

Factors affecting Language Delay in Preschool Children

Shimaa Abdallah Elsayed* Maisa Nasr Farid* Hassnaa Othman Mohammed* Reham Senosy*
 *Medical Studies Department for children, Faculty of Postgraduate Childhood Studies, Ain Shams University

Abstract

Background: Early childhood is a critical period for developing language skills. It enables the child to communicate with others in their environment, encourages the development of cognitive skills and promotes socio- emotional regulation.

Patients and methods: Crosssectional descriptive study carried on 300 children who attended the outpatient clinic of Special Need Center, Faculty of Post Graduate Childhood Studies, Ain Shams University with language delay. Their ages ranged between 1.5 years to 5 years. All patients were subjected to full history taking, complete clinical examination, audiological evaluation, and cognitive abilities assessment.

Results: Language delay is more common in boys but there was no significant relation between studied patients as regard sex. (49.6%) of fathers and (68.0%) were high educated, (94.7%) of fathers and only (21.3%) were working, more than half of cases had >2 hours daily media exposure, (56.7%) of them were not attending neither nursery nor kindergarten. There were significant differences between the studied patients as regard prenatal complication, mode of delivery, birth term and weight. (49.6%) of patients had low cognitive abilities and only (10.3%) had hearing loss.

Conclusion: Biological factors (such as gender, family history of language delay, consanguineous marriage), poor environmental stimulation (such as having more than 2 hours daily media exposure, no nursery or kindergarten attendance, absence of stories and low toys at home), and low cognitive abilities all are factors affecting early language development.

Key words: language delay, preschool, child, developmental delay.

تأخر اللغة لأطفال مرحلة ما قبل المدرسة

تعد اللغة هي وسيلة التواصل الإنساني التي يمكن من خلالها مشاركة المواطن والمعلومات، ويمكن للطفل من خلالها التواصل مع الآخرين في البيئة المحيطة، وتهدف الدراسة إلى معرفة العوامل التي تؤثر على تكوين اللغة لأطفال مرحلة ما قبل المدرسة.

وقد أجريت الدراسة على ٤٨٠ طفلاً من الأطفال الذين يعانون من تأخر اللغة ولكن ٣٠٠ طفل فقط دخلوا في الدراسة ممن حضروا عيادة الأطفال الخارجية بمركز ذوي الاحتياجات الخاصة، كلية دراسات الطفولة العليا، جامعة عين شمس، ويشكون من عدم القدرة على التحدث بشكل صحيح كما هو متوقع لأعمارهم. وتراوح أعمارهم بين سنة ونصف إلى ٥ سنوات.

وقد خضع جميع الأطفال لسجل تاريخي تفصيلي، الفحص السريري، المقابلة النفسية الإكلينيكية تعتمد على الدليل التشخيصي والإحصائي للاضطرابات العقلية-الطبية الخامسة، التقييم السمعي، تقييم القدرات المعرفية.

وأوضحت الدراسة أن أغلبية حالات الدراسة كانت ذكور بنسبة ٧١%، و٢٩% كانوا إناث ومتوسط أعمارهم ثلاث سنوات وشهر، ولوحظ أن معظم المرضى كان تعليم الوالدين من خريجي الجامعة، وكان معظم الآباء يعملون كموظفين بينما الأمهات لا يعملون، وكان ٨٧,٧% يعيشون في المناطق الحضرية، و٥٣,٣% من المرضى كان الوالدين أقارب، و٦٤% من المرضى يتعرضون يومياً لأكثر من ساعتين لوسائل الإعلام، و٥٦,٧% من المرضى لا يذهبون إلى الحضانه، و٦٣% من أمهات الأطفال لم يعانون من أي خلل خلال الحمل، و٦٦% من المرضى كانت ولادتهم قيصرية، و٩٠% منهم كانوا مكتملين لمدة الحمل، و٨٧% كان وزنهم عند الولادة في المتوسط، و١٢% كانوا أطفال مبشرين، و٣٨,٤% رضاعة طبيعية، و٧٠% من المرضى ليس لديهم تاريخ مرضي سابق، و٧٦% من المرضى لديهم تاريخ عائلي لتأخر اللغة، و٧١% من المرضى لا يعانون من أي خلل في الفحص السريري، و٢١,٣% لديهم إعاقة ذهنية، و١٦,٧% من المرضى كانت قدراتهم العقلية أقل من المتوسط، و١٠,٣% من المرضى لديهم ضعف السمع.

