

The Prevalence of Specific Language Impairment in 6-Year-Old Persian-Speaking Children in Shiraz City, Iran, 2015

Mohammad Majid Oryadi-Zanjani,¹ Maryam Vahab,^{1*} Javad Rasouli,² Fatemeh Mohammadi,¹ and Motahare Firouzi-Parizi¹

¹Department of Speech Therapy, Shiraz University of Medical Sciences, Shiraz, IR Iran

²Department of Epidemiology, Urmia University of Medical Sciences, Urmia, IR Iran

*Corresponding author: Maryam Vahab, Department of Speech Therapy, Shiraz University of Medical Sciences, Shiraz, IR Iran. Tel: +98-7136271551, Fax: +98-7136272495, E-mail: vahabm@sums.ac.ir

Received 2015 July 27; Revised 2015 August 31; Accepted 2015 September 13.

Abstract

Background: A child with a language impairment in the absence of significant sensory, psychiatric, neurological, or intellectual disorders should be diagnosed as having a specific language impairment (SLI). Data regarding the prevalence of SLI are rare and vary widely. A number of studies have been conducted in order to determine the prevalence of SLI in different populations. However, the prevalence of child language disorders in an Iranian population is unknown due to the limited epidemiologic studies in the field. In addition, many studies have found that children with SLI are at risk for social, behavioral, emotional, and educational difficulties. **Objectives:** The aim of this study was to estimate the prevalence of specific language impairment in 6-year-old Persian-speaking children.

Patients and Methods: This research was an epidemiological study conducted over a three-month period in the summer of 2015 in Shiraz. The sample size was 180 children aged 6 years that included 95 boys and 85 girls who were recruited from 10 preschool centers in 9 urban areas in Shiraz using stratified sampling. The EpiSLI system was used to diagnose SLI. The Persian version of the test of language development (TOLD-P: 3) was employed to evaluate the children's oral language skills. A number of descriptive statistics was employed, such as rates, mean, and standard deviation. In addition, the Chi-square test was used to analyze the correlation between the prevalence of SLI with sex and area at a significance level of 0.05.

Results: This study estimated the prevalence of SLI in 6-year-old Persian-speaking children to be 2.7%. In addition, the estimated prevalence rates of SLI in boys and girls were 2% and 3.5%, respectively. Also, there was no significant correlation between the estimated prevalence of SLI with sex and area ($P > 0.05$).

Conclusions: According to the findings of this study, 2.7% of the 6-year-old Persian-speaking children living in urban areas of Shiraz and enrolling at preschool centers have a specific language impairment. Therefore, it is important to employ a screening system to identify these preschool children in order to prevent subsequent problems in school-aged children.

Keywords: Prevalence, Specific Language Impairment, Speech Disorders, Child, Preschool

1. Background

Language impairment is one of the most common developmental problems that results in a referral to speech therapy clinics during the preschool years (1). As Tomblin et al. (1997) stated, "specific language impairment (SLI) is a form of developmental language impairment in which children demonstrate unexpected difficulties with the acquisition of spoken language" (2). Bishop and Leonard (2000) reported that children with SLI fall at the bottom end of the normal distribution of language competence (3). Practically, a child who has a language impairment in the absence of a significant sensory, psychiatric, neurological, or intellectual disorder is diagnosed with SLI (4, 5); In other words, as Schwartz (2009) explained, "SLI is an impairment of language comprehension, language produc-

tion, or both in the absence of hearing impairment, the absence of a general developmental delay (i.e., a normal performance IQ), the absence of any neurological impairment (e.g., perinatal bleeds, seizure disorders), and no diagnosis of autism" (6). Tomblin et al. (1996) were the first to provide a valid and reliable diagnostic system labeled the EpiSLI system for the conduct of epidemiologic research on specific language impairment. As they explained, "the system used five composite scores representing norm-referenced performance in three domains of language (vocabulary, grammar, and narration) and two modalities (comprehension and production). Children who have two or more composite scores below -1.25 standard deviations were considered as children with language disorder" (7). According to Maxwell and Satake's (2006) definition, the prevalence is the proportion of people in a surveyed population who

have a disorder at a given point in time (8). As a statistical measure, prevalence is important because (a) researchers and clinicians use this value to estimate the risk factors of certain disorders, such as SLI (8); (b) this information is used for public health policy and planning goals; (c) variations in the prevalence of a disorder can be used to identify risk factors that may predict or potentially cause the disorder (2, 9).

