Doi: 10.4274/Npa.Y5922

Comparison of Toddlers with Pervasive Developmental Disorders and Developmental Delay Based on Diagnosis Classification: 0-3 Revised

Yaygın Gelişimsel Bozukluk ve Gelişim Geriliği olan Küçük Çocukların Tanı Sınıflaması: 0-3 Yenilenmiş Basım Temelinde Karşılaştırılması

Ayhan BİLGİÇ, Runa USLU*, Oya ÖZALP KARTAL*
Malatya Devlet Hastanesi, Çocuk ve Ergen Psikiyatrisi Kliniği, Malatya, Türkiye
Ankara Üniversitesi Tıp Fakültesi, Çocuk ve Ergen Ruh Sağlığı ve Hastalıkları Anabilim Dalı, Ankara, Türkiye

ABSTRACT

Objective: The present study aimed to compare children newly diagnosed as having pervasive developmental disorders (PDDs) to those with developmental delay (DD) for the sociodemographic, clinical and parental characteristics.

Methods: The sample consisted of 35 PDDs and 29 DD patients aged 17-45 months. The Ankara Developmental Screening Inventory was used to assess the developmental level of the children. Multiaxial diagnostic classifications were made by using the Diagnostic Classification of Mental Health and Development Disorders in Infancy and Early Childhood: Revised Edition (DC:0-3 R). Parent–Infant Relationship Global Assessment Scale (PIR-GAS) and Emotional and Social Functioning (ESF) scores of the children were measured based on the DC:0-3 R. The Family Assessment Device (FAD) and the General Health Questionnaire-12 (GHQ-12) were administered to the parents.

Results: The proportion of single parent families in the DD group was higher than in the PDDs group. According to DC:0-3 R, patients with DD had a significantly higher rate of comorbid psychiatric conditions compared to those with PDDs. No significant differences were found in the mean PIR-GAS scores between the two diagnostic groups. The mean ESF scores were significantly lower in the children with DD than in those with PDDs. Worse parent–child relationship and mothers' GHQ-12 scores correlated with negative emotional and social functioning in the DD group. Mothers' and fathers' affective responsiveness and mothers' communication ratings of the FAD scale were poor in the children with DD compared to those with PDDs. The developmental level of the children negatively correlated with mothers' GHQ-12 scores in both patient groups and with fathers' GHQ-12 scores, as well as with mothers' behavior control scores of the FAD scale in the PDDs group.

Conclusion: Identication of the clinical characteristics of children with PDDs and DD using multiaxial diagnostic classifications may have important clinical implications. *(Archives of Neuropsychiatry 2011; 48: 188-94)*

Key words: Pervasive developmental disorders, developmental delay, mental retardation, toddlers, DC:0-3

ÖZET

Amaç: Bu çalışmada, yaygın gelişimsel bozukluk (YGB) ve gelişim geriliği (GG) olan yeni tanı konulmuş küçük çocukların sosyodemografik, klinik ve anababa özellikleri bakımından karşılaştırılması amaçlanmıştır.

Yöntemler: 17-45 aylık 35 YGB ve 29 GG olgusu çalışmaya dahil edildi. Çocukların gelişim düzeylerinin değerlendirmesinde Ankara Gelişim Tarama Envanteri kullanıldı. Çok eksenli tanı sınıflaması Tanı Sınıflaması: 0-3 Yenilenmiş Basım (TS:0-3 YB) kullanılarak yapıldı. Çocukların Anababa-Bebek İlişkisini Değerlendirme Ölçeği (ABİD) ve Duygusal ve Sosyal İşlevsellik (DSİ) skorları TS:0-3 YB temelinde hesaplandı. Anababalara Aile Değerlendirme Ölçeği (ADÖ) ve Genel Sağlık Anketi-12 (GSA-12) uygulandı.

Bulgular: GG grubunda parçalanmış aile oranı YGB grubuna göre daha yüksekti. GG olgularında TS:0-3 YB'ye göre belirlenen eştanı oranı YGB olgularına göre anlamlı düzeyde daha yüksekti. Ortalama ABİD puanları açısından iki grup arasında anlamlı bir fark bulunmadı. GG'li çocuklarda YGB'li çocuklara göre ortalama DSİ skorları anlamlı düzeyde daha düşüktü. GG grubunda, kötü anababa-çocuk ilişkisi ve anne GSA-12 puanları olumsuz emosyonel sosyal işlevsellik puanları ile ilişkili bulundu. ADÖ'nün "duygusal tepki verebilme" alt alanında hem anne hem babalarda, "iletişim" alt alanında ise annelerde GG grubunun puanlarının YGB grubuna göre daha olumsuz olduğu saptandı. Gelişim düzeyinin anne GSA-12 puanlarıyla her iki hasta grubunda, baba GSA-12 ve anne ADÖ "davranış kontrolü" alt alanı puanlarıyla ile YGB grubunda negatif korelasyon gösterdiği saptandı.