الخلاصة: تعد العوامل البيولوجية مثل الجنس والتاريخ العائلي لتأخر اللغوي وزواج الأقارب وعدم توفير التحفيز البيئي المناسب وكذلك ضعف القدرات الإدراكية للأطفال، جميع هذه العوامل تؤثر على تطور اللغة في وقت مبكر.

Background:

Language is the human communication way, through which emotions, ideas, information, and beliefs can be shared which can be mastered by developing children during preschool age (Al- Fadhli and Al-Bunaian, 2017). Language development is a dynamic process (Shetty, 2012) through which the child can communicate with others, encourages the development of cognitive skills and promotes social interactions (Rowe et.al., 2012). The neural networks for language acquisition are present before birth "in utero" (Perani et.al., 2011).

Language delay means that the child is developing language in the correct sequence but at a slower rate than expected (Wallace et.al., 2015).

Language delay may be primary (with no identified cause) or secondary (when other developmental, sensory, or physical problems can explain the language delay), another term used for primary language disorder is specific language impairment (SLI) (Berkman et.al, 2015).

Delayed language development (DLD) is a warning sign for many developmental disorders (Hoff and Ribot, 2017). The risk factors involved in language delay may be non- modifiable such as gender, and chromosomal syndromes (Gad- Allah et.al., 2012), or modifiable such as impaired social interaction between caregiver and children (Byeon and Hong, 2015).

Therefore, this study aimed to identify factors affecting early language development in preschool children who were seeking medical advice in Ain- Shams University, Faculty of Postgraduate Childhhod Studies, Special needs center.

Patients And Methods

The present study was a cross sectional descriptive study conducted on 300 children recruited from the outpatient clinic of our special needs center with language delay from the period of December, 2017 till December, 2018. Their ages ranged between 1.5 to 5 years whose parents agreed to participate in the study and the patients included were 213 males and 87 females.

All patients were subjected to detailed history taking using structured interview questionnaire which cover the following items:

1. Demographic data (age, sex, order of birth).
2. Sociodemographic data (parents' education, occupation, Residency).
3. Environmental\ Social characteristics (number of hours of media exposure daily, nursery\ kindergarten attendance).
4. Medical factors (prenatal complication, natal factors such as mode of delivery, birth weight, birth term, incubator admission, postnatal factors including type of feeding after birth, past history for the child illness, family history of language delay, parents' consanguinity).

A complete clinical examination (including all body systems), clinical psychiatric interview, audiological evaluation (including tympanometry and hearing tests determined according to the child's mental age to prove normal peripheral hearing or hearing loss (HL)), and cognitive abilities assessment (tailored according to the child age and intellectual leveither Stanford- Binet Intelligence Scales- fifth Edition, The Arabic version to

(Factors Affecting Language Delay...)

assess intellectual ability (Abu El- Nil, 2011) or Vineland Adaptive Behavior Scales (VABS) to assess the adaptive functions of individuals (Sparrow et.al., 1984)).

Ethical considerations:

Ethical consideration according to the research ethics committee of both Ain Shams University and Faculty of postgraduate childhood studies.

Statistical Methods:

The collected data was organized; tabulated and analyzed using the statistical package for the social science (SPSS) version 12, SPSS corporation, Chisago, Illinois, USA. The data were presented as numbers and percentages for the qualitative data, mean, standard deviations and ranges for the quantitative data. Chi- square test was used to compare frequency of qualitative variables among the different groups. For all tests a probability (p< 0.05) was considered significant.

