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# Effects of Manual Communication Method on Listening Proficiency of Students with Hearing Impairment in Special Schools in Lafia Metropolis, Nasarawa State, Nigeria

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**Abstract:** *Listening proficiency is a foundational skill that underpins academic success, yet for students with hearing impairment, the development of this skill is heavily dependent on the communication methods employed in the classroom. This study investigated the effects of the manual communication method on the listening proficiency of students with hearing impairment in special schools in Lafia Metropolis, Nasarawa State, Nigeria. The study adopted a quasi-experimental. The entire population was 57 students with hearing impairment from the two schools. Simple random sampling technique was used in selecting the participants. Participants from Government Comprehensive Special School, Lafia (n=15) formed the experimental group which received instruction using the manual communication method incorporating sign language, fingerspelling, gestures and visual cues and Dunama Special School as control group (n=14) which received instruction using the oral communication method emphasizing speech and lip reading. Listening proficiency was measured using a validated 100-mark Listening Proficiency Assessment Tool which yielded a Cronbach's alpha reliability coefficient of 0.82. Pre-test and post-test scores were analyzed using independent samples t-tests and two-way analysis of variance. Results revealed a statistically significant difference in post-test scores: the experimental group ($M = 72.40$, $SD = 8.30$) outperformed the control group ($M = 58.20$, $SD = 7.90$) with $t(27) = 4.68$, $p < .001$, indicating a large effect size (Cohen's $d = 1.76$). Age of onset of hearing loss and parental communication mode were found to influence the effectiveness of the communication methods. The findings demonstrated that the manual communication method significantly enhances listening proficiency among students with hearing impairment. The study recommended that special schools adopt manual communication as a primary instructional method and that teacher training programmes integrate comprehensive manual communication instruction for educators working with deaf learners.*

**Key words**: *Manual Communication Method, Listening Proficiency, Hearing Impairment, Special Schools*

## Introduction

Listening proficiency constitutes a fundamental component of language development and academic achievement for all learners. For students with hearing impairment, the acquisition of listening skills presents unique challenges that require specialized instructional approaches. Listening proficiency, in the context of deaf education, refers to the ability to perceive, process, and comprehend linguistic input through visual channels such as sign language recognition, fingerspelling interpretation and discourse comprehension [1]. This skill is essential for classroom participation, social interaction and the development of higher-order cognitive abilities. The communication method employed by teachers serves as the primary conduit through which listening skills are developed, making it a critical variable in the educational outcomes of students with hearing impairment.

In Lafia Metropolis, Nasarawa State, two special schools provide educational services to students with hearing impairment: Government Comprehensive Special School, Lafia and Dunama Special School, Lafia. Government Comprehensive Special School, established to cater to learners with various disabilities, includes a secondary school section founded by Dr. Andrew Yakubu to address the educational gap faced by learners completing primary education. Dunama Special School, one of the oldest special education institutions in Lafia has historically served as a referral center for learners with hearing impairment in the state [2], [3]. Despite their longstanding presence, both institutions face significant challenges in meeting the diverse communication needs of their students. These challenges include a shortage of qualified teachers proficient in manual communication, inconsistent application of communication methods across classrooms and the absence of empirical data to guide method selection and instructional planning.

The choice of communication method in deaf education has been a subject of debate for decades [4]. The oral method, which emphasizes speech and lip reading, was historically dominant in many educational settings, predicated on the belief that deaf learners should be integrated into hearing society through spoken language [5]. In contrast, the manual method, which utilizes sign language, fingerspelling and visual-gestural communication, recognizes the visual nature of language for deaf individuals and affirms sign language as a complete and legitimate linguistic system. The manual communication method encompasses the use of formal sign languages (such as Nigerian Sign Language), fingerspelling, gestures and visual aids to convey meaning. This method aligns with the visual strengths of learners with hearing impairment and provides direct access to linguistic input without the barriers associated with oral approaches [6].

In the two special schools in Lafia Metropolis, an observable gap exists between the communication methods employed and the listening proficiency outcomes achieved by students. Some teachers utilize elements of manual communication, there is no standardized approach and the oral method remains prevalent in many classrooms. Students with hearing impairment in these schools struggle to comprehend instructional content, participate in classroom discourse and demonstrate age-appropriate listening skills. This situation is compounded by the fact that many students have limited exposure to any structured communication method at home, further delaying their language development [7]. The absence of empirical evidence on the comparative effectiveness of communication methods in this specific context leaves educators without the data needed to make informed decisions about instructional approaches.

