COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF AMERICAN AND INDIAN SIGN LANGUAGE AS NON VERBAL COMMUNICATION METHOD IN SPEECH AND HEARING IMPAIRED CHILDREN FOR ASSESSMENT OF ORAL HEALTH STATUS

BABU BANARASI DAS UNIVERSITY, LUCKNOW

Thesis submitted in partial fulfilment of the requirements for degree of

MASTER OF DENTAL SURGERY

In the subject of

PEDIATRIC AND PREVENTIVE DENTISTRY

DEPARTMENT OF PEDIATRIC AND PREVENTIVE DENTISTRY

BABU BANARASI DAS COLLEGE OF DENTAL SCIENCES,

LUCKNOW, UTTAR PRADESH- 227105

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled

"COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF AMERICAN AND INDIAN SIGN LANGUAGE AS NON VERBAL COMMUNICATION METHOD IN SPEECH AND HEARING IMPAIRED CHILDREN FOR ASSESSMENT OF ORAL HEALTH STATUS"

Is a bonafide and genuine research work carried out by me under the guidance of **Dr. Neerja Singh**, **Professor and Head,** Department of Pediatric and Preventive Dentistry, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh.

Date: 7 July 2021

Place: Lucknow

Dr. ANAHITA GUPTA

CERTIFICATE

This is to certify that the dissertation entitled **"COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF AMERICAN AND INDIAN SIGN LANGUAGE AS NON VERBAL COMMUNICATION METHOD IN SPEECH AND HEARING IMPAIRED CHILDREN FOR ASSESSMENT OF ORAL HEALTH STATUS"** is an original bonafide research work done by **Dr. ANAHITA GUPTA,** in partial fulfilment of the requirement for the degree of **MASTER OF DENTAL SURGERY (M.D.S)** in the speciality of **PEDIATRIC AND PREVENTIVE DENTISTRY** under our supervision.

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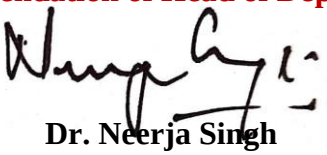
Recommendation of Head of Department



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Place: Lucknow

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AIM: To evaluate and compare the effectiveness of American and Indian sign language as nonverbal communication (NVC) methods in hearing and speech impaired pediatric population for assessment of Oral Health Status.

OBJECTIVES:

1. To evaluate the effectiveness of American Sign Language for the assessment of oral health status in speech and hearing impaired children aged 5-16years.
2. To evaluate the effectiveness of Indian Sign Language for the assessment of oral health status in speech and hearing impaired children aged 5-16years.
3. To evaluate and compare the oral health status obtained from American Sign Language and Indian Sign Language.

MATERIALS & METHODS:

Place of study-

- The present study was conducted in the Department of Pedodontics and Preventive Dentistry, BBDCODS, BBDU in collaboration with various different institutions and non-governmental organizations which have hearing and speech impaired children.

Institution involved in the study-

- **Welfare Centre for Persons with Speech and Hearing Impairment, Haryana.**
- **N C Chaturvedi School For The Deaf , Aishbagh**
- **Bal mook sansthaan, Delhi**

Inclusion criteria-

Hearing and speech impaired pediatric patients aged 5-16 years are included in the study from various institutions and non-governmental organizations.

Exclusion criteria-

Hearing and speech impaired children with any other disability or systemic disease were excluded from the study.

METHODOLOGY:

The study was conducted in Department of Pedodontics and Preventive Dentistry, Babu Banarasi Das College of Dental Sciences, Lucknow in collaboration with various NGO'S. A total of 600 children aged 5-16years were selected from different institutes dealing with hearing and speech impaired children. These children were further divided in three groups of 200 each. Group 1 was communicated through Indian sign language, group 2 was communicated through American Sign Language and group 3 was communicated through Visual Aids. The children were asked about their daily oral hygiene maintaining practices and dental problems if any with the help of sign language. They were also explained about the non-invasive or preventive measures for maintaining a good oral hygiene. There was a single operator so as to reduce the chances of any bias being created. Each child was assessed thrice at an interval of 3 months.

RESULT:

On evaluating OHI-S of all the children in all the three groups it was calculated that mean OHI-S of the children who were communicated through Indian Sign Language was 34% Good , 38.3% fair and 28% poor. In the second group who were communicated through American Sign Language mean OHI-S score was 8% good, 35.6% fair and 57% poor. In the third group who were communicated through Visual Aids mean OHI-S score was 7% good, 33.6% fair and 60% poor.

CONCLUSION:

It was concluded that Indian Sign Language was easy to communicate with the Indian population as compared to American Sign Language.

"People with disabilities are vulnerable because of the many barriers we face: attitudinal, physical, and financial. Addressing these barriers is within our reach and we have a moral duty to do so..... But most important, addressing these barriers will unlock the potential of so many people with so much to contribute to the world. Governments everywhere can no longer overlook the hundreds of millions of people with disabilities who are denied access to health, rehabilitation, support, education, and employment—and never get the chance to shine."

- Stephen Hawking

Deafness has been far-famed to exist since the start of recorded history. The hearing impaired population was typically denied the essential rights and privileges. It's far-famed that among several early and primitive folks, people who couldn't contribute their share to the requirements of the tribe weren't allowed to survive. The long, painful, and arduous struggle of the hearing impaired to emancipate themselves from these biases, prejudices, persecutions, and inhumanities continues even today.

Lack of hearing has continuously been in the midst of lack of speech, the words "Dumb" and "Mute" have continuously had a detailed association with the word "deaf "and are typically misunderstood. [1]

Oral cavity is often outlined as a very important structure of the human body that is comprised of tongue, teeth, palate, and oral mucosa. A big range of research-based articles have delineated that the upkeep of oral health is extraordinarily necessary in people for living a healthy life. Speech and hearing impaired people are an important part of the society; but, a big range of studies don't seem to be a gift for evaluating the attention level concerning oral health standing. Most of the scientific studies have targeted on the overall population for analyzing the attention level concerning oral health and dental needs. [2]

Thus, this study can play a major role in analyzing and providing oral health-related education and data to folks with hearing and speech impairment.

Good communication helps to cut back patient anxiety while enhancing patient satisfaction and minimizing misunderstandings and complaints. A number of disabilities can have an impact on 'normal' communication practice.[4] Where communication cannot be met through speech, nonverbal methods should be considered. It is important not to pretend to understand speech which is not clear.

Hearing impairment accounts for 5.76% of all disabilities.[3] The common causes for the impairment are the antepartum and postnatal infections, diseases like morbilli, brain fever, redness and typhoid fever, hypoxia, premature births, exposure to toxic agents, and trauma. It's a forceful result on the victim's psychological, emotional, and social setup that becomes additional pronounced because the severity of the matter will increase. [3]

Such a situation may lead to the problem of communication while the patients with impaired hearing are undergoing dental and medical care. This communication gap widens more due to lack of the required knowledge and training by the dental staff while dealing with the patients having impaired hearing.

Such a scenario might cause the matter of communication whereas the patients with impaired hearing are undergoing dental treatment. This communication gap widens, additional thanks to the lack of specified data and coaching by the dentists in handling the patients having impaired hearing.

Oral and dental abnormalities are vital health issues for disabled patients, as well as those having impairment or visual impairment. The happiness of life is necessary and the mouth plays an important role in its accomplishment through functions like mastication, aesthetics, phonetics, communication and expression. It has been rumored, a dental treatment is the greatest unattended health need of the disabled.[2] Due to communication problems, it not solely becomes terribly tough for a deaf and mute kid to approach the dental health care supplier, however conjointly the dental health-care suppliers realize themselves helpless in recording a correct history and explaining the treatment commit to these patients.

So, misconception may arise due to inadequate communication between health care suppliers and also the patients with impaired hearing. Additionally to the suitable nonverbal strategies (such as lip reading, signing, mimicry, drawings, figures, writing, visual communication and gestures), the dentists got to utilize the psychological

approach, kindness, creativity, endurance and mutual respect while handling the deaf patients. Such an approach would undoubtedly bridge the gap between the patients with impaired hearing and also the dental professionals.

Aim:

To evaluate and compare the effectiveness of American and Indian sign language as nonverbal communication (NVC) methods in hearing and speech impaired pediatric population for assessment of Oral Health Status.

Objectives:

1. To evaluate the effectiveness of American Sign Language for the assessment of oral health status in speech and hearing impaired children aged 5-16years.
2. To evaluate the effectiveness of Indian sign language for the assessment of oral health status in speech and hearing impaired children aged 5-16years.
3. To evaluate and compare the oral health status obtained from American sign language and Indian sign language.

A Great stride have been accomplished recently in providing better medical services for handicapped children. As the dentist begins to understand the complexity of each particular form of handicap and its characteristics, he is able to plan more efficiently for satisfactory treatment.

Handicapped persons are at a greater risk for dental disease because of greater neglect or poor oral hygiene and access to routine dental care. The reason behind is that dentists do not understand deafness and the unique problems that deaf children exhibit (**Singh RK et al, 2012).**[1] A questionnaire based study on 204 hearing impaired individuals was carried out which stated that 87% of the patients had visited a dentist, out of which 77% reported to have problem in communication while receiving dental care (**Sammieng P et al, 2014)**[5]**.**

While assessing dental fear and anxiety using a Romanian version of the Modified Dental Anxiety Scale (MDAS) and the Dental Fear Survey (DFS), it was concluded that patients suffering from a prior negative experience were found to be more anxious (**Suhani RD et al, 2016).** [4]

Deaf patients in particular often fail to obtain needed care because of communication difficulties experienced in the treatment situation.

COMMUNICATION

A human soul cannot live in complete isolation. We need to communicate with each other to get through the day. Communication can be defined as the imparting or exchanging of information by speaking, writing, or using some other medium. Thus, a medium is necessary for conveyance of these thoughts, ideas and experiences.

Not everybody is blessed enough to possess all the five senses. Absence of any one of these five senses leads to obstruction in the path of communication. Through sign language, communication is made possible between people with speech impairment or hearing disability and normal people, thereby, reducing the communication gap between them.

Interaction with the deaf and dumb people hasn't really been agreeable over the years. Due to the impairment, there has always been a communication gap between people with

disabilities and the ones sanctified. The blessed people are not to be blamed for this communication gap. In fact, no one can be blamed for this transmission difference created.

The hearing impaired and the mute people use sign language which is not known by everyone. Not everyone has a good command over sign language, the disabled included. Thus, it becomes very difficult for the impaired to express themselves in society. This leads to their under-development and the disability proves to be a liability.

The basic rules and advice given for communicating with the hearing-impaired was classified in three groups – lip-readers, sign language users and those with hearing aids. To improve communication, sign language, writing, use of Braille, lip reading can be effective (**Fabiana CMH et al, 2018)**.[7] Since each child is different, depending on the education received, the communication skills possessed, family factors (degree of parental protection, etc.), the existence of associated problems (learning difficulties), degree of loss of hearing, age, etc., the treatment provided to hearing-impaired children in the dental clinic must also be personalized (**S. B. A. Silvia, 2007).[8]** However, guidelines for the communication with deaf dental patients are still missing (**B. Tatjani et al, 2009).[9]** Therefore**,** if we remove the masks while communicating with the children , reduce the background noise and learn to use simple signs (**J Champion , Holt R ,2012)[3]** or by becoming more aware of the range of communication methods used to support those who have hearing disabilities (**H. Lorna et al , 2015)[15]** we can improve communication with them **.**

In a study it was observed that a non-expert dentist who was not trained in nonverbal communication conveyed only 36.3% of the information correctly to the hearing impaired children while an expert dentist conveyed 83% of the information correctly. It was concluded that dentists should be made aware of the NVC. The signs and gestures related to dentistry should be taught to the hearing impaired students as well as the dental students (**S Jain et al, 2017).[2]**

The dentist must know and possess the necessary strategies and tools to cope with this situation and successfully achieve the proposed treatment objectives.

SIGN LANGUAGE

The practitioners and patients prefer the usage of hand signals over other means of communication to reduce fear and anxiety and improve rapport (**Vignesh R et al, 2016).**[10] The development of a direct communication channel between dental students and the deaf can lead to increased dental access and treatment for the deaf. Thus sign language can be extended to dentists and to other dental students globally. Hence, the mandatory inclusion of sign language and Deaf culture in the dental curriculum has not just removed a communication barrier, but has also assisted the empathetic and ethical development of the dental student (**T. Jones et al, 2017)**[11]**.**

A study was conducted on the applicability of dental sign language in hearing impaired children in relieving anxiety during stressful dental treatment by improving their means of communication. 40 students were selected and randomly divided into two group of 20 into the study and the control group. Initial oral examination and dental treatment (oral prophylaxis and class 1 restorations) were performed with and without the use of dental sign language in both the groups. Subjective and objective measurements of anxiety were recorded for both groups using facial image scale (FIS), pulse oximeter and electronic blood pressure apparatus to compare for correlation. It was hence concluded that dental sign language was effective in reducing the level of anxiety in children who are hard of hearing. It also improve behavior positively during dental treatment and also aid in developing a positive dental attitude among children who are hard of hearing (**Chandrasekhar Set al, 2017)**[12]**.** Basic training of dental professionals in sign language is both effective and feasible, and brings about greater improvement in oral hygiene status and gingival health as compared to the conventional methods of health education (**Hashmi S et al, 2019)**[13]**.**

An initiative was taken to develop oral health education tools for deaf and dumb children and to assess their effectiveness in improving oral health in schools for Deaf and Dumb in Bengaluru city. The team members were trained for educating the study group in sign language and also calibrated to measure oral hygiene using Oral Hygiene Index Simplified (OHI-S). Video in sign language about brushing technique was shown and leaflets were designed as hand-outs and peer leaders were trained to reinforce the learning. Data concluded that visually appealing educational aids help children with hearing and speech impairment to understand and comprehend better (**Ashwini K et al, 2019)**[23]**.** Sign language and the validated customized video modeling proved to be

positively influencing the oral hygiene status of CHI equivalently (**M. S Baliga et al, 2020)[14].**

A high need for an epidemiological survey followed by comprehensive dental care programs for children with hearing speech impairment, as well as efforts should be taken to encourage and promote parents of these children to improve their oral health.

PREVALENCE OF DENTAL CARIES

A study was conducted on a group of hearing impaired individuals of the government special schools for hearing impaired in Pondicherry to assess the dental caries prevalence and experience. Dental caries was assessed by DFT index and DMFT index. Prevalence of dental caries in terms of DMFT was 42.9% and DFT is 45%. Mean DFT was 1.2 ±1.38 and mean DMFT was 1 ± 1.42.

It was concluded that in both deciduous and permanent dentition, the females have higher caries prevalence compared to males (**Kamatchy KRJ et al, 2003)[15]**. Similar results were concluded in a cross sectional study in Karachi Pakistan on children with hearing and speech impairment (**M. Azfar et al, 2018)[16].** The information available for speech impairment individuals is still scarce. Hence, more awareness needs to be created among the speech-impaired people (**M. Meenapriya et al, 2019)[17]**.

The impairment leads to disability, and deprivation of these groups resulting in poor oral hygiene and subsequent periodontal diseases.

ASSESSMENT OF ORAL HYGIENE

A study was conducted to assess the oral hygiene and periodontal status in a group of hearing impaired individual of the Government special school for hearing impaired in Pondicherry. It was concluded that 77.19% study population had fair oral hygiene while only 9.6% population had good oral hygiene. In the study population it was evaluated that 70% children required treatment and only 3.5 % required no treatment (**Kamatchi JKR et al, 2003)[18].** Similarly young people with impaired hearing in the region of Udaipur, Rajasthan, India have a high prevalence of dental caries, poor oral hygiene and extensive unmet needs for dental treatment (**Kumar S, 2008)[19]**.

There is a need for implementation and evaluation of a long-range public dental health care plan for children with disabilities. Hence frequent maintenance visits and oral hygiene interventions, including prophylaxis, restorative care and evaluation of the oral tissues, was recommended (**Suma G et al, 2011; Sandeep V et al, 2016)**[20]. A study was conducted to compare the oral hygiene status and dental caries experience among institutionalized hearing impaired and visually impaired children of age between 7 and 17 years in Bhopal city of Madhya Pradesh. . It was concluded that Oral hygiene status of hearing impaired children was better than visually impaired and the difference was statistically significant. There was no significant difference between both groups with respect to DMFT. The hearing impaired children had significantly higher deft than visually impaired (**A Bhambal et al, 2013)**[21]. There is an alarming situation for dental diseases among special children. Hence, it is recommended to encourage their parents and school teachers to promote and improve their dental health (**K. M. Shivakumar et al, 2017)**[22].

A holistic approach is needed from periodontitis and other specialists to achieve satisfactory periodontal health in these subjects. In addition, the oral hygiene habits of individuals with disabilities can be improved by close monitoring and periodic dental checkups.

ORAL HEALTH CARE KNOWLEDGE

A study was conducted to determine the oral health care knowledge and practices of a group of deaf adolescents in Lagos. Information about previous dental care, oral hygiene, and snacking habits were obtained through a questionnaire and sign language by the teachers. It was seen that more than 90 percent were willing to have a dental check-up. Hence it was concluded that the oral health knowledge and practices of this group of children would improve through a controlled school-based oral health education program (**Folakemi A et al, 2004)**[16]. The program of teacher and parent supervised tooth-brushing with fluoride toothpaste can be safely targeted to socially deprived communities and can enable a significant reduction in plaque and gingival scores. Thus, an important principle of oral health education is the active involvement of parents and caregivers (**Pareek S et al, 2015)**[27].

In another study on evaluating the awareness level of the individuals with hearing and speech impairments, in relation to their oral health and dental treatment needs. A questionnaire was distributed among the participants for collecting data. It was seen that most of the participants were not aware of the importance of oral health. And had not visited the dentist in the past. It was also seen that many of them did not know the right way of doing tooth brushing. Hence, deaf and dumb individuals lack basic knowledge about oral health and dental treatment needs (**Mustafa M et al, 2018)**[22].

Constant motivation of the parent and caretakers to comply with the demands of the treatment and necessary training of the dental team in matters of behavior management and treatment strategies is needed to break the jinx that these special subjects are neglected by the society. Dental health education concerning dietary behavior and prevention program to the deaf students and their parents should be reinforced; the supervision of oral health behavior for deaf and healthy students' needs to be strengthened (**A Sharma et al, 2019)**[31]. Videos of oral hygiene instructions in Arabic sign language had immensely improved knowledge regarding oral health and hygiene practices in the deaf/hearing impaired patients (**Hytham N. Fageeh et al (2019)**[23].

