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The Relationship of Lunar Cycles with Natal and Postnatal Processes in Newborn Infants

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ABSTRACT

Objective: The aim of this study was to determine the relationship between the lunar cycle and the pathological clinical findings (respiratory distress, seizures, metabolic disorders, etc.) that develop especially in the first 24-48 hours of neonate clients born in our hospital and/or admitted to the pediatric outpatient clinic. **Materials and Methods:** This retrospective study was conducted in Balıkesir University Medical Faculty Child Health and Diseases Clinic between 01 March 2022 and 01 June 2023. 997 newborn patients who were born in our clinic and/or admitted to the pediatric outpatient clinic were included in this retrospective study. The relationship between the lunar cycle and the clinical status of these patients was evaluated. The data were analyzed using the descriptive statistics, chi-square test and logistic regression analysis. **Results:** Pathological clinical findings in a newborn were seen in 10.3% of the cases, with hyperbilirubinemia 5.3% being the most common finding and respiratory distress 3.9% being the second most common. The most common lunar period with pathological clinical finding was the full moon with 26.2%, while the second most common was in the first quarter with 25.2% and again in the third quarter with the same rate, which was not statistically significant ($p=0.584$). **Conclusion:** The results of the present study suggest that there is no relationship betwixt the lunar cycle moreover the newborn patient's clinic status.

Keywords: Deliveries, Lunar Cycle, Newborn.

Ay Sikluslarının Yenidoğan Bebeklerdeki Natal ve Postnatal Süreçlerle İlişkisi

ÖZ

Amaç: Bu çalışmanın amacı, hastanemizde doğan ve/veya çocuk polikliniğine başvuran yenidoğan hastaların özellikle ilk 24-48 saat içinde gelişen patolojik klinik bulguların (solunum sıkıntısı, nöbetler, metabolik bozukluklar vb.) ile ay döngüsü arasındaki ilişkiyi belirlemektir. **Gereç ve Yöntem:** Bu retrospektif çalışma, 01 Mart 2022-01 Haziran 2023 tarihleri arasında Balıkesir Üniversitesi Tıp Fakültesi Çocuk Sağlığı ve Hastalıkları Kliniği'nde yapıldı. Kliniğimizde doğan ve/veya çocuk polikliniğine başvuran 997 yenidoğan hastası retrospektif olarak çalışmaya dahil edildi. Bu hastaların ay döngüsü ile klinik durumları arasındaki ilişki değerlendirildi. Veriler SPSS 22.0 programı kullanılarak tanımlayıcı istatistikler, ki-kare testi ve lojistik regresyon analizi kullanılarak analiz edilmiştir. **Bulgular:** Olguların %10.3'ünde patolojik klinik bulgular görülürken, en sık görülen bulgu hiperbilirubinemi %5.3 ve ikinci en sık olan ise %3.9 solunum sıkıntısı olarak görüldü. Patolojik klinik bulguların en sık görüldüğü ay dönemi %26,2 ile dolunay olurken, ikinci en sık %25,2 ile ilk dördün ve yine aynı oranda son dördün'dü ve istatistiksel olarak anlamlı değildi ($p=0.584$). **Sonuç:** Bu çalışmanın sonuçları, ay döngüsü ile yenidoğan hastaların klinik durumu arasında bir ilişki olmadığını göstermektedir.

Anahtar Kelimeler: Doğumlar, Ay Döngüsü, Yenidoğan.

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INTRODUCTION

The neonatal period is the first twenty-eight day period after birth. This is a challenging period in which the baby is trying to physiologically adapt himself to extrauterine life. The high incidence of neonatal mortality and morbidity once again shows the importance of this period. In the U.S.A. 2/3 of infant deaths in the first year after birth have been reported to be in the neonatal period (Behrman et al., 2004).

The phases of the moon refer to the situations that arise from the position of the moon against the sun and where one part is dark, and the other part is light. More specifically, the phases of the moon are related to the position of the moon relative to the stars and follow a cycle of repeated movements every 27 days, which is called the cycle of the moon. When we look at the phases of the moon, four formations are mentioned. These are: the new moon, the first quarter, the full moon, and the third quarter (Hinze et al., 1984). In some studies, in the literature, it has been seen that certain phases of lunar cycles have different effects on birth, including birth rates. The relationship of lunar phases with birth and especially with birth rate has been the focus of important research. Both in the past and more recently, many authors have investigated the possible influence of moon phases on the frequency and time of birth (Staboulidou et al., 2008).

