ORİJİNAL ARAŞTIRMA ORIGINAL RESEARCH

DOI: 10.24179/kbbbbc.2022-88444

Evaluation of Children with Hearing Loss in a Special Education Centre in Mardin by TEDIL-3 Test

Mardin'de Bir Özel Eğitim Merkezinde İşitme Kayıplı Çocukların TEDİL-3 Testi ile Değerlendirilmesi

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ABSTRACT Objective: To assess the conditions based on Early Language Development Test (TEDIL-3) scores after rehabilitation in children with hearing loss who continue special education in a single centre in Mardin, a city in southeast Türkiye. **Material and Methods:** Demography, auditory findings, depression status of 53 (53% male, 47% female, aged 3-7 years) children, given a special education, in July and October 2021, were evaluated by TEDIL-3 test. Group P consisted of patients with scores above average and F group consist of children having scores below average on the TEDIL-3 test. Scores in different characteristics and between groups were compared with analysis of correlations and factor analysis. **Results:** As a result of the study, 30 (57%) children have been found to be in Group P, 23 (43%) of them in Group F. Statistical significance and higher scores were seen in children with families with monolanguage than bilanguage ($p<0.05$). Diagnosis age was higher in Group F (mean±SD; 18.5±18.1) than group P (mean±SD; 7.5±11.4). Cochlear implant age was correlated with diagnostic age ($p=0.013$, $n=35$, $r=0.64$). Although neonatal hearing screening (NHS) does not have prognostic significance, in the NHS, 41.5% of children were false positives and 7.5% of them had no application to NHS ($p>0.05$). **Conclusion:** Bilingualism and the higher age of diagnosis in hearing loss are major negative factors that we encounter in the auditory rehabilitation by TEDIL scores in Mardin. Correct and compulsory implementation in NHS and raising awareness on both issues will contribute to auditory rehabilitaion in children in Mardin.

Keywords: Rehabilitation; hearing loss; demography; cochlear implantation

ÖZET Amaç: Türkiye'nin güneydoğusunda bir şehir olan Mardin'de, tek merkezde özel eğitime devam eden işitme kayıplı çocuklarda rehabilitasyon sonrası Erken Dil Gelişim Testi [Early Language Development Test (TEDIL-3)] skorları üzerinden durum değerlendirmesi yapmaktır. **Gereç ve Yöntemler:** Temmuz ve Ekim 2021 tarihleri arasında özel eğitim verilen 53 (%53 erkek, %47 kadın, 3-7 yaş arası) çocuğun demografi, işitsel bulgular, depresyon durumu TEDIL-3 testi üzerinden etkisi araştırıldı. Grup P, TEDIL-3 testinde ortalamanın üzerinde puan alan hastalardan, F grubu ise ortalamanın altında puan alan çocuklardan oluşturuldu. Farklı özelliklerde ve gruplar arası skorlar korelasyon ve faktör analizi ile karşılaştırıldı. **Bulgular:** Çalışma sonucunda, 30 (%57) çocuk P grubunda, 23 (%43) çocuk F grubunda bulundu. Tek dilli ailelerin çocuklarında 2 dilli ailelere göre istatistiksel anlamlı derecede skorlar daha yüksek görüldü ($p<0,05$). Teşhis yaşı; F grubunda (ortalama±SS; 18,5±18,1) istatistiki olarak P grubundan (ortalama±SS; 7,5±11,4) daha yüksek bulundu ($p>0,05$). Koklear implant yaşı, tanı yaşı ile korele idi ($p=0,013$, $n=35$, $r=0,64$). Yenidoğan işitme taramasının (YIT) prognostik önemi olmasına rağmen YIT'de çocukların %41,5'i yanlış pozitifti ve %7,5'inin YIT'ye başvurusu yoktu ($p>0,05$). **Sonuç:** İki dillilik ve ileri tanı yaşı, Mardin'de TEDIL skorları üzerinden işitsel rehabilitasyonda karşımıza çıkan olumsuz faktörlerdendir. YIT'de doğru ve zorunlu uygulanması ve her iki konuda bilinçlendirme, çocuklarda işitsel rehabilitasyona katkı sağlayacaktır.

