

## Association between specific language impairment and behavioral disorders among preschool children

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### Abstract

**Background** Specific language impairment (SLI) is the most common developmental disorder in preschool children, causing serious impairments on behavioral development. To date, there have been few studies on SLI and behavioral disorders in Palembang.

**Objective** To assess for an association between SLI and behavioral disorders in preschool children in Palembang.

**Methods** Subjects in this cross-sectional study were children who attended kindergarten. Their general characteristics, developmental history and physical examination results (including weight and height) were recorded. We administered the Specific Language Impairment checklist for language impairment and the Pediatric Symptom Checklist 17 (PSC 17) for behavioral disorders. Data was analyzed by Chi-square test.

**Results** We studied 1,340 children from 21 kindergartens in Palembang. Prevalence of SLI was 12.9%, consisting of expressive language impairment (10.2%), receptive impairment (0.5%) and mixed language impairment (2.2%). The prevalence of behavioral disorders was 15.1%, consisting of internalization disorder (6.0%), externalization disorder (5.0%), attentive disorder (0.4%), and various combinations of three disorders (3.7%). A highly significant association was found between SLI and behavioral disorders ( $P=0.000$ ;  $OR=2.082$ ; 95%  $CI$  1.419-3.053). Expressive language impairment was associated with externalization and mixed behavioral disorders. Mixed language impairment was associated with internalization, attentive, and mixed behavioral disorders. However, receptive language disorder was not associated with any behavioral disorders.

**Conclusion** SLI is significantly associated with behavioral disorders. With regards to the individual SLI types, expressive language impairment is associated with externalization and mixed behavioral disorders; mixed language impairment is associated with internalization, attentive and mixed behavioral disorders; but receptive language disorder is not associated with behavioral disorders. [*Paediatr Indones.* 2014;54:22-7.].

**Keywords:** specific language impairment, behavioral disorder, preschool

Impaired language development is the most common developmental disorder found in preschool children. It can cause serious cognitive and psychosocial developmental disorders.<sup>1-5</sup> Data obtained by the Cochrane Review Database indicated a 3 – 8% prevalence of language impairment in preschool children.<sup>6</sup> Language impairment is associated with other basic impairments such as delayed achievement of developmental milestones, impairment of verbal and nonverbal intellectual capacity, difficulties in reading and spelling, as well as psychiatric and behavioral disorders.<sup>1-8</sup>

The Diagnostic and Statistical Manual of Mental Disorders (DSM) – IV and the International Classification of Diseases (ICD) – 10 defined language impairment as expressive or receptive impairment not caused by deficits in sensory or intellectual ability, neurological condition or environmental influences. Authorities refer to it as Specific Language Impairment (SLI).<sup>9</sup>

Language impairment encompasses a wide variety of conditions that include several subgroups, such as articulation disorder, as well as expressive

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and receptive language impairment, which are often positioned as the same condition.<sup>1-4</sup> Previous studies have demonstrated an association between SLI and behavioral disorders. However, often the study subjects have a variety of language conditions and are tested with non-standardized instruments that do not account for age group, ethnicity, or local language. SLI may affect the inter- and intra-personal child development, as well as parental feelings because of the parents' functional capability and the negative environmental responses toward the child's concept of self. These factors ultimately determine the child's pattern of behavior.<sup>3-4</sup>

The Pediatric Symptom Checklist (PSC) is a set of questionnaires first published by Jellinek and colleagues (1988) to screen the behavior of children aged 4 – 18 years including behaviors that can be evaluated by parents.<sup>11-12</sup> Parents should be able to independently complete the questionnaire. However, due to the parents' varied abilities of reading and comprehension, it was recommended that the PSC be completed in an interview session.<sup>10-12</sup>

The aim of this study was to assess for a possible association between specific language impairment and behavioral disorders in preschool children in Palembang.

