Early Language Delay and Predictive Factors in Children Aged 2 Years†

Benjamas Prathanee PhD*,
Suzanne C Purdy PhD**, Bandit Thinkhamrop PhD***,
Bhunyabhadh Chaimay PhD****, Nitchara Ruangdaraganon MD*****,
Ladda Mo-suwan MD******, Rutja Phuphaibul PhD*******

†*This article was presented at the Seminar on Breastfeeding Research, Thai Health Promotion Foundation, Bangkok, 26 January 2007*
** Department of Otolaryngology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand*
*** Discipline of Speech Science, The University of Auckland, Auckland, New Zealand*
**** Department of Biostatistics and Demography, Faculty of Public Health, Khon Kaen University, Khon Kaen, Thailand*
***** Yala Provincial Health Office, Muang District, Yala, Thailand*
****** Department of Pediatrics, Ramathibodi Hospital, Faculty of Medicine, Mahidol University, Bangkok, Thailand*
******* Department of Pediatrics, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkla, Thailand*
******** Department of Nursing, Ramathibodi Hospital, Faculty of Medicine, Mahidol University, Bangkok, Thailand*

Objective: *To investigate the predictive factors for early language delay (ELD) at age 2 years based on the Prospective Cohort Study of Thai children (PCTC).*
Study design: *A prospective cohort study: secondary data retrieving.*
Subjects: *Three thousand nine hundred five children were recruited from four communities and one hospital in five areas of Thailand.*
Material and Method: *The Language Development Survey (LDS) was performed to identify children with early language delay (ELD) at age 2 years. Logistic regression analysis was used to investigate the association between possible factors (both biological and environment factors) and ELD.*
Main outcome measure: *Number of children with ELD at age of 2 years.*
Results: *The incidence of ELD at age 2 years was 11.68%. Risk factors for ELD were birth weight (Odds Ratio: OR =2.38, 95% Confidence interval: CI 1.65-3.42), male gender (OR = 2.12, 95% Confidence interval: CI 1.67-2.69), 3rd-4th and 5th child born or more (OR = 1.42, 95% CI = 1.02-1.96; OR = 1.88, 95% CI = 1.08-3.27, respectively), birth weight < 2,500 grams (OR = 2.38, 95% CI = 1.65-3.42), no first word within 1 year (OR = 2.25, 95% CI = 1.79-2.84), no walking within 1 year (OR = 1.34, 95% CI = 1.05-1.72), and maternal occupation (laborer or none) (OR = 1.36, 95% CI = 1.01-1.82). District living was a protective factor for ELD (OR = 0.42, 95% CI = 0.32- 0.54). There was no clear evidence for a link between breastfeeding and ELD.*
Conclusion: *Significant factors identified here raise strong concerns that should be addressed clinically when counseling families and planning treatment. Further study using a longer longitudinal design and more detailed information is recommended to better determine predictive factors for ELD or specific language impairment (SLI).*

Keywords: *Language development disorders, Language tests, Predictive value of tests*

J Med Assoc Thai 2009; 92 (7): 930-8
Full text. e-Journal: *http://www.mat.or.th/journal*

Correspondence to: Prathanee B, Department of Otolaryngology, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand. E-mail: benjamas@kku.ac.th

Delayed language development can result from peripheral sensory (hearing loss) or motor (speech apparatus) dysfunction. Language deficits may be secondary to more global disorders, such as mental retardation, psychiatric problems, or neurological disorders (*e.g.,* epilepsy, autism). Language disorders can also be acquired secondary to postnatal brain injury to areas of the brain that subserve language (acquired childhood aphasia). Even if all the above causes for language delay are excluded, there still exists a group of children with developmental language disorders, known as "early language delay (ELD)" or "specific language impairment (SLI)". There is substantial literature showing that children with SLI are at considerable risk for later language impairment[1-7], social and behavioral problems[8-12], as well as poor literacy (reading and spelling)[13]. Therefore, early detection is crucial for the identification of children with ELD or SLI that need early intervention versus late bloomers who may not need early intervention. If intervention is not recommended, a follow-up assessment should take place to determine whether progress toward the normal range is being made. Assuming that the condition qualifies as a disorder, the clinician needs to know what factors are positively and negatively affecting language skill development and whether intervention will help in the short or long term. The factors that affect ELD or SLI require parental counseling after diagnosis since it may be possible to mediate the effects of some risk factors in the home, such as family history with SLI or bilingualism.

