Journal of Cancer Research and Reports

Research Article

A Study of Developmental Milestones' Status and its Risk Factors in Infants at Tehran, Capital of Iran

Parichehr Tootoonchi*

Associate professor of pediatrics. Pediatric hematology and oncology subspeciality. Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.

Abstract

Background: In the first year of age an infant acquires lots of skills in all developmental domains such as gross motor, fine motor-adaptive, language and personal- social. Because at early ages the children's developmental problems are too subtle to diagnose easily by health workers or clinicians, some screening tools have been developed to detect potential problems**.** One of these screening tools is Denver developmental screening test (DDST)**.** The objective of this study was to determine the developmental milestones' status and its risk factors in infants living in Tehran, capital of Iran by DDST.

Methods: In a cross-sectional study, we studied below 1 year old infants attended to the 10 health centers throughout the Tehran, capital of Iran. The health centers selected randomly and the infants selected conveniently. From each center about 100 infants included, and their characteristics and risk factors were collected by interviewing the mothers by a structured questionnaire. Then, data about the developmental milestones' condition gathered by observing the infant according to a DDST standard catalog by trained personnel. Afterwards, the normal and abnormal (including delay) condition in the infant determined.

Findings: Of 1004 infants included in the study, overall, delay was shown in 209 infants (20.8%). In detail and separately, there were delay in 101 infants (10%) in doing gross motor, 36 infants (3.6%) in doing fine motor-adaptive, 24 infants (2.4%) in language and 48 infants (4.8%) in doing personal-social developmental milestones. As expected, there was significant statistical relationship between delay in doing gross motor, fine motor-adaptive, language or personal-social milestones with birth weight or gestational age.

Conclusion: Our findings are similar to other studies', however**,** directing prospecting studies in order to repeating DDST in the studied infants one more time for confirming the observing delay is highly recommended.

Keywords

Developmental milestone, Risk factor, Infant, Denver developmental Screening Test (DDST).

Corresponding Author Information

Parichehr Tootoonchi
MD, Associate professor of pediatrics. Pediatric hematology and oncology subspeciality. Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.

Received: July 12, 2025; **Accepted:** August 18, 2025; **Published:** August 26, 2025

Citation: Tootoonchi P. A Study of Developmental Milestones' Status and its Risk Factors in Infants at Tehran, Capital of Iran . J Can Res Rep. 2025; 1(1):1-6.

Introduction

Growth implies increases in the size of the body and development means differentiation of the functioning of the tissues and organs; both of them are affected by a combination of genetics (nature) and the environment (nurture). The 1st yr. of life is one of the most important periods of life. In this period, infants acquire new competences in all developmental domains. It is a rule that more complex skills build on simpler ones; Moreover, development in each domain affects functioning in all of the others. It is worth noting that each child grows and learns at his/her own speed, and not necessarily every child achieves his/her milestones exactly as expected. In spite of having developmental delay or disabilities results in serious and long-term consequences in the future of the child well-being, documents show that at early ages the children's problems are so subtle that clinical diagnosis of them are really difficult, if it is possible at all [1-7]. Besides, early manifestations of developmental delay (DD) are usually unrecognized by parents until the second or third year, and diagnosis of DDs takes place even later [8]. Therefore, it seems that screening by means of suitable and validated tools is the best way to detect probable problems, and refer suspicious cases for more complex approaches such as developmental evaluation which identifies the specific developmental disorder, and medical diagnostic evaluation which identifies an underlying etiology. After diagnosing a developmental delay or disability, early developmental intervention and/ or early childhood services should be served for the involved child. Developmental screening tests are brief, standardized, and validated instruments; however, they never have diagnostic value [1-7].

One of the developmental screening tests applies in below 6 yr. old children is Denver developmental screening test (DDST) [9]. The test shows that children develop skills throughout their childhood referred to as developmental milestones or steps in development that a child should reach by a given age. The test includes 125 items and takes about 10 minutes. The test categorizes basic tasks into four milestone groups: gross motor, fine motor-adaptive, language and personal- social. Gross motor milestones measure a child's ability to control the movements of the large muscles of his body. Fine motor-adaptive skills deal with a child's ability to control small movements of the hands, wrists, fingers, toes, lips and tongue. Language skill milestones measure a child's ability to develop sounds and use vocabulary. Personal and social milestones deal with a child's ability to express him emotionally and interact with others. Despite, the DDST is the most widely used test for screening developmental problems in children, it is not a diagnostic test [10-12]. The test and the last version of it (Denver II) designed for use by the clinician, teacher, General pediatricians, nurses, medical students or other early childhood professional to monitor the development of infants and preschool-aged children [9-12]. The Denver-II is widely used by health professionals because it is a low-cost tool, easy and quick to apply, and was translated and culturally adapted into lots of languages like Persian [13], Korean [14], Arabic [15], Portuguese [16], and Sri Lankan [17]. As far as we searched the literature, there was no research in Iranian infants with regards to determining the developmental milestones' status by DDST. Therefore, we performed this study to obtain a primary estimation of the developmental milestones' status by DDST and its risk factors in a sample of healthy normal infants lived in Tehran.

