

# INFLUENCE OF THE LUNAR CYCLE ON THE FREQUENCY OF MATERNITY HOSPITAL ADMISSIONS: A RETROSPECTIVE STUDY

## INFLUÊNCIA DO CICLO LUNAR NA FREQUÊNCIA DE ADMISSÕES HOSPITALARES NA MATERNIDADE: ESTUDO RETROSPECTIVO

## INFLUENCIA DEL CICLO LUNAR EN LA FRECUENCIA DE ADMISIONES HOSPITALARIAS EN LA MATERNIDAD: ESTUDIO RETROSPECTIVO

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**How to cite this article:** Grasel JT, Reis TLR, Quadros JS. Influence of the lunar cycle on the frequency of maternity hospital admissions: a retrospective study. Rev baiana enferm (2018);32:e26537.

**Objective:** to analyze whether the frequency of maternity hospitals admissions is influenced by the lunar cycle. **Method:** an analytical, documentary, and retrospective study with a quantitative approach was carried out in a maternity hospital in the South of Brazil from July 2013 to July 2014. The sample was made up of 845 medical records of pregnant women. A descriptive data analysis was carried out with the use of the Fisher's exact test and chi-square test. **Results:** approximately 84% (n=709) of the pregnant women were not admitted to the maternity hospital setting of the present study during the days of lunar change and no significant difference in the number of admissions in each lunar phase was found, determining  $p=0.1116$ . **Conclusion:** it was evidenced that lunar phase changes were not determining factors for the increase in the demand of obstetric care and hospital admission in the institution setting of the present study.

**Descriptors:** Obstetrics. Parturition. Obstetric Labor. Moon.

*Objetivo: analisar se a frequência de admissões hospitalares na maternidade sofre influência do ciclo lunar. Método: estudo analítico, documental, retrospectivo, com abordagem quantitativa, desenvolvido em uma maternidade no Sul do Brasil, no período de julho de 2013 a julho de 2014. A amostra foi composta por 845 prontuários de parturientes. A análise dos dados foi do tipo descritiva e utilizou-se teste exato de Fischer e Qui-Quadrado. Resultados: aproximadamente 84% (n=709) das mulheres não foram admitidas na maternidade cenário do estudo durante os dias de mudança de lua e não houve diferença significativa entre o número de admissões em cada fase lunar, determinando ( $p=0,1116$ ). Conclusão: evidenciou-se que as mudanças de fase da lua não foram fatores determinantes para o aumento da demanda de cuidados obstétricos e admissão hospitalar na instituição cenário deste estudo.*

*Descritores: Obstetrícia. Parto. Trabalho de Parto. Lua.*

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*Objetivo: analizar si la frecuencia de admisiones hospitalarias en la maternidad recibe influencia del ciclo lunar. Método: estudio analítico, documental, retrospectivo, con abordaje cuantitativo, desarrollado en una maternidad del Sur de Brasil, entre julio de 2013 y julio de 2014. Muestra integrada por 845 historias clínicas de parturientas. Datos estudiados por análisis descriptivo; se utilizó test exacto de Fischer y Chi-cuadrado. Resultados: aproximadamente el 84% (n=709) de las mujeres no fueron admitidas en la maternidad sede del estudio durante los días de cambio de luna, y no hubo diferencia significativa entre el número de admisiones en cada fase lunar, determinando ( $p=0,1116$ ). Conclusión: se evidenció que los cambios de fase lunar no constituyeron factores determinantes para incremento de la demanda de cuidados obstétricos y admisión hospitalaria en la institución sede del estudio.*

*Descriptor: Obstetricia. Parto. Trabajo de Parto. Luna.*

## Introduction

The way women perceive events related to childbirth and birth of their children is directly associated with knowledge and traditions transmitted over generations. These popular myths, superstitions, and beliefs are empirical knowledge originated from histories of gestations or childbirths told by family members and individuals of their community, thus ethnically, religiously, and culturally characterizing specific groups<sup>(1)</sup>.

Among the many popular beliefs, one of the most ancient and known is that related to lunar phases and their association with the parturition process. Since ancestry, several cultures relate the Moon to conception, gestation, and specifically childbirth<sup>(2)</sup>. For ancient civilizations, the light of the Moon is responsible for the germination and growth of plants and conception of animals. Therefore, it was believed that women followed this same nature. There was so much connection between women and the Moon, that the term menstruation means “Moon change” in several languages<sup>(3)</sup>.