The number of studies examining the effect of lunar cycles on childbirth is quite paltry. This study aims to investigate the relationship between natal (birth week, birth weight, mode of delivery) and postnatal characteristics [complications such as respiratory distress, seizures, metabolic disorders] of newborn babies born in our hospital with the lunar cycle.

MATERIALS AND METHODS

Study type

This study was conducted in Balıkesir University Medical Faculty Child Health and Diseases Clinic between 01 March 2022 and 01 June 2023. The files of the cases included in the study were retrospectively scanned demographic data (gender, birth height, body weight and head circumference), initial examination findings, interventions performed in the delivery room, follow-up results, and pathological clinical findings were recorded.

Study group

The clinical characteristics of nine hundred ninety-seven newborn babies born in the Balıkesir University Medical Faculty Child Health and Diseases Clinic and/or applying to the pediatric clinic in their natal and postnatal periods. Preterm (<35 weeks) and postterm (>42 weeks) birth history, <2000 g, systemic disease history (congenital malformation, genetic disease, metabolic disease, etc.) and missing file data were excluded from the study. The phases of the moon are related to the position of the moon relative to the stars and follow a cycle of repeated movements and correspond to the amount of the lunar surface reflecting

the available light visible from Earth. "Time and Date" website data were obtained according to the exact moments of different moon phases in historical context. In accordance with the time of birth its relationship with the lunar cycle was determined according to the lunar calendar on the website. Likewise, the relationship between the pathological clinical findings of the newborn patient in the birth and postpartum period with the lunar cycle was determined according to the lunar calendar on the same website.

Statistical analysis

In the statistical analysis evaluation of the data obtained from the cases included in the study, the study data were analyzed on 'Statistical Package for Social Sciences (SPSS) version 22.0 software (SPSS Inc., Chicago, IL, USA). The variables were calculated as number (N), percentage (%), and mean \pm standard deviation (SD). Chi-square test was used to compare the qualitative data of the cases that were not obtained by measurement between the groups. In all tests, p values <0.05 were considered statistically significant.

Ethical consideration

This study was approved by the Clinical Research Ethics Committee Balıkesir University Faculty of Medicine, (Decision No. 2023/118, Date: 23/08/2023).

RESULTS

Nine hundred ninety-seven neonatal cases were admitted in the research. 52.4% (N=522) of the cases were male and 47.6% (N=475) were female. Only 10.7% (N=107) of births were with NSVD. Of the newborn infants, 22.7% (N=227) had preterm and 7.5% (N=75) had low birth weight. The relationship between the pathological clinical findings and the lunar cycle was also ascertained by considering the lunar calendar data on the "Time and Date" website. Pathological clinical outcomes were seen in 10.3% (N=103) of the cases; the most prevailing clinical finding was physiological hyperbilirubinemia (N=54, 5.3%), and the second most common finding was respiratory distress with transient tachypnea of newborn (N=39, 3.9%).

When the birth times of newborn babies are evaluated according to their lunar cycles; the most common birth was during the new moon period (N=287, 28.8%), it was valid both types of births (NSVD, 31 [3.7%]; C/S, 256 [25.7%]). and the least birth was in the third quarter (N=220, 22.1%). The demographic distinctive of the cases are shared in Table 1.

When the relationship between birth characteristics and lunar cycle was examined, it was found that all birth types (NSVD, C/S) were highest in the new moon period (N=27, 28.7%), babies born <2500 g and >4000 g were most common in the third quarter period, babies born between 35^{0/7}- 40^{0/7} weeks (N=267, 26.7%) were most in the new moon period, and babies born at 40^{0/7}- 42^{0/7} weeks were in the third quarter period at most (N=23, 31%). There was no statistically momentous

discrepancy between delivery type, birth weight and delivery weeks according to lunar cycles ($p=0.409$, $p=0.737$, and $p=0.298$, respectively). The most common pathological clinical findings rate for both birth types in the postnatal process was full moon

($N=27$, 26.2%), and the second most common was in the first quarter ($N=26$, 25.2%) and third quarter ($N=26$, 25.2%), which was not statistically momentous ($p=0.584$, respectively) (Table 2).

