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# DIAGNOSTIC MASKING OF HEARING DEFECTS IN INTELLECTUAL DISABILITY: IMPLICATION FOR COMPLEMENTARY AUDIO-VISUAL INSTRUCTIONAL SUPORT IN OYO STATE, NIGERIA

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**Abstract**
Despite the growing realization of the high prevalence of children with intellectual disability having comorbid hearing impairment, the auditory needs of these children are continually neglected in classroom instructional delivery. This study investigated available audio-visual instructional support for children with intellectual disability having comorbid hearing impairment. A survey of 115 purposively selected teachers in special schools was adopted for the study. Two research questions were raised to guide the study. An instrument of 18 items with reliability coefficients of 0.88 to 0.89 was used to ask teachers to rate how often they use 21st century audio-visual instructional support for children with intellectual disability having hearing impairment. The data collected were statistically analyzed using percentage count and regression analysis. The findings revealed that teachers do not use complementary audio-visual instructional support for children with intellectual disability having hearing impairment. Also, total communication makes significant contribution to effective classroom accommodation for children with intellectual disability having comorbid hearing impairment. It was recommended among others that there should be combined efforts of government and schools to design hearing screening services for all children with intellectual disability to determine eligibility for auditory support programmes.

**Keyword:** Diagnostic masking, hearing defects, classroom audio-visuals, intellectual disability

## Background of the Study

The overwhelming effects of severe cognitive deficits in children with intellectual disability which often affect a wide range of major domains such as the intellectual functioning, social and adaptive behaviour sometimes overshadow or mask other sensory defects like hearing impairment inchildren with intellectual disability. This is much evident and true in Nigeria context where children with recognized cognitive, social, behavioural and sensory discrepancies are just

hurled into special education classrooms without proper special education processes to determine the eligibility of the child and what services and programmes the child may need to learn effectively (Dele & Tope, 2019). As such, even children with comorbid intellectual disability and hearing impairment who could benefit greatly from classroom instruction are left unattended to or just given a watered down curriculum without trying to provide for the child's hearing impairment through a range of complementary resources and instructional approaches. This consistently frustrates both the valued instructional efforts of teachers and the achievement of curriculum goals for these children.

The prevalence of hearing impairment is at least 40 times higher in people with intellectual disability compared with the general population (Carvill, 2011). In addition to developing conductive/sensorineural hearing loss, people with intellectual disability may also have central (cortical) auditory processing problems. WHO (2011) states that people with intellectual disability usually have multiple problems. To describe these problems adequately it is usually necessary to use several diagnoses taken from different parts of the classification. Undetected/untreated hearing loss imposes significant limitations upon individuals with intellectual disabilities (ID). It interferes with the already lagging cognitive development, impedes communicative and social interactions, and limits educational and vocational aspirations.

Difficulty in accessing generic services and the deficits in language and communication skills found in this population make the assessment of sensory impairment a challenge. In practice, diagnostic masking can occurs, with changes in behaviour are attributed to intellectual disability rather than to hearing impairment (Hull, 2016). Hearing defects in most children with ID in Nigerian classrooms are under diagnosed or misdiagnosed and consequently given wrong placement in the school system. Thus, the individual may receive inappropriate treatment that does not address the underlying problem. It is the observed that there is tendency for school assessors and classroom teachers to overlook symptoms of a compromised hearing health in these children; and instead trace these symptoms to the child's underlying intellectual disability. Teachers may perceive a person to be non-cooperative when in reality they cannot hear properly. The failure to recognize such double needs often technically stems more from the assessor's perception of the child's cognitive disability than from the difficulty inherent in sorting out multiple disabilities. Multiple studies consistently support the view that overshadowing is a common school teachers' bias occurring during classroom instruction for children with concomitant ID and hearing defects (Volleiy&Nunto, 2016).

Professional literature reports increased prevalence of hearing loss for people with intellectual disability compared to their general-population peers. It also reflects undetected hearing loss for individuals with ID, along with undertreated and unserved experiences once hearing loss is identified. The hearing health of children with intellectual disability has received considerable attention in published reports, and some studies have examined the hearing status of children with ID in classrooms for the purpose of providing need-based accommodations (Herer, 2012). Thus, it is important that the Nigerian educational system steps up its multidimensional assessment of children with intellectual disability to ensure that these children are given need-base classroom instructional supports.