Anahtar Kelimeler: Rehabilitasyon; işitme kaybı; demografi; koklear implantasyon

Hearing loss (HL) inhibits the development of auditory and speech capabilities in children. Early rehabilitation of HL leads to better performance in language, academic and social development. A timely and suitable diagnosis is essential to obtain better results. Severe to profound bilateral sensorineural HL (SNHL) can be managed by cochlear implantation (CI, unilateral or bilateral). Mild to moderate bilateral SNHL is easier to overcome with conventional hearing aids if started early.[1] The BAHA system has

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Peer review under responsibility of Journal of Ear Nose Throat and Head Neck Surgery.

Received: 7 Feb 2022 ***Received in revised form:*** 01 Apr 2022 ***Accepted:*** 06 May 2022 ***Available online:*** 07 Jul 2022

been proven successful in rehabilitating children with conductive HL who are unable to wear hearing aids for particular reasons.[2]

Rehabilitation is the restoration of a skill that is lost. Since hearing-related abilities have not been developed in children, the term habilitation instead of rehabilitation is more suitable. The habilitation/rehabilitation services in HL for children typically involve training in auditory perception, teaching visual cues, improving speech and language, managing communication and hearing aids and assistive listening devices. Specific services are given to children; in early intervention and school services through the Individuals with Disabilities Education Act. Early intervention services are given between 0-3 years. It is an individualized family service plan, including audiology, speech-language pathology services, and the services of teachers of the deaf and hard of hearing, etc. School service or individualized education programs take part between the ages of 3-21 years. It is a special education aimed at maximizing the child's success in his educational life or canalizing the child to postsecondary education programs (vocational, higher education, technical) by audiologists and teachers of deaf and hard hearing, etc.[3]

In our country, once a child with HL has been diagnosed medically, a disability health report is given. Then infants with HL apply to the Guidance Research Centre (GRC). GRC directs children to special schooling centres.[4] In these circumstances, factors like the age at which amplification begins, type and degree of HL, motivation, socioeconomic influences, etc. affect gain in rehabilitation, which is multidisciplinary learning in which the household is also involved.[5,6] Therefore, we evaluated the relationship of features of children with HL like age, gender, socioeconomic status of a family, age of onset of HL, CI, etc. in a single hearing rehabilitation centre in Mardin and scores of children in Test of Early Language Development-3 (TEDIL-3). Our goal is to evaluate situation of auditory rehabilitation in Mardin in a single centre by TEDIL-3 test.

MATERIAL AND METHODS

This study was conducted under the ethical principles stated in the Declaration of Helsinki and was approved by the Ethical Committee of Non-invasive Clinical Research of Mardin Artuklu University (date: December 13, 2021, no: 2021/3). All procedures performed in the study followed relevant ethical guidelines, and written informed consent was obtained from all participants and the parents of them. Patients who were unwilling to take part in the study, who were <3 and >7 years old, were excluded.

In this study, a total of 53 children who are attending a single hearing rehabilitation centre with moderate to very severe SNHL were allocated to the study. They had 4 (7.5%) moderate, 5 (9.4%) moderate-severe, 11 (20.8%) severe, 33 (62.3%) very severe HL. Mean chronological age of children were 5.49±1.13 (range 3-7years). Of them 25 (47.2%) were female, 28 (52.8%) were male. One (1.9%) child had a physical disability, 2 (3.8%) children had face-nail anomaly, 2 (3.8%) had severe loss of visual acuity. Nineteen (35.8%) children were using a hearing aid (HA). Others were using a CI. Eleven of children (20.8%) had bilateral CI, 23 (43.4%) of them had CI on the right side. Mean of diagnosis age of children were 12.33±15.59 months (minimum-maximum; 0-60 months). Mean age of CI was 32.23±15.79 months (minimum-maximum; 12-66 months).

TEDIL-3 testing was performed at routine follow-up of the child during the rehabilitation program by the teaching audiologist. The test consists of A and B, forms each with a 37-item receptive language part and a 39-item expressive language part.[7] The test also includes verbal instructions to the child, stimulus objects, or pictures to which the child is asked to respond to TEDIL-3 scores are presented as standard scores represented as a combined score which are calculated by receptive and expressive subtest scores. The TEDIL-3 scoring system is as follows: Based on combined score, scoring ranges from 35-165 points. Points 35-69 are very poor, 70-79 weak/poor, 80-89 below average, 90-110 average, 111-120 above average, 121-130 good, and 131-165 are very good.[8,9] In this study, the scoring of combined score above 90 was accepted as successful and attended group P. A score below 90 was accepted failed and attend to group F in children in the rehabilitation program.