## Methods

Subjects were children who attended kindergarten K1/K2, aged 3–5 years and who resided in Palembang. The total number of subjects was 1,340 from 21 kindergartens in 7 districts of Palembang. We excluded children with neurological conditions (e.g., cerebral palsy), sensory deficits (e.g., hearing impairment), mental retardation, autism, or ADHD. Subjects were considered to have dropped out if their parents failed to complete the full checklist form or if they did not cooperate in taking the examinations in the study. The study protocol was approved by the Ethics Committee at Sriwijaya University Medical School.

The dependent variable was behavioral disorder and the independent variable was language impairment. Economic status, maternal education, age differences between siblings, gender, and prematurity of birth were considered to be confounding variables.

Behavioral disorders were determined by the

PSC-17 questionnaire. Subjects were considered to have a behavioral disorder if 5 or more positive answers were identified in the internalization subscale, 7 or more in externalization, 7 or more in attention, or 15 or more in any combination of the three subscales.

Expressive or receptive language impairments that were not caused by sensory deficits, nonverbal intellectual deficits, neurological conditions or environmental influences were determined by the SLI checklist. A normal finding was defined as answering 'no' in one or fewer occasions, and language impairment was defined as answering 'no' in more than one occasions.

The SLI and behavioral disorder data are presented descriptively as distributions of frequency tables. Associations between SLI and behavioral disorders were analyzed using Chi-square tests. P values of less than 0.05 were considered to be significant. Strength of the association was measured as odds ratio (OR). Analyses were performed using SPSS 13.0 for Windows software.

## Results

Of the 1,340 subjects, 786 were boys (58.7%) and 554 were girls (41.3%). The oldest age group (5 years-5 years 11 months) comprised of 844 (63%) subjects and the youngest age group (3 years to 3 years and 11 months) comprised of 48 children (3.6%). The mean age of subjects was 4.59 (SD 0.56) years.

History of previous illnesses consisted of seizures in 50 (3.7%), epilepsy in 32 (2.4%), and asthma in 7 (0.5%) of the children. Most children (1,251/93.4%) had no history of major previous illness. The average age of achievement of various abilities were as follows: rolling over 3.71 (SD 0.9) months, social smile 5.28 (SD 4.2) months, sitting down 6.63 (SD 2.2) months, standing up 9.73 (SD 5.29) months, and walking 12.34 (SD 2.3) months. Subjects' characteristics are presented in **Table 1**.

The SLI checklist testing revealed that 12.9% of the study subjects had SLI, consisting of 10.2% expressive impairment, 0.5% receptive impairment, and 2.2% mixed language impairment. The complete results of the SLI checklist testing are described in **Table 2**.

Behavioral disorders were determined using

the PSC 17, with 203 children (15.1%) identified as having behavioral disorders. These disorders consisted of internalization disorders (6.0%), externalization disorders (5.0%), attention disorders (0.4%) and various combinations of the three (3.7%) (Table 3).

The most commonly found internalization disorders were anxiety and weariness in 20 and 81 subjects, respectively. The most common externalization disorder found was frequent fights with other children in 24 (35.8%) of the 115 subjects. An attention disorder, commonly identified as easily distracted, was found in 5 (83.3%) out of 40 subjects. Of those with mixed behavioral disorders, 14 out of 17 subjects were identified as easily giving up.

Distributions of SLI and behavioral disorders are shown in Table 4. Of the 173 subjects with language impairment, 43 (24.9%) also had behavioral disorders.