Sonuç: YGB ve GG olan çocukların klinik özelliklerinin çok eksenli tanı sınıflamaları kullanılarak belirlenmesi önemli klinik getirilere sahip olabilir.*(Nöropsikiyatri Arşivi 2011; 48: 188-94)*

Anahtar kelimeler: Yaygın gelişimsel bozukluk, gelişim geriliği, zeka geriliği, küçük çocuklar, TS:0-3

Address for Correspondence/Yazışma Adresi: Dr. Ayhan Bilgiç, Malatya Devlet Hastanesi, Çocuk ve Ergen Psikiyatrisi Kliniği, Malatya, Türkiye
Gsm: +90 532 527 01 20 E-mail: bilgicayhan@yahoo.com **Received/Geliş tarihi:** 03.12.2010 **Accepted/Kabul tarihi:** 13.02.2011
© Archives of Neuropsychiatry, published by Galenos Publishing. / *Nöropsikiyatri Arşivi Dergisi, Galenos Yayınevi tarafından basılmıştır.*

Introduction

Pervasive developmental disorders (PDDs) are lifelong neurodevelopmental conditions characterized by severe qualitative impairments in reciprocal social interaction, communication, and restricted, repetitive behavior, interests and activities. Mental retardation (MR) is not a disorder and refers to limitations in intellectual and adaptive functions. Because of the changeability of early developmental problems and, in order to avoid stigmatization, the term "developmental delay" (DD) was used instead of the term "mental retardation" in very young children. Many efforts have been made to explore the biologic basis of these conditions, but their etiology remains largely unknown.

PDDs and DD are among the most frequent causes of the referral to the mental health clinics in early childhood (1). Research studies on infants and toddlers with these developmental problems have usually emphasized the differential diagnosis (2). Besides the inherent characteristics of very young children, the caregiver-child relationship and associated variables which could have an impact on this relationship must also be taken into consideration. This is because the understanding and treatment of mental health phenomena may only be possible with the relationship context in this age group. Therefore, the diagnosis of PDDs or DD in infants and toddlers should be based on multiaxial classification systems which equally emphasize all axes.

Even though the DSM-IV allows multiaxial assessment, as it has been shifted towards an almost exclusive use of Axis I in practice and has relatively few diagnostic categories specific to very young children, the necessity of a more detailed and specific classification system for infants and toddlers has appeared. The Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood: 0-3 (Diagnostic Classification: 0-3 (DC: 0-3)) was developed to better address psychiatric problems of infants and toddlers (3). Subsequently, its revision was made through clinical experience and study findings that were obtained by using the DC: 0-3 (4). In addition to providing diagnosis of psychopathology, it also focuses on the assessment of the caregiver-child relationship, family structure, medical and developmental disorders, psychosocial stressors as well as social and emotional functioning of children (5).

The present study was designed to compare (i) the sociodemographic characteristics and clinical findings of newly diagnosed infants and toddlers with PDDs and DD by using the Diagnostic Classification: 0-3 Revised (DC:0-3 R) and (ii) the parental psychiatric symptoms and family functioning level in these children.

Method

Procedure

The study was approved by the ethics committee at Ankara University. The nature and purpose of the study was explained to all parents who agreed to take part and read an information sheet and, written informed consent was obtained from all participants. Seventy-three families of children consecutively referred to the department of child and adolescent psychiatry at Ankara University were approached for the study. Four families refused to participate, while five children were excluded based on the exclusion/inclusion criteria.

The assessment process included a series of three visits within a period of three weeks. At the first visit, the reason of referral and the developmental history of the children were obtained and sociodemografic data were gathered. Children with definite or suspected PDDs were examined in terms of autism symptoms in detail by using the Autism Spectrum Diagnostic Interview Form (ASDIF). The McMaster Family Assessment Device (FAD) and the 12-item General Health Questionnaire (GHQ-12) were also administered to the parents for the evaluation of family functioning and parental mental health.

At the second visit, assessments of developmental and adaptive behavior were conducted by an expert psychologist who had specific training and experience in the administration of the Ankara Developmental Screening Inventory (ADSI). The degree of DD was defined by dividing the developmental level score determined by ADSI to normative data matched for age. The children with DD were classified as borderline (15% to 30% DD), mild (30% to 50% DD), moderate (50% to 70% DD) and severe (> 70% DD).

During the last visit, the Clinical Problem-Solving Procedure (CPSP) was administered for the assessment of mother-infant interactional patterns. All children and their parents were observed through a one-way mirror by two child psychiatrists in a playroom setting. Sessions were videotaped and discrepancies in assessments were discussed between two raters observing the video records. Final decisions were established based on data obtained from the CPSP, ASDIF and the Psychiatric Assessment Interview Form (PAIF). Following a mutual agreement, a five-axis evaluation according to the DC:0-3-R was carried out. Diagnoses of autism and PDD-NOS were based on the DSM-IV criteria in accordance with the DC:0-3 R.

