

INTRODUCTION

Speech sound disorders (SSD) is a roof term which consists of five subgroups according to Dodd's (2014) psycholinguistic model where these five subgroups of SSD are identified as *articulation disorder*, *phonological delay*, *consistent atypical phonological disorder*, *inconsistent phonological disorder* and *childhood apraxia of speech*. The causes of problems in the production of speech sounds include disorders such as cognitive impairment, hearing loss, cleft lip-palate, and cerebral palsy; however, these factors explain a few numbers of SSD. The causes of the majority of SSD cases are not yet known (Broomfield & Dodd, 2004). SSD is one of the most common communication problems in preschool and school-age children (Broomfield & Dodd, 2004; McLeod et al., 2017).

The prevalence of SSD is between 10% and 15% in the preschool period, while it is 6% in school-age (American Speech-Language-Hearing Association [ASHA], 2000). In order to make early diagnosis and intervention in speech sound disorder (SSD), it is necessary for the people in the immediate circle of the child, such as family members and teachers, to have awareness of the disorder and to know which specialist to be consulted, what the early signs of SSD are, and what the factors that constitute the risk for the disorder are. The prerequisite for the early diagnosis and intervention to process well is to determine which children are in the risk group. Knowing the demographic characteristics and speech-language development processes of children diagnosed with SSD can help to provide information on which characteristics or demographic profiles may have a risk of SSD. The identification of children at risk for SSD makes it possible to monitor the children in the risk group from an early stage and to include them in the intervention program when necessary.

Recent study aims to describe the demographic characteristics of children who have speech sound disorders and to determine any possible differences between preschool and school-aged children in terms of speech sound production characteristics.

METHOD

Design

This study is a descriptive, retrospective study. Case files of the SLP clinic's archive in a university were scanned. Their demographic characteristics, familial history were examined and the percentage of correct consonants was calculated.

Participants

The study includes 140 children aged between 2;00-8;11 who applied to the Education, Research and Training Centre for Language and Speech Disorders (DİLKOM) in Anadolu University due to the complaint of a speech disorder and were diagnosed with SSD between the years of 2015-2017. The 30.7% of the children are girl, while the 69.3% are boy, and their ages are between 32-104 months ($\bar{X} = 68.53$, $SS = 14.82$). All the participants speak Turkish and there is no other neurological, psychological, structural and sensory disorders other than SSD.

Materials and Procedure

Pediatric family interview form: This is a form containing demographic information of the participants; obtaining prenatal, perinatal, postnatal history of the children; consisting of questions regarding their health, development, educational backgrounds and filled in line with the answers of the families.

Turkish articulation and phonology test-articulation sub-test (SST-SET): This test, developed by Topbaş (2005), evaluates the articulation competences of children aged 2 to 8 years. In the test there are pictures representing the different words in which all consonants used in Turkish are in different positions. Children are expected to produce words by looking at these pictures. Percentage of Consonants Correct (PCC) was calculated over the transcriptions in SST-SET implementations in order to determine the participants' severity levels regarding speech characteristics (Topbaş, 2005).

The following formula is used in the calculation of PCC.

$$PCC = \frac{\text{correct consonant frequency}}{\text{correct consonant frequency} + \text{wrong consonant frequency}} \times 100$$

The participants were classified as mild if 85% and above, as moderate if 65-84%, as severe if 51-65%, and as very severe if 50% and below according to the PCC.

The main purpose of the SST-SET test is to identify errors in producing the consonants. However, it was seen in the transcriptions that some children made mistakes in vowels as well. In this respect, the mistakes made in producing vowels by the participants were also reported as present/absent.

Data Analysis

The findings related to demographic and speech-language characteristics were presented as frequency and percentage. SPSS 24.0 package program was used for statistical analysis.

RESULTS

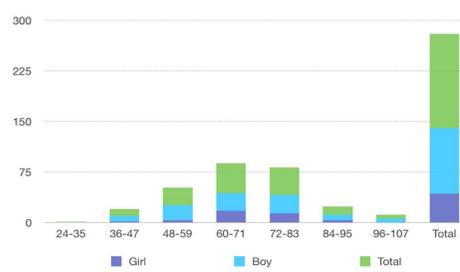


Figure 1. Distribution of age groups by gender

The highest boy/girl ratio at the incidence of SSD is found to be between 36-59 months.

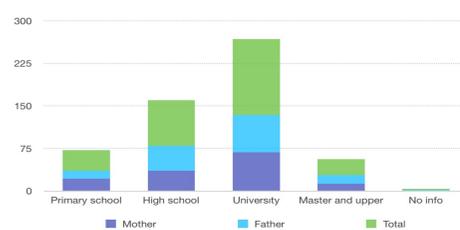


Figure 2. Parental Education Level

The families with high education level are more aware of the speech problems in their children and need an expert opinion.

Most of the participants do not have problems in gross and fine motor skills, feeding, dressing, using the toilet, sucking (nursing) and swallowing. For the school-aged participants, 94.9% of them do not show to have any problems academically; however, 5.1% of them have reading-writing difficulties.

