Determining the Factors Influencing Excessive Crying and Nocturnal-Waking Problems in Infants

Bebeklerde Inatçı Ağlama ve Gece Uyanma Sorunlarını Etkileyen Faktörlerin Belirlenmesi

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Original Research

Abstract

Objective: The aim of this study was to determine crying and sleep problems in infants, perinatal and maternal factors influencing infant crying and sleep behavior, and to evaluate the emotional and behavioral reactions of the mothers towards excessive crying and nocturnal-waking problems.

Method: A questionnaire including 30 questions related maternal, infantile and perinatal features was used in this descriptive study. Totally 107 infants aged between 0-12 months were followed in the neonatal outpatient clinic comprised the study sample. Mothers not having communication problem and postpartum depression and volunteered to participate to the study were interviewed face to face. Descriptive statistics, Spearman correlation and Mann Whitney U test were used for data analysis. Logistic regression analyses were utilized to determine risk factors for excessive crying and nocturnal-waking in infants.

Results: There was a positively significant correlation between total crying hours during a day and the frequency of nocturnal-waking at the 1st month (p<0.005), the statistical analysis did not show significance at 3rd 6th, 9th or 12th months (p>0.005). Birth by cesarean was identified as a risk factor for excessive crying (OR=2.661) and prolonged stay in incubator (OR=1.031) was revealed as a risk factor for nocturnal-waking (p=0.021). The findings concluded that a high median of infant crying was associated with maternal negative feelings including sadness, helplessness, anger and guilt. The behavioral reactions of the mothers toward infant crying favorably dispersed including breastfeeding (69.2%), taking in arms (30.8%), checking diaper (20.6%), burping (14.0), and walking around at home (8.4%).

Conclusion: In the presence of delivery by cesarean and prolonged stay in incubator, excessive crying and the frequency of nocturnal-waking in infants were found to increase more. Mothers should be supported whose

babies born by cesarean and stay prolonged time in incubator in terms of excessive crying and nocturnal-waking problems.

Keywords: Crying, infant, neonatal nursing, sleep

Öz

Amaç: Bu çalışmanın amacı, bebeklerde ağlama ve uyku sorunlarını ve bu sorunlara etki eden perinatal ve anneye ilişkin faktörleri belirlemek ve annelerin aşırı ağlama ve gece uyanma sorunlarına karşı gösterdikleri duygusal ve davranışsal tepkileri değerlendirmektir.

Yöntem: Bu tanımlayıcı araştırmada anneye, bebeğe ve perinatal özelliklere ilişkin 30 sorudan oluşan bir anket formu kullanılmıştır. Araştırma örneklemini, bir eğitim araştırma hastanesi yenidoğan takip polikliniğine gelen ve 0-12 ay arasında olan toplam 107 bebek oluşturmuştur. İletişim problemi ve doğum sonu depresyonu olmayan ve çalışmaya katılmaya gönüllü olan bebeklerin anneleri ile yüz-yüze görüşülmüştür. Verilerin analizinde tanımlayıcı istatistikler, Spearman korelasyon ve Mann Whitney U testleri kullanılmıştır. Aşırı ağlama ve gece uyanma sıklığını etkileyen risk faktörlerini belirlemek için logistik regresyon analizi uygulanmıştır.

Bulgular: Bebeklerin gündüz ağlama süresi ile gece uyanma sıklıkları arasında ilk bir aylık dönemde pozitif yönde anlamlı bir korelasyon olduğu ($p<0.005$), 3. 6. 9. ve 12. aylarda ise ilişkinin anlamlı olmadığı bulunmuştur ($p>0.005$). Sezeryan doğum şeklinin inatçı ağlama ($OR=2.661$), küvözde kalma süresinin uzamasının ise gece uyanma sıklığı ($OR=1.031$) için bir risk faktörü olduğu belirlenmiştir ($p=0.021$). Araştırma bulguları, ağlama süresi ortancasının yüksek olmasının üzüntü, mutsuzluk, kızgınlık ve suçluluk gibi anneye ilişkin olumsuz duygularla ilişkili olduğunu ortaya çıkarmıştır. Annelerin bebeğin ağlamasına ilişkin davranışsal tepkileri emzirme (%69.2), kollarına alma (%30.8), alt-bezi kontrolü (%20.6), gazını çıkarma (%14.0) ve ev içinde yürüme (%8.4) şeklinde dağılım göstermiştir.