Participants

The sample consisted of 35 children with PDDs and 29 children with DD within the 17-45 months age range who were consecutively referred to the Ankara University Department of Child and Adolescent Psychiatry and their parents. Children with major neurologic conditions or physical illnesses and those who had a history of previous psychiatric intervention or special education were excluded.

The mean referral age of the children with PDDs (27.74±5.39 months) was lower than that of the children with DD (33.03±6.71 months) ($t=-3.50$, $p<0.001$). No significant difference was found between the groups in sex distribution - 30 boys/5 girls and 20 boys/9 girls in PDDs and DD groups, respectively. There were no significant differences in terms of age and education levels of the parents.

Instruments

Psychiatric Assessment Interview Form (PAIF)

The form was previously designed based on the practice parameters developed by the American Academy of Child and Adolescent Psychiatry for the assessment of infants and toddlers (6). It provides information about reason for referral, developmental and medical history of the child, family history, and provides a foundation for further evaluation and diagnosis.

Autism Spectrum Diagnostic Interview Form (ASDIF)

The ASDIF is a semi-structured interview form administered to all patients in the PDDs group (7,8). The ASDIF includes several

symptom checklists questioning the main PDDs symptoms defined in the DSM system and some of the additional clinical features (e.g. hypersensitivity to sound, low sensitivity to pain, and some of the behaviors representative of the imitative play) of the PDDs. Application of this form requires a clinical experience and education. It helps to gather a wide range of information related to patients and to establish diagnosis of PDDs based on the DSM criteria.

Ankara Developmental Screening Inventory (ADSI)

The ADSI was developed for assessing developmental levels of Turkish children (9). It is administered to the caregiver and consists of a total of 154 questions covering an age range of 0 to 60 months. The questions address different areas of development such as cognitive, language, fine motor abilities, gross motor abilities, and social and self-care skills subscales. The total score of these four subscales yields the general developmental score. The raw scores are then converted to standard T scores, which are compared with the normative data. Test-retest reliability coefficients for the three age groups (0-12 months, 13-44 months and 45-72 months) were 0.99-0.88 and internal consistency was 0.99-0.80.

The Clinical Problem-Solving Procedure (CPSP)

The CPSP was originally designed for the observation of children aged 24-54 months (10). With minor modifications, it has been extensively used for children 12-54 months of age (11). The procedure, which is conducted in a semi-structured manner, evaluates domains of infant-parent relationship and attachment patterns. The CPSP includes "free play", "cleanup", "bubbles", "teaching tasks" and "separation-reunion" episodes. Parents are instructed about sessions prior to the initiation of the procedure. Parent-infant dyads are observed through a one-way mirror and are videotaped during the course of the procedure. Transitions from one episode to another are controlled by the observing clinicians with telephone calls. This procedure allows the observation of parent-infant interaction in lower and higher stress situations. Observers note the child's capacity for self-regulation, cooperation, showing affection and learning style, the parent's capacity to set limits, provide structure, teach effectively and maintain availability, the dyad's familiarity with play and having fun together and, finally, the parent-infant attachment pattern.

Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood- Revised, (Diagnostic Classification: 0-3 R):

The Diagnostic Classification: 0-3 was designed for a systematic and developmentally based approach to classify the psychiatric problems of infants and toddlers in the first 4 years of life (3). It is a multiaxial classification system and is useful for clinical formulation. The revised version of the DC:0-3, namely the DC:0-3 R, was published in 2005 and a translation of this version into Turkish was conducted (4,12). The DC: 0-3 R involves five axes:

Axis I: Clinical disorders are described in this axis. DC:0-3 R Axis I redefines some DSM-IV Axis I diagnoses to better suit infants and toddlers. It also has new clinical categories which complement DSM-IV. Multiple psychiatric disorders are allowed to take place in Axis I.

Axis II: Parent-child relationship disorders are described in this axis. Relationship disorders are described as significant disturbance between the child and caregiver. In this axis, the Parent-Infant Relationship Global Assessment Scale (PIR-GAS) and the Relationship Problems Checklist (RPCL) are used to evaluate the quality of the parent-child relationship. The PIR-GAS assesses the global quality of parent-child relationships on a continuum from "well adapted" to "grossly impaired". A PIR-GAS score below 40 indicates a relationship disorder. The RPCL describes overinvolved, underinvolved, anxious/tense and angry/hostile relationship disorder types. A diagnosis of a relationship disorder is made not only on the basis of observed behavior but also on the parent's subjective experience.

Axis III: Medical and developmental disorders and conditions are noted in Axis III.