BEHAVIOURAL MODIFICATION

A study was conducted to assess the effectiveness of behavioral modification techniques in combination with visual distraction with/ without video eyewear using computerized delivery system-intramuscular (CDS-IS) during the application of local anesthetic in hearing-impaired pediatric patients undergoing pulp therapy of primary molars. After the procedure, children were instructed to rate their pain during treatment on the Wong-Bakers' (WBs') Faces Pain Scale. Changes in pulse oximeter and heart rate were recorded every 5 min. it was concluded that Routine psychological (Tell-Show-Do) intervention along with visual distraction with full visibility of the surrounding and use of CDS-IS system for anesthetic delivery is recommended as an effective behavior management technique for children with hearing impairment undergoing invasive dental treatment (**Fakhruddin KS et al , 2016)**[47].

Another study was conducted to compare the effect of educational (sign language and video modeling) and therapeutic intervention (liquorice) on oral hygiene status of children with hearing impairment (CHI). There was a significant mean reduction in oral

hygiene, gingival, and plaque scores in all the children. The educational intervention could not influence the scores recorded, but the therapeutic intervention with liquorice led to a reduction in all the oral health parameters during the follow-up periods. Hence it was concluded that therapeutic intervention using liquorice as mouth wash along with educational intervention can be suggested in CHI (**K.V.Saikiran et al, 2019)**[48].

A Randomized Controlled Trial was conducted to evaluate and compare the effectiveness of American and Indian sign language as nonverbal communication (NVC) methods in hearing and speech impaired pediatric population for assessment of Oral Health Status among 5 to 16 years old children attending l special schools for the hearing and impaired children. The study was conducted in the Department of Pedodontics and Preventive Dentistry, BBDCODS, BBDU in collaborations with various different institutions and non-governmental organizations in Lucknow and Haryana which had hearing and speech impaired children.

Sample size-

Healthy subjects aged between **5-16 years** will be included in the study the sample size per group was calculated by using the following formula-

n = 4pq/d2

Where n is the required sample size,

p is the prevalence of the cause,

q Is 1-q

d is the precision.

The calculated sample size is **200 per group**. Thus a total of **600 children** will be required for the study.

The data collected from the study will be subjected for statistical analysis

Among them, 258 were males and 342 were females. The study was conducted from June 2019 to February 2020.

INCLUSION CRITERIA

Hearing and speech impaired pediatric patients aged 5-16 years are included in the study from various institutions and non-governmental organizations.

1. Children with hearing impairment (moderate to severe)

2. Children who are trained in sign language

3. Children who are not utilizing hearing aids

4. Children whose parents gave written informed consent

5. Children who are willing to participate in the study (verbal accent)

EXCLUSION CRITERIA

Hearing and speech impaired children with any other disability or systemic disease were excluded from the study.

1. Children simultaneously having other disabilities

2. Children associated with syndromes

3. Uncooperative children, unable to cope with the examination procedures

Before the start of the survey, official permission was obtained from

- Head of the special schools

- Ethical clearance to conduct the study was obtained from Institutional Review Board.

The schools included in the study were:

- **Welfare Centre for Persons with Speech and Hearing Impairment, Haryana**
- **N C Chaturvedi School For The Deaf , Lucknow**
- **Bal Mook Sansthaan, Delhi**

A questionnaire Performa was prepared with the help of WHO oral health assessment form and various studies conducted by various authors between 2003- 2019. Dental caries was recorded from the Dentition Status and Treatment Needs as described by WHO (1997). Oral hygiene status was assessed using Oral Hygiene Index- Simplified given by (Greene and Vermilion 1964) for permanent dentition and Oral Hygiene Index-Simplified given by (Greene and Vermilion 1960) for deciduous dentition. For the ages 5 to7 years, we selected labial surfaces of the 54, 61, 82 and the lingual surface of 75. For the mixed dentition we added the labial surface of 26 and the lingual surface of 46. They were divided into three groups according to the center in which they were enrolled and the type of language that was being used in the center. The three groups were:

- Group A- students who were communicated through American Sign Language
- Group I – students who were communicated through Indian Sign Language
- Group V - students who were communicated through Visual Aids

Before starting the study, the purpose of study was informed and explained to the children and their teachers with the help of the mode of communication that they used.

General information regarding:

- Name
- Age
- Gender
- Address
- Personal history
- Hard tissue examination
- Soft tissue examination
- Intraoral examination

Oral hygiene practices were recorded with the help of respective class teachers who were used as coordinators for the study and the children themselves. General information and oral hygiene practices of speech and hearing impaired children were obtained through a sign language by teachers and the doctors.

At baseline

- Gender
- Age group

The parameters that were recorded were divide into two groups:

- Communication
- Clinical

Under these groups the various parameters recorder were:

COMMUNICATION	**CLINICAL**
Brushing time	Caries
Brushing frequency	Habits
Brushing method	Calculus index
Knowledge of fluorides	Debris index
Last dental visit	OHI-S
Reason for dental visit	
Treatment done in the visit	
Toothpaste used	
Frequency of replacing toothbrush	
Eating and drinking habit	
Eating duration	
Brushing material used	

It was well planned and arranged for maximum efficiency and ease of examination. The children were examined on a chair or stool with examiner standing behind the chair.

Instruments were placed within the easy reach of the examiner. Platform table was used to keep the instruments and recording forms.

Methodology

The examination for dental caries was made by using Community Periodontal Index probe and plane mouth mirror and oral hygiene status was examined by using explorer and plane mouth mirror. Type III examination was carried out and recorded by the investigator herself throughout the study. Light source:

- In all the locations, natural light was used and the subject was placed in such a way that maximum illumination was obtained.

Sufficient numbers of sterilized instruments were taken to avoid the interruption during examination. The following armamentarium was used.

1. Double sided mouth mirrors (GDC)
2. Community Periodontal Index Probes. (GDC)
3. Explorers (GDC)
4. Tweezers (GDC)
5. Enamel bowls
6. Kidney trays (GDC)
7. Chip blower
8. Cotton holder
9. Disposable mouth masks (Medishield Health Care)
10. Disposable gloves (Medishield Health Care)
11. Sterilized cotton and gauze pieces

For recording data-

- Case record sheet
- Pen, pencil and eraser

For demonstration and instructions:

- Complete set of dental model
- Toothbrush

After each visit all the instruments were autoclaved. Clinical findings of the children were reported to the class teachers at the end of the day of the examination. Reference slips were forwarded to the parents or guardians of the students through their class teachers, for information and necessary action. School children requiring non-invasive treatment were given to them in their school premises. A health talk was given to the students and teachers of the respective schools, with the help of sign language after the completion of data collection.

Group I was communicated through INDIAN SIGN LANGUAGE. They were explained fones method or circular brushing technique and ways to keep their oral hygiene healthy.

Group A was communicated through AMERICAN SIGN LANGUAGE. They were explained fones method or circular brushing technique and ways to keep their oral hygiene healthy.

Group V was communicated through VISUAL AIDS. They were explained fones method or circular brushing technique and ways to keep their oral hygiene healthy using various videos and presentations and demo.

The same procedure was repeated three times at an interval of 3 months each.

CENTER COLLABORATED WITH

Sessions taken during oral health checkup of the students

ORAL HYGIENE INDEX - SIMPLIFIED (OHI-S) [55]

Oral hygiene index was introduced by John C. Greene and Jack R. Vermillion in 1960.

This index was modified and later called oral hygiene index - Simplified, in 1964.

The OHI -S has two components: Debris index and calculus index.

There are six index teeth selected with one surface each to be examined for both the components.

INDEX TEETH:

16	- Upper right first molar	- buccal.
11	- Upper right central incisor	- labial.
26	- Upper left first molar	- buccal
36	- Lower left first molar	- lingual
31	- Lower left central incisor	- labial
46	- Lower right first molar	- lingual.

Criteria for recording;

1) Only fully erupted permanent teeth are scored.

2) Natural teeth with full crown restorations and surfaces reduced in height by caries or trauma are not scored. In this case 2nd or 3rd molars are scored and in anterior region the central incisor on the opposite side of the midline is substituted.

SIMPLIFIED DEBRIS INDEX:

The surface area covered by debris is estimated by running the side of an explorer (SHEPARDS CROOK) along the tooth surface being examined.

SCORING SYSTEM

0. No debris or stains present.
1. Soft debris covering not more than 1/3rd of the tooth surface being examined or the presence of extrinsic stains without debris regardless of surface area covered.
2. Soft debris covering more than 1/3rd but not more than 2/3rd of the exposed tooth surface.
3. Soft debris covering more than 2/3rd of the exposed tooth surface.

SIMPLIFIED CALCULUS INDEX:

SCORING SYSTEM

0 - No calculus.

1 - Supragingival calculus covering not more than 1/3rd of the exposed tooth surface being examined.

2 - Supragingival calculus covering more than 1/3rd but not more than 2/3rd of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth.

3. - Supragingival calculus covering more than 2/3rd of exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth.

CALCULATION OF THE INDEX

For each individual, the debris scores are totaled and divided by the number of surfaces scored. At least 2 of the 6 possible surfaces must have been examined for an individual score to be calculated. Same method is used to obtain calculus score. The OHI-S score for the individual is total of debris index and calculus index.

The values for DI-S and CI-S may range from 0-3.

The clinical levels of oral cleanliness for debris that can be associated with group DIS scores are-

0.0 - 0.6 - Good

0.7 - 1.8 - Fair

1.9 - 3.0 - Poor

The OHI-S values range from 0-6

0.0 - 1.2 - Good

1.3 - 3.0 - Fair

3.1 - 6.0 - Poor

A randomized controlled trial was conducted to evaluate and compare the effectiveness of American and Indian sign language as nonverbal communication (NVC) methods in hearing and speech impaired pediatric population for assessment of Oral Health Status among 5 to 16 years old children attending l special schools for the hearing and impaired children. The study was conducted in the Department of Pedodontics and Preventive Dentistry, BBDCODS, BBDU in collaborations with various different institutions and non-governmental organizations in Lucknow and Haryana which had hearing and speech impaired children.

The study population consisted of 600 school children, out of which 258 (43%) were males and 342 (52%) were females.

Table 1: Shows sex wise distribution of study population

GENDER		
	Frequency	Percent
Male	258	43.0
Female	342	57.0
Total	600	100.0

- Total subjects available for the study were 600. Among them, 258 (43%) were males and 342 (57%) were females.

Table 2: Shows age group distribution of the study population

AGE GROUPS		
	Frequency	Percent
Group 1 (5-8 years)	86	14.3
Group 2 (9-12 years)	391	65.2
Group 3 (13-16 years)	123	20.5
Total	600	100.0

Amongst the study population maximum students 391 (65%) children were in group 2 i.e. between the age range of 9-12 years followed by group 3 i.e. 123 (20.5%) between the age range of 13-16 years.

Table 3: Shows brushing frequency of the study population

BRUSHING FREQUENCY	AGE			Total
	Group 1	Group 2	Group 3	
Morning	49	228	101	378
	57.0%	58.3%	82.1%	63.0%
Morning & Night	37	163	22	222
	43.0%	41.7%	17.9%	37.0%
Total	86	391	123	600
	100.0%	100.0%	100.0%	100.0%

- 378 (63%) study population brushed only in the morning. There were 49 (57%) children who were in the age group of 5-8 years, 228 (58%) children of the age group 9-12 years and 101(82%) children of the age group 13-16 years.

- 222 (37%) study population brushed both morning and evening. There were 37 (43%) children who were in the age group of 5-8 years , 163 (42%) children of the age group 9-12 years and 22 (18%) children of the age group 13-16 years.

Table 4: Shows brushing duration of the study population

BRUSHING DURATION		
	Frequency	Percent
30-60 seconds	184	30.7
1-3 minutes	240	40.0
3-5 minutes	176	29.3
Total	600	100.0

- Among the study population 240 (40%) children brushed their teeth for the duration of 1-3 minutes.
- Rest of the children brushed their teeth for either 30-60 sec i.e. 184 (31%) children.
- There were 176 (29%) children who brushed their teeth for more than 3 minutes a day.

Table 5: Shows material used for cleaning their teeth

MATERIAL USED		
	Frequency	Percent
Toothpaste & Brush	550	91.7
Toothpowder & Finger	50	8.3
Total	600	100.0

- Maximum study population 550 (92%) children used toothpaste and toothbrush for cleaning their teeth.
- Still there were 50 (8%) children who were unaware and were still using toothpowder and finger for cleaning their teeth.

Table 6: Shows the brushing method used for cleaning teeth

BRUSHING METHOD	AGE			Total
	Group 1	Group 2	Group 3	
Fones technique	41	163	66	270
	47.7%	41.7%	53.7%	45.0%
Bass technique	8	39	8	55
	9.3%	10.0%	6.5%	9.2%
Modified bass technique	0	173	40	213
	0.0%	44.2%	32.5%	35.5%
Roll technique	37	16	9	62
	43.0%	4.1%	7.3%	10.3%
Total	86	391	123	600
	100.0%	100.0%	100.0%	100.0%

- 270 (45%) children used fones brushing technique which accounts for the maximum study population. There were 41 (48%) children in the age group 5-8 years , 163 (42%) children in the age group 9-12 years and 66 (54%) children in the age group 13-16 years.
- 55 (9%) children used bass brushing technique for cleaning their teeth. There were 8 (9.3%) children in the age group 5-8 years , 39 (10%) children in the age group 9-12 years and 8(6.5%) children in the age group 13-16 years.
- 213 (35.5%) children used modified bass brushing technique for cleaning their teeth.there were 173 (44%) children in the age group 9-12 years and 40 (32.5%) children in the age group 13-16 years.
- 62 (10%) children used rolls brushing technique for cleaning their teeth. There were 37 (43%) children in the age group 5-8 years , 16 (4%) children in the age group 9-12 years and 9 (7%) children in the age group 13-16 years.

Table 7: Shows the toothpaste used by the study population

TOOTHPASTE USED		
	Frequency	Percent
Colgate	184	30.7
Dabur Red	305	50.8
Patanjali Dantkanti	111	18.5
Total	600	100.0

- Amongst the population of 600 there were maximum 305 (51%) children who were using Dabur Red toothpaste as a cleaning aid.
- Rest 184(31%) and 111 (18.5%) used Colgate and Patanjali dantkanti toothpaste for cleaning their teeth.

Table 8: Shows habit intercepted by the study population

HABITS		
	Frequency	Percent
Thumb sucking	72	12.0
Tongue thrusting	90	15.0
Mouth breathing	138	23.0
No habit	300	50.0
Total	600	100.0

- Amongst the population of 600 there were half of the population i.e. 300 (50%) children who had no habit.
- Apart from the remaining population 72 (12%) has a habit of thumb sucking, 90 (15%) children had a habit of tongue thrusting and 138 (23%) had a habit of mouth breathing.

Table 9: Shows dental caries prevalence in the study population

DENTAL CARIES		
	Frequency	Percent
Caries free	57	9.5
Caries present	543	90.5
Total	600	100.0

- 543 (90.5%) study population had caries when their oral screening was done leaving 57 (9.5%) children who were caries free.

Table 10: Shows the knowledge of fluorides among the study population

KNOWLEDGE OF FLUORIDES		
	Frequency	Percent
Yes	177	29.5
No	423	70.5
Total	600	100.0

- 423 (71%) population had no knowledge of fluorides amongst them.
- Only 177 (29%) population had knowledge of fluorides amongst them.

Table 11: Shows the frequency of the dental visit to a dentist

LAST DENTAL VISIT		
	Frequency	Percent
Never visited	443	73.8
Visited 1-2 years back	157	26.2
Total	600	100.0

- 443 (74%) children had never visited the dentists for their oral checkup.
- 157 (26%) children had visited the dentists 1-2 years back for their oral checkup.

Table 12: Shows the frequency for the reason of dental visit during prevalence at baseline

REASON FOR DENTAL VISIT		
	Frequency	Percent
Broken tooth	8	1.3
Decayed teeth	8	1.3
Discoloured teeth	8	1.3
Bleeding from gums	8	1.3
RCT	8	1.3
Scaling	52	8.7
Halitosis	57	9.5
General checkup	157	26.2
Not visited	443	73.8
Total	600	100.0

Table 13: Shows frequency of replacing tooth brush

FREQUENCY OF REPLACING TOOTH BRUSH		
	Frequency	Percent
3 months	155	25.8
6 months	212	35.3
9 months	233	38.8
Total	600	100.0

- 233 (39%) children changed their brush after every 9 months.
- 212 (35%) children changed their brush after every 6 months.
- 155 (26%) children changed their brush after every 3 months of use.

Table 14: Shows eating habit of the study population

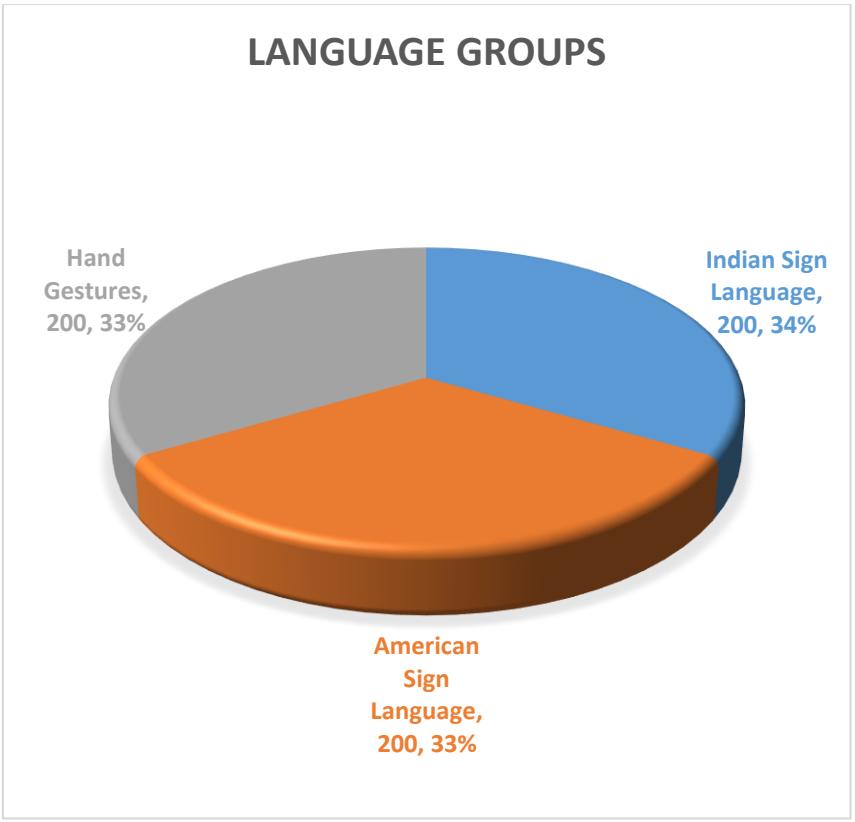
EATING DURATION		
	Frequency	Percent
In between snacking	341	56.8
After dinner snacking	259	43.2
Total	600	100.0

- 341 (57%) children loved to have snacks in between meals and 259 (43%) children liked to have late night snacks after dinner.

