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Causes and Risk Factors of Hearing Loss and Deafness among Children under Five Years of Age

A Thesis submitted

By

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ"

صَدَقَ اللَّهُ الْعَلِيُّ الْعَظِيمُ

سُورَةُ الْبَقَرَةِ

الآيَةُ (32)

Dedication

*To my ideal in life, who I carry his name proudly..... **My Father Emad Al-Khaqani***

*To the honorable Doctor...Candle of Nursing
.....**Dr. Hussein Al-Ibrahemi***

May Allah have mercy on them and grant them the highest paradise

*To the pure spirit who gave me her blood, soul, and love**my lovely Mother***

*To my magnificent husband **Saif**, who's supported me and with him I face the challenges, with my endless love*

*To my lovely daughter **Lana** who brings the joy to our life*

*To my brothers(**Mohammad and Muntader**), sisters(**Diana and Fatima**), and friends with my love and respect*

SUPERVISOR CERTIFICATE

I certify that this thesis, entitled (**Causes and Risk Factors of Hearing Loss and Deafness among Children under Five Years of Age**) submitted by **Ranya Emad Mutar** and prepared under my supervision and guidance at the Department of Pediatric, Faculty of Nursing, University of Babylon as a partial fulfillment of requirements for the Degree of Master Sciences in Nursing.

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Abstract

Hearing loss is the inability to hear. There is a potential for mild, moderate and severe hearing loss, which affects physical, social and psychological health, impairing education and social inclusion. As a result, identifying children with hearing loss early and providing appropriate interventions can be very beneficial.

The study's objectives are to identify the causes and risk factors for hearing loss and deafness and its prevalence among children under the age of five and to find out the associations between hearing loss and deafness with some demographic data related to children and their mothers.

A cross-sectional descriptive study design was used during the period from October 19th, 2021 to June 8th, 2022. This study was conducted in Babil Governorate on (150) patients suffering from hearing loss and deafness in Babil Teaching Hospital for Maternity and Children, Imam Al-Sadiq Teaching Hospital and all private hearing loss and deafness centers in Babil . Children under the age of five years were selected. Data were collected using an electronic scale and modified questionnaire and analyzed electronically using SPSS 26.

The majority of children are under five years with an average age of three years and more than half are females. The study showed that the general cause for more than three-quarters of the sample was an ear infection, while the general risk factor for more than two-thirds of the sample was a genetic disease.

The mothers' ages ranged between sixteen to fifty five years, with an average age of thirty five years .

The study concludes that there is a statistically significant relationship between the demographic characteristics of mother and their children. It is recommended that primary care physicians and healthcare professionals be educated about the importance of ear diseases, the necessity of early solutions to reduce hearing loss, and treatment options available, as well as every health institution, hospital, and even private clinic should include family support services to prevent hearing loss.

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List of Abbreviation

No.	Item	Meaning
1.	\$	Dollar
2.	%	Percentage
3.	AAP	American Academy of Pediatrics
4.	ABR	Auditory Brainstem Response
5.	ANDS	Auditory Neuropathy Disease Spectrum
6.	ASL	American Sign Language
7.	ASLHA	American Speech-Language-Hearing Association
8.	BC	Before Christ
9.	BEHL	Better Ear Hearing Level
10.	C.S	Cesarean section.
11.	CDC	Disease Control and Prevention
12.	CH	Congenital Hypothyroidism
13.	CHL	Congenital Hearing Loss
14.	CI	Cochlear Implant
15.	CMV	Cytomegalovirus
16.	dB	Decibels
17.	Df	Degree of freedom
18.	DHH	Deaf and Hard of Hearing
19.	DNA	Deoxyribonucleic Acid
20.	EAC	External Auditory canal
21.	EHDI	Early Hearing Detection and Intervention
22.	EI	Early intervention
23.	et. al.,	And others
24.	GBD	Global Burden of Disease
25.	H ₀	Null Hypothesis

26.	H ₁	Alternative Hypothesis
27.	HA	Hearing Aids
28.	HI	Hearing Impairment
29.	HIV	Human Immunodeficiency Virus
30.	HL	Hearing loss
31.	HS	High significant
32.	Hz	HertZ
33.	ICU	Intensive care unit
34.	JCIH	Joint Committee on Infant Hearing
35.	N	Number
36.	N.S	Non-significant
37.	N.V.D	Normal Vaginal Delivery
38.	NH	Normal Hearing
39.	NHS	National Health Services
40.	No	Number
41.	OM	Otitis Media
42.	PCHI	Permanent Childhood Hearing Impairment
43.	PTA	Pure Tone Average
44.	SD	Standard Deviation
45.	SHL	Sensorineural hearing loss
46.	Sig	Significant
47.	SNHL	Sensory Neural Hearing Loss
48.	SPSS	Statistical Package for the Social Science
49.	TB	Tuberculosis
50.	TM	Tympanic Membrane
51.	UHL	Unilateral hearing loss
53.	UNHS	Universal newborn hearing screening
54.	US	United State
55.	VII	Seven
56.	VIII	Eight
57.	WHO	World Health Organization
58.	X ²	Chi-square value



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Chapter one
Introduction

CHAPTER ONE

Introduction

1.1 Introduction

Hearing is essential for children's learning of spoken language, academic success, and social engagement. Education and social integration are both hampered by hearing loss. As a result, identifying children with hearing loss early and providing appropriate interventions can be extremely beneficial ([World Health Organization , 2016](#)).

Sensory experiences play a role in how humans interpret their surroundings ,for instance ; hearing considered as sensation that allows individuals to form interactions, engage in everyday routines, be alerted to danger, and involving life experiences. It is the sense that facilitates communication and fosters social contact the most ([WHO, 2018](#)) .

The typical audible domain that hears sounds quieter than soft voices is 0-20 decibel. Measurements of vocal impairment are classified into slight vocal impairment that ranges 20 - 39 decibels, moderate hearing loss is 40-69 decibels, severe hearing loss is 70-89 decibels, and intense vocal impairment is greater than 90 decibels ([Lustig , 2020](#)).

Hearing loss is characterized by a hearing deficiency when both ears have hearing levels of 20 dB or above. There is also a possibility will get slight, medium, acute, and intense loss of hearing. Conversational communication and loud noises are difficult to hear when one or both ears are affected. Hard of hearing is related to those who have a vocal impairment that extends from slight to profound. children who are deaf can use hearing aids, cochlear implants, or

other support technologies, in addition to an explanation about hearing impairment. (WHO, 2021).

Specialists support (Deaf and Hard of Hearing) DHH youngsters as well as their households on a regular basis. Medical care providers are individuals in the disciplines of medicine and nursing who are responsible for managing children's health and physical care needs, as well as monitoring and tracking their general development. Among the medical professionals who are most likely to assist DHH youngsters are Pediatricians, family practice physicians, otolaryngologists, nurse practitioners, and nurses (Szarkowski & Toe,2020).

As stated by World Health Organization (WHO), preventive efforts could prohibit roughly sixty percent of early life loss of hearing. When interference is unavoidable, it is important to make sure that children reach the overall possibility via recovery, learning, and autonomy; so, action is required on both sides (WHO, 2016) .

Hearing loss in children is a broad term that refers to a variety of conditions. In order to develop appropriate linguistics and functions of psychology, in addition, to uncover possibly entirely reasons or other following disorders, early detection, and rapid management are critical. Decibels is unit to measuring hearing, and hearing thresholds are used determination the severity loss of hearing (Lustig , 2020) . Majority people who are classified as "deaf" have significant hearing loss, meaning they can hear very little or not at all. They usually use sign language to communicate (WHO, 2021).

Severe to profound hearing loss affects between 1/800 to 1/1000 newborns. Hearing loss affects two to three times as many people when they are born (Lustig , 2020) . At least 1 to 2 children out of 1000 are born with

permanent hearing loss, which has serious consequences for their progress. When a diagnosis for loss of hearing children is delayed, accessing for early intervention programs is delayed, which has significant effects for linguistic, cognitive, and social-emotional skills (Pigeon, 2019).

There is a strong evidence that programs of universal newborn hearing screening (UNHS) result in discovery early of hearing loss in newborns. (Pigeon, 2019). Therefore, when deaf or hard of hearing (DHH) children are engaged in early intervention (EI) before the age of six months, their language outcomes improve (wiley *et al.*, 2020).

As a result, certain study found a retroactive link between earlier identification and improved preschool language in numerous program-based investigations (ching *et al.*, 2017). In the absence of a comprehensive diagnosis, functional impairments can have long-term effects, contributing to poor well-being and preventing DHH (Deaf and Hard of Hearing) youngsters from reaching their full potential as they become adults (Matthews *et al.*, 2020).

Hearing loss can strike anyone at any time occurs at birth or develops in infants and toddlers is of particular concern. If not detected and treated early, it might cause developmental problems, as proper hearing is required to understand spoken language and, later, to generate clear speech. If the child has a hearing problem in infancy or early childhood, the parents should seek medical help right once. Even a transient but considerable hearing loss during this stage might make learning spoken language or speech patterns extremely difficult for the youngster (American Academy of Pediatrics, 2021).

Children who are risky for develop postnatal loss of hearing might be monitored by the Early Hearing Detection and Intervention (EHDI) program. Consequently, the EHDI program covers widely than merely assessing the birth hearing of newborns. Tracking children through timing and evaluating variables found in every kid that these programs work also includes identifying factors that cause hearing loss, specifically those which correlate to delayed-onset hearing loss ([Walker et al. , 2017](#)) .

One month of age should check by Universal hearing screening, three months of age identification problems of hearing , and six months of age enrolment in early intervention by are all advices made by the Infant Hearing Joint Committee. The EHDI 1-3-6 guidelines are the most popular choice for these suggestions ([wiggin et al. , 2017](#)) .

In the pediatric population, hearing loss can be classified as either congenital or acquired. In terms of etiology, congenital hearing loss can be classed as genetic or non-genetic. The first category accounts for more than half of all congenital conditions and can be caused by an autosomal dominant, recessive, or sex-linked mutation ([Hearing link,2021](#)) .

Loss of hearing that is congenital indicates problems of hearing present at birth. Examples are hereditary loss of hearing or hearing impairment which is caused by another reason found in the uterus (before birth) or at delivery time. In children, greater than half of overall congenital hearing loss cases are considered to be caused by genetic causes. Hearing loss can run in families, autosomal recessive, the X-linked that associated with the sex chromosome, or autosomal dominant ([The American Speech-Language-Hearing Association , 2015](#)).

In children, otitis media with effusion consider a great cause of acquired loss of hearing. However, it has a bimodal peak between the ages of 2 and 5, and a flattened tympanogram and conductive hearing loss describe this condition. The major category for acquired hearing loss is infections, and there is a strong association with mumps, measles, and bacterial meningitis. Primary otological pathologies such as cholesteatoma impacted wax and otosclerosis in addition to trauma are other causes ([Hearing link,2021](#)).

Sound signals that do not reach the brain cause hearing loss, which depending on the location of the problem, that relating to two primary forms of hearing loss. sensorineural loss of hearing cause by injury to the auditory nerve or the sensory hair cells of the inner ear. Get older or result of an injury that might happen naturally. Occurrence conductive loss of hearing when the sounds are unable to flow from the outer ear to the inner ear because of blockage, for instance, earwax or glue ear ([National Health Services ,2021](#)).

Hearing loss and mortality may share risk factors and this explained the link between hearing loss and mortality, for instance occupational, socioeconomic, and cardiovascular factors, and this interference with mortality and loss of hearing ([Engdahl et al., 2019](#)).

There are 11 risk factors inserted for the loss of hearing for children and infants by the Joint Committee on Infant Hearing (JCIH) in statement 2007 of position. Delayed-onset hearing loss hugely constitutes about eight of the 11 risk factors, therefore it is used utilized for detecting and monitoring infants at risk of developing acquiring hearing loss in the future, who passed infants' hearing screening. According to a statement 2007 JCIH, the risk factors of all newborns who have a loss of hearing should have the age of 24 to 30 months at least one audiology evaluation, with those with particular risk factors receiving

more frequent and earlier monitoring for instance history of family childhood hearing loss and anomalies of craniofacial ([Walker et al. , 2017](#)).

All newborns' hearing must evaluate not more than a one month old to maximize the result for hearing impaired or deafeningly infants. children screening uncrossing must be not more than 3 months old making evaluated by an audiologist. Babies who have verified loss of hearing must get suitable assistance from workers in health as well as learning specialists who hearing loss and deafness specialize ([Joint Committee on Infant Hearing , 2007](#)).

Ear damages through frequent loud noises exposure are another prevalent cause that led to the loss of hearing. Noise-induced hearing loss is caused by destroying the sensitive hair cells inside the cochlea, which can occur after unexpectedly being exposed to a very loudly noisy, for instance, burst - known as Acoustic trauma. Nose and sinus cancer radiotherapy, specific drugs of chemotherapy, as well as several antibiotics, all of these are examples of some medications and treatments, which may harm the nerves of auditory as well as the cochlea, resulting in loss of sensorineural hearing. As well as it is more common in diabetes people, renal with chronic illness, and disease of cardiovascular. Hearing aids were frequently required to improve hearing in those who have sensorineural hearing loss ([NHS , 2021](#)).

A perforated eardrum, In a perforated eardrum, in the middle ear there is an abnormal growth of bone which can lead to stapes (inner hearing bone) low movement as well as low effectiveness in the way of sound transmission, known as otosclerosis, sometimes cases for instance cholesteatoma and around the eustachian tube swelling result from surgery for the jaw and nasal and otosclerosis radiotherapy (the middle ear growth abnormal bone), damage to

the hearing bones from injury, and collapsed eardrum, which results in loss of hearing caused by conductive noise that always transitory and repaired by surgery and treatment (NHS,2021).

Finally ; it was mentioned by (Moeller *et al.* , 2017) that majority of children with hearing loss are at risk for language delays in the first five years, and that this risk rises with the severity of hearing loss .

1.2 Importance of study:

World Health Organization , (2016) stated that 360 million people in estimation, or 5% population of the global, suffer from hearing loss that is considered debilitating; nearly 32 million of these are kids ; Around the world, the majority of the population lives especially in low- and middle nations (WHO , 2016). On another side, individuals are 430 million, or the world's population of 5%, require auditory recovery to treat their "severe disability" problems of hearing (Adults 432 million, children 34 million). By 2050, maybe anticipated nearly 700 million people, or one out of every ten will have a debilitating condition (WHO, 2021).

According to a statistic published in Nations of United, about 7.5 million in Egypt are the number of deaf and dumb people. About 360 million around the world people, as well as around 5% population of the world, have hearing disabling, around 32 million children from them, and young people between the ages of 12 and 35 years old about 1.1 billion because of loud music noise at risk of loss of hearing, according to the World Health Organization (Albayan.2019) .

According to the most recent data, around 78 million people in the Arab world suffer from hearing loss, and the Eastern Mediterranean Region is one Organization of the Health World's six regions. Persons in the Region who suffer from loss of hearing are predicted to elevate 194 million. They live in 80 percent of the world's low- and middle-income countries, and the majority of them lack access to the services required for effective ear and hearing care ([United Nation News , 2021](#)).

The price of treating is prohibitive, costing societies up to \$30 billion yearly, necessitating extra investments. It costs less than one dollar per person to provide these facilities, with a return of more than seven dollars over ten years. This is a very small financial investment, and if we measure it not only in terms of materiality, but also in terms of the priceless lives of human beings, we can imagine the significance of this investment and its very high returns for the various societies in our region and around the world ([United Nation News , 2021](#)).

In 2050 are expected to have nearly 2.5 billion people with a loss of hearing, as well as about 700 million people, who will require rehabilitation to enhance their hearing. Approximately 1 billion younger people are at high risk of irreparable, preventable auditory damage as a result of unsafe listening habits. A yearly additional expenditure mostly less than US\$ 1.40 for each individual will be needed to keep expanding auditory childcare globally. This offers returning investment over a ten-year period of roughly US\$ 16 for each US dollar ([Engdahl et al., 2019](#)).

According to GBD (Global Burden of Disease) estimated as the proportion of those who have a hearing loss that ranges from mild to severe do

not make utilization aids of hearing is 83 % of global unachieved need for aids of hearing (Chadha *et al*, 2020), therefore hearing screening in combination with hearing aid provision is a cost-effective strategy, saving over US\$1000 each disorder avoided because of high prices (Baltussen & Smith , 2009).

Despite the fact that cost-effective hearing loss therapies exist, however it is prohibitively expensive for health systems in low- and middle-income nations. Burden-reduction strategies should be implemented in areas where there is a significant demand, and they should be complemented by expanding health systems and universal health coverage to ensure that initiatives are administered effectively (Graydon *et al.*, 2019).

1.3 Problem Statement

Causes and Risk Factors of Hearing Loss and Deafness among Children under Five Years of Age

Due to the increase in hearing loss and deafness in most countries of the world, which prompted the researcher to establish a study causes and risk factors have a great negative impact on loss of hearing prevalence .

1.4 Objectives of Study

- 1.** Identify the causes of hearing loss and deafness among children who are under five years old.
- 2.** Identify the risk factors of hearing loss and deafness among children who are under five years old.
- 3.** Identify the prevalence of hearing loss and deafness among children who are under five years old.

4. Find out the associations between hearing loss and deafness with certain demographic data related to children and their mothers.

1.5 Hypothesis

H₀: There is no significant association between hearing loss and deafness with certain demographic data related to children and their mothers.

H₁: There is a significant association between hearing loss and deafness with certain demographic data related to children and their mothers.

1.6 Definitions of the terms:

1.6.1 Children

a. Theoretical definition

A child between the ages of birth and puberty, or in terms of development, between infancy and puberty, in addition to that, a person under 18 of the majority refers to a minor through the legal idea of the kid ([Wikipedia](#), 2022).

b. Operational definition

It is called individuals from the age of birth until end of adolescence.

1.6.2 Causes

a. Theoretical definition

It is a rationale for intervening or a situation ([Merriam-Webster](#), 2022).

b. Operational definition

It is a reason that gives rise to an action or condition, which increase the spread of the diseases .

1.6.3 Risk Factors

a.Theoretical definition

Risk Factors is something that raises a person's chance of transmitting a disease (Moke *et al.* , 2021) .

b.Operational definition

It is condition that increase from the spread of certain health problem.

1.6.4 Hearing Loss

a. Theoretical definition

It is a problem that affects one's hearing ability to sound does not in the same manner that healthy children hear. (Felman , 2018) .

b. Operational definition

Hearing loss can affect either one or even both ears and can range from mild to profound.

1.6.5 Deafness

a. Theoretical definition

A total loss of hearing occurs when a person's hearing capacity is fully lost (Felman , 2018).

b. Operational definition

Deafness is described as a loss of functional hearing and a reliance on visual communication.

Chapter Two
Literature Review

CHAPTER TWO

Literature Review

This chapter summarizes almost all relevant and available literature on Hearing Loss and Deafness among children. The presentation has been systematically arranged as :

2. 1 Background of Hearing Loss and Deafness

The term (deaf and dumb) is considered disrespectful. In fact, in many European languages, the term meant not only "deaf and silent" but also "deaf and stupid"—unable to speak and so unable to be educated, as it did in English. Muteness is a term used to describe deaf people who refuse to use spoken language. Unfortunately, a typical meaning of silent implies a lack of mental ability, which most deaf people do not have. Deaf individuals nowadays consider the term (deaf and dumb) to be disrespectful (Welling & Uksrins , 2019) .

Deaf is an audio-logical term that refers to people who suffer from a serious loss of hearing and can't utilize their sense of hearing like the principal exchange of information in daily basis. Adults and children who share the use of American Sign Language and Deaf culture, including common values, standards for behavior, customs, and perspectives on themselves and others, are referred to as Deaf with a capital (D) (Welling & Uksrins , 2019).