**Table 1.** Characteristics of subjects (n = 1,340)

Characteristics	Number n=1,340	Percentage
Gender		
Male	786	58.7
Female	554	41.3
Nutritional status		
Undernourished	1059	79
Well-nourished	281	21
Age		
3 yrs – 3 yrs 11 mo	48	3.6
4 yrs – 4 yrs 11 mo	448	33.4
5 yrs – 5 yrs 11 mo	844	63
Previous illness history		
Seizure	50	3.7
Epilepsy	32	2.4
Asthma	7	0.5
None	1,251	93.4
Mean age at developmental milestones, months (SD)		
Rolling	3.71 (0.9)	
Smiling	5.26 (4.2)	
Sitting	6.63 (2.2)	
Standing	9.73 (5.2)	
Walking	12.34 (2.3)	

**Table 2.** Distribution of language impairment

SLI language checklist	Number n=1,340	Percentage
Language impairment by category	173	12.9
Expressive	137	10.2
Receptive	7	0.5
Mixed	29	2.2
No language impairment	1,167	87.1

**Table 3.** Distribution of behavior disorders

PSC 17 results	Number n =1,340	Percentage
Behavioral disorder by category	203	15.1
Internalization	81	6.0
Externalization	67	5.0
Attention	6	0.4
Internalization and externalization	15	1.1
Internalization and attention	1	0.1
Externalization and attention	16	1.2
Internalization, externalization and attention	17	1.3
No behavioral disorder	1,137	84.9

Of the 1,167 subjects who did not have language impairment, 160 (13.7%) had behavioral disorders while the rest did not.

There was a significant association between SLI and behavioral disorders (P=0.000; OR=2.082; 95%CI 1.419 to 3.053).

We also evaluated possible associations between the various types of language impairment and behavioral disorders. Expressive language impairment in the presence of an internalization behavioral disorder was identified in 3 (2.2%) subjects, but Fisher’s exact test revealed no statistically significant association (P=0.056). Among children with receptive language impairment, none were identified as having internalization behavioral disorders. Fisher’s exact test also revealed no significant association (P=0.999). However, mixed language impairment in the presence of an internalization disorder was found in 7 out of 29 subjects, with a statistically significant association (P=0.000; OR 5.319) (Table 5).

In children with an expressive language impairment, 14 (10.2%) had externalization behavioral disorders, a statistically significant association revealed by Chi-square test (P=0.003; OR=2.470). There was no externalization behavioral disorders in children with receptive language disorder, hence, Fisher’s exact test demonstrated no significant association (P=0.999). Among children with mixed language impairment, only 1 (3.4%) had an externalization behavioral disorder. As such, Fisher’s exact test revealed no significant association (P=0.999).

In children with a mixed language impairment, 2 (6.9%) had attentive behavioral disorders, a significant association revealed by Fisher’s exact test (P=0.000; OR= 24.204).

Ten (7.3%) subjects had expressive language impairment concomitant with mixed behavioral disorders, a significant association revealed by Chi-square test (P=0.017). Fisher's exact test demonstrated no significant association between receptive language impairment and mixed behavioral

reported a prevalence of 7.4% in preschool children.<sup>1</sup> Our findings were also higher than that of the Cochrane Review Database results, which reported 3-8%.<sup>2</sup>

The prevalence of behavioral disorders was 15.1%, consisting of 6.0% internalization behavioral

**Table 4.** Association between SLI and behavioral disorders (n = 1,340 )

Language Impairment	Behavioral disorder				Number	%	OR (95% CI)	P*
	Yes	%	No	%				
Yes	43	24.9	130	75.1	173	100	2.082 (1.419-3.053)	0.000
No	160	13.7	1,007	86.3	1,167	100		

\* Chi-square test

**Table 5.** Analysis of certain types of language impairment toward behavioral disorder

Specific language impairment type	Behavioral disorders							
	Internalization		Externalization		Attentive		Mixed	
	OR	P	OR	P	OR	P	OR	P
Expressive	0.323	0.056*	2.470	0.003#	1.005^	0.999*	2.350^	0.017#
Receptive	1.065^	0.999*	1.053^	0.999*	1.005^	0.999*	4.462	0.230*
Mixed	5.319	0.000#	0.674^	0.999*	24.204	0.000*	5.999	0.000#

\* Fisher's exact test; # Chi-square test; ^ Odds ratio

disorder (P=0.230), however, the odds ratio value obtained was a considerable 4.462. Among subjects with mixed language impairment, 5 (17.2%) had mixed behavioral disorders, a significant association revealed by Fisher's exact test (P=0.000; OR 5.999).