Sonuç: Sezeryan yolu ile doğumun inatçı ağlamayı, küvözde kalma süresinin uzamasının ise bebeklerde gece uyanma sıklığını daha fazla arttırdığı bulunmuştur. Özellikle sezeryan yoluyla doğan ve bebeği uzun süre küvözde takip edilen annelerin inatçı ağlama ve gece sık uyanma sorunlarına yönelik desteklenmeleri önerilmiştir.

Anahtar Sözcükler: Ağlama, bebek hemşireliği, uyku, yenidoğan

Introduction

Crying as a universal form of behavior, modulated in an inborn way by an infant's internal condition, by illness or health. An infant crying peak during the early months of life[1]. Several studies name the problem as "colic" and babies with a colic problem as "colicky". The recent etiological studies centered upon neurobiological developments and algesia.[1-3] One hypothesis explicated the infant crying by hyperalgesia derived from decreased pain threshold due to hypersensitive primary afferent neurons and secondary dorsal horn neurons.[1,3] According to the hypothesis, the attenuation in crying at three months was resulting from the development of interneuronal inhibitory connections in the substantia gelatinosa and inhibition from the brainstem.[3,4] As the colic name implies gastrointestinal tract problems excessive and prolonged crying terms were used in the present study.[5] Excessive crying defined in wide range such as a period of crying or fussing of more than three hours a day, occurring on more than three days in any one week and lasting for more than three weeks (Wessel criteria) crying two hours per day or maternal perception as excessive crying.[6,7]

Prompt response to these cries leads to development of self-trust, construction of healthy attachment style and positive interpersonal interaction according to Erikson.[8] Accordingly, unmet needs of infants and negligence towards crying can result in basic mistrust, depression, withdrawal and even paranoia later in life. This theory was proved recently by a research regarding the destructive influence of intense cry on brain development particularly on brainstem and limbic system due to the excessive release of adrenaline and cortisol in the first months of life.[8,9]

Like infant crying, maternal soothing techniques towards neonatal crying is one of the most worldwide behavioral approaches of maternal sensitivity to infant distress. Infants try to show a sign of seeking for help, want to be in a safety place and establish social interactions by crying. As Barr, Hopkins and Green[10] emphasize, crying can be considered as an important sign and symptom, so crying in infants has been studied for a long time.[11] Numerous studies have tried to define different kinds of maternal interpretations of infant crying, and its origin, and various maternal soothing techniques to stop infants crying[12]. These common soothing techniques include using the pacifier, swaddling, touching, feeding, talking, or taking the infant in arms.[13]

Beside crying, nocturnal-waking is often seen during the first months of life in infants. In view of the crying problem being strongly correlated with nocturnal-waking, these issues cannot be considered separately. Both excessive crying and nocturnal-waking have complex triangular pattern in terms of neonatal characteristics, the maternal perception and maternal interventions and opens the way to the interpretation of the different variables which seem to shape these phenomena.

The aim of the study was to assess variables influencing excessive crying and nocturnal- waking problems in the infants. The following research questions were determined in line with the aim of the study.

What is the frequency of infant crying-fussing and sleeping problems?

What are perinatal factors influencing infant crying and sleeping behavior?

What are the risk factors for excessive crying and nocturnal-waking in the infants?

What are the emotional and behavioral reactions of the mothers towards crying babies?

Methods

Design

This descriptive study was conducted using a questionnaire comprised of 30 questions regarding maternal, infantile and perinatal features.

Study sample

Participants were recruited from an infant out-patient clinic of a Training and Research Hospital between January 1 and March 05, 2013 located in Ankara, Turkey. For simple linear regression and multiple linear regression models; the number of independent variables, the effect size, the power of the test, and the explaining variance included in the model are reported to define the minimum sample size in the literature.[14-16] To determine the minimum sample size for the study, a-priori sample size calculator program for Multiple Regression was used.[17] In the model, 10 independent variables influencing excessive crying and nocturnal-waking (education level, working status, number of births, physical and emotional problems during pregnancy, difficulties in delivery, emotional reactions, getting social support, duration of staying in incubation, gestational week, and mode of delivery), the effect size=0.20, the power=0.85, and alpha value=0.05 were used for calculation and the results

revealed that at least 100 infants need to be recruited. Totally, 107 consecutive infants were recruited from the outpatient clinic. The inclusion criteria were under twelve months, having congenital anomalies, and hospitalization following birth. The mothers having post-partum depression, and were not volunteer excluded from the study.

