and contained 12 questions. Eight questions were based on a five-point likert scale, three utilized yes/no nominal scale with the opportunity to give open-ended feedback, and the last question was an open-ended question (see Appendix 3). The questionnaire was targeted to determine whether the teachers had learned more information than they previously knew as a result of the training. The questions also assessed whether or not the teachers had seen an increase and improvement in the children's speech production and improvement in their listening. A post-graduate student from Kenyatta University, who wasn't part of the design of the study and training, administered the teacher's questionnaire.

A parent questionnaire was developed and contained 13 questions with answers based on a five-point likert scale, and one question utilized a yes/no nominal scale (see Appendix 4). The data from the questionnaire was to determine whether the parents had seen differences in the amount of time their child wore their hearing aids, improvement in listening skills, as well as increase and improvement in verbal communication.

The questionnaires were validated by reviewing available literature for similar tools, focused group discussions, expert interview as well as back and forth translations into Kiswahili and piloting and modification. A research assistant who understands the culture of the country administered the parent questionnaire over the phone. The questionnaires were administered mainly using Kiswahili, as that is the primary language used by most parents in our study. At baseline, 70 parents responded to the questionnaire and 64 of these parents responded to the questionnaire post-intervention.

Results

One hundred students participated in the study 49 were male and 51 were female. Ages of the students ranged from 5 to 18 years. The average age of the participants was 8.5 years. Participants had varying degrees of hearing loss from mild to profound. Participants also had various causes of their hearing loss.

Many students had congenital hearing loss, while others had hearing loss due to illnesses or ototoxic medication. A large number of the students included in this pilot had only recently (within a month) been fit with hearing aids.

Thus "hearing age" for many children was less than one month. Of those who had been fit with hearing aids previously, few were wearing them consistently before starting the pilot.

Tables 1 and 2 present the responses from the parents and teachers questionnaires while the charts in Figures 3-5 highlight some of these responses as it relate to the outcome and impact being assessed.

Comparisons Of Pre And Post- Pilot Parent Perception										
Questions	While wearing the hearing aids, how often does your child vocalize at home?		How often does your child repeat sounds or words when prompted?		How often does your child name items/objects?		How often does your child wait and listen to you speak before he/she attempts to answer your question?		Are you and your child able to speak to each other in full conversation using speech?	
Frequency	Pre-Pilot (%)	Post-Pilot (%)	Pre-Pilot (%)	Post-Pilot (%)	Pre-Pilot (%)	Post-Pilot (%)	Pre-Pilot (%)	Post-Pilot (%)	Pre-Pilot (%)	Post-Pilot (%)
Always	1.6	12.5	3.1	12.5	1.6	9.4	0	7.8	1.6	9.4
Never	82.8	12.5	39.1	15.6	84.4	45.3	89.1	45.3	98.4	51.6
Often	0	21.9	0	20.3	0	4.7	3.1	10.9	0	3.1
Rarely	6.3	23.4	23.4	12.5	7.8	26.6	4.7	21.9	0	21.9
Sometimes	9.4	29.7	31.3	39.1	6.3	14.1	3.1	14.1	0	14.1

Table 1: Comparisons of pre and post pilot parent perception N (64).

Teachers' Perception On Trainings Outcome				
Questions	From the trainings provided in this project, how much more have you learned than you previously knew on eliciting speech from children with hearing loss? (%)	How much do you feel that the training provided you with useful techniques to use in class to promote listening? (%)	How much of an increase have you observed in your student's vocalizations from before the program started until now? (%)	How much more have your students become aware of sound since they started wearing the hearing aids consistently? (%)
Responses				
Little	0	25	37.5	0
Somewhat	0	12.5	12.5	12.5
Much	75	37.5	50	50
A Great deal	25	25	0	37.5

Table 2: Teachers' perception on trainings outcome N (9).

