

Role Of Parental Questionnaires In Developmental Evaluation Of Children: A Comparison Of Mothers' Report And Screening Test Results

Çocukların Gelişimsel Olarak Değerlendirilmesinde Ebeveyn Anketlerinin Yeri: Anne Raporları İle Gelişimsel Tarama Test Sonuçlarının Karşılaştırılması

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Öz

Giriş: Ebeveyn anketleri, çocukların gelişimini değerlendirmek amacıyla çocuk sağlığı ve hastalıkları polikliniklerinde sıkça kullanılmaktadır. Bu çalışmada annenin, yaşı ve eğitim durumuna göre çocuğunun gelişimi hakkında bilgi düzeyi ile standart gelişimsel tarama testi sonuçları karşılaştırılmış ve toplumumuzda çocukların gelişiminin değerlendirilmesinde ebeveyn anketlerinin doğruluğu değerlendirilmiştir.

Metod: Annelere Türk çocuklarına uyarlanan ve standardize edilen Denver II gelişimsel tarama testindeki çocuğun kronolojik yaşına uygun maddeler soruldu ve cevapları kaydedildi. Daha sonra çocuklara Denver II gelişimsel tarama testi, sertifikalı çocuk gelişim uzmanı veya çocuk sağlığı ve hastalıkları uzmanı tarafından uygulandı. Annelerin ankete verdiği cevaplar ile Denver II gelişimsel tarama testi sonuçları karşılaştırıldı, birbiriyle uyumlu ve uyumsuz maddeler kaydedildi.

Sonuçlar: Çalışmaya 178 anne ve çocuk dahil edildi. Anne raporu ve test sonuçları olguların %55'inde uyumluuydu. Anne yaşı ve eğitim düzeyine göre belirlenmiş gruplarda bu uyum benzer oranlardaydı. Uyumsuz maddelerin dağılımı her gelişim alanında benzer orandaydı.

Tartışma: Bu çalışmada anne raporu ile standart gelişimsel tarama testi sonucu arasındaki uyum yetersiz bulunmuştur. Diğer gelişim testleri ve okul performansı ile korelasyon gösterdiği saptanan Denver II gelişimsel tarama testinin anne raporlarına göre daha güvenilir olduğu düşünülmüştür. Gelişimsel gecikmelerin belirlenmesi için anne raporları ve Denver II testi sonuçlarının, Türk toplumuna uyarlanmış ve standardize edilmiş diğer testlerle doğrulanması gerekmektedir.

Anahtar Kelimeler: Gelişimsel, anket, anne, çocuk, Denver II

Abstract

Background: Parental questionnaires are extensively used in pediatric outpatient clinics for developmental evaluation. Our purpose was to examine the accuracy of questionnaires in our population by comparing developmental screening test results with mother's report in relation with her age and education.

Methods: Mothers were interviewed using the items corresponding to their child's chronological age on the Denver II developmental screening test adapted for Turkish children. Then the Denver II test was administered to the child by a certified child development specialist or pediatrician. Mothers' answers to the questionnaire and the child's Denver II test results were compared and discrepancies were recorded.

Results: The sample consisted of 178 mother-child dyads. Mothers' reports and test scores were concordant in 55% of cases, with similar rates in all maternal age and educational groups. Items subject to disagreement were distributed equally over all developmental domains.

Conclusion: The rate of agreement between mother's reports and screening test results was unsatisfactory. While the Denver II, previously shown to correlate with other tests and school performance, is more likely to be accurate than mother's report, both data need to be confirmed by other tests standardized and adapted to the population in order to detect developmental delays.