A wide range of possible factors may contribute to language development, including both biological and environmental factors. Biological factors include birth weight, duration of breast-feeding, neonatal illness, birth order, and family history of specific language impairment (SLI). Environmental factors include the number of siblings in the family, maternal-paternal education, socioeconomic status, and a bilingual language environment. It is hypothesized that these factors contribute to risk for delayed language development or SLI. Some consistently arise as risk factors for SLI in the literature, such as gestational age < 37 weeks[14-16], low birth weight (between 1500 and 2499 g), and very low birth weight (birth weight < 1500 g)[16]. The effects of some factors are not clear, such as family history with SLI[7,17,18], low birth weight (birth weight < 2500 g)[19], and poverty[20]. There has been an interesting new finding regarding the role of breastfeeding in language development or susceptibility to SLI[21]. This case-controlled study aimed to determine the effects of prenatal and perinatal factors on SLI. One hundred and seventy-seven monolingual English speaking kindergarten children with SLI and 925 control group children with typical language development were investigated. Children with breastfeeding had 50% of protective effect on SLI incidence relative to those with no breastfeeding (OR = 0.5, 95% CI = 0.4-0.7). The present study also indicated that a long lasting period of breastfeeding (> 9 months) had a greater protective effect against SLI compared to 3-9 months of breastfeeding (OR = 0.4, 95% CI = 0.1-0.9). This finding was supported by Vestergaard et al study[22], which found that a longer duration of breastfeeding appeared to have a protective effect on early pre-linguistic language development. Significant positive effects on early polybabbling were found among infants with longer exclusive breastfeeding duration (2-3, 4-5 and $\geq$ 6 months), relative to those with 0-1 month breastfeeding duration (OR = 1.2, 95% CI = 1-1.4, OR = 1.3, 95% CI = 1.2-1.5, and OR = 1.5, 95% CI = 1.3-1.8, respectively). The findings also indicated that partial breastfeeding might have protective effects for early language development. Children with partial breastfeeding durations of 1, 2 and 3 months or more had prelinguistic skills earlier than those who had no breastfeeding (OR = 2, 95% CI = 1.1-3.6, OR = 1.8, 95% CI = 0.8-3.8, and OR = 1.2, 95% CI = 0.6-2.4, respectively). These predictive factors affecting language development or SLI are summarized in the authors' previously published literature review[23].

To the authors' knowledge, there has not been any study of predictive factors and speech and language in Asian countries. Therefore, clinicians have had to rely upon Western research for counseling and treatment of Thai children, which may not be appropriate given the cultural, environmental, and linguistic differences affecting child development in Thailand. A longitudinal cohort study of Thai children with ELD at age 2 years that could highlight risk factors and the critical time for identification of children who lack language skills would allow clinicians in Thailand and other Southeast Asian countries to have a more relevant evidence-based guide for their work.

The objective of the current study was to investigate the association between predictive factors, especially breastfeeding duration, and early language delay (ELD) at age 2 years based on The Prospective Cohort Study of Thai Children (PCTC).

Material and Method

Data using for analysis in the present study were secondary variables that were retrieved from the PCTC project. This project was established as follows:

The PCTC project was conducted in five areas of Thailand: three different community-based districts, the West, the South, the Northeast, one community-based city area in the North, and a hospital-based city area, the Center of Thailand.

Four thousand two hundred forty five children were enrolled for this project. Fifty-four children died, 11 children withdrew, and nine children were excluded from the study by pediatricians at age 1 month because they had significant health problems. Three thousand nine hundred five participants (missing 6.30%) were assessed for language screening at age 2 years (Fig. 1). This final sample size had sufficient statistical power (100%) for the detection of odds ratios from the logistic regression.

Measures

Main outcome: The main study outcome was whether a child had ELD at age of 2 years. This was dichotomous variable (0 = no, 1 = yes). Children were screened using the Language Development Survey (LDS) questionnaire, which was administered by well-trained research assistants in a face-to-face interview with mothers or caregivers. Based on the LDS, children who had vocabularies equal or less than 50 words or who had no combined words at age of 2 years were classified as ELD[24]. Four hundred and eighty two children (12.34%) were identified as ELD and the rest of the children (3,423 children or 87.66%) were considered to have typical language development.

