How to Cite:

Mutar, R. E., & Aldoori, N. M. (2022). Causes of hearing loss and deafness among children under five years of age. *International Journal of Health Sciences*, *6*(S8), 897–907. https://doi.org/10.53730/ijhs.v6nS8.9860

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

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Abstract---Background: Hearing loss is defined as the inability to hear. There is also the 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. Aims: to identify the causes for hearing loss and deafness and to know the relationship between hearing loss and deafness with some demographic data related to children and their mothers. Methods: A cross-sectional descriptive study design was used during the period from 2nd February 2022 to 2nd May 2022. This study was conducted in Babil Governorate on (150) patients suffering from hearing loss and deafness in Babel Teaching Hospital for Women and Children, Imam Al-Sadiq Teaching Hospital and all private hearing loss and deafness centers. Children under the age of five years were selected. Data were collected using an electronic scale, non-stretch measuring and modified questionnaire and tape, analyzed electronically using SPSS 26. Results: The majority of children are between the ages of (less than one year - 5) years with an average age of (3) and more than half are females. The study showed that the general cause for more than three-quarters of the sample was ear infection, while the general risk factor for more than two-thirds of the sample was genetic disease. As for the mothers, their ages ranged between (16-55) years, with an average age of (35) years. There is a significant relationship between hearing loss and deafness and some maternal demographic, obstetric, and gynecological history, while there is a non-significant ant relationship between hearing loss and deafness and the demographic data of any child. Conclusions:. After all, there a statistically significant relationship between the demographic characteristics of the mother and their children. More

Manuscript submitted: 27 March 2022, Manuscript revised: 9 May 2022, Accepted for publication: 18 June 2022

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.

research is recommended to investigate hearing impairment and deafness of different age groups and a larger sample that could include all centers in the country.

Keywords---hearing loss, deafness, children, causes.

Introduction

Hearing loss is hearing deficiency when both ears have 20 dB or above hearing levels. There is also a possibility of slight, medium, acute, and intense loss of hearing, and 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 [1]. Hearing loss in children is a broad term that refers to a variety of conditions. Decibels is unit to measuring hearing, and hearing thresholds are used determination the severity loss of hearing .The typical audible domain that hears sounds quieter than soft voices is 0-20 decibels. Measurements of vocal impairment are classified into slight vocal impairment that ranges from 20 - 39 decibels, moderate hearing loss 40-69 decibels, severe hearing loss is 70-89 decibels, and intense vocal is impairment is greater than 90 decibels [2]. About 360 million around the world people, as well as around 5% population of the world, have hearing disabling, and around 32 million children from them [3]. According to the most recent data, around 78 million people in the Arab world suffer from hearing loss, and Persons in the Eastern Mediterranean Region who suffer from loss of hearing are predicted to elevate 194 million[4]. At least 1 to 2 children out of 1000 are born with permanent hearing loss, which has serious consequences for their progress [5].

There are the three main forms of hearing loss Conductive, sensor-neural, and mixed hearing loss [6]. Hearing loss is treated differently depending on the cause and kind of hearing loss [7]. Hearing loss has negative consequences on children's language, speech, schooling, social function, capacities of cognitive, as well as to life quality[8]. 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 [9]. 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 [10].

Methodology

Design and Sampling

A quantitative, descriptive cross-sectional study design research was carried throughout the present study to identify causes of hearing loss and deafness and find out associations between hearing loss and deafness with certain demographic data related to children and their mothers in Babylon province through the period from February 2 to May 2, 2022. A Purposively (non-probability) sample 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.

Data Collection

The data was collected by using a questionnaire, which was constructed and developed as a tool for data collection. The questionnaire includes three parts; the first part was socio-demographic data of mothers. The second part is comprised of mothers' Obstetric and Gynecological history. The third part consists of child demographic data . The last part is composed of Causes of hearing loss and deafness among children under five years old.

Data Analysis

The data of the present study analyzed electronically via the Statistical program (SPSS) version 26. The method that used in this program aimed to find out the descriptive and inferential statistics such as frequencies, percentage, chi-square and T-test by entering data in order to achieve the objectives of the study.

Results

Demographical data	Frequency	Percentage %			
Mother age	Iother age 16-25		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		

Table (1): Mother demographic characteristics (N =150)

Obstetric and Gynecologica	Frequency	Percentage %	
Pregnancy duration	ration Preterm		52.7
	Full term	64	42.7
	Post term	7	4.7
	Total		
Mode of delivery	Normal vaginal delivery (N.V.D)	73	48.7
	Caesarean section (C.S)		51.3
Total		150	100.0
Birth Plurality	Single	91	60.7
Multiple pregnancy Total		59	39.3
		150	100.0
Place of delivery Governmental		73	48.7
	Private hospital	58	38.7
Home		18	12.0
	Other	1	0.7
	150	100.0	

Table (2): Mothers obstetric and gynecological history

Table (3) Children Distribution According to their Demographic characteristic

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

Table (4) The causes related to medication history

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

		Frequency	Percentage %
Did your child ever have a lot 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	Yes	101	67.3
bilirubin ?	No	49	32.7
	Total	150	100.0