Demographic data including gender, family income, the education level of mother and father, the job of the mother and father, children number in family, language at home (monolanguage/bilanguage), consanguineous marriage and depression level by Beck Depression Inventory were filled by a teaching audiologist during rehabilitation interviews. The distribution of TEDIL-3 scores according to these factors were assessed. Beck's Depression Inventory, which is a 21 item inventory that represents the most common symptoms of depression was used to assess the depression level of the mother.[7]

Etiology of HL, hearing level of the patient, diagnosis age of HL, HL in the family, other disability in the patient and the family, NHS, hearing assistive device usage were compaired between group P and F. Of the continous variables, age, at the tme of diagnosis age, CI age, mother delivery age, TEDIL combined scores were correlated and risk factors were analyzed.

STATISTICAL ANALYSIS

In this study, conformity of continuous variables to the assumption of normality distribution was tested with Kolmogorov-Smirnov test and homogeneity was examined by the Levene test. In comparing the differences between the averages of independent groups, the Mann-Whitney U test for non-parametric analysis tests were used. Independent t-tests for parametric analysis tests and chi-square statistical analysis tests in frequency evaluations of different parameter variables were used. The relation between continuous variables was tested with Pearson correlation analysis. Logistic regression analysis was performed to evaluate the effect of variables determining factors affecting rehabilitation. 95% confidence intervals were calculated. A p value of <0.05 indicated that the difference is significant, p<0.001 is considered a very significant difference.

RESULTS

The study included 53 children between the ages of 3 and 7 with a mean±standard deviation (SD) of 5.49 ±1.13 who met the inclusion criteria and attended to rehabilitation centre for hearing rehabilitation. The information related to age, gender, and audiological findings of children with HL were given in Table 1. Receptive, Expressive, and Compound language scores were represented in Figure 1, Figure 2, Figure 3, Figure 4. TEDIL-3 scores in males were statistically insignificant, but scores of males were slightly higher than females (versus female; 91.5±12.12 versus 86.6±16.6). Scores were higher in families with incomes above minimum wage against families with minimum wage or below, but the results were statistically insignificant (p>0.05). Scores were also higher in higher maternal education, but statistically insignificant (p>0.05). Scores were neither high nor statistically significant in higher paternal education (p>0.05), All mothers were housewives, therefore the effect of mother' job was not analyzed. Scores were higher in fathers with nonoffical jobs, but the results were statistically insignificant (p>0.05). The scores were higher in families with 1-2 children than families with 3 or more children, but no statistical significance was seen (p>0.05). In families with consanguineous marriage, children's scores were lower than the others, but no statistical significance was seen. Although scores were higher in children with no, slight, mild depression than children in families with moderate/high depression status, no statistical significance was found (p>0.05). Statistical significance and higher scores were seen in children with families with monolanguage than bilanguage (p<0.05) (Table 2).

TABLE 1: Data related to age, gender and audiological findings of children with hearing loss.

Features	Children with HL
Number	n=53
Age	5.49±1.13
Gender	28 (52.8%), 25 (47.2%)
Diagnosis age of HL (month)	12.33±15.59 month
Type of amplification	31 (58.5%) CI 20 (37.7%) HA 1 (1.9%) BAHA 1 (1.9%) CI+HA
Age of CI (month)	32.23±15.79 month

HL: Hearing loss; HA: Hearing aid; CI: Cochlear implantation.

Twenty three (43%) children were accepted as failed (Group F) and 30 (57%) children were accepted as successful (Group P). In P group; congenital disorders (41.5%) were higher than F group

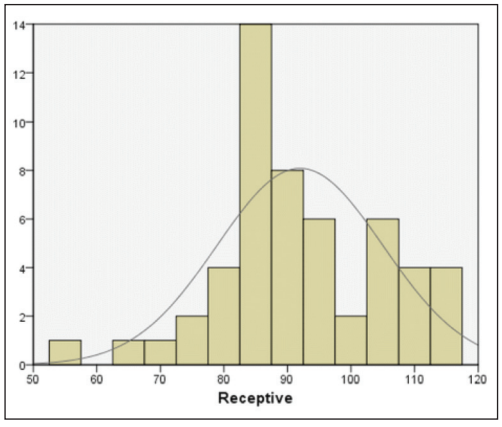

FIGURE 1: Receptive language scores of patients.
Footnote: x-axis denotes TEDIL-3 receptive scores, the y-axis denotes the number of patients. TEDIL-3: Test of Early Language Development-3.