Explanatory variables: Maternal history and childbirth information, based on interviews and hospital records at birth were used to obtain data. Both biological factors (*gestational age, birth weight*, *duration of breastfeeding*, *maternal age*, *child's gender*, *birth order, the first meaningful word within 1 year*, *the first step/walking within 1 year*, *and listening/attention duration of 5 minutes at 1 year*) and environmental factors *(maternal education*, *maternal occupation, maternal status*, *socioeconomic status*, *bilingual home*, *family members*, *and site of study*) that were extracted from the "picture diary developmental calendar" completed by parents and caregivers, as well as face-to-face interviews every three months, were obtained from the data base of the PCTC Project.

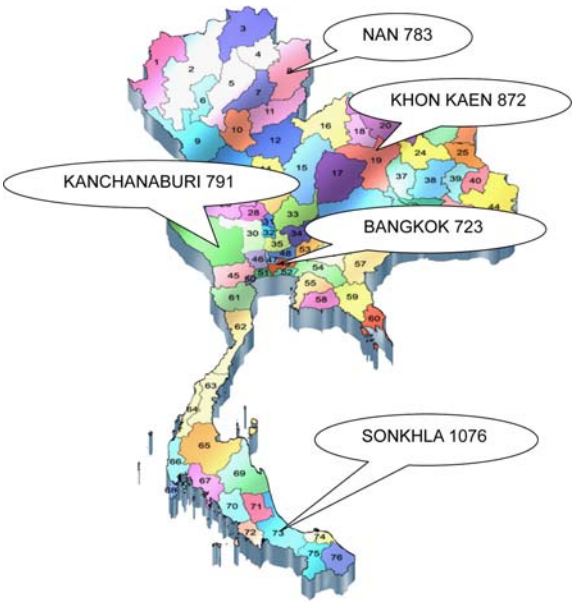

Fig. 1 Number of participants in each study area

Statistical analysis

Demographic characteristics of the children were described using numbers and percentages. Multiple logistic regression was used to investigate which factors were associated with of ELD at age 2 years. Factors that were potential risks of ELD were identified based on an extensive review literature and were the candidates to enter the initial logistic model. Other factors were selected based on bivariate analysis where there p-value are less than 0.2. Backward elimination method was used for obtaining the final model. Stata (StataCorp, TX) was used for all data analysis. Significant level was set to be 0.05.

Results

Demographic characteristics of these children including biological and environmental predictors are shown in Table 1. Language delay was estimated based on parental report using the LDS to determine vocabulary size and use of combined words.

Possible explanatory factors and language outcomes for the 3,125 children (80% of 3,905) with complete data were fitted with a model to explore the relationship between breastfeeding and other predictive factors and ELD. The incidence of ELD at age 2 years was 11.68% (365/3,125).

Table 1. Demographic characteristics of study children aged 2 years (n = 3,125)

Factors	Number	Percentage	Factors	Number	Percentage
Biological factors			Environment factors		
Breastfeeding within 1 year			Maternal education		
1-3 months	784	25.09	Certificate or more	550	17.60
4-6 months	306	9.79	Secondary school	890	28.48
7-9 months	158	5.06	≥ Primary school	1,685	53.92
10-12 months	1,877	60.06	Maternal status		
Gestational age			Separated	2,901	92.83
38-41 weeks	2,432	77.82	Married	224	7.17
24-37 weeks	570	18.24	Maternal occupation		
42-45 weeks	123	3.94	Office or professional	878	28.10
Gender			Laborer or none	2,247	71.90
Female	1,578	50.50	Socioeconomic status		
Male	1,547	49.50	Sufficient or higher	509	16.29
Birth order			Slightly insufficient	1,587	50.78
1st -2nd child born	2,530	80.96	Insufficient	1,029	32.93
3rd-4th chi ld born	472	15.10	Language number		
5th child born and more	123	3.94	Monolingual	2,676	85.63
Birth weight			Bilingual or more	449	14.37
2500-5220	2,875	92.00	Family membership at 1 year		
855-2499	250	8.00	7-22 persons	2,431	77.79
Maternal age			2-6 persons	694	22.21
14-34 years	2,730	87.36	Site		
35-48 years	395	12.64	Cites	1,044	33.41
First word within 1 year			Districts	2,081	66.59
Yes	1,960	62.72			
No	1,165	37.28			
Walking within 1 year					
Yes	1,343	42.98			
No	1,782	57.02			
Listening duration 5 month					
Yes	523	16.74			
No	2,602	82.67			

