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Arch Basic Clin Res 2022; 4(3): 119-124 • DOI: 10.5152/ABCR.2022.221524

Original Article

The Affectivity in Infants with Developmental Dysplasia of the Hip and Distress and Depressive Symptoms in Their Mothers

Gelişimsel Kalça Displazisi Olan Bebeklerde Duygulanım Durumu ve Annelerinde Depresif Belirtileri ve Ebeveyn Stresi

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Cite this article as: Demirpençe Seçinti D, Albayrak ZS, Şen Demirdöğen E, et al. The affectivity in infants with developmental dysplasia of the hip and distress and depressive symptoms in their mothers. *Arch Basic Clin Res* 2022;4(3): 119-124.

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ABSTRACT

Objective: Although developmental dysplasia of the hip is the most common orthopedic condition of infancy, there is limited evidence on the impact of developmental dysplasia of the hip on postpartum maternal psychology and infant behavior. Thus, this study aimed to investigate the relationship between developmental dysplasia of the hip, postpartum maternal depression, parental distress, and infant behavior.

Methods: Forty-six mothers and infants aged 3-6 months were enrolled in this case–control study. The case group comprised mothers and infants with developmental dysplasia of the hip and the control group comprised mothers and infants without developmental dysplasia of the hip. Developmental dysplasia of the hip diagnosis was made by hip ultrasonography performed via the Graf technique. Infants with types 3 and 4 developmental dysplasia of the hip based on the Graf classification were included in the case group. Maternal depressive symptoms were screened with the Edinburgh Postpartum Depression Scale; maternal stress, parent–child interaction, and difficult temperament were assessed with the Parenting Stress Index; and infant behavior was determined by the Infant Behavior Questionnaire Revised Very Short Form.

Results: There were no differences between groups in maternal depressive symptoms (P=.737), parental distress (P=.569), parent–child dysfunctional interaction (P=.677), difficult child (P=.201), negative behavior (P=.806), and positive behavior (P=.111).

ÖZ

Amaç: Gelişimsel kalça displazisi bebekliğin en sık görülen ortopedik problemi olmasına rağmen, gelişimsel kalça displazisinin doğum sonrası anne psikolojisi ve bebek davranışı üzerindeki etkisine dair yeterli çalışma bulunmamaktadır. Bu çalışma, kalçanın gelişimsel displazisi, postpartum depresyon, ebeveyn stresi ve bebek davranışı arasındaki ilişkiyi araştırmayı amaçlamıştır.

Yöntem: Bu vaka kontrol çalışmasına 3-6 aylık 46 bebek ve anneleri alındı. Olgu grubu gelişimsel kalça displazisi olan bebekler ve annelerinden, kontrol grubu ise gelişimsel kalça displazisi olmayan bebekler ve annelerinden oluşturuldu. Kalçanın gelişimsel displazisi tanısı Graf tekniği ile yapılan kalça ultrasonografisi ile konuldu. Graf sınıflamasına göre tip 3 ve 4 gelişimsel kalça displazisi olan bebekler olgu grubuna dahil edildi. Maternal depresif belirtiler Edinburgh Postpartum Depresyon Ölçeği ile tarandı; anne stresi, ebeveyn-çocuk etkileşimi ve zor mizaç Ebeveyn Stres İndeksi ile değerlendirildi; ve bebek davranışı Bebek Davranış Anketi çok kısa revize formu ile belirlendi.

Bulgular: Annede depresif belirtiler (P = .737), ebeveyn stresi (P = .569), ebeveyn-çocuk disfonksiyonel etkileşimi (P = .677), zor çocuk olma (P = .201), olumsuz davranış (P = .806) ve olumlu davranış (P = .111) açısından gruplar arasında fark görülmedi.

Sonuç: Gelişimsel kalça displazisinin, bebeklerin ebeveyn stresi ve anne depresif belirtilerini etkileyen huysuzluk, fazla ağlama, fazla yapışma gibi olası ağrı ile ilgili davranışlar sergilemesine

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Geliş Tarihi/Received: July 18, 2022
Kabul Tarihi/Accepted: September 14, 2022

Conclusions: Developmental dysplasia of the hip did not cause infants to demonstrate pain-related behaviors such as clinginess, fussiness, and crying that affected parental distress and maternal depressive symptoms. Because no changes in infant behavior and no limitations in infant motor movement were observed by the mothers, having an infant with developmental dysplasia of the hip was not related to maternal depressive symptoms or distress.