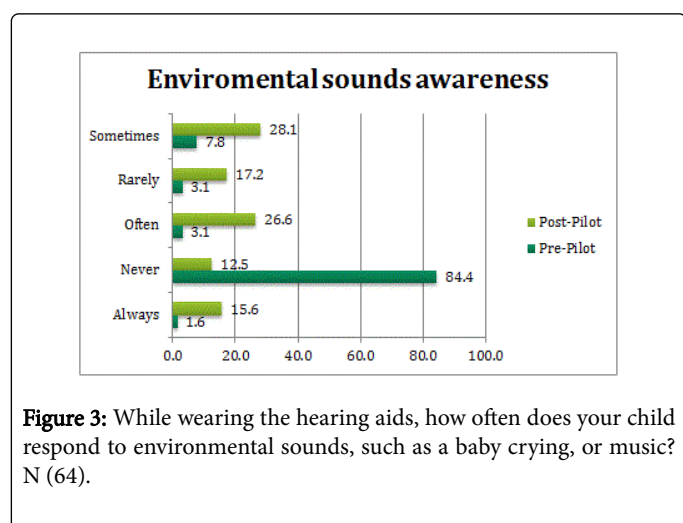


Figure 3: While wearing the hearing aids, how often does your child respond to environmental sounds, such as a baby crying, or music? N (64).

A One-sample test of proportions was conducted to compare pre and post pilot responses. There was a significant difference in the responses when parents were asked if their children could respond to

environmental sounds and if they could vocalize. The proportion of parents that responded their children could respond to environmental sounds increased from 15.6% (95% CI 6.7, 24.5), to 87.5% (95% CI 79.4, 95.6) ($p < 0.05$). An increase in the proportion of those that responded their children could vocalize increased from 17.2% (CI 7.9, 26.4), to 87.5% (CI 79.4, 95.6) ($P < 0.05$).

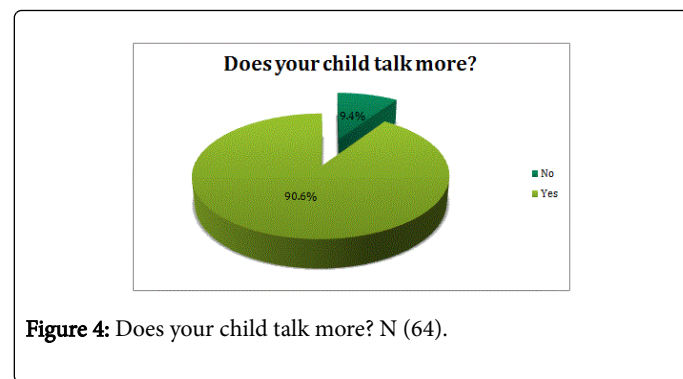


Figure 4: Does your child talk more? N (64).

Furthermore, the result revealed that post-pilot, 90.6% (95% CI 83.5, 97.8) ($P < 0.05$) of parents perceived their children with hearing

impairment now talk more due to the pilot an approximately 50% of the teachers also observed much increase in the vocalization of the students. These results suggest a perception of increased environmental sounds awareness, vocalization and increase/improved speech due to the intervention.

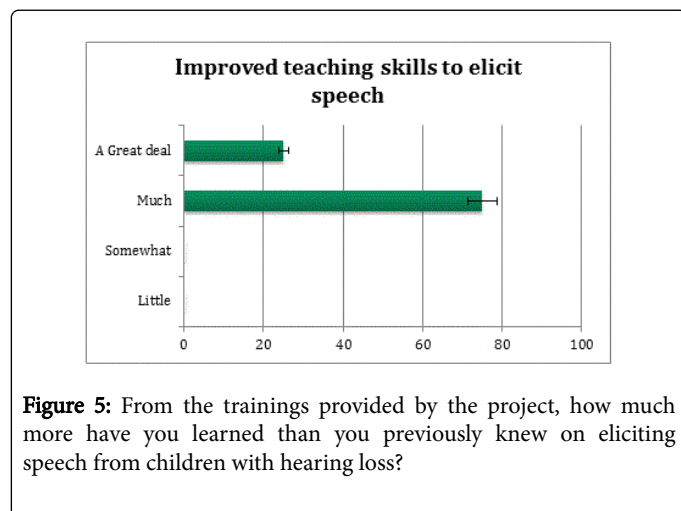


Figure 5: From the trainings provided by the project, how much more have you learned than you previously knew on eliciting speech from children with hearing loss?