ELD = early language delay, OR = odds ratio, CI = confidence interval

Factors affecting ELD at age 2 years

Crude analysis indicated that most factors, both biological and environmental, were tentative predictors for ELD at age 2 years and the association between these possible predictors and ELD after controlling for other factors was further explored using adjusted odds ratios as shown in Table 2. Odds ratios (OR) show the magnitude of the effect of the association. For biological variables, low birth weight, male gender, 3rd-5th or more birth orders, no first word within 1 year, no first step walking within 1 year, and maternal occupation (laborer or none) were statistically significant strong risk predictors for ELD.

The odds ratio of birth weight 2.38 (Table 2) indicates that children with low birth weights had significant risk for ELD, compared to normal birth weight infants. Other risk predictors for ELD were being male (OR = 2.12), being born 3rd, 4th, 5th or more in the family relative to 1st or 2nd (OR = 1.42 and 1.88, respectively), producing no first word within 1 year (OR = 2.25), and no walking independently within 1 year (OR = 1.34). In contrast, district living had a protective effect against ELD (OR = 0.42). The adjusted odds ratios showed that breastfeeding had no clear effect on ELD.

Amongst the environmental factors, the strong predictors of ELD at 2 years were maternal occupation and site of study. Interestingly, children whose mothers worked as an office worker or a professional were 1.36 times more at risk for ELD than

Table 2. Crude and adjusted factors affecting ELD for children aged 2 years (n = 3,125)

Factors	Number	ELD (%)	Crude OR	Adjusted OR	95% CI	p-value
Biological factors						
Breastfeeding within 1 year						0.765
1-3 months	784	12.50	1	1	-	
4-6 months	306	10.78	0.84	0.94	0.61-1.45	
7-9 months	158	13.92	1.13	1.26	0.74-2.12	
10-12 months	1,877	11.29	0.89	0.96	0.70-1.30	
Gestational age						0.581
38-41 weeks	2,432	11.18	1	1	-	
24-37 weeks	570	14.56	1.35	1.10	0.82-1.47	
42-45 weeks	123	8.13	0.70	0.77	0.38-1.53	
Gender						<0.001
Female	1,578	7.79	1	1	-	
Male	1,547	15.64	2.19	2.12	1.67-2.69	
Birth order						0.024
1st-2nd child born	2,530	10.87	1	1	-	
3rd-4th child born	472	13.56	1.29	1.42	1.02-1.96	
5thchild born and more	123	21.14	2.20	1.88	1.08-3.27	
Birth weight						<0.001
2500-5220 grams	2,875	10.85	1	1	-	
855-2499 grams	250	21.20	2.21	2.38	1.65-3.42	
Maternal age						0.336
14-34 years	2,730	11.39	1	1	-	
35-48 years	395	13.67	1.23	0.84	0.59-1.20	
First word within 1 year						<0.001
Yes	1,960	8.01	1	1	-	
No	1,165	17.85	2.50	2.25	1.79-2.84	
Walking within 1 year						0.019
Yes	1,343	8.49	1	1	-	
No	1,782	14.09	1.77	1.34	1.05-1.72	
Listening duration 5 month						0.064
Yes	523	9.94	1	1	-	
No	2,602	12.03	1.24	1.36	0.98-1.89	
Environment factors						
Maternal education						0.098
Certificate or more	550	12.36	1	1	-	
≤ Primary school	1,685	12.34	1.00	1.43	0.97-2.11	
Secondary school	890	10.00	0.79	1.09	0.75-1.60	
Maternal status						0.200
Married	2,901	11.51	1	1	-	
Separated	224	13.84	1.23	1.32	0.87-2.01	
Maternal occupation						0.042
Office or professional	878	14.01	1	1	-	
Laborer or none	2,247	10.77	1.35	1.36	1.01-1.82	
Socioeconomic status						0.748
Sufficient or higher	509	12.57	1	1	-	
Insufficient	1,029	11.08	0.87	0.97	0.66-1.42	
Slightly insufficient	1,587	11.78	0.93	0.90	0.64-1.25	
Language number						0.526
Monolingual	2,676	11.43	1	1	-	
Bilingual or more	449	13.14	1.17	1.11	0.81-1.52	
Family membership at 1 year						0.353
2-6 persons	2,431	10.82	1	1	-	
7-22 persons	694	14.70	1.42	1.14	0.87-1.50	
Site						<0.001
Cities	1,044	16.95	1	1	-	
Districts	2,081	9.03	0.49	0.42	0.32-0.54	