Regarding the prevalence of SLI, data are rare and vary widely (10). A number of studies have been conducted in order to determine the prevalence of SLI in different populations. However, Bishop (2014) noted that a “lack of an agreed set of criteria for language impairment makes comparisons of prevalence rates problematic” (9). Overall, 2% - 8% of preschool children suffer with SLI (11). Tomblin et al. (1997) estimated the prevalence of SLI in monolingual English-speaking kindergarten children using the EpiSLI system. They screened 7,218 children in rural, urban, and suburban areas in the state of Iowa in the United States of America. Their findings presented an estimated overall prevalence rate of 7.4% for SLI. The prevalence estimates for boys and girls were 8% and 6%, respectively, but this difference was not significant (2).

Oryadi-Zanjani et al. (12) conducted an epidemiologic study in order to estimate the prevalence of SLI in 5-year-old Persian-speaking children. They used the EpiSLI system to diagnose SLI in Persian-speaking children for the first time. They surveyed 180 children in urban areas in Shiraz city in Iran and reported a prevalence rate of 3.3% for SLI. Additionally, they found no significant difference between boys (2%) and girls (3.5%) (12). Mohammadi et al. (2014) carried out an epidemiologic study in order to determine the prevalence of SLI in 5-year-old Persian-speaking children. They surveyed 436 children in urban areas in Semnan city in Iran and estimated the overall prevalence rate of SLI to be 3.4%. In addition, they also found no significant difference between boys (3.61%) and girls (3.25%) in the estimated prevalence of SLI (13). However, Kazemi et al. (2015) conducted a systematic review regarding the studies of child language disorders in Persian-speaking children. They concluded that the prevalence of child language disorders in an Iranian population is unknown due to the limited epidemiologic studies in the field (14). In addition, many studies have found that children with SLI are at risk for social, behavioral, emotional, and educational difficulties (15-17). Therefore, it is essential to identify the exact prevalence of the impairment in Persian-speaking children.

2. Objectives

The aim of this study was to estimate the prevalence of specific language impairment in 6-year-old Persian-speaking children in Shiraz city, Iran.

3. Patients and Methods

This research was a cross-sectional study conducted during a three-month period in the summer of 2015 in Shiraz, one of the biggest cities in Iran. Informed consent was obtained from the parents of each child who participated in the study, and the research protocol was approved by the ethics committee of Shiraz University of Medical Sciences. The sample size was 183 children aged 6 years old and included 97 boys and 86 girls who were recruited from 10 preschool centers of 9 urban areas in Shiraz. Stratified sampling was used to select the children. The inclusion criteria included living in an urban area of Shiraz, being Persian-speaking, enrolling at a preschool center, and having a normal nonverbal IQ (> 80), normal hearing, no other disabilities such as such fluency, phonological, and neurological disorders, and a history of abnormal communication age-related behaviors. The EpiSLI system (Tomblin et al. 1996) (7) was used to diagnose the SLI. The recorded developmental history of each child and interview with the children’s parent/teacher were used to gain the information. The human representation drawing of Abell et al. (18) was used by the examiners to assess the intellectual abilities of children. As, Tomblin et al. (1997) suggested, the Test of language development (TOLD) for diagnosing the SLI (2) as well as the Persian version of the test (TOLD-P: 3) (19) was employed in order to assess the children’s oral language skills. The mean Cronbach’s alpha was a measure of the test’s consistency, and the mean of validity coefficient was a measure of a test’s usefulness; these values were 90.7 and 43.7, respectively for the test (19). Specifically, four subscales of the TOLD were used in order to assess listening and speaking modalities, including picture vocabulary, oral vocabulary, grammatic understanding, and grammatic completion. The listening quotient included the composite scores of picture vocabulary and grammatical understanding; additionally, the speaking quotient was the composite scores of oral vocabulary and grammatic completion. At first, 190 preschool centers located in 10 areas of Shiraz city were identified. Area 10 was excluded because it was in a suburb of Shiraz, leaving 9 stratum containing 20 children in each. Therefore, several centers were randomly selected in each area. All 6-year-old children were surveyed at the first selected center. This manner continued until the sampling was satisfied. We

Table 1. The Demographic Information of the 6-Year-Old Children

Group	Sex (n = 183) ^a		Age		
	Boys	Girls	Min	Max	Mean (SD)
6-Year-old children	97 (53)	86 (47)	72	81	75.05 (2.54)

^aValues are presented as No. (%).

employed eight examiners who were undergraduate students in speech-language pathology. Although all of them knew about SLI, we trained them in regards to the diagnostic system.