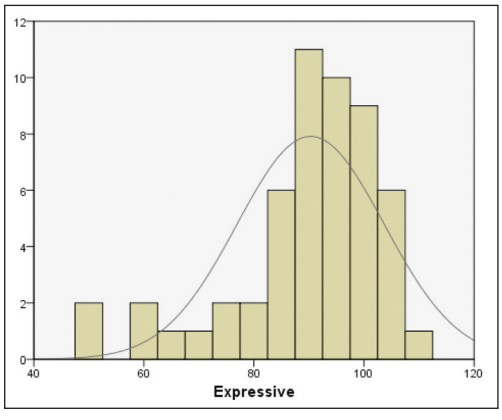

FIGURE 2: Expressive language scores of patients.
Footnote: x-axis denotes TEDIL-3 expressive scores, the y-axis denotes the number of patients. TEDIL-3: Test of Early Language Development-3.

(26.4%), but no statistical significance was found among etiologic factors (p>0.05). The number of severe/profound HL was higher than moderate HL. Also a higher number of patients were found in severe/profound HL, but the groups were statistically alike (p>0.05). Absence of the history of HL is higher in P group; 34% (p group) versus 18, 9% (F group). In disabilities in the family, absence of other disabilities was higher in P group (30.2%) than F group (18.9%), but no statistical significance was found (p>0.05). Children without other disabilities like visual, mental etc. were higher in P group (49.1%) than F group (34%), but no statistical significance was seen (p>0.05). Children, who failed NHS were higher in P group (41.5%) than F group (20.8%), but groups were statistically alike according to NHS results (p>0.05). Also, children who pass the NHS although they did not hear were higher in the F group (15.1%) than in P group (7.5%). In P group; 30.2% CI, 20.8% HA, 1.9% BAHA, 1.9% CI+HA users were seen, whereas in F group, 28, 3% CI, 17% HA users were seen. And the groups were statistically alike (p>0.05). Diagnosis of age was found to be significantly higher in Group F (mean±SD; 18.5±18.1) than Group P (mean±SD; 7.5±11.4) (p>0.05) (Table 3).

In the correlation analysis of continuous variables, CI age was found to be correlated with diagnosis, age, and in Pearson correlation analysis, age was correlated with combined TEDIL scores (Table 4).

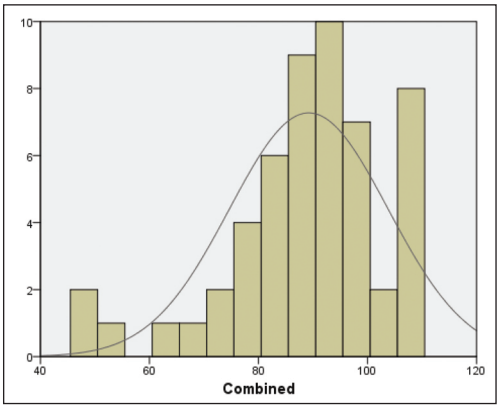

FIGURE 3: Combined language scores of patients.
Footnote: x-axis denotes TEDIL-3 combined scores, the y-axis denotes the number of patients. TEDIL-3: Test of Early Language Development-3.

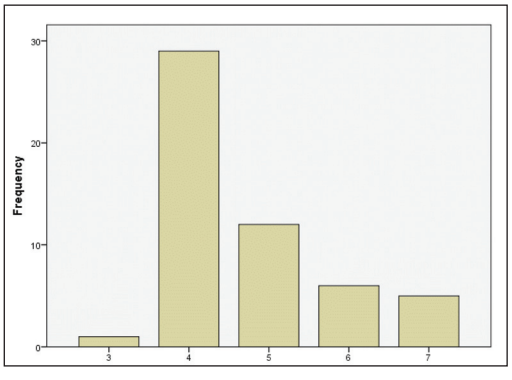

FIGURE 4: The number of patients distributed among groups according to combined language scores in Table 1.
Footnote: x-axis denotes groups: 1: Very good, 2: Good, 3: Above average, 4: Average, 5: Below average, 6: Weak/poor, 7: Very poor. Y-axis denotes the number (frequency) of patients.