Key Words: developmental, questionnaire, mother, child, Denver II

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Introduction

Developmental delay is defined as delay exceeding 2 standard deviations of the mean, and global developmental delay is considered when this occurs in more than two developmental domains^(1,2). About 15% of children experience varying degrees of delay in cognitive, psychological, adaptive, language, or self-care functions. Only 20-30% of these children are detected before school age⁽¹⁻⁴⁾. Parents may have questions or concerns about their child's development, but do not always express them in outpatient clinics: a recent study from Australia showed 11-26% of parents had doubts about their child's behavior or language but only about 40% of them were expressed during the pediatric visit⁽⁵⁾. In addition, family members and even physicians may overlook mild or moderate delays in the first years of life⁽⁶⁾. Those children who are not diagnosed early are likely to experience academic, adaptive, social and emotional problems. On the other hand, their potential can be expanded by early detection and early intervention^(1,2,7). For these reasons, the American Academy of Pediatrics (AAP) recommends regular developmental screening and, in particular, developmental follow-up by the physician as part of routine child care^(1,2). After AAP's recommendation about regular screening in 2001, the rate of screened children in the USA increased from 20% in 2002 to 50% in 2009⁽⁸⁾. The screening tools that are most frequently used are parental questionnaires: The Child Development Review (CDR), the Ages and Stages Questionnaire (ASQ), or the Parents' Evaluation of Developmental Status (PEDS)^(8,9). The CDR combines parents' and pediatricians' observations to monitor the development and adjustment of infants and young children. It was standardized on 220 children aged 3-4 years from primarily white, working class families; sensitivity was low (0,68) and specificity (0,88) was moderate⁽¹⁰⁾. The ASQ and, to a lesser extent, PEDS were suggested as reliable methods for developmental screening in children 12 to 60 months old when compared with Bayley Scales of Infant Development-III, the Wechsler Preschool and Primary Scale of Intelligence-Third Edition, the Preschool Language Scale-Fourth Edition, and the Vineland Adaptive Behavior Scales-Second Edition⁽¹¹⁾.

Among other questionnaires, the Parent Report of Children's Abilities-Revised (PARCA-R) results compared well with the Mental Development Index of the Bayley Scales of Infant Development in very preterm infants at 2 years of age⁽¹²⁾. On the other hand, a brief parent questionnaire, the Motor and Social Development scale, had moderate correlation with the Bayley-III in children born prematurely at the corrected age of 5-35 months⁽¹³⁾. The ASQ was found to have a high negative predictive value in detecting developmental delay when compared to psychometric assessments (Griffith Mental Development Scales for 12- and 24-months, Bayley Mental Development Intelligence Scale for 18-months, McCarthy General Cognitive Intelligence Scale for 48-months) in children with corrected age 12-48 months⁽¹⁴⁾. Rydz et al⁽¹⁵⁾ analyzed the positive and negative predictive values of parent-completed questionnaires: when compared to Battelle Development Inventory results, and suggested that a single evaluation by parental questionnaire had little value in developmental screening.

All these studies have an important oversight: they compare a parental questionnaire with a full "gold-standard" test. However, the alternative to a parental questionnaire in a pediatric clinic is a screening test. Among the latter, the Denver II is the revised and re-standardized form of the Denver Developmental Screening Test⁽¹⁶⁾. It is among the most commonly used screening tools worldwide and comprises fine motor-adaptive, gross motor, personal-social, and language items scored by observation and parental report⁽¹⁷⁻²¹⁾. The ASQ and Denver II were compared in several studies: correlation was high in 4 to 60 month-old children^(22,23). The percentage agreement between Denver II and ASQ was strongest in gross motor (95%) and personal social development (95%) but weakest in language development (67%)^(22,23).

Because few studies compared parental reports and screening test results, we sought to evaluate mother's assessment of her child's development in comparison with the Denver II test in our population, and the influence of her age and educational level on her knowledge.

