# Lunar Cycle and its Correlation with Unnatural Death in Different Age Group

**Mayank Gupta[1], Amit Kumar Nayak[2], Praveen Kumar Tiwari[3]**

*[1]Assistant Professor, Department of Forensic Medicine, Institute of Medical Sciences, [2] Assistant Professor, Department of Anatomy, Institute of Medical Sciences,[3]Research Scholar, Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University*

## Abstract

It is believed abstraction that the Planets and stars influence human health and psychology is a popular notion in astrological science in India. However, debates are still ongoing about the exact effects and their extent and quality. This study aims to deduce the correlation between unnatural deaths in different age groups and the lunar cycle in 2819 cases. The cases were selected from the dead bodies brought into the mortuary of the department for medico-legal postmortem examination from the various police stations of Varanasi between the duration of 1st January 2013 to 17th July 2014. The compiled data were studied and analyzed statistically by employing the 'one-way parametric ANOVA.' It was observed that out of 2819 cases the most affected age group was between 21-40 years (52.4%) followed by the age group 41-60 years (23.1%) and 13-20 years (13.7%). The insignificant rise in unnatural death among different phases of the lunar cycle of different age groups indicates minimal correlation and association with the lunar cycle. A detailed study may be done in the future considering one parameter at a time.

***Keywords:*** *Full moon day, New moon day, Unnatural death*

## Introduction

It is believed abstraction that the Planets and stars influence human health and psychology is a popular notion in astrological science in India. However, debates are still ongoing about the exact effects and their extent and quality.

The moon and paranormal activity have often been associated with each other. The common belief is that a full moon is the most favorable time for paranormal investigations. Others believe the best time to experience paranormal activity is two or three days before or after the full moon and new moon. Why? No one can say for sure. One theory about investigating during a full moon is an increased gravitational pull on the earth from a full moon. This event could cause the ascend in paranormal activity.

C P Thakur, Dilip Sharma (1984) randomly selected 3 police stations of Bihar (India), i.e. Gaya Sadar, Kirtya Nand Nagar, and Sonari. Each at least 300 km apart from another. The number of crimes that occurred during 1978-82 was noted each day. Data were pooled and analyzed by the computer using a basic programming method. It was observed that the incidence of crimes committed on full moon days was notably higher than on any other day. Although a small peak in the number of crimes was observed on new moon days, it was insignificant as compared to those committed on other days[1].

Owen C et al. (1998) carried out a prospective study of lunar cycles and violent behavior. The study established no significant relationship between total violence and aggression or level of violence and aggression and different phases of the moon[2].

**Corresponding Author:**
**Mayank Gupta**
Email: mayanknbmc@gmail.com
Mobile No- 9838882298

Biermann T et al. (2005) conducted a population-based study to assess the influence of the lunar phases on suicides according to age, sex, and chosen method. The study was conducted in Middle Franconia between 1998 and 2003 for a total of 3054 suicides (1949 males and 1105 females) cases. No significant connection was observed between the full, absent, and moon's inter-phases and suicides. Nevertheless, a weak association was present between the no moon days and the inclination of the non-violent methods of suicide in men aged less than the median of 40.2 years. They concluded that there was no relationship between suicide and different phases of the moon[3]. A similar sort of study titled 'Suicides and the lunar cycle' was done by J.M. Guti´errez-Garcıa and F. Tusell (1997) in which the results were no different from Biermann T et al[4].

Jay Karan et al. (2010) in their study titled 'Full Moon Days and Crime: Is there any association?' found that there was no noteworthy difference in crimes happening on full moon days and other days ($p = 0.07$). On stratification, there was no difference between full moon days of the week, and the same non-full moon day of the week except on Wednesday[5].

A study conducted by Joseph A. Schafer et al. (2010) in United State titled 'Bad moon on the rise? Lunar cycles and incidents of crime' and a similar study executed by Teresa Biermann et al (2009) in Germany, titled 'Relationship between lunar phases and serious crimes of battery: a population-based study' also concluded that there is no correlation between the lunar cycle and incidence of crime[6, 7].

