

# The correlation between the phase of the moon and the number of psychiatric patients admitted to the hospital

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## SUMMARY

Each lunar cycle is 29.5 days long, and many medical professionals believe that the presence of a full moon will increase the incidence of medical emergencies, including psychiatric incidents. While previous studies suggest lunar phase could impact human health, mental state, and physiology, a direct relationship between lunar phase and number of psychiatric admissions had not previously been investigated. We hypothesized that as the monthly moon phase neared a full moon, during the Lunar-Gibbous phase, the average number of psychiatric patients would increase significantly, peaking on day 15 (full moon). Data consisted of 5,987 patients admitted to 4 psychiatric facilities over the course of 3 years. The numbers of psychiatric admissions for each day of the lunar cycle were displayed on a trend-line graph, and groups separating days of the lunar cycle were compared using a statistical two-sample t-test. The p-value was found to be approximately  $1.60 \times 10^{-12}$ , indicating a significant difference between the Lunar Gibbous and Lunar Non-Gibbous groups. However, contrary to the hypothesis, psychiatric admissions were lower during the gibbous phase compared to the non-gibbous phase, suggesting a potential negative correlation. As such, the original hypothesis was not supported, and further research is needed to investigate potential factors contributing to this result. These findings challenge existing assumptions about lunar influence on mental health and highlight the importance of using empirical evidence to inform psychiatric theory and practice.

## INTRODUCTION

In the medical field, it is not uncommon to hear rumors of the intense effects of the full moon on hospital activity. Nights of full moons are often credited with higher homicide and suicide rates, traumas, and birth rates by medical professionals, but without sufficient evidence. The lunar phase of the moon is defined as the shape created when the sun directly illuminates a portion of the moon, which is in turn viewable by humans on Earth (1). Each lunar cycle starts with a new moon, leading into a waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, and waning crescent before repeating (2). Each of the eight distinct phases lasts slightly more than 3.5 Earth days, with the true full moon occurring on the 15 day of each lunar month (3). Different phases create different lunar gravities, creating high and low tides in the Earth's oceans (3). As the human body

is made up of nearly up to 80 percent water, some speculate that the moon influences the body's functions, suggesting that humans are subjected to lunar influence like that of the tides in the ocean (4).

A correlation between the full moon and human illness is believed by as many as 81% of mental health professionals (5). A study performed in 2008 observed there was a possible correlation between the lunar phase and the frequency of ruptured intracranial aneurysms (6). The results showed a significant increase in incidence during the new moon, suggesting that the lunar cycle does impact the wellness of the human body (6). Research examining the distribution of births across the lunar month revealed a lower birth rate during the first phase of the moon, with a noticeable increase in births occurring between the waning crescent and the new moon (7). This data highlights that the phase of the moon could have an influence on human physiology (7). Some studies provide evidence to the moon phase having an influence on humans' psychological state in addition to their physiological state. A previous study recorded the number of psychiatric episodes recorded in two hospitals for up to three days before and after several full moons (8). This study demonstrated that slightly fewer patients presented to the hospital with a diagnosis of personality disorders on days farthest from the full moon (8).

However, contrary to the widely held belief in the medical community that the phase of the moon impacts human behavior, several studies have found conflicting evidence regarding this phenomenon. In a study conducted from 1993-2002, researchers inspected the number of psychiatric patients admitted during particular phases of the moon (full, new, quarter, waxing, waning) (9). Their results showed that the lunar phase was not associated in any significant way with psychiatric admissions or emergency presentation (9). A study conducted in Finland found a negative correlation between the full moon and violent events, such that homicides occurred 15% less frequently on nights of the full moon (10). Another related study found no correlation between the full moon and psychiatric admissions to a children's hospital (11). Therefore, evidence remains mixed as to whether or not there is a connection between admissions and the phase of the moon.

