

The Gravitational Pull of the Full Moon to Explain Phenomenon: Superstition or Science

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Abstract

Superstitious beliefs are embraced among healthcare providers regardless of the lack of, or inconsistency in, scientific validation. Previous research identified the belief that the presence of a full moon increased the number of births and the number of patients seeking care in an Emergency Department setting for psychiatric concerns. Using a retrospective approach, nine months of medical record data from the Women's Health Department detailing the number of births and nine months of medical record data from the Emergency Department were analyzed. Correlation of births on full moon dates was compared to overall rates, and overall Emergency Department contacts and contacts specifically for psychiatric concerns were compared to rates on non-full moon dates. Analyses failed to identify any statistically significant differences in either clinical scenario during the full moon dates. The use of superstitions, among healthcare professionals, provides a sense of control, which may reduce anxiety. While scientific advantages may not be able to detect a connection between behavioral differences and lunar phases, embracing one's beliefs in superstition may provide a mindfulness approach which is supportive while recognizing that the clinical environment cannot be controlled.

Keywords

Superstition, Births, Emergency Department, Psychiatric, Retrospective Data

1. Introduction

Superstition, as a concept, has been a topic of discussion since ancient times. According to Martin (2009), Christianity was perceived to be superstitious by Greek and Roman scholars. Martin posits that modern-day persons, when describing themselves as superstitious, "usually indicates their recognition that

they are accepting certain beliefs—or at least they act in ways we might take as accepting certain beliefs—ones that are admittedly rejected or marginalized by scientific culture” (pp. 10-11). Anecdotal conversations while presenting the results of our original survey study (Thomassy et al., 2021) resulted in the request to investigate the impact of the full moon, as a concept, on patient volume or reason for accessing care. Thus, a review of the number of births, Emergency Department contacts, and Emergency Department contacts specifically for psychiatric concerns was undertaken. The aim of this activity was to determine if data supports the premises and/or describes the control superstitions have. Superstition, as a concept, may not be amendable to scientific validation. Yet superstitious beliefs may support psychological and/or cognitive factors that provide coping mechanisms.

1.1. Literature Review

Focusing specifically on superstitious health beliefs, Taher et al. (2020) identified demographic, circumstance-related, social, and psychological factors as influencing the knowledge of, and belief in, superstitions. Health belief superstitions, because of the necessity for intervention to include scientific reasoning, have a pronounced psychological-cognitive aspect. Huque and Huq Chowdhury (2007) define superstitions as “beliefs about particular events that cannot be interpreted by scientific reasoning” (p. 19). Despite our scientific and technological advances, superstitious tendencies remain prevalent in health care. In fact, superstitious beliefs are capable of relating one event to another, even in the absence of natural or scientific reasoning (Hirshleifer, Jian, & Zhang, 2018). Human behavior can be predicted and guided by superstitious beliefs, for superstition provides a sense of understanding and the perceived ability to control the environment (Taher et al., 2020).

Correlations between the lunar phases and health disorders, specifically psychiatric disturbances, have been explored in the literature since ancient times (Raison et al., 1999). Survey data from the 1980s and 1990s (Rotton & Kelly, 1985; Vance, 1995) concluded that 43% of respondents believed lunar phenomena altered individual behavior, a number that increased to 81% among mental health professionals. Results from a meta-analysis (Rotton & Kelly, 1985) identified few statistically significant relationships between the lunar cycle and behavioral alterations. Throughout time, published research data continues to conclude that lunar cycles have no correlation with admission rates of psychiatric patients (Gupta et al., 2019).

1.2. Research Background

Results of our original survey-design study (Thomassy et al., 2021) determined that respondents who described themselves as being superstitious also reported an increase in correlating these beliefs to clinical relevancy, and thus used to guide care decisions. Ninety-five-point eight percent of the study respondents

described being “very familiar” with the item assessing familiarity and relevance of a full moon (a full moon means chaos is coming). Eighty-two-point-seven percent of the study population described this item as being “very relevant” to their clinical practice. This item was ranked the highest for both knowledge and relevance among all items within the survey. Subsequent anecdotal conversations among health care providers in Women’s Health and the Emergency Department settings concluded that, in their perception, the full moon item was not a superstition but a fact. It is not unreasonable for those in healthcare experiencing a common event to seek a shared, visible, and scientific explanation. Strong visual cues have been noted to have the ability to skew memories of events, ascribing stronger relationships and recall (Tanrikulu, Chetverikov, & Kristjánsson, 2021). The full moon is an overt phenomenon with known scientific influence such as gravitational pressures on tides and melatonin levels in humans (Hartstein et al., 2022). Both of these theoretical frameworks were included in the development of this retrospective study.