The majority of babies in this study born in the same hospital so they are followed-up for development in the same clinic. The data-collection form was applied with face to face interview to the mothers once in the policlinic. Mothers asked to response following questions based on their babies' experiences regarding excessive crying and nocturnal-waking in the first, 3rd, 6th, 9th and 12th month periods. The investigators considered months/old of infant and then directed questions to the mothers. For example, if infant, 6 months old, the questions regarding crying and nocturnal-waking included the first, 3rd and 6th month periods.

The questionnaire form had been developed by the researchers after doing an extensive review of the literature that the babies crying and sleep problems. The questionnaire consisted of two parts and included totally 30 questions that infant and maternal related characteristics. [3,5,11,13,19,20]

Data collection

The data of the study were collected using a questionnaire developed by the researchers based on the literature and the writers' clinical and academic experiences.[7,18] The questionnaire consisted of two sections. The first section included questions related to maternal features such as socio-demographic characteristics (age, gender, educational status, employment) parity, maternal stress level and familial adversity during pregnancy, ranging from none to severe, help seeking behavior for infant care, emotional and behavioral reactions to the infant cry, and the practices used for soothing the infant. The second section posed questions related to the characteristics of the delivery and the infant including type and duration of delivery, gestational age at delivery, birth-weight, having problems during delivery, congenital anomalies, breast feeding, the remaining questions assessing the average of crying time and nocturnal-waking of the infants based on infants' months/old: including 0-1 month, 1-3 month, 3-6 month, 6-9 month and 9-12 month.

The data was collected from mothers of the infants by face-to-face interviews. The data collection form was utilized to the mothers who bring her baby for follow-up visit and meet inclusion criteria at the end of the baby examination. The mothers were asked to respond by remembering their baby's crying and nocturnal-waking behaviors. Crying characteristics of the infants were categorized using mothers' self-expressions to the query with mean duration of infant crying per day at 0-1 month, 1-3 months, 3-6 months, 6-9 months and 9-12 months. Night-sleep behavior was determined with the question containing mean number of wake-ups per night at 0-1 month, 1-3 months, 3-6 months, 6-9 months and 9-12 months. In order to gather mothers' intact reflections and practice narratives without any restriction, open-ended questions were utilized for querying behavioral reactions to the infant cry and the practices used for soothing the infant.

In order to evaluate the content validity of the questionnaire, data collection form e-mailed two experts working in pediatric nursing field and their opinions were obtained and necessary corrections were made in the form according to their suggestions. As the questionnaire implemented in the present study did not contain numerical ratings, a small pilot study was conducted with 15 mothers to ensure that the open-ended questions were posed explicitly. As there was no negative feedback from mothers, the format and content of the questionnaire were not changed.

Data analysis

The data were analyzed using the Statistical Package for Social Sciences 22.0 (SPSS). Descriptive statistics were used to present characteristics of study sample. The Spearman correlation was used to determine the association between nocturnal-waking and daily duration of crying by months. The Mann Whitney U test was used to compare the median duration of crying per day and nocturnal-waking with variables including getting support, emotional reaction to crying, and having problems during delivery. The risk factors for excessive crying and nocturnal-waking were analyzed with logistic regression. The model for regression analysis was constituted with potential predictors of excessive crying including mode of delivery; and duration of staying in incubator were used for nocturnal-waking. The data in the model was selected by forward method.

Excessive crying was defined as crying more than two hours at one month and over 1 hour for three, six, nine and twelve months according to the literature.[18,20] Nocturnal-waking was considered as a problem when the number reached over five times a month and over four times for the subsequent months.[19-22]

Ethical aspects of the study

Ethical approval was obtained from the Hacettepe University Ethics Commission. Informed consent was obtained from the mothers after verbal and written explanations of the study objectives. Following ethical approval, the institutional permission was obtained from the hospital.

Results

Descriptive characteristics of mothers and infants

The majority of mothers were young, between ages 25 and 34 (57.9%), graduated from elementary school (56.1%), unemployed (87.9%), and almost half had two children (40.2%). Of the mothers, 55.1% stated that they experienced physical (43.0%) or emotional (13.1%) problems during pregnancy. The ratio of support was 64.5% by mostly family members (98.5%) or babysitter (1.5%) for maternal and household activities.

With regard to perinatal features, the mode of delivery was mostly caesarean section (58.9%), more than half of gestational age at delivery was preterm (%39.3), 20.6% problematic delivery and 11.2% had congenital anomaly. Almost half of the newborns (46.7%) stayed in an incubator at a median of 20.0 days (Range=1-150 days). Interestingly, of the newborns, 10.3% did not receive breast milk. Staying in the incubator impacted initiation of the practice of breastfeeding; namely initiation time of breastfeeding was 3.5 hours for the infants in incubators and 0.5 hour for those who were not in incubators.