Most people with intellectual disability with congenital hearing loss use a very simple version of sign language. Some of which have basic sign language vocabulary and structure. The Picture Exchange Communication System (PECS) can also be used to facilitate service users' autonomy by showing pictures of the items they need (**Reza & Miller, 2010)**. Thus, it might be important for classroom teachers to be ingenious both in observation and classroom practices to use adequate audio-visual instructional support or and total communication approaches in teaching children with intellectual disability to help to make up for the diagnostic biases that typify special education processes in Nigeria.

Therefore, total communication (TC) is philosophy of educating children with hearing problems that incorporates all means of communication; formal signs, natural gestures, finger spelling, body language, listening, lip-reading and speech. Also, closely related is audio-visual sensory support which is a procedure where classroom instructional communication is offered in a complementary manner to appeal to both sight and hearing at the same time. Children in total communication and or audio-visual sensory programmes typically wear hearing aids or cochlear implants. The goal is to optimize language development while providing curricula contents in most appropriate ways for optimum learning outcome (Hands and Voices, 2010). Its purpose is to provide each child with the communication tools needed for that child to develop language and social competence. This ought to continue to be the goal of every teacher for every child with intellectual disability who may have concomitant hearing defects.

The current classroom instructional practices for children with intellectual disability with associated hearing problems have become of much scientific and social value to researchers and parents alike. Thus, the purpose of this paper is to investigate the available classroom audio-visual instructional support for intellectually disabled children with compromise hearing health.

**Statement of the Problem**

Experience, researches and parents continue to provide strong evidence that children even mild with intellectual disability consistently perform academically and socially below the expected functional capacity and curriculum goals. Sequel to this, strong evidence suggest that because of the high incidence of its comorbidity with hearing impairment, adequate audio-visual instructional support to provide for associated hearing impairments is not adequately provided rather emphasis is on only intellectual functioning. With the claim that if there is improved intellectual functioning every other area of deficits will automatically improve. Thus, parents and researchers are keen to know the available audio-visual instructional support used by teachers to meet the hearing needs of children intellectual disability having hearing impairment.

It is as a result of this academic injustice that inspired the curiosity to investigate the audio-visual sensory instructional support available for children with intellectual disability having comorbid hearing impairment. Therefore, the problem of the study is what classroom audio-visual instructional support are available for children with intellectual disability having comorbid hearing impairment?

**Purpose of the study**

The objectives of this study to investigate:

1. The available audio-visual instructional support for children with intellectual disability having comorbid hearing impairment.
2. The relative contribution of total communication and nonvisual support approaches to classroom accommodation for children with intellectual disability having comorbid hearing impairment.

**Research questions**

In order to achieve the objectives of this study, the following research questions were posed:

1. What complementary audio-visual instructional support are adopted for children with intellectual disability having comorbid hearing impairment?
2. What is the relative contribution of total communication and nonvisual support approaches to effective classroom teachingof children with intellectual disability having comorbid hearing impairment?

**Methodology**

The study adopted a survey research design. Purposive sampling technique

was used to sample 115 special education teachers having learners with intellectual disability in their classrooms. A self-developed 18 item 4 points scale was used, of which 8 items were designed to ask teachers to rate the extent to which they use key best audio-visual instructional accommodations for children with intellectual disability having comorbid hearing deficits in the classroom. The other 10 items were used find out the extent to which total communication and nonvisual support approaches are effective in classroom teaching of children with intellectual disability having comorbid hearing impairment.

The instrument was validated with reliability coefficients ranging from 0.88 to 0.89 were administered to the 115 respondents. Two research questions were posed to achieve the objectives of the study. The data collected were statistically analyzed descriptively using percentage count and regression analysis at 0.05 level of significance.

**Results**

Research question 1: What complementary audio-visual instructional support are adopted for children with intellectual disability having comorbid hearing impairment?