In an online survey, some respondents picked normal sense, and the majority chose sight as the sense they would most hate to lose. Losing any sense

is clearly life-changing, but there is a strong case made that hearing contributes more to human connection than anything else (Naff, 2010).

As a care provider to a patient diagnosed with hearing loss, it is vital to understand the "social" connotations of certain terminology and should be aware that some of these terms are unclear may have negative connotations and may be considered insulting by others (Welling & Uksrins, 2019).

Hearing loss affects Americans 48 million as well as an approximated 700 million individuals globally, with mild to severe symptoms. But the majority of individual who developed loss of hearing throughout the course of their lives, others have been born deaf and engage in Deaf culture. The "Ebers Papyrus," an Ancient Egyptian medical treatise, has the first mention of hearing loss that we are aware of today. This papyrus, which dates from 1550 BC, has a recipe for a treatment for "Ear-That-Hears-Badly." Olive oil, bat wings, ant eggs, red lead, and goat urine were mixed together and placed into the ears as a treatment. It's unclear whether this was designed for people with chronic hearing problems or as a way to get rid of earwax buildup. The ancient Egyptians had a habit of being friendly to people who they deemed to be crippled (Weissman, 2021).

Despite the fact that Deaf culture and American Sign Language (ASL) enable Deaf people to live fulfilling and lives independently, Deaf people have long been perceived as a minority oppressed who also are extremely misunderstood even by the surrounding community (Lane *et al.*, 2011).

There is evidence that views toward persons with hearing loss would have been worse in Ancient Greece. Plato proposed in 350 BC that a deaf individual could not be bright at the beginning meaning from birth or before learning to

speakers because they were inextricably linked to cleverness, as well as speaking ability. Unfortunately, a mindset prevailed throughout the majority of Western history, only to fade away in comparatively recent times (Weissman, 2021).

Sign language was first mentioned by a group of Burgundy monks in the 10th century, who established it for communication but maintained a vow to remain silent. As a technique for word expansion, Pedro Ponce de Leon, a Spanish Benedictine monk, founded the first school for the deaf in the mid-16th century (Weissman, 2021).

2.2 Development of the ear

The ear is a complicated organ with three parts: the exterior, middle, and internal ear (Figure 2.1). The external ear is made up of an auricle and an external acoustic canal, which direct sounds toward a tympanic membrane. The tympanic membrane separates the exterior and middle ear. The malleus, incus, and stapes, three auditory ossicles in the middle ear cavity, are responsible for conveying vibrations to the inner ear. To enhance and transfer sounds from the outside surroundings to the inner ear, the external and middle ears collaborate. Hearing and balance are controlled by the inner ear. It consists of two ectodermal thickenings that occur in the 4th week of development. (Helwany & Tadi, 2022).

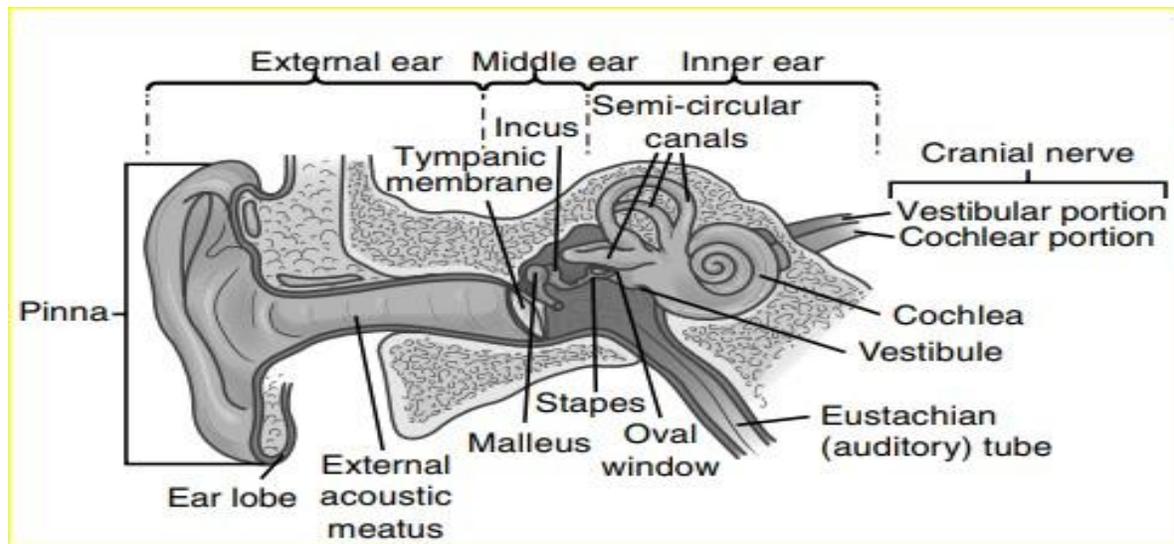


Figure 2.1 Structures of the external, middle, and inner ear. (chiocca E., 2010)

The initial pharyngeal fissure gives the external auditory meatus. It starts as an ectoderm invagination that extends inwards towards developing middle ear structures between the first and second pharyngeal arch. This ectodermal diverticulum extends towards the pharynx at week 5 of embryonic development and includes proliferation cells ectodermal which compose plugs of meatal that fill the lumen. A lower of the meatal plug swells circumferentially at ten weeks, forming a disk-like shape (Helwany & Tadi, 2022).

By the twelfth week, this disk plug has interacted with the primary malleus medially, helping in the formation of the tympanic membrane. Around the fifteenth week, the disk plug splits, leaving behind the thinning layer of the ectodermal cells' embryonic tympanic membrane. Follow up of the pinna's thin skin lines the entire external auditory meatus and the outside surface of the

tympanic membrane. The external ear meatus is completely patent and has grown to its maximum size by the eighteenth week (Maier & Ruf, 2016).

Develops of the auricle from six mesenchymal proliferation called hillock generated from the 1st and 2nd pharyngeal arches which boundary first pharyngeal cleft by ending the fourth week of development. Three auricular hillocks eventually combine for creating the auricle, on each side of the external meatus. First three auricular hillocks that develop from the first pharyngeal arch form the tragus, helix, and cymbal concha. the second pharyngeal arch forms concha, antihelix, and antitragus.. As the mandible grows, the external ears begin embryological development in the lower neck area and progressively climb poster-laterally to the level of the eyes (Fuchs & Tucker, 2015).

The middle ear, as a tube tympanic recess is an outgrowth of the endoderm of the first pharyngeal pouch that gives rise to the tympanic cavity and Eustachian tube. The tube tympanic recess grows laterally until it reaches the floor of the first pharyngeal cleft during week 5 of development (Helwany & Tadi, 2021).

The tympanic cavity is an extension of the pharynx, and it is bordered with the pharyngeal endoderm epithelium, which also extends to the mastoid antrum. The Eustachian tube connects the tympanic cavity to the oral cavity and serves to ventilate and drain the tympanic chamber. The Eustachian tube is more horizontal, shorter, and narrow at birth than it is in adults, which is one of the main reasons why newborns get recurring ear infections. During the weeks 16 to 28 of fetus period , the Eustachian tube shows the highest expansion (Anthwal & Thompson, 2016).

The middle ear ossicles are formed by a condensation of mesenchyme at the dorsal end of the tubotympanic recess during the sixth week of development. The first and second pharyngeal arches' neural crest-derived mesenchyme is the source of cartilage for the three middle ear ossicles. First pharyngeal arch cartilage of Meckel's gives rise to the incus and malleus, whereas second pharyngeal arch cartilage of Reichert's gives rise to the stapes. Until the eighth month of development, the early phases of ossicle formation take place within the mesenchyme of the first two pharyngeal arches (Helwany & Tadi, 2021). The cartilages ossify while the tympanic cavity grows, a process known as endochondral ossification that lasts throughout the fetal period. The mesenchyme that holds the ossicles in place undergoes resorption throughout the eighth and ninth months of pregnancy, resulting in an air-filled tympanic cavity at delivery. In the human body the tympanic cavity houses for two tiniest muscle, the stapedius muscle and tensor tympani, in addition for skeletal components. The middle ear muscles protect the inner ear by dampening the malleus and stapes' vibrations in reaction to harsh and harmful noises (Maier & Ruf, 2016).

The temporal bone houses the inner ear, which is located deep within it. This complicated structure includes the hearing organs balance (semicircular canals), cochlea, cranial facial nerve VII and vestibule cochlear VIII. The bone labyrinth houses the cochlea and semicircular canals. The membrane he labyrinth that fluid collected named perilymph, is surrounded and protected by the bone labyrinth (Brunner *et al.*, 2008).

2.3. Types of Hearing Loss

There are the three main forms of hearing loss Conductive, sensorineural, and mixed hearing loss.

2.3.1 Conductive Hearing Loss

Hearing issues are caused by abnormalities with the outer/middle ear's function, resulting in conductive hearing loss ([Health Services Executive , 2021](#)); this is a disorder in which sound does not travel adequately from the external auditory canal to the eardrum and the middle ear bones or ossicles. As a result, the individual doesn't hear weak sounds, this sound doesn't transmit efficiently into the internal auditory canal, and/or sound levels will be reduced. This form of hearing loss is frequently treated medically or surgically ([Kallioinen *et al.* , 2016](#)) .

Conductive hearing loss associated indicators are otitis media with effusion that is recurrent or chronic and Deformities of the Eustachian tube and various illnesses that impact its function Neurodegenerative conditions ([Kliegman *et al.*, 2020](#)) .

2.3.2 Sensor-neural Hearing Loss

Sensorineural loss of hearing is caused by internal ears or cochlear nerve dysfunction, which prevents either the transmission of nerve impulses to the cerebral auditory cortex via the eighth cranial nerve and central auditory pathways. or the transformation of mechanical power to neuron responses in the cochlear. The most prevalent kind is sensorineural HI, which is caused by cochlear impairment([Sundstrom , 2018](#)).

2.3.3 Mixed Hearing Loss

Mix of conductive and sensorineural HI is referred to as mixed HI (Sundstrom , 2018).

The degree of HI (dB) at 500, 1000, 2000, and 4000 Hz, measured in decibels used to estimate the HI level called pure tone average (PTA) better ear hearing level (BEHL). According to the World Health Organization 2018, loss of Hearing is categorized as shown in **table 2.1**. Hearing loss of more than 30 decibels is considered debilitating in youngsters(WHO, 2018).

Table 2.1 Loss of Hearing is categorized depend on degree of HI (dB) (WHO, 2018).

Category	The degree of HI (dB)
Slight/mild	26–40 dB
Moderate	41–60 dB
Severe	61–80 dB
Profound	Above 81 dB

Classifications that exist are alternative, for instance classification the American Speech-Language-Hearing Association's (ASHA), that differ somewhat in terms of values threshold of various loss of hearing degrees (ASLHA, 2018).

HI can also be bilateral, meaning it affects both ears, or unilateral, meaning it just affects one ear. Hearing can differ between the ears in one person, as indicated by all of the above parameters (Sundstrom , 2018).

2.4 Epidemiology of Hearing Loss

Children loss of hearing remains as a serious community health problems since it affects early speech and language development, as well as later academic and career performance. Even minor hearing loss has been shown to have a detrimental impact on educational and social success. Assessing the epidemiology of juvenile hearing loss has been difficult due to the several existing categories of hearing impairment and the scarcity of reliable markers. Concerns have grown that the occurrence of hearing loss in children and adolescents, particularly noise-induced hearing loss, is on the rise, probably as a result of recreational noise exposure (Brooke & Dylan , 2017) .

Hearing at the start of life is recognized to be a human's primary sensory accessibility, allowing to recognize, give awareness to, and effect sound, as well as combine important experiences of hearing for build abilities of the language (Reis *et al* , 2019) , therefore it is considered as a public health issue because of the impact it has on citizens. Sensorineural hearing loss (SHL) affects one to three out of every 1000 infants born in developed nations. In poor nations, this rate is expected to be greater (Oliveira *et al* , 2013), and Humans who suffer from deafness, which is one of the most frequent communication problems. A serious hearing loss affects around one out of every thousand newborns, which becomes much more common as people get older (Emmett & West , 2015).

A prevalence of around 0.1 % of kids with a loss of hearing of further 40 decibels (dB) has been regularly found in population-based research in North America And Europe. Other worldwide studies have shown greater estimates using various techniques or criteria (such as examinations, surveys, and less severe decibel thresholds). By the Centers for Disease Control and prevention

(CDC) based on data obtained from states and provinces in 2019. Hearing loss was detected in almost 98 percent of babies in the United States. Almost 6,000 babies in the United States were born in 2019 with a permanent hearing loss. In 2019, 1.7 out of 1,000 newborns who were examined for hearing loss had hearing loss ([Centers of Diseases Control , 2019](#)) .

It is believed that more than 5% of people in the globe are affected by HL, that the incidence of HL in the United States estimated to be 2–3/1,000, 0.4/1000 in Japan, and 1.48/1000 in Denmark. In Palestine, for instance, a prevalence of 18 newborns per 1,000 births has been documented ([Sidenna *et al* , 2020](#)) .

The incidence and relative risk of acquiring hearing loss was shown to be inversely related to the weight measured at birth in studies involving populations of infants with low birth weight ([Batalla *et al* , 2012](#)) .

Unilateral hearing loss (UHL) is a typical occurrence in youngsters, despite the fact that the estimated prevalence of congenital sensorineural hearing loss (HL > 40 dB) at birth is about two per 1,000, 30–40% of those affected have UHL. In children, the most prevalent causes of UHL include congenital CMV, congenital inner ear malformation for example enlarged vestibular aqueduct, bacterial/viral meningitis and viral/bacterial mumps ([Hornsby *et al*,2020](#)).

The surveys are unbelievable: 360 million individuals worldwide suffer from hearing loss that is debilitating. This represents a sizable 5.3 percent of the global population. In India, the prevalence and incidence of hearing loss are likewise rather high. Deafness is mostly preventable and avoidable over the

world, including in India, and it is prevalent in South-East Asia, ranging from 4.6 percent to 8.8 percent (Varshney , 2016) .

Some studies have identified no gender-related variations in the prevalence of OM, epidemiological data imply that the incidence of OM is higher in boys than in girls (Kliegman *et al* , 2022) .

2.5. Types of Deafness.

Felicite , (2021) mentioned that there are two definitions of terms for deafness called; deafness of prelingual and deafness of postlingual, which are useful to learn : deafness of prelingual is a problem that occurs in children whose hearing loss appears at delivery or prior to language and speech development, while deafness of postlingual situation in which a child's hearing loss occurs after they have spontaneously acquired language and speech.

Auditory problems can be caused by hereditary factors, birthing problems, some viral disorders, chronic ear infections, use of certain medicines, excessive noise exposure, and age, according to WHO information sheet No 300 (WHO, 2021). There are two types of reasons for loss of hearing and deafness: congenital and acquired.

2.5.1 Congenital Deafness

Congenital deafness not only hinders the creation of circuits functional neural which can analyze the acoustic shape, but also it restricts the formation of active neural pathways that can analyze the auditory shape. lastly, it might to have an impact on cognitive functions that rely on auditory "data format" in normal conditions (Kral , 2013) , the hearing form appears to have certain

distinct characteristics: Hearing is a sense that reliably interprets timing data, outperforming vision by approximately a factor of 100 in temporal acuity. In terms of spatial acuity, however, vision exceeds hearing by a comparable amount. Obviously, every sensory system is specified to a distinct area from the physical world and this led to allow for the organization of information in a specific fashion. The auditory data type reference may be used by cognition to process temporal information and order. As a result, the loss of hearing from birth impairs the establishment of this reference, with potentially negative consequences for non-auditory processes as well (Kral & Donoghue, 2010).

Congenital deafness in infants is caused by hereditary factors, particularly history of hearing loss in families, and prior to consanguineous marriage should have genetic counseling, that widespread at Asian countries, key considerations consider. Furthermore, early detection, prompt management, meningitis immunization, better prenatal care, and avoidance of ototoxic drugs can prevent many occurrences of hearing loss in children, lowering the cost of schooling associated with hearing loss (Afshar *et al* , 2022) . Due to congenital factors, hearing loss might appear at birth or after delivery develops shortly. Genetic factors that are hereditary and non-hereditary, in addition to pregnancy and childbirth complications, for instance, infection during pregnancy like syphilis, maternal rubella, and others; low weight percentile; at birth lack of oxygen called birth asphyxia; during pregnancy using an inappropriate medication, like aminoglycosides, cytotoxic drugs, antimalarial drugs, and diuretics; lastly jaundice is a condition that occurs when a neonate is born with severe jaundice (Felicite,2021) .

2.5.2 Acquired Deafness

Deafness that occurs at any time during the life may be related to infections like mumps, meningitis, and measles; using medication like antimalarial and antibiotics drugs; trauma for the head or ear; chronic ear infections; otitis media (the liquid gathered in the ear); and noising that results from occupational like machinery and explosions as well as recreational noise that present from audio devices. One of the most prevalent causes of hearing impairment in babies is chronic otitis media (Felicite,2021).

The prevalence of old age deafness is growing as a result of increased noise pollution, ototoxic medications, and ototoxic substances. According to the WHO, 360 million people worldwide suffer from hearing loss, with 91 percent of adults and just 9% of children. Hearing loss that is disabling is defined as >40 (dB) in ear that better in a person over age 15, and > 30 (dB) in ear that better in a person under age 15 (Varshney , 2016) .

2.6 Severity of Symptom

Loss of hearing decibels (dB) measuring, which is intensity measurement. The essential hearing speech range is assessed at different frequencies like 500, 1000, and 2000 cycles per second. Hearing impairment is categorized by the degrees of symptom severity as it affects speech and the hearing threshold level (the assessment of an individual's hearing threshold using an audiometer). Since children's capacity to use residual hearing varies widely, these classifications only provide basic guidance about the impact of the impairment on any given child (Table 2.2) (Hockenberry *et al* , 2019).

(Table 2.2) Clinical Manifestations of hearing impairment (Hockenberry et al , 2019).

Infant	Children
-Deficiency of a startle or blink reaction when exposed to a loud noise	-When expressing wishes, use gestures rather than words, especially after 15 months.
-Difficulty to be awoken by loud noises in the surroundings	-Failure to produce understandable speech by the age of 24 months
-Unable to locate a sound source by the age of six months	-Vocal play, head banging, or foot stamping for vibratory feeling; monotone and incomprehensible speech; reduced laughing
-By the age of seven months, there should be no gibberish or vocal inflections.	-Expressing joy, demands, or anger by yelling or shrieking
-Sound is generally ignored.	-Asking for things to be repeated or erroneously responding them
-Inability to respond to oral instructions; failure to respond to spoken words	-A greater reaction to facial expression and gestures than to verbal explanation
-In contrast to the voice, the response to loud noises	-Avoidance of social engagement; prefer to play alone and face with a curious, occasionally perplexed look
	-Suspicious attentiveness alternates with collaboration frequent intransigence due to a lack of understanding irritation at not being understood.

Children with significant hearing loss are far more likely to be diagnosed in infancy than children with less severe hearing loss. If the issue is not diagnosed in early infancy, it will most likely become apparent when the kid begins school and has difficulties learning. Unfortunately, some of these youngsters are mistakenly put in special courses for kids with learning

problems. As a result, the nurse must suspect a hearing impairment in any kid who exhibits the behaviors (Table 2-3)(Hockenberry *et al* , 2019).