TABLE 2: Distribution of TEDIL-3 compound scores according to demographic factors.

Variables	n	M	SD	p value
Gender				
Male	28 (53%)	91.5	12.12	0.217
Female	25 (47%)	86.6	16.6	
Family income				
The minimum wage or lower	47 (87%)	88.87	14.89	0.62
Above minimum wage	6 (13%)	92.00	12.05	
Maternal education				
Elementary school, lower or				
Primary education	40 (75%)	87.9	15.19	0.26
High school or higher	13 (25%)	93.15	11.93	
Paternal education				
Elementary school, lower or				
Primary education	28 (53%)	89.71	12.04	0.94
High school or higher	25 (47%)	88.68	17.14	
Mother's job				
Housewife	53 (100%)	89.23	14.53	-
Working	0 (0%)	0	0	
Father's job				
Offical	7 (13%)	87.14	8.89	0.62
Nonoffical	46 (87%)	89.54	15.25	
Children number				
1-2	12 (23%)	91.08	11.38	0.56
>3	41 (77%)	88.68	15.41	
Language				
Turkish	23 (43%)	93.57	11.90	0.048*
Two language	30 (57%)	85.90	15.65	
Consanguineous Marriage				
Yes	34 (64%)	88.94	16.38	0.85
No	19 (36%)	89.74	10.85	
Depression				
Moderate/high	6 (11%)	81.67	17.95	0.17
No, mild, slight	47 (89%)	90.19	13.97	

Logistic regression analysis of risk factors that may affect hearing rehabilitation was evaluated. Of the socioeconomic factors and hearing-related factors, only diagnosis age is a significant factor playing role in change of TEDIL-3 scores in various models that are presented in Table 5 ($p<0.05$).

DISCUSSION

In the literature, the monosyllabic word test is used to evaluate speech perception, calculating the correct percentage of consonants is used for speech production evaluation and the Peabody Picture vocabulary test is used to evaluate language performance.[5] TEDIL-3 test, developed by Hresko, Reid, and Hammill in 1999 was used to measure receptive and expressive language development. It was adopted into

TABLE 3: Characteristics of Group P and Group F related to hearing loss.

Variables	Group P	Group F	p value
Etiology of HL			
Congenital disorders	22 (41.5%)	14 (26.4%)	p=0.69
Seizure	4 (7.5%)	5 (9.4%)	
Jaundice	1 (1.9%)	1 (1.9%)	
Prematurity	2 (3.8%)	2 (3.8%)	
Hypothyroidism	1 (1.9%)	0 (0%)	
Hypoglycemia	0 (0%)	1 (1.9%)	
Hearing level			
Moderate	5 (9.4%)	3 (5.7%)	p=0.71
Severe/profound	25 (47.2%)	20 (37.7%)	
Diagnosis age of HL (months) mean±SD	7.5±11.4	18.5±18.1	p=0.03*
Family history of HL			
None	18 (34%)	10 (18.9%)	p=0.48
1.and 2. degree relative	6 (11.3%)	7 (13.2%)	
≥3 degree relative	6 (11.3%)	6 (11.3%)	
Other disability in family history			
None	16 (30.2%)	10 (18.9%)	p=0.46
Hearing loss	12 (22.6%)	13 (24.5%)	
Autism	1 (1.9%)	0 (0%)	
Mental retardation	1 (1.9%)	0 (0%)	
Another disability in child			
Visual disability	2 (3.8%)	0 (0%)	p=0.84
Ear-nail disability	0 (0%)	2 (3.8%)	
Cerebral palsy	0 (0%)	1 (1.9%)	
Learning disability	0 (0%)	2 (3.8%)	
Ear canal atresia	2 (3.8%)	0 (0%)	
None	26 (49.1%)	18 (34%)	
Neonatal hearing screening			
Yes	4 (7.5%)	8 (15.1%)	p=0.12
No	22 (41.5%)	11 (20.8%)	
Not applied	4 (7.5%)	4 (7.5%)	
Hearing assistive device			
CI	16 (30.2%)	15 (28.3%)	p=0.85
HA	11 (20.8%)	9 (17%)	
CI+HA	1 (1.9%)	0 (0%)	
BAHA	1 (1.9%)	0 (0%)	

*lines that make up the statistical difference ($p<0.05$);
HL: Hearing loss; SD: Standard deviation; CI: Cochlear implantation; HA: Hearing aid.

