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HUSHED FACTORS CAUSING HARD-OF-HEARING IN JOS CONURBATION

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ABSTRACT

This paper discusses "Hushed Factors Causing Hard-of-Hearing in Jos Conurbation". Hearing impairment is seen as a damage done to the organ of hearing which results in defected ability to perceive sounds with the ear. It took a look at some features/activities that are often sources of concern to the audiologists, hearing rehabilitation scientists and other scientists related to ear care, hearing health and special education. These features/activities are noise pollution, Triethyltin/Tin-Mesoporphyrin and ototoxic materials from poor waste disposals in the markets, hospitals and other public places. A common effect of these features and activities is hard-of-hearing and even deafness. Emphasis is made on the fact that Jos conurbation is noise: "inhabitants live, eat and sleep noise," as a result, many live with hard-of-hearing if not deafness. The paper finally looked at audiological services in Jos conurbation.

Introduction

Hearing is the ability to perceive sounds with the ear. The ear is the gateway through which a person can pick out speech or information. Where one cannot pick and process speech or information effectively; knowledge, skills, norms, beliefs and culture cannot be inculcated into the person effectively. Hearing impairment on the other hand is a damage done to the organ of hearing which results in defected ability to perceive sounds with

the ear. No matter how slight a person's hearing is impaired he/she cannot hear a whisper and the normal voice beyond a few arm's length.

Jos and Nigeria at large is one of the inhabitants of the world struggling with rehabilitation of persons with hard-of-hearing and deafness. There are a lot of problems with health and rehabilitation provisions that concern elimination or reduction of hearing disabilities in the country. Prominent amongst the problems is the lack of competencies in the areas of identification and assessment of persons with hearing impairment. The lack of these competencies has caused devastation, pains and depressions in the life of persons with disabilities and their families. Ordinarily students could have functioned intellectually well, but do encounter difficulties with learning skills due to difficulties with basic learning skills which have not been identified or assessed early in life.

In addition, inclusive education is being emphasized all over the world today. By implication, children with hard-of-hearing will need serious identification and assessment, if they must be detected for early intervention. This is to have them included in our regular schools and for them to benefit from educational and aural rehabilitation programmes. The importance of early identification cannot be over emphasized. Early identification reduces the effect of disability and also facilitates the process of early intervention.

Where causes of hard-of-hearing occur and they are not managed, the person with hearing impairment may not access information effectively and adequately. Today, there is so much emphasis on strategies to control/manage the causes of hearing impairment and in the medical and rehabilitation fields for identification, assessment and management of persons (especially students) with hearing impairment worldwide. This is because organisations and individual experts in the field discovered the usefulness of these processes. There is the need to do a great deal in terms of identification of the causes and management of hard-of-hearing. Prevention they say is better than cure.

Jos Conurbation

This conurbation covers Jos-North Local Government Area (L.G.A.), Jos-South L.G.A., Jos-East L.G.A., Barking-Ladi L.G.A., Riyom L.G.A. and Bassa L.G.A. This is usually called Plateau-North, found in the

North- central of Nigeria; commonly referred to as Middle-Belt. Plateau state has an estimated population of 3,916,187 with the majority from this conurbation. Therefore 10% of this population (391,618.7) lives with disability (NPC, 2009; WHO, 2011; Obinaju, 2013).

Jos metropolis is indeed cosmopolitan, multi-ethnic, sophisticated and never insular (Mallum, Elaigwu and Irmiya (nd)). One of the consequences of the population increase is poor hygiene. Many of the inhabitants hardly keep their surroundings clean; in order to prevent illnesses or diseases/pathogens. Poor hygiene, waste materials or poor waste disposals and diseases/pathogens are serious challenges to both government and the people in the state, as a result, many children, students and adults are constantly falling sick; leading to their being placed in one or more hushed principal causes of hearing impairment (ototoxic drugs or antibiotics).

There is an airport, Nigerian air force, a railway station, indiscriminate motor parks etc: Jos conurbation is also an area for different kinds of constructions, industries and house-hold products-industries, with thousands of people including students engaged in one activity or the other to earn some income.

All those features/activities are often sources of concern to the audiologists, hearing rehabilitation scientists and other scientists related to ear care, hearing health and special educationists: Those are sources of concern due to the waste disposal, pathogens, noise-pollution, etc., often experienced by the people/students working or even residing in and around such features.