(Table 2-3) Classification of Hearing Impairment Based on Symptom Severity (Hockenberry *et al* , 2019)

Level of Hearing	Impact
Slight (16-20)	<ul style="list-style-type: none"> ➤ Has trouble hearing distant or weak speech ➤ Is usually unaffected by hearing loss. ➤ Probably will do well in school, but may have difficulties. ➤ No difficulties with speech
Mild to moderate (26-55)	<ul style="list-style-type: none"> ➤ Speech problems are possible ➤ At 0.9-1.5 m interprets face-to-face interpersonal communication (3-5 ft)
Modestly severe (56-70)	<ul style="list-style-type: none"> ➤ Conversational communication is difficult to comprehend unless it is loud ➤ Significant difficulty participating in group or classroom discussions
Severe (71-90)	<ul style="list-style-type: none"> ➤ A loud speech is heard nearby and may be able to recognize loud environmental noises. ➤ Can tell the difference between vowels and most consonants. ➤ Speech training is required.
Profound (91)	<ul style="list-style-type: none"> ➤ Only loud noises may be heard. ➤ Extensive speech training is required.

2.7 Etiology

Hearing loss in babies can be caused by a variety of factors and can occur before, during, or after delivery; it can also be hereditary or non-genetic, congenital, or acquired. Perceptions of members of the family for problems of hearing, genetically factors, history of the family with sensorineural hearing loss in childhood, the circumstance of birth, intensive care unit (ICU) admission more than 5 days, exchange transfusion that required exceeding 30 mg/dl hyperbilirubinemia, also mechanical ventilation required for pulmonary hypertension persistent, according to the Joint Committee on Infant Hearing (JCIH) (Reis *et al*, 2019), therefore within 48 hours of birth, all newborns must undergo Auditory brainstem response (ABR) or electrophysiological hearing test, might be conducted if a test fails twice in a row after birth for 40 hours and the first screening during 30 days. In reaction to sonic stimulation, the ABR records the activity of electricity flowing at the internal ear to the cortex cerebral. ABR responses may be categorized using a variety of parameters, the most frequent of which is the response latency. The ABR is suggested for use as a hearing evaluation tool for children. However, in neonates and babies, the gestational age must be taken into account, since the maturation process in the central hearing system has an impact on that group. This assessment can detect cochlear hearing loss as well as neural hearing abnormalities such auditory neuropathy spectrum disease (ANSD) (Casali & Santos , 2010).

The majority of full-term boys were found in research conducted in Curitiba, Parana, Brazil on neonates (104) who are suspected for loss of hearing who were delivered in maternity facilities and sent to hearing health

high complexity services. Staying in an ICU for more than 5 days was the primary risk factor (Reis *et al* , 2019) .

2.7.1 Acquired Hearing Loss

Otitis media with effusion consider commonly cause for acquired children loss of hearing. It is beyond the scope to go into depth, however it is characterized by a bimodal beak between the ages of 2 and 5, as well as conductive hearing loss and a flattened tympanogram (Corrigan *et al* , 2016) , It usually goes away on its own when the Eustachian tube matures or after a ventilation tube is inserted into the middle ear. This clinical appearance may be influenced by adenoidal enlargement. Infections are another common cause of acquired hearing loss. Primary otological diseases such as cholesteatoma, impacted wax, and otosclerosis, as well as trauma, are among the other causes (Grossman & Dimitrov , 2019).

2.7.2 Genetic Causes

A wide range of causes can contribute to hearing loss. Hearing impairment is a defining feature of over 400 genetic syndromes, and genes that counted more than a hundred are linked to genetic nonsyndromic hearing impairment (Alford *et al.*,2014).

Hearing loss (HL) is caused by ototoxicity drugs, pregnancy Rubell, too much noise, trauma, and about 20,000 gene mutations that make up the genome of humans. identified a lot of causes of HL that are related to the environment by eradicated legislation and lifestyles or modern medicine, therefore now consider factors that are genetic the primary risk for HL. An individual background genetic may impact suspicion, start, or acquired hearing

impairment severity, therefore any remaining environmental-caused HL is likely to include a genetic component (Brownstein *et al*, 2013).

2.7.3 Anomalies in Embryonic Development

External ear defects, such as microtia, anotia, or EAC atresia, are frequently accompanied with other craniofacial disorders and, in most cases, lead to a CHL. Inner ear anomalies, on the other hand, originate during the embryonic development of the temporal bone, can be linked to genetic disorders or craniofacial abnormalities, and can cause conductive, sensorineural, or mixed hearing loss. The severity of hearing loss varies greatly across persons (Margaret *et al* , 2007) .

2.7.4 Infections

Chronic otitis media is the most prevalent cause of hearing loss, as it is critical to take the proper steps to treat current infections and avoid recurrences. Children with a history of ear or respiratory infections, or any other illness that increases the risk of hearing loss, should get their hearing tested on a regular basis (Hockenberry *et al.* , 2019). Cytomegalovirus (CMV) is the most prevalent infectious cause of congenital SNHL, infecting one out of every 100 babies in the United States. Each year, 6,000-8,000 newborns develop clinical symptoms, with roughly 75% having SNHL. Hearing loss is linked to congenital CMV in both symptomatic and asymptomatic forms, with bilateral and unilateral hearing loss, respectively; the hearing loss might be progressive. At the age of 4-5 years, congenital CMV has caused some youngsters to lose their remaining sense of hearing. Toxoplasmosis and syphilis are two less prevalent congenital infectious causes of SNHL. Congenital CMV, toxoplasmosis, and syphilis can all cause

SNHL to appear months or years after birth. Rubella, which used to be the most prevalent viral cause of congenital SNHL, is now extremely rare (Kliegman *et al.*, 2020) .

2.7.5 Exposure to Noise

Excessive noise exposure Noise-induced hearing loss is caused by both long-term, recurrent exposure to noise and a single exposure to an exceptionally loud sound. Both cause damage to the auditory system and result in hearing loss. Hearing loss is generally gradual at first, but it worsens with time as long as the exposure continues. Actually, the negative consequences of exposure to noise may last for a long time after it has stopped; these remain permanent (Babisch *et al.* , 2014) . Loud sounds caused damage to the cochlea in two ways:

- destruction Mechanical: the hair cells lose their rigidity by regular exposure to loud sounds and over time lose their capacity to function efficiently because of destroy sensory cells.
- At the cellular level, there is a lot of metabolic activity. During periods of intense exposure to loud sounds, hair cells demand a higher degree of energy. As a result of the increased oxygen consumption, there are more free radicals in the cochlea. The ear's antioxidant defense system can't keep up with high levels, and free radicals kill cell (Harrison , 2008) .

2.7.6 Trauma

Auditory damage following trauma can be caused by a variety of factors, so the first step is to figure out what kind of trauma happened. The doctor should consider the damage to the external ear canal or the middle ear in situations of

acute trauma, for instance, a branch of a tree, a swab of cotton, and pencils. The auditory canal wall skin can readily be lacerated by external auditory canal trauma. So because bony channel walls skin is very thin and adheres strongly to the external acoustic channel bone. It will bleed even if there is minor stress to it. Vertigo should not be caused by external auditory canal damage. Vertigo following a traumatic event should alert the practitioner to the possibility of inner ear injuries. This may happen as a consequence of a penetrating force shattering the stapes footplates through the tympanic membrane, or as a result of a temporal bone fracture (Djalilian & Hamid, 2015).

2.7.7 Ototoxicity

Ototoxic substances can cause inner ear symptoms by function impairing of several structures internal ear and adjusting the mechano-electrical transduction fine-tuning. Susceptibility of internal ear is heightened a result of abnormalities of molecular inside the stereocilia. Streptomycin, rifampicin, and capreomycin are some of the antibiotics that are used to treat tuberculosis. Aminoglycosides, loop diuretics, cytostatics such as cisplatin and cyclophosphamide; quinine, chloroquine, salicylic acid, and phenothiazines are among the medications causing ototoxic side effects (Poonual *et. al.*, 2016 ; Eras *et. al.*, 2014; Davis *et. al.*, 2003; Oliveira *et. al.*, 2013).

2.7.8 Congenital Malformations of the Ear

During the first and second branchial arches and grooves form exterior and middle ears, which continue to expand until adolescence, while the internal ear, which grows from the otocyst, is fully developed by mid-fetal development. The ossicles (malleus and incus) come from the first and second arches, whereas the stapes come from the second arches and capsule of the otic. By the

15th week of pregnancy, the malleus and incus have reached adult size and shape, while the stapes have reached adult shape and size by the 18th week of pregnancy. Congenital ear issues can be modest and just influence appearance, or they can be severe and affect both look and function. In the newborn stage, any kid born with a pinna, external auditory canal, or TM anomaly should undergo a comprehensive audiological assessment (Kliegman *et al* , 2022).

2.7.9 Meniere Disease

Meniere's disease is no doubt the most severe acute inner ear illness. If the condition worsens, hair cells die and loss of hearing permanent develop instate variable loss of hearing. Today, endolymphatic hydrops is thought to be a pathophysiological correlate of Meniere's illness, resulting in changes in osmotic pressure and hydrostatic at endo-perilymphatic spaces (Ciuman, 2013).

2.8 Risk Factors of Hearing Loss and Deafness

One of the risk factors for the development of congenital hearing loss has been identified as consanguinity. Though several research has offered insight into the functional component of the cochlea, the influence of consanguinity on cochlear morphology has been a source of discussion, and the goal of this study was to see if consanguinity had any influence on the morphology of cochlear, therefore consanguineous marriages' children had normal cochlear morphology, according to the study. Consanguinity may not result in a severe anatomical defect of the cochlea like risky factors of developing sensor-neural loss of hearing. The genetic testing of these patients does not need to be thorough; it can be confined to a selective screening of genes involved in the cochlea's function rather than its morphological

development (kavitha *et al.* , 2017). In 20 percent of kids having a hearing impairment, (Behavioral attention-deficit hyperactivity disorder-type) difficulties have been discovered. Delay detection of hearing loss in babies, as well as delayed accessibility to early intervention services, may exacerbate the detrimental effects on linguistic, cognition, and community relationships (Afshar *et al.* , 2022) .

Elements contributing to the association of poverty with OM include crowding, limited hygienic facilities, suboptimal nutritional status, limited access to medical care, and limited resources for complying with prescribed medical regimens. Additionally , breast milk feeding has been shown to protect against OM in the majority of trials. The preventive impact could be stronger in children from low-income families than in children from higher-income families. Rather than the mechanics of nursing, the protection benefit is due to the milk itself. According to the pattern of viral upper respiratory infection incidence in general, the highest levels of occurrence of OM are recorded in winter weather months and the lowest rates are observed during warm weather months (Kliegman *et al.* , 2022) .

2.9 Path-ophysiology of Hearing Loss and Deafness

In the United States, hearing loss is one of the most frequent impairments. Hearing loss affects 1 to 6 out of every 1000 healthy neonates at varying levels 36 (Grindle , 2014), and When babies are hospitalized to neonatal critical care units, the rate jumps to about 2 to 4 per 100 newborns (Souza *et al.* , 2014),

Approximately one million at United States children have hearing loss, ranging in age from delivery to 21 years old, and nearly one-third of these kids also have additional problems such as visual or cognitive deficiencies (AAP, 2017).

Hearing disorders are classified depending on the position of the abnormality. The interference of sound transmission to the middle ear causes conductive or middle-ear hearing loss. It is the most prevalent kind of hearing loss, and it is almost always caused by repeated serious otitis media. The major symptom of conductive hearing loss is interference with sound volume (Hockenberry *et al*, 2019)

Damage to the inner ear tissues or the auditory nerve causes sensorineural loss of hearing. Causation substantial congenital loss of hearing are split into two categories: environmental (50 percent) and genetic (50 percent). Viral illnesses including Toxoplasma, rubella, CMV, and herpes simplex virus can all be caused by the environment. There are two types of genetic causes: syndromic (30percent) and non-syndromic (70 percent) (Morton & Nance , 2006) .

Hearing loss caused by sensorineural hearing loss causes sound distortion and discriminating issues. The youngster can hear part of what is going on around him or her, but the voices are distorted, making differentiation and understanding difficult. Interference with sound transmission in the middle ear and throughout brain pathways causes mixed conductive-sensorineural hearing loss. which is being common causes from recurrent otitis media and its consequences(Hockenberry *et al* , 2019).

All hearing deficits that are not connected to impairments in the conductive or sensorineural structures are classified as central auditory imperceptions. Organic and functional losses are generally separated. The organic kind of central auditory imperceptions affects the receipt of auditory inputs through brain pathways, as well as the translation of the message into meaningful communication. Aphasia is the inability to articulate thoughts in any form, whether written or spoken; agnostic is the inability to accurately interpret sound; and dysacusis is the inability to comprehend details or distinguish between sounds. There is no biological lesion to explain the central auditory loss in functional hearing loss. Conversion hysteria (an unconscious retreat from hearing to suppress recall of a traumatic incident), infantile autism, and infancy schizophrenia are all examples of functional hearing loss (Hockenberry *et al* , 2019).

2.10. Nursing Process for Reducing Hearing Loss and Health Promotion of the Children .

The Nursing Process has several advantages for both patients and nursing staff, as well as the general public. The nursing staff concentrates on professional recognition as a result of qualification as well as acknowledgment, legal assistance, and care optimization, as a source of information provide assurance to patients. Personalized care and strengthen the bond between them professionals, patients, and caregivers, resulting in qualified professionals, patients, caregivers, and kind treatment (Pereira *et al.*, 2017).

2.10.1. Nursing Assessment

A major nursing job is to assess children for hearing impairment, as begin with early detection of hearing loss and intervention no later than 6 months of age are critical for improving the linguistic and scholastic development of children with hearing impairments. The startle reflex, head-turning, eye blinking, and stoppage of body movement are all signs of the neonate's response to aural stimulation, which the nurse may see at delivery. Depending on the infant's level of wakefulness, the intensity of the reaction may vary. A regular lack of responsiveness, on the other hand, should raise suspicions of hearing loss (Hockenberry *et al* , 2019).

2.10.1.1: External Ear Assessment

Inspection the pinna, or auricle, refers to the complete external earlobe; one is situated on each side of the head (Figure 2.2). Draw an invisible line from the eye's outer orbit to the posterior part of the skull , and extreme noticeable skull protrusion, to determine height pinna alignment. This line must be crossed or met by top of the pinna. Low-set ears are frequently linked to kidney problems or cognitive impairment. By painting a line vertical from the line that imaginary horizontal and next to it positioning the pinna, you may determine the angle of the pinna. The pinna is normally positioned at to the vertical line at a 10-degree angle. If it is fall outgoing of this range, make a note of it and search for further abnormalities (Wilson *et al* , 2013).

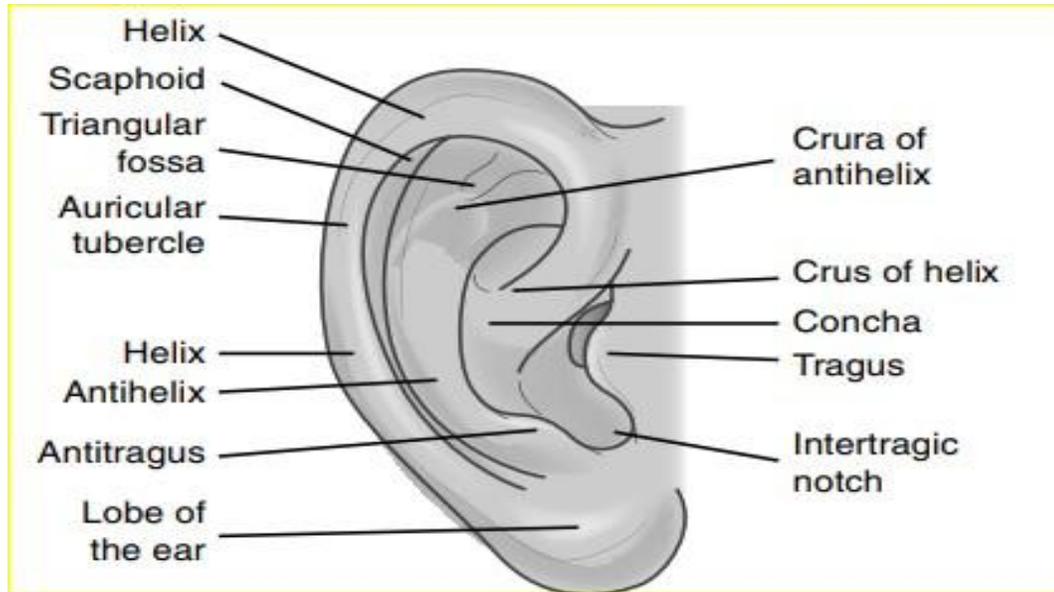


Figure 2.2 Landmarks of the pinna ([chiocca E ., 2010](#))

Size, shape, symmetry, and abnormality of the pinnae should all be checked. With a patent external auditory canal, the pinna should be symmetrical and entirely formed. Microtia (excessively small ears) can suggest a congenital condition or hearing loss. A helix with an upward or backward slope is considered normal. Renal disease, various congenital disorders, and chromosomal defects are linked to helical-fold abnormalities, asymmetry, or irregular shape of the pinnae, a missing tragus, or a constricted external auditory canal ([Austin *et al*, 2013](#)).

Palpation • The provider should palpate each pinna, drawing it up and down or out and back, and noting any lumps, discomfort, or pain. Pushing on the tragus and applying pressure on the mastoid process should also be included in the palpation, with tenderness noted. The pinna should be soft, malleable, and not painful to the touch. If the pinna results in pain, the provider should suspect otitis externa, external auditory canal inflammation, trauma, or local infection.

The mastoid process, as well as the preauricular and postauricular lymph nodes, should all be palpated. Ear infections are frequently accompanied by auricular lymphadenopathy. Mastoiditis is diagnosed by palpating the mastoid process and feeling pain (Chiocca, 2010).

2.9.1.2 External Auditory Canal

Otosopic Examination

Examine the canal walls, the color of the tympanic membrane, the light response, and the normal landmarks of the middle ear's bony prominences as you insert the speculum into the external canal. The external auditory canal's walls are pink, while dark-skinned children's walls are more pigmented. The outermost region, where cerumen is formed, has minute hairs. Take note of any discomfort, foreign bodies, or infection symptoms (Foote , 2019) , and it is a bright pearl pink or gray transparent membrane. observe any erythema (which might mean suppurative otitis media); a dull, nontransparent grey tint (which could mean serous otitis media); or ashen gray patches (signs of scarring from a previous perforation). A puncture of the membrane that has not healed is generally indicated by a dark spot (Hockenberry *et al* , 2019) .

2.9.1.3 Auditory test

There are many types of hearing tests that may be used to examine newborns and toddlers. Pure tone audiometry testing at 500, 1000, 2000, and 4000 Hz is recommended by the American Academy of Pediatrics, with children failing if they cannot hear the tones at 20 dB (Anderson *et al.*, 2011) ,therefore every state in the United States offers neonatal hearing screening. For those children who may have disorders related to hearing loss, their caregivers

are worried regarding hearing problems, and who have acquired habits that signal hearing disability, the nurse must operate with a high index of suspicion (Harlor, A. D., Jr., Bower, C., & Committee on Practice and Ambulatory Medicine, Section on Otolaryngology-Head and Neck Surgery, 2009).

2.10.2 Nursing Diagnosis

- 1) Impaired verbal communication related to Anatomical defect (hearing)
- 2) Impaired skin integrity related to Mechanical factors (surgery, intravenous catheter)
- 3) Impaired comfort related to Secondary effects related to treatment.
- 4) Risk for infection related to inadequate primary defenses (ruptured skin, invasive procedures)
- 5) Risk for falls related to impaired balance and Hearing difficulties
- 6) Risk for bleeding related to secondary effects related to treatment (surgery) (Pereira *et al.*, 2017).