Results:

The current study was carried on 300 children (213 males and 87 females) with a mean of age 3.1±1.3 years. The demographic and socioeconomic data of studied patients were presented in table (1) and there were significant differences between the studied patients as regard father education and occupation, father education 79.3%, and occupation 94.7% (P value >0.05)

Table (1) Demographic and socioeconomic data of studied patients

Age (Years)		Mean± SD 3.1±1.3		Range 1.5- 5
Variables		No	%	P Value
Sex	Male	213	71.0%	0.975
	Female	87	29.0%	
Residency	Rural	37	12.3%	0.1
	Urban	263	87.7%	
Birth Order	1 st Order	112	37.3%	
	2 nd - 4 th	184	61.4%	
	4 th order>	4	1.3%	
Father Education	Not	62	20.7%	0.01*
	Educated	238	79.3%	
Mother Education	Not	96	32.0%	0.1
	Educated	204	68.0%	
Father Occupation	Not	16	5.3%	0.01*
	Working	284	94.7%	
Mother Occupation	Not	236	78.7%	0.1
	Working	64	21.3%	

More than half of cases had >2 hours daily media exposure, and (56.7%) of them were not attending neither nursery nor kindergarten as shown in table (2).

Table (2) Environmental\ Social characteristics of studied patients

Variables		No	%
Media exposure (hour\ day)	<1 Hour\ Day	57	19.0%
	1- 2 hour\ Day	51	17.0%
	>2hours\ Day	192	64.0%
Nursery\ Kindergarten Attendance	No	170	56.7%
	Irregular (<6ms)	74	24.7%
		Regular (>6ms)	40
	Kindergarten	16	5.3%

As shown in table (3), 63%, of patients had no prenatal complication, 87.0% had average birth weight there were significant differences between the studied patients as regard prenatal complication (p value 0.025*), mode of delivery, birth term and birth weight (p value 0.001*).

Table (3) Medical factors of studied patients

Variables		No	%	P Value
Prenatal Complication	No	189	63.0%	0.025*
	Yes	111	37.0%	
Mode Of Delivery	Vaginal Delivery	102	34.0%	0.05*
	Cesarean Section	198	66.0%	
Birth Term	Full Term	273	91.0%	0.025*
	Pre- Term	27	9.0%	
Birth Weight	Average	261	87.0%	0.001*
	Low	39	13.0%	
Incubator Admission	No	224	74.7%	0.1
	Yes	76	25.3%	
Type Of Feeding After Birth	Breast Fed	115	38.4%	0.95
	Artificial Fed	82	27.4%	
	Both	102	34.1%	
Past History	No	210	70.0%	0.95
	Yes	90	30.0%	
Family History Of Language Delay	No	72	24.0%	0.95
	Yes	228	76.0%	
Parents Consanguinity	Positive	160	53.3%	0.9
	Negative	140	46.7%	

Most of cases had no abnormalities detected in clinical examination, about half of cases had low cognitive abilities and only (10.3%) had HL as shown in table (4).

Table (4) Clinical examination and assessment of studied patients

Variables		No	%
Clinical Examination	Normal	213	71.0%
	Dysmorphic Features	21	7.0%
	Abnormal Occipito- Frontal Circumference (OFC)	20	6.7%
	Abnormal Neurological Examination	18	6.0%
	Abnormal General Examination	28	9.3%
Cognitive Abilities	Average	41	13.7%
	Sub- Average	110	36.7%
	Low	149	49.6%
Hearing Assessment	Normal	31	10.3%
	Hearing Loss	269	89.7%

Discussion:

Language is a crucial aspect in the overall child development (McLeod and Verdon, 2014). The factors affect language development includes environmental/ social and biological factors. The interplay of those factors can affect the normal language development (AlHammadi, 2017) so; the aim of this work was to identify factors affecting early language development and main causes of language delay in preschool children.