Even in obstetrics' classic texts, the Moon directly rules the gestational cycle, because the length of gestation is defined in ten lunar months or nine solar months, or even forty weeks<sup>(4)</sup>. This lunar influence on the day of birth created roots in the popular culture, involving mysticism, astrology, and science. Even today, this belief instigates professionals to relate the increase in the demand for obstetric care to lunar cycles<sup>(2)</sup>.

This relation often occurs for two reasons. The first reason by the belief that the full moon,

compared with the other phases, influences the beginning of labor<sup>(2,5)</sup>. The second reason is the belief that the Moon exerts great influence on the existing fluids in the planet, especially the seas. In this perspective, because the human body is made up of 60% of water, it is also influenced by the Moon. Therefore, this influence would be greater in gestation, because the fetus is immersed in amniotic liquid<sup>(6-7)</sup>.

Despite the small number, studies with population groups in different parts of the world used different methodologies to correlate the parturition process to the lunar phases, finding contradictory results. With regard to Brazilian studies, no publications seeking associations or evidence of this hypothesis were found<sup>(8-9)</sup>.

Studies of this nature may contribute to the understanding of the mysticism that involves the Moon, permeates maternities, and instigates professionals. In addition, they may provide a theoretical contribution so that professionals involved in childbirth develop guidance and practice based on scientific evidence, aiming at a better preparedness and qualification for obstetric care. Therefore, the aim of the present study was to analyze whether the frequency of maternity hospitals admissions is influenced by the lunar cycle.

## Method

This was an analytical and retrospective study with a quantitative approach carried out by means of documentary survey. The study setting was a maternity hospital located in a city in the

state of Rio Grande do Sul, Brazil, focused on the care of low obstetric risk situations. Because it is a public institution, its care is exclusively directed toward users of the Brazilian Unified Health System (SUS).

Data were collected from the medical records of low-risk pregnant women admitted in the institution setting of the study, from July 2013 to June 2014, covering 12 lunar cycles. Low obstetric risk is understood as: pregnant women with no diagnoses of maternal pathologies, gestational age between 37 and 41 weeks, first pregnancy, cephalic fetal presentation, and birth weight acceptable for the gestational age<sup>(10)</sup>. Because the present study focused on analyzing the influence of the lunar cycle on the trigger of labor, the medical records of women who did not undergo spontaneous labor and those who underwent an elective cesarean section were excluded. The total sample was made up of 862 medical records. Of these, 17 were lost for not presenting complete information regarding the hospital admission. Therefore, the eligible sample was made up of 845 medical records.

Data collection was carried out from August to December 2014 in the hospital's medical file service that provided the medical records. From these, the information required for filling out the form designed by the authors was extracted, which contained the following data: identification data, sociodemographic characteristics (maternal age, marital status, occupation, and education level), obstetric history (number of previous childbirths, gestational age, cervical dilation, uterine dynamics, amniotic membrane status,

and delivery method), and data about the lunar cycle (lunar phase and lunar change period during the hospital admissions).

After data collection, the information was entered into Microsoft Excel 2010 and then transferred to the Statistical Package for the Social Sciences 20.0 (SPSS) for Windows. Descriptive statistics was carried out for characterization of the sample and socioeconomic and demographic profile of the pregnant women. Fisher's exact test was used to evaluate the distribution of the independent variables compared with the dependent variable. The chi-square test was also used (QUI<sup>2</sup>) with 5% significance level.

The data presented are part of a study<sup>(11)</sup> carried out and presented in 2015 as a partial requisite to receive the title of obstetric nurse, approved by the research ethics committee of the Franciscano de Santa Maria University Center, under protocol no. 739.564/2014. Ethical and legal aspects of research involving human beings were observed, according to the guidelines and regulatory standards of resolution 466/12 of the Brazilian National Health Council<sup>(12)</sup>.

## Results

Regarding the sociodemographic profile, the study population was characterized by young women (55.4% [n=468]) aged between 15 and 24 years and adolescents (18.6% [n=157]) aged between 12 and 18 years. With regard to their skin color, 68.8% (n=581) reported being white, 18.1% (n=153) brown, and 13.1% (n=111) black (Table 1).

**Table 1** – Sociodemographic data of low-risk pregnant women. Santa Maria, Rio Grande do Sul, Brazil – 2013-2014 (N=845) (continued)

Variables	n	%
<b>Education level</b>		
No education level	4	0.5
Elementary school (Grades 1-4)	52	6.1
Elementary school (Grades 5-8)	381	45.1
High school and incomplete higher education	382	45.2
Higher education	26	3.1
<b>Occupation</b>		
Steady job or paid activities	337	39.9
Housewife	391	46.3
Students	117	13.8

**Table 1** – Sociodemographic data of low-risk pregnant women. Santa Maria, Rio Grande do Sul, Brazil – 2013-2014 (N=845) (conclusion)

<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Marital status</b>		
Single	665	78.7
Married or in a stable union	139	16.4
Divorced	14	1.7
Widowed	27	3.2

Source: Created by the authors.