These previous studies suggest that the lunar phase could impact human health, mental state, and physiology. However, a direct study of the relationship between the lunar phase and the number of psychiatric admissions has not been conducted. Therefore, we investigated the correlation between the phase of the moon and the number of psychiatric patients admitted to the hospital. We hypothesized that as the monthly moon phase nears a full moon, the average number of psychiatric patients would increase significantly, peaking on day 15.

Day of Lunar Cycle	Average Number of Admissions
1	9.167
2	10.083
3	12.000
4	10.000
5	10.833
6	11.000
7	10.667
8	9.667
9	11.833
10	10.417
11	9.750
12	10.384
13	11.692
14	9.538
15	9.077
16	11.308
17	10.385
18	8.846
19	10.923
20	10.846
21	9.923
22	9.769
23	9.308
24	10.077
25	10.500
26	11.333
27	9.750
28	10.667
29	10.500
30	10.143

**Table 1: Day of the Lunar Cycle and average number of admissions.** Boxes highlighted in yellow represent days of the "Lunar Gibbous Group," and the box highlighted in pink represents the full moon.

	Mean	Standard Deviation
Lunar Non-Gibbous	10.39808696	0.89728
Lunar Gibbous	10.17571429	1.084

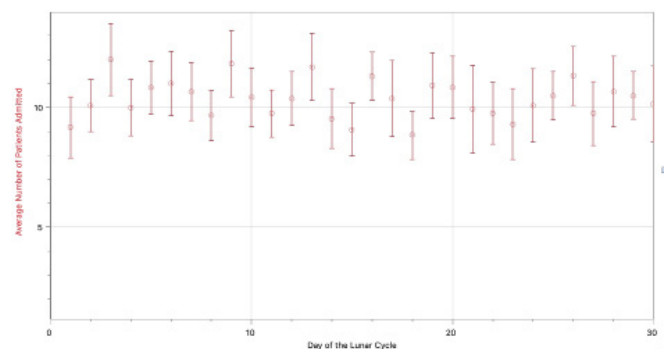
**Table 2: Admission mean and standard deviation for "Lunar Non-Gibbous" and "Lunar Gibbous" groups.** The "Lunar Non-Gibbous" group is data from days 1-11 and 19-30 of each lunar cycle. The "Lunar Gibbous" group is data from days 12-18 of each lunar cycle.

## RESULTS

A total of 5,987 participants over the age of 18 participated in this study. After collecting data and calculating the average number of psychiatric patients admitted for each day of the lunar month, days 1–11 and 19–30 were placed in the "Lunar Non-Gibbous" group (**Table 1**). This group had a mean value of 10.398, and a standard deviation of 0.897 (**Table 2**). Days 12–18 were placed in the "Lunar Gibbous" group (**Table 1**) which had a mean value of 10.176 and a standard deviation of 1.084 (**Table 2**). We found a significant difference between the Lunar Gibbous and Lunar non-Gibbous groups ( $p\text{-value} = 1.60 \times 10^{-12}$ ) with a higher mean in the Lunar Gibbous Group. This indicates psychiatric admissions were lower during the gibbous phase compared to the non-gibbous phase. Therefore, we found that the number of hospital admissions was significantly different depending on the lunar phase. However, the original hypothesis, which predicted an increase in admissions as the full moon approached, was rejected, as the observed trend indicated a decrease in admissions during this period. This suggests a potential negative correlation between lunar phase and psychiatric admission (**Figure 1**). There is not sufficient evidence to support my original hypothesis.

## DISCUSSION

The purpose of this study was to investigate the impact of the moon phase on the number of psychiatric admissions to the hospital. We investigated the correlation between the phase of the moon and the number of psychiatric patients admitted to the hospital. We hypothesized that as the monthly moon phase nears a full moon, the average number of



**Figure 1: Quadratic trend-line fit of patients admitted over the course of the Lunar Cycle.** Average number of patients admitted per day of the lunar cycle. R-value = -0.1013. Error bars show standard deviation.

psychiatric patients will increase significantly, peaking on day 15. Therefore, proximity to a full moon night should impact the admission rates to psychiatric hospitals with a positive correlation. Our data does not support hypothesis.