**Table 1: Available complementary audio-visual classroom instructional support**

| | | Never → Always | | | | |
|---|---|---|---|---|---|---|
| S/No | Items | 0 | 1 | **2** | **3** | **4** |
| 1 | Total communication | N=103 | N=9 | N=3 | 0 | 0 |
| | | 89.6% | 7.8% | 2.6% | - | - |
| 2 | Intensive interaction | N=109 | N=3 | N=3 | 0 | 0 |
| | | 94.8% | 2.6% | 2.6% | - | - |
| 3 | Soundproof classrooms | N=112 | N=1 | N=2 | 0 | 0 |
| | | 97.4% | 0.9% | 1.7% | - | - |
| 4 | Preferential seating and lighting | N=15 | N=19 | N=39 | N=36 | N=6 |
| | | 13% | 16.5% | 33.9% | 31% | 5% |
| 5 | Assistive listening devices | N=111 | N=4 | 0 | 0 | 0 |
| | | 96.5% | 3.5% | - | - | - |
| 6 | Visual Presentation of Materials | N=12 | N=27 | N=41 | N=32 | N=3 |
| | | 10.4% | 23.5% | 35.7% | 27.8% | 2.6% |
| 7 | Auditory sandwich | N=110 | N=2 | N=2 | N=1 | 0 |
| | | 95.7% | 1.7% | 1.7% | 0.9% | - |
| 8 | Acoustic Highlighting | N=108 | N=5 | N=1 | N=1 | 0 |
| | | 93.9% | 4.3% | 0.9% | 0.9% | - |

The Table 1 above shows the response of teachers of children with intellectual disability on the frequency they use the understudied audio-visual classroom accommodations for children with intellectual disability having comorbid hearing impairment. The responses indicate that over 89% of teachers of these children do not employ total communication for instructional delivery in the classroom. Also, the responses reveal that over 94% of teachers of children with intellectual disability having comorbid hearing defects do not use intensive interaction during classroom instructional delivery.

Also, over 97% of teachers agreed that they do not ensure as a matter of pedagogical practice that unnecessary sounds do not disrupt classroom teaching by using soundproof classroom. Fortunately, only about 13% of teachers do not adopt preferential seating and lighting approaches to provide auditory needsof children with intellectual disability having comorbid hearing problems. About 87% adopt these to ensure classroom auditory and visual support. Though, assistive listening devices are outside the domain of the classroom teachers but having over 96% of teachers whose classroom children do not have these aids reveals how much their auditory needs are neglected. Desirably, only about 10% of teachers of these children agreed that they do not use audio-visual materials in classroom presentations. Visual presentation of materials is beneficial in meeting the sensory needs of children with intellectual disability.

Unfortunately, over 95% of teachers do not adopt auditory sandwich in classroom instructional delivery. Similarly near 94% of teachers of these children do not use acoustic highlighting in teaching.

**Research question 2:** What is the relative contribution of total communication and nonvisual support approaches to effective classroom teaching of children with intellectual disability having comorbid hearing impairment?

**Table 2: Summary of multiple regression analysis showing relative contribution of total communication and nonvisual support approaches to effective classroom accommodation for children with intellectual disability having comorbid hearing impairment**

| Variable | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| Model | (B) | Std. Error | Beta | T | Sig. |
| Constant | 17.461 | .546 | - | 21.577 | .000 |
| Total communication | .909 | .058 | .721 | 25.149 | .000 |
| Nonvisual support approaches | .111 | .002 | .001 | 9.238 | .000 |

Table 2 reveals that total communication unlike nonvisual support approaches contributes significantly to effective classroom teachingof children with intellectual disability having comorbid hearing impairment expressed as beta weights. Using the standardized regression coefficient to determine the relative contribution of the variables, total communication ($\beta = 0.721$, $t=25.149$, $p<0.05$) indicates a potent contributor to effective teaching, while nonvisual support approaches ($\beta = 0.001$, $t=9.238$, $p>0.05$). This implies that while total communication contributes significantly to effective classroom teaching; whilenonvisual support approaches do not have any significant contribution to effective classroom teaching of children with intellectual disability having comorbid hearing impairment.