With regard to the clinical-obstetric characteristics at the time of hospital admission, 51.6% (n=436) of the women were not in active labor, that is, they did not have strong uterine dynamics and minimum cervix dilation of four centimeters, 41.3% (n=349) were admitted with patent cervix between four and seven

centimeters, and 5.2% (n=44) between seven centimeters and complete uterine cervix dilation. In the same period, 80.1% (n=677) of the women presented intact amniotic membranes. Of these, 39.4% (n=267) presented spontaneous rupture of amniotic membranes during labor (Table 2).

**Table 2** – Clinical-obstetric data of low-risk pregnant women. Santa Maria, Rio Grande do Sul, Brazil – 2013-2014 (N=845)

<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Previous childbirths</b>		
Nulliparous	478	56.6
Primiparous	174	20.6
Multiparous (two childbirths)	105	12.4
Multiparous (three or more childbirths)	88	10.4
<b>Gestational age at the beginning of labor</b>		
37 weeks to 37 weeks and 6 days	59	7
38 weeks to 38 weeks and 6 days	193	22.8
39 weeks to 39 weeks and 6 days	284	33.6
40 weeks to 40 weeks and 6 days	309	36.6
<b>Type of delivery</b>		
Vaginal birth	695	82.4
Unplanned cesarean section	150	17.7

Source: Created by the authors.

The most frequent indications for the undertaking of a cesarean section reported in the medical records of the population studied were not-reassuring fetal status, cephalopelvic disproportion, failure to progress in labor, and pelvic position. Regarding the associations between lunar cycles and hospital admission,

the data indicated that approximately 84% (n=709) of the women were not admitted to the maternity hospital setting of this study during lunar change days. With regard to the lunar cycles, no significant difference was found among the number of admissions in each lunar phase (p=0.1116) (Table 3).

**Table 3** – Distribution of hospital admissions according to the phase of the lunar cycle. Santa Maria, Rio Grande do Sul, Brazil – 2013-2014 (N=845)

<b>Hospital admission</b>	<b>n</b>	<b>%</b>
<b>Lunar phase change</b>		
Lunar phase change days	138	16.3
Regular days	707	83.7
<b>Lunar phases</b>		
New	221	26.2
Waxing crescent	226	26.7
Full	186	22
Waning gibbous	212	25.1

Source: Created by the authors.

Of the total women in this study, 51.4% (n=435) presented spontaneous rupture of amniotic membranes, either before hospital admission (19.8% [n=168]), or during hospitalization (31.5% [n=267]). When considering the relationship between spontaneous rupture and lunar phase change days, the statistical data showed that 36.8% (n=160) of the spontaneous ruptures occurred during the lunar phase change and 63.2% (n=275) on regular days. Regarding the several lunar phases, no difference was found between the proportion of intact and torn amniotic sac ( $p=0.8006$ ).

## Discussion

The social and obstetric profile of the participants in the study was characterized by young nulliparous women, and they were mostly single housewives with low education level. The high number of women who reported not having a paid occupation may be associated with the low education level presented, in addition to their age. For young women, marriage and maternity are still the most important events in their social insertion, although their participation in the school and job market has grown<sup>(13)</sup>.

A great number of admission of women in the latent labor phase was found. Of the population studied, approximately half of the women were hospitalized at the right time, that is, at the beginning of the active phase of labor. Admittedly, early hospital admission increases the length of hospital stay of pregnant women,

submitting them to the hospital environment with no need and increasing the number of obstetric interventions, such as the early rupture of amniotic membranes and intravenous infusion of oxytocin, thus modifying the childbirth's physiological course<sup>(14-15)</sup>.

Regarding the delivery method, there was a prevalence of vaginal births, a fact justified by the clientele of the institution, which is a reference regional hospital in the care of low-risk childbirth. The cesarean section rate was approximately 18% (n=152), not far from the 10% to 15% recommended by the World Health Organization for all the world, aiming at better maternal and neonatal results, considering the healthcare resources available and maternal preferences<sup>(16-17)</sup>.

With regard to the association between the number of hospital admissions and lunar phase changes, only 16% (n=135) of the women were admitted during the days of lunar transition, showing that this was not a determining factor for the increase in hospital admissions in the institution setting of this study. This fact is strengthened by the data, which showed that there was no association between the lunar phase changes and proportion of spontaneous ruptures of amniotic membranes. Therefore, this result demystifies the belief that lunar phase change days result in a greater demand for obstetric care.