Varinder S. Parmar et al. (2014) did a study using three different definitions of a full moon. The result was different in different definitions of a full moon. Therefore, they quoted that the different definitions of "full moon" may relate to the discrepancies in the findings of full moon studies. There is a need for standardization of the definition of the "full moon" for future research[8].

Mayank Gupta et al. (2015) studied homicidal and suicidal deaths and their correlation with the lunar cycle. The study reveals a rise in incidences of homicide and suicide during the full moon but is statistically insignificant[9, 10].

## Material and Method

The cases in the present study were selected from the dead bodies brought into the mortuary of the department of Forensic Medicine, Institute of Medical Sciences, BHU for medico-legal postmortem examination from the various police stations of Varanasi. The total duration of the study was 18.5 months (1st January 2013 to 17th July 2014). A total of 2819 cases were taken in this study, which includes deaths by suicide, homicide, and accidents.

The history regarding the circumstances of the unnatural death and other relevant data were collected from the following source-

(1) The papers sent by police for the medico-legal autopsy:

(a) Inquest report,

(b) Copy of the first information report (F.I.R.),

(c) Death certificate if hospital death is there,

(d) Suicidal notes/other relevant reports, etc.

(e) Hospital records/reports if available, etc.

(2) From the post-mortem register maintained by our department

The compiled data were studied and analyzed statistically by employing the 'one-way parametric ANOVA' and the results of the analysis have been presented in various tables that were discussed and concluded.

***Observations and results***

The study includes 2819 cases and it aims to deduce the correlation between unnatural deaths in different age groups and the lunar cycle. The cases were categorized in the different age groups**,** i.e. 0-12 years, 13-20 years, 21-40 years, 41-60 years, 60 years onward.

The lunar cycle has been divided into three categories:

1. Full moon days (includes 2 days before and after the full moon event)

2. New moon days (includes 2 days before and after

the no/new moon event)

3. Rest of the days (i.e. excluding 1 and 2)

A total of 19 events of full moon and new moon each occurred during 18 and half months of the study. It was observed that out of the 2819 cases, the age group affected most was between 21-40 years (52.4%) followed by the age group 41-60 years (23.1%) and 13-20 years (13.7%). The extreme of ages, i.e. below 12 years and above 60 years contributes 3.7% and 7.1% respectively to unnatural deaths.

***Table - 1*** indicates the rate of incidence of unnatural deaths over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

Full moon days (5.22) > overall rate (5.02) > new moon days (4.98) and the rest of the days (4.98).

The rise in incidences during the full moon days over the others is statistically insignificant as indicated by the P-value (0.712).

***Table - 2*** indicates the rate of incidence of unnatural deaths of the children below the age of 12 years over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

Rest of the days (6.42) > overall rate (6.12) > full moon days (5.93) > new moon days (5.50).

The rise in incidences during the rest of the day over the others is statistically insignificant as indicated by the P-value (0.267).

***Table - 3*** indicates the rate of incidence of unnatural deaths of the children between the ages of 13-20 years (i.e. adolescent age group) over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

Full moon days (6.27) >> overall rate (5.85) > new moon days (5.84) > rest of the days (5.67).

The rise in incidences during the full moon days over the others is statistically insignificant as indicated by the P-value (0.516).

***Table - 4*** indicates the rate of incidence of unnatural deaths in the age group between 21-40 years over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

Full moon days (5.58) > overall rate (5.36) > rest of the days (5.33) > new moon days (5.25).

The rise in incidences during the full moon days over the others is statistically insignificant as indicated by the P-value (0.630).

***Table - 5*** indicates the rate of incidence of unnatural deaths in the age group between 41-60 years over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

The full moon days (5.84) > rest of the days (5.71) > overall rate (5.70) new moon days (5.55).

The rise in incidences during the full moon days over the others is statistically insignificant as indicated by the P-value (0.796).