In the current study the mean age of studied patients was 3 years and 1 month. Our results agreed with Silva et.al (2013) who found that the mean age of cases on Brazil were 3 years. But Al- Fadhli et.al (2017) on Saudi Arabia found that the mean age of cases were 4 years and Aboufaddan and Ahmed (2018) found in their study on children with language delay aged (3- 5) years at Assiut university hospitals on Cairo, Egypt that the mean

age of studied patients was 4.3 years and there was significant relation between case and control as regard age. The differences between studies may be explained by absence of screening for language delay in primary health care centers, poor orientation of families about language delay especially in early years of life.

In the current study boys were 2.5 times more affected than girls. Our results agreed with Sunderajan and Kanhere (2019) who found that boys more commonly affected than girls (59.5%, 40.5% respectively). This may be attributed to the slower maturation of the central nervous system among boys; the effect of testosterone that stops cell death and makes proper connections difficult (Silva et.al., 2013).

We found that (20.7%) of parents were not educated. This was in disagreement with Aboufaddan and Ahmed (2018) who found that (10%) of parents were illiterate/ read and write. On the other hand, the majority of fathers in our study were working (94.7%); while the majority of mothers (78.7%) were house wives. This was different with Abdel Khalek et.al. (2018) who suggested that the maternal employment initiates a cascade of early starting and long- lasting care of infants by others such as grandparents, baby- sitters, may affect establishing the attachment relationship between infants and their mothers, and can affect cognitive development.

Most of cases in the study (87.7%) were living in urban areas but there was no significant difference between the studied patients as regard residency. This can be explained by cases who received medical advice in our special needs center were living in Cairo and the areas around which are mostly urban regions. But, This was in disagreement with Mondal et.al (2016) who found that only (64.8%) of cases were living in rural regions in India. Regarding the order of birth, about one third of cases in our study were 1st order of birth, as the first- born children exposed to an early social and language environment which was different from that experienced by later- born children (Abdel Khalek et.al., 2018).

The parent- child interaction is an essential component for language development (Al- Fadhli et.al (2017) as language learning does not occur passively (Dunphy- Lelii et.al., 2014). We found more than half of patients had media exposure > 2 hours daily. This is similar with Byeon and Hong (2015) who found 2.7 times increase in the risk of language delay for children watching TV > 2 hours daily; and the risk increased proportionately with increase in TV time. The American Academy of Pediatrics (AAP, 2016) advised children aged < 2 years to have minimal or no screen media exposure.

We found more than half of cases had no nursery/ kindergarten attendance. Ribeiro et.al (2017) suggested that peers at classroom had positive effects on the child's cognitive and language skills. Also; the time spent outdoor and free play affects positively language development (Wasik et.al., 2006).

Regarding the prenatal history, more than half of studied patients (63%) had no antenatal complications. This was in disagreement with Mondal et.al (2016) who found that (87.7%) of cases had no antenatal

complications. This may be due to difference in sample size and type of population. More than half of patients (66%) were delivered by cesarean section. This was in disagreement with Al- Fadhli et.al (2017) who found that (65.7%) of cases were born vaginally in Saudi Arabia. The Majority of cases in our study (9%) were preterm. This was in agreement with Mathews and MacDorman (2010) who found that the rate of preterm deliveries was ranging (5- 7%) of live births in developed countries, but higher in developing countries. But, Mondal et.al (2016) found that most of cases were full term (98.9%) and (1.1%) were preterm. Also, 13.0% of cases were low birth weight, but Sunderajan and Kanhere (2019) found that only (23.8%) of cases were LBW.

In the current study, (38.4%) of children were breast fed. Iqbal et.al (2017) found that children who breastfed for more than 1 year had an advantage for both cognitive and language development as the breast milk has long chain polyunsaturated fatty acids (PUFAs) which found in high concentrations in the brain and the retina that have a beneficial effect on the neuro- cognitive development thus leading to significantly improved cognitive and language development in infants (Jiao et.al., 2014). But, Walfisch et.al. (2013) found that the effect of breast feeding on the child neuro- development was due to maternal intelligence and socio- economic status.