2.10.3 Nursing Intervention

The ability of loss of hearing and deaf youngsters to learn and utilize the language spoken has greatly grown during the previous four decades. This progress is due to two key factors: learning or teaching approaches and techniques. Aspects improve accessing lingual data in a variety of methods. Hearing high gain aids, microphones directional, microphones radiofrequency, and multichannel cochlear implants give auditory increased access to clearer speech information. Frequency-specific newborn screening capabilities, as measured by otoacoustic emissions and steady-state evoked potentials, allow for better-fitting hearing aids from a young age. The unifying thread that runs across all of these advancements is that they all provide youngsters with higher-

quality auditory speech data for long durations and earlier in life (Bamey J.& Sarant Z., 2013) .

Hearing loss in children is common, and there has been great progress in detecting and treating these cases. Early identification and awareness of the cause of hearing loss can aid in prognostic and family counseling. Furthermore, understanding the many treatment options available, such as hearing devices, implanted devices, and assistive devices, can help with patient management and achieve the greatest results (Lieu *et al.* , 2020) .

A properly fitting and working hearing aid or Cochlear implant gives most youngsters with enough hearing for the development of spoken language. Successful results, on the other hand, are contingent on capacity of the cognitive for interpret relevant data (Sullivan, 2013). Furthermore, the assistance quantity and quality, such as that provided by audiologists and speech-language pathologists, is critical to learn to using hearing for children (Yoshinaga-Itano, 2014).

In conclusion, the using of CI and HA allows babies with HI to acquire spoken language, although children who have normally hearing not under the same conditions. Speech and language outcomes are influenced by a multitude of factors, including causation and vision, interventions, intellectual capability, and parent and instructor assistance. In HI children the degree of variation in cognition, speech, and language with has been consistently found in investigations. While many children attain age-appropriate levels, some fall short (Torkildsen *et al.*,2019).

2.10.4. Therapeutic Management

Hearing loss is treated differently depending on the cause and kind of hearing loss.

2.10.4.1 Conductive Hearing Loss

Antibiotic therapy for acute otitis media or implantation of tympanostomy tubes for chronic otitis media are effective treatments for many conductive hearing impairments. Hearing can be enhanced through the use of a hearing aid to enhance sound when the conductive loss is permanent (Rosenfeld *et al.*,2022).

Hearing aid kinds, basic care, and handling should all be familiar to the nurse, especially if the kid is in the hospital. Children may get self-conscious about the device as they become older. Hair style to conceal behind-the-ear aids, the use of in-the-ear or small digital models, and advocating the use of beautiful frames for glasses with linked hearing aids are all examples of ways to make the device invisible. Because promoting independence is a fundamental objective of rehabilitation, give children responsibility for the device's care as soon as they are able (Hockenberry *et al* , 2019) .

2.10.4.2 Sensorineural Hearing Loss

Hearing aids or cochlear implants are used to improve hearing and communication in people with sensorineural hearing loss. Damaged auditory hair cells or nerve fibers, as well as abnormal inner ear development, have been linked to sensorineural hearing loss. Hearing aids simply magnify sound that a damaged inner ear may not be able to process, thus some children may not

benefit from them and require a referral for a cochlear implant. A cochlear implant works by bypassing the hair cells and stimulating the remaining auditory nerve fibers directly, allowing them to convey messages to the brain. The brain can interpret these messages to generate sound and sensations (Easwar *et al.* , 2017).

Cochlear insertion is a relatively secure auditory surgery with a minimal rate of complications. Minor issues, mostly infectious in children (acute otitis media) and cochleovestibular in adults (tinnitus and vertigo), were documented as well as significant complications, which usually included reimplantation following revision surgery or device failure (Mancini *et al.* , 2014)

A cochlear implant offers a hearing sense for individual who have severe and permanent loss of hearing. A cochlear implant makes up of an internal surgically implanted prosthetic device (receiver and electrode array) and an external device that consists of a microphone, speech processor, and transmitter coil (Bentton *et al.*, 2016). Moreover, incidences of meningitis have been observed, notably pneumococcal meningitis. As a result, it is advised that all kids who get a cochlear implant receive a pneumococcal polyvalent immunization (Gürler *et al.* , 2019)

Multi channels devices are complex devices that use various processing impulses that activate a sensory nerves in many areas. This sort of activation enables a person to better interpret speech by allowing them to utilize the pitch information included in voice signals. The current tendency is to utilize cochlear implants as early as 12 months old to provide the infant the best

chance of developing hearing, speech, and communication skills (Mancini *et al.*, 2014).

2.11 Strategies to Reduce Children Hearing Loss and Deafness.

Hearing loss has negative consequences on children's language, speech, schooling, social function, capacities of cognitive, as well as to life quality. Loss of hearing can be congenital, onset delayed, or acquired, with a variety of causations involving congenital infections, reasons both syndromic and nonsyndromic genetic, and traumas. Loss of hearing might be evaluated by focusing on the diagnosis probably, laterality, type, loss of hearing degree, starting age, and other factors for example taking cranial irradiation. Aids of hearing implant cochlear, devices anchored to bone, and supportive equipment like systems for frequency modulating may be used for rehabilitation loss of hearing children (Lieu *et al.*, 2020).

Individual patterns of auditory and linguistic development were seen in both children groups. NH control group when compared to the children with CIs gained a different quantity of receptive and expressive language. Three of the children in the CI group took nearly six months to demonstrate speech development improvements that were commensurate with their chronological age. Overall, all youngsters in the implanted group's receptive and expressive development improved as they grew older (Schramm *et al.*, 2010).

The most important variables that may assist the deaf babies to achieve the peer's normal level in their capacity to comprehend and express verbal language and other abilities include early loss of hearing identification, prompt making decision, and cochlear implant, as well as the duration of use.

When a deaf child receives an implant of cochlear in 1st two years or before that, the age of hearing is reduced to the lowest possible level, and sufficient hearing experience is provided during a difficult time of learning speech-language, and a deaf child's ability and capability language is comparable to that of a child with hearing (Ahmadi *et al.*, 2017).

If the children acquire a cochlear implant with a considerable delay after 24 months of age, it will be difficult to compensate for the difference between both auditory age and calendars age. Additionally, the language ability of such youngsters will differ from those of hearing the same age children. Differences in individuals, level of hearing before the operation, assistive devices use, socially condition, a greater level of socioeconomic, remaining hearing, deficiency of disabilities associated, the ability to perceive nonverbal, disabilities of learning, environmental factors, memory, and a parent's unique collaboration and verbal parents' communication all influence the development of language and speech in loss of hearing children(Sani *et al.*, 2017) .

A primary nursing role is a prevention of hearing impairment therefore, Women who are pregnant must be counseled on the early prenatal care importance, which includes genetic counseling for known familial disorders, avoidance of all ototoxic drugs, especially during the first trimester, tests to rule out syphilis, rubella, or blood incompatibility, medical management of maternal diabetes, strict control of alcohol intake, adequate dietary intake, and avoidance of smoke e. Emphasize the need of routine childhood vaccination to prevent acquired sensorineural hearing loss from rubella, mumps, or measles (encephalitis) (kraaijenga *et al.*, 2016)

2.12. Previous Studies

2.12.1 Frist study

A study titled (Determination risk factors for severe and profound hearing loss in child candidates for cochlear implantation in the southeast of Iran during 2014-2020), at Iran was conducted by (Afshar *et al.*, 2022). A total of 400 cases from Bandar Abbas, Zahedan, and Kerman during the years 2014–2020 were reviewed and referred to a cochlear implant center in southeastern Iran, In the control group, boys (46.5%) and girls (53.5%), with the age range of 6.73 ± 3.26 . The commonest risk factor for children was a history of loss of hearing family, followed by age of gestational over 35 and weight less than 1500 g.

2.11.2 Second study

A study at Sub-Saharan Africa (SSA) in province of Zimbabwe by (Pedersen *et al.*, 2022), titled(“Prevalence and causes of pediatric hearing loss in a rural province of Zimbabwe: A cross-sectional study”) , that aimed to estimate the prevalence of HL. Common causes was 40% otitis media of all cases of HL

2.11.3 Third study

A study that conducted by (Butcher *et al.*, 2020). Several perinatal risk factors for childhood permanent hearing loss (PCHI) are known, 19,504 participants from the United Kingdom to examine associations between parent-reported PCHI by age 11 years and length of pregnancy affected PCHI scores were 2.1 per 1,000 Newborn disease, rather than gestational length, predicts risk of PCHI.

2.11.4 Fourth study

The study entitled (Monitoring for Postnatal Hearing Loss Using Risk Factors A Systematic Literature Review) was conducted by (pigeon *et al.*, 2019) in the Australiae , This review contained a total of 40 articles, the most commonly reported risk factors in programs were: gestational age, low birth weight, toxoplasmosis, other infections, rubella, respiratory cytomegalovirus (CMV), herpes simplex virus infections, craniofacial anomalies, support, and the administration of aminoglycosides.

2.11.5 Fifth study

A study was conducted by (walker *et al.* , .2017). A retrospective data evaluation of 115,039 children born between 2010 and 2012 was done in the UK . The end outcome was 90% infants were born without any risk factor for loss of hearing, and 99.9% of children had normal hearing by the age of three. 96.3 percent of infants born with risk factors had hearing normally by the three age, 1.4 percent had loss of hearing that congenital, and 2.3 percent had permanent loss of hearing by the three age . Neurodegenerative illnesses, congenital infections, and syndromes were among that put children at the greatest risk of congenital hearing loss. Craniofacial deformities , congenital CMV, and syndromes were among the factors that put children at the greatest risk of acquiring persistent postnatal loss of hearing.

Chapter Three
Methodology

CHAPTER THREE

Methodology

This chapter presents the methods used in the study , which including certain steps assist in accomplishing the study's aims.

3.1 Study Design

A quantitative, design of a descriptive cross-sectional research conducted on private centers for hearing loss and deafness , Babil Teaching Hospital For Maternity and Children and Imam Al-Sadiq Teaching hospital throughout the period from 19th October, 2021 to 8th June , 2022.

3.2 Arrangements for Administration

Before data collection, formal administrative permits were required, and they were obtained for the study as shown in [Appendix \(A\)](#).

1. The first permission was obtained from the Babylon University College of Nursing to the Higher Education Committee as a proposal presented which consist of the major statement and its objectives.
2. The research approval was obtained from scientific and ethical research committee to provide the researcher with an administrative order for facilitating the task of completing the research to the centers specialized in the problem.
3. An official permission have been received from "Ministry of Health" /Babylon health directorate /Training and development center.

4. An administrative agreement was attained from the Imam Al-Sadiq Teaching hospital and Babil Teaching Hospital For Maternity and Children.
5. The consent was taken from all the private centers for hearing loss and deafness in Babylon province.

3.3 Setting of Study

Babylon Governorate contains specialized centers and help in accomplishing and achieving the planned research problem such as AL-Imam Al-Sadiq Teaching Hospital/Consultant of Ear, Nose, and Throat(ENT) /Hearing Examination Unit, Babil Teaching Hospital for Maternity and Children, and all private centers for hearing loss and deafness as five from seven centers were selected according to the availability of the sample for conducting the study ([Appendix B](#)).

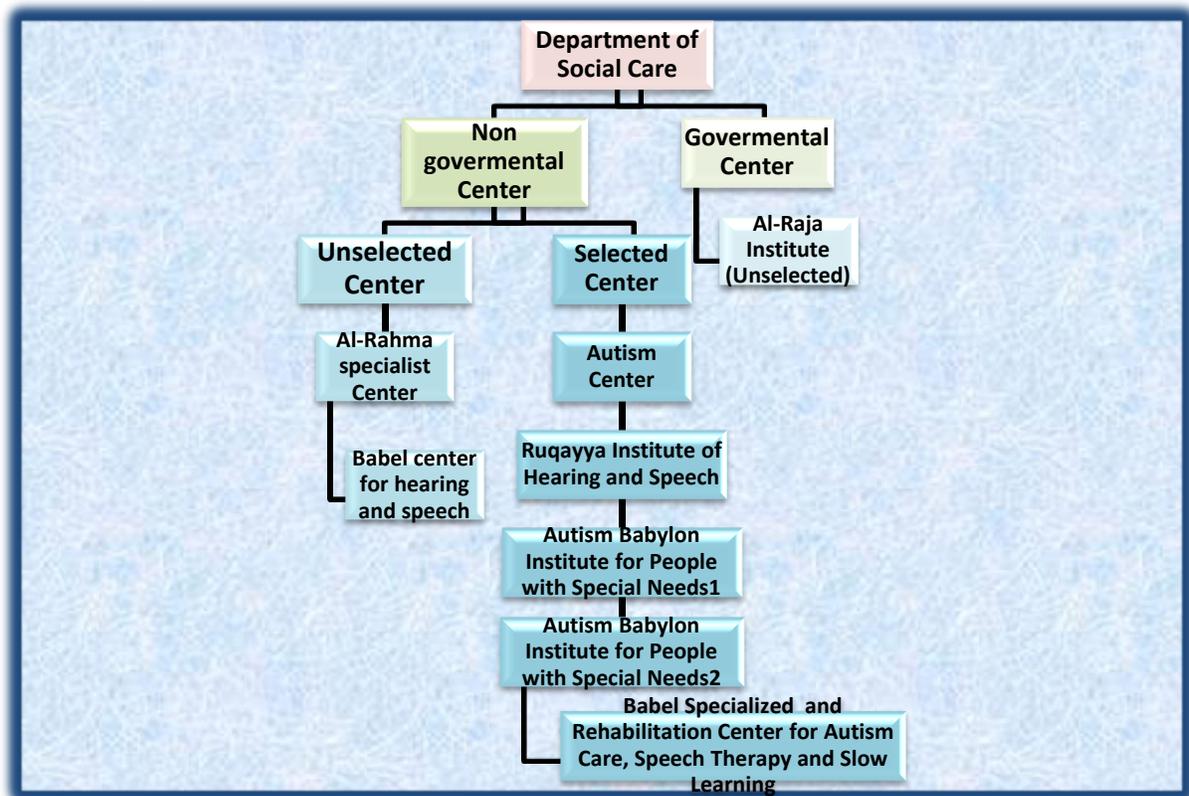


Figure 3.1 : Setting of samples that are selected and unselected

3.4 The Study's Sample

The sample of the study was selected Purposively (non-probability), which is made up of 150 hearing loss and deafness of both genders who were chosen from records of patients who had been medically diagnosed with hearing loss and deafness in the two main hospitals and private centers at Babylon Province, during the period from 2nd February to 2nd May, 2022. The current study population consisted of all children records that were diagnosed with hearing loss and deafness which accounted for (N=200) throughout this period and the sample is divided into (15) samples for a pilot study , (35) exclusion samples and , (150) inclusion samples as shown in the **figure (3.2)**below:



Figure 3.2 : Distribution of the targets sample (children who are under five years from both gender)

3.5 Eligibility Criteria:

3.5.1 Sample's inclusion Criteria

Participants in the current study were required to meet certain requirements, including the following:

1. Children, both males and females are less than five years .
2. A resident of Babylon Province.
3. Children diagnosed with hearing loss and deafness.

3.5.2 Exclusion Criteria

1. Patients who refuse to participate in the study
2. Patients with other problems unrelated to hearing loss and deafness.

3.6 The Instrument of Study

The "questionnaire" is modified for data collection to accomplish the goals of the study after a comprehensive review of the relevant literatures, which was based on the causes and risk factors of hearing loss and deafness. It consist of four sections was designed to cover all aspects of the study as shown in [Appendix \(C\)](#).

Part I: demographic characteristics of the mothers (Maternal Risk factors).

This section is shown on a socio-demographic data sheet consisting of numerous items classified mothers information including the mother's age, level of education (categorized into 4 levels; unable to read and write, primary level, secondary or above, and Diploma or above). The economic status of the family (enough and not enough), and the residence of the family (urban or rural).

Part II : Obstetric and Gynecological history as maternal risk factors.

This part consists of the history of pregnancy duration, mode of delivery (Normal Vaginal Delivery and cesarean section), Birth Plurality (single or multiple pregnancies) Place of delivery (categorized into 4 types; Governmental, private hospital, home, and other). Another item is related to schedule of visiting and follow up to the health center, private clinic, or hospital. Then if the mother has a history of chronic disease and takes any medication through pregnancy.

Part III : Demographic characteristic of the child (child risk factor).

This section is shown on a "demographic data" sheet consisting of numerous items classified their children's information including the child's age, child weight, child gender classified into female or male, history of the child (including the ear that doesn't hear well, the onset of the hearing loss suddenly or slowly, history of surgery, history of a bad concussion or another head injury that caused drainage from the ear, and history of health problems), and genetic history of the child (consist of parents history of hearing loss, siblings with hearing loss and deafness, and child with genetic diseases).

WHO child growth standards has separately weight to age percentile chart for girl and weight to age percentile for boy as mentioned in **Appendix E** . It is include age from birth to five years of age.

Part IV : Causes of hearing loss and deafness among children under five years old.

This part contains multiple items about medical history (such as ear infections, meningitis, diabetes, thyroid problems, birth asphyxia, respiratory problems, and elevated bilirubin), medication history including if the child was hospitalized and taken an antibiotic or any medication on a daily basis and if the mother taken aspirin during pregnancy, and sign and symptoms including tinnitus and noise in the ear and child always feel dizzy, then the history of the first time feel that child has hearing loss.

3.7 Validity of the Questionnaire:

Accomplishing the relevance, adequacy and clarity of the questionnaire , a preparatory copy of the questionnaire is drawn up and submitted to nineteen experts of more than ten years' experience. (9) members of faculty in the nursing college at Babylon university, (2) pediatricians and members of faculty in the medicine college / Babylon university, (4) in nursing college at Baghdad university, (1) member faculty in nursing college at Kufa University, (2) members faculty in nursing college at Karbala University, and lastly, (1) in a nursing college of at Thi-Qar university . **(Appendix D)** shows the panel of experts who have appreciated the arbitration of the questionnaire.

The result of their revisions for the tool by the experts revealed that all of them agreed on it, except slight variations were implemented and little items are excluded with esteem to the expert's proposal, as is clear and appropriate for the measurement of the phenomena underlying the study, then the last draft is ready to be managed.

3.8 Pilot Study

The study was conducted on a group of (15) mothers of children who were diagnosed with hearing loss and deafness at private centers for hearing loss and deafness in Babylon Province as an interviewing technique. The pilot study sample is eliminated from the original study sample , which was conducted from 2nd February to 8th , 2022.

It's done for a variety of reasons, including:

- ✚ Evaluate the instrument's reliability.
- ✚ Determine the nature of the difficulties that the researcher may face during the study.
- ✚ Ensure that the instrument and its content are appropriate for the situation and identify the required modifications.
- ✚ Estimated time needed for each patient for the interview and the measurements of weight.

The findings demonstrated that:

- ✚ The "questionnaire items" were understood and clear as well.
- ✚ Minor changes are made to a few number items.
- ✚ The time required to complete the instrument for each participant is between (20-30 min).

3.9 Reliability of the Study Instrument

The measurement's consistency is referred to as reliability and the data are gathered from 15 hearing loss and deafness children selected from the private hearing loss and deafness centers in Babylon province to assess the internal instrument reliability , which was computed via the calculation the Cronbach's alpha technique resulted to = 0.686 by using (SPSS) version 26 of reliability analysis and shown in the table below(3.1):

Table 3.1: Reliability of the Studied Questionnaire

Domains	No. of Items	Cronbach's Alpha	Result
Overall	32	0.686	Accepted

3.10 Collection of the data

The data were obtained in the period from 15th February 2022 until 15th April 2022; part of the data was collected by utilizing the questionnaire and the interview technique with the participants who were interviewed singly at the private centers and hospitals, in Babylon province, using the Arabic version and by interviewing all participants inclusive in the research sample in a similar manner, the same questionnaire was used at the same place to achieve the objectives of the research and other part collected by using an electronic scale for weight. Filling the instrument taken approximately (20-30) minute for each participant

3.11 An Approach to Statistical Data Analysis:

A current research were analyses electronically over application of the following statistically approach used to analyze data:

The significant relationship is divided into high significant relationship (P-Value<0.01), relationship of significance (P-Value<0.05), relationship of non-significance (p-value>0.05).