Methods:

Mother-child dyads were collected from the pediatric outpatient clinics of Hacettepe University Ihsan Dogramaci Children's Hospital and Sinop Atatürk State Hospital over a 6-month period. The study was approved by The Clinical Research Ethics Committee of Institutional Review Board (reference number: 663/2014). Informed consent was obtained from the legal guardian of each child before enrollment. Children who were chronically ill or known to have developmental delay were excluded. Demographic data including child's age, gender, gestational week, mother's age and mother's educational level were recorded. The sample was divided into groups according to child's age (0-1 year old, 1-3 years old, 3-6 years old), mothers' age (≤ 30 and ≥ 31 years old) and mother's years of education (≤ 5 years and ≥ 6 years of schooling). Mothers were interviewed on the developmental items appropriate for the child's chronological age on the chart of Denver II adapted for Turkish children⁽¹⁷⁾. Then Denver II was administered to the child by a certified specialist of child development or a pediatrician. The questionnaire was scored according to mother's answers and interpreted as "normal," "questionable," or "abnormal", as done for Denver II test results. The results of mother's report and Denver II were defined as "compatible" when they were identical. In case of non-compatibility, the items causing the discrepancy and the direction of the discrepancy were recorded.

For statistical analysis, categorical variables were expressed as the frequency or percentage (%). Categorical variables were analyzed by Pearson's chi square or Fisher exact test. Mann Whitney U test was used to compare groups. Spearman Correlation Analysis was used to assess the correlation of variables. SPSS (version 12.0, SPSS Inc., Chicago, IL, USA) was used. Significance was defined as $p < 0,05$.

Results:

A total of 178 mother-child dyads with 95 boys and 83 girls were enrolled in the study. There were 80, 61 and 37 children between 0-1, 1-3 and 3-6 years of age respectively (Table 1). Mothers' education was evenly distributed between ≤ 5 years or higher in all age groups (Table 2). The age distribution of mothers did not differ between educational groups.

Table 1: Distribution of children in the study group

Ages (year)	Boys		Girls		Total	
	N	%	N	%	N	%
0-1	38	47.5	42	52.5	80	44.9
1-3	37	60.7	24	39.3	61	34.3
3-6	20	54	17	46.0	37	20.8
Total	95	53.4	83	46.6	178	100

N: number

Table 2: Distribution of mothers' age and years of schooling

Years of schooling	≤ 5 years		≥ 6 years		Total	
	N	%	N	%	N	%
Mothers ≤ 30 years of age	61	47.5	67	52.5	128	100
Mothers ≥ 31 years of age	21	42	29	58	50	100

N: number

In the whole study group, 55% (98/178) of mothers' reports were compatible with the Denver II result. The percentage was similar in maternal age groups: 71/128 (55%) of mothers ≤ 30 years old and 27/50 (54%) of mothers ≥ 31 years old reported developmental milestones as in the test results. The percentage of mothers' reports being compatible (55%) and

noncompatible (45%) with the child's performance at Denver II did not differ significantly between educational groups and age groups (Table 3).

Table 3: Compatibility of mothers' reports with their child's Denver II test performance according to age and education

Years of schooling	Age ≤ 30 years N	Age ≥ 31 years N	Total N
≤5 years			
Compatible	67	21	88
Noncompatible	54	14	68
≥6 years			
Compatible	4	6	10
Noncompatible	3	9	12
p value for years of education	0.33		
p value for age	0.86		

N: number

Items that were frequently (>40%) discrepant were related to response to visual and auditory stimuli (following object, regarding raisin, raking raisin, turning to rattling sound, turning to voice) and some gross motor items (chest up with arm support, stand alone) in infants 0-12 months old. In older children (3-6 years) items from various domains (towers with cubes, pointing at pictures, naming pictures, copying cross and square, balance on one foot) differed between maternal report and test. Items highly (>80%) concordant were scribbling, putting cube into cup, playing ball with tester, reaching, passing cube, pointing to doll's parts, sitting by self well, standing holding on, walking well, running, kicking ball forward, stopping and recovering, and jumping up.

Discussion:

Early detection of developmental and behavioral problems in children is important for early initiation of any potential medical treatment and behavioral-educational intervention. These measures can reduce the degree of developmental delay, and also allow prevention of secondary problems and recurrences in future offspring^(1,2). Longitudinal surveillance should be added to formal screening methods for accurate eva-

luation of a child's development. However surveillance is only possible with developmental records that are updated regularly and consulted at each visit, which is not the case in most outpatient clinics. Pediatric follow-up is usually done regularly until 18 months: thereafter, children are taken to the doctor only in case of sickness. Therefore an acute transient disorder bringing the child to a healthcare center may constitute the only opportunity for developmental assessment.