The diagnostic system included two phases: screening and diagnosis. In the screening phase, 1) the records of each child were used to survey his/her health condition regarding hearing, speech, and neurology; if the child was normal, 2) a number of questions about age-related communication behaviors were asked from his/her parent/teacher. If the answers to one or more questions were positive, the child failed the screening (25 children). As a result, he/she would be moved to the phase of diagnosis. In this phase, 1) the child's intelligence performance was assessed using the human figure drawing; if his/her IQ > 80, 2) the child's oral language performance was evaluated with the TOLD; finally, if his/her listening and/or speaking quotients were -1.25 SD below the mean (EpiSLI system), SLI was diagnosed (5 children). In addition, all processes were conducted at the preschool centers.

A number of descriptive statistics was employed, such as rates, mean, and standard deviation, in order to present the findings. In addition, Chi-square testing was used to analyze the correlation between the prevalence of SLI with sex and area at a significance level of 0.05. The IBM Statistical Package for the Social Sciences (SPSS), version 21, was used to analyze the data.

4. Results

Table 1 illustrates the demographic information of the 6-year-old Persian-speaking children. This study estimated the prevalence of SLI in 6-year-old Persian-speaking children as 2.7% (95% confidence interval for prevalence: 0.4% - 5.1%) (**Table 2**). All children diagnosed with SLI had only an expressive language disorder; their scores on the subtests for receptive language were in the normal range. In addition, the estimated prevalence of SLI in boys and girls was 2% and 3.5%, respectively (**Table 2**).

According to **Table 3**, the estimated prevalence of SLI in 6-year-old children who showed abnormal age-related communication behaviors was 20%.

Table 2. The Estimated Prevalence of SLI and Other Disabilities in 6-Year-Old Children Based on Sex

Group	Number	Normal Speech/Normal Language ^a	SLI ^a	Other Disabilities ^a
Total	183	167 (91.2)	5 (2.7)	11 (6.1)
Boys	97	87 (89.7)	2 (2)	8 (8.2)
Girls	86	80 (93)	3 (3.5)	3 (3.5)

Abbreviation: SLI, specific language impairment.

^aValues are presented as No. (%).

Table 4 shows the estimated prevalence of other disabilities in 6-year-old Persian-speaking children, including stuttering (0.5%), a phonological disorder (1.6%), a motor disorder (2.2%), epilepsy (1%), and traumatic brain injury (0.5%). Additionally, the estimated prevalence of other disabilities in boys and girls according to the type of disorder has been reported in **Table 4**.

According to **Table 5**, there was no significant correlation between the estimated prevalence of SLI with sex and area ($P > 0.05$).

5. Discussion

The estimation of this study regarding the prevalence of SLI in 6-year-old Persian-speaking children in Shiraz (2.7%) was similar to the findings of Oryadi-Zanjani et al. (2015), who reported the prevalence of SLI to be 3.3% in 5-year-old Persian-speaking children (12). The main reason for this finding may be that the conditions of these studies were the same; both included the criteria of language impairment, a diagnostic system, and inclusion criteria. As Bishop (2014) clarified, a comparison of the prevalence rates is problematic because of the lack of an agreement on a criteria for language impairment (9). However, our findings are the same as Mohammadi et al.'s (2014) estimation of the prevalence of SLI in 5-year-old Persian-speaking children in Semnan (3.4%) (13). The main difference between this study and Mohammadi et al.'s (2014) research was their diagnostic systems; Mohammadi et al. (13) used a developmental questionnaire and speech sampling during the picture description and conversation as the diagnostic tools without taking the children's intelligent performance into account. In contrast, our study was conducted by employing the EpiSLI system (2, 7).