3.11.1. An Approach to Descriptive Data Analysis

Tables of Statistics are used to calculate the description of demographic characteristic which include :-

- (F) Frequencies, Percentages (%)
- Mean (x)
- Stander deviation (SD)
- Maximum and minimum

3.11.2. Inferential Analysis

a- The Cronbach Alpha Technique is form questionnaire reliability.

b- Chi-square test: is used to determine the association between hearing loss and deafness with certain demographic data related to children and their mothers.

Chapter Four
Results of Study

Chapter Four

Result of the study

The findings of the data analysis are presented as tables and figures ; which correlate to the study's objectives as follows:

Table 4.1: Mother demographic characteristics (Mothers risk factors) (N= 150) .

Demographical data		Frequency	Percentage %
Mother age	16-25	36	24.0
	26-35	47	31.3
	36-45	34	22.7
	46-55	33	22.0
	Total	150	100.0
	Mean (SD)	35.22 (10.23)	
	Minimum	16	
	Maximum	53	
Educational level	Unable to read and write	30	20.0
	Primary level	46	30.7
	Secondary or above	37	24.7
	Diploma or above	37	24.7
	Total	150	100.0
Economic status	Enough	65	43.3
	Not enough	85	56.7
	Total	150	100.0
Residence	Urban	79	52.7
	Rural	71	47.3
	Total	150	100.0

Table4.1: This demonstrates 47 (31.3%) of mother's age were between (26-35) year and 46 (30.7%) were primary level. Regarding to economic status, 85 (56.7%) were Not enough and 79 (52.7%) were urban.

Table 4.2: Mothers obstetric and gynecological history (Maternal risk factors)(N=150).

Obstetric and Gynecological history		Frequency	Percentage %
Pregnancy duration	Preterm	79	52.7
	Full term	64	42.7
	Post term	7	4.7
	Total	150	100.0
Mode of delivery	Normal vaginal delivery (N.V.D)	73	48.7
	Caesarean section (C.S)	77	51.3
	Total	150	100.0
Birth Plurality	Single	91	60.7
	Multiple pregnancy	59	39.3
	Total	150	100.0
Place of delivery	Governmental hospital	73	48.7
	Private hospital	58	38.7
	Home	18	12.0
	Other	1	0.7
	Total	150	100.0
Do you have schedule visiting for antenatal care	Yes	98	65.3
	No	52	34.7
	Total	150	100.0
If the answer is yes , where was the follow up ?	Health center	39	26.0
	private clinic	41	27.3
	Hospital	18	12.0
	No schedules	52	34.7
	Total	150	100.0
Have you had any chronic diseases ?	Yes	76	50.7
	No	74	49.3
	Total	150	100.0
Have you had any medications taken through pregnancy ?	Yes	114	76.0
	No	36	24.0
	Total	150	100.0

Table4.2: Illustrate that 79 (52.7%) of pregnancy duration were preterm and 77 (51.3%) were caesarean section (C.S). Regarding the birth plurality, 91 (60.7%) were single , while the place of delivery indicate 73 (48.7%) were

governmental, 98 (65.3%) were have a schedule visiting for antenatal care, and 76 (50.7%) were having a chronic diseases, 114 (76%) had any medications taken through pregnancy.

Table 4.3: Children Distribution According to their Demographic characteristic (child risk factors)(N=150).

Demographic characteristic		Frequency	Percentage %
Child age	Less than one year	10	6.7
	1	16	10.7
	2	31	20.7
	3	50	33.3
	4	43	28.7
	Total	150	100.0
Gender	Male	69	46.0
	Female	81	54.0
	Total	150	100.0
Percentile of weight	Less than 5 th percentile	85	56.7
	From the 5 th percentile to the 85 th percentile	62	41.3
	From the 85 th percentile to the 95 th percentile	2	1.3
	Greater than 95 th percentile	1	0.7
	Total	150	100.0

The table above revealed that 50 (33.3%) of the children age were 3 years, female represented as 81 (54%) with less than 5th percentile weigh signified as 85 (56.7 %).

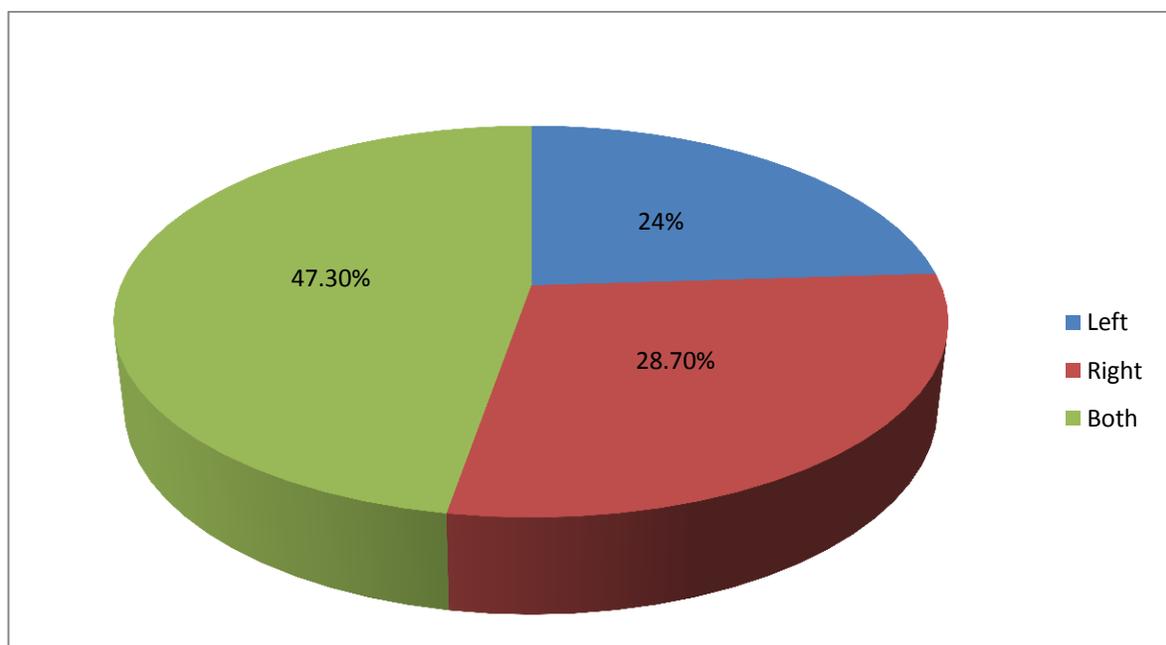


Figure 4.1: Prevalence of hearing loss and deafness among children.

Figure 4.1: Shows that 47.3% the of respondents does not hear in both ear.

Table 4.4: Distribution of the sample According to their Histories(N=150).

		Frequency	Percentage %
Did your hearing impairment come on.	Slowly	89	59.3
	Suddenly	61	40.7
	Total	150	100.0
Has your child had an ear surgery in the past ?	Yes	15	10.0
	No	135	90.0
	Total	150	100.0
Have you ever had a serious concussion or other type of head trauma that resulted in ear discharge or loss of hearing?	Yes	32	21.3
	No	118	78.7
	Total	150	100.0
Has your child complained of health problems in the previous months?	Yes	73	48.7
	No	77	51.3
	Total	150	100.0

Table 4.4: Demonstrate that 89 (59.3%) of hearing impairment were come on slowly. In spite of the majority 135 (90%) were no ear surgery in the past, as well as 118 (78.7%) did not have a serious concussion or another type

of brain damage. In relation to previous health problems, 77 (51.3%) were did not complained of health problems in the previous months.

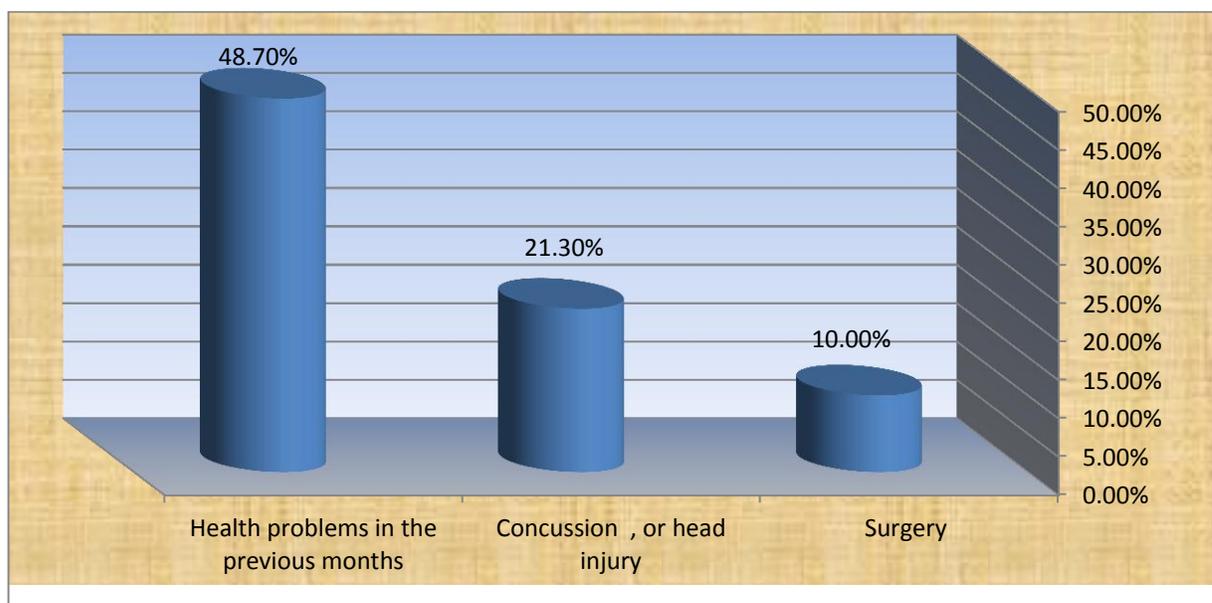


Figure 4.2: Risk factors of hearing impairment related to history of the child(N=150).

Figure 4.2: show that 10% of children with hearing impairment having a previous surgery, and 21.3 % of them having an incidence of concussions or other types of brain injuries, that resulted in ear discharge or loss of hearing, while 48.7% of child complained of health problems in the previous months.

Table 4.5: Genetic history of the defected child statistically as follows:

		Frequency	Percentage %
Dose one of the parents have a family history of hearing loss ?	Yes	50	33.3
	No	100	66.7
	Total	150	100.0
Are there siblings of your child with hearing loss or deafness ?	Yes	54	36.0
	No	96	64.0
	Total	150	100.0
Does your child suffer from genetic diseases ?	Yes	49	32.7
	No	104	67.3
	Total	150	100.0

Table 4.5: This demonstrate 50 (33.3%) of parent have a family history of hearing loss and 36% of the siblings with hearing loss or deafness. Also there are about 32.7 of children suffer from genetic diseases.

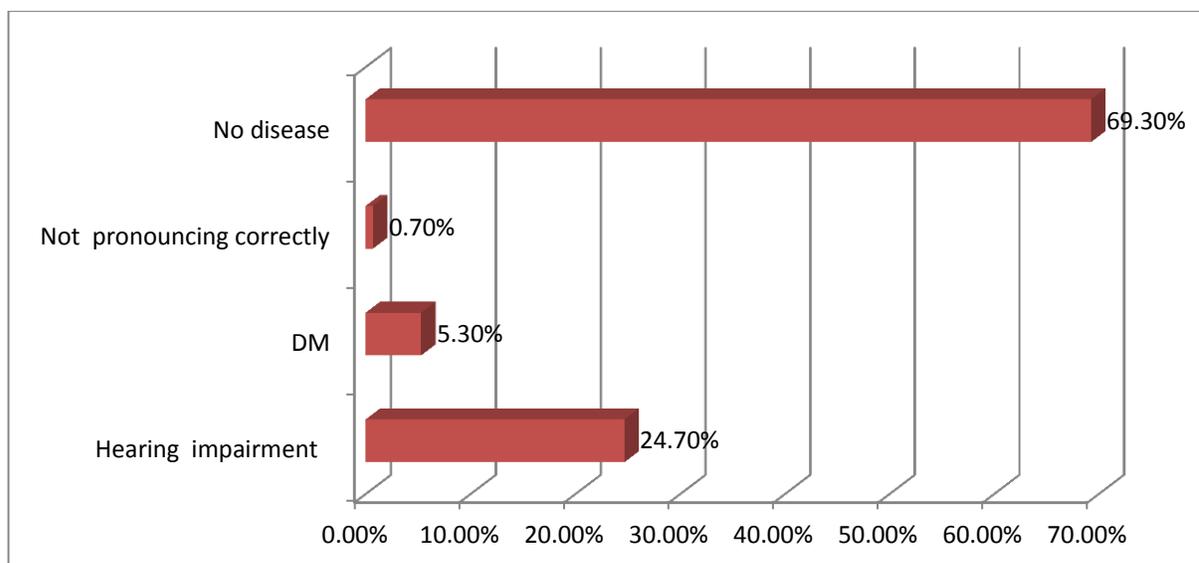


Figure 4.3: Genetic diseases related to hearing impairment(N=150).

Figure 4.3: show that 24.7% of genetic diseases was hearing impairment

Table 4.6: The causes related to medical history(N=150).

		Frequency	Percentage %
Did your child ever have recurrent of ear infections ?	Yes	106	70.7
	No	44	29.3
	Total	150	100.0
Did your child ever have meningitis ?	Yes	50	33.3
	No	100	66.7
	Total	150	100.0
Did your child have diabetes ?	Yes	25	16.7
	No	125	83.3
	Total	150	100.0
Did your child have thyroid problems ?	Yes	36	24.0
	No	114	76.0
	Total	150	100.0
Did your child have birth asphyxia?	Yes	82	54.7
	No	68	45.3
	Total	150	100.0

Did your child have a lot of respiratory problems ?	Yes	77	51.3
	No	73	48.7
	Total	150	100.0
Did your child have any problem led to elevated bilirubin ?	Yes	101	67.3
	No	49	32.7
	Total	150	100.0

Table 4.6: Displays that 106 (70.7%) of child were have an ear infections, and 50(33.3%) of child ever have meningitis. Also there are 25 (16.7%) of child have diabetes, and 33 (24%) of child have thyroid problems. This table also show that 82 (54.7%) of child have birth asphyxia, 77 (51.3%) of child have a lot of respiratory problems, and 101 (67.3%) of child have a problem led to elevated bilirubin.

Table 4.7: The causes related to medication history(N=150).

		Frequency	Percentage %
Has your child previously been admitted to the hospital and given an antibiotic directly or indirectly in his /her veins ?	Yes	105	70.0
	No	45	30.0
	Total	150	100.0
Did the mother take aspirin during pregnancy or breast feeding?	Yes	70	46.7
	No	80	53.3
	Total	150	100.0
Did your child take any medication on a daily basis?	Yes	55	36.7
	No	95	63.3
	Total	150	100.0

Table 4.7: Illustration that 105 (70%) of child previously admitted to hospital and given an antibiotic directly or indirectly in his /her veins, and 70 (46.7%) of mother take aspirin during pregnancy or breast feeding. Also there are 55 (36.7 %) of child take any medication on a daily basis.

Table 4.8: Descriptive statistics of Sign and symptoms related to deafness(N=150) .

Sign and symptoms		Frequency	Percentage %
Did your child have tinnitus and noise in the ear ?	Yes	75	50.0
	No	75	50.0
	Total	150	100.0
Did your child always feel dizzy ?	Yes	57	38.0
	No	93	62.0
	Total	150	100.0
Since when did you feel that your child has a hearing loss ?	One month or less	28	18.7
	1 year	73	48.7
	2 years	25	16.7
	3 years	24	16.0
	Total	150	100.0

Table 4.8: This demonstrate that 75 (50%) of child have tinnitus and noise in the ear, and 57(38%) of child always feel dizzy. Regarding to duration of the begging of hearing loss, there are 73 (48.7 %) of child feel has a hearing loss since 1 year.

Table 4.9: Hearing loss and deafness in relation to mother demographic data

		Which ear has trouble hearing?			Chi-Square Tests
		Left	Right	Both	
Mother age	16-25	5	13	18	$X^2 = 6.987$ Df= 6 p-value = 0.322 (N.S)
	26-35	13	12	22	
	36-45	12	10	12	
	46-55	6	8	19	
Total		36	43	71	150
Educational level	Unable to read and write	12	4	14	$X^2 = 21.629$ Df= 6 p-value = 0 .001 (H.S)
	Primary level	6	12	28	
	Secondary or above	9	19	9	
	Diploma or above	9	8	20	
Total		36	43	71	150
Economic status	Enough	14	20	31	$X^2 = .470$ Df= 2 p-value = 0.791 (N.S)
	Not enough	22	23	40	
Total		36	43	71	150
Residence	Urban	17	29	33	$X^2 = 5.284$ Df= 2 p-value = 0.041 (Sig.)
	Rural	19	14	38	
Total		36	43	71	150

$X^2 = \text{Chi-square}$, $\text{Sig} = \text{significance}$, $N.S = \text{non significance}$, $H.S = \text{highly significance}$ $P \text{ value} \leq 0.05$

The schedule above demonstrate a large and extremely significant link exists between hearing loss and deafness and some mothers data of demographical at $P\text{-value} \leq 0.05$, like (Educational level, Residence). With the exception of (Age of Mother, Economic status) that there is a non-significant association at $P\text{-value} \leq 0.05$.

Table 4.10: Hearing loss and deafness in relation to mothers' obstetric and gynecological history

		Which ear has trouble hearing?			Chi-Square Tests
		Left	Right	Both	
Pregnancy duration	Preterm	19	25	35	$X^2 = 3.356$ Df= 4 p-value = 0.5 (N.S)
	Full term	15	18	31	
	Post term	2	0	5	
Total		36	43	71	150
Mode of delivery	Normal vaginal delivery (N.V.D)	16	21	36	$X^2 = .375$ Df= 2 p-value = .829 (N.S)
	Caesarean section (C.S)	20	22	35	
Total		36	43	71	150
Birth Plurality	Single	20	21	50	$X^2 = 5.748$ Df= 2 p-value = .056 (N.S)
	Multiple pregnancy	16	22	21	
Total		36	43	71	150
Place of delivery	Governmental	15	20	38	$X^2 = 19.061$ Df= 6 p-value = 0 .004 (H.S)
	Private hospital	20	21	17	
	Home	1	2	15	
	Other	0	0	1	
Total		36	43	71	150
Do you have schedule visiting for Antenatal care	Yes	22	36	40	$X^2 = 9.239$ Df= 2 p-value = 0 .01 (Sig)
	No	14	7	31	
Total		36	43	71	150
Have you had any chronic diseases ?	Yes	30	20	26	$X^2 = 21.271$ Df= 2 p-value = 0 .001 (H.S)
	No	6	23	45	
Total		36	43	71	150
Have you had any medications taken	Yes	28	33	53	$X^2 = .147$ Df= 2
	No	8	10	18	

through pregnancy ?					p-value = 0.929 (N.S)
Total		36	43	71	150

$X^2 = \text{Chi-square}$, $Sig = \text{significance}$, $N.S = \text{non significance}$, $H.S= \text{highly significance}$ $P \text{ value} \leq 0.05$

The schedule demonstrate a large and extremely significant link exists between hearing loss and deafness and some mothers Obstetric and Gynecological history at $p \leq 0.05$, such as (Place of delivery, Do you have schedule visiting for Antenatal care, Have you had any chronic diseases ?). Except with (Pregnancy duration, Mode of delivery, Birth Plurality, Have you had any medications taken through pregnancy ?) that there is a non-significant association at $P\text{-value} \leq 0.05$.