Keywords: Developmental hip dysplasia, postpartum depression, infant reactivity

neden olmadığı görüldü. Anneler tarafından bebek davranışında herhangi bir değişiklik ve bebek motor hareketlerinde herhangi bir kısıtlama gözlemlenmediği için, gelişimsel kalça displazisi olan bir bebeğe sahip olmak annede depresif belirtiler veya stres ile ilişkili görülmedi.

Anahtar Kelimeler: Gelişimsel kalça displazisi, Infant reaktivitesi, Postpartum depresyon.

INTRODUCTION

Developmental dysplasia of the hip (DDH), along with the associated laxity of the joint and subsequent development of osteoarthritis, is the most common orthopedic disorder in infants, with a reported prevalence ranging from 0.8% to 4% depending on the criteria used for diagnosis, the method of screening, and the population studied.[1,2] Although there is inconsistency in the literature regarding whether the risk of DDH is affected by factors such as birth weight and prematurity, there is consensus that a family history of DDH, female sex, firstborn status, and breech position increases the risk of a baby having DDH.[3]

It is generally agreed that late diagnosis of DDH (diagnosis after 3 months) increases the risk of long-term complications, including pain.[4] However, a consensus has not been reached on whether babies with DDH feel pain in the absence of the complication of late DDH diagnosis. Given infants' inability to self-report their pain experience, caregivers play a crucial role in assessing pain and taking appropriate action to manage it. Pain studies on infants suggest that mothers can observe their babies' pain through changes in voice tone and movements.[5] There is insufficient evidence in the literature regarding whether DDH causes pain or physical discomfort in infants. A probable pain or discomfort in infants may manifest as increased negative affect or decreased positive affect.

Negative affectivity in a baby becomes observable in the third month after birth. The negative affectivity of a 3-month-old baby is evidenced by crying, restlessness, and distress to limitations, while positive affect is seen through activity level, smiling and laughter, and soothability.[6] Negative and positive affectivity are critical components of an infant's temperament that are affected by psychosocial and environmental factors,[7] and negative and positive affectivity between 3 and 6 months of age affect internalization and externalization problems in the future.[8] Therefore, it is important to evaluate the factors affecting an infant's negative and positive affectivity.[8] Being exposed to distress is accepted as one of the possible factors affecting negative and positive affectivity, as infants exposed to distress have been shown to have increased discomfort, negative affect, irritability, and motor movement.[9]

Negative affectivity in an infant is also one of the important factors detrimentally affecting the mental health of mothers and increasing maternal negative feelings due to the strong dyadic interaction between infant and mother mental health.[10] This is supported by the literature indicating that an infant's pain is described by parents as a source of psychological stress and that a baby exposed to stress increases the mothers negative affect.[5] The period when the baby is between 3 and 6 months is one of the periods when the mother is most vulnerable to negative affect and when both the affectivity of the baby and the relationship between the mother and the baby are shaped the most. The quality of this early dyadic interaction between mother and infant is important for the child's socioemotional, cognitive, language, and brain development.[11]

The purpose of this study was to investigate the effect of DDH on infant affectivity, postpartum depression and parental distress, and parent–child interaction. It was hypothesized that DDH may cause increase negative affectivity in infants and that maternal depression and parental distress may thus be higher in mothers of infants with DDH compared to mothers of infants without DDH.

MAIN POINTS

- There is no difference between the groups with and without developmental dysplasia of the hip in terms of infant positive and negative affect.
- The presence of developmental dysplasia of the hip does not cause an increase in parental stress and does not affect parent–child interaction.
- There is no difference in postpartum depression between mothers of babies with and without developmental dysplasia of the hip.