Table (5) The causes related to medical history

Table (6) Hearing loss and deafness in relation to mothers and their child demographic data

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

902
<i>702</i>

Total		36	43	71	150
Residence	Urban	17	29	33	$X^2 = 5.284$
	Rural	19	14	38	Df= 2 p-value = 0.041 (Sig.)
Total		36	43	71	150
Pregnancy	Preterm	19	25	35	$X^2 = 3.356$
duration	Full term	15	18	31	Df= 4
	Post term	2	0	5	p-value = 0.5 (N.S)
Total	Total		43	71	150
Mode of delivery	Normal vaginal delivery (N.V.D)	16	21	36	X ² = .375 Df= 2
	Caesarean section (C.S)	20	22	35	p-value = .829 (N.S)
Total		36	43	71	150
Birth Plurality	Single	20	21	50	X ² = 5.748
	Multiple pregnancy	16	22	21	Df= 2 p-value = .056 (N.S)
Total		36	43	71	150
Place of delivery	Governmental	15	20	38	X ² = 19.061
	Private hospital	20	21	17	Df= 6
	Home	1	2	15	p-value = 0 .004
	Other	0	0	1	(H.S)
Total		36	43	71	150

B. Child		Which hear we	ear doe: 11 ?	s not	Chi-Square Tests
		Left	Right	Both	
Child age	Less than one	3	2	5	X ² = 9.256
	year	5	2	5	Df= 8
	1.00	5	4	7	p-value = 0.321
	2.00	8	11	12	(N.S)
	3.00	14	17	19	
	4.00	6	9	28	
Total		36	43	71	150
Gender	Male	21	15	33	$X^2 = 4.350$
	Female				Df= 2
		15	28	38	p-value = 0 .114
					(N.S)
Total		36	43	71	150

 X^2 = Chi-square ,Sig = significance, N.S = non significance, H.S= highly significance P value ≤ 0.05

Discussion

Children loss of hearing remain 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 [11].

Mothers Demographic Characteristics

The current study is shown in Table (1) 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. As well their educational level revealed that more than a quarter is a primary level, more than half of the mother's financial income was insufficient, and more than half of the mothers live in urban areas ^{[12][13]}. 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. Low and middle incomes have limited access to certain diagnostic services due to a lack of diagnostic services and specialized intervention.

Mothers obstetric and gynecological history

Table (2) revealed that more than half of the gestation period was preterm and in terms of mode of delivery more than three-quarters of mothers who underwent a cesarean section (C.S), also that less than two-thirds of the sample was one birth at government hospitals ^{[20][18][14][15][16][17][19]}. 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.

Descriptive statistics of Demographic characteristic of the child

Table (3) revealed that about one-third of child age was 3 years and more than half were female [21][22][23][24][25][26][27]. Accordingly, this has a significant detrimental influence on the development and results of hearing-impaired children.

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

The causes related to medication history

Table (4) illustrates that more than two-thirds of the child has ever been hospitalized and given an antibiotic directly or indirectly in their veins, while less than half of mothers take aspirin during pregnancy or breastfeeding. Finally, there are less than Two-fifths of children take any medication on a daily basis^{[28][29][30]}. In children, several aminoglycoside antibiotics can induce deafness

and frequently Antibiotics are administered through injection they should only be used in the case of life-threatening illnesses.

The causes related to medical history

Table (5) Displays that more than two-thirds of children have an ear infection. Untreated middle-ear illness seems to be a more unique physical health problem ^[33]. As well as the current study results display that One-third of children has meningitis^[20]. 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 with poor diabetes management because there is One-quarter of the children have diabetes^[27].

One-third of children who have thyroid problems. The study also shows that more than half of the child has birth asphyxia. And more than half of children have a lot of respiratory problems^[30].Lastly, study shows that more than two-thirds of the children have a problem led to elevated bilirubin. The researcher's point of view is that jaundice in 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 ^{[29] [15] [16]}

Hearing loss and deafness in relation to demographic data of mothers and their children

The result of the current study as presented in (table 6) demonstrates that a large and extremely significant link exists between hearing loss and deafness and some mothers demographical data. In addition, the study demonstrates that a large and extremely significant link exists between hearing loss and deafness and some mothers' Obstetric and Gynecological history. Finally, the study demonstrates no statistically significant link between hearing loss and deafness and any child demographical data ^{[27][6]}.

Conclusion

The study reaches the following conclusions based on the interpretation and discussion of the study findings that there is a statistically significant relationship between the demographic characteristics of the mother and their children. Etiology in terms of ear infection is considered the most common cause of hearing loss and deafness.

Recommendation

Every health institution, hospital, and even private clinic should include Family Support Services to prevent hearing loss, and 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. As well as it is recommended that more research be conducted to determine more causes and risk factors for different age groups and a larger

904

sample that could include all governmental and nongovernmental centers in the country.

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