ELD = early language delay, OR = odds ratio, CI = confidence interval

those whose mothers worked as a laborer or were not employed. Children who lived in district areas (Pranomtuan, Kranuan, and Thepa) had significantly greater protection against having ELD relative to city areas (Nan and Bangkok).

Discussion

The incidence of ELD at age 2 years was 11.68%. This value falls within the overall estimated prevalence range of 2.63-16% for primary language delay (PLD) in children aged 2-7 years based on a systematic review of the speech and language screening studies[25].

A logistic model was constructed to explore the association between multiple possible covariates and ELD. The strongest risk factors for ELD were birth weight, gender, and no production of first word within 1 year. Children with low birth weight (< 2,500 grams) had a risk effect (OR = 2.38) for having ELD. This is consistent with a previous finding[16] that children with moderate (1500-2499 grams) and very low (< 1500 grams) birth weight are at greater risk for having SLI compared to children with normal birth weight (> 2500 grams) (OR = 1.40, 95% CI = 1.20-1.50 and OR = 2.20, 95% CI = 1.80-2.28, respectively)[19]. Thus, birth weight appears to be a robust predictor of risk for early language difficulties.

There is controversy regarding gender ratios in SLI, however, the present study indicates that gender was a strong predictor for having ELD. Being male was a risk factor for ELD (OR = 2.12, 95% CI = 1.67-2.69). This finding agrees with the previous studies[26,27] showing higher rates for SLI in males than females (1.3:1 - 2:1).

Children who did not produce the first word within the first year were at greater risk (OR = 2.25, 95% CI = 1.79-2.84) for ELD at 2 years, relative to those who did. This finding suggests that delayed first word is a significant predictor for ELD at age 2 years. The importance of very early linguistic behavior in predicting later language difficulties has been noted in other studies[28,29].

Children who were born first or second in the family had a protective effect against ELD. This result supports recent studies[16,20] showing that being the first or second born child has a protective effect for having SLI, compared to the third, fourth, fifth, or higher birth order. It is possible that this birth order effect results from the parent having more time to interact with early born children than later born children. Alternatively, this might be due to other factors that may be associated with higher birth order, such as poorer maternal antenatal health and nutrition, and less adequate housing, caregiver support, and resources.

Children who did not walk their first step within the first year had a greater risk factor for having ELD, consistent with previous evidence for an association between motor immaturity and SLI[30]. Thus, early motor development was a protective predictor of ELD. There has been speculation regarding causes for the relatively high co-morbidity of motor deficits and SLI[31], including the possibility of a common process underlying both areas of difficulty such as a generalized slowing of processing speed.

An interesting aim of the current study was to investigate the association between breastfeeding and ELD. There was no significant effect on ELD at 2 years in the current study. This did not agree with previous studies that found a clear effect of breast-feeding duration on language development at older age (*kindergarten)*[19]. It might be that the effects of breast milk on neurodevelopment in the present study were not strong enough to identify putative effects on language development at 2 years. This discrepancy may be resolved by further research that could explore the relationship between breastfeeding and language difficulty at an older age, or focus on the association between the exclusive breastfeeding and early language delay, or explore other language measures.