**Discussion of Findings**

The research findings have shown that there is little or no available audio-visual classroom instructional support for children with intellectual disability having comorbid hearing defects. The findings show that over 89% of teachers in the current study do not employ total communication in teaching these children. Research by Collette and Ruil (2020) provides evidence that teaching methods that adopt verbal language support to speech such as formal signs, natural gestures, fingerspelling, body language and lip-reading are crucially needed to meet the both intellectual and auditory needs of children with intellectual disability having

compromised hearing. Lack of such practices by teachers in the current study may probably be because of the limited knowledge of teachers on co-occurrence of intellectual disability and hearing deficits. The findings of the current study also corroborate the position of Yate and Bole (2018) which states the many educators are not equipped with 21st century pedagogical practices such as intensive interaction and auditory sandwich to help the majority of children with intellectual disability who may have hearing impairment to benefit from classroom instruction.

The findings of the current study show that over 93% of teachers of children with intellectual disability having comorbid hearing defects do not use intensive interaction, auditory sandwich and acoustic highlighting during classroom instructional delivery. Intensive interaction approaches such as using touch, stimulating sensory toys, enunciating syllables and words within close range hold potential to help these dual struggling learners to learn better. Also, auditory sandwich is not used in the classroom. This might in part due to limited knowledge on it use. It is important that for these category of children, information is presented through listening before the introduction of visual or other support information is given to a child. *Auditory sandwich*is based on the premise that children with this comorbid condition need to learn to trust their hearing and rely on auditory input to learn spoken language (Yate & Bole, 2018).

The findings of the current study also suggest that limited knowledge of the comorbidity and lack of training of teachers on acoustic highlighting may be the reason for such low utilization in the classroom. Interestingly, for every child with intellectual disability, it is important that teachers emphasize specific words (sounding it louder) when saying a phrase or sentence to make it stand out from the rest of the message. Similarly, the findings of the current study revealed that classrooms for children with intellectual disability having hearing impairment are not soundproof or low noise and hearing aids are not provided.

These findings are similar to Goge (2017) who reported that lack of hearing aids and noisy classrooms for children with intellectual disability who are already prone to compromised hearing. While soundproof classrooms are architectural and administrative provisions, and assistive listening devices are outside the domain of teachers, teachers also have ingenious ways of keeping out unnecessary noise interference in classroom instructions. Thus, preferential seating and lighting as well as visual presentation of learning materials help to some extent where there is lack of soundproof classrooms and hearing aids (Goge, 2017). Fortunately, the findings of the current study showed that over 80% of teachers adopt these practices but it is not clear whether or not they adopt these approaches

in response to the diagnosis of comorbid intellectual disability and hearing impairment.

The current findings are in agreement with (Alkhalhi, 2016) which reveals that total communication contributes significantly to effective classroom teaching for children with intellectual disability having comorbid hearing impairment. Conversely, the current study did not support the use of nonvisual support approaches (abstract verbal presentations, reading) as a way of meeting the auditory needs of children with intellectual disability who already have high risk of compromised hearing in addition to language acquisition problems.

**Conclusion**

The provision of effective instructional support for children with intellectual disability who also have hearing impairment is a continuing challenge for intellectual disability services. Most professionals lack knowledge and skills not only in the observational assessment but also in the classroom instructional management of this population of learners. Resources are sparse and there are limited numbers of specialist services to address this group's needs. Providing adequate and appropriate accommodations for students with hearing loss in the classroom is not easily accomplished; accommodations require time, money, expertise, and institutional support to be implemented well.

Hearing impairment has significant detrimental impact on sociocognitive and language development. Despite this, it is very much underrecognised and underdiagnosed in people with intellectual disability. Raising awareness of hearing impairment among professionals and carers is extremely important for early management to prevent further social handicap in people with intellectual disability.

**Recommendations**

Based on the findings of the study, the authors recommended that:

i. There should be combined efforts of government and schools to design hearing screening services for all children with intellectual disability to determine eligibility for auditory support programmes.
ii. Government and schools should provide in-service training for teachers on total communication and other audio-visual approaches to equip them with 21st century knowledge on classroom pedagogies for children with intellectual disability having comorbid hearing impairment.
iii. Government should support schools and parents not only in the hearing screening for all children with intellectual disability but also in the provision of hearing aids and good classroom environments for effective learning.

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