Materials and Methods

This study was a cross-sectional study performed in Tehran, capital of Iran. First of all, we divided Tehran into 10 areas. Then, randomly one health center from each area was selected. From each center, about 100 below 1 yr. infant attended for routine visits, growth monitoring or vaccination were selected conveniently. All the infants affected by cerebral palsy or other disabilities, major congenital abnormalities, or chromosomal abnormalities excluded from the study. A trained interviewer, asked the mothers about the infants' characteristics and risk factors by a structured questionnaire. These characteristics include infant's age, sex, birth weight, gestational age, birth order, type of feeding (breast milk, formula or both of them), the duration of breast feeding, the time of beginning of supplemental food, infant's sleeping position in most of the time, delivery method, history of hospital admission, maternal age at the infant birth, maternal gravidity, multiple gestation, maternal education level and the family size. The data about 4 groups of developmental milestones were collected by observing infants by trained personnel. It was a necessity that the observed infant must be alert and complies, as well as not tired, fearful, hungry, distracted or sleepy. There is a catalog in which each one of the 4 groups' milestones by child age (monthly from birth to 24 months) is shown. Each group includes lots of test items in boxes from left to right proceeds by the age. Moreover, each test item box shows the 25, 50, 75 and 90 percent of children passed the item. In the interpretation of the test, a delay is considered if the infant doesn't able to do a test item 90% of his/her peers can do. Finally, if there was a delay in each group, the infant was referred for more complicated examinations. A Research conducted by the university of Social Welfare and Rehabilitation Sciences in 0-6 Year Olds in Tehran showed that Persian version of DDST-II has a good validity and reliability [13] and can be used as a screening tool for developmental screening of children at least in Tehran.

Findings

1004 infants included in the study. The frequency and percent distribution of the studied characteristics were summarized in the Table 1. The mean, standard deviation, maximum and minimum of the studied numerical variables were summarized in Table 2. Overall, delay was shown in 207 infants (20.5%). In detail and separately, delay was found in 59 infants (5.87%) in doing gross motor, 48 infants (4.76%) in doing fine motor-adaptive, 61 infants (6.07%) in language and 39 infants (3.88%) in doing personal-social developmental milestones. As expected, there was significant statistical relationship between delay in doing gross motor, fine motor-adaptive, language and personal- social milestones with birth weight or gestational age. Furthermore, there was significant statistical relationship between delay in doing gross motor milestones and infant age, type of feeding, the duration of breast feeding, multiple gestation, time of starting of supplemental food, and sleeping position (Table 3). Moreover, there was significant statistical relationship between delay in doing fine motor-adaptive milestones and infant age, the duration of breast feeding, time of starting of supplemental food, maternal age and history of hospital admission (Table 4). Also, we found significant statistical relationship between delay in language milestones and family size, or history of hospital admission (Table 5). At last, significant statistical relationship was found between delay in doing personal-social milestones and the duration of breast feeding, as well as history of hospital admission (Table 6).

Table 1: The frequency and percent distribution of the studied characteristics in the infants.

Parameter	Category	Number	Percent	Parameter	Category	Number	Percent
Sex	Male	488	48.6	**Family Size**	2-3	518	51.5
	Female	516	51.4		=>4	486	48.4
Delivery Method	Vaginal	480	47.8	**Birth Order**	1	555	55.3
	Cesarean S	524	52.2		>1	449	44.7
Type of Feeding	Breast Milk	908	90.4	**Starting of Supplement Food**	Not yet	393	39.1
	Others	96	9.6		<7Mo	489	48.7
Maternal Gravity	1	477	47.5		=>7Mo	122	12.2
	>1	527	52.5	**Maternal Education**	<Diploma	359	35.8
Sleeping Position	Supine	493	49.1		=>Diploma	645	64.2
	Others	515	50.9	**Maternal Age (year)**	<20	58	5.8
Gestational	<37wk	37	3.7		20-35	899	89.5
	=>37wk	967	96.3		>35	47	4.7
Birth Weight	<2500	76	7.6	**History of Hospital Admission**	Yes	148	14.7
	=>2500	928	92.4		No	856	85.3
Infant Age	<= 6Mo	511	51.1	**Type of Pregnancy**	Single	978	97.4
	>6Mo	493	49.9		Twin	26	2.6

Table 2: Mean, Standard deviation, minimum, and maximum of the studied numerical variables.