When considering environmental factors, the site of study was the strongest protective predictor for having ELD. The city study sites, *Nan and Bangkok*, are quite busy cities, with traffic jam problems that affect everyday life. Parents or caregivers might be busy with daily life activities such as preparing food and transportation with less time to play, interact, and encourage language skills in their children. An easier lifestyle in the district areas, *Pranomtuan, Kranuan, and Thepa,* may enable parents or caregivers to have more time to interact with their children and encourage language development. The positive effects that parents can have on early language development have been noted in language intervention studies[32,33]. Thus, there was a protective effect (OR = 0.42, 95% CI = 0.32-0.54) on language skills of living in a district areas compared to city areas.

Maternal occupation was another factor that affected ELD. Children whose mothers were laborers or not employed (home workers or students or teenagers) were 1.36 times (95% CI = 1.01-1.82) more at risk for ELD than those whose mothers were

office workers or professionals. Unlike previous studies[16,19,34], maternal education was not a significant predictor for ELD in the current study; it is strongly recommended that this be considered in further research to clarify this discrepancy.

Conclusion

The strongest biological predictors for ELD were birth weight, gender, age of the first word, or language status at age of 1, followed by motor development at age 1. The strongest environmental factor was the area in which the study was conducted, followed by maternal occupation. Even though breastfeeding had no clear effect on ELD at 2 years, this effect should be explored in a longer longitudinal study with exclusive breastfeeding specified.

Results from the present study can be used for parent counseling when deciding whether to "wait and see" or whether short or long-term intervention is recommended for ELD. Presumably, those with more risk factors for ELD may continue to have language difficulties and hence should be targeted for early intervention. Long-term follow-up of the children in the current study may provide more insight into factors that predict resolution of early language difficulties, which create considerable costs for families and communities.

Acknowledgements

The present study was supported funding by Thai Breastfeeding Center and a part of The Prospective Cohort Study of Thai Children (PCTC), which was supported by The Thailand Research Fund Regional Office, Health System Research Institute, Thai Ministry of Public Health, as well as the World Health Organization. We gratefully acknowledge research assistants, and parents and children who participated in this project.

References

1. Paul R, Looney SS, Dahm PS. Communication and socialization skills at ages 2 and 3 in "late-talking" young children. J Speech Hear Res 1991; 34: 858-65.
2. Johnson CJ, Beitchman JH, Young A, Escobar M, Atkinson L, Wilson B, et al. Fourteen-year follow-up of children with and without speech/language impairments: speech/language stability and outcomes. J Speech Lang Hear Res 1999; 42: 744-60.
3. Nathan L, Stackhouse J, Goulandris N, Snowling MJ. The development of early literacy skills among children with speech difficulties: a test of the "critical age hypothesis". J Speech Lang Hear Res 2004; 47: 377-91.
4. Rescorla L, Roberts J, Dahlsgaard K. Late talkers at 2: outcome at age 3. J Speech Lang Hear Res 1997; 40: 556-66.
5. Weismer SE, Murray-Branch, Miller JF. A prospective longitudinal study of language development in late talkers. J Speech Hear Res 1994; 37: 852-67.
6. Bishop DV, Edmundson A. Language-impaired 4-year-olds: distinguishing transient from persistent impairment. J Speech Hear Disord 1987; 52: 156-73.
7. Thal DJ, Reilly J, Seibert L, Jeffries R, Fenson J. Language development in children at risk for language impairment: cross-population comparisons. Brain Lang 2004; 88: 167-79.
8. Beitchman JH, Nair R, Clegg M, Ferguson B, Patel PG. Prevalence of psychiatric disorders in children with speech and language disorders. J Am Acad Child Psychiatry 1986; 25: 528-35.
9. Silva PA, Williams S, McGee R. A longitudinal study of children with developmental language delay at age three: later intelligence, reading and behaviour problems. Dev Med Child Neurol 1987; 29: 630-40.
10. Paul R, Cohen DJ. Outcomes of severe disorders of language acquisition. J Autism Dev Disord 1984; 14: 405-21.
11. Cantwell DP, Baker L. Clinical significance of childhood communication disorders: perspectives from a longitudinal study. J Child Neurol 1987; 2: 257-64.
12. Rice ML, Sell MA, Hadley PA. Social interactions of speech- and language-impaired children. J Speech Hear Res 1991; 34: 1299-307.
13. Catts HW, Fey ME, Tomblin JB, Zhang X. A longitudinal investigation of reading outcomes in children with language impairments. J Speech Lang Hear Res 2002; 45: 1142-57.
14. Luoma L, Herrgard E, Martikainen A, Ahonen T. Speech and language development of children born at < or = 32 weeks' gestation: a 5-year prospective follow-up study. Dev Med Child Neurol 1998; 40: 380-7.
15. Weindrich D, Jennen-Steinmetz C, Laucht M, Esser G, Schmidt MH. At risk for language disorders? Correlates and course of language disorders in preschool children born at risk. Acta Paediatr 1998; 87: 1288-94.
16. Stanton-Chapman TL, Chapman DA, Bainbridge NL, Scott KG. Identification of early risk factors for language impairment. Res Dev Disabil 2002; 23: 390-405.