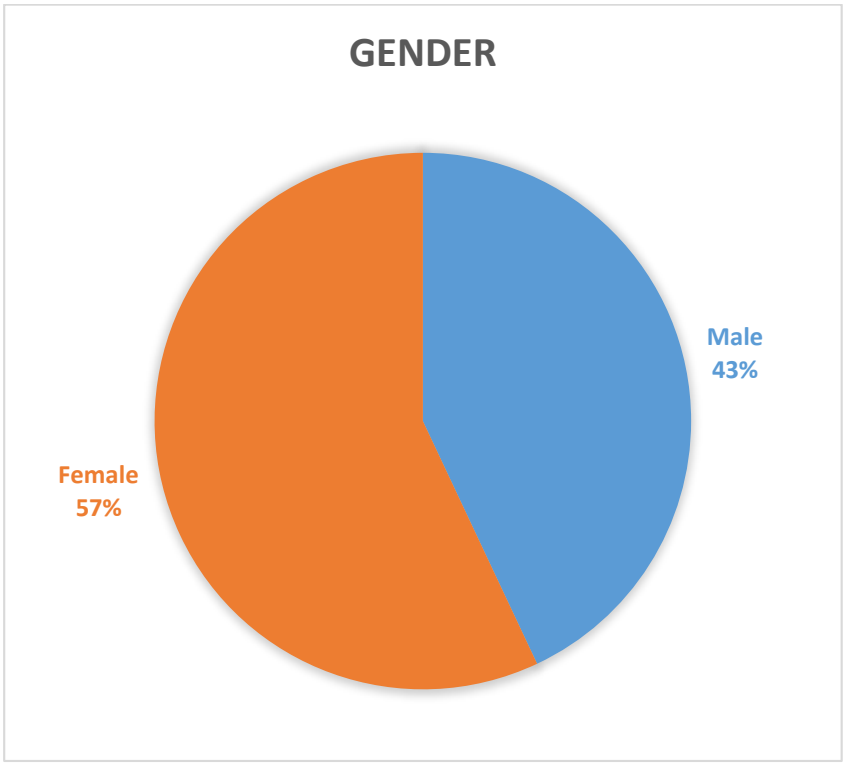
Table 15: Shows frequency of eating and drinking habit

EATING & DRINKING DURATION		
	Frequency	Percent
Sweet milk	142	23.7
Juices	256	42.7
Sticky confectionaries	202	33.7
Total	600	100.0

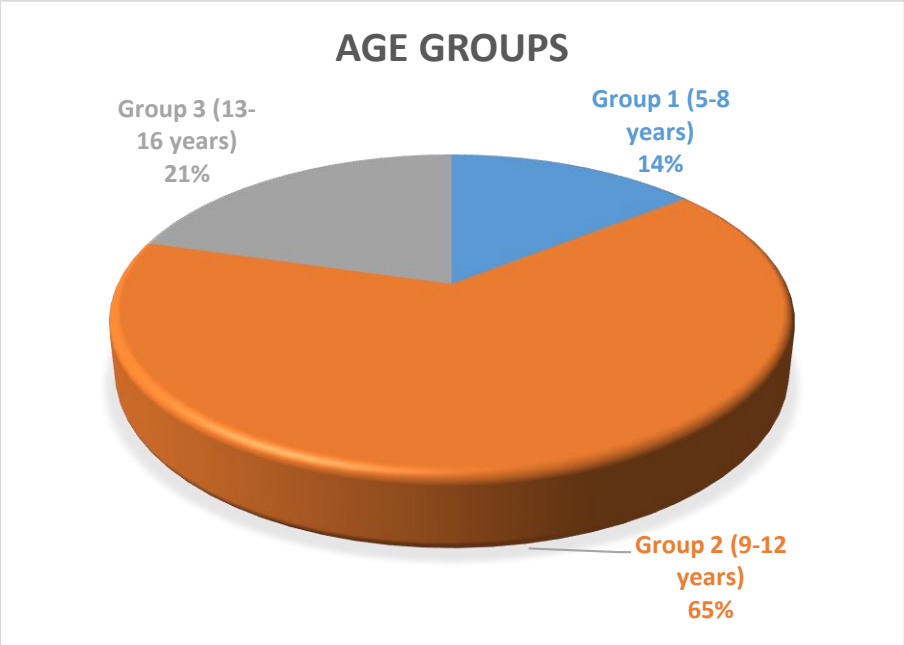
- 256 (43%) children loved juices while 202 (34%) and 142 (24%) children loved sticky confectionaries and sweet milk respectively as snacking food.



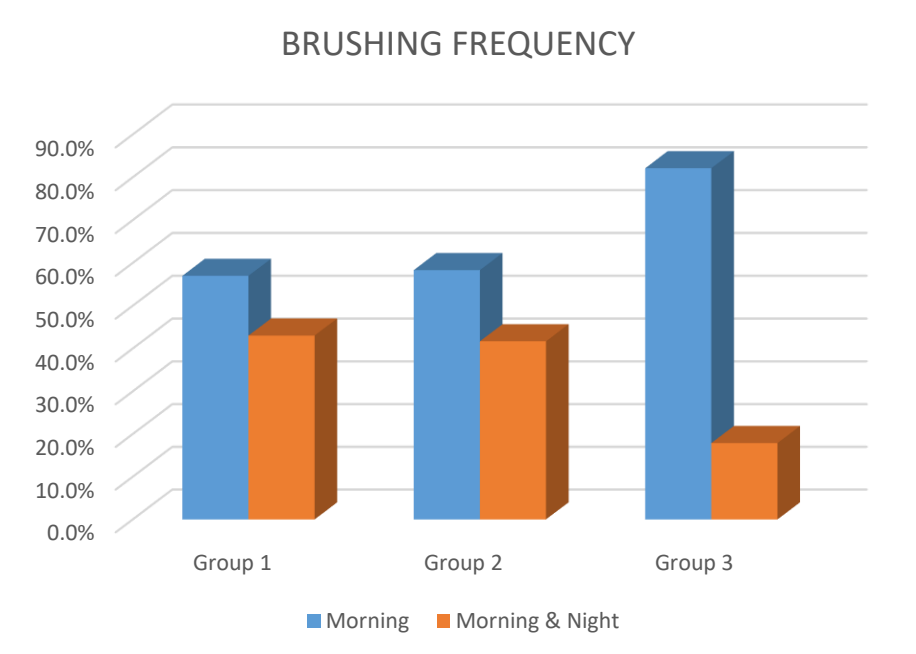
GRAPH 1: Different language groups in the study



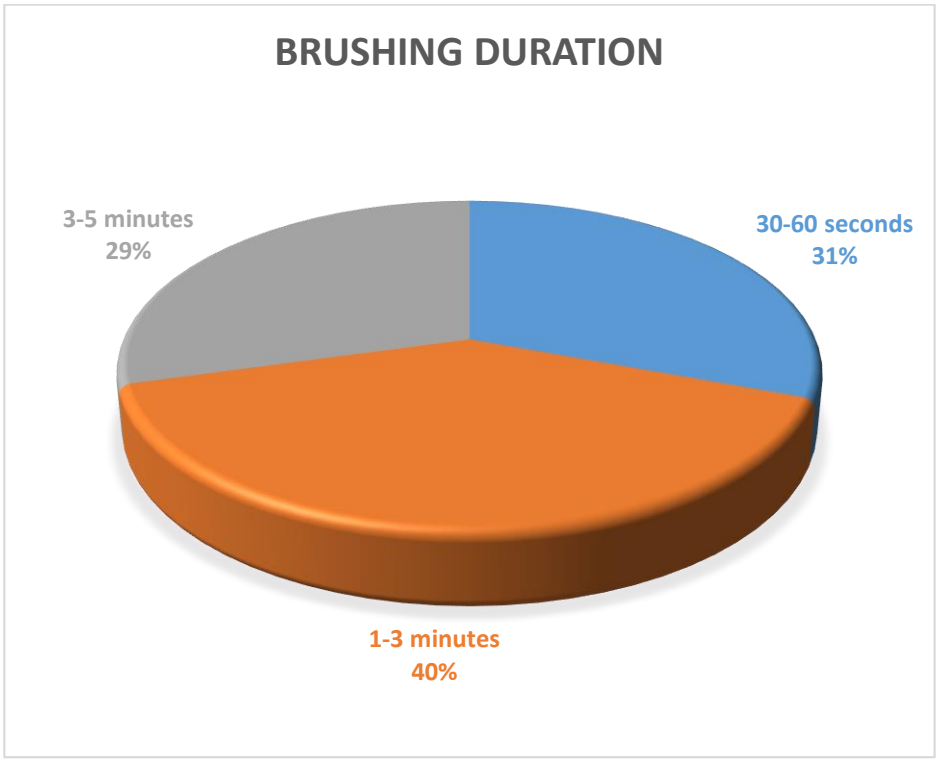
GRAPH 2: Gender distribution in the study group



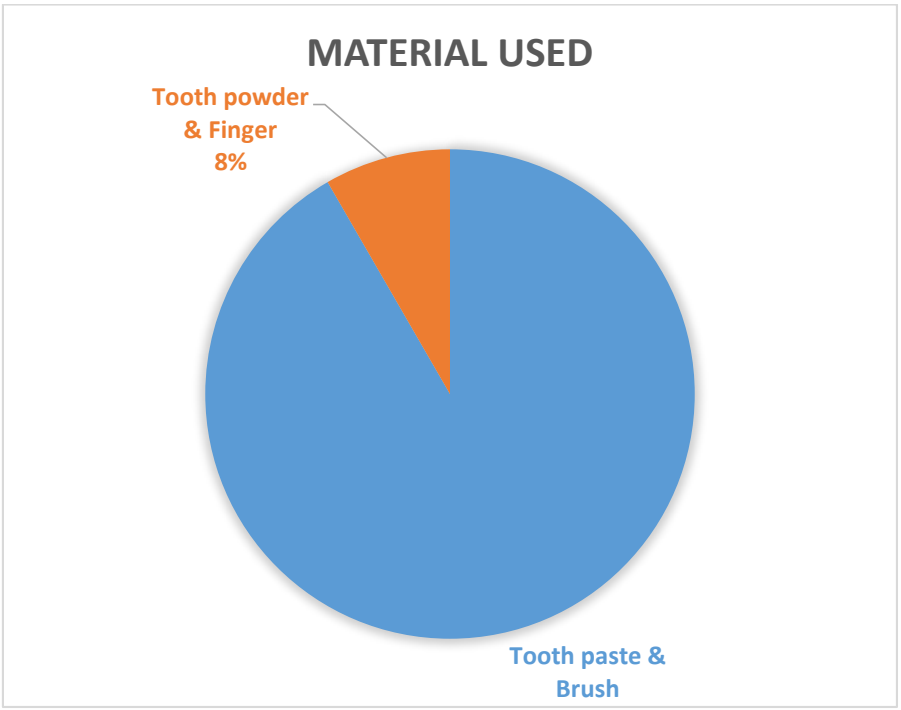
GRAPH 3: Age group distribution of the study group



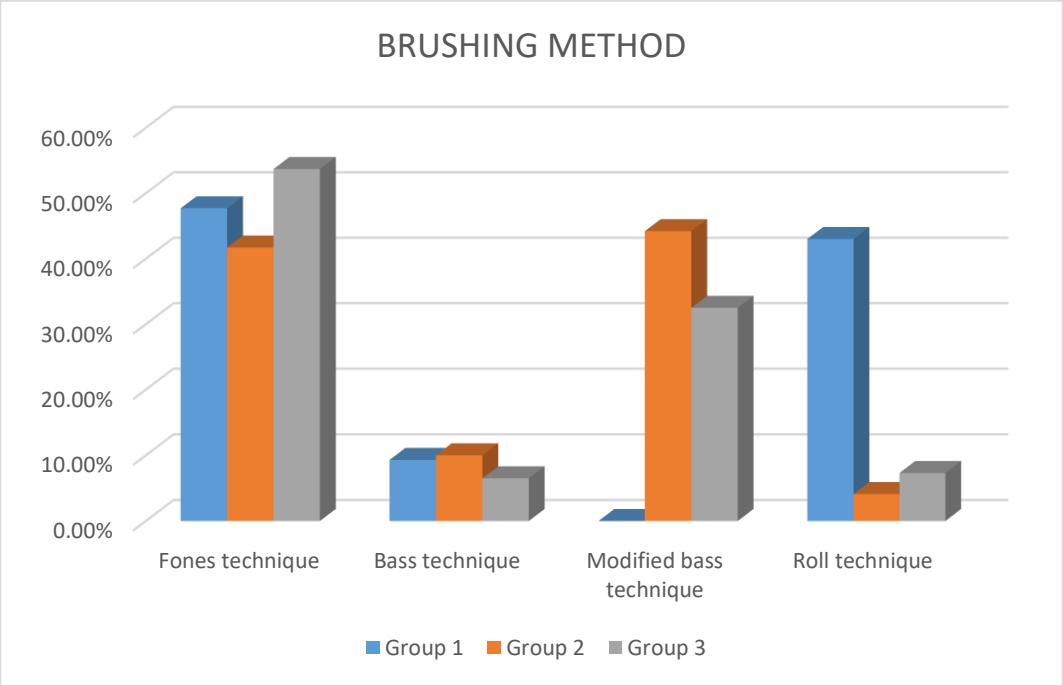
GRAPH 4: Brushing frequency distribution in the study group



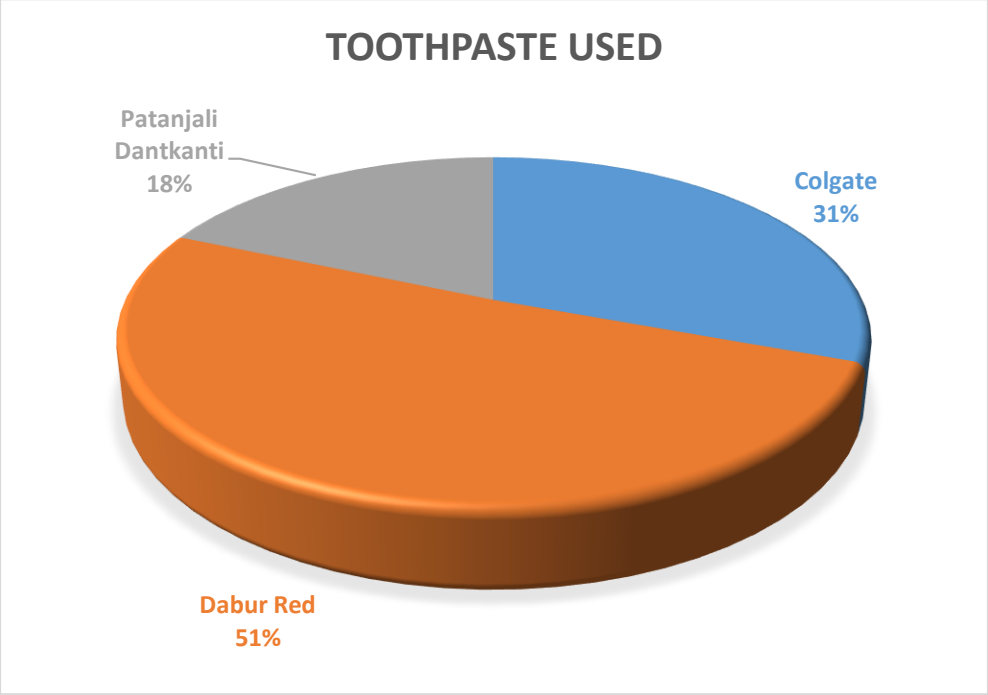
GRAPH 5: Brushing duration distribution in the study group



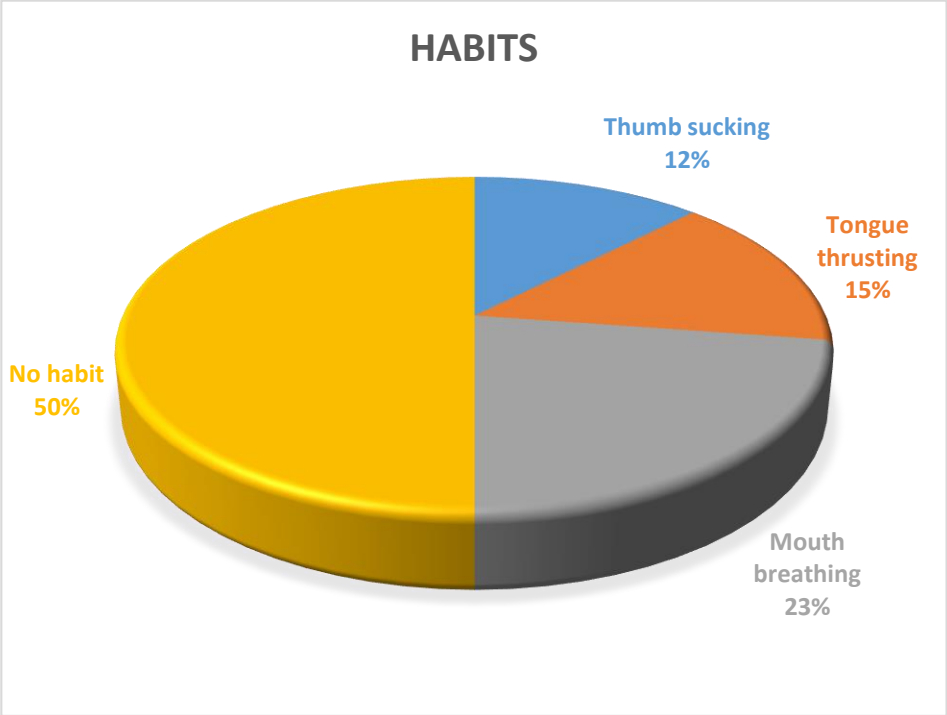
GRAPH 6: Material used distribution in the study group