Our estimation is, however, in contrast with Tomblin et al.'s (1997) reported prevalence of 7.4% for English-speaking children (5). However, our explanations of this difference includes the following: 1) according to Tomblin

Table 3. The Estimated Prevalence of SLI in the 6-Year-Old Children Who Showed Abnormal Age-Related Communication Behaviors^{a,b}

Group	SLI	Normal Language
No other disabilities + abnormal age-related communication behaviors	5 (20)	20 (80)

Abbreviation: SLI, specific language impairment.

^an = 25.

^bValues are presented as No. (%).

Table 4. The Estimated Prevalence of Other Disabilities in 6-Year-Old Children Based on Sex and the Type of Disorder^a

Group	Number	Stuttering	Phonological Disorder	Motor Disorder	Epilepsy	Traumatic Brain Injury
Total	183	1 (0.5)	3 (1.6)	4 (2.2)	2 (1)	1 (0.5)
Boys	97	1 (1)	2 (2)	4 (4.1)	-	1 (1)
Girls	86	-	1 (1.1)	-	2 (2.3)	-

^aValues are presented as No. (%).

Table 5. The Correlation Between the Estimated Prevalence of SLI With Sex and Area

Factors	SLI		
	χ^2 ^a	df	P Value
Sex	0.35	1	0.555
Area	11.62	8	0.169

Abbreviation: SLI, specific language impairment.

^achi-square.

et al. (5), there is a variation in prevalence among children of different racial/cultural backgrounds; 2) we selected samples only from the urban area of the city, but their population was comprised of urban, suburb, and rural areas of the state; and 3) our sampling was conducted on the children who enrolled at the preschool centers, whereas that was not an inclusion criteria in their study. Therefore, we estimated the prevalence of SLI in 6-year-old Persian-speaking children based on a more limited population compared to Tomblin's study.

Our findings showed no significant difference in the prevalence of SLI between 6-year-old Persian-speaking boys (4.2%) and girls (2.4%). This estimation is associated with the findings of Tomblin et al. (1997), Oryadi-Zanjani et al. (2015), and Mohammadi et al. (2014) (2, 12, 13).

In addition, there was no significant difference among the areas in respect to the prevalence of SLI, which was the same as the findings of Oryadi-Zanjani et al. (2015) (12). This could be due to (a) the inclusion criteria of enrolling at preschool centers; in other words, the children who are already enrolled in these settings are usually from some society categories or (b) the small sample size; it is recommended to replicate this study with a larger sample size.

On one hand, as previously mentioned, children with a specific language impairment are at considerable risk for social, behavioral, emotional, and educational problems (15-17); On the other hand, the estimates indicate a high prevalence of SLI in preschool, Persian-speaking children. Consequently, it is necessary to diagnose these children in preschool ages in order to refer them to speech and language therapy as soon as possible.

5.1. Conclusions

The prevalence estimates of SLI have varied from 2% - 8% based on variations in language, culture, race, areas (rural, urban, and suburb), diagnostic systems, and criteria for language impairment. According to the findings of this study, 2.7% of the 6-year-old Persian speaking children living in urban areas of Shiraz and enrolling at the preschool centers have a specific language impairment. In addition, 2.2% of this population has speech disorders, include stuttering and phonological disorders. Therefore, it is important to employ a screening system to target these preschool children in order to prevention of the subsequent problems certainly in school.

Acknowledgments

We would like to thank the children and their parents who participated in the study.

Footnotes

Authors' Contribution: Study concept and design: Fatemeh Mohammadi and Motahare Firouzi-Parizi; acquisition of data: Fatemeh Mohammadi and Motahare Firouzi-Parizi; analysis and interpretation of data: Mohammad

Majid Oryadi-Zanjani; drafting of the manuscript: Mohammad Majid Oryadi-Zanjani; critical revision of the manuscript for important intellectual content: Mohammad Majid Oryadi-Zanjani; statistical analysis: Javad Rasouli; administrative, technical, and material support: Maryam Vahab; study supervision: Maryam Vahab.

Funding/Support: This study was supported in part by the Shiraz University of Medical Sciences.