In this study more than half of cases were of consanguineous marriage. This was in agreement with Sunderajan and Kanhere (2019) who found that (59.5%) of cases had positive consanguinity. But, Abdel Khalek et.al., (2018) found that consanguineous marriage was found in (65.3%) of cases. As intellectual and developmental disability are higher in consanguineous families (Bittles, 2001) also; the autosomal recessive disorders and other inherited disorders were frequent among them (Pedersen et.al., 1992).

Near two third of our cases (70%) had no previous history of illness/ complication. This was in disagreement with Silva et.al (2013) who found that only (18.8%) of children hadn't risk factors.

About two third of patients (76%) had positive family history of language delay as shared genetic predisposition can influence early brain development (Al- Fadhli et.al., 2017) and raise the possibility of X- linked disorders especially in males (McIntosh, 2009) but this was in disagreement with (Mondal et.al., 2016) who found that (81.4%) of cases had no family history of language delay.

We found that nearly half of cases had low cognitive abilities (49.6%). This was in agreement with Abo El Elella et.al (2017) who found that preschool children with developmental delay had lower IQ scores. We had only (10.3%) of cases had HL. HL is a well documented etiology of language delay (Wooles et.al., 2018).

Limitations of this study were incomplete data and refusal of parents to participate or complete the study.

Conclusions:

Biological factors (such as gender, family history of language delay, consanguineous marriage), poor environmental stimulation (such as having more than 2 hours daily media exposure, no nursery or

kindergarten attendance), and low cognitive abilities all are factors affecting early language development.

References:

1. Abdel khalek E, Ahmed S, Ahmed R, Soliman G (2018): Risk Factors of Delayed Milestones among Children Attending Sohag General Hospital. *The Egyptian Journal of Hospital Medicine*, 72 (2): 3968-3978.
2. Abo El Elella S, Tawfik M, Abo El Ftooh W, Barseem N (2017): Screening for developmental delay in preschool- aged children using parent- completed Ages and Stages Questionnaires: additional insights into child development. *Postgrad. Med. J.*, 0:1- 6.
3. Aboufaddan H. and Ahmed S (2018): Risk Factors of Delayed Language Development among Preschool Children Attending Assiut University Hospitals. *Med. J. Cairo Univ.*, 86 (5): 2279- 2285.
4. Abu El- Nil M (2011): **Stanford binet intelligence scale- fifth image- Arab institution for the preparation**, Standardization And Dissemination Of Psychological Tests, Cairo, Egypt.
5. Al- Fadhli K and Al- Bunaian N (2017): Prevalence and Social Influences of Delayed Language Development in Preschool- Age Saudi Children, *International Journal of Science and Research*, 6 (8): 1712- 1720.
6. AlHammadi F (2017): Prediction of child language development: A review of literature in early childhood communication disorders, *Lingua*, 199: 27- 35.
7. American Academy of Pediatrics (2016): Media and young minds. *Pediatrics*, 138(5): e20162591.
8. Berger S and Nuzzo K (2008): Older siblings influence younger siblings' motor development. *Infant and Child Development*, 17 (6): 607- 615.
9. Bittles A (2001): Consanguinity and its relevance to clinical genetics. *Clin Genet.*, 60: 89- 98.
10. Berkman N, Wallace I, Watson L, Coyne- Beasley T, Cullen K, Wood C, and Lohr K (2015): Screening for Speech and Language Delays and Disorders in Children Age 5 Years or Younger: A Systematic Review for the U.S. Preventive Services Task Force. *Evidence Synthesis* 120, 13: 1- 210.
11. Byeon Hand Hong S (2015): Relationship between television viewing and language delay in toddlers: Evidence from a Korea national cross-sectional survey. *Plos One*, 10(3): e0120663.
12. Dunphy- Lelii S., LaBounty J., Lane J., and Wellman H (2014): The social context of infant intention understanding. *Journal of Cognition and Development*, 15(1): 60- 77.
13. Hoff E and Ribot K (2017): Language Growth in English Monolingual and Spanish- English Bilingual Children from 2.5 to 5 Years. *Journal of Pediatrics*, 190: 241- 245.
14. Iqbal M, Rafique G and Ali S (2017): The effect of breast feeding on the cognitive and language development of children under 3 years of age: Results of 'Balochistan- Early Childhood Development Project', J