***Table - 6*** indicates the rate of incidence of unnatural deaths in the age group above 60 years (i.e. geriatric age group) over the different phases of the lunar cycle. It is observed that the rate is found to be in the following order:

New moon days (6.56) > full moon days (6.33) > overall rate (6.03) > rest of the days (5.82).

The rise in incidences during the full moon days over the others is statistically insignificant as indicated by the P-value (0.329).

1983;20(5):487-495.

**Table 1: Showing the Rate of Unnatural Deaths in Different Phases of Lunar Cycle:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 95 | 5.22 | 2.726 | .280 | 4.67 | 5.78 |
| Rest of days | 373 | 4.98 | 2.542 | .132 | 4.73 | 5.24 |
| New moon days | 95 | 4.98 | 2.518 | .258 | 4.47 | 5.49 |
| Total | 563 | 5.02 | 2.567 | .108 | 4.81 | 5.24 |

F value= 0.339 P value= 0.712

**Table 2: Showing the Rate of Unnatural Deaths in Age Group 0-12 years:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 14 | 5.93 | 2.973 | .795 | 4.21 | 7.65 |
| Rest of days | 59 | 6.42 | 2.415 | .314 | 5.79 | 7.05 |
| New moon days | 24 | 5.50 | 1.865 | .381 | 4.71 | 6.29 |
| Total | 97 | 6.12 | 2.390 | .243 | 5.64 | 6.61 |

F value= 1.338 P value= 0.267

**Table 3: Showing the Rate of Unnatural Deaths in Age Group 13-20 years:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 41 | 6.27 | 2.684 | .419 | 5.42 | 7.12 |
| Rest of days | 184 | 5.76 | 2.586 | .191 | 5.38 | 6.13 |
| New moon days | 51 | 5.84 | 2.453 | .343 | 5.15 | 6.53 |
| Total | 276 | 5.85 | 2.574 | .155 | 5.54 | 6.15 |

F value= 0.664 P value=0.516

**Table 4: Showing the Rate of Unnatural Deaths in Age Group 21-40 years:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 86 | 5.58 | 2.578 | .278 | 5.03 | 6.13 |
| Rest of days | 334 | 5.33 | 2.410 | .132 | 5.07 | 5.59 |
| New moon days | 87 | 5.25 | 2.368 | .254 | 4.75 | 5.76 |
| Total | 507 | 5.36 | 2.430 | .108 | 5.15 | 5.57 |

F value= 0.462 P value=0.630

**Table 5: Showing the Rate of Unnatural Deaths in Age Group 41-60 years:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 67 | 5.84 | 2.717 | .332 | 5.17 | 6.50 |
| Rest of days | 254 | 5.71 | 2.429 | .152 | 5.41 | 6.01 |
| New moon days | 66 | 5.55 | 2.463 | .303 | 4.94 | 6.15 |
| Total | 387 | 5.70 | 2.481 | .126 | 5.45 | 5.95 |

F value= 0.229 P value=0.796

**Table 6: Showing the Rate of Unnatural Deaths in Age Group above 60 years:**

| Lunar cycle | Total no. of days | Mean | Standard Deviation | Standard Error | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Full moon days | 27 | 6.33 | 3.000 | .577 | 5.15 | 7.52 |
| Rest of days | 106 | 5.82 | 2.487 | .242 | 5.34 | 6.30 |
| New moon days | 27 | 6.56 | 2.309 | .444 | 5.64 | 7.47 |
| Total | 160 | 6.03 | 2.554 | .202 | 5.63 | 6.43 |

F value=1.120 P value=0.329

## Discussion

To start with the hypothesis, the incidence of unnatural death increases in and around full moon days or new moon days or both. To prove this hypothesis, we compared the 'mean' of unnatural deaths overall and also those occurring in different age groups to the lunar cycle.

***The overall distribution of victims of unnatural death***

When we compared the overall 'mean' of unnatural deaths in different phases of the lunar cycle, namely the full moon period, new moon period, and the rest of the day. It is found that there is a rise in the mean incidence of unnatural deaths in the full moon period over the new moon period and also the rest of days.