Table 4.11: Hearing loss and deafness in relation to child demographic data.

		Which ear does not hear well ?			Chi-Square Tests
		Left	Right	Both	
Child age	Less than one year	3	2	5	$X^2 = 9.256$ Df= 8 p-value = 0.321 (N.S)
	1.00	5	4	7	
	2.00	8	11	12	
	3.00	14	17	19	
	4.00	6	9	28	
Total		36	43	71	150
Gender	Male	21	15	33	$X^2 = 4.350$ Df= 2 p-value = 0 .114 (N.S)
	Female	15	28	38	
Total		36	43	71	150
Percentile of weight	< 5 th percentile	21	24	40	$X^2 = 1.946$ Df= 6 p-value = 0 .925 (N.S)
	the 5 th - 85 th percentile	15	18	29	
	85 th - 95 th percentile	0	1	1	
	> 95 th percentile	0	0	1	
Total		36	43	71	150

$\chi^2 =$ Chi-square ,Sig = significance, N.S = non significance, H.S= highly significance *P* value ≤ 0.05

The schedule above show that the link between the two variables isn't substantial hearing loss and deafness and any of child demographical data at *P*-value ≤ 0.05 .

Chapter Five

Discussion

Chapter Five

Discussion of the Results

The globe aimed to minimize the prevalence of hearing loss and deafness, but most developing nations, including Iraq, failed to meet this target. This chapter discusses the implications of the data collected and published in [Chapter 4](#), their significance in connection to related articles, and the study's results regarding causes and risk factors of hearing loss and deafness. The focus of the conversation was on a demographic trait that indicates risk factors, as well as the causes of both mothers and their children.

5.1. Mothers Demographic Characteristics (Maternal Risk Factors)

5.1.1 Mother age

In the study conducted in Northern Thailand “Risk Factors for Hearing Loss in Infants Subject to a Comprehensive Hearing Screening Program in Northern Thailand”, they found that the most prevalent risk factors in terms of maternal age were 20-35 years ([Poonual et al., 2016](#)). This result is consistent with the existing study as shown in [Table 4-1](#), which was mothers aged between 16-55 years, and as a result of the study, it was found that less than a third of the mothers were between (26-35) years.

On another side, it was found that the average age of mothers of children with hearing impairment or deafness is 31 years, and this corresponds to the age resulting from the current study ([Foch et al. 2018](#)).

The reason for this is due to many factors, the most important and prevalent which is the lack of stability on a gynecologist and obstetrician, and this leads to the diversity of treatment provided to the mother, as well as the economic situation of mothers.

5.1.2 Educational level

Regarding the educational level of mothers, the current study revealed that more than a quarter is a primary level, which has been rationalized by our policy in the early marriage of females as well as their failure to complete their studies. This is due to the culture of our societies in that it is not necessary for females to continue studying and dedicate their responsibilities at home only, and thus they are ready for marriage regardless of their awareness about motherhood and child care.

The current study is consistent with the Chinese research “Prevalence and Social Risk Factors for Hearing Impairment in Chinese Children – A National Survey”, which reported that most of the children in the sample had parents with lower educational levels (illiteracy or primary school) and they were significantly higher than the parents of children with High educational level (junior school or more) (Zheng *et al.*, 2017).

5.1.3 Economic status

The researcher's point of view is that the study was mostly on those whose economic conditions are not sufficient for the needs of life, and the evidence for this is the result of the under hand study, which showed that more than half of the mother's financial income was insufficient.

Low and middle incomes have limited access to certain diagnostic services due to a lack of diagnostic services and specialized intervention, or the family itself suffers from low income that prevents them from checking and following up on their son's health during and after pregnancy. To support these findings, there is a companion study in which low-income countries showed a high incidence of hearing impairment and deafness (Graydon *et al.*, 2019).

5.1.4 Residence

This study showed that in the vast majority of the residential areas of the sample, more than half of the mothers live in urban areas, which justifies the random selection from the city center, so most of the mothers are from urban areas. The result of the previous study of China's research presented the rural more than the urban. While the results of a study conducted in Uganda that represented the prevalence of ear infections in urban areas higher than in rural areas were approved (Kisembo *et al.*, 2018)

5.2. Mothers obstetric and gynecological history as risk factors.

5.2.1 Pregnancy duration

The contemporary study revealed that more than half of the gestation period was preterm, and this finding is in agreement with the result of research conducted in Poland which accounts for the hearing impairment detected in preterm infants born between 26 and 28 weeks of gestation and children born between 29 and 32 weeks. weeks of gestation (Swanepoel *et al.*, 2015 ; Wroblewska-Seniuk *et al.*, 2017).

The researcher's opinion is that hearing impairment is a common and serious complication of preterm birth, and because its occurrence is inversely

proportionate to the infant's maturity. The most prevalent cause of severe pediatric hearing loss was preterm birth. Diagnosis and treatment are often delayed, putting this population at risk for poor outcomes.

5.2.2 Mode of delivery

Regarding the method of delivery, the researcher's view is that the study was focused on more than three-quarters of mothers who underwent a cesarean section (C.S). The type of delivery (Caesarean section) is a major risk factor for mothers with hearing loss, and this is evidence of research conducted in Iran (Mohammed *et al.*, 2008). In addition to the case report, it describes a female patient who underwent an emergency cesarean section and subsequently developed hearing impairment (Benson R., 2012; Vieira *et al.*, 2015 ; Alwan, M., & Hurtado, G., 2019). While the results of this current study are inconsistent with the study conducted in Turkey whose main risk factor was the type of birth (vaginal delivery) (Konukseven *et al.*, 2014).

The researcher's opinion is that the cause may be labor not progressing, baby distress, abnormal position of the baby, umbilical cord prolapse, health concerns, and previous CS.

5.2.3 Birth Plurality

The researcher's view concerning multiple birth ; revealed that less than two-thirds of the sample was one birth. While this current study is inconsistent with the study conducted in the Netherlands, parity (multiple birth) was represented as a risk factor (Coenraad *et al.*, 2010). It is rationalized that the reason is related to other problems that mothers suffer during pregnancy , which could be due to poor follow-up during pregnancy ; may be concerned to their

educational and cultural level and poor awareness of the changes taking place in them that require monitoring during the specific period and after.

5.2.4 Place of delivery

In terms of place of birth, government hospitals were the most common place of birth as evidence of results indicate that less than two-thirds of them were government. The risk factors for caesarean section delivered in public hospitals were higher than in private hospitals according to a study conducted in northeastern Brazil (Vieira *et al.*, 2015). The reason for this, according to the researcher, due to the economic situation and weakness in the services provided in the governmental health field where, they were unable to follow at non-governmental situations.

5.2.5 Antenatal care

In relation to antenatal care, the researcher's point of view is that the study was mostly the mothers who have scheduled care during the pregnancy period so the current study concerted that less than two-thirds had a schedule visiting for antenatal care. The Hospital Agamenon Magalhaes in Brazil and collaborators undertook a retrospective study of 70 babies ages range from birth to 10 months having laboratory indications of Zika virus infection and microcephaly. Whole children delivered for indications of mothers of infection Zika virus through gestation, including those who seem normal at birth, must have their hearing examined (Leal *et al.*, 2016). During pregnancy, various illnesses can be passed from the mother to the baby, causing harm to the infant's hearing. Rubella (German measles), TB, cytomegalovirus (CMV), and syphilis are among these illnesses (Felicite, 2021; Niemann *et al.*, 2004). While there are One third of mothers have no schedule for antenatal care.

The researcher's opinion is pregnant women must have access to adequate nutrition and health care. Because of disease or insufficient nutrition during delivery, a baby might be born with hearing loss. For example, if a woman's pelvis is too narrow due to inadequate nutrition, her baby may become trapped during delivery, which could be a result in hearing loss from brain injury.

5.2.6 Chronic diseases

Regarding chronic disease, the study findings found the most prevalent risk factors are maternal diseases during and before pregnancy (Poonual *et al.*, 2016 ; Foch *et al.*, 2018). The finding of this study that was conducted in Turkey represents the main risk factor is maternal infection (Konukseven *et al.*, 2014). The researcher's point of view is that the study was mostly the mothers who more than half were having a chronic disease during and before pregnancy, which is related to mother's neglect of herself during and after pregnancy, either due to the many requirements or multiple pregnancies and having many children.

5.2.7 Pregnancy medication

Regarding pregnancy medication, the study results were more than three quadrants from mothers who had taken medications through pregnancy. And as mentioned earlier, the lack of consistency with one gynecologist leads to a multiplicity of treatments used, which can affect the life and health status of the fetus, and another reason is due to the health situation in the country, a large number of diseases and the economic situation. Evidence of the study agrees with the result of a study that presented several aminoglycoside antibiotics that can induce deafness for ex: Garamycin, amikacin, kanamycin, gentamicin,

netilmicin, neomycin, tobramycin, streptomycin, cytotoxic drugs, antimalarial drugs, and diuretics. This can happen if the antibiotic was given to the mother during pregnancy, as well as when a woman takes thalidomide during gestation to cure HIV/AIDS, cancer, or leprosy related diseases, the baby might develop a variety of serious abnormalities, including hearing loss (Felicite ,2021; kliegman *et al.*, 2020; Niemann *et al.*,2004).

5.3. Descriptive statistics of Demographic characteristic of the child (child risk factors).

5.3.1 Child age

Regarding child age, The current study revealed that about one-third of child age was 3 years. According to the results , a retrospective data study in an audiologist center in South Africa's Free State Province revealed at the time of the initial visit and diagnosis, the children were between the ages of 3.4 and 3.7 years (Manyisa *et al.*, 2022; Butler *et al.*, 2013). As well as the study results represented that hearing loss in South African data, showed that most of the children under the age of five with a severe degree of hearing loss had sensorineural hearing loss (Swanepoel *et al.*,2015). Because a quarter of the children were under the age of 5 when they were initially evaluated at the audiology clinic in Gaborone, Botswana, a larger proportion of under-5 children exhibited sensor-neural hearing loss (Banda *et al.*,2018). A bimodal beak for hearing loss and deafness in children aged from 2 -to 5 years (Corrigan *et al.* , 2016) Finally, in Port Harcourt Patients in the age group of 0–3 years, one-third were more affected in the study to determine the age group that was infected by hearing loss (Ibekwe & Oghenekaro, 2020). accordingly, this has a

significant detrimental influence on the development and results of hearing-impaired children.

5.3.2 Gender

In relation the gender, the current study revealed that more than half were female, the study result that agrees represented the prevalence of hearing disorders was 89.1% in males and 81.5% in females (Hosseini *et al.*, 2020), while boys were significantly more affected by hearing loss than girls (Boudewyns *et al.*, 2013 ; Wändell *et al.*, 2021).

5.3.3 Weigh percentile

While the child weight percentile, In the study by Felicite, 2021; Poonual *et al.*, 2016; Batalla *et al.* , 2012, found the most prevalent risk factors in infants were low birth weight exposure similar to what the author of the current study found that about less than the 5th percentile weight represented as more than half. The reason for this is that the child under normal weight suffers from either immunodeficiency diseases in which he is more susceptible to diseases or suffers from nutritional deficiencies

5.4 Prevalence of hearing loss and deafness among children who are under five years old.

In the current study, the prevalence of hearing loss and deafness among children who are under five years old was more than half of children don't hear well in both ears as presented in figure 4.1. This result agreed with the finding of the study which is carried out in Northern Brazil which shows the incidence of hearing loss in infants from private institutions is 2 instances per 1,000 examined individuals (Oliveira *et al.*, 2013 ; Zheng *et al.*, 2017). According to

the results conducted in Gaborone, Botswana, on children with the known hearing outcomes reach 622, who had impairment hearing are 201. (Banda *et al.*,2018). In India, the prevalence and incidence of hearing loss are likewise rather high. Deafness is mostly preventable and avoidable over the world, including in India, and it is prevalent in South-East Asia, ranging from 4.6 percent to 8.8 percent (Varshney , 2016)

There were a total of 20,514 instances (53.7 percent) of prolonged sensor-neural hearing impairment, the risk of protracted sensor-neural hearing impairment was higher in children with parents from Asia, notably Iraq, and lower in boys with parents from Nordic nations, South Europe, and North America (Wändell *et al.*, 2021).

Approximately, at birth is about two per 1,000, 30–40% of those affected have UHL (Hornsby *et al.*,2020).The researcher’s point of view, the reason for the prevalence of hearing loss and deafness among children is either hereditary conditions, intrauterine infections during pregnancy or during childbirth such as congenital asphyxia and high bilirubin as well as after childbirth is a middle ear infection, and all of this doesn’t take into account the resulting problems.

5.5 Distribution of the sample According to their Histories.

The study demonstrates as presented in table 4.4 that more than half of hearing impairments were come on slowly, respectively agrees with the study that concerted hearing loss was acquired related to prematurity, CMV infection, and meningitis in more than one quadrant of the babies(Dirks & van der Zee, 2022),

and In spite of the majority were no ear surgery in the past, as well as than more three quarters did not have a serious concussion or another type of brain damage. In relation to previous health problems, More than half were did not complained of health problems in the previous months.

5.6 Risk factors of hearing impairment related to history of the child

The results of the current study as presented in [figure 4.2](#) shows that less than one quarter of children with hearing impairment having a previous surgery, and nearly one quarter of them having an incidence of concussions or other types of brain injuries, that resulted in ear discharge or loss of hearing, while less than half of child complained of health problems in the previous months.

According to a study finding that was conducted at the Children's Hospital of Philadelphia, the incidence of hearing loss in preschool children following cardiac surgery in infancy might be 20 times greater than the 1% prevalence reported in the general population. Hearing loss was linked to a younger gestational age, the existence of a genetic defect, and a longer postoperative stay ([Grasty et al., 2018](#)).

A history of bad concussion, or other head injuries, that caused drainage from your ear or hearing loss nearly one quarter, this result agrees with the results conducted in Gaborone, Botswana. The majority of the kids had a head trauma history as well as repeated discharge and infections ear ([Grossman & Dimitrov , 2019](#) ;[Banda et al.,2018](#); [Djalilian & Hamid, 2015](#)) .

These results agree with the study in which there is a vast amount of information that shows a strong correlation between hearing loss and physical deterioration. Untreated middle-ear illness seems to be a more unique physical health problem. Otitis media complications are estimated to cause over 21 000 fatalities each year throughout the world (Graydon *et al.*, 2019; Banda *et al.*,2018 ; Niemann *et al.*,2004).

5.7 Genetic history of the defected child.

The results of the current study as presented in table 4.5 shows one-third of parents have a family history of hearing loss and two-fifths of siblings of children with hearing loss or deafness. Also, there are about one-third of children suffer from genetic diseases, and percent of these genetic diseases were hearing impairment.

The research results of the study that was conducted in the Netherlands demonstrated genetic was loss of hearing cause. Many of these kids had a condition that caused them to lose their hearing. In all, 19% of the babies were established in families where one or more parents or siblings were deaf. Hearing loss did not happen within the family in 81 percent of the cases (Dirks & van der Zee, 2022). Additionally, in the research findings conducted in Northern Brazil families represented the loss of hearing history was the common greatest cause loss of hearing in the population study(Oliveira *et al.*, 2013). Also, findings of a cross-sectional comparative study conducted in India from 6 months to 1 year infants agree with the current study results in family deafness genetically produces children with hearing loss or deafness (kavitha *et al.* , 2017;Mukherjee *et al.*, 2013 ; Swanepoel *et al.*,2015; Alford *et al.*,2014).

From the researcher's point of view, the reason for the genetic effect is endogamy, especially in the rural areas. It justifies that the nurses not practicing

one of their most important roles is genetic counseling, as one of its goals is to control genetic diseases that increase the morbidity of children and thus may affect the family and society from the stability of the health system and increase the cost for the purpose of caring for these groups of children..

5.8 Genetic diseases related to hearing impairment.

The results of the current study as presented in [figure 4.3](#) shows that one quadrant of genetic diseases was hearing impairment. Genes are chemical units found in all of the body's cells. the genetic hearing loss represented less than one quadrant of cases in the study conducted in Cameron ([Oluwole et al., 2020](#)), which rationalized by genes generate specialized structures called chromosomes inside the cell, which make up our DNA and store our inherited features. A total of 30,000 genes make up each cells in the human body. Human hearing is influenced by genes in ear cells, which help in the processing of sound into signals which interprets by brain. Alteration of genes' DNA can happen at any time, affecting their functioning. If all these mutations occur in a gene which provides crucial information on our sense of hearing, hearing loss or, in severe cases, deafness may result.

5.9 Descriptive statistics of causes of hearing loss and deafness among children under five years old

5.9.1 The causes related to medical history

[Table 4.7](#) Displays that more than two-thirds of children have an ear infection, and these results agree with a study that is a vast amount of information that shows a strong correlation between hearing loss and physical deterioration. Untreated middle-ear illness seems to be a more unique physical

health problem. Otitis media complications are estimated to cause over 21 000 fatalities each year throughout the world (Dirks & van der Zee, 2022; Hornsby *et al.*, 2020 ; kliegman *et al.*, 2020; Graydon *et al.*, 2019 ; Hockenberry *et al.* , 2019; Grossman & Dimitrov , 2019; Corrigan *et al.* , 2016; Chiocca, 2010).

The current study results display that One-third of children has meningitis these results agree with a case series cross-sectional study was carried out and conducted by (Silva *et al.*, 2006 ; Coenraad *et al.*, 2010) that present later in childhood, the biggest cause of hearing impairment is meningitis, a disease that may lead to profound hearing loss. Another study finding agrees with the current results conducted in Mexico demonstrating the main cause of loss of hearing is meningitis (Poblano *et al.*, 2008).

Hearing loss was shown to be very widespread among diabetic patients in this study, and it grew more prevalent in those with uncontrolled blood glucose and prolonged illness duration, resulting in a 92.6 percent prevalence of hearing issues among patients with poor diabetes management (Hosseini *et al.*, 2020), and that agree with the present study Because there are One-quarter of the children have diabetes. As a result of the findings, the diabetic group had a prevalence of hearing loss, implying that one-sixth of diabetes have hearing impairment And which supports the present findings (Treviño-González *et al.*, 2015).

One-third of children who have thyroid problems agree with the result of this study that represented the children with CH (congenital hypothyroidism) had a three times greater probability of self-declared hearing loss than the general population. Hearing loss was detected at a median age of 7.0 years who were impacted needed hearing aids in their early adulthood. Families and primary care professionals must be conscious of this risk since early detection

and management can help these patients have a better long-term outcome (Lichtenberger-Geslin *et al.*,2013).

This current study also shows that More than half of the child has birth asphyxia which these results agree with the research findings conducted in Netherland and US that presented that asphyxia is the main cause for loss of hearing (Hille *et al.*, 2007).Another study that supports the current study findings is conducted in Jordan which represented postnatal hypoxia is one of the risk factors (AbuShaheen *et al.*, 2014).

More than half of children have a lot of respiratory problems, and these results agree with findings conducted in the Netherland and Turkey which demonstrate the main cause is a respiratory distress syndrome (Hille *et al.*, 2007; Konukseven *et al.*,2014).