Discussion

Children with hearing impairment often have some degree of speech and/or language delay [16-19]. There are a number of different approaches to facilitate speech and language in these cases, and these depend on factors such as the degree of impairment, parents wishes, type of school child is attending, and type of assistive technology child is using [20-23].

Parent questionnaire

The parents of the children in the schools included in this study don't often see their children because they are in boarding schools (with the exception of one school). So, the parent training was done before many of the children had gone home. This provided baseline results. During the training, we found out that most parents were unaware that their child had been given hearing aids. Parents also had very little or no information on hearing loss which shows that when the children were diagnosed with hearing loss, parents were not given adequate information, and some children had never even had a clinical hearing test completed.

When parents were asked approximately four months after the first intervention "How often does your child wear their hearing aids at home?" There was an increase in the proportion of children who wore their hearing aids at home, from 20% to 95%. The administration at the schools for the deaf had not let the hearing aids go home because parents had not been trained and administration was afraid the hearing aids would get lost, sold, or broken.

When the question "While wearing the hearing aids, how often does your child respond to environmental sounds, such as a baby crying, or music" was asked, the results showed that parents had little or no knowledge on hearing loss and how it might affect communication. Also, the result revealed that the students had not been going home with the hearing aids so, they would have been hearing very little at home prior to the intervention. Post-intervention, the children were wearing the hearing aids more and the parents were more in tune with

their children and how they could interact with their children. This resulted in a decrease in the proportion of children that never responded to environmental sounds from 84% to 13% of the children as displayed in Table 1.

When a child with some form of hearing impairment, especially profound hearing loss does not wear hearing aids, they hear very little. They typically only hear very loud sounds, or sometimes they feel vibrations of sounds. When you introduce hearing aids, almost all children will have some more awareness of sound. The awareness of sound they may receive, especially for profound hearing losses may not be meaningful, but the awareness will typically be present, especially with some training.

When the question "While wearing the hearing aids, how often does your child vocalize at home" was asked, the proportion of the children that vocalize increased from 15.7% to 71.9% after the intervention. In the training, we taught parents to try to get their child to vocalize more at home. Even if that was just having the child repeat simple words or sounds such as 'ba ba ba' or banana.

When asked "how often does your child repeat sounds or words when prompted" and "how often does your child name items/objects such as food, toys, etc". We saw approximately 9 and 8 percentage points increase respectively in the children that could always repeat sounds when prompted and name objects when pre-pilot proportions were compared with post-pilot proportions. These questions help to show that the information taught during the parent training was implemented.

We also are assuming that before the training parents never worked on speech at home with their children. As has been the culture, parents tend to not communicate with their deaf children using speech or sign language. So, after the parents were taught ways to work with their children, the parents revealed they have started communicating with their children at home.

"Are you and your child able to speak to each other in full conversation using speech" was a question that saw an 8 percentage increase (2% to 10%) in those that responded 'always' when pre and post-pilot proportions were compared. At this point in the intervention, we don't expect a dramatic increase in this variable. We knew that it would take time for children to have full conversations. However, we saw that there was a very positive increase in the children who always have full conversations. This could be because parents would get frustrated with their children and would not try to talk to them. However, now that the parents have been trained, they are in a better place to understand the needs of their children especially when it comes to communicating with them.

Our last question on the parents' perspective or observation of any increase in their children speaking revealed that approximately 91% of the parents reported they had seen some increase in their children's verbal communication.