Parameter	Mean	Standard Deviation	Minimum	Maximum
Infant Age (mo)	6.53	3.02	1	12
Birth weight(g)	3193	508.79	800	4300
Gestational age(wk)	38.93	1.03	32	41
Time of supplemental starting food (mo)	6.71	2.93	3	9
Maternal age	26.56	4.97	16	48

Table 3: The condition of statistically significant relationship between gross motor milestones by the infants' characteristics.

Infant characteristics	P value
Infant age	p<0.001
Type of feeding	p<0.02
The duration of breast-feeding	p<0.05
Multiple gestation	p<0.01
Time of starting of supplemental food	p<0.001
Sleeping position	p<0.001

Table 4: The condition of statistically significant relationship between fine motor-adaptive milestones by the infants' characteristics.

Infant characteristics	P value
Infant age	p<0.05
The duration of breast-feeding	p<0.05
Time of starting of supplemental food	p<0.05
Maternal age	p<0.002
History of hospital admission	p<0.01

Table 5: The condition of statistically significant relationship between language by the infants' characteristics.

Infant characteristics	P value
Family size	p<0.007
History of hospital admission	p<0.003

Table 6: The condition of statistically significant relationship between personal-social milestones by the infants' characteristics.

Infant characteristics	P value
Duration of breast-feeding	p<0.001
History of hospital admission	p<0.004

Discussion

Overall, 20.58% of the studied infants had shown delay according to DDST. This figure is like a study in southern Brazil (21.4%) [18], however, much lower than the figure of other studies performed in Brazil (33-46%) [19-22], Ghana (44.6%) [23], Thailand (37.1%) [24], and New Zealand (35%) [25]; and also much higher than the figure in the studies performed in China (6.91%) [26], United Arab Emirates (8.4) [27], Taiwan (11.3%) [28], Singapore (12.6%) [29], US (10-16%) [30-33] Canada (10%) [34], and Turkey (6.4%) [35]. It seems that these differences attributed to the differences among composition and genetics of populations, environmental factors such as childcare, sampling methods, small sample size, and different screening methods of the infants (observation versus just asking the parents) at various studies. We found significant relationship between delay in general or in each of the four groups of developmental milestones with infants' gestational age or birth weight, like other studies [25,36-41]. In our study, there were no relationship between infant delay in general and infant sex, history of breastfeeding or its duration, history of hospitalization, maternal age or education level, multiple gestation or family size, like some of other studies [28,42]; however, in some of the studies there were significant relationship between infant's delay and infant sex [19,38,41], maternal age [20,40], maternal education [20,26,27,40], multiple gestation [26], history of breastfeeding [37,43,44], breastfeeding duration [25,37,39,41-45], family size [37,39-41] or history of hospitalization [38]. These differences are probably because of different types of infants' nutrition, economic factors such as low-income families, close physical contact between the mother and the infant, environmental factors such as childcare practices, family size, working mothers and other known (such as

prenatal and birth complications, family history of developmental delay) or unknown factors which influence on the findings in different studies. 6% and 5% of our infants had delay in doing gross motor or fine motor-adaptive coordination respectively which is similar to the figures in Great Britain (9% and 6% respectively) [43]. Like other studies we found significant relationship between delay in doing gross motor or fine motor-adaptive milestones and breastfeeding or its duration [40-44]. A study in Ghana [23] found that the maternal education was significantly associated with gross motor development, however, we didn't. It was probably because the education level of our infants' mothers was high, (just 1.7% of the studied mothers in our study were uneducated and 9.3% of them had primary school education). Furthermore, sleeping in supine position was a significant factor for delay in attainment of gross motor development in our study like other studies [48-54]. Besides, we found that 6% of the infants showed delay in language which was lower than the figure of UAE (9.9%) [55]; however, similar to the figure in Ghana (5.8%) [23]. Moreover, there was no significant relationship between delay in language development and breast feeding or its duration as a study in Ireland confirmed our results [47]; however, some of other studies didn't [44,45,56]. This difference could be explained by the various categories in the breastfeeding duration among the studies, because we considered breast feeding duration at least 1 month and other studies considered it at least 6 months or more. Besides, we found significant relationship between delay in language milestones and family size like a study in US [57]; however, in contrary to other studies, no relationship with the infant sex, the birth order, maternal age or education level was found [56-58]. It seems that the most important reason for differences in risk factors for language delay between our study and others is the age of studied children, which was over 2 years old in all of the other studies. The figure of delay in personal-social developmental milestones in our study (3.88%) was much lower than the figure in Ghana (12.4%) [23]. Like other studies [45,47], we found significant relationship between delay in personal-social development and breast-feeding duration.