Certain study shows that more than two-thirds of the children have a problem led to elevated bilirubin these findings agree with the study conducted in Northern Thailand which found the most prevalent causes in infants who have severe hyperbilirubinemia (Poonual *et al.*, 2016). The researcher's point of view is that jaundice of neonatal develops during the first few days of life, and women, in any case, the place they selected for giving birth, require to be more informed and conscious of the early indicators of this illness so that appropriate phototherapy or blood transfusions may be administered.

Wroblewska S. *et al.*, 2018 found hyperbilirubinemia patients phototherapy requiring in more than half of SNHL children. As stated to findings, None of the youngsters investigated had significant hyperbilirubinemi, therefore They didn't need any more treatments like kernicterus and exchange transfusions, however, this might be related to the fact that phototherapy was started early in the disease's progression. In addition to previous studies, there is

a research finding that agrees with a current study represented one of the Hyperbilirubinemia's main causes of hearing loss child (Mohamed *et al.*, 2008 ; Olusanya B. O, 2011 ; Dabrowski *et al.*, 2018; Reis *et al.* , 2019).

5.9.2 The causes related to medication history.

The results of current study as presented in table 4.8 illustration that more than two third of child ever been hospitalized and given an antibiotic directly or indirectly in his /her veins, In children, several aminoglycoside antibiotics can induce deafness for ex: Amikacin, Gentamicin, Garamycin, tobramycin, kanamycin, streptomycin, neomycin, or netilmicin. If the antibiotic is given to the child, this can happen. Antibiotics are frequently administered through injection. They should only be used in the case of life-threatening illnesses, While less than half of mother take aspirin during pregnancy or breast feeding. Women might be classified as a high-risk population because of the high occurrence of premature birth. The use of aspirin as a risk-reduction medication was linked to a history of preterm birth and those aged 30 and up (Abheiden *et al.*, 2020). Aspirin should not be given to children under the age of 12. Children can take paracetamol for pain and fever (acetaminophen). When used in greater than regular amounts, aspirin might cause hearing impairment. Likewise, It could cause transient hearing loss and tinnitus, which usually subside after the aspirin is ceased(Niemann *et al.*,2004).

Also, there are less than Two-fifths of children take any medication on a daily basis. In the study population, the use of ototoxic drugs was the utmost common cause of loss of hearing (Oliveira *et al.*, 2013 ; Poonual *et al.*, 2016 ; Eras *et al.*, 2014).

5.10 Descriptive statistics of Sign and symptoms.

The results of current study as presented on [table 4.9](#) shows that half of child have tinnitus and noise in the ear, Also, less than Two fifth of child always feel dizzy. Regarding to duration of the begging of hearing loss, there are less than half of child feel has a hearing loss since 1 year. The overall results was Tinnitus is frequently associated with hearing loss ([Zhou et al., 2011](#); [Kerr et al. , 2017](#) ; [Harrison , 2008](#)).

The researcher point of view hearing sensitivity changes and/or tinnitus develops as a result of the physiological changes in the ear, while the time for detecting hearing loss is very late. The reason back to the parents and their lack of knowledge of the healthy and unhealthy developments of the child, especially during the first two years.

5.11 Hearing loss and deafness in relation to mother demographic data

The result of current study as presented on ([table 4.10](#)) demonstrates that a large and extremely significant link exists between hearing loss and deafness and some mothers demographical data, such as (Educational level, Residence). Except with (Mother age, Economic status) that there is a non-significant association .

A significant association between hearing impairment prevalence and the area of living of mothers was urban 71.8%, also regarding the educational level of the mother ([Boudewyns et al., 2013](#)) .

5.12 Hearing loss and deafness in relation to mothers' obstetric and gynecological history

The result of current study as presented on (table 4.11) demonstrates that a large and extremely significant link exists between hearing loss and deafness and some mothers Obstetric and Gynecological history , such as (Place of delivery, Do you have schedule visiting for Antenatal care, Have you had any chronic diseases ?). Except with (Pregnancy duration, Mode of delivery, Birth Plurality, Have you had any medications taken through pregnancy ?) that there is a non-significant association .

5.13 Hearing loss and deafness in relation to child demographic data.

The result of current study as presented on (table 4.12) demonstrates no statistically significant link between hearing loss and deafness and any of child demographical data .In terms of hearing status and the types of hearing disorders, there was no significant difference between males and girls according to study conducted in Iran (Hosseini *et al.*, 2020), And some studies have found no gender-related differences in the occurrence of OM that leading to hearing loss or deafness(Kliegman *et al*, 2022).

Chapter Six
Conclusions &
Recommendations

Chapter Six

Conclusions and Recommendations

6.1 Conclusions:

According to the results of the study, the investigator has come up with several conclusions, which are listed as follows:

1. Mothers who have children with hearing loss or deafness aged between 26-35 years, as well as they are at primary level, do have not enough income and live in urban areas of Babylon Governorate.
2. Mother's pregnancy was cesarean section (C.S), and single delivered in a governmental hospital with antenatal care at risk to having child with hearing loss. In addition the mothers who have chronic diseases and medications taken through pregnancy.
3. More than half female children who aged three years old, they are at risk to have hearing loss . Also they are under weight and born with abnormal gestational age.
4. History of the child demonstrate that hearing impairment was come on slowly and in relation to previous health problems were did not complain of health problems in the previous months.
5. Genetically, parents who have hearing loss or deafness, they most likely to have children with the same disease.
6. Etiology in terms of ear infection is considered the most common cause of hearing loss and deafness.
7. Mother's age and economic status, it has negligible influence on their children who have hearing loss or deafness, as well as other risk factors like; their Place of delivery, antenatal care, and chronic diseases have affected their children.

6.2. Recommendations

Based on the findings above, the investigator has made the following recommendations:

1. Decision-makers in the health directorate must be on maternity and children's services, strict follow-up rules are offered.
2. Encouraging couples to use family planning options and keeping them informed about risky childbearing age groups.
3. Every health institution, hospital, and even private clinic suggest Family Support Services to prevent hearing loss
4. Strengthen mother and child health programs to avoid incidence of hearing problems , preterm, birth asphyxia, congenital CMV infection, and newborn jaundice.
5. Primary-care physicians and health-care professionals should be educated on the importance of ear illnesses, the necessity for early solutions to reduce hearing loss, and the treatment choices available.
6. To eliminate the stigma associated with hearing loss, raise knowledge about proper ear care habits that can reduce ear infection, the hazards of loud sounds, and among the general public.
7. It is recommended that more research be conducted to determine more causes and risk factors for different age groups and a larger sample that could include all governmental and nongovernmental centers in the country.

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Appendices

Appendix A

Administrative Arrangements

السيد المعاون العلمي المحترم

السيد رئيس فرع تـمريض صحة الام والوليد والطفل والمراهق المحترم
اللجنة العلمية والأخلاقيات المحترمون

م اخلاقيات البحث

يرجى التفضل بالموافقة على عرض موضوع (الماجستير) على اللجنة العلمية واخلاقيات البحث العلمي عن موضوع رسالتي الموسومة باللغة العربية (اسباب الخطورة و عواملها لضعف السمع و الصمم بين الاطفال دون سن الخامسة)

واللغة الإنكليزية
Causes and Risk Factors of Hearing Loss and Deafness among Children under
Five Years of Age

مع التقدير

توقيعه

اسم المشرف : أ.م.د. نهاد محمد قاسم الدوري

توقيعه

اسم الطالبة : رانيا عماد مطر

توقيعه

رئيس الفرع و توقيعه : م.د. وفاء أحمد

المعاون العلمي

المعاون العلمي : أ.م.د. نهاد محمد قاسم الدوري

ملاحظة: ترفق جميع الاستمارات الخاصة بلجنة اخلاقيات البحث مع الطلب. (Ethical form 1, Ethical form2, Ethical Form3)

Appendices

University of Babylon
College of Nursing
Research Ethics Committee



جامعة بابل
كلية التمريض
لجنة اخلاقيات البحث العلمي

Issue No:

Date: / /2022

Approval Letter

To,

Ranya Emad Mutar

The Research Ethics committee at the University of Babylon, College of Nursing has reviewed and discussed your application to conduct the research study entitled " Causes and Risk Factors of Hearing Loss and Deafness among Children under Five Years of Age"

The Following documents have been reviewed and approved:

1. Research protocol
2. Research instrument/s
3. Participant informed consent

Committee Decision.

The committee approves the study to be conducted in the presented form. The Research Ethics committee expects to be informed about any changes occurring during the study, any revision in the protocol and participant informed consent.


Prof. Dr. Salma K. Jihad
Chair Committee
College of Nursing
Research Ethical Committee
18 / 01 / 2022

UNIVERSITY OF BABYLON
COLLEGE OF NURSING

اللجنة اخلاقيات البحث العلمي

UNIVERSITY OF BABYLON
COLLEGE OF NURSING



Ref. No. :

Date: / /



العدد : ٥٨٢
التاريخ : ٢٠٢٢ / ٢ / ١

الى / هيئة رعاية ذوي الاعاقة والاحتياجات الخاصة/معهد الامل للصم والبكم
م/ تسهيل مهمة

تحية طيبة :
يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالبة الماجستير
(رانيا عماد مطير) لغرض جمع عينة دراسة الماجستير والخاصة بالبحث
الموسوم :

اسباب الخطورة وعواملها لضعف السمع والصمم بين الاطفال دون سن الخامسة.

Causes and Risk Factors of Hearing Loss and Deafness among Children under Five Years of Age.

مع الاحترام ...

الموافق لـ
بمجلس كلية التمريض
الكلية التمريضية
جامعة بابل



المرفقات //
• بروتوكول.
• استمارة.

معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢٢ / ٢ / ١

صورة على التي //
• مكتب السيد العميد للتفضل بالاطلاع مع الاحترام.
• لجنة الدراسات العليا
• الصادرة

E-mail:nursing@uobabylon.edu.iq



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الى / دائرة صحة بابل

دائرة الرعاية الاجتماعية

مركز التوحد في بابل

مركز الرحمة التخصصي

مركز بابل التخصصي والتأهيلي لرعاية التوحد - علاج النطق وبطئ التعلم

معهد رقية للسمع والتخاطب في بابل

معهد اوتزم بابل لذوي الاحتياجات الخاصة

مركز بابل للسمع والتخاطب

م/ تسهيل مهمة

العدد : ٤٩٦
التاريخ : ١٤٤١ / ١ / ٢٠٢٠

تحية طيبة :
يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالبة الماجستير
(رائيا عماد مطر) لغرض جمع عينة دراسة الماجستير والخاصة بالبحث
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Causes and Risk Factors of Hearing Loss and Deafness among Children under Five
Years of Age.

مع الاحترام ...

المرافقات //

- بروتوكول.
- استبانة.

كاملية
الاعمال العلمية

م.م. د. نهاد محمد قاسم الدوري
معاون العميد للشؤون العلمية والدراسات العليا

٢٠٢٢/١/٢٧

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- الصادرة .

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العدد : ٤٩٦
التاريخ : ١٤٤١ / ١ / ٢٧

تحية طيبة :

يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالبة الماجستير
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Causes and Risk Factors of Hearing Loss and Deafness among Children under Five
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مع الاحترام ...

المرافقات //

- بروتوكول.
- استبانة.

كامل
العماد
م. د. نهاد محمد قاسم الدوري

معاون العميد للشؤون العلمية والدراسات العليا

٢٠٢٢ / ١ / ٢٧

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مع الاحترام ...

المرافقات //

- بروتوكول.
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ا.م. د. نهاد محمد قاسم الدوري
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢٢ / ١ / ٢٧

صورة عنه الى //

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مع الاحترام ...

د. نهاد محمد قاسم الدوري

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للسمع والتخاطب / بابل

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٢٠٢٢/١/١٧

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٢٠٢٢ / ١٢ / ١٤

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• بروتوكول.
• استمارة.

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٢٠٢٢ / ١٢ / ١٤

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جمهورية العراق

<p>Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621</p>		<p>وزارة الصحة والبيئة دائرة صحة محافظة بابل المدير العام مركز التدريب والتنمية البشرية وحدة ادارة البحوث</p> <p>العدد: ١١٩ التاريخ: ٢٠٢٢ / ١ / ٢١</p>
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مستشفى الامام الصادق (ع)
مستشفى بابل للنسائية والاطفال
م / تسهيل مهمة

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

الملاءم عليه ...
أشارة إلى كتاب جامعة بابل /كلية التمريض / لجنة الدراسات العليا ذي العدد ٤٩٦ في
٢٠٢٢/١/٢٧
نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحثة طالبة الماجستير (رانيا
عماد مطر)
للتفضل بالاطلاع وتسهيل مهمة الموما اليه من خلال توقيع وختم استمارات اجراء البحث المرفقة
في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا اجراء اللازم
على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية مع الاحترام

خدمة التعليم الطبي المستمر
للمهاتم والاكاديميين

الملاحظات:
استمارة عدد ٢/

٢٨٦
الدكتور

محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
٢٠٢٢ / ١

صيدلاني
مجلس مهتمب جهاد
VISC Pharmaceuti

السيد مدير قسم الاقبال الإهم
يرجى بيان رأيكم بشأن تسهيل مهمة
الطالبة (رانيا عماد) وتكم الاستمارة

د. هيام محمد
دكتوراه تمريض
٢٠٢٢/١/٢٤

نسخة منه الي:

• مركز التدريب والتنمية البشرية / وحدة ادارة البحوث مع الأوليات ...

سزنان ١/٢١

جمهورية العراق

<p>Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621</p>		<p>وزارة الصحة والبيئة دائرة صحة محافظة بابل المدير العام مركز التدريب والتنمية البشرية وحدة ادارة البحوث</p> <p>العدد : ١١٩ التاريخ : ٢٠٢٢ / ١ / ٢١</p>
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إلى / مستشفى الأمام الصادق (ع)
مستشفى بابل للنسائية والاطفال
م/ تسهيل مهمة

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

السلام عليكم ...

أشارة إلى كتاب جامعة بابل /كلية التمريض / لجنة الدراسات العليا ذي العدد ٤٩٦ في ٢٠٢٢/١/٢٧
نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحثة طالبة الماجستير (رانيا عماد مطر)
للتفضل بالاطلاع وتسهيل مهمة الموما أليه من خلال توقيع وختم استمارات إجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا إجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية مع الاحترام

المدير المحترم
د. شيلا محمد الضحان
وحدة التعليم الطبي المستمر
مستشفى بابل للنسائية والاطفال

المرفقات :

استمارة عدد ٢/

السليم العبيد
+ الاشارة الى

١١٩
الدكتور

محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
٢٠٢٢ / ١

الدكتورة
زهراء جاسم السليمان
اختصاص في قلب متوارى

نسخة منه إلى :

• مركز التدريب والتنمية البشرية / وحدة ادارة البحوث مع الأوليات ...

سوزان ١/٢١

Appendices

<p>Ministry of Health Babylon Health Directorate Imam Sadiq General Hospital</p>	<p>جمهورية العراق  وزارة الصحة العراقية Ministry of Health of Iraq</p>	<p>وزارة الصحة دائرة صحة بابل مستشفى الامام الصادق (ع) شعبة الموارد المالية والادارية وحدة الموارد البشرية العدد: ٢٩٤٤ التاريخ: ٢٠٢٢ / ١٦</p>
<p>إلى/ دائرة صحة محافظة بابل / المدير العام/مركز التدريب والتنمية البشرية/وحدة ادارة البحوث م/ تسهيل مهمة</p> <p>تحية طيبة</p> <p>اشارة الى كتابكم ذي العدد ١١٩ في ٢٠٢٢/١/٣١ لا مانع لدينا من تسهيل مهمة الطالبة (رانيا عماد مطر) لإتمام بحثها في مستشفىنا قدر تعلق الامر بنا وحسب الضوابط على أن لا تتحمل مستشفىنا أي تبعات مالية أو قانونية. للتفضل بالاطلاع مع الاحترام</p> <p> صيدلاني مدير مستشفى الإمام الصادق (ع) التعليمي ٢٠٢٢ / ١٦</p> <p></p> <p>نسخة منه الى</p> <ul style="list-style-type: none">• مكتب مدير المستشفى• وحدة التدريب والبحوث• قسم الاطفال		

جمهورية العراق

Ministry Of Health
Babylon Health Directorate
Email:-
Babel_Healthmoh@yahoo.com
Tel:282628 or 282621

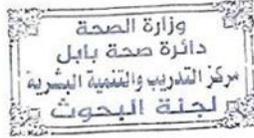


وزارة الصحة والبيئة
دائرة صحة محافظة بابل
المدير العام
مركز التدريب والتنمية البشرية
لجنة البحوث

استمارة رقم :- ٢٠٢١/٠٣

رقم القرار :- ٢٠٢٢/٢٧

تاريخ القرار :- ٢٠٢٢/٢٧



قرار لجنة البحوث

تحية طيبة ...

درست لجنة البحوث في دائرة صحة بابل مشروع البحث ذي الرقم (٢٠٢١/٠١٩/بابل) المعنون (أسباب الخطورة وعواملها لضعف السمع والصمم بين الأطفال دون سن الخامسة) والمقدم من الباحثة (رانيا عماد مطر) إلى وحدة إدارة البحوث والمعرفي مركز التدريب والتنمية البشرية في دائرة صحة بابل بتاريخ ٢٠٢٢/٢٧ وقررت :

قبول مشروع البحث أعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة .

مع الاحترام

الدكتور / محمد عبد الله عجرش
رئيس لجنة البحوث
٢٠٢٢ / /

نسخة منه إلى :

● مكتب المدير العام / مركز التدريب والتنمية البشرية / وحدة إدارة البحوث ... مع الأوليات.

سوزان

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز babiltraining@gmail.com

Appendices

Appendix B

Distribution of selected hospitals and private centers according to geographical location and available sample.

No.	Names of Hospitals	The location
1	Al_Imam Sadiq Teaching Hospital	The Center of Babylon
2	Babil Teaching Hospital for maternal and children	
3	Ruqayya Institute of Hearing and Speech	
4	Autism Center	
5	Babel Specialized and Rehabilitation Center for Autism Care, Speech Therapy and Slow Learning	

Appendices

6	Autism Babylon Institute for People with Special Needs1	
7	Autism Babylon Institute for People with Special Needs2	The North of Babylon

Appendix C

**Causes and risk factors of hearing loss and deafness
among children under five years of age**

Part I: Mother demographic characteristics (Maternal Risk factors):

1.1. Mother age: Year

1.2. Educational level:

a. Unable to read and write

b. Primary level

c. Secondary or above

d. Diploma or above

1.3. Economic status: a. enough

b. not enough

1.4. Residence : a. Urban

b. Rural

part II: Mothers obstetric and gynecological history (Maternal risk factors).

2.1. Pregnancy duration : week

2.2. Mode of delivery :

Appendices

a. Normal vaginal delivery (N.V.D)

b. Caesarean section (C.S)

2.3. Birth Plurality :

a. Single

b. Multiple pregnancy

2.4. Place of delivery : a. Governmental

b. Private hospital

c. Home

d. Other

2.5. Do you have schedule visiting for Antenatal care ?

a. Yes b. No

If the answer is yes , where was the follow up ?

Health center

private clinic

Hospital

2.6. Have you had any chronic diseases ?

a. Yes

b. No

2.7. Have you had any medications taken through pregnancy ?

Appendices

a. Yes

b .No

Part III : Demographic characteristic of the child (child risk factor):

3.1. Child age

Year Month Week

3.2. child weight kg

3.3. Gender : a . Male

b. Female

3.4. History of the child

a. Which ear does not hear well ? (circle one)

Left Right Both

b. Did you hearing come on : (circle one)

Slowly Suddenly

c. Has your child had an ear surgery in the past ?