Axis IV: Psychosocial and environmental stressors that directly or indirectly impact the infant or young child are described in Axis IV. These stressors may be acute or enduring. A Psychosocial and Environmental Stressors Checklist is used for noting multiple sources of stressors, their duration and severity.

Axis V: Emotional and social functioning (ESF) of the infants or young children is described in this axis. The assessment of emotional and social functioning of the child is made in the context of the parent-child relationship. Six separate capacities determining emotional and social functioning are noted in the DC:0-3 R: attention and regulation, forming relationships or mutual engagement, intentional two-way communication, complex gestures and problem solving, use of symbols to express thoughts and feelings and connecting symbols logically and abstract thinking. Each of the capacities is scored from one to six, with lower scores indicating better functioning.

Family Assessment Device (FAD)

The FAD is a 60-item measure assessing family functioning based on the McMaster model (13). It assesses family functioning in six dimensions: problem solving, communication, roles, affective responsiveness, affective involvement and behavior control, plus a total scale, general functioning. The questionnaire is scored on a five-point Likert-type scale, with higher scores indicating less healthy functioning. It demonstrated good concurrent validity and reliability in Turkish families (14).

General Health Questionnaire-12 items (GHQ-12):

The GHQ-12 was developed by Goldberg and Hiller in order to evaluate psychiatric morbidity (15). This questionnaire is scored on a four-point Likert-type scale. It was demonstrated to be useful in the prediction of psychopathology. It has been validated in the Turkish population (16). In the present study, the questionnaire was completed by the mothers and fathers.

Statistical Analyses

The analysis of the data was performed by SPSS 11.0 statistical software. Demographic characteristics and clinical features of patients were determined using descriptive statistics. Student's t-test and chi-square test were used to analyze the differences between the groups. The Pearson's or Spearman's correlation coefficient was calculated to examine the relationship between psychological test scores and clinical variables. The significance was set at a level of 0.05 (two-tailed).

Results

In the PDDs group, 28 children were diagnosed with autism and 7 of these received diagnosis of PDD-NOS. The proportion of the

single-parent families was higher and the nuclear family was lower in the DD group compared to the PDDs group (χ^2=6.79, p<0.01; χ^2=7.71, p<0.01, respectively). Psychiatric comorbidity was determined in two children with PDDs and in ten with DD according to the DC:0-3 R criteria. Patients with DD had a significantly higher rate of comorbid psychiatric conditions compared to those with PDDs (Table 1). There were no significant differences between the two groups in distribution of psychosocial stressors (Table 1). No significant differences were found between the PDDs and DD groups in terms of classification of DD and developmental levels in different areas of development measured by the ADSI (Table 1 and Table 2).

The mean mother-rated "communication" and "affective responsiveness" scores and father-rated "affective responsiveness" scores of the FAD scale were significantly higher in the DD group compared with the PDDs group (Table 3). However, no signicant differences were observed between the study and control groups for mother- or father-rated mean GHQ-12 scores (Table 3).

Correlations of developmental levels of the children with the GHQ-12 and the FAD scores of the parents were evaluated in both patient groups and in the total sample. Mothers' GHQ-12 scores negatively correlated with: (i) the ADSI total (r=-0.41, p<0.05), cognitive language (r=-0.45, p<0.05) and social/self-care skills (r=-0.39, p<0.05) scores in the DD group; (ii) ADSI cognitive language (r=-0.35, p<0.05) and social/self-care skills (r=-0.35, p<0.05) scores in the PDDs group; and (iii) ADSI total (r=-0.34, p<0.01), cognitive language (r=-0.39, p<0.01), gross motor abilities (r=-0.31, p<0.05) and social/self-care skills (r=-0.36, p<0.01) scores in the entire sample. Fathers' GHQ-12 scores negatively correlated with ADSI social/self-care skills in the PDD group (r=-0.37, p<0.05) and in the entire sample (r=-0.36, p<0.01). Mothers' "behavior control" scores of the FAD scale negatively correlated with: (i) ADSI total (r=-0.46, p<0.01), cognitive language (r=-0.37, p<0.05), fine motor abilities (r=-0.42, p<0.05) and social/self-care skills (r=-0.57, p≤0.001) scores in the PDD group and (ii) ADSI total (r=-0.32, p<0.05), cognitive language (r=-0.29, p<0.05), fine motor abilities (r=-0.33, p<0.05) and social/self-care skills (r=-0.29, p<0.05) scores in the total sample. No significant association was found between the other subscale scores of the FAD scale and the ADSI scores for both age groups and for the entire sample.

Child-parent relationship was scored according to the PIR-GAS scale. No significant differences were found in the mean PIR-GAS scores between the two diagnostic groups (Table 2). Twelve dyads in the PDDs group and fourteen in the DD group were found to have a relationship disorder in Axis II measured by their PIR-GAS scores (≤ 40). All of the cases who had relationship disorders in the PDD group had an "underinvolved" relationship disorder, yet in the DD group, twelve dyads had "underinvolved" and two had a "verbally abusive" relationship disorder. PIR-GAS scores did not show association between parents' educational level, parents' GHQ-12 and FAD scores and developmental levels of the children in both groups.