The use of screening tests and questionnaires increases rates of detection and referral in pediatrics. While questionnaires are limited by the subjectivity of parental report, most health providers find routine screening easier than expected and feasible even in a busy primary care setting after appropriate training^(8,11,24). Although screening tests' accuracy is being debated, they aim to assess global development in a relatively short time with optimal reliability. Among these, Denver II is used worldwide to identify children in need of more extensive assessment and work-up, takes 10-15 minutes per test, and concords with school performance⁽²⁵⁻²⁸⁾. Even then, most physicians do not use it due to time, scheduling and reimbursement issues⁽²⁹⁾. For this reason, a questionnaire form of Denver II, the Prescreening Developmental Questionnaire 2 (PDQ-II), has been developed. In a study comprising 237 normal children aged 0-6 years, PDQ-II was shown to have good content validity and reliability but moderate sensitivity and specificity in comparison with the Denver-II screening test. The number of cautions and delays were greater in language domain in both methods. PDQ identified over 80% of non-normal Denver II results⁽³⁰⁾.

Our study investigated whether such parental questionnaires could be extracted from Denver II items, whether certain items were more reliable for a questionnaire, and whether parents' observations differed in infants and toddlers in our population. It was conducted in two busy pediatric outpatient clinics where 40-50 children are examined by one paediatrician daily. The results show relatively high (45%) discrepancy between mothers' reports and Denver II in all maternal age and educational groups. In general, mothers ten-

ded to consider their child able to perform the task while the tester observed a “fail”. Mother’s overestimation of developmental milestones may be due to not having paid attention, subjectivity, or, as shown in other studies, misunderstanding the standard nature of the particular “pass” score⁽⁶¹⁾. In the literature, various results have been found regarding agreement between parental questionnaires and professionally administered developmental scales^(12-15,22,23,32-35). Willinger et al⁽³⁶⁾ remarked vocabulary and gross motor development were not estimated correctly by mothers. In our study group, mothers were more often confused in fine motor, language and gross motor items of Denver II.

Parental reports may be less reliable than observation in certain socio-cultural or rural populations⁽³⁷⁾. Maternal education tends to increase recognition of the psychological characteristics and needs of the infant^(3,38-40). Palfrey et al⁽⁵⁾ observed that handicapped children whose mothers had high educational attainment were more likely to be diagnosed early than those whose mothers had less schooling. Ertem et al⁽³⁹⁾ showed mothers with higher education and fewer children had higher scores on the Caregiver Knowledge of Child Development Inventory. Ninio⁽⁴⁰⁾ also showed mothers of low socioeconomic status were less likely to know when infants attain developmental skills and when to begin caregiving activities that support child development than mothers of high socioeconomic status. Parents’ correct knowledge about their child’s development is important: it correlates with parenting skills⁽⁴¹⁾. Caregiver awareness in motor and language problems was reported as a valid indicator of children’s developmental status, while it may not correctly identify emotional/behavioral problems or global developmental delay⁽⁴²⁾. In addition to its effect on the child’s upbringing, mother’s lack of awareness of her child’s development may affect counselling and referral by the physician.

The main limitation of our study is the absence of a “gold-standard test” in the comparison of developmental testing methods. On the other hand, such tests are seldom feasible in pediatric outpatient clinics, which limits their use to referral centers. Our re-

sults suggest the application of observational tests for developmental assessment. The relatively small size of our sample is another limitation. On the other hand, the inclusion of different centers located in two cities of different sizes (5 million and 203 thousand, respectively) has illustrated that mothers of different age and educational groups have similar tendencies in interpreting their child’s behavior. Future studies including several types of parental questionnaires and a gold standard test like Bayley Scales of Infant Development for comparison can help to identify the least and most reliable items for parental questionnaires. This may allow the establishment of an optimal combination of parent-reported and directly observed items as a practical and reliable assessment method for children.

Conflict of interest statement: The authors have no conflict of interest.

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