Yes No

d. Did you ever have a bad concussion , or other head injury , that caused drainage from you ear or hearing loss ?

Yes No

e. Has your child complained of health problems in the previous months?

Yes No

3.5. Genetic history :

Appendices

a. Dose one of the parents have a family history of hearing loss ?

Yes No

b. Are there siblings of your child with hearing loss or deafness ?

Yes No

c. Does your child suffer from genetic diseases ?

Yes No

If the answer is yes , please mention the name of the disease

Part IV : Causes of hearing loss and deafness among children under five years old :

4.1. Medical history

a. Did your child ever have recurrent of ear infections ?

Yes No

b. Did your child ever have meningitis ?

Yes No

c. Did your child have diabetes ?

Yes No

d. Did your child have thyroid problems ?

Yes No

e. Did your child have birth asphyxia?

Yes No

Appendices

f. Did your child have recurrent of respiratory ?

yes No

g. Did your child have any problem led to elevated bilirubin ?

yes No

4.2. Medication history

a. Have your child ever been hospitalized and given an antibiotic directly or indirectly in his /her veins ?

Yes No

b. Did the mother take aspirin during pregnancy or breast feeding?

Yes No

c. Did your child take any medication on a daily basis?

Yes No

4.3. Sign and symptoms

a. Did your child have tinnitus and noise in the ear ?

Yes No

b. Did your child always feel dizzy ?

Yes No

c. Since when did you feel that your child has a hearing loss ?

days week month year

اسباب الخطورة وعواملها لضعف السمع و الصمم بين الاطفال دون سن الخامسة

الجزء الاول : البيانات الديموغرافية و الاجتماعية للأمهات (عوامل الخطورة للام):

1.1 عمر الام سنة

2.1. المستوى التعليمي

أ. لا يقرأ ولا يكتب

ب. ابتدائية

ج. متوسطة او اعلى

د. معهد او اعلى

3.1. الدخل الشهري و الحالة الاقتصادية أ. كافي

ب. كافية الى حد ما

4.1. السكن :- أ. مدينة

ب. ريف

الجزء الثاني : تاريخ الولادة

2.1. مدة الحمل أسبوع

2.2. نوع الولادة : أ. ولادة قيصرية

ب. ولادة طبيعية

3.2. نتائج الحمل : أ. ولادة منفردة

ب. ولادة متعددة

4.2. مكان الولادة : أ. مستشفى حكومي

ب. مستشفى اهلي

Appendices

ج. في البيت

د. أخرى

5.2. المتابعة خلال الحمل : أ. نعم

ب. لا

ان كان الجواب نعم ، اين كانت المتابعة : مركز صحي

عيادة خاصة

المستشفى

2.6. هل تعرضت لأمراض مزمنة ؟ أ. نعم

ب. لا

2.7. هل تناولت أي دواء أثناء الحمل ؟ أ. نعم

ب. لا

الجزء الثالث :- الخصائص الديموغرافية للطفل (عوامل الخطورة للطفل) :

1.3. عمر الطفل :- سنة شهر أسبوع

2.3. وزن الطفل كغم

3.3. جنس الطفل أ. ذكر

ب. أنثى

4.3. التاريخ الطفل

أ. أي أذن لا يسمع بها جيدا ؟

كلاهما اليمنى اليسرى

ب. كيف كانت بداية ضعف السمع ؟

تدرجيا مفاجئ

ج. هل تعرض طفلك لعملية في الأذن في الماضي؟

نعم لا

د. هل أصاب طفلك من قبل بارتجاج شديد أو إصابة أخرى في الرأس تسببت في إفرازات من أذنه أو فقدان سمعه؟

Appendices

نعم لا
ه. هل اشتكى طفلك من مشكلات صحية في الاشهر السابقة؟

نعم لا

5.3. التاريخ الوراثي

أ. هل لدى احد الوالدين تاريخ أسري في ضعف السمع؟

نعم لا

ب. هل هنالك أشقاء لطفلك مصابين بصعف السمع أو الصمم؟

نعم لا

ج. هل يعاني طفلك من امراض وراثية؟

نعم لا

إذا كان الجواب نعم يرجى ذكر اسم المرض

الجزء الرابع : أسباب فقدان السمع و الصمم لدى الاطفال دون سن الخامسة :-

1.4. التاريخ المرضي

أ. هل الطفل يعاني من التهاب الاذن المتكرر؟ نعم لا

ب. هل كان الطفل يعاني من السحايا؟ نعم لا

ج. هل الطفل يعاني من داء السكري؟ نعم لا

د. هل الطفل لديه مشاكل في الغدة الدرقية؟ نعم لا

ه. هل كان الطفل يعاني من الاختناق الولادي؟ نعم لا

و. هل كان طفلك يعاني من اضطرابات الجهاز التنفسي المتكررة؟ نعم لا

ز. هل يعاني طفلك من مشكلة أدت الى ارتفاع نسبة البيليروبين؟ نعم لا

2.4. الادوية

أ. هل دخل طفلك المستشفى سابقا و قد اعطي مضادات حيوية بصورة مباشرة أو غير مباشرة في الوريد؟ نعم لا

ب. هل اخذت الام الاسبرين خلال فترة الحمل او الرضاعة؟ نعم لا

ج. هل طفلك يأخذ علاجات يومية وبصورة مستمرة؟ نعم لا

Appendices

3.4. علامات و الأعراض

أ. هل لدى طفلك طنين او ضوضاء في الاذن؟ نعم لا

ب. هل يشعر طفلك بالدوار دائما؟ نعم لا

ج. منذ متى شعرت ان طفلك يعاني من ضعف السمع؟

سنة يوم اسبوع شهر

Appendix D

خبراء تحكيم الاستبانة

ت	اسم الخبير	الاختصاص	اللقب العلمي	مكان العمل	سنوات الخبرة
1	د. أمين عجيل الياصري	تمريض صحة الاسرة والمجتمع	استاذ	جامعة بابل/ كلية التمريض	37
2	د. سجاد هاشم محمد	تمريض الصحة النفسية والعقلية	استاذ	استاذ متمرس/ جامعة بابل/ كلية التمريض	40
3	د. عفيفة رضا عزيز	تمريض صحة الطفل والمراهق	استاذ	جامعة بغداد/ كلية التمريض	40
4	د. سلمى كاظم جهاد	تمريض صحة المجتمع	استاذ	جامعة بابل/ كلية التمريض	37
5	د. يحيى عبد الشهيد الطفيلي	طب اطفال	استاذ	جامعة بابل /كلية الطب	36
6	د. عبد المهدي عبد الرضا	تمريض الصحة النفسية والعقلية	استاذ	جامعة بابل/ كلية التمريض	43
7	د. خميس بندر عبيد	تمريض الاطفال	استاذ	جامعة كربلاء/ كلية التمريض	21
8	د. محمد باقر حسن آل دخيل	تمريض الاطفال	استاذ مساعد	جامعة الكوفة/ كلية التمريض	18
9	د. سحر ادهم	تمريض البالغين	استاذ مساعد	جامعة بابل / كلية التمريض	27
10	د. صافي داخل نوام	تمريض الصحة النفسية والعقلية	استاذ مساعد	جامعة كربلاء/ كلية التمريض	15
11	د. عذراء حسين شوق	تمريض الاطفال	استاذ مساعد	جامعة بغداد/ كلية التمريض	17
12	د. أحمد عبدالله عبد الحسيناوي	تمريض الاطفال	استاذ مساعد	جامعة ذي قار/ كلية التمريض	13
13	د. ناجي ياسر سعدون	تمريض صحة مجتمع	استاذ مساعد	جامعة بابل / كلية التمريض	33
14	د. ماهر خضير هاشم	اللغة العربية	استاذ مساعد	جامعة بابل / كلية التمريض	15
15	د. حسن علي حسين	تمريض الصحة	استاذ مساعد	جامعة بغداد/ كلية التمريض	20

Appendices

			النفسية والعقلية		
15	جامعة بابل/ كلية التمريض	استاذ مساعد	تمريض صحة الام و الوليد	د. وفاء أحمد امين	16
14	جامعة بغداد / كلية التمريض	استاذ مساعد	تمريض الصحة النفسية و العقلية	د. قحطان قاسم محمد	17
11	جامعة بابل / كلية التمريض	مدرس	تمريض الصحة النفسية و العقلية	د. علي احمد كاظم الحطاب	18
10	جامعة بابل /كلية الطب	مدرس	طب الاطفال	د. أحمد عبد المحسن فخري	19

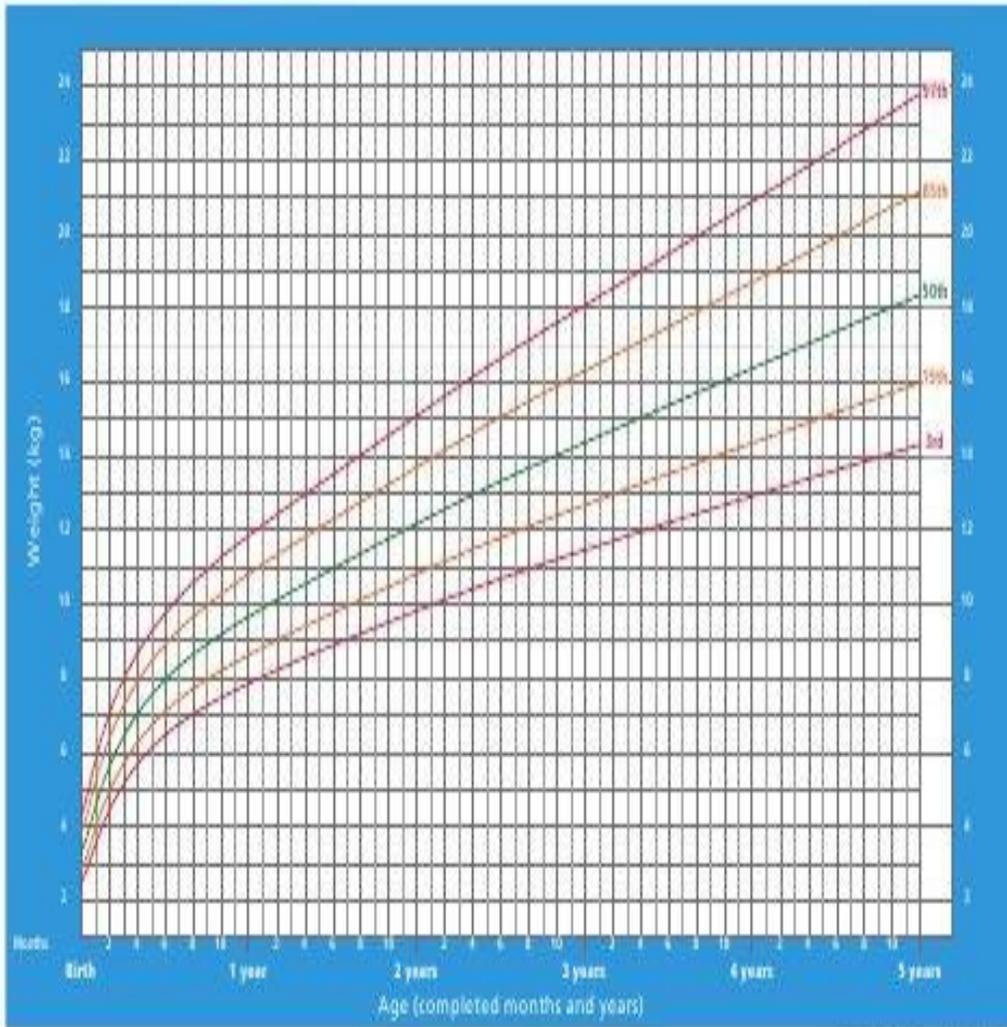
Appendices

Appendix E

Growth Chart

Weight-for-age BOYS

Birth to 5 years (percentiles)

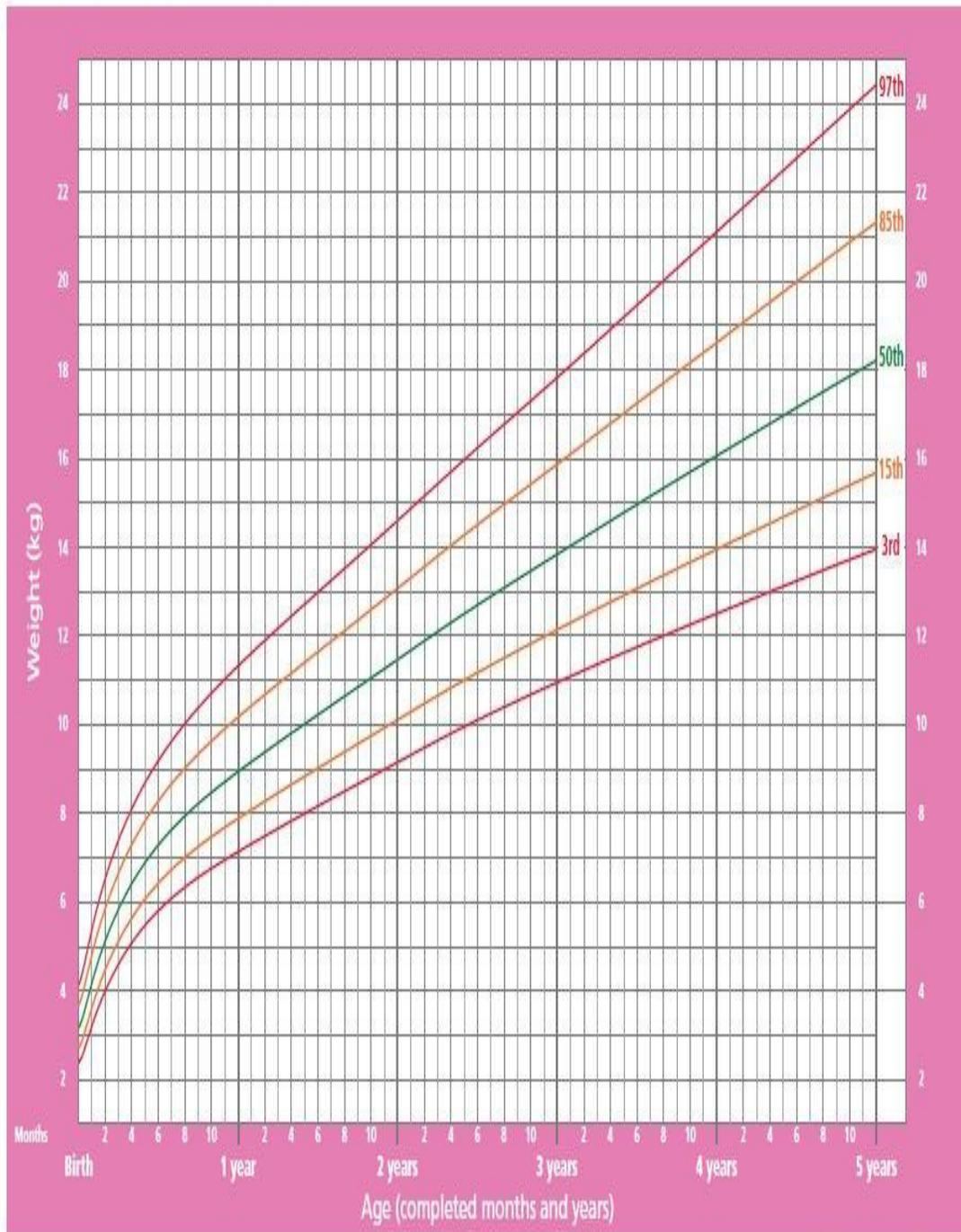


WHO Child Growth Standards

Weight-for-age GIRLS



Birth to 5 years (percentiles)



Appendix F

Linguistic Approval

Ministry of Higher Education and Scientific Research
جامعة البصرة
وزارة التعليم العالي والبحث العلمي

University of Babylon
College of Education for Human Sciences
جامعة بابل
كلية التربية للعلوم الانسانية



Ref. No :
Date:

العدد ٥٤٥٥
التاريخ ٦ / ٢٩ / ٢٠٢١



الم/ جامعة بابل / عمادة كلية التربية / مكتب السيد معاون العميد للشؤون العلمية المحترم
م/ اعادة رسالة
تحية طيبة:
نعيد اليكم رسالة طالبة الماجستير (رانيا عماد مطر صالح) في كليتكم بعد تقويمها لغويًا ولأسلوبيًا
(أ.د. قاسم عبيس دعيم) من قسم اللغة الانكليزية في كليتنا. نأمل من الباحثة الالتزام بالملاحظات
المتبته على متن الرسالة .

أ.د. اسامة كاظم عمران
معاون العميد للشؤون العلمية
والدراسات والعليا



م. علي المذبح
ابراهيم
Amour

نسخة منه الي
- الدراسات العليا .
- الصادرة -

الخلاصة

فقدان السمع هو عدم القدرة على السمع. هناك احتمالية لضعف السمع الخفيف والمتوسط والشديد ، مما يؤثر على الصحة البدنية والاجتماعية والنفسية ، ويضعف التعليم والاندماج الاجتماعي. نتيجة لذلك ، يكون التعرف على الأطفال الذين يعانون من ضعف السمع مبكرًا وتقديم التدخلات المناسبة مفيدًا للغاية.

تهدف هذه الدراسة إلى معرفة أسباب وعوامل الخطورة لفقدان السمع والصمم وانتشاره بين الأطفال دون سن الخامسة ومعرفة العلاقة بين فقدان السمع والصمم مع بعض البيانات الديموغرافية المتعلقة بالأطفال وأمهاتهم.

تم استخدام تصميم الدراسة الوصفية المقطعية خلال الفترة من 19 تشرين الأول 2021 إلى 8 حزيران 2022. أجريت هذه الدراسة في محافظة بابل على (150) مريض يعانون من ضعف السمع والصمم في مستشفى بابل التعليمي للنساء والأطفال ، مستشفى الإمام الصادق التعليمي وجميع مراكز ضعف السمع والصمم الخاصة. تم اختيار الأطفال الذين تقل أعمارهم عن خمس سنوات. تم جمع البيانات باستخدام مقياس إلكتروني واستبيان معدل وتحليلها إلكترونيًا باستخدام SPSS26.

أظهرت الدراسة ان غالبية الأطفال هم دون الخمس سنوات بمتوسط عمر ثلاث سنوات وأكثر من النصف هم من الإناث. وأظهرت الدراسة أن السبب العام لأكثر من ثلاثة أرباع العينة هو التهاب الأذن ، بينما كان عامل الخطر العام لأكثر من ثلثي العينة مرض وراثي. أما الأمهات فتتراوح أعمارهن بين (16-55) سنة بمتوسط أعمار خمس و ثلاثون سنة.

خلصت الدراسة إلى وجود علاقة ذات دلالة إحصائية بين الخصائص الديموغرافية للأم وأبنائها. و يوصى بتنقيف أطباء الرعاية الأولية والمتخصصين في الرعاية الصحية حول أهمية أمراض الأذن ، وضرورة الحلول المبكرة لتقليل فقدان السمع ، وخيارات العلاج المتاحة ، وكذلك يجب على كل مؤسسة صحية ومستشفى وحتى عيادة خاصة ، تشمل خدمات دعم الأسرة لمنع فقدان السمع.



وزارة التعليم العالي والبحث العلمي

جامعة بابل

كلية التمريض

أسباب الخطورة وعواملها لضعف السمع والصمم بين
الاطفال دون سن الخامسة

رسالة تقدم بها الطالب

رانيا عماد مطر

جامعة بابل / كلية التمريض / تمريض صحة الطفل

وهي جزء من متطلبات نيل درجة الماجستير علوم في التمريض

إشراف

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