Jay Karan et al (2010) in their study in Surat, Gujarat reported that there was no significant difference in crime events on full moon days and non-full moon days when compared by the Chi-Square test (p = 0.07). Except on Wednesday, no difference was observed between full moon day and corresponding non-full moon day of the week[5].

Joseph A. Schafer et al (2010) using police, astronomy, and weather data from a major southwestern American city, reported that there is no correlation between lunar cycles and rates of reported crime[6].

Oderda GM, Klein-Schwartz W (1983) found that a larger proportion of total calls to the center, and unintentional poisoning calls occurred during the full moon period. A significantly higher number of unintentional poisonings occurred during the full moon period[11].

***The age-wise distribution of victims of unnatural death***

Out of 2819 studied cases, the largest number of victims of unnatural death belonged to 21-40 years of age group which constituted more than half of the total victims (52.4%) followed by 23.1% in 41-60 years age group. The study also revealed that the extreme age groups**,** i.e. up to twelve years (i.e. pediatric age group) and sixty years and above (i.e. geriatric age group) were found to be minimal 3.7% and 7.1% respectively as the victims of unnatural death. The high mortality in the age group of 21-40 years can be due to more outdoor activities, the use of high-speed automobiles, also the adventurous nature of the people of this age group. Also, these victims were found bearing most socially active life and responsibility, so they are much exposed to accidents, rivalry, betrayal, stress, and business/property disputes resulting in higher deaths.

When we compared the 'mean' of unnatural deaths during different phases of the lunar cycle in the different age groups separately, it is found that except for the

extremes of ages (i.e. pediatric and geriatric age groups as mentioned), all the other age groups show a rise in the mean incidence of unnatural deaths in the full moon period over new moon period and also the rest of days.

The pediatric age group shows fall during the full moon and new moon periods as compared to the rest of the day. While in the geriatric age group, the rise is in new moon days.

The study shows that this rise in mean value during different phases of the lunar cycle is not consistent in all age groups. It is also found that none of these rises in mean value has got any statistical significance.

Oderda GM, Klein-Schwartz W (1983) found that different phases of the moon had no effect with regard to the victim's age or sex or treatment location[11].

When we compared the 'mean' of unnatural deaths during different phases of the lunar cycle in the gender groups separately, it is found that there is a rise in the mean incidence of unnatural deaths in the full moon period over new moon period and also rest of the days in both male and female groups.

The study shows that this rise in mean value during different phases of the lunar cycle, which although is consistent in both the groups, it is also found that none of these rises in mean value has got any statistical significance.

Oderda GM, Klein-Schwartz W (1983) found that different phases of the moon had no effect with regard to the victim's age or sex or treatment location[11].

## Conclusion

The present study is done over 2819 victims of unnatural deaths, the majority of the victims belonged to 21-40 years of age group (52.4%) and the rise in the unnatural deaths during a particular phase of the lunar cycle among different age groups is not consistent. It is also seen that there is an overall rise in the unnatural deaths in the 'full moon period' as compared to the other parts of the lunar cycle. Since no rise in the different parameters separately or overall is found to be statistically significant, the study finally concluded that there might be a correlation between unnatural death and the lunar cycle, but there is no association between them in our preliminary study.

In this study, we considered new moon days along with full moon days, which is not the case with many other studies. Also, we took two days back and forth of the new moon and full moon days, which is again the strength of our study. Although this study is not conclusive, further studies can be carried out in two different ways. Firstly, taking one parameter at a time might throw some more light on the association. Secondly, by including the cases in which incidence doesn't lead to death as well. This may lead to more specific results, and if any, positive association is found, it will be very beneficial to take the necessary steps to bring it down.

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**Ethical Clearance:** The present study was approved by "Institutional Ethical Committee" of Institute of Medical Sciences, Banaras Hindu University, Varanasi.

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