- GenPract** (Los Angel), 5: (2), 1000305.
15. Jiao J, Li Q, Chu J, Zeng W, Yang M, et.al. (2014): Effect of n- 3 PUFA supplementation on cognitive function throughout the life span from infancy to old age: a systematic review and meta- analysis of randomized controlled trials. **AM J Clin Nutr** 100: 1422- 1436.
 16. Mathews T and MacDorman M (2010): Infant mortality statistics from the 2006 period linked birth/ infant death data set. **Nat. Vital. Stat. Rep.**, 58:1- 31.
 17. McLeod S and Verdon S (2014): A review of 30 speech assessments in 19 languages other than English. **Am. J. Speech- Lang. Pathol.**, 23: 708- 723.
 18. Mondal N, Bhat B, Plakkal N, Thulasingam M, Ajayan P, and Rudhan R. (2016): Prevalence and risk factors of speech and language delay in children less than three years of age. **J. Compr. Ped.**, 7 (2): e33173.
 19. Pedersen N, Plomin R, and Nesselroade J, (1992): A quantitative genetic analysis of cognitive abilities during the second half of the life span. **Psychol. Sci.**, 3, 346- 352.
 20. Perani D., Saccuman M, Scifo P., Anwander A., Spada D., Rowe M., Raudenbush S., and Goldin- Meadow S. (2012): **The pace of vocabulary growth helps predict later vocabulary skill.** Child Development, 83(2): 508- 525.
 21. Ribeiro L, Zachrisson H and Deaning E (2017): Peer effects on the development of language skills in Norwegian child care Centers. **Early Childhood Research Quarterly**, 41: 1- 12.
 22. Rowe M., Raudenbush S., and Goldin- Meadow S. (2012): **The pace of vocabulary growth helps predict later vocabulary skill.** Child Development, 83(2): 508- 525.
 23. Shetty P (2012): Speech and language delay in children: A review and the role of a pediatric dentist. **Journal of Indian society of pedodontics and preventive dentistry**, 30 (2): 103- 108.
 24. Silva G, Couto M, and Molin□Avejonas D (2013): Risk factors identification in children with speech disorders. Pilot study. **Codas**, 25:456- 462.
 25. Sparrow S, Balla D, and Cicchetti DV (1984): **Vineland Adaptive Behavior Scales.** Circle Pines, MN: American Guidance Service.
 26. Sunderajan T, Kanhere S (2019): Speech and language delay in children: Prevalence and risk factors. **Journal of Family Medicine and Primary Care**, 8 (5): 1642- 1646.
 27. Walfisch A, Semmer C, Cressman A, Koren G (2013): Breast milk and cognitive development- the role of confounders: a systematic review. **J Neurointerv Surg**, BMJ 3: e003259.
 28. Wallace I, Berkman N, Watson L, Coyne- Beasley T, Wood C, and Cullen K (2015): Screening for speech and language delay in children 5 years old and younger: a systematic review. **Pediatrics**, 136(2): 448- 462.
 29. Wasik B., Bond M., and Hindman A. (2006): The effects of a language and literacy intervention on Head Start children and teachers. **Journal of Educational Psychology**, 98: 63- 74.
 30. Wooles N, Swann J, and Hoskison E (2018): Speech and language delay in children: A case to learn from. **Br. J. Gen. Pract.**, 68: 47- 48.