Table 1. Demographic Data.

Lunar Cycle					
	New Moon	First Quarter	Full Moon	Third Quarter	<i>P</i>
Gender	n (%)	n (%)	n (%)	n (%)	0.454
Female	133 (13.3%)	129 (12.9%)	115 (11.5%)	98 (9.8%)	
Male	154 (15.4%)	121 (12.1%)	125 (12.5%)	122 (12.2%)	

Table 2. Birth data and pathological clinical finding according to lunar cycles.

Lunar Cycle					
	New Moon	First Quarter	Full Moon	Third Quarter	<i>p</i>
Type of birth	n (%)	n (%)	n (%)	n (%)	0.409
NSVD	31 (3.1%)	24 (2.4%)	22 (2.2%)	30 (3%)	
C/S	256 (25.7%)	226 (22.7%)	218 (21.9%)	190 (19%)	
Birth weight	n (%)	n (%)	n (%)	n (%)	0.737
2000-2500 g	18 (1.8%)	20 (2%)	70 (7%)	155 (15.5%)	
2500-3000 g	88 (8.8%)	70 (7%)	74 (7.4%)	144 (14.4%)	
3000-4000 g	169 (16.9%)	155 (15.5%)	57 (5.7%)	136 (13.6%)	
>4000 g	12 (12%)	5 (0.5%)	88 (8.8%)	169 (16.9%)	
Pathological clinical finding	n (%)	n (%)	n (%)	n (%)	0.584
Present	24 (2.4%)	26 (2.6%)	27 (2.7%)	26 (2.6%)	
Absent	263 (26.4%)	224 (22.4%)	213 (21.4%)	194 (19.5%)	

DISCUSSION

In this study, although there was no statistically significant difference in the characteristics of newborn babies in natal (mode of birth, birth week, birth weight) and postnatal processes according to their lunar cycles, it was determined that complications in the postnatal process were most common in the full moon period, and the features including risk factors for newborn babies (<2500 g, >4000 g, babies born at 40⁰⁷-42⁰⁷ weeks) were detected at most in the third quarter period.

Studies assessing extraneous conditions on labor often rule out medically achieved births. A few inquiry include solely term birthing (Ghiandoni et al., 1998; Ochiai et al., 2012). Our study incorporated solely cases born between 35⁰⁷ and 42⁰⁷ weeks of gestation.

In addition to studies investigating the effects of innate phenomena alike as drizzle, temperature changes and barometric pressure on gravidity and delivery, there are limited studies investigating the effect of lunar cycles and birth (Cesario, 2002; Joshi et al., 1998; Mark et al., 1983; Morton-Pradhan et al.,

2005; Nalepka et al., 1983). The different variables in the earth and the potential effects of the lunar cycle on human well-being have historically attracted the attention of a large number of researchers. Although no association has been shown in most studies, others have linked the lunar cycle to medical events such as cardiopulmonary resuscitation, fertility, acute coronary events and neuropsychiatric findings (Abell & Greenspan, 1979).

The possible influence of the moon on births has been explained in several ways. One study emphasized that serum sodium and serum lithium levels in rabbits varied reliant on the moon stage (Malek et al., 2011). Another study in rats showed that oxytocin degrees increased with blood pressure, which was linked to gravity and increased in the phases closest to the full moon (Stocker et al., 2004; Widjaja et al., 2015). Melatonin degrees may likewise alter with the phases of the moon and may affect births (Periti & Biagiotti, 1994). Melatonin levels decrease around the period of the full moon due to greater availability of light (Cajochen et al., 2013). Melatonin levels rise during pregnancy and decrease greatly during childbirth.

This is why a decrease in melatonin levels in the days closest to the full moon may be linked to a decrease in melatonin levels during childbirth (Olcese et al., 2013).