The data found in the present study are similar to those found in international studies. In India, a retrospective and observational study carried

out with 9,890 spontaneous vaginal births did not find any association of lunar effect with the number of births<sup>(2)</sup>. Similarly, studies carried out in Brazil, Peru, and Spain observed 1,122, 1,836, and 5,421 births, respectively, and concluded that there is not sufficient evidence to affirm the relationship between the lunar phase and beginning of labor<sup>(5,18-19)</sup>.

The lunar phases result from the fact that the Moon is not a luminous body, but a body illuminated by the Sun. Its facets change gradually, as it orbits around Earth throughout the month, completing its cycle in approximately 29.5 days. Therefore, the light facet of the Moon is that which is faced toward the Sun as well as Earth. Traditionally, there are four phases of the cycle: new moon, waxing crescent, full moon, and waning gibbous<sup>(7,20)</sup>.

The observation of the several lunar phases, the main investigation object of the present study, did not show, in the statistical analyses, any significant correlation with the number of hospital admissions. In the four lunar cycles, the percentage of hospital admissions was similar, between 22% and 26%. These numbers are similar to the results found in two Spanish studies<sup>(3,19)</sup> and corroborate findings that affirm not existing a specific distribution of childbirths according to the lunar cycle, with no significant difference among the number of births in the several lunar phases<sup>(2,18-19,21)</sup>.

When compared, no statistically significant difference was found in the number of hospital admissions between the full moon and other lunar phases, even considering the days before and after the lunar phase change. This result demystifies the belief that the full moon is the most important phase in the induction of the beginning of labor, and, consequently, a higher number of births. In an attempt to validate this belief, studies<sup>(2-3,19,21)</sup> presented similar results, showing that there is no statistical difference between the number of childbirths in full moon and vaginal births, nor cesarean sections.

The superstition associated with the full moon is based on astrology, because the Sun is aligned with the planet Earth during this lunar

phase and the Moon strongly interferes with the volume, ebb, and flow of earth fluids, and fluids present in the human body. Therefore, even if the fetus is immersed in a small volume of amniotic fluid, it would receive lunar thrust for the rupture of the amniotic sac and beginning of labor. Another fact would be regarding the brightness of full moon nights, which would provide greater safety in childbirth. Curiously, one of the recommendations of the humanization childbirth movement is the low light in delivery rooms, in order to ensure greater comfort and relaxation to the pregnant women during labor. In addition, the benefit to the fetuses is defended, since they lived in a dark environment during the whole gestation<sup>(6,17)</sup>.

However, no difference was found between the proportions of intact and torn sac in the several lunar phases. That is, the fact of being a full moon or any other did not interfere with the number of torn sacs. The purpose of the studies carried out in this perspective is to investigate the influence of the several lunar phases at the beginning of labor. However, no statistically significant results refuting this hypothesis were found<sup>(3,7)</sup>.

A limitations of the present study is the fact that it was carried out in a teaching hospital characterized by the use of obstetric interventions, such as amniotomy and use of exogenous oxytocin, often present in this study. In addition, it is believed that there are several factors related to labor signs, hospital admission, and rupture of amniotic membranes, which may have influenced the results found.

## Conclusion

The findings of the present study allowed to conclude that lunar phase changes were not a determining factor for the increase in the demand for obstetric care and hospital admission in the institution setting of this study. In addition, no significant difference was found in the number of hospital admissions associated with the several lunar phases.

Although there is no scientific evidence supporting the mysticism involving the Moon, it is impossible to ignore its power over people's imagination. This myth permeates maternities until today, being perpetuated in the culture and beliefs in health that involve the process of giving birth, sometimes determining behaviors of patients and professionals, and interfering with care and best practices. Despite the results of the present study, it is believed that the superstition that relates the Moon to the increase in the number of childbirths will continue to exist, which strengthens the need for further studies, in order to deconstruct superstitions and reach more consistent conclusions that may contribute to the qualification of the obstetric care.

### Collaborations:

1. conception, design, analysis, and interpretation of the data: Jessica Torres Grasel and Thamiza Laureany da Rosa dos Reis;

2. writing of the article and relevant critical review of the intellectual content: Jéssica Torres Grasel, Thamiza Laureany da Rosa dos Reis and Jacqueline Silveira de Quadros;

3. final approval of the version to be published: Jéssica Torres Grasel, Thamiza Laureany da Rosa dos Reis and Jacqueline Silveira de Quadros.

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Received: May 18, 2018

Approved: August 27, 2018

Published: November 27, 2018



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