The mean ESF scores of the PDDs and DD groups are presented in Table 2. The mean ESF scores were significantly lower in children with DD than in those with PDDs. These results indicated better ESF in the group of children with DD. There were no significant relationships between the ESF and the PIR-GAS scores in the PDDs group. On the other hand, in the DD group, PIR-GAS scores showed inverse relationships with all dimensions of ESF apart from "connecting symbols logically and abstract thinking" (Table 4).

Correlations between the ESF scores and parents' GHQ-12 and FAD scores were also evaluated. GHQ-12 scores of mothers had significant positive correlations with "intentional two-way communication" (r=0.44, p<0.05), "complex gestures and problem

Table 1. Distribution of the comorbid psychiatric disorders and psychosocial stressors, and classification of developmental delay in the diagnostic groups (chi-square)

	PDD	DD	χ^2	p
Comorbid psychiatric disorders	2	10	8.63	<0.01
RDSP Hypersensitive Type (Negative/Defiant))	2	1		
RDSP Hyposensitive/Underresponsive Type	-	1		
RDSP Sensory Stimulation-Seeking/Impulsive Type	-	1		
DMD Emotionally Withdrawn or Inhibited Pattern	-	6		
DMD Indiscriminate or Disinhibited Pattern	-	1		
Classification of developmental delay			5.39	NS
Borderline	6	7		
Mild	21	18		
Moderate	8	2		
Severe	-	2		
Psychosocial stressors	24	22	0.42	NS
Marital Discord	9	10		
Economic Challenges	6	3		
Child Care Challenges	4	5		
Parental Psychopatology	10	6		

PDDs: pervasive developmental disorder, DD: developmental delay DMD: deprivation/maltreatment disorder, RDSP: regulation disorders of sensory processing, NS:not significant

solving" (r=0.49, p<0.05), and "use of symbols to express thoughts and feelings" (r=0.46, p<=0.05), dimensions of the ESF in children with DD.

Discussion

Infant and toddler psychiatry is a relatively new field and, studies evaluating psychiatric disorders in these age groups are limited. DC:0-3 R was developed to better address psychiatric problems of infants and toddlers, and the experience in use of DC:0-3 R is also limited. We aimed to investigate toddlers with PDDs and DD in the context of the caregiver-child relationship by using DC:0-3 R in the present study. To our knowledge, this is the first study in the literature examining the clinical characteristics of newly diagnosed toddlers with PDDs and DD based on the DC:0-3 R.

The number of single-parent families was significantly higher in the DD group than in the PDDs group. In addition, the mother-rated "communication" and "affective responsiveness" scores and father-rated "affective responsiveness" scores of the FAD scales were significantly higher in the DD group compared to the PDDs one. These results show that family characteristics and functioning are poor in children with DD. Previous studies have demonstrated the importance of family context for social and emotional development of these children, though many children with DD have a biological substrate (17). We suggest that our findings support those of previous studies and reflect that environmental factors which cause emotional deprivation may increase the tendency to DD in early childhood.

The importance of the assessment of behavior, development, quality of life and psychopathology in infants and young children in the context of the caregiver-child relationship has been shown in many studies (18-20). The evaluation of the caregiver-infant relationship indicated not only to children's developmental challenges, but it was also predictive for individual adaption in the subsequent stages of development (11,19,21). Caregiver-child

Table 2. PIR-GAS scores, developmental levels and ESF scores in the PDDs and DD groups (t tests)

		PDDs	DD	t	p
	PIR-GAS	52.29	51.03	- 0.28	NS
Developmental levels according to ADSI	Cognitive language (%)	54.5	55.5	-0.33	NS
	Fine motor abilities (%)	57.4	60.5	-0.78	NS
	Gross motor abilities (%)	80.5	76.3	0.63	NS
	Social self-care skills (%)	58.9	65.5	-1.41	NS
	Total (%)	58.5	59.4	-0.25	NS
Emotional and Social Functioning	Attention and regulation	3.94	2.59	7.20	<0.001
	Forming relationships or mutual engagement	4.49	3.03	6.21	<0.001
	Intentional two-way communication	4.97	3.52	6.71	<0.001
	Complex gestures and problem solving	5.54	4.00	6.02	<0.001
	Use of symbols to express thoughts and feelings	5.78	4.55	5.18	<0.001
	Connecting symbols logically and abstract thinking	6.73	6.17	2.20	<0.05

PDDs: pervasive developmental disorder, DD: developmental delay, ADSI: Ankara Developmental Screening Inventory, ESF: emotional and social functioning, PIR-GAS: Parent–Infant Relationship Global Assessment Scale, NS: not significant
Note: Developmental levels were defined by dividing the developmental levels scores determined by ADSI to normative data matched for age

