The Relationship between Inclusive Education and Children with Hearing Impairment and Academic Achievement.

A systematic Review

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ABSTRACT

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Over the years, “Education for All” has been the theme for inclusive education. According to the Salamanca declaration for Framework and the convention of the Human Rights of persons living with disability, every child has the right to study in the same classroom as “normal” children. Hearing impairment is an impairment that affect the hearing functioning of a child which can me from mild to severe. This paper focuses on the children with mild hearing loss. The systematic study examined the relationship between inclusive education for children with mild hearing loss and their academic achievement in a general education setting. Here, resources like devices and assistive materials used by children with mild hearing loss are examined to evaluate their academic achievement. For this study three data bases were used to analysed (PubMed, ERIC and CINAHL) the results which was based on methods, devices used, test, subjects (writing, language, spellings, vocabulary) in relation to academic achievement. The limitation was based on how appropriate the analysis was toward academic achievement.

Keywords: Inclusive education, children, hearing impairment, assistive devices. Special education.
1. INTRODUCTION

Since the concept of inclusive education which was adopted by the UNESCO under the Salamanca Declaration of Framework (1994), there has been some guarantee for children with hearing impairment which states that all children irrespective of the disability has the right to study in the same environment with the peers. The concept stresses the participation, interaction, communication, culture, and curriculum there by discouraging all forms of exclusion (Booth, Ainscow 1998). Education has been seen as a means to an end through empowerment of people with disability especially those with are hearing impairment to live an independent life in the future (Kyere 2009). To understand the concept of inclusive education (IE) on children with mild hearing loss (MHL) and academic outcome, Bronfenbrenner’s bioecological model of PPCT (process, person, context, and Time) (Bronfenbrenner & Morris 1998) will be used. In this model, emphasis is laid on the role a person has in his development, how a person uses resources, engagement in activity to trigger outcomes. This means that for children with mild hearing impairment to study in an inclusive environment, there should be able to identify what kind of support is needed, availability of supported material or devices like hearing aids, Individualised Educational Goal (IEP), a good environment for interaction and communication and how it will trigger positive outcome.

1.1 Rational of the Study

According to the UNESCO declaration of the Framework for action on special need education, children with disability has the right to study in the same classroom as their peers with disability irrespective of their disability. Education is considered as a social service which serves as a tool to ensure that children with mild hearing problems do not feel limited in terms of privileges or opportunities that can become employable in the independent future (Kyere 2009). Research on the progress on academic achievement of children with MHL has shown they have a poor language skills and speech problem (Stevens et al., 2013). Moreover, children with MHL also using standardised test, national test also have experience one or more year of grade retention and a lower performance than their hearing peers in an inclusive environment (Françoise et al., 2015). The prevalence for the study will enable us to understand the extend to wish mild hearing loss is related to a child’s academic performance in an inclusive setting with their hearing peers with the support of assistive devices like cochlear implant, hearing aid, IEP, etc.
2. **BACKGROUND**

2.1 **Inclusive Education**

Over the years, there has been some struggle to abolish discrimination against children with disabilities through the creation of treaties like the Rights of Persons with Disabilities (1975) World program of Action concerning disabled persons (1982), adopted by the United General Assembly (1989), UNESCO (1994) through the Salamanca statement and framework for action on special needs education thrills inclusion movement by coming up with a framework for inclusive education “Education for All”. According to (Kokkala, 2006), these laws was to enable children with disabilities to study in the same environment as their peers with disabilities. This will also enhance the performance of children with special needs through interaction, participation in the same environment with them and the help of necessary supports.

The study focuses on children with mild hearing impairment (MHI) in general inclusive schools with children without disability and their academic achievement. According to Okeke (2001), hearing impairment can be described as a problem that affects the effective functioning of the total personality no matter the origin. It is a disability that affect a child’s hearing function, and this can affect their academic achievement thus, the is a need for a medical report to assess if there is an underlying illness apart from hearing loss or not, placement and how the IEP can be designed.

Inclusion should not be limited at the policy level and placement level but should suits the curricular goals of the school, the method of teaching, adaption of children with hearing impairment according to their individual needs which is hearing aids, cochlear implants etc (Odom, et al., 2011). There is a need for accurate information from the medical record on whether the child has an underlying illness before inclusion in a mainstream school.