METHODS

This was a case–control study conducted between January 5, 2017, and January 5, 2018. A total of

102 patients referred for routine DDH screening from the hospitals where the authors also worked were recruited for the study. All individuals in the study were Turkish. Infants with a history of premature birth, postnatal complications, genetic or metabolic diseases, or chronic diseases that might affect motor development, as well as infants older than 6 months, were excluded from the study. After application of the exclusion criteria, 33 mothers and infants with DDH and 32 mothers and infants without DDH were included in pre-study screening for inclusion in the study. Developmental dysplasia of the hip diagnosis was made by hip ultrasonography performed according to the Graf technique, and patients with type 3 and type 4 DDH based on the Graf classification were included in the case group. After the groups were matched randomly according to gender, the case group consisted of 27 participants and the control group consisted of 19 participants. The Infant Behavior Questionnaire Revised Very Short Form (IBQ-R VSF), Parenting Stress Index (PSI), and Edinburgh Postpartum Depression Scale (EPDS) were administered to mothers before the DDH examination. Informed consent was obtained from each participant prior to the research. Participants were informed of their ability to withdraw from the study at any point. The questionnaires were entered by an orthopedic resident, and another orthopedic residence blinded to DDH diagnosis/group allocation/patient identification checked the files.

This research has been approved by the institutional review board of the Baltalimanı Metin Sabancı Bone Diseases Training and Research Hospital (12.11.2018 no.: 37), and the study was conducted in accordance with the Declaration of Helsinki.

Baseline demographic characteristics such as maternal age and educational status were recorded in the sociodemographic data form. Maternal age was categorized as under 30 years old and over 30 years old.

Edinburgh Postpartum Depression Scale is a self-reported questionnaire consisting of 10 items on a 4-point Likert scale.[12] It assesses depressive symptoms in mothers during the postpartum period. It is a reliable and valid instrument, with values above 13 indicating depression. The Cronbach's alpha value for the Turkish version of the EPDS has been reported as 0.72.[13]

Parenting Stress Index, which was developed by Abidin, was used to assess parental distress, parent–child interaction, and features of difficult children.[14] The PSI is a self-reported questionnaire consisting of 36 items within the subscales of parental distress, parent–child dysfunctional interaction, and difficult child. The Turkish version of the PSI has been shown to be reliable and valid. A satisfactory internal consistency was calculated for the total stress score (0.71) as well as for the difficult child (0.78), parent–child dysfunctional interaction (0.76), and parental distress (0.81) subscales.[15]

The Infant Behavior Questionnaire Revised Very Short Form, which was developed by Gartstein, Rothbart, and Leerkes,[16] was used to assess infant behavior. The original IBQ-R VSF assessed infant behavior in the 3 fields of surgency, negative affectivity, and effortful control. The Turkish reliability and validity study of the questionnaire was performed by Fazlıoğlu,[17] who further organized the scale into the domains of negative affectivity and positive affectivity. The negative affectivity subscale consists of items assessing crying (e.g., "After sleeping, how often did the baby cry if someone didn't come within a few minutes?"), restlessness (e.g., "When tired, how often did your baby show distress?"), and separation anxiety (e.g., "How often did your baby refuse to go to an unfamiliar adult he/she meets?"). Therefore the questions related to negative affect might reflect the restlessness and distress due to pain that DDH can cause. The positive affectivity subscale consists of the items assessing smiling (e.g., "How often during the last week did the baby smile or laugh when given a toy?"), excitement (e.g., "When visiting a new place, how often did your baby get excited about exploring new surroundings?"), and orientation (e.g., "When being dressed or undressed during the last week, how often did the baby squirm and/or try to roll away?"). The Cronbach's alpha coefficients were 0.84 for the entire scale, 0.80 for the positive affect subscale, and 0.80 for the negative affect subscale.[19]

All statistical analyses were performed using Statistical Package for Social Sciences version 26. Categorical variables were compared using the chi-squared test. Firstly, the normality of the data was analyzed by the Kolmogorov–Smirnov test. It was found that the data of the study were not normally distributed ($P < .05$). Therefore, nonparametric tests were used to compare mean scores of the PSI subscales, IBQ subscales, and EPDS with a level of significance of 0.05. Power calculations were performed using G*Power Software V 3.1.9.2.[18] Probability of type I error (0.05) and conservative effect size (0.5) were entered into the G*Power analysis. The power of the Mann–Whitney test was found as 0.52. The associations between the IBQ, EPDS, and PSI were evaluated using Pearson correlation analysis.

RESULTS

There were no significant differences between the 2 groups in the maternal age category, maternal education category, and infant gender.