A previous study found no notable variation in psychiatric admissions across the various lunar phases (12). These findings are similar to ours, showing no significant increase in admissions during the full moon. Another scientific report confirmed that the full moon phase of the lunar cycle does not increase hospital admission (13). A different study looked at the connection between the full moon and the length of admission (14). This study, using almost 18,000 patients, found that there is little evidence that humans' well-beings are influenced by the moon (14).

There are several limitations that could have affected the results of this study. One limitation in this study was the occurrence of the 30th day. The lunar cycle is only 29.5 days, but after several cycles, an extra day must be added. This might slightly skew the results projected in the data. In future studies, the inclusion of hours in the day could prevent this problem. Due to the necessary anonymity of the patients, the names and genders of those admitted were protected. Therefore, no tests could be performed to determine there were discrepancies between genders. The size of the study group could have an impact on the results, and a larger sample size could provide more accurate results. This data also only represents the moon's impact on hospitals in South Florida. In future studies, more hospitals should be studied, for a longer period of time, and in various regions around the world. This data assumes that the rate of admission is the same throughout the year. However, certain disorders such as Seasonal Affective Disorder could have skewed results and resulted in a higher occurrence in certain months of the year. In future studies, this should be considered when collecting and processing data. This data does not describe certain aspects of psychiatric admissions such as the hospital length of stay, or the time of admission. These small elements could have impacted our understanding of this topic. Finally, this data likely does not show the full effects of the full moon, only its effects on psychiatric patients. In future studies, it would be best to study general hospital admissions, to include non-psychiatric related incidents. If a clear relationship between lunar phases and psychiatric admissions were established, it could transform how hospitals allocate resources and staff during specific times of the month. Understanding such patterns could allow psychiatric facilities to better prepare for potential fluctuations in patient volume, leading to more efficient care and improved outcomes.

## MATERIALS AND METHODS

### Study group

This study consisted of observational data from a total of 5,987 patients admitted to psychiatric facilities at Broward Health Medical Center, Broward Health North, Broward Health Coral Springs, and Broward Health Imperial Point over the course of 3 years. This set includes data for patients between the ages of 18 and 99. The anonymity of the patients was protected on account of HIPAA regulations.

### Procedure

Before data procurement, the study received appropriate approvals from the Institutional Review Board (IRB) at

Broward Health. We obtained data from each day of 37 lunar cycles (3 years) for each of the 5,987 patients admitted to Broward Health psychiatric facilities.

## Data collection and analysis

Each admission data point consisted of an admission date range, diagnosis code, diagnosis description, and admission facility. The data was organized for analysis. The number of psychiatric admissions from each day of the lunar cycle for all 37 cycles was averaged. The average was determined for psychiatric admissions from the first day of 37 lunar cycles. The same was done for all data for each day up to "day 29" (the last day of the lunar cycle). The averaged data points from each day were then distributed on a scatterplot graph and represented with a curve-fitting trend-line. The data was separated into two groups, "Lunar Gibbous" and "Lunar Non-Gibbous." Days 12–18 were placed in the "Lunar Gibbous" group (admissions during the 3 days before, during, and 3 days after the full moon). Days 1–11 and 19–30 were placed in the "Lunar Non-Gibbous" Group (admissions during the remaining days of the lunar cycle). The average of all data points from the "Lunar Gibbous" group was compared to the average of all data points from the "Lunar Non-Gibbous" group using a two-sample t-test. These averages determined if there was a correlation between the number of daily psychiatric admissions and the lunar phase. For a visual representation, the data was spread on a LoggerPro graph. A quadratic-fit trend line was created and showed no visible increase in psych admissions on days 12–18 (**Figure 1**). This type of trendline was used, as it could capture the general trend without forcing a straight line.

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