2.2 **Hearing Impairment**

Over the year there has been a lot of definitions from different researchers on hearing impairment, but this study focuses on hearing impairment from (WHO, 2018) which states a child is considered to have hearing loss if he or she cannot hear well like other hearing peers and his hearing thresholds is not up to at least 20dB in both ears. This can affect one or both ear in hearing conversation and loud sounds. Globally about 32 million children and 180 million adults have hearing problem (WHO, 2018) and this has let to an increase in disabling hearing loss (Vos et al., 2016; Wilson et al., 2017). Hearing loss is being assessed through clinics and
community settings to early identify ear diseases and suggest possible solution to minimise the impact in the later years.

However, the causes of hearing loss have two stages which is the childhood stage and the adult hood stage. At the childhood stage, it can the caused by meningitis infection and or asphyxia (during childbirth) drugs that damage the inner ear, and at the adult hood stage it can be caused by chronic middle ear infection, otosclerosis, smoking and a sudden sensorineural hearing loss or noise induced hearing loss. Also, (Okeke, 2001) defined hearing loss as an impairment that affects the hearing functioning of personality irrespective of its origin. This is a handicapping condition that has impacts on not only on the child academics but also on social interaction, loneliness, and stigma.

Hearing impairment can be classified in to two groups, which are either hard of hearing (mild to partial hearing) or deaf. Mild/ partial of hearing are usually assisted with technologies like hearing aid, cochlear implant which enables them study with their hearing peers while deaf children are usually assisted by sign language interpreter or by living in an environment with people primarily using signs for communication. This study focuses on children with mild hearing loss which are those children whose sense of hearing have problem, but who are functional with or without aid in a mainstream school. According to Alade & Aboki, hearing impairment has a role to play in their academic achievements and so, for these children to study in a mainstream school with their peers with “normal hearing”, availability of resources like hearing aids, cochlear implants, classroom modification and other devices are important (Alade & Aboki, 1991). Studies has shown that children with mild hearing loss often scores lower than their hearing peers in attention, language, communication (Stevenson et al., 2015) and often need a well sound audio verbal classroom with at least 47dB to accommodate children with hearing loss.

2.2.2 Communication of children with hearing impairment

According to the Salamanca framework work of action, for children to be placed in an inclusive educational setting with their peers, there has to the availability of didactic material as well as assistive technology for them to be able to communicate with their hearing peers. Hearing aid such as cochlear implant has been a major support provided for children with mild hearing problem in a general inclusive school setting. This helps them to communicate orally and developed social skills. According to (Schorr,2006), the development of speech and social skill
among children when interacting with their hearing peer reduces loneliness and boost self-esteem. However, there has been some studies about children with mild hearing impairment and academic achievement toward the curriculum.

2.2.1 Interaction of Children with Hearing Impairment

The concept of communicative interaction has been observed over the years as one of the most important aspects of child development. According to (Kemple & Ellie, 2005), children develop social skill when interacting with their peers and adults. Moreover, interaction between children with hearing problem and their peer is the crucial factor of social development (Lemanek et al., 1986). Children with hearing impairment often have difficulty in interacting with their hearing peer and as such putting children with hearing impairment in the same inclusive classroom with their peers without hearing disability does not guarantee interaction (Anita et. al, 2010). So, for these children with hearing impairment to interact freely with their peers without hearing problem, there should be available resources like hearing aid to enable smooth interaction.

2.2.3 Academic Achievement of children with Hearing Impairment

The word ‘achievement’ means accomplishing something. Academic achievement is defined as a successful performance in schooling (Fish, 1995). This has been articulated to the learning goals, teaching styles, assistive material that is established in an instructional environment such as school, classrooms, and the teacher’s knowledge about the disability. Teaching techniques and assistive devices used has been the most important to improve academic achievement has been seen as.