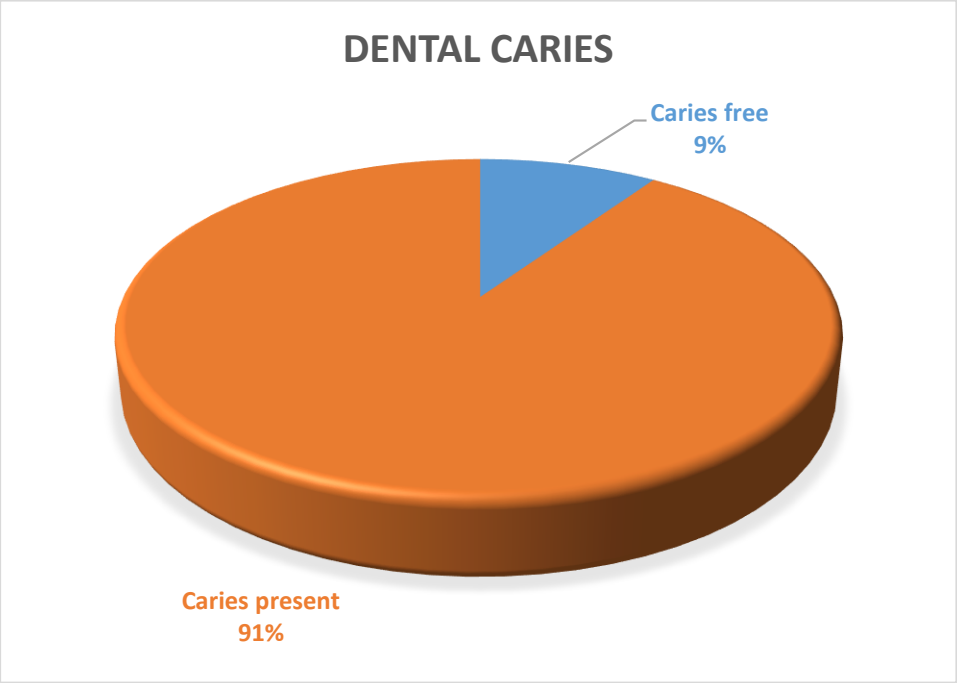
GRAPH 7: Brushing method distribution in the study group



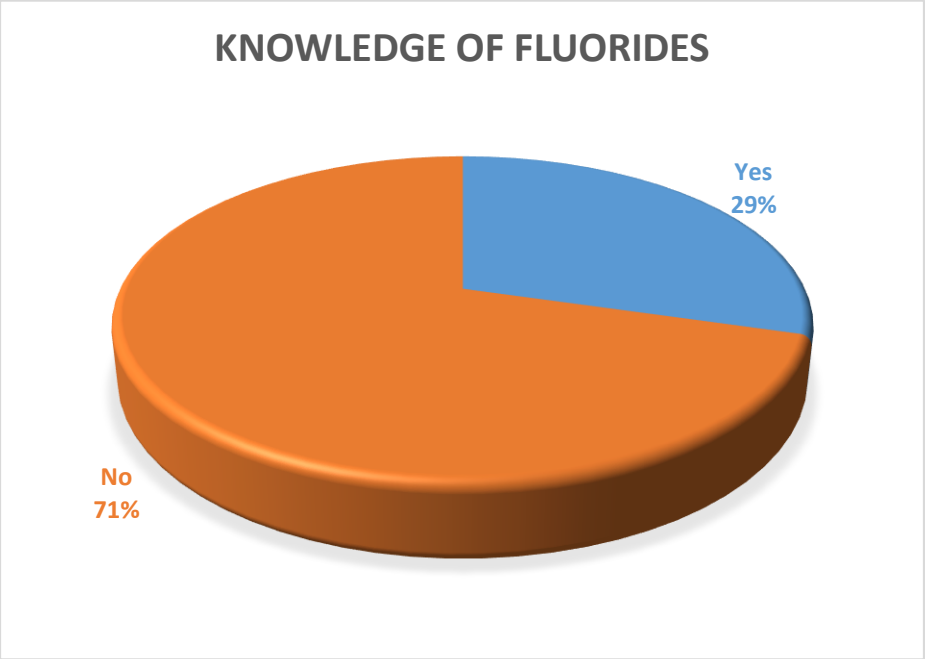
GRAPH 8 : Toothpaste used distribution in the study group



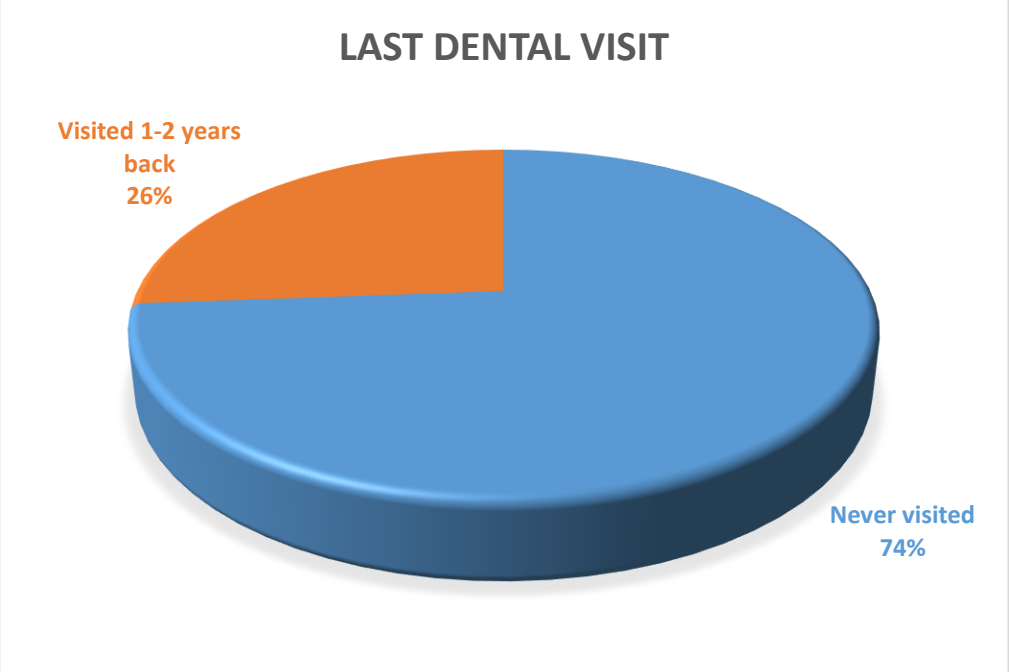
GRAPH 9: Habit distribution in the study group



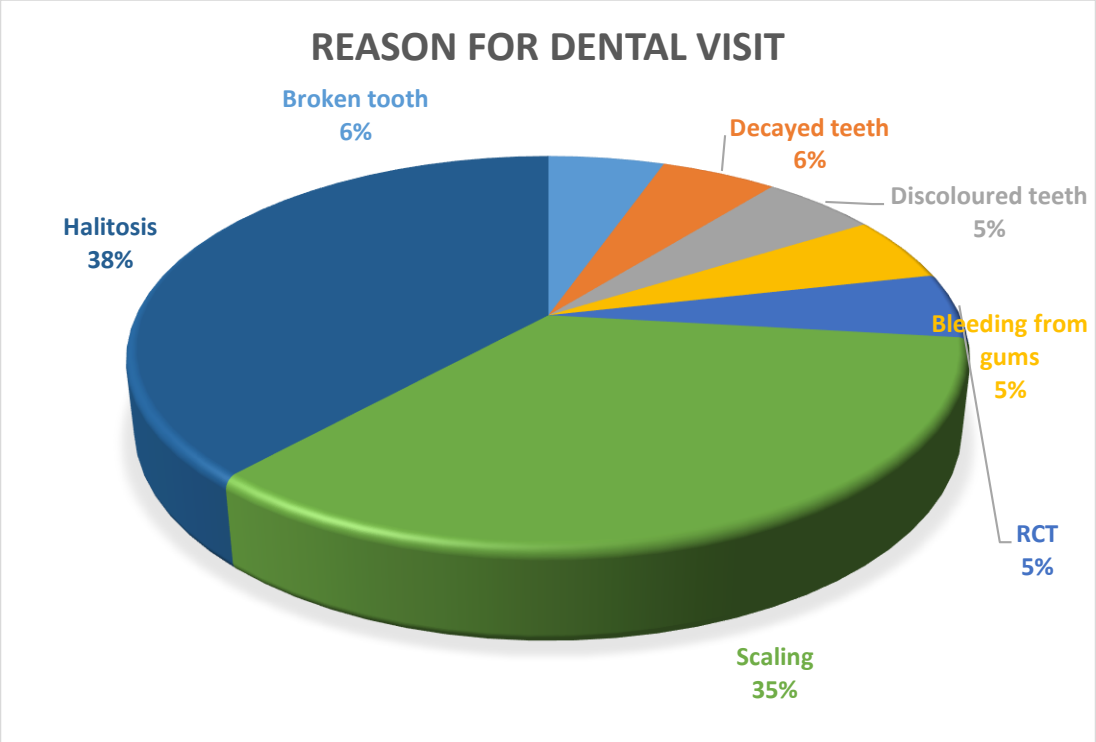
GRAPH 10: Dental caries distribution in the study group



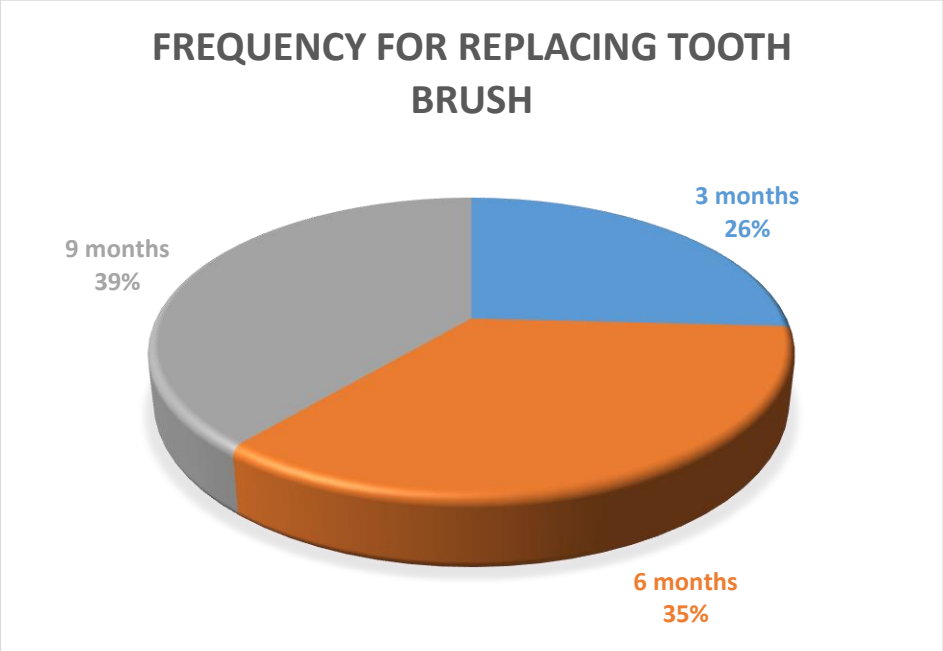
GRAPH 11: Knowledge of fluorides distribution in the study group



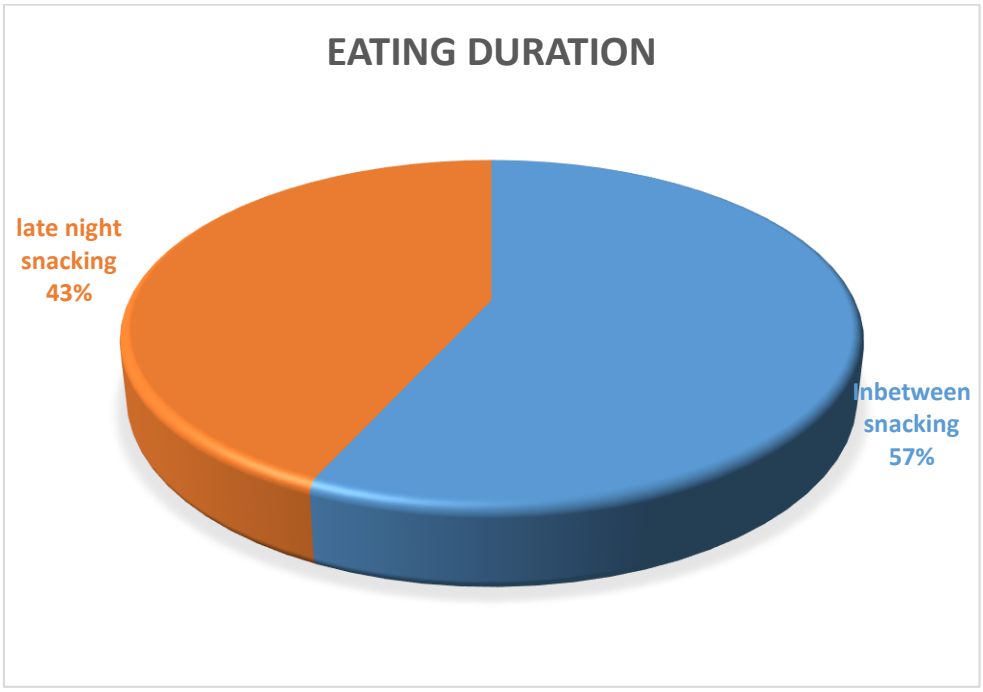
GRAPH 12 : Last dental visit distribution in the study group



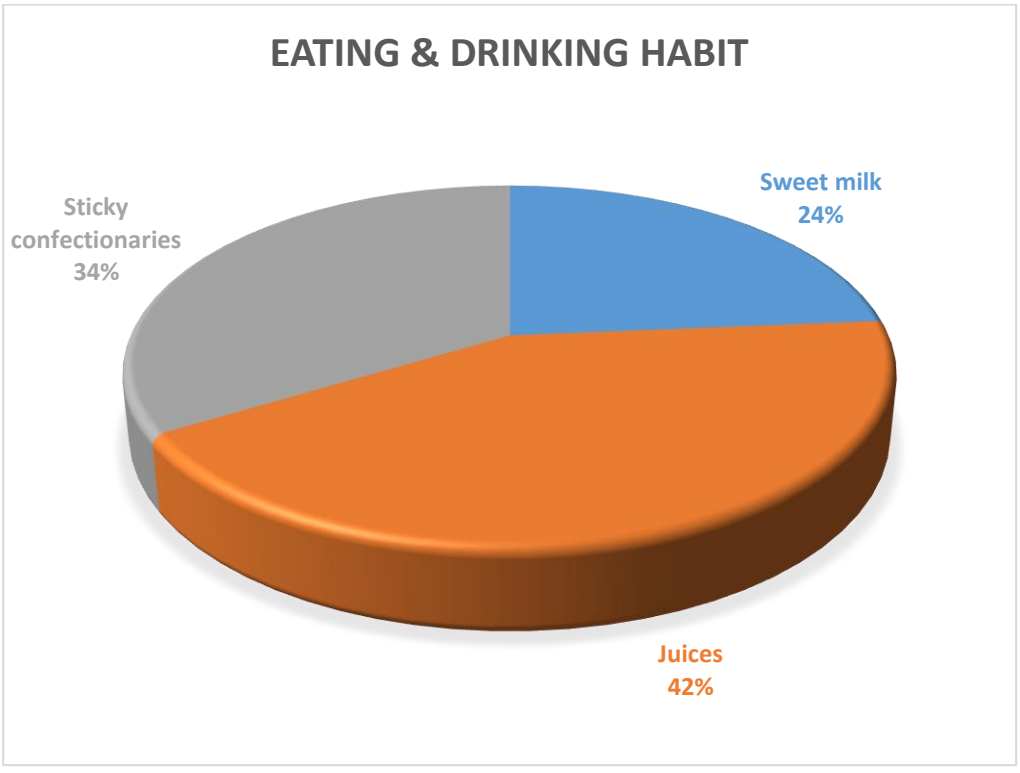
GRAPH 13: Reason for dental visit distribution in the study group



GRAPH 14: Frequency of replacing toothbrush distribution in the study group



GRAPH 15: Eating duration distribution in the study group



GRAPH 16: Eating and drinking distribution in the study group

OHI-S INFERENCE OF ALL THE THREE GROUPS

Table 16 : Shows frequency of debris index for the group with Indian Sign Language in their First Visit

DEBRIS INDEX(1st visit) 1		
	Frequency	Percent
Good	34	17.0
Fair	110	55.0
Poor	56	28.0
Total	200	100.0

- In first group who were communicated through Indian Sign Language , their debris index score at their first visit was found good in 17% children , fair in 55% children and poor in 28% children.

Table 17 : Shows frequency of calculus index for the group with Indian Sign Language in their First visit

CALCULUS INDEX(1st visit) 1		
	Frequency	Percent
Good	33	16.5
Fair	95	47.5
Poor	72	36.0
Total	200	100.0

- In first group who were communicated through Indian Sign Language , their calculus index score at their first visit was found good in 16.5% children , fair in 47.5% children and poor in 36% children.

Table 18: Shows frequency of OHI-S for group with **Indian Sign Language** in their **FIRST VISIT**

OHI-S INFERENCE (1st visit)

	Frequency	Percent
Good	42	21.0
Fair	70	35.0
Poor	88	44.0
Total	200	100.0

- In first group who were communicated through Indian Sign Language , their OHI-S score at their first visit was found good in 21% children , fair in 35% children and poor in 44% children.

Table 19: Shows frequency of debris index for group with **American Sign Language** in their **FIRST VISIT**

DEBRIS INDEX(1st visit)		
	Frequency	Percent
Good	32	16.0
Fair	95	47.5
Poor	73	36.5
Total	200	100.0

- In the second group who were communicated through American Sign Language , their debris index score at their first visit was found good in 16% children , fair in 47.5% children and poor in 36.5% children.