References

- Norbury CF, Tomblin JB, Bishop DVM. Understanding Developmental Language Disorders. 1st ed. USA: Psychology Press; 2008.
- Tomblin JB, Records NL, Buckwalter P, Zhang X, Smith E, O'Brien M. Prevalence of specific language impairment in kindergarten children. *J Speech Lang Hear Res.* 1997;**40**(6):1245-60. [PubMed: 9430746].
- Bishop DVM, Leonard LB. Speech and language impairments in children. 1st ed. USA: Psychology press; 2000.
- Moyle J, Stokes SF, Klee T. Early language delay and specific language impairment. *Dev Disabil Res Rev.* 2011;**17**(2):160-9. doi: 10.1002/ddrr.1110. [PubMed: 23362035].
- Tomblin JB, Smith E, Zhang X. Epidemiology of specific language impairment: prenatal and perinatal risk factors. *J Commun Disord.* 1997;**30**(4):325-43. [PubMed: 9208366] quiz 343-4.
- Schwartz RG. Handbook of child language disorders. 1st ed. USA: Psychology press; 2009.
- Tomblin JB, Records NL, Zhang X. A system for the diagnosis of specific language impairment in kindergarten children. *J Speech Hear Res.* 1996;**39**(6):1284-94. [PubMed: 8959613].
- Maxwell DL, Satake E. Research and statistical methods in communication sciences and disorders. 1st ed. Canada: Thomson; 2006.
- Bishop DV. Ten questions about terminology for children with unexplained language problems. *Int J Lang Commun Disord.* 2014;**49**(4):381-415. doi: 10.1111/1460-6984.12101. [PubMed: 25142090].
- Kasper J, Kreis J, Scheibler F, Moller D, Skipka G, Lange S, et al. Population-based screening of children for specific speech and language impairment in Germany: a systematic review. *Folia Phoniatr Logop.* 2011;**63**(5):247-63. doi: 10.1159/000321000. [PubMed: 21304231].
- Villanueva P, de Barbieri Z, Palomino HM, Palomino H. [High prevalence of specific language impairment in Robinson Crusoe Island. A possible founder effect]. *Rev Med Chil.* 2008;**136**(2):186-92. [PubMed: 18483672].
- Oryadi-Zanjani MM, Vahab M, Rasouli J, Ashkbousi R, Barpoosh N. The Prevalence of Specific language Impairment in 5-year-old Persian-Speaking Children in Shiraz City of Iran - 2015. *J Rehabil Sci Res.* 2015;**4**:93-96.
- Mohammadi M, Sadollahi A, Ghorbani R. Prevalence of specific language impairment in 5 year-old children of an Iranian. *Koomesh.* 2014;**15**(2):182-90.
- Kazemi Y, Stringer H, Klee T. Study of child language development and disorders in Iran: A systematic review of the literature. *J Res Med Sci.* 2015;**20**(1):66-77. [PubMed: 25767525].
- St Clair MC, Pickles A, Durkin K, Conti-Ramsden G. A longitudinal study of behavioral, emotional and social difficulties in individuals with a history of specific language impairment (SLI). *J Commun Disord.* 2011;**44**(2):186-99. doi: 10.1016/j.jcomdis.2010.09.004. [PubMed: 20970811].
- St Clair MC, Durkin K, Conti-Ramsden G, Pickles A. Growth of reading skills in children with a history of specific language impairment: the role of autistic symptomatology and language-related abilities. *Br J Dev Psychol.* 2010;**28**(Pt 1):109-31. [PubMed: 20306628].
- Aguilar-Mediavilla E, Buil-Legaz L, Perez-Castello JA, Rigo-Carratala E, Adrover-Roig D. Early preschool processing abilities predict subsequent reading outcomes in bilingual Spanish-Catalan children with Specific Language Impairment (SLI). *J Commun Disord.* 2014;**50**:19-35. doi: 10.1016/j.jcomdis.2014.03.003. [PubMed: 24767985].
- Abell SC, von Briesen PD, Watz LS. Intellectual evaluations of children using human figure drawings: an empirical investigation of two methods. *J Clin Psychol.* 1996;**52**(1):67-74. [PubMed: 8682914].
- Hassanzadeh S, Minaei A. Adaptation and standardization of Test of Language Development Primary to Persian language. 1st ed. Iran: Special Education Organization; 2002.