Over the years, academic achievement has been seen as the most important outcome of school. This is usually through a continuous assessment or examination depending on the educational goal of the school. It is often done at the national level or at the class level to evaluate if a child is ready to be promoted to the next class or not. The feeling of acceptance of children with partial hearing loss by their peers often affect the academic performance (Rubin, Bukowski & parker 1998). This is because children with mild or partial hearing loss often feel isolated in a general inclusive school setting with their hearing peer (Leigh, 1999; Stinson, Whitmire, & Kluwin, 1996), and thus social acceptance has a role to play in their academic’s outcome (Kluwin, Stinson, & Colarossi 2002). So, to have a positive outcome for children with mild hearing loss, these children must fully participate in most of the activities with their hearing
peers with the necessary support. To gained confidence and developed explicit knowledge and skill which help in their language development (Guskey, 2013).

3. Theoretical Framework

3.1 The bio-ecological model

In 1995, Bronfenbrenner described the environment as the most influential element when it comes to academic performance. So, for children to study in an inclusive environment, the structure and resources must be adequate to meet the academic need for that child. To dictate a positive learning outcome of a child with mild hearing impairment in a general inclusive school setting, the individual needs (assistive materials, trained teachers, structure) in connection with the curriculum must be assessed (Slee, 2012). The bioecological model describes human development as the interaction between people and objects found within an environment which occurs fairly on the daily basis that led to a desire outcome (Bronfenbrenner and Morris, 1998). The PPCT model will used to illustrate how children with mild hearing loss academic is influenced by interaction and use of available resources found in that environment.

- **Process**: The proximal process is the core stage in development as interaction with people occurs daily and the how individuals use objects and symbols for an outcome. Developmental outcome can be referred to as dysfunction which is caused by difficulties of the environment, or a competence outcome caused from a stabled environment.

- **Person**: A person individual characteristics is a force that influenced development outcome whether positive or negative. This has to do with a person ability to handle stress, emotions, resources found in an environment.

- **Context and Time**: Context is the process of interaction within one or more social partners. This is how development takes place at the micro, macro, mesos and exosystems levels. How they interrelate to produce their desire outcome of development. While time broadens what happens in the environment over a historical time. Here the chronosystem is used to see the changes that has occur over time with the used of available resources, policies, people, interaction to achieve desire outcome.
4. AIM OF THE STUDY AND RESEARCH QUESTION

The aim of this study is to examine the relationship between inclusive education on children with mild hearing impairment and academic achievement in a general school setting.

Hearing impairment is an impairment in hearing and listening of a child whether permanent or fluctuating which has a role to play in the academic performance. This impairment can either hard of hearing or deafness. This has led to the following research question.
1. Do hearing loss affect academic achievement in school despite hearing devices?
2. Is inclusive education beneficial to children with mild hearing loss?
3. Do assistive devices improve academic achievement of children with mild hearing loss?

**Table 1: PICO**

<table>
<thead>
<tr>
<th>Population</th>
<th>Children with mild hearing impairment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Assistive devices, communication.</td>
</tr>
<tr>
<td>Comparison</td>
<td>No comparison.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Academic achievement.</td>
</tr>
</tbody>
</table>

5. METHODS

This is a systematic review which helps with facilitating theory of development. Fink (2014) described systematic review as that which helps in identifying, evaluating, and synthesizing the full body of content of research produced by other researchers thereby making it explicit and systematic.

5.2 Search Strategy

The data search used for this paper was carried out from February to May 2022 which the use of databases. Data bases used for this paper were the school universal data base (PRIMO), PubMed CINAHL and ERIC. Search were limited to peer reviewed, English language articles and from year 2010-2022, which means that systematic review and dissertations were filtered from the search. Detailed of this will be seen on the inclusion and exclusion criteria below.

PRIMO was used as a guide and a preliminary search in finding articles with free words used like *Children* OR *hearing impairment* OR *Disability* AND *academic performance* which helped the writer in coming up with CINAHL, ERIC and PubMed.

For database ERIC, thesaurus search was different from CINAHL and PubMed as thesaurus suggestions differs with databases. Search words used were *hearing impaired* OR *children
with hearing impairment* Or *mild hearing loss* AND *academic achievement*. For this, 144 articles were found with 3 duplications.

For PubMed, thesaurus search words were, *hearing impairment*, OR *mild hearing loss* Or *partial hearing loss* AND *academic achievement* OR *Academic performance* OR *academic outcome*. In this search, 130 articles were found with 7 duplicates.