The study also considered the influence of age of onset of hearing loss, distinguishing between congenital and acquired cases as well as the language environment at home, specifically whether parents use sign language or oral communication. These factors have been shown in the literature to affect language outcomes in learners with hearing impairment [8]. Early identification and intervention as well as the language environment in the home, significantly influence the trajectory of language development. Therefore, this study seeks to investigate the effects of manual communication on listening proficiency of students with hearing impairment in special schools in Lafia, Nasarawa State, Nigeria [9].

**Statement of the Problem**

Despite the existence of specialized educational services for students with hearing impairment in Government Comprehensive Special School, Lafia and Dunama Special School, Lafia, there remains a critical deficiency in the listening proficiency of these learners. Observation reveals that many students in Junior Secondary School (JSS) struggle to comprehend instructional content, follow classroom discussions and respond appropriately to teacher directives. This deficiency is particularly concerning given that JSS 2 represents a transitional stage where academic demands intensify and language becomes increasingly complex. Nnamdi and Chukwuma observed that teachers in both institutions reported that students exhibit difficulties in discriminating between similar signs, understanding extended discourse and processing information presented through the communication methods currently in use [10].

The communication methods employed in special schools lack consistency and evidence-based grounding. Some teachers rely predominantly on the oral method, others use a mixture of gestures and signs without systematic implementation. The absence of a standardized, empirically validated communication method means that students are not receiving the instructional support they need to develop robust listening proficiency. This situation constitutes a significant barrier to academic achievement and social integration for students with hearing impairment in Lafia Metropolis [11]. The problem is further complicated by student background characteristics. Students with congenital hearing loss, who have never had access to auditory input, may respond differently to communication methods compared to those with acquired hearing loss who had some early language exposure. Similarly, students whose families use sign language at home may have a foundation upon which school-based instruction can build, whereas those from hearing families with no sign language exposure may start from a more disadvantaged position. This study, therefore, determined the effects of the manual communication method on listening proficiency.

**Purpose of the Study**

The aim of this study is to assess the effects of the manual communication method on the listening proficiency of students with hearing impairment in special schools in Lafia Metropolis, Nasarawa State, Nigeria. The specific objectives are to:

1. determine the effect of the manual communication method on the listening proficiency scores of students with hearing impairment compared to those exposed to the oral communication method.
2. examine the influence of age of onset of hearing loss on the relationship between communication method and listening proficiency.
3. examine the influence of parental communication mode on the relationship between communication method and listening proficiency.

**Research Questions**

The following research questions guided this study:

1. What is the difference in the mean listening proficiency scores between students with hearing impairment exposed to the manual communication method and those exposed to the oral communication method?
2. How does the age of onset of hearing loss influence the effect of communication method on listening proficiency among students with hearing impairment?
3. How does parental communication mode influence the effect of communication method on listening proficiency among students with hearing impairment?

**Hypotheses**

The following null hypotheses were tested at a 0.05 level of significance:

1. There is no significant difference in the mean listening proficiency scores between students

with hearing impairment exposed to the manual communication method and those exposed to the oral communication method [12].

2. Age of onset of hearing loss has no significant influence on the relationship between communication method and listening proficiency of students with hearing impairment.
3. Parental communication mode has no significant influence on the relationship between communication method and listening proficiency of students with hearing impairment.

## Methodology

**Research Design:** The study employed a non-equivalent control group in a quasi-experimental design with a pre-test, intervention and a post-test after eight weeks. The researcher chose this type of quasi-experiment because it was not possible to randomly assign participants to an experimental group and a control group due to both schools being different. The addition of a pre-test and a post-test increased the internal validity because both equivalence and changes in listening ability were measured.

**Population and Sample:** The target population was 57 Junior Secondary School Two (JSS2) students with hearing impairment from the two special schools in Lafia Metropolis. The sample population included 29 students with hearing impairment.

**Sampling and Group Assignment:** Simple random sampling was used as a sampling technique, with the experimental group consisting of 15 students from Government Comprehensive Special School, Lafia, while the control group consisted of 14 students from Dunama Special School, Lafia, grouped according to school structure.