1.3. Problem of the Study

The desire for shared explanation(s), combined with strong visual cues from a full moon that has demonstrated scientific effects on the physical world, cumulated in those in healthcare ascribing events to the effects of a full moon. This resulted in the desire to compare patient data to moon phases to determine if a full moon impacts birth rates, accessing the Emergency Department for care, or accessing assessing the Emergency Department for care of a psychiatric concern.

1.4. Study Objectives

- To determine if there was an increase in the number of births, regardless of delivery mode, during full moon dates.
- To determine if there was an increase in the number of people seeking care or seeking care specifically for psychiatric concerns through the Emergency Department during full moon dates.

1.5. Study Significance

- While these data failed to support the hypotheses, the use of superstitious beliefs decreases anxiety among healthcare professionals.
- New, innovative means to explore behavior and lunar cycles may be forthcoming, but until then superstitious beliefs provide mindfulness and supportive intervention.

1.6. Study Hypotheses

- This descriptive retrospective study aimed to correlate rates and purpose of admissions to either the Women’s Health or Emergency Department clinical areas to the monthly timeframe when a full moon was present.

- Study hypothesis one: to determine the effect of a full moon on the number of births.
- Study hypothesis two: to determine the effect of a full moon on the number of patients seeking care in the Emergency Department or seeking care for a psychiatric-related health condition.

2. Methodology of Study

Superstitions, or “beliefs about particular events that cannot be explained by scientific reasoning” (Huque & Huq Chowdhury, 2007: p. 18) are known to guide behavior (Taher et al., 2020). Results from the previous study (Thomassy et al., 2021) described the awareness and inclusion of superstitious beliefs into clinical practice among healthcare professionals. As described by Parnell et al. (2012), superstitions are often used to explain events that are not supported by scientific reasoning. Data for the present study, obtained through retrospective chart reviews, aimed to determine if the superstitions could be scientifically explained, or if they were used to support one’s perceptions. Once study approvals were secured, a request was forwarded to the medical record department.

3. Data Analyses and Discussion of Results

3.1. Characteristics of the Study Sample

To answer the first study hypothesis, data included de-identified medical record information describing the daily number of births and delivery mode (vaginal or Cesarean-section) for the dates January 1, 2021, through September 30, 2021, inclusively. During the study timeframe, there were a total of 1391 live births; of these, 980 were vaginal deliveries, and 411 were Cesarean-section deliveries. The total live birth monthly totals varied from 121 - 188, with a mean of 154.3 and standard deviations ranging from 0.77 to 5.11; vaginal births, monthly, ranged from 89 - 131, with a mean of 108 and standard deviations ranging from 1.9 to 3.00; the range for Cesarean-section monthly births was 32 - 60, with a mean of 45.66 and standard deviations ranging from 0.77 to 1.77. During the study timeframe, there were a total of 43 live births on full moon dates (27 vaginally; 16 by Cesarean-section). This calculates to 3.09% of all live births occurring on full moon dates.

Data to answer the second study hypothesis was limited to deidentified data for all patient contacts to the Emergency Department, the primary reason (chief complaint) for the encounter, and the disposition. The study inclusion dates were January 1, 2021, through September 30, 2021, inclusively. Emergency Department contacts during the same study timeframe totaled 48,492, with 3741 of these contacts for psychiatric reasons. This calculates to 7.71% of all Emergency Department contact during the study timeframe for psychiatric concerns. Monthly total contacts with the Emergency Department varied from 4371 to 6005 (mean = 5388; standard deviations ranged from 11.14 to 24.73), while psychiatric concerns ranged from 382 - 444 (mean = 415.66; standard deviations ranged from

3.13 to 4.72). Of the 1600 total contacts on full moon dates, 128 of these, or 8%, were for psychiatric concerns.

These months were selected to accommodate known cyclical changes in either setting. Once data were available, a study-specific SPSS database was developed. All study data were transferred, checked for accuracy, and maintained on password-protected computers. Descriptive statistics were used to determine the total number of encounters, data relevant to the specific hypothesis, and then data focused on full moon dates. These dates were identified by the Farmer's Almanac (Burnett, 2021), and specific to the Northern Hemisphere.