Table 3. Family Assessment Device scores of the parents of children with PDDs and DD (t tests)

	Mothers of PDD (n=35)	Mothers of DD (n=29)	t	p	Fathers of PDD (n=35)	Fathers of DD (n=24)	t	p
GHQ	14.33	15.31	-0.56	NS	11.13	11.29	-0.11	NS
FAD								
Problem Solving	2.04	2.16	-0.68	NS	1.81	1.89	-0.48	NS
Communication	1.86	2.20	-2.35	<0.05	1.69	1.82	-1.31	NS
Roles	2.04	2.14	-0.88	NS	1.96	1.98	-1.00	NS
Affective Responsiveness	1.63	2.05	-2.51	<0.05	1.53	1.87	-2.23	<0.05
Affective Involvement	1.90	1.88	0.21	NS	1.75	1.92	-1.22	NS
Behaviour Control	2.03	2.19	-1.34	NS	1.85	2.01	1.56	NS
General Functioning	1.81	2.07	-1.83	NS	1.66	1.80	-1.11	NS

PDDs: pervasive developmental disorder, DD: developmental delay, FAD: Family Assessment Device, GHQ: General Health Questionnaire, NS: not significant

Table 4. The correlations between the ESF and the PIR-GAS scores in the PDDs and DD groups (Spearman correlations)

		Attention and regulation	Forming relationships or mutual engagement	Intentional two-way communication	Complex gestures and problem solving	Use of symbols to express thoughts and feelings	Connecting symbols logically and abstract thinking
PIR-GAS Scores of PDDs Group	r	-0.29	-0.14	-0.14	-0.13	-0.12	0.22
	p	NS	NS	NS	NS	NS	NS
PIR-GAS Scores	r	-0.44	-0.73	-0.70	-0.66	-0.60	-0.36
of DD Group	p	<0.05	<0.001	<0.001	<0.001	<0.001	NS

PDDs: pervasive developmental disorder, DD: developmental delay, PIR-GAS: Parent–Infant Relationship Global Assessment Scale, ESF: emotional and social functioning, NS: not significant

relationships might have been affected by problems arising from parents or children. The delay and deviance in development of social and communicative skills in young children caused by PDDs are generally more prominent compared with DD. Therefore, we hypothesized that caregiver-infant relationships are more negatively affected in the PDDs group than in the DD group. However, no significant differences were found in the mean PIR-GAS scores between the PDDs and DD groups in the present study. These results may be explained by the presence of more negative parental factors in the DD group. Seven out of 29 children with DD were diagnosed as deprivation/maltreatment disorder (DMD) which is generally related to poor parenting and we suggest that this finding supports abovementioned idea. Compatible with our opinion, it was reported by Boris that children with attachment disorders had lower PIR-GAS scores compared to those with other psychiatric disorders (22).

It was reported that psychosocial stressors experienced in early childhood are more detrimental to the development of children compared to experienced later in life (23). The rate of psychosocial stressors is found to be quite high in both groups. We considered that psychosocial stressors may precipitate the emergence of DD in some children. On the other hand, having a child with a developmental disability contributed to the presence of other stressors such as parental mental illness or economic deprivation. Therefore, the reciprocal relations between developmental disorders and psychosocial stressors may explain the high rate of the stressors in the lives of these children. Previous studies also showed a relation between child psychopathology and psychosocial stressors (24,25).

Children diagnosed with PDDs or MR are at risk for developing mental health problems (26-28). Although researches about the prevalence of psychiatric disorders among children with developmental disabilities have been generally conducted on school age children and adolescents, behavioral and emotional problems, and difficulties with attention and activity regulation are seen in toddlers, as well (17,29,30). Accurate and reliable diagnosis of comorbid psychiatric disorders has a great importance in developmental disorders. Comorbid conditions may cause serious functional impairments and enhance the impact of the disorder on children and their families (27-30). Detection of whether behavioral symptoms are related to comorbid conditions or developmental disorders alone, may allow the use of specific treatments. The rate of comorbid psychiatric disorders was significantly higher in children with DD compared to PDDs in the present study. However, most patients were diagnosed as DMD in the DD group and the diagnosis of DMD cannot be made in children with PDDs according to DC:0-3 R. Because the term "deprivation/maltreatment disorder" have been used to describe attachment disorders in the DC:0-3 R and their symptoms are similar to social interaction deficits which occurred in children with PDDs. Therefore, it cannot be concluded that the frequency of comorbid psychiatric disorders are higher in toddlers with DD than those with PDDs based on this study.