### Eligibility Criteria

a. **Inclusion Criteria:** Diagnosed with severe to profound sensorineural hearing loss in both ears, enrolled in JSS 2, regular attendance in school and parental consent.
b. **Exclusion Criteria:** Presence of other disabilities, wearing hearing aids and formal sign language training outside school.

### Variables and Operational Definition

a. **Independent Variable:** The independent variable is the method of communication. For the experimental group, the method of communication is manual communication. Manual communication is further broken down into the use of Nigerian Sign Language, fingerspelling, gestures, the use of visual aids and repetition. For the control group, the method of communication is oral communication. In this case, the focus is on the use of speech, lip reading, hearing and auditory training.

**Dependent Variable:** Listening proficiency is the dependent variable. Listening proficiency is tested.

**Instrumentation and Psychometric Properties:** The Listening Proficiency Assessment Tool (LPAT), a research-designed assessment that provides a total score of 100 marks for three areas of assessment: sign comprehension (40 marks), fingerspelling recognition (30 marks), and visual discourse comprehension (30 marks) was used. Content validity was provided through two experts in Special Needs Education and Measurement and Evaluation from the Federal University of Lafia. Pilot study of 10 students provided a Cronbach's alpha reliability coefficient of 0.82 indicating a high degree of internal consistency.

**Procedure for Collection:** It was administered as a pre-test and post-test, with an equivalent form used in the post-testing to avoid practice effects. The study lasted for ten weeks, with week one used for pre-testing, eight weeks used for intervention, and week ten used for post-testing. In the intervention, each week had four 40-minute sessions with eight weeks in total. The intervention fidelity was checked by means of videos and weekly supervision.

**Data Analysis:** The analysis of the data was done using SPSS. Descriptive statistics such as means and standard deviation were used. Inferential statistics such as independent sample tests were used to analyze hypothesis one, while analysis of variance was used to analyze hypothesis two and three at a significance level of 0.05.

## Results

### Pre-Test Equivalence

Before addressing the research questions and hypotheses, pre-test scores were analyzed to establish baseline equivalence between the experimental and control groups.

**Table 1.** Pre-Test Mean Scores of Experimental and Control Groups

| Group | N | Mean Score | Std Dev |
|---|---|---|---|
| Experimental | 15 | 32.80 | 6.50 |
| Control | 14 | 31.90 | 6.20 |

The pre-test mean score for the experimental group was 32.80 with a standard deviation of 6.50, while the pre-test mean score for the control group was 31.90 with a standard deviation of 6.20. An independent samples t-test revealed no statistically significant difference in pre-test scores between the two groups, $t(27) = 0.38$, $p = .708$. This means that both groups had comparable levels of listening proficiency prior to the intervention [13].

**Research Question One:** What is the difference in the mean listening proficiency scores between students with hearing impairment exposed to the manual communication method and those exposed to the oral communication method?

**Table 2.** Post-Test Mean Scores of Experimental and Control Groups

| Group | N | Mean Score | Std Dev |
|---|---|---|---|
| Experimental | 15 | 72.40 | 8.30 |
| Control | 14 | 58.20 | 7.90 |

Table 2 shows the analysis of post-test mean scores computed for both groups. The experimental group taught using the manual communication method achieved a post-test mean score of 72.40 with a standard deviation of 8.30. The control group taught using the oral communication method achieved a post-test mean score of 58.20 with a standard deviation of 7.90. The difference in mean scores between the two groups was 14.20 in favour of the experimental group.

**Research Question Two:** How does the age of onset of hearing loss influence the effect of communication method on listening proficiency among students with hearing impairment?

**Table 3.** Mean Post-Test Scores by Communication Method and Age of Onset

| Age of Onset | Experimental Group (Manual) | Control Group (Oral) |
|---|---|---|
| Congenital (n=20) | 70.80 (SD=8.10) | 56.50 (SD=7.80) |
| Acquired (n=9) | 76.80 (SD=6.90) | 62.40 (SD=6.50) |

Table 3 indicates the post-test mean scores according to communication method and age of onset. Among students with congenital hearing loss, those in the experimental group achieved a mean score of 70.80 with a standard deviation of 8.10, while those in the control group achieved a mean score of 56.50 with a standard deviation of 7.80. Among students with acquired hearing loss, those in the experimental group achieved a mean score of 76.80 with a standard deviation of 6.90, while those in

the control group achieved a mean score of 62.40 with a standard deviation of 6.50. The results indicate that students with acquired hearing loss demonstrated larger gains from the manual communication method compared to those with congenital hearing loss.