Table 20: Shows frequency of calculus index for group with **American Sign Language** in their **FIRST VISIT**

CALCULUS INDEX(1st visit)		
	Frequency	Percent
Good	24	12.0
Fair	71	35.5
Poor	105	52.5
Total	200	100.0

- In the second group who were communicated through American Sign Language , their debris index score at their first visit was found good in 12% children , fair in 35.5% children and poor in 52.5% children.

Table 21: Shows frequency of OHI-S for group with **American Sign Language** in their **FIRST VISIT**

OHI-S INFERENCE (1st visit)

	Frequency	Percent
Good	16	8.0
Fair	79	39.5
Poor	105	52.5
Total	200	100.0

- In the second group who were communicated through American Sign Language , their OHI-S score at their first visit was found good in 8% children , fair in 39.5% children and poor in 52.5% children.

Table 22: Shows frequency of debris index for group with **Visual Aids** in their FIRST **VISIT**

DEBRIS INDEX(1st visit)		
	Frequency	Percent
Good	25	12.5
Fair	90	45.0
Poor	85	42.5
Total	200	100.0

- In the third group who were communicated through visual aids , their debris index score at their first visit was found good in 12.5% children , fair in 45% children and poor in 42.5% children.

Table 23: Shows frequency of calculus index for group with **Visual Aids** in their FIRST **VISIT**

CALCULUS INDEX(1st visit) 3		
	Frequency	Percent
Good	21	10.5
Fair	60	30.0
Poor	119	59.5
Total	200	100.0

- In the third group who were communicated through visual aids , their calculus index score at their first visit was found good in 10.5% children , fair in 30% children and poor in 59.5% children.

Table 24: Shows frequency of OHI-S for group with **Visual Aids** in their FIRST **VISIT**

OHI-S INFERENCE (1st visit)

	Frequency	Percent
Good	12	6.0
Fair	69	34.5
Poor	119	59.5
Total	200	100.0

- In the third group who were communicated through visual aids , their OHI-S score at their first visit was found good in 6% children , fair in 34.5% children and poor in 59.5% children.

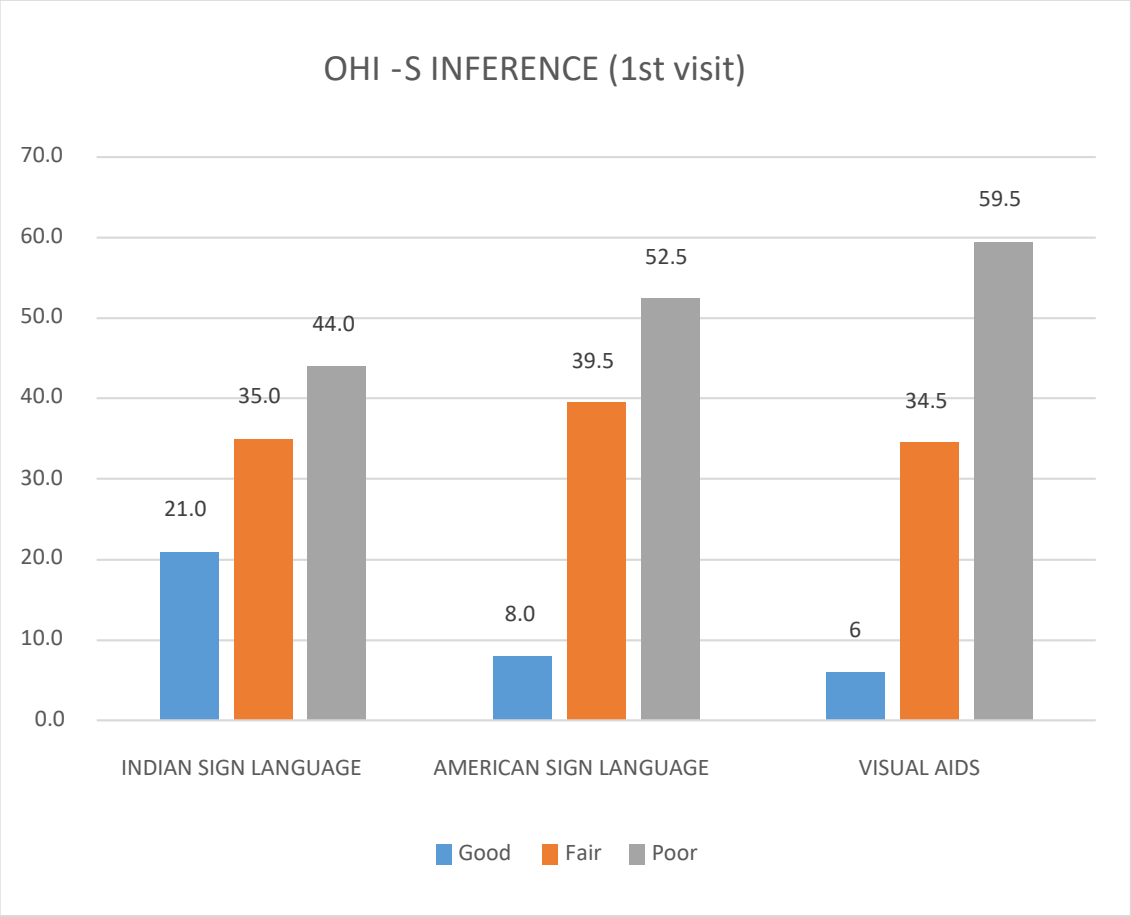


Table 25: Shows frequency of debris index for group with **Indian Sign Language** in their **SECOND VISIT**

DEBRIS INDEX (2nd visit) 1		
	Frequency	Percent
Good	42	21.0
Fair	110	55.0
Poor	48	24.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language , their debris index score at their second visit was found good in 21% children , fair in 55% children and poor in 24% children.

Table 26: Shows frequency of calculus index for group with **Indian Sign Language** in their **SECOND VISIT**

CALCULUS INDEX (2nd visit) 1		
	Frequency	Percent
Good	57	28.5
Fair	87	43.5
Poor	56	28.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language , their calculus index score at their second visit was found good in 28.5% children , fair in 43.5% children and poor in 28% children.

Table 27: Shows frequency of OHI-S for group with **Indian Sign Language** in their **SECOND VISIT**

OHI-S INFERENCE (2nd visit)

	Frequency	Percent
Good	41	20.5
Fair	95	47.5
Poor	64	32.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language , their OHI-S score at their second visit improved
- It was found to be good in 20.5% children which remained same to that in their first visit.
- It was found to be fair in 47.5% children which increased from first visit.
- It was found to be poor in 32% children which decreased from their first visit.

Table 28: Shows frequency of debris index for group with **American Sign Language** in their **SECOND VISIT**

DEBRIS INDEX (2nd visit) 2		
	Frequency	Percent
Good	30	15.0
Fair	103	51.5
Poor	67	33.5
Total	200	100.0

- In the second group who were communicated through American Sign Language , their debris index score at their second visit was found good in 15% children , fair in 51.5% children and poor in 33.5% children.

Table 29: Shows frequency of calculus index for group with **American Sign Language** in their **SECOND VISIT**

CALCULUS INDEX (2nd visit) 2		
	Frequency	Percent
Good	41	20.5
Fair	73	36.5
Poor	86	43.0
Total	200	100.0

- In the second group who were communicated through American Sign Language , their calculus index score at their second visit was found good in 20.5% children , fair in 36.5% children and poor in 43% children.

Table 30: Shows frequency of OHI-S for group with **American Sign Language** in their **SECOND VISIT**

OHI-S INFERENCE (2nd visit)

	Frequency	Percent
Good	16	8.0
Fair	85	42.5
Poor	99	49.5
Total	200	100.0

- In the second group who were communicated through American Sign Language , their OHI-S score at their second visit improved
- It was found to be good in 8%% children which remained same to that in their first visit.
- It was found to be fair in 42.5% children which increased from first visit.
- It was found to be poor in 49.5% children which decreased from their first visit.

Table 31: Shows frequency of debris index for group with **Visual Aids** in their **SECOND VISIT**

DEBRIS INDEX (2nd visit) 3		
	Frequency	Percent
Good	26	13.0
Fair	101	50.5
Poor	73	36.5
Total	200	100.0

- In the third group who were communicated through visual aids , their debris index score at their second visit was found good in 13% children , fair in 50.5% children and poor in 36.5% children.

Table 32: Shows frequency of calculus index for group with **Visual Aids** in their **SECOND VISIT**

CALCULUS INDEX (2nd visit) 3		
	Frequency	Percent
Good	37	18.5
Fair	72	36.0
Poor	91	45.5
Total	200	100.0

- In the third group who were communicated through visual aids , their calculus index score at their second visit was found good in 18.5% children , fair in 36% children and poor in 45.5% children.

Table 33: Shows frequency of OHI-S for group with **Visual Aids** in their **SECOND VISIT**

OHI-S INFERENCE (2nd visit)

	Frequency	Percent
Good	12	6.0
Fair	82	41.0
Poor	106	53.0
Total	200	100.0

- In the third group who were communicated through visual aids , their OHI-S score at their second visit improved
- It was found to be good in 6% children which remained same to that in their first visit.
- It was found to be fair in 41% children which increased from first visit.
- It was found to be poor in 53% children which remained same from their first visit.

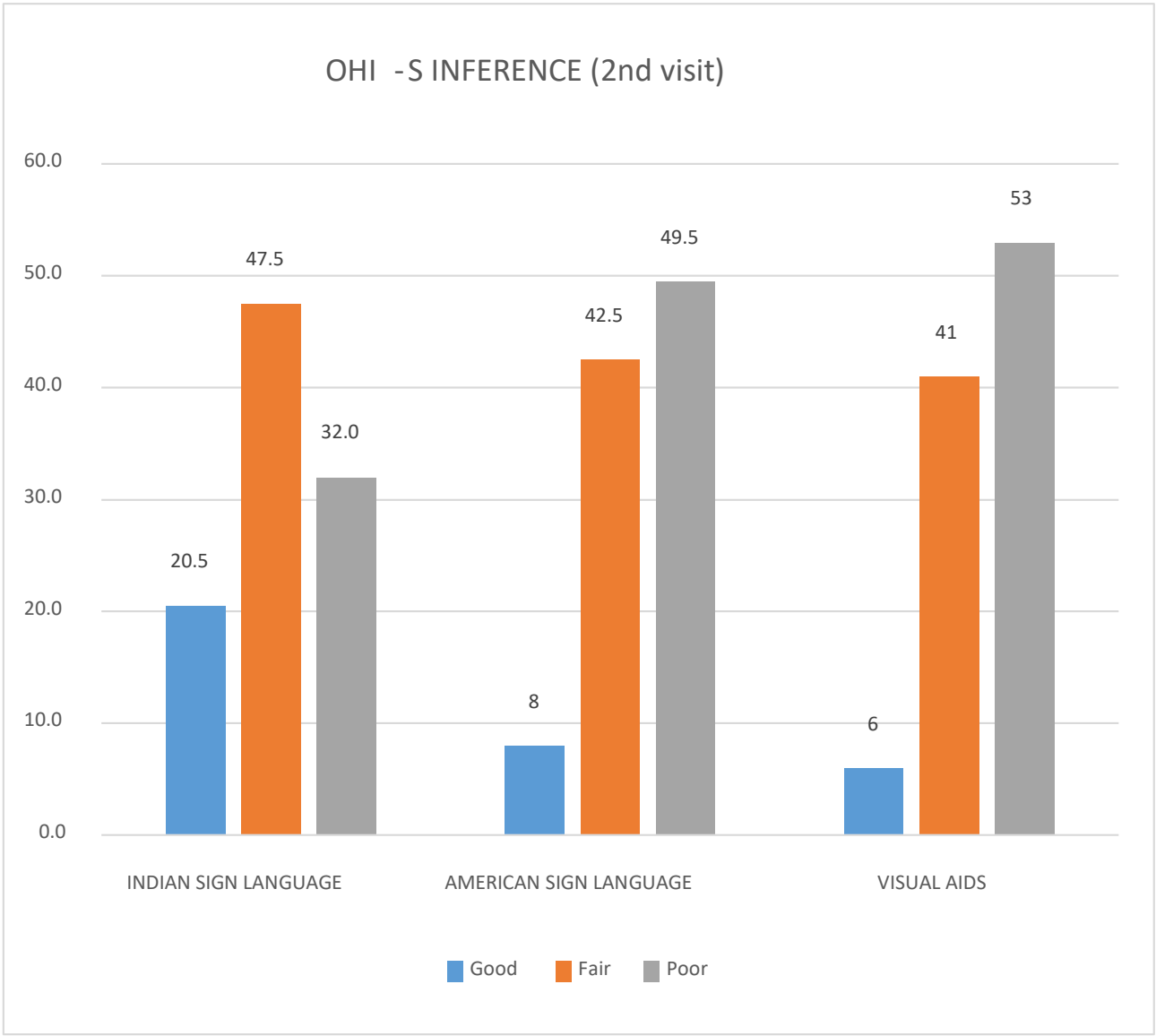

OHI -S INFERENCE (2nd visit)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20.5
47.5
32.0
8
42.5
49.5
6
41
53
INDIAN SIGN LANGUAGE
AMERICAN SIGN LANGUAGE
VISUAL AIDS
Good
Fair
Poor

Table 34: Shows frequency of debris index for group with **Indian Sign Language** in their **THIRD VISIT**

DEBRIS INDEX (3rd visit)		
	Frequency	Percent
Good	120	60.0
Fair	64	32.0
Poor	16	8.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language , their debris index score at their third visit was found good in 60% children , fair in 32% children and poor in 8% children.

Table 35 : Shows frequency of calculus index for group with **Indian Sign Language** in their **THIRD VISIT**

CALCULUS INDEX (3rd visit)		
	Frequency	Percent
Good	120	60.0
Fair	72	36.0
Poor	8	4.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language , their calculus index score at their third visit was found good in 60% children , fair in 36% children and poor in 4% children.

Table 36: Shows frequency of OHI-S for group with **Indian Sign Language** in their **THIRD VISIT**

OHI-S INFERENCE (3rd visit)

	Frequency	Percent
Good	120	60.0
Fair	64	32.0
Poor	16	8.0
Total	200	100.0

- In the first group who were communicated through Indian Sign Language, their OHI-S score at their third visit improved significantly.
- It was found to be good in 60% children which highly increased when compared to the first and second visit.
- It was found to be fair in 32% children which decreased from first visit and second visit.
- It was found to be poor in only 8% children which decreased significantly from their first visit and second visit.

Table 37 : Shows frequency of debris index for group with **American Sign Language** in their **THIRD VISIT**

DEBRIS INDEX (3rd visit)		
	Frequency	Percent
Good	24	12.0
Fair	88	44.0
Poor	88	44.0
Total	200	100.0

- In the second group who were communicated through American Sign Language , their debris index score at their third visit was found good in 12% children , fair in 44% children and poor in 44% children.

Table 38: Shows frequency of calculus index for group with **American Sign Language** in their **THIRD VISIT**

CALCULUS INDEX (3rd visit)		
	Frequency	Percent
Good	32	16.0
Fair	64	32.0
Poor	104	52.0
Total	200	100.0

- In the second group who were communicated through American Sign Language , their calculus index score at their third visit was found good in 16% children , fair in 32% children and poor in 52% children.

Table 39: Shows frequency of OHI-S for group with **American Sign Language** in their **THIRD VISIT**

OHI-S INFERENCE (3rd visit)

	Frequency	Percent
Good	16	8.0
Fair	48	24.0
Poor	136	68.0
Total	200	100.0

- In the second group who were communicated through American Sign Language, their OHI-S score at their third visit deteriorated significantly.
- It was found to be good in 8% children which remained same when compared to the first and second visit.
- It was found to be fair in 24% children which decreased from first visit and second visit.
- It was found to be poor in 68% children which increased significantly from their first visit and second visit.

Table 40 : Shows frequency of debris index for group with **Visual Aids** in their **THIRD VISIT**

DEBRIS INDEX (3rd visit)		
	Frequency	Percent
Good	26	13.0
Fair	89	44.5
Poor	85	42.5
Total	200	100.0

- In the third group who were communicated through visual aids, their debris index score at their third visit was found good in 13% children , fair in 44.5% children and poor in 42.5% children.

Table 41: Shows frequency of calculus index for group with **Visual Aids** in their **THIRD VISIT**

CALCULUS INDEX (3rd visit)		
	Frequency	Percent
Good	34	17.0
Fair	65	32.5
Poor	101	50.5
Total	200	100.0

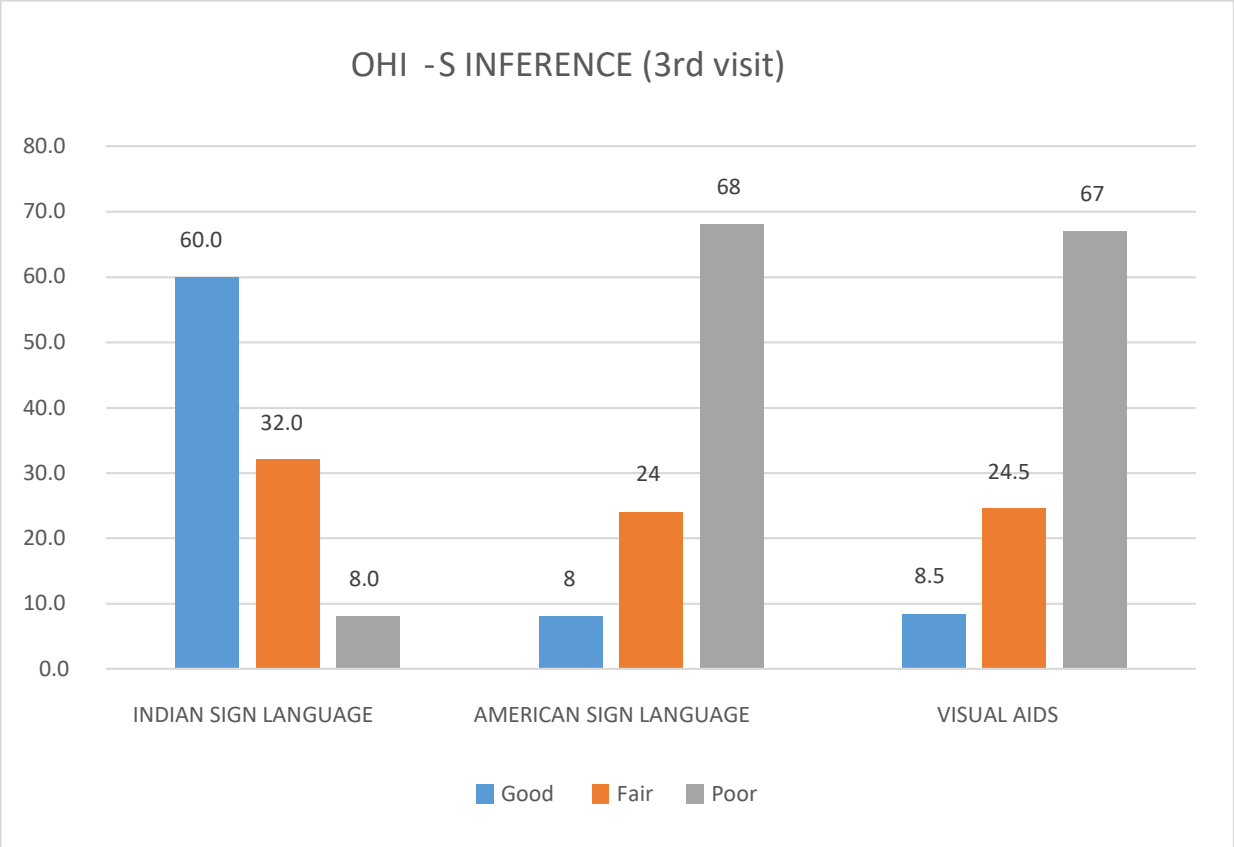
- In the third group who were communicated through visual aids, their calculus index score at their third visit was found good in 17% children , fair in 32.5% children and poor in 50.5% children.