On data base CINAHL, thesaurus search was performed with free search words like *Inclusive education* OR *children partial hearing loss* OR *hearing impairment* AND *academic achievement*. For this search 35 articles were found with 3 duplications.

**5.3 Selection Criteria**

Selection criteria were based on the research aim and research question which was the examiner relationship between inclusive education and children with mild hearing loss with academic performance.

**Table 2: Inclusion and Exclusion criteria**

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>- Qualitative</td>
</tr>
<tr>
<td></td>
<td>- Quantitation</td>
</tr>
<tr>
<td></td>
<td>- Mixed Methods.</td>
</tr>
<tr>
<td></td>
<td>-Systematic study</td>
</tr>
<tr>
<td></td>
<td>- Literature review.</td>
</tr>
<tr>
<td></td>
<td>-Peer reviewed articles</td>
</tr>
<tr>
<td></td>
<td>- Articles published in English language.</td>
</tr>
<tr>
<td>Population</td>
<td>-Encyclopaedia, newsletters, magazines, conference papers.</td>
</tr>
<tr>
<td></td>
<td>- French and other language articles.</td>
</tr>
<tr>
<td>Population</td>
<td>Children and youth between the ages of 5 -18years.</td>
</tr>
<tr>
<td></td>
<td>Children with mild hearing problem in a general inclusive school setting.</td>
</tr>
<tr>
<td>Outcome</td>
<td>-Children above 18years.</td>
</tr>
<tr>
<td></td>
<td>- Deaf children.</td>
</tr>
<tr>
<td></td>
<td>-Special schools.</td>
</tr>
<tr>
<td></td>
<td>-Development out of the school curriculum.</td>
</tr>
</tbody>
</table>
Academic achievement in connection with assistive devices,
Areas of development with regards to the school curriculum.
- Parent perception of improvement of their children.

5.4 Selection Process

Articles were selected based on three levels which is the title, abstract and full text level. All articles were imported using Endnotes. A total of 212 articles was found and when screening was done at the Title level, 98 did not meet the inclusion criteria so, n=101 was selected at the title level. At the abstract level, 5 articles did not have abstract, so they were excluded and 59 were included based on the abstract and 38 excluded because they did not meet with the inclusion criteria. At the full text level 21 articles were included because with the guide of the PICO, the outcome of these articles was not based on the academic achievement which is the outcome of this paper. Moreover n=11 articles was excluded because the participant was not within the required age for this paper. So, finally n= 10 articles analyzed to compile the result base on the research questions and the aim of the study. This can be seen in the Prisma flow diagram below.
Figure 1. Prisma Flow Chart.

DATA BASES

Eric = 144
PubMed = 130
Cinahl = 35

Number of Articles = 212

Duplication = 13
Excluded based on the level = 98

Record Reviewed on title level = 101

Excluded based on abstract = 42

Abstract Level = 59

Excluded because they did not meet with the inclusion criteria = 38

Full text level = 21

Not within the age range of the participant = 11

Total articles included = 10
5.5 Selection Process.
Selection of article for the aim of this study was done using three steps. These were title, abstract and full text levels.

At the title level, articles were chosen based on their titles which led to n= 101 articles found at this level, but this was just a primary level so at the abstract levels, n=59 articles were selected depending on the aim of the research. At this the full text levels n= 21 articles was found, in-depth selection was done based on the methods and the results on how academic achievement of children with mild hearing impairment were analysed which led to the final selection of n=10 relevant for this study. See (Prisma flow diagram above.)

5.6 Data Extraction
Data was extracted based on the information found on each article to answer the research questions related to the design, such as children with mild hearing impairment in an inclusive school with the use of assistive devices and how it affected their academic achievement. These were, type of articles (journal), title of the articles, year of publication, aim of the study, country, design, tools used for data analysis, sex of participants, number of girls and boys, countries, population size, study design, ages of participants, result with regards to academic achievement/performance in line with the academic curriculum, level of hearing impairment, drop out, limitation of the study, level of hearing loss, assistive devices used in an inclusive classrooms. These were extracted and placed on an excel sheets to write this paper.