Teachers' questionnaire

When teachers were asked about how much more they have learned than they previously knew on eliciting speech from children with hearing loss, teachers from all schools answered that they had learnt a great deal. The teachers' education while they were in school had very little emphasis placed in "total communication." And it may be that anything that was said about total communication was about the teachers talking and not the children. With this intervention, they were

taught how to encourage their students to talk more. We truly believe this was not happening to any extent in the classrooms previous to the training received as part of this effort. They only ever expected the children to sign. As displayed in Table 2, when the teachers were asked about what they learned, 25% and 75% responded they learned “a great deal” and “much” respectively in verbal communication strategy with their students.

When teachers were asked, “*how much do you feel that the training provided you with useful techniques to use in class to promote listening*”, 63% responded ‘a “great deal” and “much” difference. Trying to teach children to listen is very difficult, especially when a child gets to be older. From this study, it is evident that more training on teaching children listening skills will be important to their success.

For those children that were between mild to severe hearing impairment, half of the teachers responded that the training had helped them improve the vocalization of the students in class. The teachers noted that there was a distinction between the children with the profound hearing losses and the children with the less severe hearing losses. This is what we would expect from different severities of hearing loss.

When teachers were asked about the increase of attention of their students, most teachers answered positively with 38% saying “a great deal”, 50% saying “much” and 12% saying “somewhat” ($p < 0.05$). We believe that with this pilot, the teachers are forced to go over and reteach concepts while they are teaching because they are trying to teach with both speech and sign language. Due to this, the children have to pay very close attention when the teachers speak so they can read lips and try to listen to what is said. As such, we believe this is helping the children to pay more attention to all aspects of teaching and not just speech.

Teachers were also asked how much of an increase in speech had helped the students in their everyday concepts, and 75% answered “much”, while 25% answered “somewhat”. As was noted earlier, we believe that with the initiation of this pilot, the teachers were forced to repeat topics multiple times. Because of this, the children are more apt to understand the concepts that are coming in. And they are not only going to have one input, but they also have the input of verbal communication.

The teachers were asked if they felt that speech should be incorporated into the curriculum. All the teachers responded either a “great deal” or “much”. These positive results stem from the positive changes the teachers observed in their students from the beginning of this pilot until now. We feel that this question is one of the most positive and can have an impact in demonstrating to the government that teachers are in support of this type of a program.

Limitations

One limitation of this pilot study involved the choice of the pilot sites. For practical purposes, a random sampling of the schools for the deaf was not possible; therefore the sample may not be representative of the whole country. The sample size is also a source of limitation to the outcome of our assessment. Despite these limitations, there is no evidence that there is no evidence that these schools are not representative of the schools for the hearing impaired in Kenya and authors feel that the positive results observed in this pilot study may be seen in all schools of the hearing impaired in Kenya.

Conclusion

Preliminary results suggest promising benefits on the improvement of the use of verbal communication by children with HI. This simple, popular approach demonstrates a plausible method to improve hearing-impaired children’s ability to communicate verbally. It is hoped that the use of verbal communication by these children will provide them with opportunities for improved socioeconomic status and be integration into the larger society. It is impossible from our result to demonstrate right balance of investments in parent or teacher training as well as the long term-impact of the training on the quality of lives of the children. More research is required to understand the long-term impact of the intervention on the quality of lives of the children as well as the right investments that have the potentials of significant impact. Additionally, more research is required to understand the impact of the attitudes of the teachers and parents on the success of the program.

Policy implications

The government of Kenya and most Sub-Saharan Africa countries need to enact and implement policies that encourage verbal communication with hearing impaired children both in schools by teachers and at home by parents and siblings especially those that have hearing aids. Furthermore, a rigorous assessment of hearing impaired children needs to be done to understand their degrees of hearing losses and the right type of education to maximize their potentials. This pilot has also revealed that the potential impact that can be made when parents are treated as key stakeholders and are continuously trained on how to communicate with their hearing impaired children is tremendous.

We propose policies that support the inclusion of and consistent training of parents on the support and communication skills with their hearing impaired children. Additionally, based on the teachers’ responses policies that support the use of verbal communication strategy in the schools for the hearing impaired needs to be introduced, implemented, and monitored.

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