3.2. Testing the Hypotheses of the Study

Hypothesis one: Determining the effect of the full moon on number of births. Data retrieved from the medical records department was reviewed for accuracy and assurance that the data set was complete. Analyses were completed by calculating the monthly birth rates and then the method of delivery (vaginal and Cesarean-section). These data were used to determine the total, mean, range, and standard deviation of scores. Guided by the dates of the full moon, study subsets were developed. This allowed calculation of total, mean, range, and standard deviation of monthly scores specific to these dates. During the study timeframe, there were a total of 43 live births on full moon dates (27 vaginally and 16 by Cesarean-section). As displayed in **Table 1**, both the number and the type of births varied slightly when comparing all days to the full moon date. All births are within the mean for the calculated range, apart from August, where the daily mean was 6.06 and 7 total births, which is slightly above the mean.

Hypothesis two: Determining the effect the full moon has on the number of patients seeking care in the Emergency Department and the number of patients seeking care for a psychiatric-related health concerns. Similar to hypothesis one, study data were retrieved from the medical records department and reviewed for accuracy and assurance that the data set was complete. Analyses were completed by calculating the monthly and full moon Emergency Department contact rate, and then the number of contacts for a psychiatric concern. These data were used to determine the total, mean, range, and standard deviation of scores. Guided by the dates of the full moon, a study subset was developed. This allowed calculation of total, mean, range, and standard deviation of monthly scores specific to these dates. When globally considered, Emergency Department contacts for psychiatric concerns encompass 7.71% of the total population, over the study timeframe. Yet, contacts for psychiatric concerns on full moon dates encompassed 8% of the total population. This slight increase seems to dissipate throughout the nine-month study time frame. Emergency Department contacts and Emergency Department contacts for psychiatric reasons on full moon dates were within each category range, with little variance in standard deviation calculations. Total Emergency Department contacts, on full moon dates, were above the mean for 4/9 months of the study timeframe (February, April, May, and September), with

Table 1. Birth number and types of delivery by month and during full moons.

Variable	Date	Total Births	Vaginal Delivery	Cesarean-section Delivery
January Total Births		145	103	43
January Daily Mean		4.67	3.32	1.38
January Daily Range; SD		0 - 9; 4.25	1 - 7; 2.20	0 - 4; 1.05
January Full Moon	1-28-21	5	2	3
February Total Births		121	89	32
February Daily Mean		4.32	3.17	1.14
February Daily Range; SD		0 - 9; 2.78	0 - 7; 2.14	0 - 4; 0.77
February Full Moon	2-27-21	2	2	0
March Total Births		146	107	39
March Daily Mean		4.70	3.45	1.25
March Daily Range; SD		0 - 9; 5.00	0 - 8; 3.75	0 - 4; 1.83
March Full Moon	3-28-21	4	3	1
April Total Births		155	99	57
April Daily Mean		5.15	3.30	1.90
April Daily Range; SD		1 - 11; 5.27	0 - 6; 3.00	0 - 6; 2.75
April Full Moon	4-27-21	5	2	3
May Total Births		149	103	47
May Daily Mean		4.80	3.32	1.51
May Daily Range; SD		0 - 10; 6.54	0 - 7; 4.75	0 - 5; 1.38
May Full Moon	5-26-21	6	5	1
June Total Births		145	100	45
June Daily Mean		4.83	3.33	1.59
June Daily Range; SD		0 - 10; 4.54	0 - 7; 3.75	0 - 4; 1.68
June Full Moon	6-24-21	4	3	1
July Total Births		178	131	47
July Daily Mean		5.74	4.22	1.51
July Daily Range; SD		1 - 11; 5.54	1 - 7; 3.18	0 - 5; 2.75
July Full Moon	7-24-21	5	3	2
August Total Births		188	128	60
August Daily Mean		6.06	4.12	1.93
August Daily Range; SD		2 - 12; 6.17	0 - 8; 5.38	0 - 5; 3.75
August Full Moon	8-22-21	7	4	3
September Total Births		162	121	41
September Daily Mean		5.40	4.03	1.36
September Daily Range; SD		1 - 10; 6.45	1 - 9; 2.38	0 - 5; 2.75
September Full Moon	9-20-21	5	3	2

the greatest increase (25) occurring during the month of May. Emergency Room contacts were slightly below the mean for 3/9 months over the study timeframe (March, June, and August), with the largest decrease (22) occurring during August. Emergency Department contacts were equal to the mean for the remaining 2/9 months (January and July). Emergency Department contacts for psychiatric concerns on full moon dates were above the mean scores for 3/9 months (April, May, and July), with the greatest increase (6) occurring during April. Emergency Room contacts for psychiatric concerns were below the mean scores for 4/9 months (January, March, June, and August), with decreases (2) noted during January, July, and August. Contacts during February and September were similar to their mean scores. In summary, full moon Emergency Department contacts, for generic or psychiatric concerns, were consistently below the mean during March, June, and August, slightly above the mean during April, and May. The months of January, February, July, and September had varied results (**Table 2**).