5.7 Quality Assessment
Quality assessment helps in identifying the validity of the various study. To understand the relationship between the children with mild hearing loss and academic achievement, (CASP,2017) was used as checklist for the analysis of the research (Qualitative, Quantitative, and Mixed Method.). This is done based on the kind of instrument used and how valid is it to the study. The scores were used to test the quality. Scores ranges from 0 to 1. Score 1 is = very good, score 0 = good and score 0 = fair. Percentage allocations were Very good= >80%, Good= >60%, and Fair=<50%. Out 10 articles 7 were of very good quality and 3 very good for this study. (See appendix A)
Table 3: Quality Assessment Scores (%)

<table>
<thead>
<tr>
<th>ID</th>
<th>Authors and years</th>
<th>Quality Assessment Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Akiko Suggya et.al, 2019</td>
<td>90%</td>
</tr>
<tr>
<td>2</td>
<td>Julia Z. Sarant et. al, 2015</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>Lauri H. et. al, 2016</td>
<td>90%</td>
</tr>
<tr>
<td>4</td>
<td>Bradley W. Kesser et. al, 2013</td>
<td>90%</td>
</tr>
<tr>
<td>5</td>
<td>Jiunn Yihet et. al, 2020</td>
<td>80%</td>
</tr>
<tr>
<td>6</td>
<td>Jigenya et. al, 2017</td>
<td>60%</td>
</tr>
<tr>
<td>7</td>
<td>Mohd et. al, 2010</td>
<td>80%</td>
</tr>
<tr>
<td>8</td>
<td>Julien Zanin et.al, 2016</td>
<td>90%</td>
</tr>
<tr>
<td>9</td>
<td>Efua Esaaba et. al, 2017</td>
<td>70%</td>
</tr>
<tr>
<td>10</td>
<td>Moluleke et. al, 2021</td>
<td>90%</td>
</tr>
</tbody>
</table>

*ID- Identification Number.

5.8 Data Analysis
An extraction protocol was done on an excel sheet. Data was extracted based on general information. To answer the research question which is how children with hearing impairment academic achievement is affected with hearing devices. Extracted studies will be analysed based on what kind of devices used by children with hearing loss, method used to examine academic achievement. So, most of the studies found were common in terms of devices used, approach and inclusive education of children with mild hearing loss. Contents were similar and recognised according to their various relations to the topic. Academic achievements were based on children who uses available devices in an inclusive school to study. Standardised comprehension test, assessment test was used to analysed progress in comprehension, Language, spelling, vocabulary, writing with children within age group of children with hearing impairment with the use of different teaching methods and environment with their hearing peers. IDs were allocated as reference for each article which were 1-10.
6. RESULTS

In the screening process ten articles were included the association of communication, interaction of mild hearing-impaired children in a mainstream school with the use assistive devices and their academic achievement. These articles are coded from 1-10. *See table below*

6.1 Characteristics of studies.
So globally articles were chosen from both high income and low incomes countries. Two articles came from the United States (3 and 4), three from Australia (2, 5 and 8) with 5 coming from the remote regions in Australia, one from Japan (1), one from Malaysia (7) and one from India (Mumbai) (6), one from south Africa (10), one from Ghana (9). Relationship between children with mild hearing loss and academic achievement was described depending on the type of device used and availability of educational support provided.

Assistive devices help an individual with hearing impairment to communicate effectively through hearing of speech. This help in the amplification of sound and enable help in separating speech from background noise. According to the 10 articles, Cochlear implant was used on article 7 articles which were, 1, 6, and 3, 5, 8, 9, 10 because its helps children in learning speech and give them the ability to understand speech without using visual signs. Hearing Aid was used for article 2, 4, 7, 8, and 10.

Other materials such as Speech therapy, loudspeakers and microphones in classrooms were used on article 4 and 8, while Individualised Educational Plan (IEP) was used on article 3 to identify areas of progress and see need for intervention. Echo check Otoacoustic Emission screener was used on article 7. On article 6, children academic achievement was assessed using their learning style of children with cochlear implant in class with their hearing peers.

However, the age group ranges from 5 to 15 years old which was chosen based on when they were diagnosed with hearing problem, when they had the devices on them and how long they have had the devices.