Table 1. Demographic Characteristics of the Study Participants

Variables	DDH (%), n=27	N-DDH (%), n=19	χ^2	*P*
Maternal education			3.052	.888
Primary school	8 (29.6)	2 (10.5)		
Secondary school	3 (11.1)	3 (15.8)		
High school	8 (29.6)	9 (47.4)		
University	8 (29.6)	5 (26.3)		
Maternal age			2.242	.231
Under 30 years old	11 (40.7)	12 (63.2)		
Over 30 years old	16 (59.3)	7 (36.8)		
Infant gender			0.137	.552
Female	25 (92.6)	17 (91.3)		
Male	2 (7.4)	2 (8.7)		

DDH, developmental dysplasia of the hip; N-DDH, nondevelopmental dysplasia of the hip.

The groups were compared by the Mann–Whitney test. No differences found between groups in scores on the EPDS, positive and negative infant affect subscales of the IBQ-R VSF, and parental distress, dysfunctional parent–child interaction, and difficult child subscales of the PSI (Table 1).

Across the entire sample, 9 (19.6%) of 46 mothers had postpartum depression. There was not a significant difference between the DDH and non-DDH groups in the frequency of postpartum depression (χ^2 [1, df=44]=0.293, *P*=.716) (Table 2).

Table 2. Comparison of EPDS, IBQ-R VSF, and PSI Scores Between Groups

	DHD (n=27)	N-DHD (n=19)			
Outcome Measure	Mean Rank	Mean Rank	*U*	*z*	*P*
EPDS	24.06	22.71	241.500	–0.336	.737
PD	24.44	22.16	231.000	–0.570	.569
PCI	24.19	22.53	238.000	–0.416	.677
DC	25.13	20.08	191.500	–1.280	.201
TS	25.37	20.84	206.000	–1.128	.259
IBQ-P	26.15	19.74	185.000	–1.595	.111
IBQ-N	23.91	22.92	245.500	–0.245	.806

DDH, developmental dysplasia of the hip; N-DDH, nondevelopmental dysplasia of the hip; EPDS, Edinburgh Postpartum Depression Scale; PD, parenting distress; DC, difficult child; TS, total parental stress; PCI, parent–child interaction; IBQ-P, Infant Behavior Questionnaire Positive Affectivity; IBQ-N, Infant Behavior Questionnaire Negative Affectivity; IBQ-R VSF, Infant Behavior Questionnaire Revised Very Short Form; PSI, Parenting Stress Index.

DISCUSSION

This study found no differences between the DDH and non-DDH groups in infant positive and negative affectivity, parental stress, parent–child interaction, and maternal depression.

The levels of negative and positive affectivity and difficult temperament did not differ in the infants of the DDH group compared to the infants of the non-DDH group, which was contradictory to our expectations. There are no previous studies on this topic to compare with our results. It was hypothesized that infants in the DDH group would have more discomfort and/or pain and that the mothers of these infants would experience more depressive symptoms and distress due to observing the infant's discomfort and restricted mobility[13]; due to these factors, infants with DDH would demonstrate elevated negative affect.

There are a limited number of studies on the experience of pain in babies.[6,19,20] It has been reported that the vast majority of pain-inducing procedures are performed without analgesia in intensive care units due to inadequate knowledge regarding pain in infants.[21] However, functional magnetic resonance imaging studies have shown that the same areas are activated during painful stimuli in adults and infants. As babies cannot express their pain verbally, pain assessment tools using babies' movements as indicators of pain have been developed.[19] The results of pain assessment in infants have been contradictory.[6,22] While some studies have reported that infant behaviors such as facial expression, body movement, and crying observed by parents are the best indicators of pain,[23] other studies have stated that multidimensional or composite tools such as The Premature Infant Pain Profile-Revised should be used for pain assessment.[20] Based on these previous findings, it was hypothesized in this study that a child with DDH might be more restless due to DDH and that this restlessness might cause increased negative affectivity and decreased positive affectivity. However, the results of our study revealed no significant differences between the 2 groups in negative and positive affectivity. There are several possible explanations for these results. First, although DDH is a developmental disorder that leads to pain in later periods,[24] it might not cause a level of discomfort and pain in infancy that elicits negative affectivity. Furthermore, the restlessness of infants with DDH may be mild enough to be soothed by their mothers. In our study, the behavior of infants was evaluated by their mothers, while in a previous study, pain in infants was evaluated by both cortical activity and scales completed by their mothers.[25]