17. Rice ML, Haney KR, Wexler K. Family histories of children with SLI who show extended optional infinitives. J Speech Lang Hear Res 1998; 41: 419-32.
18. Tallal P, Ross R, Curtiss S. Familial aggregation in specific language impairment. J Speech Hear Disord 1989; 54: 167-73.
19. 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: 1245-60.
20. Horwitz SM, Irwin JR, Briggs-Gowan MJ, Bosson Heenan JM, Mendoza J, Carter AS. Language delay in a community cohort of young children. J Am Acad Child Adolesc Psychiatry 2003; 42: 932-40.
21. Tomblin JB, Smith E, Zhang X. Epidemiology of specific language impairment: prenatal and perinatal risk factors. J Commun Disord 1997; 30: 325-44.
22. Vestergaard M, Obel C, Henriksen TB, Sorensen HT, Skajaa E, Ostergaard J. Duration of breast-feeding and developmental milestones during the latter half of infancy. Acta Paediatr 1999; 88: 1327-32.
23. Prathanee B, Thinkhamrop B, Dechongkit S. Factors associated with specific language impairment and later language development during early life: a literature review. Clin Pediatr (Phila) 2007; 46: 22-9.
24. Rescorla L. The Language Development Survey: a screening tool for delayed language in toddlers. J Speech Hear Disord 1989; 54: 587-99.
25. Law J, Boyle J, Harris F, Harkness A, Nye C. Screening for speech and language delay: a systematic review of the literature. Health Technol Assess 1998; 2: 1-184.
26. Beitchman JH, Nair R, Clegg M, Patel PG, Ferguson B, Pressman E, et al. Prevalence of speech and language disorders in 5-year-old kindergarten children in the Ottawa-Carleton region. J Speech Hear Disord 1986; 51: 98-110.
27. Rodrigues L, da Silva PA, Pinto P, Galego N, Silva N, Pereira LM. Identification of the in vivo topically applied "human-identical" ceramides included in negatively charged liposomes. Boll Chim Farm 1998; 137: 395-402.
28. Paul R, Jennings P. Phonological behavior in toddlers with slow expressive language development. J Speech Hear Res 1992; 35: 99-107.
29. Olswang LB, Rodrguez B, Timler G. Recomending intervention for toddlers with specific language learning difficulties: we may not have all the answer, but we know a lot. Am J Speech Lang Patho 1998; 7: 23-32.
30. Bishop DV. Motor immaturity and specific speech and language impairment: evidence for a common genetic basis. Am J Med Genet 2002; 114: 56-63.
31. Hill EL. Non-specific nature of specific language impairment: a review of the literature with regard to concomitant motor impairments. Int J Lang Commun Disord 2001; 36: 149-71.
32. Bowen C, Cupples L. Parents and children together (PACT): a collaborative approach to phonological therapy. Int J Lang Commun Disord 1999; 34: 35-55.
33. Iacono TA, Chan JB, Waring RE. Efficacy of a parent-implemented early language intervention based on collaborative consultation. Int J Lang Commun Disord 1998; 33: 281-303.
34. Dollaghan CA, Campbell TF, Paradise JL, Feldman HM, Janosky JE, Pitcairn DN, et al. Maternal education and measures of early speech and language. J Speech Lang Hear Res 1999; 42: 1432-43.