Conclusion

Despite our findings are similar to the results of other studies in most of circumstances, the study was a cross-sectional one and visiting and examining an infant just for one time during the infancy period definitely is not enough to determine the developmental milestones accurately because of the vast and quick nature of the developmental milestones' changes happen during this period of life with time from one side and the vast majority of impacts various types of diseases and environmental factors have on these changes on the other side. With regards to the study method and our resources, we weren't able to conduct more powerful study on the subject. Besides, the sampling method restricted our access to another next visit of the infants for confirming the delay. Therefore, we recommend that the screening studies of developmental status of children should be designed and performed as cohort studies. In this way, a group of the children with known status of exposure (risk factor) are available and we can visit them in different ages and examine them with a developmental screening test such as DDST not only for early detection of suspicious children with developmental problems, referring them for more diagnostic studies and serving on time necessary interventions, but also for determining accurate condition of the risk factors. Furthermore, the impact of emerging acute or chronic disorders on the acquisition of the next developmental milestones are easily measurable by using the screening test throughout the time, therefore, referring the involved children with delay to higher centers for further evaluation or investigations would be possible on time.

References

1. American Academy of Pediatrics. Developmental surveillance and screening of infants and young children (RE0062). Pediatrics. 2001; 108: 192-196.
2. Council on Children with Disabilities; Section on Developmental Behavioral Pediatrics. Identifying infants and young children with developmental disorders in the medical home: an algorithm for developmental surveillance and screening. Pediatrics. 2006; 118: 405-420.
3. Shevel Ml, Ashwal S, Donley D, J Flint, M Gingold, et al. Practice parameter: Evaluation of the child with global developmental delay. Neurology. 2003; 60: 367-380.
4. Shevel MI, Majnerner A, Rosenbaurn P, M Abrahamowicz. Etiologic yield of subspecialists of young children with global developmental delay. J Pediatr. 2000; 136: 593-598.
5. Centers for Disease Control and Prevention (CDC). Facts About Child Development. Division of Human Development and Disabilities, National Center on Birth Defects and Developmental Disabilities. 2011.
6. Centers for Disease Control and Prevention (CDC). Developmental Milestones. Division of Human Development and Disabilities, National Center on Birth Defects and Developmental Disabilities. 2011.
7. Centers for Disease Control and Prevention (CDC). What Are Developmental Disabilities? Division of Human Development and Disabilities, National Center on Birth Defects and Developmental Disabilities. Low birth weight, premature birth, multiple birth, and infections during pregnancy are associated with an increased risk for many developmental disabilities. 2011.
8. Rah SS, Jung M, Lee K, Hannah K, Soyoung J, et al. Systematic review and meta-analysis: Real world accuracy of children's developmental screening tests. J Am Acad Child Adolesc Psychiatry. 2023; 62: 1095-1109.
9. Frankenburg WK, Dobbs JB. The Denver Developmental Screening Test. J Pediatr. 1967; 71: 181-191.
10. Canadian Task Force on the Periodic Health Examination. The Canadian Guide to Clinical Preventive Health Care. Ottawa: Minister of Supply and Services Canada; Chapter 26 "Preschool Screening for Developmental Problems". 1994.

11. Frankenburg William K. Developmental Surveillance and Screening of Infants and Young Children. Pediatrics. 2002; 109: 144-145.

12. Frankenburg WK, Dodds J, Archer P, Shapiro H, Bresnick B. The DENVER II: A major revision and restandardization of the Denver Developmental Screening Test. Pediatrics. 1992; 89: 91-97.

13. Shahshahani S, Vameghi R, Azari N, Firoozeh S, Anooshirvan K. Validity and Reliability Determination of Denver Developmental Screening Test-II in 0-6 Year-Olds in Tehran. Iran J Pediatr. 2010; 20: 313-322.