Considering parental distress, parent–child interaction, and difficult infant temperament, there was no difference between the 2 groups. Infant pain has been suggested to

be a source of stress for parents due to feelings of inability to protect and support the baby and perceptions of not being an adequate parent, which might, in turn, cause high levels of parental distress and maternal depression.[25] However, few research studies on DDH and its effect on maternal and infant mental health have been performed.[22] In one of these studies, which compared splinted infants and non-splinted infants, researchers found no differences in parental anxiety, infant attachment, parental distress, and infant mood.[22] In these studies, caregivers were primarily concerned about their infants requiring invasive procedures, even when they knew the diagnosis of DDH. Therefore, a diagnosis of DDH alone did not predict parental anxiety.

In the current study, there was no difference between the 2 groups in the rate of postpartum depression, and the prevalence of postpartum depression across the entire sample was consistent with the prevalence reported in previous studies.[26] The sample of the current study was homogeneously distributed in terms of maternal age, gestational age, education level, and infant characteristics, which are accepted as the most important factors affecting postpartum depression.[27,28] There are several possible explanations of this result in our study. First, our study also found that DDH did not cause negative affectivity in infants; thus, the mental health of mothers of infants with DDH might not differ from mothers of infants without DDH. Second, as the scales employed in our study were administered before screening for DDH, the mothers were unaware of their infants' diagnosis, and any distress or depressive symptoms caused by the DDH diagnosis were unaccounted for.

Implications

Based on the findings we state that the DDH may not be related with the negative affectivity in infants. When we consider other studies that have established that crying and restlessness in a baby trigger alarm in families and cause them to seek medical attention,[23] it may take a long time for DDH to cause pain at a severity that causes concern for the family. This can decrease the likelihood of diagnosis or delay intervention for DDH. Therefore, DDH screening should be a mandatory component of national health policies.

Limitations

The sample of this study was not large enough to reflect all strata of the Turkish population, such as age and socioeconomic status. Hence, additional studies investigating more diverse samples are needed to increase the generalizability of the result.

In addition, the negative affectivity of the baby was evaluated only by the mothers, and the mothers completed the questionnaires before the diagnosis. Future studies should include the observations of the health-care professional in addition to the evaluation by the mother and compare the distress of parents before the diagnosis and after diagnosis.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Baltalimanı Metin Sabancı Bone Diseases Training and Research Hospital (Date: November 12, 2018, Decision No:TUEK No: 37).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – D.D.S., Z.S.A., K.A.; Design - D.D.S., Z.S.A.; Supervision – E.A., A.İ.B.; Resources – D.D.S., Z.S.A.; Materials – D.D.S., Z.S.A.; Data Collection and/or Processing – K.A., E.T., E.A., A.İ.B.; Analysis and/or Interpretation – D.D.S.; Literature Search – D.D.S., Z.S.A., K.A., E.Ş.D.; Writing Manuscript – D.D.S., E.Ş.D.; Critical Review – D.D.S., Z.S.A., K.A., E.Ş.D., E.T., E.A., A.İ.B.

Declaration of Interests: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study has received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite Metin Sabancı Baltalimanı Kemik Hastalıkları Eğitim ve Araştırma Hastanesi'nden alınmıştır. (Tarih: 2 Mart 2021, Karar No: 68/482)

Hasta Onamı: Çalışmaya katılan tüm katılımcılardan yazılı onam alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir – D.D.S., Z.S.A., K.A.; Tasarım – D.D.S., Z.S.A.; Denetleme – E.A., A.İ.B.; Kaynaklar – D.D.S., Z.S.A.; Malzemeler – D.D.S., Z.S.A.; Veri Toplanmasıve/veya İşlemesi – K.A., E.T., E.A., A.İ.B.; Analiz ve/veya Yorum – D.D.S.; Literatür Taraması – D.D.S., Z.S.A., K.A., E.Ş.D.; Yazıyı Yazan – D.D.S., E.Ş.D.; Eleştirel İnceleme – D.D.S., Z.S.A., K.A., E.Ş.D., E.T., E.A., A.İ.B.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

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