The maternal emotional reactions to the infant crying were predominantly negative such as sadness (38.3%), helplessness (16.8%), anger (2.8%), guilt (1.9%) and some positive emotions were expressed towards infant crying including happiness (18.7%), and perceiving crying as a normal state (15.9%). In addition, some of mothers expressed that feeling curiosity (4.7%) toward baby crying. Breastfeeding (69.2%) was the most common maternal reaction to infant cry, followed by taking in arms (30.8%), checking diapers (20.6%), burping (14.0%), walking around at home (8.4%), talking (7.5%), formula feeding (6.5%), and shaking (4.7%). Additionally, among soothing practices, massage (17.7%) or rubbing with baby oil (5.6%) and music (3.7%) were utilized by the mothers.

Crying and sleep behaviors of the infants and influencing factors

An abatement of excessive crying by months was determined with 20% in the first month and at the third month, 9.3% at nine months and none at 12 months. The number of nocturnal waking was also lowered by months with 63.6% more than 5 interruptions in the first month and the majority had uninterrupted sleep at the sixth month with 86.5%, at 12 months with 97.4%. As shown in Table 1, total crying hours during a day and the frequency of nocturnal-waking were correlated positively at the 1st month (r=0.274, p=0.004), and the statistical analysis did not show significance at 3rd (r=0.250, p=0.090), 6th (r=0.045, p=0.827), at 9th (r=-0.379. p=0.250) or 12th months (r=-0.487, p=0.406).

Table 1. The correlation between duration of crying and nocturnal-waking by months (n=107)

		Duration of crying per day/ hours				
		1st month	3rd month	6th month	9th month	12th month
octurnal-waking	1st month	r= 0.274 p= 0.004				
	3rd month		r= 0.250 p= 0.090			
	6th month			r= 0.045 p= 0.827		
	9th month				r= -0.379 p= 0.250	
	12th month					r= -0.487 p= 0.406

Statistical analysis was performed to ascertain the relation between maternal traits and crying-sleep problems. However, the analysis revealed no significant association between maternal education level (p=0.633), working status (p=0.579), parity (p=0.812), physical (0.964) and emotional problems during pregnancy (p=0.796), duration of delivery (p=0.491), gestational age at delivery (p=0.637), birth-weight (p=0.918) and infantile crying at first month. Also, no statistically significant differences were found between maternal education level (p=0.677), working status (p=0.056), parity (p=0.271), physical (p=0.673) and emotional problems during pregnancy (p=0.896), duration of delivery (p=0.511), gestational age at delivery (p=0.374), birth-weight (p= 0.434) and the number of wake-ups during nocturnal sleep in the first month.

As presented in Table 2, the high median of crying hours prompted mothers to seek help (median crying hour: 0.5 vs. 1.0). Negative feelings toward crying were associated with high median of crying hours (median crying hour: 1.0 vs. 0.5) and high frequency of nocturnal waking (median number of nocturnal waking: 6.6 vs. 4.8) (p<0.005). Furthermore, statistical analysis revealed that the extent of nocturnal waking significantly increased for infants with having problems during delivery (median number of nocturnal waking: 6.0 vs. 5.0) (p<0.005) (Table 2).

As seen in Table 3, a statistical analysis was carried out to determine risk factors influential in excessive crying and nocturnal waking problem in the first month. Accordingly, birth by cesarean was identified as a risk factor for excessive crying (OR=2.661) and prolonged stay in in incubator (OR=1.031) was revealed as a risk factor for nocturnal-waking (p=0.021). As baby born by cesarean, excessive crying increased 2.661 times; in addition, duration of staying in incubator is increased, prompted a 1.031 fold increase in nocturnal waking problems.