Emotional regulation and social development levels are related to both neurological development and caregiver-infant interaction pattern. We consider that the detection of poor emotional and social functioning level in the children with PDDs compared to the children with DD is consistent with general expectations, because of the inherent characteristics of PDDs. The present study showed that poor ESF scores were related to impaired PIR-GAS and maternal GHQ-12 scores in the children with DD. Compatible with our findings, it was reported that toddlers with depressed mother were below age-appropriate ESF levels during interaction with their mother (24). These results suggest that emotional and social functioning of the children with DD is significantly affected by environmental factors. Furthermore, we suspected that these findings support the idea which the development of DD may be related to parental psychiatric problems and impaired child-caregiver relationship at least in some cases. On the other hand, these relations were not found in the PDDs group. ESF levels were possibly more affected from structural factors in children with PDDs compared to those with DD.

In the present study, no significant differences were found between the parents of children with PDDs and DD in terms of GHQ-12 scores. However, GHQ-12 scores showed inverse correlations with the developmental levels of children in both patients group. It is well known that the rates of various psychiatric disorders are high in the parents of children with developmental disorders (31-34). There is data indicating that parents of children with autism experience more psychiatric difficulties compared to parents of children with diagnoses other intellectual disabilities such as MR (33,34). Studies also supported the notion of a strong genetic basis for autism and they suggested that the high rate of psychiatric disorders in the parents of children with PDDs may be related to their genetic vulnerability (33,35). However, the stressful experience of raising a child with autism may surpass that of raising a child with other intellectual disabilities (33). Therefore, the high rate of psychiatric disorders in the parents of children with

autism compared to different developmental disorders attributed to having a child with a more severe developmental disorder (33). The correlations we found between parental psychiatric status and DD levels of the children are also compatible with this idea. Our study was performed on newly diagnosed young children. The lack of a significant difference between the two groups with regard to GHQ-12 scores may be related to this property of our sample. The psychological impact of taking care of a child with a more severe developmental disorder such as PDDs may become symptomatic in time; therefore, the assessment of parental psychiatric status may need to be repeated later.

There are some limitations for this study. The mean referral age of the children with PDDs was higher than for the children with DD. This result may cause some bias when comparing these two groups. However, especially in mildly affected cases, diagnosis of the DD in infancy and early childhood may be difficult compared to PDDs. Therefore, we have considered that to avoid such a bias may be difficult in practice. Another limitation is that our findings may only be generalized to the clinical population. The study implications are also limited by the cross-sectional nature of the design. A longitudinal design would allow evaluating how the variables related to children and their parents change in the course of time, and better analyze the interactions between these variables.

In conclusion, the findings of this study may have important implications for clinical practice, and for future research aimed at understanding the effects of environmental factors on the course of the developmental disorders in early childhood. This study also observed that, as in all childhood mental disorders, the diagnosis and treatment processes of toddlers with PDDs and DD should be carried out in the parent-infant relationship context.