Table 42: shows frequency of OHI-S for group with **Visual Aids** in their **THIRD VISIT**

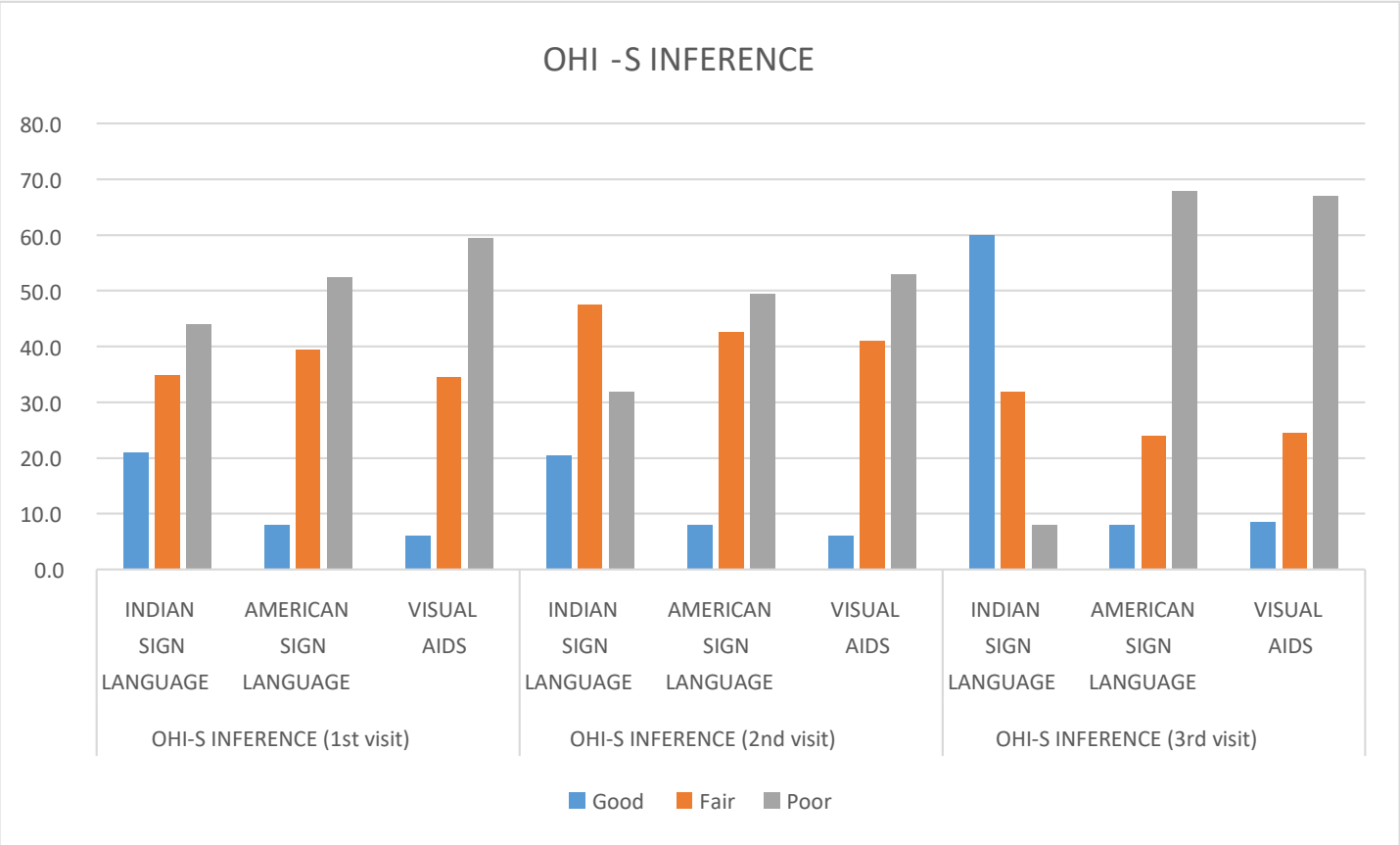
OHI-S INFERENCE (3rd visit)

	Frequency	Percent
Good	17	8.5
Fair	49	24.5
Poor	134	67.0
Total	200	100.0

- In the third group who were communicated through visual aids, their OHI-S score at their third visit improved.
- It was found to be good in 8.5% children which increased when compared to the first and second visit.
- It was found to be fair in 24.5% children which decreased from first visit and second visit.
- It was found to be poor in 67% children which increased from their first visit and second visit.


OHI -S INFERENCE (3rd visit)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
60.0
32.0
8.0
8
24
68
8.5
24.5
67
INDIAN SIGN LANGUAGE
AMERICAN SIGN LANGUAGE
VISUAL AIDS
Good
Fair
Poor

On evaluating OHI-S of all the children in all the three groups it was calculated that mean OHI-S of the children who were communicated through Indian Sign Language was 34% good , 38.3% fair and 28% poor. In the second group who were communicated through American Sign Language mean OHI-S score was 8% good, 35.6% fair and 57% poor. In the third group who were communicated through Visual Aids mean OHI-S score was 7% good, 33.6% fair and 60% poor.



ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
DEBRIS INDEX(1st visit)	Between Groups	1.117	2	.559	1.073	.343
	Within Groups	310.875	597	.521		
	Total	311.992	599			
CALCULUS INDEX(1st visit)	Between Groups	7.602	2	3.801	6.622	.001
	Within Groups	342.700	597	.574		
	Total	350.302	599			
OHI-S SCORE (1st visit)	Between Groups	15.457	2	7.728	3.848	.022
	Within Groups	1199.001	597	2.008		
	Total	1214.458	599			
DEBRIS INDEX (2nd visit)	Between Groups	7.816	2	3.908	7.695	.001
	Within Groups	303.192	597	.508		
	Total	311.008	599			
CALCULUS INDEX (2nd visit)	Between Groups	22.817	2	11.409	18.925	.000
	Within Groups	359.903	597	.603		
	Total	382.720	599			
OHI-S (2nd visit)	Between Groups	57.147	2	28.574	13.891	.000

	Within Groups	1228.033	597	2.057		
	Total	1285.180	599			
DEBRIS INDEX (3rd visit)	Between Groups	151.377	2	75.688	158.362	.000
	Within Groups	285.333	597	.478		
	Total	436.710	599			
CALCULUS INDEX (3rd visit)	Between Groups	211.152	2	105.576	177.142	.000
	Within Groups	355.812	597	.596		
	Total	566.964	599			
OHI-S (3rd visit)	Between Groups	720.091	2	360.045	178.132	.000
	Within Groups	1206.671	597	2.021		
	Total	1926.762	599			

Multiple Comparisons

Tukey HSD

Dependent Variable		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
DEBRIS INDEX(1st visit)	Indian Sign Language vs American Sign Language	.0085000	.0721615	.992	-.161048	.178048
	Indian Sign Language vs Visual Aids	-.0870000	.0721615	.450	-.256548	.082548
	American Sign Language vs Visual Aids	-.0955000	.0721615	.383	-.265048	.074048
CALCULUS INDEX(1st visit)	Indian Sign Language vs American Sign Language	-.1795000*	.0757652	.048	-.357516	-.001484
	Indian Sign Language vs Visual Aids	-.2710000*	.0757652	.001	-.449016	-.092984
	American Sign	-.0915000	.0757652	.449	-.269516	.086516

	Language vs Visual Aids					
OHI-S SCORE (1st visit)	Indian Sign Language vs American Sign Language	-.2060000	.1417172	.314	-.538975	.126975
	Indian Sign Language vs Visual Aids	-.3930000*	.1417172	.016	-.725975	-.060025
	American Sign Language vs Visual Aids	-.1870000	.1417172	.385	-.519975	.145975
DEBRIS INDEX (2nd visit)	Indian Sign Language vs American Sign Language	-.2075000*	.0712643	.010	-.374940	-.040060
	Indian Sign Language vs Visual Aids	-.2660000*	.0712643	.001	-.433440	-.098560
	American Sign Language vs Visual Aids	-.0585000	.0712643	.690	-.225940	.108940
CALCULUS INDEX (2nd	Indian Sign Language vs	-.3905000*	.0776435	.000	-.572929	-.208071

visit)	American Sign Language					
	Indian Sign Language vs Visual Aids	-.4335000*	.0776435	.000	-.615929	-.251071
	American Sign Language vs Visual Aids	-.0430000	.0776435	.845	-.225429	.139429
OHI-S (2nd visit)	Indian Sign Language vs American Sign Language	-.5980000*	.1434227	.000	-.934982	-.261018
	Indian Sign Language vs Visual Aids	-.6995000*	.1434227	.000	-1.036482	-.362518
	American Sign Language vs Visual Aids	-.1015000	.1434227	.759	-.438482	.235482
DEBRIS INDEX (3rd visit)	Indian Sign Language vs American Sign Language	-1.0790000*	.0691335	.000	-1.241434	-.916566

	Indian Sign Language vs Visual Aids	-1.0515000*	.0691335	.000	-1.213934	-.889066
	American Sign Language vs Visual Aids	.0275000	.0691335	.916	-.134934	.189934
CALCULUS INDEX (3rd visit)	Indian Sign Language vs American Sign Language	-1.2705000*	.0772010	.000	-1.451889	-1.089111
	Indian Sign Language vs Visual Aids	-1.2460000*	.0772010	.000	-1.427389	-1.064611
	American Sign Language vs Visual Aids	.0245000	.0772010	.946	-.156889	.205889
OHI-S (3rd visit)	Indian Sign Language vs American Sign Language	-2.3495000*	.1421698	.000	-2.683538	-2.015462
	Indian Sign Language vs Visual Aids	-2.2975000*	.1421698	.000	-2.631538	-1.963462

	American Sign Language vs Visual Aids	.0520000	.1421698	.929	-.282038	.386038

*. The mean difference is significant at the 0.05 level.

Hearing impairment are often inherent, inherited, or non- inheritable throughout life because the results of accident, disease, drug-induced or as a part of the aging method.

Two main forms of hearing disorder is also delineated: semi conductive and sensory neural.

The degree of hearing impairment ensuing from these impairments could vary from slight (average loss not surpassing 40 db) to profound (average loss within the way over 95 db) and should be unilateral or bilateral[25].

Four degree of hearing impairment were designated:

Mild (26–40 db), moderate (41–70 db), severe (71–90 db), and profound (>90db0)[29].

Our oral cavity is taken into account a mirror of our general body health. People with disabilities are at a larger risk for developing oral health issues and create distinctive difficulties in their dental management. Primary preventive care is of utmost importance and services for lots have to be compelled to be designed with the essential objective of assuaging and preventing diseases in our society.

Handicapped are typically termed as underprivileged cluster, as a result they're bereft from several social advantages within the society. Such a state of affairs could result in the matter of communication gap that widens more due to lack of the required knowledge and training .Hence the introduction of sign language in dental medicine as nonverbal communication methodology to speak with speech and hearing impaired medical specialty population for assessment of oral hygiene standing in kids have drawn the eye of the many researchers[32].

Communication could be a complicated system of causing, receiving and decoding messages. At its simplest it's a two-way method, involving a sender and a receiver. Communication are often delineated as: "A shared system of signals which needs systematic coding and applicable cryptography of signals." masterly communication entails that the signal sent and therefore the signal received square measure identical, notwithstanding the system of signals used, for instance, language, symbols, or photos[38].

Very few studies have been done in India and abroad to assess the effectiveness of American and Indian language as nonverbal communication strategies in hearing and

speech medical specialty population for assessment of Oral Health standing among 5 to 16 years old children attending special schools.

So the present study was applied to assess the oral hygiene status in three special schools:

- Welfare Centre for Persons with Speech and Hearing Impairment , Haryana
- N C Chaturvedi faculty For The Deaf , Lucknow
- Bal mook sansthan , Delhi

Various authors have explored totally different modes of communication for Children with Hearing Impairment, like through written directions to people, informative manuals, and additionally via videos. They have stated that written directions appear to be least effective, whereas directions given via visual suggests that have the advantage of higher understanding and convenience. The use of video modeling as health education methodology has this further advantage that it are often used repetitively with none additional price and efforts.

Deaf and hard of hearing individuals favor to communicate in numerous ways that, depending on their level of hearing disorder and who they are communicating with. They will use any, or any combination of, the following:

Lip-reading: This can be terribly wearing and needs loads of concentration. It involves recognizing lip patterns, however is tough as several sounds, like “b” and “p,” have similar lip patterns[21].

Sign language: This has its own structure and syntax. There are several sign languages like the American Sign language, British Sign language (BSL), and Australian Sign language, in Republic of India the National language additionally called the Indian Sign language is followed virtually all over with province as an exception wherever Local/Regional language is followed[38].

Fingerspelling: Using the manual alphabet where there are 26 different hand positions representing the 26 letters of the alphabet[41].

Hearing aids and cochlear implants: These are often helpful in creating the foremost of any residual hearing however don't restore traditional hearing. They’ll not essentially

build all sounds dead clear, they amplify all sounds and ground noise are often a selected drawback.

Written information: Some deaf individuals carry a Hearing Concern Sympathetic Hearing Card. Deaf those that have very little or no effective speech square measure doubtless to use pen and paper.

Shetty et al. tried the efficiency of language in coaching the Children with Hearing Impairment at the side of the help of their caregivers. He concluded that on comparing sign language with visual aids, Video modeling was found to be effective. He further supported that video modeling relies on social learning theory, which states that majority of the habits of a private square measure learned either by his/ her own experiences or by observant people[35].

Sign language is one in all the usually used strategies for human activity with hearing impaired children. In this, words are symbolized by forming totally different shapes with fingers and hands representing a special alphabet, requiring loads of practice, skill and talent. Hence, this methodology necessitates the support of trained personnel to interact. This barrier is overcome by a completely unique approach of coaching the dental skilled in standardized Indian language within the present study. This not solely encourages others to support children with Special Health Care desires, but additionally sets AN example for the complete medical and paramedical professionals

The study population consists of 600 hearing and speech impaired kids attending 3 special faculties, out of that, 258 (43%) were males and 342 (52%) were females. In another study by Saikiran kV et al in 2019 had ninety three kids with handicap out of that sixty five were boys and twenty eight were ladies.

Amongst the study population most students belonged to the age bracket of 9-12 years i.e. 391 (65%) kids and exactly 121 (20%) kids were of the age ten years that was just like the age teams determined in alternative studies by Sandeep V et al (2014), Arunakul M et al (2012), Doichinova L et al (2015), Shetty V et al (2014), Kumar S et al (2008), Khalaf MA et al (2015)[32-37].

Acc to our study 378 (63%) study population brushed only in the morning and 222 (37%) study population brushed both morning and evening. Majority of the population brushed everyday but once a day only as quoted by Oliveira ER et al (2000)[38] and Hamilton ME et al (1991)[39].

Among the study population 240 (40%) children brushed their teeth for the duration of 1-3 minutes.

Maximum study population 550 (92%) children used toothpaste and toothbrush for cleaning their teeth.

In our study, 270 (45%) children used horizontal brushing technique which accounts for the maximum study population. Stacey et al. (1972) have suggested that the proper brushing technique must be demonstrated and the importance of dental health must be emphasized for attaining the desired level of dental hygiene[40].

Amongst the population of 600 there were half of the population i.e. 300 (50%) children who had no habit. Apart from the remaining population 72 (12%) has a habit of thumb sucking, 90 (15%) children had a habit of tongue thrusting and 138 (23%) had a habit of mouth breathing.

In our study, 543 (90.5%) study population had caries when their oral screening was done leaving 57 (9.5%) children who were caries free. The high caries activity in these children can be attributed to their difficulty in maintaining oral hygiene, poor muscular co-ordination and muscle weakness interfering with routine oral hygiene practices

Amongst the study group, 423 (71%) population had no knowledge of fluorides amongst them. In the survey, 233 (39%) children changed their brush after every 9 months. Amongst the population of 600 there were maximum 305 (51%) children who were using Dabur Red toothpaste as a cleaning aid. Similar results were seen in a study by Fageeh HN (2019) [54]

In our study results, 443 (74%) children had never visited the dentists for their oral checkup.

There were 157 (26%) children had visited the dentists 1-2 years back for their oral checkup. Amongst which 157 (26%) reported for a general checkup and 57 (9.5%) children reported with complain of bad breath or halitosis. Similar results were seen in a study by Oliveira ER et al (2000)[38] and Hamilton ME et al (1991)[39].

In our study, 341 (57%) children loved to have snacks in between meals and 259 (43%) children liked to have late night snacks after dinner. Similar results were obtained in a

study by Aruna CM et al (2005) where it was seen that 58% were in a habit of consuming snacks in between meals[42].