TABLE 4: Means, standard deviations, and intercorrelations for the continuous variables.

	Mean	SD	n	1	2	3	4	5
1. Diagnosis age	12.33	15.59	53	1	-0.59	0.414*	0.090	-0.082
2. Age	5.49	1.13	53	-0.59	1	0.019	0.182	0.462**
3. CI age (months)	32.23	15.79	35	0.414*	0.019	1	-0.024	-0.108
4. Mother delivery age	27.79	6.55	53	0.090	0.182	-0.024	1	0.224
5. Combined score	89.23	14.53	53	-0.082	0.462**	-0.108	0.224	1

*Correlation is significant at the 0.05 level (2- tailed).
**Correlation is significant at the 0.01 level (2- tailed).
SD: Standard deviation; n: Number; CI: Cochlear implantation.

TABLE 5: Logistic regression analysis of risk factors in the success of hearing rehabilitation based on TEDIL scores.

							95% CI for EXP (B)	
	B	SE.	Wald	df	Sig	Exp (B)	Lower	Upper
Language	-.995	.656	2.300	1	.129	.370	.102	1.338
Diagnosis age	-.056	.023	6.063	1	.014	.946	.905	.989
Gender	.787	.626	1.581	1	.209	2.196	.644	7.484
Constant	.326	1.037	.099	1	.754	1.385		

*Correlation is significant at the 0.05 level (2- tailed).
**Correlation is significant at the 0.01 level (2- tailed).
SD: Standard deviation; n: Number.

the Turkish language by Topbaş and Güven in 2013. The TEDIL-3 test identifies the language delay, language disorders. In the TEDIL-3 test, the child is asked to respond to verbal commands, pictures, or stimulus objects.[8] In our study, receptive and expressive language scores are given in Figure 1. We evaluated all children with combined scores of TEDIL-3 calculated by receptive and expressive language scores. Twenty three (43%) children were accepted failed, the success rate was 56% according to TEDIL-3 scores.

CI/HA or BAHA usage and presence of other disabilities in children or families were not found to affect rehabilitation. In the literature, CI users get more benefits than HA users.[10] BAHA has also been a good choice for aural atresia patients. And the patient with BAHA had aural atresia. Thirty percent of HL patients are affected by various syndromes. Over 400 syndromes are associated with HL like branchio-oto-renal, Waardenburg syndrome, etc. in which eye, skin renal anomalies are seen.[11] In this study, no child was genetically analyzed and diagnosed with a syndrome (Table 2). Also, HL was seen in the family history of relatives in 25% of cases.

Bilingualism adversely affects the rehabilitation of hearing debilitated children. Children living in monolingual families have better scores of speech perception and receptive and expressive language than children living in bilingual families.[12] Even normal children growing up in a bilingual home are at increased risk for lower levels of receptive and expressive language skills than children of monolingual families.[13] On the other hand, bilingualism has been found to have a positive effect on children's ability to judge grammar and to substitute symbols. Exposure to more than one language facilitates children's metalinguistic awareness. Bilingualism is present to some extent in every society and at least half of the world's population uses more than one language in everyday life.[14] In this study, bilingualism adversely affected rehabilitation in adaptation to rehabilitation by TEDIL-3 scores.

Early identification of HL and, therefore, age of diagnosis affects language development. Children diagnosed and intervened before 6 months of age show a similar development of language development compared to their peers with normal hearing.[15] In a study by Sahli in 2019, the mean diagnosis age of children

with unilateral CI is 11.2 months, and the mean age of CI is 19.5 months. Performance of rehabilitation was found to be better when diagnosis age is between 0-6 months.[16] In our study, the average age of diagnosis is 12.33±15.59 months and the average age of CI was 32.23±15.79 months. There are differences between different districts of Türkiye in terms of diagnosis age of HL and mean age of CI. Diagnosis age and CI age in this study are higher than the literature.