A multivariate analysis was performed for risk factors and language impairments which could result in behavioral disorders using the logistic regression Wald method. After adjustment, factors associated with the occurrence of behavioral disorders were language impairment (P=0.000) (OR=6.125; 95% CI 2.871 to 13.068), premature birth (P=0.000) (OR=2.660; 95% CI 1.596 to 4.435), and male gender (P = 0.006) (OR=1.569; 95%CI 1.135 to 2.168).

## Discussion

Based on the SLI checklist results, 12.9% of our subjects had language impairments, consisting of 10.2% expressive language impairment, 0.5% receptive language impairment, and 2.2% mixed language impairment. Our findings showed a higher prevalence (12.9%) than that of Tomblin *et al.* who

disorder, 5.0% externalization disorder, 0.4% attentive disorder, and 3.7% variations of the three disorders. Previous studies reported behavioral disorder prevalences of 3-6% in preschool children and 5-15% in school-aged children. However, Glascoe reported prevalences of 13% in children aged less than 4 years and 27% in children 4-16 years.<sup>13</sup>

We found a statistically significant association between SLI and behavioral disorders. The 24.9% subjects with language impairment had behavioral disorder compared to those without language impairment (13.7%). Beitchman *et al.* reported 50% of children with specific language impairment exhibited behavioral disorder, while only 12% of those without language impairment.<sup>14</sup> Cohen *et al.* (1993) reported that 34.4% of children with language impairment had behavioral disorder.<sup>15-18</sup>

The differences in prevalence rates of SLI and behavioral disorders were possibly due to the differences in the characteristics of specific language impairment and behavioral disorder risk factors, such as parents' educational level, socioeconomic status, parenting pattern applied, treatment of the children, and parental temperament. There were

43 (24.9%) subjects who had SLI and behavioral disorders. Most SLI subjects without behavioral disorders had the expressive language impairment, consisting of 110 (84.6%) children. Subjects who had behavioral disorders but no language impairment most commonly had an internalization behavioral disorder (71/160 children; 44.4%). Analysis of associations between several types of SLIs and behavioral disorders suggested that preschool children (3-5 years old) with SLI are at increased risk of internalization, attentive, and mixed type behavioral disorders. Children with expressive language impairment are at increased risk of externalization and mixed behavioral disorders, while those with receptive language impairment are not at risk of a behavioral disorder.

Our subjects were preschool aged children who attended kindergartens K1 and K2. Hence, we could gain access to these children and their parents for our study. However, a limitation of our study was that we did not include children who did not attend kindergarten. It can be assumed that a larger number of subjects with SLI and behavioral disorders could be identified if we had included children who did not attend kindergarten, since factors that influence and increase the prevalence of SLI and behavioral disorders include low socioeconomic level, low parental education level, and larger number of siblings. In addition, parents of preschool-aged children with language impairment or behavioral disorders may defer enrolling their children into preschool.

In conclusion, the prevalence of language impairment is 12.9%, which consisted of 10.2% expressive language impairment, 0.5% receptive language impairment, and 2.2% mixed language impairment. The prevalence of behavioral disorder is 15.1%, which consisted of 6.0% internalization behavioral disorder, 5.0% externalization behavioral disorder, 0.4% attentive behavioral disorder, and 3.7% various combinations of the three disorders. There is a strong association between language impairment and behavioral disorder ( $P=0.000$ ) ( $OR=2.082$ ; 95% CI 1.419 to 3.053). Expressive language impairment is associated with externalization and mixed behavioral disorders. Mixed language impairment is associated with internalization, attentive and mixed behavioral disorders. However, receptive language impairment is not associated with behavioral disorders.

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