256 (43%) children loved juices while 202 (34%) and 142 (24%) children loved sticky confectionaries and sweet milk respectively as snacking food. The majority of the children snacked on soft drinks, biscuits, or sweets. They did not understand the harmful effects of cariogenic foods and drinks as stated by Oredugba FA et al 1999[43].

A number of factors might exist to explain why there so much treatment need for dental caries among the handicap children. Lack of knowledge about good oral hygiene practices among the concerned authorities, lack of motivation, low priority given to dental care in the society, lack of facilities for early and regular oral health checkup and prompt treatment, poor socioeconomic status of the parents or guardians, and cost of treatment may be the reasons for the accumulated treatment needs. Whatever may be the reason, there is sufficient evidence to suggest that the treatment need amongst these children is not being met 46.

The oral hygiene status among study population in their first visit in the first group with Indian Sign Language was recorded as fair in 35%, good in 21%, and 44% of the study population showed poor oral hygiene status.
Similarly, the oral hygiene status among study population in their first visit in the second group with American Sign Language was recorded as fair in 39.5%, good in 8%, and 52.5% of the study population showed poor oral hygiene status.

Also The oral hygiene status among study population in their first visit in the third group with Visual Aids was recorded as fair in 34.5%, good in 6%, and 59.5% of the study population showed poor oral hygiene status.

And oral hygiene status among different groups was significant

The oral hygiene status among study population in their second visit in the first group with Indian Sign Language was recorded as fair in 47.5%, good in 20.5%, and 32% of the study population showed poor oral hygiene status.

Similarly, the oral hygiene status among study population in their second visit in the second group with American Sign Language was recorded as fair in 42.5%, good in 8%, and 49.5% of the study population showed poor oral hygiene status.

Also The oral hygiene status among study population in their second visit in the third group with Visual Aids was recorded as fair in 41%, good in 6%, and 53% of the study population showed poor oral hygiene status.

And oral hygiene status among different groups was significant

The oral hygiene status among study population in their third visit in the first group with Indian Sign Language was recorded as fair in 32%, good in 60%, and 8% of the study population showed poor oral hygiene status.
Similarly, the oral hygiene status among study population in their third visit in the second group with American Sign Language was recorded as fair in 24%, good in 8%, and 68% of the study population showed poor oral hygiene status.

Also The oral hygiene status among study population in their third visit in the third group with Visual Aids was recorded as fair in 24.5%, good in 8.5%, and 67% of the study population showed poor oral hygiene status.

And oral hygiene status among different groups was significant

The poor oral hygiene status described above could partly be explained by limitations in personal abilities or technical difficulties (e.g. The inability to reach the tooth brush), but there is quite a strong feeling that nurses and caregivers are more interested in general hygiene than in oral hygiene. Parents and educators of handicapped children are aware of the presence of oral problems such as bleeding gums, halitosis, and the presence of plaque or calculus. Many have reported that they had never received any advice on oral health care.

In this study diet might have played a role in affecting the oral hygiene status of study population. Various investigators have reported poor oral hygiene in handicapped children and it may be due to prolonged retention of food particles in the oral cavity. This might also result in a higher incidence of dental caries or due to psychological competition, to show that they are as good as others, and this may also be due to strict instruction and supervision of teachers to the students to clean their teeth regularly after taking food.

The present study was done in the Department of Pedodontics and Preventive Dentistry, Babu Banarasi Das College of Dental Sciences, Lucknow in collaboration with centres for speech and hearing-impaired children. The study was done with an aim of comparative evaluation of the effectiveness of American and Indian Sign Language as nonverbal communication method in speech and hearing-impaired children for assessment of oral health status.

On the basis of results obtained from the study following conclusions were drawn-

- Effectiveness of American Sign Language for the assessment of oral health status was found to be good in 8% children, 35.6% fair and 57% poor in speech and hearing-impaired children.
- Effectiveness of Indian Sign Language for the assessment of oral health status was 34% good, 38.3% fair and 28% poor in speech and hearing-impaired children.
- Indian Sign Language was more effective than American Sign Language because it uses both the hands i.e., two- handed fingerspelling alphabet to express and communicate but American Sign Language uses only one hand i.e., one-handed fingerspelling alphabet to communicate while expressing.

On the basis of our conclusion, it is recommended that Indian Sign Language should be taught to the dental students as well as the practising experts so as to facilitate the communication between speech and hearing-impaired children and Pediatric Dental surgeon.

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APPENDIX-I

Babu Banarasi Das University
Babu Banarasi Das College of Dental Sciences,
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

Dr. Lakshmi Bala
Professor and Head Biochemistry and
Member-Secretary, Institutional Ethics Committee

Communication of the Decision of the VIIth Institutional Ethics Sub-Committee

IEC Code: 40 **BBDCODS/01/2019**

Title of the Project: Comparative Evaluation of the Effectiveness of American and Indian Sign Language as Non Verbal Communication Method in Speech and Hearing Impaired Children for Assessment of Oral Health Status.

Principal Investigator: Dr. Anahita Gupta **Department:** Paedodontics & Preventive Dentistry

Name and Address of the Institution: BBD College of Dental Sciences Lucknow.

Type of Submission: New, MDS Project Protocol

Dear Dr. Anahita Gupta,

The Institutional Ethics Sub-Committee meeting comprising following four members was held on 10th January 2019.

1.	Dr. Lakshmi Bala Member Secretary	Prof. and Head, Department of Biochemistry, BBDCODS, Lucknow
2.	Dr. Amrit Tandan Member	Prof. & Head, Department of Prosthodontics and Crown & Bridge, BBDCODS, Lucknow
3.	Dr. Rana Pratap Maurya Member	Reader, Department of Orthodontics & Dentofacial Orthopedics, BBDCODS, Lucknow
4.	Dr. Sumalatha M.N. Member	Reader, Department of Oral Medicine & Radiology, BBDCODS, Lucknow

The committee reviewed and discussed your submitted documents of the current MDS Project Protocol in the meeting.
The comments were communicated to PI thereafter it was revised.

Decisions: The committee approved the above protocol from ethics point of view.

Lakshmi Bala 21/01/19

Member-Secretary
Institutional Ethic Committee
BBD College of Dental Sciences
BBD University
Faizabad Road, Lucknow-226028

(Dr. Lakshmi Bala)
Member-Secretary
IEC

Forwarded by:

PRINCIPAL
Babu Banarasi Das College of Dental Sciences
(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow

(Dr. B. Rajkumar)
Principal
BBDCODS

APPENDIX-II

Babu Banarasi Das College of Dental Sciences

(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

Consent Form (English)

Title of the Study - Comparative evaluation of the effectiveness of american and indian sign language as non verbal communication method in speech and hearing impaired children for assessment of oral health status.

Study Number……..
Subject's Full Name…**Dr. Anahita Gupta**…….
Date of Birth/Age …**12 May 1993 / 25 years**…..
Address of the subject …**WZ-332A LANE 12 2ND FLOOR LAJWANTI GARDEN NEW DELHI 110046**…….
Phone no. and e-mail address…MOB- **9868892669** /
E-MAIL- **anahita.gupta17@yahoo.co.in**…….
Qualification
…**Graduated**……
Occupation: **Student** / Self Employed / Service / Housewife/ Other (Please tick as appropriate)
Annual income of the Subject…….
Name and of the nominees(s) and his relation to the subject……. (For the purpose of compensation in case of trial related death).

1. I confirm that I have read and understood the Participant Information Document dated…….for the above study and have had the opportunity to ask questions. **OR** I have been explained the nature of the study by the Investigator and had the opportunity to ask questions.
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected.
3. I understand that the sponsor of the project, others working on the Sponsor's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the trial. However, I understand that my Identity will not be revealed in any information released to third parties or published.
4. I agree not to restrict the use of any data or results that arise from this

study provided such a use is only for scientific purpose(s).

5. I permit the use of stored sample (tooth/tissue/blood) for future research.

Yes [ ] No [ ] Not Applicable [ ]

6. I agree to participate in the above study. I have been explained about the complications and side effects, if any, and have fully understood them. I have also read and understood the participant/volunteer's Information document , given to me.

Signature (or Thumb impression) of the Subject/Legally Acceptable Representative:……..

Signatory's Name……. Date …….

Signature of the Investigator……

Date……..

Study Investigator's Name…....

Date…….. Signature of the witness……..

Date…….. Name of the witness……

Received a signed copy of the PID and consent form

Signature/thumb impression of the subject or legally acceptable representative

Date……..

,

APPENDIX-III

Babu Banarasi Das College of Dental Sciences

(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

सहमति पत्र

अध्ययन शीर्षक अमेरिकी और भारतीय साइन लैंग्वेज की प्रभावशीलता का तुलनात्मक मूल्यांकन, मौखिक स्वास्थ्य स्थिति के आकलन के लिए भाषण और सुनने वाले बच्चों में गैर मौखिक संचार विधि के रूप में।

अध्ययन संख्या.....

प्रतिभागी के पूर्ण नाम.....

जन्म तिथि / आयु.....

प्रतिभागी का पता .....

फोन नं. और ई-मेल पता .....

योग्यता .....

व्यवसाय: छात्र / स्व कार्यरत / सेवा / ग्रहिणी .....

अन्य (उचित रुप मे टिक करें) .....

प्रतिभागी की वार्षिक आय .....

प्रत्याशीयो के नाम और प्रतिभागी से संबंध...(परीक्षण से संबंधित मौत के मामले मे मुआवजे के प्रयोजन के लिए)

1. मेरी पुष्टि है कि मैने अध्ययन हेतु सुचना पत्र दिनांक ..... को पढ व समझ लिया तथा मुझे प्रश्न पुछने या मुझे अध्ययन अन्वेषक ने सभी तथ्यों को समझा दिया है तथा मुझे प्रश्न पुछने के समान अवसर प्रदान किए गये।

2. मैंने यहॉ समझ लिया कि अध्ययन में मेरी भागीदारी पूर्णतः स्वैच्छिक है और किसी भी दबाव के बिना स्वतंत्र इच्छा के साथ दिया है किसी भी समय किसी भी कारण के बिना , मेरे इलाज या कानूनी अधिकारो को प्रभावित किए बिना , अध्ययन में भाग न लेने के लिए स्वतंत्र हुँ ।

3. मैंने यह समझ लिया है कि अध्ययन के प्रायोजक , प्रायोजक की तरफ से काम करने वाले लोग, आचार समिति और नियामक अधिकारियों को मेरे स्वास्थ्य रिकार्ड को वर्तमान अध्ययन या आगे के अध्ययन के सन्दर्भ देखने के लिए मेरी अनुमति की जरूरत नही है, चाहे मैने इस अध्ययन से नाम वापस ले लिया है। हॉलाकि मै यह समझता हुँ कि मेरी पहचान को किसी भी तीसरे पक्ष या प्रकाशित माध्यम में नही दी जायेगी।

4. मै इससे सहमत हूँ कि कोई भी डेटा या परिणाम जो इस अध्ययन से प्राप्त होता है उसका वैज्ञानिक उद्देश्य (ओं) के उपयोग के लिए मेरी तरफ से कोई प्रतिबंध नही है।

5. भविष्य के अनुसंधान के लिए भंडारित नमूना (ऊतक/रक्त) पर अध्ययन के लिए अपनी सहमति देता हुँ।

हॉ [ ] नही [ ] अनउपयुक्त [ ]

6. मै परीक्षण की अनुमति देता हुँ। मुझे इसके द्वारा यदि कोई परेशानी होती है, इसके बारे में जानकारी दे दी गई है। मैने रोगी जानकारी सूचना पत्र को पढ तथा समझ लिया है।

प्रतिभागी / कानूनी तौर पर स्वीकार्य प्रतिनिधि का हस्ताक्षर (या अंगूठे का निशान.....

हस्ताक्षरकर्ता का नाम..... दिनांक .....अन्वेषक के हस्ताक्षर ..... दिनांक .....

अध्ययन अन्वेषक का नाम .....

गवाह के हस्ताक्षर ..... दिनांक .....गवाह के नाम .....

मैनें पीआईडी और विधिवत भरे सहमति फार्म का एक हस्ताक्षर की नकल प्राप्त की.

प्रतिभागी कानूनी तौर पर प्रतिनिधि का हस्ताक्षर/ अंगूठे का निशान ..... दिनांक.....

APPENDIX-IV

Babu Banarasi Das College of Dental Sciences

(A constituent institution of Babu Banarasi Das University)

BBD City, Faizabad road, Lucknow – 226028 (INDIA)

,

Participant Information Document (PID)

1. Study title

Comparative evaluation of the effectiveness of American and Indian Sign Language as Non Verbal Communication method in speech and hearing impaired children for assessment of oral health status.

2. Invitation paragraph?

You are being invited to take part in a research/trial study. Before you decide it is important for you to understand why the research/study is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends, relatives and your treating physician/family doctor if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

3. What is the purpose of the study?

To evaluate and compare the effectiveness of American and Indian Sign Language as nonverbal communication (NVC) methods in hearing and speech impaired pediatric population for assessment of Oral Health Status.

4. Why have I been chosen?

It has been reported that a dental treatment is the greatest unattended health need of the disabled due to communication problem. So to bridge this gap between the dentist and them speech and hearing impaired children of age 5-16 years irrespective of their gender would be chosen for the study. There will be approximately 88 other children who would be participating in this study.

5. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still are free to withdraw at any time and without giving a reason.

6. What will happen to me if I take part?

- An oral screening would be conducted in the institute wherever you are.
- After the screening children would be given basic required atraumatic dental procedure i.e. oral prophylaxis , fluoride application and ART
- Children will be divided in two groups and will be explained about the basic oral hygiene practices in two different sign language
- They will be motivated to keep their oral hygiene clean
- After three months again an oral screening would be done and their oral health status would be recorded and compared.
- Similiarly the same procedure would be repeated thrice and a comparison would be drawn out.

It will be the duty of the child to understand and follow the instructions as given to them to clean and maintain a proper oral hygiene.

7. What do I have to do?

There are no lifestyle restrictions to be followed. There are no dietry restrictions nor any medication restriction. You will follow your normal day routine .There will not be any changes.

The child will just need to follow proper instructions of clearing his/her oral cavity and maintain a proper oral hygiene.

8. What is the procedure that is being tested?

There will be no drug given to the child related to the study. The children participating in the study will be given a card with details of the study. They will be asked to carry that card if they need to visit the institute a second time.

9. What are the interventions for the study?

Minimal intervention in which your child will be provided basic preventive dental treatment.

10. What are the side effects of taking part?

There are no possible side effects of taking part in the study , but incase if you feel to enquire about anything during the study a contact name and number to phone would be provided to you in any way concerned or in case of emergency.

11. What are the possible disadvantages and risks of taking part?

It is possible that if the study is performed to a pregnant woman it will harm the unborn Child. Pregnant women must not therefore take part in this study, neither should woman who plan to become pregnant during the study. Women who are at risk of pregnancy may be asked to have a pregnancy test before taking part to exclude the possibility of pregnancy. Women who could become pregnant must use an effective contraceptive during the course of this study. Any woman who finds that she has become pregnant while taking part in the study should immediately inform the investigator.
Use the pregnancy statement carefully. In certain circumstances (e.g. terminal illness) it would be inappropriate and insensitive to bring up pregnancy.
You should clearly state what will happen if you detect or find a condition of which the patient was unaware. It is treatable? What are you going to do with this information?

12. What are the possible benefits of taking part?

The possible benefits of taking part in the study would improve the oral status of your child. It will help the dentist and these special children to bridge a bond between them and have a good communication with each other.

13. What if new information becomes available?

Sometimes during the course of a research project, new information becomes available about the research being studied. If this happens, your researcher will tell you about it and discuss with you whether you want to continue in the study. If you decide to withdraw, your researcher/investigator will make arrangements for your withdrawal. If you decide to continue in the study, you may be asked to sign an updated consent form.

14. What happens when the research study stops?

If the study finishes/stops before the stipulated time, the participants will be explained and well-informed.

15. What if something goes wrong?

The participants parents will be well-informed about the study but still if something goes wrong a proper available address with the contact number of the concerned person would be provided to them before the beginning of the study.

16. Will my taking part in this study be kept confidential?

If you consent to take part in the research any of your medical records may be inspected by the company sponsoring (and/or the company organizing) the research for purposes of analyzing the results. They may also be looked at by people from the company and from regulatory authorities/IEC to check that the study is being carried out correctly. Your name, however, will not be disclosed outside the laboratory/centre.

All information collected about you during the course of the research will be kept strictly confidential. Any information which leaves the laboratory will have your name and address removed so that you cannot be recognized from it.

17. What will happen to the results of the research study?

The final outcome/results will be told to the participants as soon as the study gets completed. Any of the participants information regarding their identity will not be revealed in any report/publications.It will strictly be confidential.

18. Who is organizing the research?

This research is being organized in the Department of Pedodontics and Preventive Dentistry, Babu Banarasi Das College Of Dental Sciences, Babu Banarasi Das University, Lucknow in collaboration with various other institutes and non-governmental organisations for speech and hearing impaired children. The participants do not have to pay for anything.

19. Will the results of the study be made available after study is over?

The result of the study will be made available to the participant.

20. Who has reviewed the study?

The HOD maam of the Department Of Pedodontics and Preventive Dentistry, Babu Banarasi Das College Of Dental Sciences, Babu Banarai Das University, Lucknow has reviewed and approved the study.

21. Contact for further information

Dr Anahita Gupta

Department of Pedodontics and Preventive Dentisry

Babu Banarasi Das College Of Dental Sciences

Lucknow 227105

anahita.gupta17@yahoo.co.in

9868892669

Dr Neerja Singh

Professor and Head

Department of Pedodontics and Preventive Dentisry

Babu Banarasi Das College Of Dental Sciences

Lucknow 227105

Dr. Lakshmi Bala

Member Secretary

Babu Banarasi Das College Of Dental Sciences

Lucknow 227105

bbdcods.iec@gmail.com

Thank you for taking out your precious time for reading the documents and participating in the study.