Again articles 1, 4, 5, 7, 8, 9, and 10 were conducted in a general inclusive primary school of children between the ages of 5-12 years old. According to article 3, parents whose children has attended mainstream schools were interviewed on the personal development of their children outside classroom, how long they wear their devices (cochlear implants and hearing aid) and how they communication with their siblings at home. Articles 6 was an exception because
academic achievement was based on parent perspective and how they feel about their children’s academic report.

Classrooms are audio-verbal environment and so children’s performance is analysed on how well the background noise is and how well they can understand or hear their teacher in classroom. In article 7, 8 and 10 a well sound classroom needs to be sound with at least 47dB and noise often affect children in the younger age group with hearing impairment than the older children. Moreover, the sitting position of children with hearing impairment also has a role to play because from these articles, children don’t understand or hear well when seated at a distance from the teacher even with the hearing devices.

Academic achievement can be described as the outcome or result which shows the extent to which a child has achieved their learning goals according to the educational curriculum of the school. This can be in either long term or short-term goals. According to the articles, articles 1, 5, 7, 8, 9, 10 focuses on the national curriculum set by the school in evaluating academic performance through standardised test. Also, performance was also based on personal development through academic reports and parents’ perception on their hearing-impaired children improvement with the use of these devices with children without hearing impairment. This can be seen in articles 2,4.

Areas of assessment and evaluation were, communication Reading, writing, vocabulary, mathematics, spellings from article 1,2,3,4,5,6, 7,8, and 10. In Article 9, children’s difficulties they faced in learning in with their hearing peers in classroom.

Assessment and evaluation enable the school to know which children is ready for promotion to the next academic year. This is based grades (A, B, C), scores are on/20, and points in numbers. In most of the articles, there is a relationship between children with hearing loss and academics achievement either for personal development or according to the school curriculum. In article 1, 2, 3, 4, 5,7,8 and 10, children’s grades were between grade A and B with very few students with grade C. Boys and gilrs did not have any difference in performance because a massive improvement in communication, spellings, and writing with the use of assistive devices such as cochlear implants, hearing aids, loudspeakers, and microphones was recorded.

In articles 5, boys scores higher (above 15/20) in mathematics than girls according to the academic report of the school. These poor performances in articles 5 and 9 were as a result that many children came from an overcrowded house, inadequate resources, financial difficulties
and only used English as a second language which affected their language development and as such poor academic performance.

There is significant increase in personal development which may affected their academic achievement in articles 1, 2, 3, 4, 6, 7, 8 and 10. with the help of assistive devices, IEP, and others available resources. Teachers understood individual needs or support of every child. This can be seen in article 7 and 8 where teaching is done in a quiet classroom with no background noise which may distract their listening.