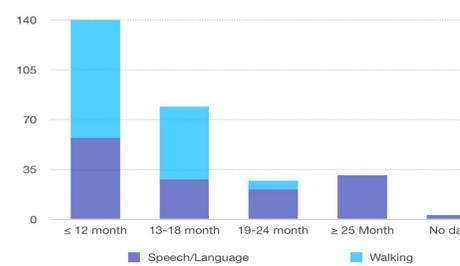


Figure 3. Development of Speech and Language and Walking

40.7% of children produced their first words before the age of 12 months, whereas 57.1% of them produced at the age of 13 months and older. It is seen that children begin to walk in the appropriate ages.

Most of the participants do not have any serious problems in the perinatal period. Family history of speech and language problems is varied. 19.3% of them are speech sound disorders; 15.7% of delayed language, 5.7% fluency disorders, and 1.4% is other problems. 10% of participants reported two kinds of problem seen together (e.g., speech sound disorder and fluency disorder).

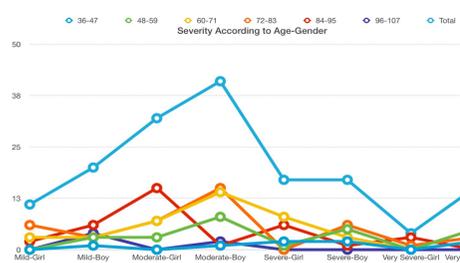


Figure 4. Severity According to Age-Gender

PCC of children is between 23.33 and 97.11 ($\bar{X} = 71.55$, $SS = 16.13$). The severity level of participants 23.5% is mild; 44.1% is moderate; 20.6% is severe, and 11.8% is very severe.

Both boy and girl participants mostly have a moderate level of severity. However, the number of boy participants is much higher than girls' at all levels. Especially, at the "very severe" level, boys are far more than girls.

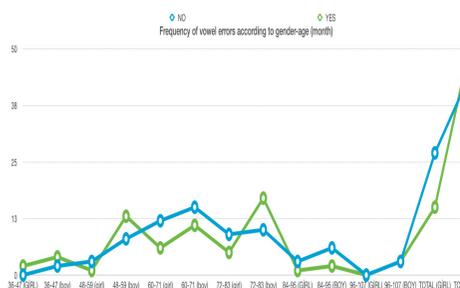


Figure 5. Frequency of Vowel Errors According to Gender-Age

52.2% of participants do not have any vowel errors; 47.8% of them have. Boys have more errors in vowel production than girls. Overall, all participants have problems both in consonants and vowels more in the age between 48-83 months.

The relationship between PCC and vowel errors was analysed by Spearman Correlation Coefficient test. According to the results there is a significant relationship between two variables ($r = -.414$, $p < .001$). Additionally, the direction of the relationship is negative. In other words, the higher PCC, the lower severity participants have. Accordingly, increasing in severity level means increasing vowel errors too. According to test results, 9.3% of participants in the assessed group have a typical language development. 4.9% of them have a lower score than their peers, and 0.7% have higher performance than their peers. It is found that there is a significant relationship ($r = -0.222$, $p = 0.009$) between implementing a language assessment and severity level of SSD.

DISCUSSION

Being a boy is a risk factor for SSD (Broomfield & Dodd, 2004; McLeod et al., 2017). The results of this study about gender (69.3% boys/ 30.7% girls) were in agreement with the literature. Some of SSD cases have a familial history of SSD, as well. In the recent study, 19.3% of participant's familial history is SSD, and some of them have both SSD and fluency disorders. When the fluency disorders are added to the SSD, then the SSD begins to increase dramatically. Boys show more severe level in SSD than girls. Besides, severity level and vowel errors increase by age. The recent study showed that the severity of SSD does not decrease by the school ages; on the contrary, the severity level is higher among school-aged children than pre-school aged ones. All in all, the recent study presented that being boy, having a familial history of SSD, history of delayed language and vowel errors are the risk factors for the potential SSD.

Approval of the Ethical Committee of Anadolu University (Protocol No: 6855) was obtained for the study.

REFERENCES

- American Speech-Language-Hearing Association (2000). Speech sound disorders. Retrieved from <https://www.asha.org/public/speech/disorders/Speech-Sound-Disorders/>
- Broomfield, J., & Dodd, B. (2004). Children with speech and language disability: caseload characteristics. *International Journal of Language & Communication Disorders*, 39(3), 303-324.
- Dodd, B. (2014). Differential diagnosis of pediatric speech sound disorder. *Current Developmental Disorders Reports*, 1(3), 189-196.
- McLeod, S., Crowe, K., Masso, S., Baker, E., McCormack, J., Wren, Y. & Howland, C. (2017). Profile of Australian preschool children with speech sound disorders at risk for literacy difficulties. *Australian Journal of Learning Difficulties*, 1-19.