Hard-of-Hearing

Mallubu (2004), Okuoyibo (2006) and Babuduh (2008) opined that hearing impairment is a generic term, which describes any condition that reduces the hearing acuity of an individual and makes it less possible for the sufferer to perceive and interpret auditory signals (sounds). Reduced hearing (hard-of-hearing) arises when there is any disorder or impairment affecting the auditory system, which includes the ear, the auditory nerve and the auditory cortex. Hard-of-hearing varies from person to person depending on the following factors: the degree of loss or level of impairment; the time of on-set of impairment and the place of impairment

(site of lesion).

National Ear Centre (NEC) (nd) reported that sometimes there are problems in the hearing system which reduces or eliminates completely the ability to hear sound. A reduction in hearing is called hard-of-hearing; not hearing at all is called deafness. A person with normal hearing can hear someone whispering at arm's length. A person is said to have "hard-of-hearing" if he/she cannot hear a whisper but can hear the normal voice at an arm's length or when the speaker shouts before he/she is heard.

No wonder, Jikukka (2010) puts it that whenever a person is assessed (audiologically) and found not to perceive sounds at all, such a person is said to be deaf or to be living with "profound hearing loss". If however the person can perceive and identify or benefit from the sound in a little way, the person is said to be hard-of-hearing. Hearing with some difficulties (even with hearing aids) is what is being referred to as hard-of-hearing. Otana (2003) says that the level or degree of hearing and hearing impairment (hearing loss) can be measured using the audiometer (in decibels (dB)) and can be classified as follows:

Levels of Hearing and Hearing Impairment:

CLASS	DEGREE
Normal hearing	10dB 25dB
Mild hearing loss	25dB -40dB
Moderate hearing loss	40dB – 60dB
Severe hearing loss	60dB – 90dB
Profound hearing loss	90db and above

This implies that persons with hearing loss between 25dB-90dB are said to be hard-of-hearing, while those with 90dB and above are profoundly impaired (deaf). Okuoyibo (2006) stated that these classifications of hard of hearing (mild to severe hearing loss) and of deaf (profound loss) are very essential for the sake of planning, rehabilitation and educational programs for children, students and adults. It is common to hear people referring to all persons with any level (degree) of hearing impairment as deaf. It is

important at this point to say again that a reduction in hearing that falls between 25dB to 90dB is referred to as "hard-of-hearing", while hearing that is above 90dB is called deafness ("not benefiting at all").
NEC (nd) has this classification and description:

Classification and Description of Hearing and Hearing Impairment:

CLASSIFICATION	DESCRIPTION
Nomal hearing	A person with nomal hearing can hear someone whispering at an arm's length.
Slight hearing impairment	A person is said to have a slight hearing impairment if he/she cannot hear a whisper but can hear the normal voice at an arm's length.
Severe impairment	Impairment is said to be severe if it is necessary to shout in order to be heard or use amplification in order to hear.
Profoundly deaf	If a person cannot even hear a shout the person is said to be profoundly deaf.

Here, the slight hearing impairment and the severe impairment, make up the Hard-of-Hearing; with the degree of loss ranging between ±25dB to ±90dB. Therefore, "Hard-of-hearing" is a generic term which describes: mild hearing loss, moderate hearing loss and severe hearing loss.

Hard-of-hearing also varies from person to person depending on the site of lesion (place of impairment). Site of lesion is another classification of hearing impairment which is very important especially for the sake of amplification (for the sake of hearing aids fitting). Site of Lesion can be categorized into:

a. Conductive hearing loss,
b. Sensory- neural hearing loss,
c. Mixed hearing loss and
d. Non-organic hearing loss.

Conductive hearing loss (CHL) occurs when any part of the outer or the middle ear is affected. Difficulty in terms of transmitting sound from the outer/middle ear to the inner ear is experienced. Whenever sound does not reach the eardrum (Tympanic membrane), this might be because the auditory canal (ear hole) is blocked. The blockage can be due to hard wax, a foreign body is stuck in the auditory canal or because there is some sort of

growth for example a boil in the ear (Abiodun, 2011). Otana (2003) listed some common causes of conductive hearing impairment in the canal such as: congenital malformation, impacted wax, otitis external and tumours. While in the middle ear are: Otitis media with effusion, acute and chronic sepperative otitis media, barotraumas (during air flight), dislocation of ossicles (trauma), otosclerosis and trauma to ear drum (slap, blow and foreign body, perforation).