References

1. Uslu R, Özalp O, Bilgiç A, ve ark. Bebek ruh sağlığı polikliniğine başvuran hastalarda TS:0-3 YB Tanı Dağılımı'na ilişkin bir ön-çalışma (in Turkish). Türkiye Klinikleri Pediatrik Bilimler 2007; 3:8-13.
2. Zwaigenbaum L, Bryson S, Rogers T, et al. Behavioral manifestations of autism in the first year of life. Int J Dev Neurosci 2005; 23:143-52.
3. ZERO TO THREE. Diagnostic classification of mental health and developmental disorders of infancy and early childhood (DC:0-3) (1994) Washington, DC: ZERO TO THREE Press
4. ZERO TO THREE. Diagnostic classification of mental health and developmental disorders of infancy and early childhood: Revised edition (DC:0-3R) (2005) Washington, DC: ZERO TO THREE Press
5. Emde RN, Wise BK. The cup is half full: initial clinical trials of DC:0-3 and a recommendation for revision. Infant Ment Health J 2003; 24:437-46.
6. Thomas JM, Benham AL, Gean M, et al. Practice parameters for the psychiatric assessment of infants and toddlers (0-36 months). American Academy of Child and Adolescent Psychiatry. J Am Acad Child Adolesc Psychiatry 1997; 36(10 Suppl):21-36.
7. Akçakın M. Normal eğitim gören otistik çocuklarla özel eğitim gören otistik çocukların karşılaştırıldığı bir izleme çalışması (in Turkish). Türk Psikoloji Dergisi 1993; 29:3-9.
8. Akçakın M, Kerimoğlu M. Otistik bozuklukta tanı koyma ve belirti dağılımı (in Turkish). Ankara Üniversitesi Tıp Fakültesi Mecmuası 1993; 46:413-28.
9. Savaşır I, Sezgin N, Erol N. Ankara Gelişim Tarama Envanteri (AGTE). 2. ve 3. Basım (In Turkish), Türk Psikologlar Derneği, Ankara, 1998.
10. Crowell JA, Feldman SS. Mothers' internal models of relationships and children's behavioral and developmental status: a study of mother-child interaction. Child Dev 1988; 59:1273-85.
11. Zeanah CH, Larrieu JA, Heller SS. Infant – parent relationship assessment. In: Zeanah CH (2. ed). Handbook of Infant Mental Health. New York, Guilford Press, 2000; pp:222–35.
12. Doğan D G, Bingöler E B, Ünal Ö, ve ark. Bebeklik ve Erken Çocukluk Döneminde Ruh Sağlığı ve Gelişimsel Sorunların Tanı Sınıflaması: Yenilenmiş (In Turkish). Yayınlanmamış çeviri; 2006.
13. Epstein NB, Baldwin LM, Bishop DS. The Mc Master Family Assessment Device. J Marital Fam Ther 1983; 2:171-80.
14. Bulut I. Aile Değerlendirme Ölçeği el kitabı (In Turkish), Özgüzeliş Matbaası, Ankara, 1990.
15. Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. Psychol Med 1979; 9:139-45.
16. Kılıç C. Genel Sağlık Anketi: Güvenilirlik ve Geçerlilik Çalışması (In Turkish). Türk Psikiyatri Dergisi 1996; 7:3-9.
17. Walters AS, Blane KK. Mental retardation. In: Zeanah CH (2. ed). Handbook of Infant Mental Health. New York, Guilford Press, 2000; 271-81.
18. Carter AS, Briggs-Gowan MJ, Davis NO. Assessment of young children's social-emotional development and psychopathology: recent advances and recommendations for practice. J Child Psychol Psychiatry 2004; 45:109-34.
19. Aoki Y, Zeanah CH, Heler SS, et al. Parent-infant relationship global assessment scale: a study of its predictive validity. Psychiatry Clin Neurosci 2002; 56:493-7.
20. Üneri ÖŞ, Karadavut Kİ. Ebeveyn değerlendirmesine dayalı, serebral palsili çocuklarda yaşam kalitesi: bir ön çalışma (In Turkish). Archives of Neuropsychiatry 2010; 47:127-32.
21. Field T, Estroff DB, Yando R, et al. "Depressed" mothers' perceptions of infant vulnerability are related to later development. Child Psychiatry Hum Dev 1996; 27:43-53.
22. Boris N, Zeanah CH, Larrieu J, et al. Attachment disorders in infancy and early childhood: a preliminary study of diagnostic criteria. Am J Psychiatry 1998; 155:295-7.
23. Aber JL, Jones S, Cohen J. The impact of poverty on the mental health and development of very young children. In: Zeanah CH (2. ed). Handbook of Infant Mental Health. New York, Guilford Press, 2000;113–28.
24. Öztop D, Uslu R. Behavioral, interactional and developmental symptomatology in toddlers of depressed mothers: a preliminary clinical study within the DC:0-3 framework. Turk J Pediatr 2007; 49:171-8.
25. Goodman SH, Gotlib IH. Risk for psychopathology in the children of depressed mothers: a developmental model for understanding mechanisms of transmission. Psychol Rev 1999; 106:458-90.
26. Rush KS, Bowman LG, Eidman S, et al. Assessing psychopatology in individuals with developmental disabilities. Behav Modif 2004; 28:621-37.
27. Gürkan K, Akçakın M, Kılıç BG, et al. Psychiatric comorbidity and drug treatments in high functioning children and adolescents with pervasive devolepmental disorders. Neurology, Psychiatry and Brain Research 2008; 15:143-50.
28. Mukaddes NM, Herguner S, Tanidir C. Psychiatric disorders in individuals with high-functioning autism and Asperger's disorder: Similarities and differences. World J Biol Psychiatry 2010; 11:964-71.
29. Lainhart JE. Psychiatric problems in individuals with autism, their parents and siblings. Int Rev Psychiatry 1999; 11:278-98.
30. Koenig K, Rubin E, Klin A, et al. Autism and pervasive developmental disorders, In: Zeanah CH (2. ed). Handbook of Infant Mental Health. New York, Guilford Press, 2000; pp:298-310.
31. Olsson MB, Hwang CP. Depression in mothers and fathers of children with intellectual disability. J Intellect Disabil Res 2001; 45:536-43.
32. Demir T, Dogangun B, Karacetin G, et al. Psychiatric disorders and symptoms in mothers of children with autistic disorder. Neurology, Psychiatry and Brain Research 2008; 15:191-6.
33. Yirmiya N, Shaked M. Psychiatric disorders in parents of children with autism: a meta-analysis. J Child Psychol Psychiatry 2005; 46:69-83.
34. Fırat S, Diler RS, Avci A, et al. Comparison of psychopathology in the mothers of autistic and mentally retarded children. J Korean Med Sci 2002; 17:679-85.
35. Fombonne E, Simmons H, Ford T, et al. Prevalence of pervasive developmental disorders in the British nationwide survey of child mental health. J Am Acad Child Adolesc Psychiatry 2001; 40:820-7.