Appendix. Operational definitions

Breastfeeding	refers to feeding of breast milk direct from the maternal breast whether this includes also breast milk fed by other means - bottle, cup, and spoon.
Formula feeding	refers to the child has received any liquid or semi-solid food from a bottle with a nipple/teat.
Exclusive breastfeeding	refer to feeding only breast milk without other food or liquid.
Early language delay	refer to failure to acquire language at a typical rate, no significant co-occurring cognitive, emotional neurological, perceptual, or sensory deficits at age < 3 years.
Specific language impairment	refers to the failure to acquire language at a typical rate, with no significant co-occurring cognitive, emotional neurological , perceptual, or sensory deficits at age = 3 years.

พัฒนาการภาษาล่าช้าและปัจจัยในการทำนายในเด็กอายุ 2 ปี

เบญจมาศ พระธานี, ซูซาน ซี เปอร์ดี, บัณฑิต ถิ่นคำรพ, ปุญญพัฒน์ ไชยเมย์, นิชรา เรืองดารกานนท์, ลัดดา เหมาะสุวรรณ, รุจา ภู่ไพบูลย์

วัตถุประสงค์: *เพื่อหาความสัมพันธ์ระหว่างปัจจัยที่มีผลต่อการพัฒนาการทางภาษาล่าช้าของเด็กอายุ 2 ปี ในโครงการวิจัยเด็กระยะยาว (The Prospective Cohort Study of Thai Children: PCTC)*

รูปแบบของการศึกษา: *การศึกษาเด็กระยะยาวโดยใช้ข้อมูลที่มีอยู่ในโครงการวิจัยเด็กระยะยาว*

กลุ่มตัวอย่าง: *เด็กจำนวน 3,905 คนบนฐานข้อมูลจาก 4 อำเภอและ 1 โรงพยาบาลใน 5 ภูมิภาคในประเทศไทย*

วัสดุและวิธีการ: *ใช้แบบสำรวจพัฒนาภาษา (Language development survey) ในการคัดแยกเด็กที่มีพัฒนาการภาษาล่าช้าที่อายุ 2 ปี และใช้การวิเคราะห์การถดถอยเชิงพหุโลจิสติกในการหาความสัมพันธ์ระหว่างปัจจัยต่าง ๆ เกี่ยวข้อง (ทั้งทางด้านชีววิทยาและด้านสิ่งแวดล้อม) และการพัฒนาภาษาล่าช้า*

ตัวแปรหลักที่วัด: *เด็กอายุ 2 ปีที่มีภาวะพัฒนาการภาษาล่าช้า*

ผลการศึกษา: *ปัจจัยเสี่ยงที่มีผลต่อการพัฒนาภาษาล่าช้าคือเพศชาย (OR = 2.12, 95% CI = 1.67-2.69), ลำดับการเกิดลำดับที่ 3, 4, 5 หรือมากกว่า (OR = 1.42, 95% CI = 1.02-1.96; OR = 1.88, 95% CI = 1.08-3.27 ตามลำดับ), น้ำหนักแรกเกิด < 2,500 กรัม (OR = 2.38, 95% CI = 1.65-3.42), การไม่พูดคำแรกเมื่ออายุ 1 ปี (OR = 2.25, 95% CI = 1.79-2.84), การยังไม่เดินเมื่ออายุ 1 ปี (OR = 1.34, 95% CI = 1.05-1.72) การมีอาชีพระดับรับจ้างกรรมาชีพหรือไม่มีอาชีพของมารดา (OR = 1.36, 95 % CI = 1.01-1.82) การที่เด็กอาศัยอยู่ในชนบทเป็นปัจจัยที่ลดความเสี่ยงต่อการพัฒนาภาษาและการพูดล่าช้า (OR = 0.42, 95 % CI = 0.32- 0.54) แต่ไม่มีข้อมูลที่แสดงถึงความสัมพันธ์ระหว่างระยะเวลาของการให้นมแม่ต่อการพัฒนาภาษาล่าช้า*

สรุป: *บุคลากรที่เกี่ยวข้องทางการแพทย์สามารถใช้ผลการศึกษาครั้งนี้ในการให้คำแนะนำพ่อแม่ของเด็กที่มีพัฒนาภาษาและการพูดล่าช้า และวางแผนการรักษา การศึกษาในครั้งต่อไปควรศึกษาปัจจัยที่สามารถทำนายภาวะการพัฒนาล่าช้าที่กว้างขวางมากขึ้นและระยะยาวมากขึ้น*