Otana (2003) further listed some common causes of sensory-neural hearing loss (SNHL) which occurs when any part of the inner ear is affected; that this loss may be due to some disorders in the inner ear to the auditory cortex (the part of the brain concerned with hearing). These causes (in the inner ear) include: Congenital anomalies of inner ear structures, hereditary (caused by maternal infections or drug use during pregnancy), acoustic trauma, noise induced hearing loss, and Labyrinthine concussion (caused by head injury). Others are: Labyrinthitis, Meniere's disease, Presbyacusis (caused by old age) and Ototoxicity (drug induced) e.g. Aminoglycoside antibiotics; Gentamicin; Streptomycin; Thanamycin; Loop diuretics; Frusemide (Lasix); Ethacrynic acid; Salicyclates; Aspirin; Dispirin; Quinine etc.

Mixed hearing loss (MHL) is that simultaneous existence of a CHL and SNHL. That is a condition where both the conductive as well as the inner part of the ear are impaired. An individual is said to have mixed hearing loss when he has sensory-neural and conductive hearing impairments.

Ali (2006) opined that non-organic hearing loss causes hard-of-hearing (a reduction in hearing). Non-organic hearing loss (NHL) does not occur within the organs of hearing (a kind of false hearing loss). None of the organs of hearing is impaired but the person in question may claim not to hear what is been said or spoken; this in most cases has to do with the mind or a way of thinking/feeling. Some persons feel that non-organic hearing loss could be psychogenic or psychological.

SOME HUSHED FACTORS CAUSING HARD-OF-HEARING

Noise Pollution

Due to the rocky/mountainous nature of Jos metropolis, quarry sites are easily seen. It is very difficult to travel for over 4km without seeing a

quarry site. The mountains are at an elevation of about 1,238 meters/4,062 feet high above sea level. This is an important quarry site for most companies from the Federal Capital of Nigeria (Abuja), who buy or transport their products (granites) from Jos to Abuja, thereby increasing the number of the already existing heavy duty trucks moving in and out of the metropolis. Sounds of quarry machines such as stone crushing plants, Aggregate plants, Grinding plants, Mineral plants, milling plants, Project case, Recycling plant and Artificial sand making plants can easily be seen and heard, their noises (sound) are quite alarming and irritating to the ear. Heavy duty construction machines are also easily heard crushing rocks and stones for road constructions, building constructions and the like, apart from the dynamites that highly characterize so many activities in the metropolis, these activities are quite disturbing to specialists in hearing impairment.

Otana (2003) confessed that when humans stay in noisy places for a long time; hearing impairment is inevitable and that literature suggests that ninety-five percent of all children under the age of five (5) experience serious hearing impairment, greatly increasing the possibility of long term damage making matters worse (when they become students in their lives) due to prolonged noise from heavy duty machines and general environmental noise pollution. Audiola (2013) painted it that very loud sounds (e.g. explosions, gunshots, noisy machines etc.) can damage delicate hair cells found in the cochlear of the ear, which are responsible for good hearing. This can also happen when a person continually listens to steady, long-term noise. Only a small number of people know what a "loud sound" truly means. Researches show that environments with sound levels higher than 75dB cause hearing loss. Otana (2003) puts it that continuous sound levels above 90 dB should not be permitted since noise induced hearing loss is on the increase and has no excellent cure. Hearing problems in students often are mistaken for hyperactivity, naughtiness or learning disabilities. Exposure to noises above 75dB can cause deafness. Prolonged exposure to noise (above 150 decibels) can easily cause permanent deafness and if it is above 192 decibels, it may result to death and not only hearing loss.

Adurokiya (2012) lamented that noise of different kinds from different sources had increased and took over all nooks and crannies of

Nigerian towns and cities. The spate is far from abating. Nigerians live, eat and sleep noise. Noise pollution is an "unwanted or disturbing sound". Sound becomes noise when it interferes with one's sleep, conversation, disrupts class lessons or lectures, diminishes your quality of life etc. The fact that sound (noise) cannot be seen, taste or smell; it may help explain why it has not received as much attention as other types of pollution in Nigeria. In fact and indeed the air in Jos metropolis is constantly filled with sounds (noises), yet most people would not notice or admit that they are surrounded by noise.