The relationship of lunar phases to birth, and in particular to the birth rate, has become the focus of important study, and a positive correlation has been reported between the onset of labor and a surpassing birthing amount, particularly in the course of the full moon period (Staboulidou et al., 2008). Many obstetric nurses have stated that the number of women who are in delivery and give birthing at the time of the full moon is higher. Danzl (1987) notes that in 1987, when 80% of nurses and 64% of doctors believed the moon had an effect. Another study also reported a statistically significant difference between the annual total spontaneous births that occurred during full moon periods and births that occurred during all other lunar phases (Laganà et al., 2014). However, there are studies indicating that lunar cycles have no effect on human issues, including automobile accidents, hospital admittances, surgery sequels, cancer survival indicendes, menstruation, births, birth complications, depression, violent behavior, suicides and homicides (Foster & Roenneberg, 2008). Criss and Marcum, in a 1968 study of 140,000 live infants, stated that lunar cycles had little effect on childbirth, and in this study, the authors reported a weak but definite relationship between light and menstrual cycle, negatively affecting ovulation during the lunar period when the light effect was low (Criss & Marcum, 1981). In addition to this idea, Wake and colleagues, in their study involving 1007 births, observed a significant increase in births where the Moon's gravitational influence on the Earth was less than 31.5 Newtons (Wake et al., 2010). In a study conducted by Abell and Greenspan on 11691 births involving a fifty one month cycle; it has been shown that there is no relationship between the birth rate and the phases of the moon (Abell & Greenspan, 1979). Another study showed that regardless of the type of birth, the lunar cycle did not affect the frequency of delivery (Bharati et al., 2012). In studies by Joshi et al. (1998), Periti et al. (1994), and Romero and Martinez (2004), it was stated that the number of births on full moon days was not statistically different from other days. In a study involving six million births in France, they found that a greater number of births occurred during the new moon and the first quarter (Guillon, et al., 1986). Lentz (2005) also found that there were more births during the full moon and new moon. In this study, when the relationship between birth characteristics (birth type, birth week, birth weight) and the lunar cycle was examined, although there was no statistically significant difference, it was seen that all birth types and babies born between 35^{0/7}- 40 weeks were mostly in the new moon period. Consideration of the Moon's influence on the tides has led to the belief for centuries that pregnant women

can have an effect on amniotic fluid pressure, and consequently that sudden pressure change can result in premature membrane rupture. Lentz et al. (2005) investigated the synergistic relationship between barometric pressure and gravitational forces in relation to the physiology of pregnancy and concluded that neither size nor barometric pressure gradient had a significant effect on human pregnancy, while the gravitational effects of the new moon and full moon had no effect on birth rates. Staboulidou et al. (2008) noted that the lunar cycle had no effect on childbirth and neonatal pathological clinical findings. In contrast to the relationship between the lunar cycle and the pathological clinical findings seen after birth and afterbirth, it is emphasized in the literature that findings after some diseases are related to some lunar cycles. For example, it has been emphasized that spontaneous pneumothorax cases are most common one week before and after the new moon period, and cardiovascular mortality is more common between the first and third quarter (Sok et al., 2001; Strestik & Sitar, 1996).

In this study, although the pathological clinical findings of postnatal processes were not statistically significant with lunar cycles, the moon phase with the most frequent findings was the full moon.

Strengths of this study is to be retrospective and including a focused research. The lack of a neonatal care unit in our clinic, frequent cesarean births and the small number of births included in the study are the limitations of our study.

CONCLUSION

In our study, as in some previously published scientific studies, it was seen that certain phases of lunar cycles had different effects on natal and postnatal processes. Thus, recognizing that lunar cycles have a predictable effect on natal and postnatal periods will be useful in terms of the care and treatment of newborn babies. Guaranteeing the relationship of the pathological clinical findings seen with lunar cycles by statistical tests that cannot be properly explained by chance is important for the reproducibility and predictability of the moon's effect. It is obvious that more center-based studies involving a large number of cases from different regions are needed for long-term outcomes.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

Author Contributions

Plan, design: Aydin, H.; Ceviker, H.E. **Material, methods and data collection:** Aydin, H.; Ceviker, H.E.; **Data analysis and comments:** Aydin, H.;

Ceviker, H.E. **Writing and corrections:** Aydın, H.; Ceviker, H.E.

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Ethical consideration

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