14. Lee K. Standardization of the Denver Developmental Screening Test for children in Seoul: a validity study. Ewha Med J. 2024; 47: e61.

15. Al Ansari SS, Bella H. Translation and Adaptation of the Revised Denver Pre-Screening Developmental Questionnaire for Madinah Children, Saudi Arabia. Annals of Saudi Medicine. 1998; 18: 42-46.

16. Albuquerque KA, Cunha ACB. New trends in instruments for child development screening in Brazil: a systematic review. J Hum Growth Dev. 2020; 30: 188-196.

17. Wijedasa D. Developmental screening in context: adaptation and standardization of the Denver Developmental Screening Test-II (DDST-II) for Sri Lankan children. Child Care Health Dev. 2012; 38: 889-899.

18. Halpern R, Barros AJ, Matijasevich A, Iná SS, Cesar GV, et al. Developmental status at age 12 months according to birth weight and family income: a comparison of two Brazilian birth cohorts. Cad Sude Publica. 2008; 24: S444-S450.

19. Brito CM, Vieira GO, Costa Mda C, NF de Oliveira. Neuropsychomotor development: The Denver scale for screening cognitive and neuromotor delays in preschoolers. Cad Saude Publica. 2011; 27: 1403-1414.

20. Da Cunha HL, de Melo AN. Assessment of risk to neuro-psychomotor development: screening using the Test Denver II and identification of maternal risks. Acta Cir Bras. 2005; 20: 42-46.

21. Ribeiro DG, Perosa GB, Padovani FH. Risk factors for impaired development in children attended at family health units at the end of the first year of life: socio-demographic aspects and maternal mental health. Cien Saude Colet. 2014; 19: 215-226.

22. Souza SC, Leone C, Takano OA, HB Moratelli. Development of children enrolled in preschools in Cuiabá, Mato Grosso State, Brazil. Cad Saude Publica. 2008; 24: 1917-1926.

23. Bello AI, Quartey JNA, Appiah LA. Screening for developmental delay among children attending a rural community welfare clinic in Ghana. BMC Pediatrics. 2013; 13: 119.

24. Jeharsae R, Sangthong R, Wichaidit W, Virasakdi C. Growth and development of children aged 1-5 years in low-intensity armed conflict areas in Southern Thailand: a community-based survey. Confl Health. 2013; 4: 7-8.

25. Paterson J, Iusitini L, Gao W. Child developmental assessment at two-years of age: data from the Pacific Islands Families Study. Pac Health Dialog. 2011; 17: 51-63.

26. Zhou WJ, Liang AM, Wang FZ, Wen HC, Xiu YW, et al. Epidemiological study on developmental delay of 18-month-old children from four districts/counties in Beijing. Beijing Da Xue Xue Bao. 2013; 45: 211-216.

27. Eapen V, Zoubeidi T, Yunis F, Aithala KG, Sufyan S, et al. Prevalence and psychosocial correlates of global developmental delay in 3-year-old children in the United Arab Emirates. J Psychosom Res. 2006; 61: 321-326.

28. Chen CJ, Li IC, Chien LY. Developmental status among 3 to 5-year-old preschool children in three kindergartens in the Peitou District of Taipei City. J Nurs Res. 2003; 11: 73-81.

29. Lim HC, Ho Ly, Goh LH, SL Ling, R Heng, et al. The field testing of Denver II Developmental Screening Test. Ann Acad Med Singapore. 1996; 25: 200-209.

30. Mackrides PS, Ryherd SJ. Screening for developmental delay. Am Fam Physician. 2011; 84: 544-549.

31. Cole S, Ball A. Developmental assessment in children (Review). Osteopathic Family Physician. 2013; 6: 225-229.

32. Boyle CA, Boulet S, Schieve LA, Robin AC, Stephen JB, et al. Trends in the prevalence of developmental disabilities in US children, 1997-2008. Pediatrics. 2011; 127: 1034-1042.

33. Rosenberg SA, Zhang D, Robinson C. Prevalence of developmental delays and participation in early intervention services for young children. Pediatrics. 2008; 121: e1503-e1509.

34. Limbos MM, Joyce DP. Comparison of the ASQ and PEDS in screening for developmental delay in children presenting for primary care. Dev Behav Pediatr. 2011; 32: 499-511.

35. Çelikkiran S, Bozkurt H, Coskun M. Denver Developmental Test Findings and their Relationship with Sociodemographic Variables in a Large Community Sample of 0–4-Year-Old Children. Noro Psikiyatr Ars. 2015; 52: 180-184.