It is sad to note that noise can cause hearing impairment, and that such noise emanates from siren-blaring government officials, traditional leaders, political leaders, security operatives like soldiers, police escorts or patrol vans, speakers (public address systems), machines, quarry sites, dynamites, passenger-calling in motor parks, roadside compact disc dealers, town criers, religious revivalist/calling for prayers, and overzealousness of muezzins cry at the wee hours of every morning amongst others. Even those who live within estates are never secure: neighbors often make things worse through the use of generating sets and sound sets, sometimes at abnormal hours. When residents employ the services of all kinds of generators (from individuals or corporate bodies) with all sorts of noise; the noise pollution in such environment is better imagined.

The excesses of motorists who would rather blare their horns as though every inch of their lives depend on how well they blare them, instead of applying breaks. With all those noise pollution in Jos metropolis, it is no exaggeration in saying that Jos conurbation is noise: inhabitants live, eat and sleep noise (as mentioned earlier). No wander, Jikukka (2006) revealed that great or subtle hearing impairment exists amongst learners in regular schools. Noise pollution in Jos metropolis adversely affects the lives of hundreds of students. Every nook and cranny is noise galore. Studies have shown that there are direct links between noise and hearing impairment.

Other harms related to noise, according to medical professionals include sleep disruption, high blood pressure, speech interference, stress related illnesses, and loss of productivity even as a student. Noise Induced Hearing Loss (NIHL) is the most common but rarely discussed health effect, but research has revealed that exposure to constant or high levels of

noise can cause countless adverse health effects (Otana Hearing and Edu-Health Services, 2013). Today many persons in Jos metropolis and especially students can hardly hear at whispering level, except spoken words; this has great devastating effect on the education of these young stars (students).

Triethyltin/Tin-Mesoporphyrin

Tin mining is a common activity almost in every nook and cranny of Jos conurbation. Most of the mining ponds have constituted death traps for the inhabitants (everyone is conversant with) and the emissions coming from the waste or residue of the tin (everyone seems to be ignorant of it,) this ought to be a thing of concern to everyone in Jos metropolis.

Lenntechg (2013) openly declared that the emissions coming from the waste or residue of the tin is fast becoming a thing of concern to many scientists, a few residents and health officers. No wonder on the 9th of April, 2013: Plateau Radio and Television Cooperation showed the Plateau State Commissioner for Environment (Mrs. Sarah Yusuf) being sad over the illegal tin mining activities going on in Jos Metropolis, she lamented over the kind of emissions that will eventually be coming out from the tin residue which can be hazardous to the health of the people in Jos metropolis (PRTVC, 2013).

Speaking about the dangers posed by tin-mesoporphyrin in man, American Association for the Study of Liver Diseases (2013) opined that Tin-metrophyrin shares many of the properties of its parent's compound (tin-protoporphyrin). These include competitive inhibition of home oxygenase, amelioration of jaundice and suppression of chemically induced hepatic porphyria. Tin-mesoporphyrin is cleared from the plasma of normal subjects with dose-dependent pharmacokinetics and small amount are excreted into the urine and faeces. Tin- mesorphyrin causes: liver injury, liver diseases, viral hepatitis etc.

The organic tin bonds are the most dangerous forms of tin for human. Tin poison goes with serious consequences. The effects of organic tin substances can vary. Triethyltin is the most dangerous organic tin substances for human. It has relatively short hydrogen bonds. Humans can absorb tin bonds through breathing, the skin and exposed food. The uptake of tin bonds can cause acute effects as well as long-term effects (Lenntech,

2013). Lenntech further indicates that some of the acute and long-term effects of tin bonds are as follows:

Acute effects are:

- Eye and skin irritation
- Headaches
- Stomach-aches
- Sickness and dizziness
- Severe sweating
- Urination problems etc.

Long – term effects are:

- Depression
- Liver damage
- Malfunctioning of immune system
- Chromosomal damage
- Shortage of red blood cells
- Brain damage (causing anger, sleeping disorders, forgetfulness and headaches)

There are many different types of organic tin that can vary greatly in toxicity and can affect both the environment and humans (students especially). Once one of the acute and long-term effects are noticed and treated with over-term drugs, especially toxic drugs which easily deal with the hair cells in the cochlear of the ear, thereby giving room to hearing loss to begin: bit by bit until it becomes severe or profound hearing impairment (Lenntech, 2013).