Table 2. Variables influencing infantile crying and nocturnal sleep behaviors in the first month(n=107)

		Duration of crying per day/ hours		The number of nocturnal-waking	
		Median (Min-Max)	*Z and p values*	*Median (Min-Max)*	*Z and p values*
Getting support	No (n=38)	0.5(0.0-3.0)	Z= -2.322	5.0(3.0-15.0)	Z=-0.364
	Yes (n=69)	1.0(0.0-8.0)	**p= 0.020**	5.0(2.0-25.0)	p= 0.716
Type of emotional reactions to crying	Negative (n=65)	1.0(0.1-8.0)	Z= -2.785	5.0(2.0-25.0)	Z= -2.006
	Both positive and negative (n=42)	0.5(0.0-2.0)	**p= 0.005**	5.0(2.0-10.0)	**p= 0.045**
Having problems during delivery	Yes (n=22)	1.0(0.0-8.0)	Z= -0.611	6.0(4.0-25.0)	Z= -3.269
	No (n=85)	0.5(0.0-6.0)	p= 0.541	5.0(2.0-15.0)	**p= 0.001**

* Mann Whitney U test was used for group comparisons (p<0.005)

Table 3. The risk factors for excessive crying and nocturnal-waking in the first month (n=107)

		B	E	Wald	OR	95% CI	p
Excessive crying (2+ hours per day)	Mode of delivery (Cesarean)	0.979	0.509	3.702	2.661	(0.982-7.213)	0.054
Nocturnal-waking (5+ per night)	Staying in incubator/day	0.031	0.013	5.346	1.031	(1.005-1.059)	0.021

B= Beta coefficient, SE= Standard error, Wald= Wald statistic, OR= Odds ratio, CI= Confidence interval

Discussion

This study aimed to determine the risk factors that cause crying and sleeping problems in babies, feelings of mothers' when their babies cry, the techniques of mothers' uses to seek to silence the baby for crying and sleeping problems

According to Faris, McCarroll [8] the response to the infant crying depends on cultural factors and can be misdirected by outdated information such as spoiling the baby. Specifically, Van der Wal, Van Eijsden, Bonsel [18] revealed the cultural aspect of mothers' soothing techniques of crying baby. Shaking, slapping, and using the prone position were mostly determined among Turkish families comparing with Dutch population at this research. In the present study, maternal reaction to the infant crying was mostly acceptable such as feeding, taking in arms, changing diapers, burping, walking around at home and talking.

Numerous research studies with inconsistent findings related to maternal education level, working characteristics, parity, stress level, the traits of delivery and birth-weight were conducted in the field of crying-sleeping problems. Accordingly, early resumption of work, high educational level, primiparity, stressful experiences during pregnancy and negative delivery experience were found as risk factors for infant crying in certain studies.[7,18] Regarding sleep problem, similar inconsistency was determined in the literature. [23,24] Maternal socio-economic factors, distressing events during pregnancy and parity may not be seen as influencing variables of infants' crying and sleep behaviors directly. These variables possibly affect mother-infant interaction and maternal feelings towards infant. When crying-fussing and sleep problems arise, the situation turns into reciprocal negative interaction with a

growing harmful impact on dyad.[25] Supporting this interpretation, the finding of this study revealed that increased crying hours and nocturnal-waking prompt mothers to have negative emotional reactions towards infant crying. Additionally, the unfavorable feelings toward baby cry appeared as a risk factor on the excessive crying. The implication from this result is that the reciprocal adverse impact of crying exacerbated the situation for both the mothers and the infants. Meaningfully, help seeking behavior was high with the mothers having infants with high median crying hours and support was usually gotten from family members in the present study. The relief obtaining from the family for infant care probably prevented exhausted mothers from detrimental behaviors towards crying infants.[7, 25, 26]

This study has certain limitations. First, all study data were collected from mothers using face to face interviews. Therefore, collection of data through mothers (baby's length of stay in the hospital, daily crying interval between 0-1 months, frequency of nocturnal wake-up, presence of congenital anomaly, etc.) may cause reliability problems for data. Another limitation is that not including mothers with postpartum depression in the study. As depressive symptoms can alter emotional reactions toward excessive crying and nocturnal-waking in infants, it is important to conduct future studies focusing on mothers with depressive symptoms to define their reactions toward crying and nocturnal wake-up problems.

Conclusion

The findings of the present study suggested that a high mean of infant crying was associated with maternal negative feelings. Additionally, the unfavorable feelings towards baby cry appeared as a risk factor on the duration of crying. Maternal characteristics were not revealed as influencing variables of infants' crying and sleep behaviors. Considering the finding of the relation between nocturnal-waking and having a problem during delivery, mothers having infants with problematic delivery should be supported vigilantly.

Conflicts of interest

None declared.

Yazarların Katkıları

Çalışma tasarımı: L Ö, H B, Z G-M

Veri toplama ve/veya analizi: Z G-M, L Ö, H B

Makalenin hazırlanması: L Ö, Z G-M, H B

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