Parents perception on the academic achievement is important because, teachers get report form parents on how long these children have the devices on at home, how they interact and communicate with their siblings and peers at home. These give a favourable outcome as seen in article 6 were children with hearing loss improved in communication through interacting with their siblings at home in a very quiet room which enables them gain confidence in school there by increasing their academic performance.
<table>
<thead>
<tr>
<th>Number of Articles</th>
<th>Title of articles</th>
<th>Authors &amp; Year</th>
<th>Country</th>
<th>Level of hearing Loss</th>
<th>Number of participants</th>
<th>Study methods</th>
<th>Devices Used</th>
<th>Types of Tests</th>
<th>Ages of participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Impact of reading and writing skills on academic achievement</td>
<td>Akiko Suggya et. al, 2019</td>
<td>Japan</td>
<td>Mild to moderate hearing loss</td>
<td>546 children</td>
<td>Quantitative</td>
<td>Cochlear Implants and hearing aids.</td>
<td>Standardised comprehension Test</td>
<td>5 -12 years</td>
</tr>
<tr>
<td>2</td>
<td>Academic outcomes for school aged children with severe profound hearing loss.</td>
<td>Julia z. Sarant et.al, 2015</td>
<td>Australia</td>
<td>Mild to Profound hearing loss</td>
<td>44 Children</td>
<td>Quantitative</td>
<td>Hearing aid.</td>
<td>Speech Language test using wechler individual achievement. Match verbally presented word to oral expression</td>
<td>8 years</td>
</tr>
<tr>
<td>3</td>
<td>Parent perceptions for their child’s communication and academic experience with cochlear implants.</td>
<td>Lauri H. et.al, 2016</td>
<td>United States</td>
<td>Mild hearing Loss</td>
<td>125 Children</td>
<td>Qualitative</td>
<td>Cochlear Implants</td>
<td>Parent- report based on academic achievement of their children</td>
<td>18 years</td>
</tr>
<tr>
<td>4</td>
<td>Impacts of Unilateral conductive hearing loss due to aural atresia on academic performance in children</td>
<td>Bradley W. Kesser et.al, 2013</td>
<td>United States</td>
<td>Mild Unilateral hearing Loss</td>
<td>132 Children</td>
<td>Quantitative</td>
<td>Hearing Aids</td>
<td></td>
<td>10 to 12 years</td>
</tr>
<tr>
<td>5</td>
<td>The impacts hearing impairment on early academic in Aboriginal children living the remote Australia: A data linkage study</td>
<td>Jiunn et.al, 2020</td>
<td>(Remote) Australia</td>
<td>Mild and Moderate hearing Loss</td>
<td>2208</td>
<td>Quantitative</td>
<td>Cochlear Implants</td>
<td>National Assessment program-literacy &amp;numeracy</td>
<td>8years</td>
</tr>
<tr>
<td>6</td>
<td>Learning style and academic achievement in children with and without hearing Loss</td>
<td>Jigenya et.al, 2017</td>
<td>India</td>
<td>Mild hearing Loss</td>
<td>30 children</td>
<td>Qualitative</td>
<td>Cochlear Implants</td>
<td>6-9years</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>The effects of mild hearing loss on academic achievement</td>
<td>Mohd et.al, 2010</td>
<td>Malaysia</td>
<td>Mild hearing Loss</td>
<td>Quantitative</td>
<td>Hearing Aids</td>
<td>11years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Function hearing in the classroom: Assistive listening devices for students with hearing impairment.</td>
<td>Julien et.al, 2016</td>
<td>Australia</td>
<td>Mild hearing Loss</td>
<td>20 students</td>
<td>Qualitative</td>
<td>Cochlear Implants, Hearing aids, Sound amplification Microphones and Loudspeakers.</td>
<td>LIFE-R Questionnaire</td>
<td>12years</td>
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<td>9</td>
<td>Academic Challenges of</td>
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<tr>
<th>Study Title</th>
<th>Country</th>
<th>Type of Hearing Loss</th>
<th>Number of Participants</th>
<th>Methodology</th>
<th>Intervention</th>
<th>Assessment Area</th>
<th>Age Range</th>
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<tr>
<td>School readiness and academic achievement of children with hearing impairment: A South African Exploratory Study.</td>
<td>South African</td>
<td>Mild Hearing Loss.</td>
<td>8 children</td>
<td>Qualitative</td>
<td>Cochlear Implants and hearing Aids</td>
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<td>9-12 years</td>
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<td>10 students with hearing impairment in Ghana</td>
<td>Ghana</td>
<td>Mild to profound Hearing Loss</td>
<td>12 students</td>
<td>Qualitative</td>
<td>Cochlear Implants</td>
<td>Reading and curriculum assessment</td>
<td>15 years</td>
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<td>Efua Esaaba. et.al, 2017</td>
<td></td>
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Discussion

According to the Bioecological model, emphasis should be laid on individual’s characteristics, interaction and how much time spend which triggers output. Individual characteristics has been seen as an important mechanism for development which can be both positive and negative (Tudge et al., 2009).

At the Proximal process, interaction can be seen from all the articles where children who were hearing impaired are allowed to study in the same environment with their hearing peers. This was highly favourable in the academic achievement in terms of communication, writing, spelling, and vocabulary. Children were assessed based on how they interact with their peers in school and at home with the use of cochlear implants, and hearing aids.

At the person stage, both male and female children between the ages of 5 to 18 years old were used for the study because at this age, can communicate, show emotions on how to handle stress, and show their ability to use resources available for a desire outcome. Children were able to use resources such as classrooms, teachers, devices such as hearing aids and cochlear implants, teaching methods, loudspeakers, microphones to improve in the academics compared with their hearing peers in an inclusive school in different subjects like communication, spellings, mathematics, writings.