Poor Waste Disposal

The geometrical growing population in Jos metropolis has posed great health challenges to the metropolis; especially in the area of waste disposal which is tagged "poor waste disposal". Otana Hearing and Edu-Health Services (2013) claimed that the chief cause of hearing impairment in Middle Belt, Niger Delta zone and indeed in Nigeria as a whole is/are drug(s); ototoxic drugs especially anti-biotics often prescribed to the affected. A country without a standard waste management system is a sick country; the inhabitants will live with all forms of impairments (hearing impairment inclusive).

Ngwuluka, Ochekpe, Odumosu and John (2009) carried out a

research and discovered poor management of healthcare waste and the like; do expose residents to the toxic effects. Waste generated from establishments (both government and private) often exposes the general public to the toxic effect of these wastes. The poor disposals of wastes do lead to serious environmental problems as well as human health impairments: affecting the people in no small measure.

Findings had indicated that the health conditions in Jos conurbation go down below the recommended waste management practice prescribed by World Health Organization (WHO) and regulatory authorities (Rao, Ranyal, Bhatia and Sharma, 2004; Ngwuluka, Ochekpe, Odumosu and John, 2009); it has been discovered that wastes are not often properly disposed but are in-appropriately disposed in many parts of Jos conurbation. The residents often act as if they are ignorant of relevant regulations that guide proper wastes dispositions, simple wastes management techniques and the effects of toxic wastes on general health and especially on the organs of hearing.

Ngwuluka et al (2009) expressed sadness that infectious wastes contain pathogens in quantities sufficient to transmit infectious diseases on exposure to them. It is important to know that no waste is totally un-harmful. Hazardous waste can be classified into infections, pharmaceutical, pathological, genotoxic, chemical, radioactive and those with high heavy mental contents. A hazardous waste is one which may be toxic, genotoxic, corrosive, shock sensitive, flammable, reactive, explosive, radioactive and containing infectious agents. Exposure to hazardous waste can be as a result of ignorance, nonchalance, deliberate negligence on the part of waste handlers. Most chemical and ototoxic drugs are good examples of products that are harmful throughout their lives cycle and disposal; exposure to harmful waste could lead to infectious, infertility, genital deformities, asthma and neurological disorders in people. The people at risk of this hazardous waste include: students, pupils, and the general society. The effects of exposure to hazardous waste can be hearing impairment (drugs induced hearing impairment, psychogenic deafness and others).

The presence of many hospitals, maternity homes (health centers) etc and their poor method of healthcare waste management is another point of concern. The waste management options in the hospitals (in Jos metropolis) do not meet the standard practices; as a result, they contribute to

the present and future threats to human and environmental health problems (Rao, Ranyal, Bhatia and Sharma, 2004).

Where hospital wastes are not properly managed, diseases and outbreaks of sickness may be the order of the day and their treatment are normally done with anti biotics (Ototoxic drugs) which at long run, easily amount to drug induced hearing loss. It is needful to say that students in Jos metropolis have problems with hearing.

In most cases, the hearing losses start as mild cases before they increase bit by bit. The most common symptom is where speech perception, especially during conversations in large classes, groups, public places, general meetings, at school etc. are not properly heard. During audiological clinical sessions and other general occasions in the near past and present, student had revealed hearing loss by not responding to simple tests, common verbal instructions during teaching-learning processes as expected or by manifestation of some speech retardations and the in ability to locate sound sources or directions effectively. Jikukka (2006) in a research, discovered that some students live in their classes without the parents and teachers knowing that they live with hearing impairment, as a result, classed the common symptoms of hearing impairment to some other things. When these teachers with students that are living with hearing impairment were asked to comment on these students, shortly before they get to know that these students were living with hearing impairment: most of the teachers' comments were as follows:

i. "This student is always absent minded in the classroom".
ii. "This student is always day-dreaming".
iii. "This student has short concentration span".
iv. "This student is fund of asking "you said"?" Or requesting: "come again!"