Table 2. Emergency department contacts totally and psychiatric concerns, by month and during full moons.

Variable	Date	Contacts	Psychiatric CC
January Total Contacts		5059	
January Daily Mean		163.19	13.10
January Daily Range; SD		134 - 197; 15.73	6 - 23; 4.25
January Full Moon	1-28-21	163	11
February Total Contacts		4371	
February Daily Mean		156.11	13.64
February Daily Range; SD		112 - 238; 24.73	5 - 21; 3.73
February Full Moon	2-27-21	163	14
March Total Contacts		5168	441
March Daily Mean		166.72	14.23
March Daily Range; SD		139 - 200; 15.01	6 - 25; 4.20
March Full Moon	3-28-21	150	13
April Total Contacts		5355	419
April Daily Mean		178.50	13.97
April Daily Range; SD		149 - 202; 13.46	8 - 22; 4.35
April Full Moon	4-27-21	181	20
May Total Contacts		5548	444
May Daily Mean		178.07	14.32
May Daily Range; SD		140 - 203; 15.25	8 - 22; 14.32
May Full Moon	5-26-21	203	18
June Total Contacts		5647	432
June Daily Mean		188.23	14.40

Continued

June Daily Range; SD		166 - 217; 11.90	8 - 21; 3.13
June Full Moon	6-24-21	183	13
July Total Contacts		5804	406
July Daily Mean		193.47	13.10
July Daily Range; SD		159 - 237; 15.25	6 - 22; 3.75
July Full Moon	7-24-21	194	15
August Total Contacts		6005	397
August Daily Mean		193.71	12.81
August Daily Range; SD		171 - 211; 11.14	5 - 23; 4.72
August Full Moon	8-22-21	171	10
September Total Contacts		5535	414
September Daily Mean		184.50	13.80
September Daily Range; SD		149 - 224; 15.19	8 - 23; 3.61
September Full Moon	9-20-21	189	14

4. Conclusion

Through both a desire for a shared explanation, knowledge of the moon's scientific effects on the physical world, and an enhanced recall of the full moon through visual cuing, healthcare providers perceived the full moon to have influence over births and/or Emergency Department contact. The fact that perceptions that births or psychiatric contacts to the Emergency Department increase during full moon dates cannot be supported by this research that does not negate these beliefs. As [Taher et al. \(2020\)](#) describe, superstitions provide a sense of control which reduces anxiety. These are positive benefits of adhering to one's superstitious beliefs, even when knowing that data fails to support the premise. [Wehr and Helfrich \(2021\)](#) summarize recent longitudinal observations supporting a complex synchronization of menstrual cycles, sleep-wake cycles, and manic-depressive cycles to lunar phases. Admitting that the synchrony may be temporary and may occur during different phases of the lunar cycle, they recommend that lunar influence on behavior be investigated by longitudinal research using case-by-case analysis.

[Brookfield et al. \(2019\)](#) explored the hypothesis that uttering the word "quiet" increases the clinical workload and avoiding the word would thus decrease the workload. The results of this study determined that the utterance of the word (quiet) has no impact on the clinical workload. Yet, these authors recommend that the use of the word should be encouraged, as sentiment in wishing a colleague a quiet shift and hoping that remains true. The same may be true for perceptions surrounding the impact the full moon has on the clinical environment.

As [Rotton and Kelly \(1985\)](#) summarize, despite the fact that there are few statistically significant studies which demonstrate a relationship between phases of

the moon and behavior, that does not imply that people do not behave more (or less) strangely during various phases of the moon. While the topic of superstitions may border on paranormal activities, belief in superstitions is apparent in people with varying academic credentials and professional positions; thus, the topic should receive serious consideration.

Being mindful of not only where we are and what we are doing but being aware of the presence of others and what they are experiencing allows one to not over-react to or become overwhelmed by what is going on around them. So while a belief in superstitions may be a coping mechanism, being mindful of these perceptions provides the ability to infuse a superstition into clinical practice, as appropriate, and not allow it to drive clinical decisions. They are but one part of your narrative.

Conflicts of Interest

The authors report no conflict of interest in the data collection, analyses, or publication of this paper.

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