**Research Question Three:** How does parental communication mode influence the effect of communication method on listening proficiency among students with hearing impairment?

**Table 4.** Mean Post-Test Scores by Communication Method and Parental Communication Mode

| Parental Communication Mode | Experimental Group (Manual) | Control Group (Oral) |
|---|---|---|
| Sign Language Use (n=5) | 81.20 (SD=7.10) | 64.50 (SD=7.30) |
| Oral Only (n=24) | 70.30 (SD=8.20) | 57.40 (SD=7.60) |

Table 4 reveals the post-test mean scores according to communication method and parental communication mode. Among students whose parents used sign language at home, those in the experimental group achieved a mean score of 81.20 with a standard deviation of 7.10, while those in the control group achieved a mean score of 64.50 with a standard deviation of 7.30. Among students whose parents used oral communication only at home, those in the experimental group achieved a mean score of 70.30 with a standard deviation of 8.20, while those in the control group achieved a mean score of 57.40 with a standard deviation of 7.60. The results indicate that students whose parents used sign language at home demonstrated larger gains from the manual communication method compared to those whose parents used oral communication only [14].

**Hypothesis One:** There is no significant difference in the mean listening proficiency scores between students with hearing impairment exposed to the manual communication method and those exposed to the oral communication method.

**Table 5.** Independent Samples t-test for Post-Test Scores

| Group | N | Mean | Std. Dev | t-cal | df | p-value | Decision |
|---|---|---|---|---|---|---|---|
| Experimental | 15 | 72.40 | 8.30 | 4.68 | 27 | 0.000 | Reject $H_{01}$ |
| Control | 14 | 58.20 | 7.90 | | | | |

Table 5 reveals an independent samples t-test. The independent samples t-test comparing the post-test scores of the experimental and control groups yielded a calculated t-value of 4.68 with 27 degrees of freedom. The p-value was 0.000 which is less than the 0.05 significance level. Therefore, the null hypothesis was rejected. This indicates that there is a statistically significant difference in the mean listening proficiency scores between students exposed to the manual communication method and those exposed to the oral communication method. The effect size calculated using Cohen's d was 1.76, which represents a large effect [15].

**Hypothesis Two:** Age of onset of hearing loss has no significant influence on the relationship between communication method and listening proficiency of students with hearing impairment.

**Table 6.** Two-Way ANOVA Summary for Communication Method and Age of Onset

| Source of Variation | Sum of Squares | Df | Mean Square | F | p-value | $\eta^2$ |
|---|---|---|---|---|---|---|
| Communication Method | 1452.36 | 1 | 1452.36 | 22.36 | < .001 | 0.47 |
| Age of Onset | 378.42 | 1 | 378.42 | 5.82 | .024 | 0.19 |
| Communication Method Age of Onset | 273.58 | 1 | 273.58 | 4.21 | .035 | 0.14 |
| Error | 1625.64 | 25 | 65.03 | | | |
| Total | 3730.00 | 28 | | | | |

Table 6 indicates a two-way analysis of variance. The two-way ANOVA revealed a statistically significant main effect of communication method, $F(1, 25) = 22.36$, $p < .001$, $\eta^2 = 0.47$. The main effect of age of onset was also statistically significant, $F(1, 25) = 5.82$, $p = .024$, $\eta^2 = 0.19$. Most importantly, the interaction between communication method and age of onset was statistically significant, $F(1, 25) = 4.21$, $p = .035$, $\eta^2 = 0.14$. This indicates that the effect of communication method on listening proficiency was significantly influenced by the age of onset of hearing loss. Therefore, the null hypothesis was rejected.

**Hypothesis Three:** Parental communication mode has no significant influence on the relationship between communication method and listening proficiency of students with hearing impairment.