36. Rydz D, Shevell MI, Majnemer A, M Oskoui. Developmental screening. J Child Neurol. 2005; 20: 4-21.

37. Halpern R, Giugliani ER, Victora CG, FC Barros, BL Horta. Risk factors for suspicion of developmental delays at 12 months of age. J Pediatr (Rio J). 2000; 76: 421-428.

38. De Moura DR, Costa JC, Santos IS, Aluísio JDB, Alicia M, et al. Risk factors for suspected developmental delay at age 2 years in a Brazilian birth cohort. Paediatr Perinat Epidemiol. 2010; 24: 211-221.

39. Barros FC, Victora CG, Morris SS, R Halpern, BL Horta, et al. Breast feeding, pacifier use and infant development at 12 months of age: a birth cohort study in Brazil. Paediatr Perinat Epidemiol. 1997; 11: 441-450.

40. Ozkan M, Senel S, Arslan EA, Can DK. The socioeconomic and biological risk factors for developmental delay in early childhood. European Journal of Pediatrics. 2012; 171: 1815-1821.

41. Cheng S, Maeda T, Yamagata Z, Kiyotaka T, Noriko Y, et al. Comparison of factors contributing to developmental attainment of children between 9 and 18 months. Journal of Epidemiology. 2010; 20: S452-S458.

42. Jonsdottir OH, Thorsdottir I, Gunnlaugsson G, Mary SF, Patricia LH, et al. Exclusive breastfeeding and developmental and behavioral status in early childhood. Nutrients. 2013; 5: 4414-4428.

43. Sacker A, Quigley MA, Kelly YJ. Breastfeeding and developmental delay: findings from the millennium cohort study. Pediatrics. 2006; 118: e682-e689.

44. Chiu WC, Liao HF, Chang PJ, Pau CC, Yi CC. Duration of breast feeding and risk of developmental delay in Taiwanese children: a nationwide birth cohort study. Paediatr Perinat Epidemiol. 2011; 5: 519-527.

45. Ali SS, Dhaded, Goudar S. The impact of nutrition on child development at 3 years in a rural community of India. Int J Prev Med. 2014; 5: 494-499.

46. Dee DL, Li R, Lee LC, Laurence MGS. Associations between breastfeeding practices and young children's language and motor skill development. Pediatrics. 2007; 119: S92-S98.

47. McCrory C, Murray A. The effect of breastfeeding on neuro-development in infancy. Matern Child Health J. 2013; 17: 1680-1688.

48. Pin T, Eldridge B, Galea MP. A review of the effects of sleep position, play position, and equipment use on motor development in infants. Dev Med Child Neurol. 2007; 49: 858-867.

49. Liao PJ, Zawacki L, Campbell SK. Annotated bibliography: effects of sleep position and play position on motor development in early infancy. Hys Occup Ther Pediatr. 2005; 25: 149-160.

50. Majnemer A, Barr RG. Association between sleep position and early motor development. J Pediatr. 2006; 149: 623-629.

51. Salls JS, Silverman LN, Gatty CM. The relationship of infant sleep and play positioning to motor milestones achievement. Am J Occup Ther. 2002; 56: 577-580.

52. Davis BE, Moon Ry, Sachs HC, Ottolini MC. Effects of sleep position on infant motor development. Pediatrics. 1998; 102: 1135-1140.

53. Jantz JW, Blosser CD, Fruechting LA. A motor milestone change noted with a change in sleep position. Arch Pediatr Adolesc Med. 1997; 151: 565-568.

54. Kuo YL, Liao HF, Chen PC, Wu-SH, Ai WH. The influence of wakeful prone positioning on motor development during the early life. J Dev Behav Pediatr. 2008; 29: 367-376.

55. Eapen V, Zoubeidi T, Yunis F. Screening for language delay in the United Arab Emirates. Child Care Health Dev. 2004; 30: 541-549.

56. Peyre H, Bernard JY, Forhan A, Marie AC, Maria DA, et al. Predicting changes in language skills between 2 and 3 years in the EDEN mother-child cohort. Peer J. 2014; 1: 2-e335.

57. Nelson HD, Nygren P, Walker M, Rita P. Screening for speech and language delay in preschool children: systematic evidence review for the US Preventive Services Task Force. Pediatrics. 2006; 117: e298-e319.

58. Muluk NB, Bayoğlu B, Anlar B. Language development and affecting factors in 3- to 6-year-old children. Eur Arch Otorhinolaryngol. 2014; 271: 871-878.