Signature of PI……

Name……

Date ……

APPENDIX-V

Babu Banarasi Das College of Dental Sciences

(Babu Banarasi Das University, Lucknow)
BBD City, Faizabad Road, Lucknow – 227105 (INDIA)

प्रतिभागी के लिए सूचना पत्र

1. अध्ययन शीर्षक

क्या आप का अध्ययन शीर्षक एक आम आदमी के समझने योग्य है ? यदि नही,, तो आप एक अतिरिक्त सरल शीर्षक शामिल कर सकते हैं।

2. निमंत्रण अनुच्छेद

आपको समझाना चाहिए कि मरीज को एक अध्ययन/शोध परीक्षण में भाग लेने के लिए कहा जा रहा है. निम्नलिक्षित एक उदाहरण है.:
आप को एक अध्ययन/शोध परीक्षण में भाग लेने के लिए आमंत्रित किया जा रहा है। इससे पहले आपके लिए यह समझना जरूरी है कि यह अध्ययन क्यों किया जा रहा है और उसमें क्या चीजे शामिल है। कृप्या अपना समय निकालकर इस सूचना को पढें तथा अपनी इच्छानुसार अपने मित्रों , परिजनो तथा अपने चिकित्सक के साथ चर्चा करें। अगर आपको कोई जानकारी समझ में नही आती है या और चाहिए तो हमें बताए। आप अपना समय निकालकर इस सूचना को पढें और बताए कि आप अध्ययन में भाग लेना चाहते है कि नहीं

3. अध्ययन का उद्देश्य क्या है ?

पृष्ठभूमि और अध्ययन के उद्देश्य की जानकारी सरल शब्दों में यहॉ देनी चाहिए।

4. मुझे इस अध्ययन के लिए क्यों चुना गया है ?

कृप्या आप प्रतिभागी को बताए कि उसे क्यों चुना गया है और इस में और कितने लोगो का चुनाव किया जाना है।

5. क्या इसमें मुझे भाग लेना चाहिए ?

कृप्या आप भागी को समझाए कि अनुसंधान / परीक्षण में भाग लेने के पूरी तरह स्वैच्छिकता है। आप निम्नलिखित पैराग्राफ का इस्तेमाल कर सकते है :–
'' यह आप पर निर्भर है कि आप को भाग लेना चाहिए की नहीं । यदि आप भाग लेने का फैसला करते है तो आप को अपने पास रखने के लिए एक सूचना पत्र दिया जाएगा और एक सहमति फार्म पर हस्ताक्षर करने के लिए कहा जाएगा। यदि आप ने भाग लेने के लिए फैसला किया फिर भी किसी भी समय बिना कारण वापस भाग न लेने के लिए स्वतंत्र है।

6. मुझे क्या होगा यदि मैं इस अध्ययन में भाग लेता हूँ।

आपको यह बताना चाहिए कि प्रतिभागी को कितने समय के लिए अध्ययन में भाग लेना है और यह अध्ययन कितने समय चलेगा। प्रतिभागी को यह भी बताना होगा कि भागी को कितनी बार और कितने दिनों के लिए परीक्षण के लिए सी0 बी0 एम0 आर0 आना होगा। आप प्रतिभागी को यह भी बताए कि उसे सी0 बी0 एम0 आर0 आने जाने का खर्च किसे देय होगा ? आप भागी को यह भी बताए की उसे आने पर हर बार कौन सी जॉच करनी होगी। आप प्रतिभागी को यह भी बताए कि उसकी क्या जिम्मेदारी होगी। प्रतिभागी को यह लिखकर दीजिए की उसे क्या सावधानी बरतकर आना चाहिए। आप प्रतिभागी को अध्ययन के विभिन्न पहलू के बारे में जानकारी दीजिए।

7. मुझे क्या करना है ?
क्या अध्ययन में भाग लेने से जीवन शैली पर किसी तरह का फर्क पडेगा ? आप भागी को यह भी बताए कि उसे आहार में कोई सावधानी बरतनी होगी। आप प्रतिभागी को यह भी बताए कि क्या वह रोज कि तरह गाडी चला सकता है ? क्या वह खेलखूद में भाग ले सकता है ? क्या वह रोज की तरह दवाए ले सकता है? क्या उसे रक्त देने से बचना चाहिए ? आप यह भी बताए कि उसे गर्भवती हो जाने पर क्या करना चाहिए ।

8. किस प्रक्रिया का परीक्षण किया जा रहा है ?

आप को प्रक्रिया या डिवाइस का एक संक्षिप्त विवरण देना चाहिए। आप को उनके विकास के बारे में जानकारी देना चाहिए। आप को दवा की खुराक और और उसे देने की विधि के बारे में जानकारी देना चाहिए। यदि मरीज को दवा के परीक्षणों में शामिल किया जाता है तो उसे अध्ययन की जानकारी का एक पहचान पत्र जैसा कार्ड देना चाहिए।

9. इस शोध में कौन से हस्तक्षेप दिए जायेगें ?

शोध के लिए रोगी को आप यह बताए कि उसे कौन से हस्तक्षेप दिए जायेगे।

10. इस अध्ययन में भाग लेने के क्या दुष्प्रभाव है **?**

किसी भी नई शोध या प्रक्रिया के लिए आप प्रतिभागी को उसके संभव दुष्प्रभाव को समझा जाना चाहिए। यदि वे इन या किसी भी अन्य लक्षण से पीडित है तो उन्हें अगली बार जब आप से मिलने आए तो उन्हे बताना चाहिए। आप भी उन्हे अपना नाम और फोन नंबर देना चाहिए ताकि यदि वे किसी भी आपातकालीन

स्थिति में आप से संपर्क कर सके । ज्ञात दुष्प्रभाव को भागी को सरल भाषा में समझकर तथा लिखकर देना चाहिए। किसी भी नई शोध 1के लिए अज्ञात दुष्प्रभाव के बारे में रोगी को पता होना चाहिए।

11. इस अध्ययन में भाग लेने के सम्भावित जोखिम और नुकसान क्या है ?

अध्ययन के पहले या उसके दौरान महिला यदि गर्भवती हो जाती है तो बच्चे पर नुकसान हो सकता है, उसे आपको इन शब्दों में बताना होगाः–

'' यह संभव है कि अगर एक गर्भवती महिला को शोध के लिए चुना गया है तो उसे इस अध्ययन में भाग लेना चाहिए या नही ? या जो औरत अध्ययन के दौरान गर्भवती होने की संभावना है और कुछ महीने के बाद दोबारा इस अध्ययन में भाग लेना है या नही । किसी भी औरत को यदि पता चलता है कि वह गर्भवती बन गयी है , तो उसे तुरन्त अन्वेषक को सुचित करना चाहिए। गर्भावस्था के बयान को सावधानी से करें ।

12. अध्ययन में भाग लेने के संभावित लाभ क्या हैं ?

क्या प्रतिभागी को अध्ययन में भाग लेने से कुछ फायदा है? यह स्पष्ट रूप से कहा जाना चाहिए। यह महत्वपूर्ण है अध्ययन के बारे में प्रतिभागी को बढाचढाकर नही बताना चाहिए । बल्कि उसे इस भाषा में समझाना चाहिएः

हमें आशा है कि परीक्षणों से आपको मदद मिलेगी। हालांकि यह गारंटी नही हो सकती ,इस अध्ययन से प्राप्त जानकारी हमें भविष्य में लोगो की बीमारी के बारे में जानकारी मिल सकती है।

13. क्या होगा यदि कोई नई जानकारी उपलब्ध हो जाती है ?

यदि अनुसंधान / परीक्षण के दौरान अतिरिक्त नई जानकारी उपलब्ध हो जाती है आप इस बारें में प्रतिभागी को बताएँ । आप निम्न शब्द इस्तेमाल कर सकते हैः

'' कभी कभी एक अनुसंधान परियोजना / परीक्षण या शोध के दौरान नई जानकारी उपलब्ध हो जाती है। यदि ऐसा होता है तो आपके चिकित्सक आपको इसके बारे में बताएगे और आप के साथ चर्चा करेगे कि क्या आप इस अध्ययन में भाग लेना जारी रखना चाहतें है या नही । यदि आप वापस लेने का फैसला करते है तो आपका चिकित्सक आपके शोध को जारी रखने की व्यवस्था करेगे । यदि आप अध्ययन में जारी रखने का निर्णय लेते तो आपको एक अपडेटेड सहमति फार्म पर हस्ताक्षर करने के लिए कहा जा सकता है।

इसके अलावा नई जानकारी प्राप्त होने पर आपका चिकित्सक आपके हित के लिए अध्ययन से वापस लेने के लिए कह सकता है । वह इन कारणों को आपको बताएगें और इलाज जारी रखने की व्यवस्था करेगें।

14. क्या होता है जब अध्ययन / शोध परीक्षण बन्द हो जाता है ?

अगर यह शोध समय से पहले समाप्त हो जाता है तो इसकी पुरी सुचना प्रतिभागी को देना अनिवार्य है। कभी–कभी जो संस्था शोध को आर्थिक रूप से सहायता प्रदान कर रही होगी उसकी मदद न करने से शोध बन्द हो जाता है । अगर यह एक कारण है तो इसकी जानकारी प्रतिभागी को देनी चाहिए।

15. क्या होगा अगर कुछ गलत हो जाता है ?

प्रतिभागी को सुचित करना चाहिए कि उसकी शिकायतो का निवारण कैसे होगा और जिनके पास शिकायत करनी , उनके पते क्या है ? आपको शिकायत करने की प्रकिया की के विषय में पूर्ण जानकारी देनी होगी एवं शोध के दौरान किसी भी प्रकार के अप्रिय घटना घटने के पश्चात उन्हें कहॉ सम्पर्क करना है उसकी जानकारी उन्हें देनी होगी ।

16. मेरे इस अध्ययन में भाग लेने को गोपनीय रखा जाएगा ?

आपकों प्रतिभागी के चिकित्सीय प्रपत्र की पूर्ण जानकारी देने के लिए प्रतिभागी से आज्ञा लेनी पडेगी। आपको यह बताना होगा जो भी जानकारी प्राप्त की जाएगी वह गोपनीय रखी जाएगी। इसका निम्न वर्णन है।

'' यदि आप शोध में भाग लेने की सहमति देते है परीक्षण के लिए आपके मेडिकल रिकार्ड / परिणामों का विश्लेषण जॉच प्रायोजित कंपनी द्वारा किया जा सकता है । यह कंपनी और नियामक अधिकारियों द्वारा अध्ययन सही ढंग से किया जा रहा है की नही इसे देखने के लिए किया जाता है। आपका नाम का अस्पताल / क्लिनिक और प्रयोगशाला के बाहर खुलासा नही किया जाएगा ''

'' सभी अनूसंधान / परीक्षण के दौरान आप के बारे में एकत्र जानकारी कडाई से गोपनीय रखी जाएगी । कोई भी जानकारी है जो अस्पताल/ क्लिनिक और प्रयोगशाला से बाहर जाएगी , तो उसके ऊपर से नाम और पता हटा दिया जाएगा।

17. अध्ययन / शोध परीक्षण के परिणाम का क्या होगा ?

आप को रोगी के अनुसंधान / परीक्षण के परिणाम को यह बताना होगा कि आगे उसका क्या होगा । आप को यह भी समझाना होगा की उसकी पहचान किसी भी रिपोर्ट /प्रकाशन में नही की जाएगी।

18. इस अध्ययन को कौन आयोजित कर रहा है और इस परीक्षण के लिए धन कहॉ से आएगा ?

कौन सी संस्था या कंपनी शोध कार्य को प्रायोजित/सहयोग/वित्त पोषण (जैसे सरकारी एजेंसी,एन0 जी0 ओ0 , शैक्षिक संस्थान) कर रही है। इसकी जानकारी यहॉ उल्लेखीत होनी चाहिए।

प्रतिभागी को इसकी जानकारी देना होगा कि शोधकर्त्ता जॉच के लिए उन्हें अलग से कोई धनराशि देगे या नही? जिस शोध में वह भाग ले रहे है । इसका तात्पर्य है कि उस जॉच अथवा परीक्षण की जो कीमत है उसका वहन कौन कर रहा है? क्या वह फ्री है ? क्या प्रतिभागी को इस परीक्षण के लिए कोई शुल्क देना होगा या नही?

19. क्या सेवाएं शोध खत्म हो जाने के बाद उपलब्ध रहेगी या नही ?

इस जानकारी की कृप्या आप सूचना पत्र में शामिल करें ।

20. इस अध्ययन का पुर्ननिरिक्षण किसने किया है ?

आप यह बताए कि इसका पुर्ननिरिक्षण या पुर्नावलोकन हमारे संस्थान की नैतिकता / आचार समिति ने किया है तथा अध्ययन करने की सहमति दी है ।

निम्न लोगो से सम्पर्क करें

21. अधिक जानकारी के लिए

आपको प्रतिभागी को अधिक जानकारी देने के लिए मरीज का संपर्क पता देना चाहिए जो अन्वेषक के नाम पर है

प्रमुख अन्वेषक का नाम , पता , ई मेल पता , दूरभाष नं0 और नाम , संस्था की नैतिकता समिति के सदस्य सचिव (डा0 लक्ष्मी बाला , सदस्य सचिव,)

bbdcods_iec@gmail.com) दूरभाष नं0 :– 1233

1 , प्रतिभागी को घन्यवाद अवश्य प्रदान करे।

2 , प्रतिभागी सूचना पत्र में दिनांक लिखित है

3. प्रतिभागी सूचना पत्र में इसकी जानकारी अवश्य हो कि इसकी एक प्रतिलिपि आपने प्रतिभागी को दिया है।

प्रमुख अन्वेषक के हस्ताक्षर

प्रमुख अन्वेषक का नाम ..... दिनांक.....

APPENDIX-VI

Babu Banarasi Das College of Dental Sciences

(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

Child Information Document

Study title: Comparative evaluation of the effectiveness of American and Indian sign language as non verbal communication method in speech and hearing impaired children for assessment of oral health status.

Introduction

The purpose of the study is to bridge the communication gap between the dentist and speech and hearing impaired children so that the importance of a healthy oral cavity can be told to them. We invite you to participate in this study.

What will you have to do?

To participate in this research study, you will be interviewed/examined by the doctor who will be carrying out the study and if found to fulfill pre-specified criteria, you will be eligible to be enrolled in this research study.

Since you are in the age group of 8-18 years we ask your accompanying parent / guardian will also sign a similar form called as the Parent Informed Consent Form.

List all procedures, which will be employed in the study. Point out any that are considered experimental/or otherwise, and explain technical and medical terminology in simple, nontechnical & direct language.

In addition, to record the same parameters daily your parent / guardian will also be provided with a diary where they will enter the same findings accordingly. You will have to tell them about your symptom and they will mark accordingly in the diary

Risks and discomforts

There is no foreseen significant risk / hazard to your health, if you wish to participate in the study. If you follow the directions of the doctor in charge of this study and you are injured due to any procedure given under the study plan, the Sponsor will pay for the medical expenses for the treatment of that injury.

Benefits

If you participate in the study you will receive knowledge of keeping your oral hygiene healthy. If you appear to have any acute illness during the treatment you will be offered free treatment for those visits in accordance with local standard medical care.

You will not be offered free treatment for chronic diseases or conditions not related to study procedures.

Your participation in the study may help others, because this participation will help us determine if the study drug/procedure is safe.

Confidentiality

Your existing medical records may be accessed; personal health information about you may be collected and processed by study investigators for the purpose of performing the study. Information about you will be collected and stored in files with an assigned number, and not directly with your name. All documents related to the study will only be accessed by the study investigator, sponsor, the Ethics Committee and the Regulatory authority.

Your parent / guardian will have the right to access personal information about you at any time with the study doctor and the right to correct this personal information. Your parent / guardian can take away your authorization to collect process and disclose data about you at any time.

Right to refuse or withdraw

You do not have to take part in this research if you do not wish to do so. You may stop participating in the research at any time you wish. The study investigator may decide to withdraw you from the study if he/she considers it is in your best interest. You will be informed of important new findings developed during the course of the study so you will be able to consider your participation in the study in light of new information.

Parents responsibilities

It is the responsibility of your parent / guardian to come along with you to the centre during the study period for all the visits unless you withdraw or are prematurely discontinued from the study. It is also your responsibility and your parent / guardian to report any expected or unexpected reactions (side effects) that you notice during the study period. We expect your co-operation throughout the study.

APPENDIX-VII

Babu Banarasi Das College of Dental Sciences

(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

Child Assent Form

Study Title- Comparative evaluation of the effectiveness of American and Indian sign language as non verbal communication method in speech and hearing impaired children for assessment of oral health status.
Study Number_____
Subject's Full Name _____
Date of Birth/Age_____
Address _____
_____

I_____, exercising my free power of choice, hereby give my consent for participation in the study entitled: "Comparative evaluation of the effectiveness of American and Indian sign language as non verbal communication method in speech and hearing impaired children for assessment of oral health status."
I have been informed, to my satisfaction, by the attending physician, about the purpose of the study and the nature of the procedure to be done. I am aware that my parents/guardians do not have to bear the expenses of the treatment if I suffer from any trial related injury, which has causal relationship with the said trial drug. I am also aware of right to opt out of the trial, at any time during the course of the trial, without having to give reasons for doing so

Signature of the study participant _____Date:_____
Name of the study participant_____

Signature of the Witness _____Date_____
Name of the Witness _____

Signature of the attending Physician _____Date:_____
Name of the attending Physician

APPENDIX-VIII

Babu Banarasi Das College of Dental Sciences
(Babu Banarasi Das University)
BBD City, Faizabad Road, Lucknow – 226028 (INDIA)

शिशु सहमति पत्र

मैं _____में भाग लेने के लिए अपनी सहमति प्रदान करता हूँ | मुझे इस अध्ययन के हेतु और उसमे की जाने वाली प्रक्रिया के बारे में चिकिस्तक द्वारा बता दिया गया है| मुझे पता है कि अध्ययन सम्बन्धी किसी हानि जिसका अध्ययन की दावा से सम्बन्ध है उसका खर्च मेरे माता पिता अथवा अभिवाहक को नहीं वहां करना है | मुझे यह भी पता है कि मैं इस अध्ययन से किसी समय बिना कोई कारण बताये बाहर हो सकता हूँ |

अध्ययन में भाग लेने वाले का नाम और हस्ताक्षर
_____दिनांक_____

गवाह के हस्ताक्षर _____दिनांक _____

गवाह का नाम _____

चिकिस्तक का नाम और हस्ताक्षर_____दिनांक_____

Curiginal

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