Neonatal hearing screening (NHS) leads to early identification of HL. The incidence of HL is 10 times more common in high-risk infants.[17] With the NHS program, early identification and rehabilitation are possible. In this study, no relation was found in terms of rehabilitation success because rehabilitation starts with the identification of HL. In this study, we notice patients without the NHS and false NHS results. Also, most of the etiology of HL was congenital (41.5% in P versus 26.4% in F). History of seizure, jaundice, prematurity, hypothyroidism, hypoglycemia which necessitates intensive care unit are seen in Table 2 that are also risk groups in the NHS program. In a study by Kılıçaslan et al., a higher rate of HL was seen in NHS in a study conducted in the Van region, and it was attributed to social and environmental factors such as the frequency of consanguineous marriage, genetic predisposition, negative influences experienced in the uterine period, and difficulties in accessing health services.[18] The patients who did not attend to the NHS and, false-negative NHS results that are detected in this study can be explained by similar reasons.

Young children raised in poverty experience impoverished language environments with less lexical diversity (i.e., distinct types of words), syntactic complexity (i.e., different sentence types), gesture, and fewer conversational turns and open-ended questions.[19] Socioeconomic status was found to be inversely related to speech and language development.[20] On the other hand, Smith et al. declare that Medicaid ensures similar results providing equal access to rehabilitation and speech therapy for both socioeconomic statuses low and high groups.[6] Similarly, in this study, socioeconomic factors like parents, education, job, income did not find to be statistically related to the result of rehabilitation by TEDIL-3 scores, although scores were higher better socioeconomic status (Table 2).

Depression negatively affects the outcome of rehabilitation after CI. In a study by Heinze-Köhler, depressive symptoms after CI negatively correlated with monosyllabic recognition scores after 3 months and 1 year of CI.[21] In depression, verbal memory and verbal learning are impaired felt by a problem with attention and long-term memory.[22] In this study, patients had mild-moderate depressive symptoms. No major depression was observed. Therefore, no correlation was found between Beck's depression scores and TEDIL-3 scores although scores of TEDIL-3 were higher in mild depression than moderate depression. Beck's depression score does not provide a depression diagnosis. Li et al. reported that the prevalence of moderate depression is 14% in men and 20% in women with hearing difficulties.[23]

Consanguineous marriage is related to an increase in the prevalence of inherited disorders.[24] It is more common in Middle East countries reaching up to 67.6%, whereas in Europe, it is less than 0.5%. Autosomal recessive disorders, including sensorineural hearing loss, increased by consanguineous marriages. In developed countries, SNHL is seen at 3-4/1,000 whereas in Middle East countries, it reaches 14/1,000 with an increased incidence of consanguinity.[25] Consanguinity was not related to the success of rehabilitation. It is related to the increased incidence of HL.

This study is the first study in the literature examining status of children in rehabilitation centre in the South East of Türkiye. The sample size is a limitation of this preliminary study. In larger samples, we believe that some other factors may appear to influence rehabilitation success. Another drawback of this study is that children were evaluated by only TEDIL-3 test and results of scores of TEDIL-3 before and after rehabilitation were not compaired to see success of rehabilitation in a period of time. Better results can be obtained with further studies by paying attention to these parameters. Also, some parents did not give exact information about their economic status and depression status. Expectations of parents of children are low due to socioeconomic background. This leads to negative motivation and less progress in rehabili-

tation. We believe that facilities should be possible by the time and by economic and cultural development of the region, rehabilition of HL in children will be better.

CONCLUSION

In this study, we evaluated sociodemographic factors and clinical properties of children with HL who were attending to Hearing Rehabilitation Centre in Mardin, in the South East of Türkiye. Age of diagnosis of HL is important in the success of hearing rehabilitation of children. Also, TEDIL-3 scores were lower in bilingual families. Because of the circumstances like low expectations of parents and difficulties in accessing health services, restricted social environment, rehabilitation is difficult in this region.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Neslihan Sarı;* ***Design:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***Control/Supervision:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***Data Collection and/or Processing:*** *İbrahim Halil İmrak, Neslihan Sarı;* ***Analysis and/or Interpretation:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***Literature Review:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***Writing the Article:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***Critical Review:*** *Neslihan Sarı, İbrahim Halil İmrak;* ***References and Fundings:*** *Neslihan Sarı;* ***Materials:*** *İbrahim Halil İmrak, Neslihan Sarı.*

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