However, Time and Context can be seen from the outcome of children with mild hearing loss, process of time, how long they took to achieve these outcomes. How micro, macro mesos, exosystem interrelate with the chronosystem to have the desire outcome. Children interacted and assessment were based on well children with mild hearing problem used available resources for their studies, if there were differences in the cochlear implants and hearing aids, achievement in different subjects with their hearing peers in an inclusive classroom, how they feel using the devices and some of the challenges that they faced while studying in an inclusive environment (Agyire-Tettey et al., 2017).

Also, to answer the research questions, there is a relationship between children with mild hearing loss and academic achievement in an inclusive setting as educational achievement can only be evaluated through test, grades, and scores to know how well a child has performed in a particular subject. From this study, there is increase interaction, communication, speech, writing, mathematics as well as speech development which gives a positive outcome in their academic report with the help of available resources cochlear implants, hearing aids and other supportive.
Again, children with mild hearing loss who studied in an inclusive school setting with their hearing peers performed poorly academically because they did not have enough support and available resources were inadequate due lack of fund to purchased some of these devices like cochlear implant, or hearing aids and such could not hear their teacher well in class with their hearing peers. Some teachers did not pay attention to the needs of children with mild hearing loss when teaching.

CONCLUSION

To obtain a positive academic achievement on children with hearing impairment there is a need for interconnection of resources. Children with mild hearing loss cannot be accommodated in an inclusive environment without prior knowledge from the medical’s reports, available resources needed, IEP, assistive devices, trained special educators, and a well sound audio verbal classroom with sound range of at least 47dB.

Also, inclusive education has not be left only at the level of policy making because from the above analysis it has led to a great improvement in Language, communication, writing through the provision resources, proper curriculum, trained teachers, and devices that suit the individual needs of all in an inclusive setting.

Limitations

One of the major limitations is inadequate analysis of study on academic achievement toward the curriculum. There was no proper diagnose and follow up on the duration of devices used and academic achievements from the study. Inadequate analysis of teachers’ knowledge of teaching children with mild hearing loss. Also, some of the background did not tally with the result of the study. For instance, one of the first step for inclusion was prior medical report but in the findings no data was found on medical report for the study. Also, no data was found on the strength and witnesses of using cochlear implant and hearing aid. The study was limited to academic achievement which is not the only achievement needed to be successful life.
**Recommendations**

From the above analysis, the importance of inclusive education has been stressed out through effective functioning and social participation of children with mild hearing problem (Kluwin, Stinson, & Colarossi, 2002). This has been successfully not only academically but also in personal development in communication, language, spelling, writings etc.

However, this present study has inadequate analysis of medical reports of children with mild hearing problem that is, how long they have had hearing loss or if there is an underlying illness which should be the primary stage prior to inclusive education placement. So, in the future study, emphasis should be laid on medical check before inclusion.

Also, some children performed poorly in their academic which was because of inadequate available resources and, some teachers’ altitude and knowledge did not meet the individual needs of these children which has an impact on the educational outcome of children with hearing impairment (Bunch et. al, 1997). Researcher should pay attention to teachers’ knowledge, teaching style and altitude in which affects educational outcome.
REFERENCES


Appendix A

Quality assessment tool (CASP)

<table>
<thead>
<tr>
<th>Appraisal Guide</th>
<th>Remark</th>
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<td>Yes/no/don’t know</td>
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<tr>
<td>Was the methodology used appropriate?</td>
<td>Yes/no/don’t know</td>
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<tr>
<td>Was the research design related to the study?</td>
<td>Yes/no/don’t know</td>
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<td>Were the data analysed properly with relation to the paper?</td>
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<td>Yes/no/don’t know</td>
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<td>Were there any limitations of the studies?</td>
<td>Yes/no/don’t know</td>
</tr>
</tbody>
</table>

Remark of the study.

Remark.

Yes =1

No=0

Don’t know= 0
Percentage Rating.
Very Good = >80%
Good = >60%
Fair = <40

Acknowledgement.

I would like to dedicate this work to my husband (Mr Bertrand Asongwe Tita) and my children (Jael and Abira) for their tremendous support all through my master’s program.