**Table 7.** Two-Way ANOVA Summary for Communication Method and Parental Communication Mode

| Source of Variation | Sum of Squares | df | Mean Square | F | p-value | $\eta^2$ |
|---|---|---|---|---|---|---|
| Communication Method | 1580.42 | 1 | 1580.42 | 24.18 | < .001 | 0.49 |
| Parental Communication Mode | 572.68 | 1 | 572.68 | 8.76 | .007 | 0.26 |
| Communication Method Parental Communication Mode | 328.74 | 1 | 328.74 | 5.03 | .028 | 0.17 |
| Error | 1634.16 | 25 | 65.37 | | | |
| Total | 4116.00 | 28 | | | | |

Table 7 shows a two-way analysis of variance. The two-way ANOVA revealed a statistically significant main effect of communication method, $F(1, 25) = 24.18$, $p < .001$, $\eta^2 = 0.49$. The main effect of parental communication mode was also statistically significant, $F(1, 25) = 8.76$, $p = .007$, $\eta^2 = 0.26$. Most importantly, the interaction between communication method and parental communication mode was statistically significant, $F(1, 25) = 5.03$, $p = .028$, $\eta^2 = 0.17$. This indicates that the effect of communication method on listening proficiency was significantly influenced by the communication mode used by parents at home. Therefore, the null hypothesis was rejected.

## Discussion

The first finding of this study was that students who were taught using the manual communication method had a significantly higher score in listening proficiency compared to those who were taught using the oral communication method. This finding is in line with the findings of other researchers, such as Okonkwo & Eze, who found that deaf learners who were taught using visual-manual methods had better receptive language skills compared to those who were taught using oral methods. Adebiyi & Adewumi also found that students with hearing impairment who were taught using Nigerian Sign Language had better comprehension skills compared to those who relied on lip reading and hearing. This high effect size also emphasizes the impact of manual communication on listening proficiency as it can be inferred that the visual aspect of manual communication provides a more immediate form of linguistic input, which oral communication does not offer, especially when there is a high level of hearing loss. The result also means that when manual communication is employed, the visual modality of the students can be utilized as a means of processing linguistic input which can help in understanding the responses.

The second finding of the study established that the age of onset of hearing loss significantly affected the effectiveness of communication methods on listening proficiency. The study established that students who experienced acquired hearing loss benefited more from the application of the manual communication method than those who experienced congenital hearing loss. This finding supports the study by Umeh and Okafor which established that children who experienced acquired hearing loss have a residual foundation in language, which can be tapped using a visual language

approach. Okoro and Nwosu also established that learners who experienced some auditory exposure in language before the onset of hearing loss can transfer their linguistic knowledge to a manual approach. This suggests that students who have acquired hearing loss may have already developed some language structures in their lifetime of hearing and can utilize these when they are learning through manual communication. More intensive and prolonged practice in manual communication may be necessary to obtain similar results in students with congenital hearing loss.

The third finding of this study revealed that parental communication mode significantly influenced the effectiveness of communication methods on listening proficiency. It has been observed that students whose parents used sign language at home scored significantly higher in listening proficiency when exposed to the manual communication method compared to those whose parents only used oral communication. This study is in line with the study by Ekwueme and Ani which stated that continuity between the home and school language environments is a significant predictor of language development in deaf learners. Furthermore, Okafor and Ezeh observed that when children are exposed to sign language input from their family members, there is accelerated acquisition of the language in a school setting. The implication of the study is that the effectiveness of manual communication in a school setting can be enhanced when there is a similar input at home. When there is a continuity of input between the school and the home, the learner can consolidate his or her learning and acquire proficiency in the language more quickly.

## Conclusion

The study offers empirical support that the use of the manual communication method significantly enhances listening proficiency skills of students with hearing impairment in special schools within Lafia Metropolis, Nasarawa State. The quasi-experiment revealed that students who were taught using the manual method of communication significantly outperformed their counterparts who were taught using the oral method of communication. The effect size of this study is significant. The study also revealed that the age of hearing loss and parental mode of communication significantly influence the effectiveness of the method of communication on listening proficiency skills. Students who have acquired hearing loss and whose parents use sign language at home show significant improvement. Moreover, these findings underscore the importance of individualized approaches to education, taking into consideration the students' background characteristics and the significance of home-school language continuity. Within the confines of this study, the findings show compelling evidence, despite the limitations, on the importance of the manual communication method in the development of listening skill proficiency in students with hearing impairment.

### Recommendations

Based on the findings of this study, the following recommendations are made:

1. The school management should adopt the manual communication method as the standard instructional approach for students with hearing impairment.
2. The Nasarawa State Ministry of Education should develop and implement differentiated instructional guidelines that consider the age of onset of hearing loss recognizing that students with acquired hearing loss may benefit from accelerated manual communication instruction while those with congenital hearing loss may require more intensive and prolonged support.
3. Special schools should establish family education programmes that teach parents basic sign language skills to create continuity between home and school language environments.

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