Jikukka (2006) further observed that the teachers found it very difficult to believe that students with Mild Hearing Loss actually live with hearing impairment. None of the teachers ever suspected any form of hearing loss, called "Mild Hearing Loss", but accepted that they were aware of those with severe and profound hearing losses.

Audiological Services in Jos Metropolis

Special needs services and especially audiological services in Jos conurbation are some of the sympathetic cases in the history of primary ear care and hearing health/hearing loss prevention. Persons who are hearing impaired, have a history of neglect, disregard and marginalization. Jos Metropolis is one of the most populous areas in the middle-belt of Nigeria today, but it has experienced many political, cultural and socio-economic problems that have retarded its progress including audiological services (Obiakor and Offor, 2011).

Nigerian Government and in particular Plateau State Government have been unable to eradicate corruption thereby affecting audiological and special needs services in general. As a result, the dream of getting standard audiological centres, equipment and professionals in special needs service delivery is not possible (Olatuji, 2010).

Jos Metropolis has made several efforts in the prevention and management of hearing impairment; it has struggled to make sure that programs and services are available to its citizenry and to primary pupils, secondary school students, and those who need them, however, it's traditional, socio-cultural, tribalism, health problems, nepotism and even corruption have prevented some of these programmatic consistency and progress. As a result, the audiological and health delivery system has faltered and waned.

The early effort by missionaries, humanitarian organizations and government were focused on evangelization, training and little education (for the hearing impaired). There were also little or no audiological services at certain moments in the history of the city. Even though there are a few organized philanthropic groups in Nigeria; there is a lot to be done in Jos conurbation. Ajavon (2006) opined that there are organizations/societies for the care of the hearing impaired in Nigeria. Organizations such as: Department of Special Education and Rehabilitation Sciences, University of Jos; Otana Hearing and Edu-Health Services; Christoffel Blinden Mission; Pro-Health; Faith Alive; etc. were doing their best but much needs to be done especially in Jos conurbation.

In 1977 the Plateau State Government started a school for the hearing impaired in Jos Metropolis, which is now at Bassa Local Government area. There were no enough facilities for certain educational and health services for the hearing impaired in Jos conurbation just as there

are too few in Nigeria today. Adelogbe (1974) and Ajavon (2006) articulated that there were medical supervision made available to all the institutions through public hospitals and clinics. Doctors in the community programme visit the institutions to examine and give advice on the hearing impaired. Medical and Nursing students are regular visitors to the institutions under the guardians of their lecturers. The schools and ENT clinics cooperate with each other a lot. But these ENT units and Audiological centres lack the basic facilities (physical and man power) to operate. Instrument like hearing aids were and are still difficult to come by due to cost and lack of proper fitting centres.

After the primary six in those days, the hearing impaired found their ways to Government trade centres, some to vocational training centres and a few more to other vocations (self employed) (Ojile, 2010 and Ajavon, 2006). Ojile and Ajavon further iterated that the problem of providing for the handicapped such as in deafness, dumbness and blindness has become more complicated today. The current level of efforts has proved inadequate in meeting their needs. Lack of essential equipment (such as audiometers, hearing aids, speech trainers etc.) is one of the major problems.

The services of specialists such as Psychologists, Audiologists, Otologists etc. were not quite available to these schools and even the public hospitals and clinics. Since then till date Jos Metropolis and indeed Nigeria at large was and is in grave need of the above specialists to be appointed. There is urgent need for more specialists in both the educational and health sectors to be trained. Jikukka (2006) affirmed that if a hearing impaired person is detected and rehabilitated before the critical learning, character and behaviour acquisition periods of early life and existence is passed, many of the disabling and handicapping consequences of hearing impairment can be alleviated, and in some instances, avoided.

Conclusion

The Government has to join forces with special educationists, rehabilitation scientists, medical professionals, Para-medical specialists, social workers, community leaders and the general public, to control before managing the hushed and loud factors causing hard-of-hearing and eventually deafness in our communities. There must be functional laws that could give protection to children and adults against human activities that

constitute factors causing hard-of-hearing/deafness.

Public enlightenment, workshop programmes, symposiums, seminars and interactive sessions could be used as suitable avenues to educate the society on human activities that constitute factors causing hard-of-hearing and deafness. Government should establish Special Education Centres and provide resource materials in every local government area to enhance quality education on human activities that constitute factors causing hard-of-hearing/deafness and to handle otherwise manage them.