

# A Structured Review of Relation between Full Moon and Different Aspects of Human Health

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## Article Information

Received date: May 14, 2017

Accepted date: May 23, 2017

Published date: May 25, 2017

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**Keywords** Full moon; Lunar cycle;  
Human health; Sleep; Behavior;  
Endocrine system; Cardiovascular  
system

## Abstract

Full moon is the lunar phase that occurs when the moon is illuminated completely as seen from the earth. Across the centuries many a person has altered the phrase, 'there must be a full moon out there' in an attempt to explain weird happening at night. Even today many people think the mystical power of full moon induce erratic behavior, psychiatric, hospital admission, suicide, homicide, sleep pattern, birth of baby, emergency room call, traffic accident and all manners of strange events. The main objective of this review is to find out the effect of full moon on different aspect of human health. The study was undertaken Kumudini Women's Medical College, Bangladesh during the period between June 2016 to May 2017. Here we summarized the literature of 33 trials collected from secondary sources like Pub Med, Goggle Scholar and other different articles through online searching. The coverage of the study was effect of full moon on cardiovascular system, endocrine system, on behavior, on reproductive system, on behavior system of human being. The ultimate result of this review in maximum cases no significant changes observed in human health. In spite of these findings there is further scope for elaborate study on this aspect.

## Introduction

Lunar phase of the moon is the shape of the illuminated part of the moon as seen by an observer on the earth. The moon and the earth are tidally locked so that same lunar surface always faces the earth. Full moon occurs when the moon is opposite to the sun and opposite side of the earth from the sun. The interval between two lunar phases is synodic month, which is on an average 29.53 days. As the closest celestial body to our earth the moon has developed a number of myths itself over the year across the globe. The most common myth surrounding the full moon is that it evokes madness. There are old beliefs that a higher rate of insanity, homicide, suicide lunacy affected by the full moon. Superstition about full moon is still popular now days. For example some people believe that there is link between full moon and epilepsy. Their belief is that during full moon there is increase the chance of delivery of baby and also full moon effect on human sleep. However impact of full moon on sleep, on cellular change, on endocrine system is reported. By analyzing all the trials some studies reported that there is some changes occur in sleep during full moon [1,2] on cellular change scientist reported that lunar regolith has been made of meteoroids. If a person inhale this it causes a pulmonary change on human body [3]. It is reported that in the endocrine system the level of melatonin is changed during full moon [4] and melatonin has significant effect on endocrine system of human life [1]. Most of the people believe that there is effect of full moon on human behavior. But by studying most of the studies researchers found that there is no relation with full moon on human behavior [5-8].

This review is an attempt to consolidate the earlier studies on this subject and to get a broad based idea if there exists any relationship between full moon and various physiopsychological aspects on human like behavior, sleep cycle, cardiovascular system, endocrine system, birthrate, reproductive system.

## Methodology

Data were collected from review of literatures from various scientific studies conducted so far globally. To meet our objectives, we try to do a study and see what actually occurs in the human body during full moon. To find out the related up-to-date topics we searched through PUB Med central, Goggle Scholar and related bibliographic databases. Only peer reviewed articles were chosen which were supposed to be of high quality. Database was created in the Endnote software and full text articles were collected by Endnote software. If there was a lack of information we contacted the corresponding authors for further clarification.

Pub Med was searched by following keywords: “Full moon” [All Fields] And “Effect of full moon on human health” [All Fields] OR “Lunar cycle” [All Fields]. Google Scholar was searched by following key words: “Effect of full moon on different aspect of human health”. To avoid the diversification in the conception clearly defined were used and synonyms words not used. We examined reference lists of the included articles for any studies which were missed in the database search process. Collected data are compiled and studied for critical review of impact of full moon on all aspect of human health.

## Results and Discussion

### Effect of full moon on different aspects of human health

**Effect on heart:** That there is association between season and cardio vascular diseases is well known [9] Myocardial infarction is a major problem in developing countries. There are many facts that cause the disease. A study has shown that the circadian variation of MI occurs due to rupture of the plaque in morning [10-12]. A study has stated that there is a relationship between the occurrence of myocardial infarction and gravitation of the moon [13] The study has shown that there were 11369 patient of first MI. These people showed sign and symptom of MI like chest pain, ST segment elevated by 2 mm and increased serum creatinine level. They were diagnosed by specialist cardiologist and they detected that AMI occurs during resting position or bed rest position. Another study tried to identify the effects of the lunar cycle and seasonal variation on ascending aortic dissection surgery outcomes [14] they also applied these factors on risk adjusted hospital mortality and the length of stay followed by surgery for survivors. They chose different criteria for their investigation like first they want to co-relate full moon and seasonal variation, demographic and patient risk varieties and made a model that controls demographic risk factor of people like age, different kind of diseases (diabetes mellitus, hypertension). They made two groups for their study. Group A where patient having ascending aorta dissection only and Group B where patient having ascending aorta surgery plus aortic valve surgery or coronary bypass surgery or both. Ultimately they said that, season or full moon had no effect on mortality or length of stay (LOS) following aortic dissection repair. The full moon decreases the odds of death (association between an exposure and an outcome).



Figure 1: Photograph of full moon during the total lunar eclipse of 28 September 2015.

**On Sleep:** On earth the biology of life can be influenced by different factors like moon, tide, geographical cycle [15,16] There is a very good analysis that depicts that lunar cycle effect on not only sleep, but also some endogenous hormonal matter like melatonin level, cortisol level, Electroencephalogram activity (EEG), non Rapid Eye Movement sleep (NREM) [1,2]. They indicated that during full moon EEG activity decreased during NREM by 30% and time to fall asleep increases by 5 minutes. Ultimately sleep duration was reduced by 20 minutes.

The graphical representation shows that during a lunar cycle what happened in different factor in our body (Figure 1).

In this picture (Figure 2) different dots represent sleep onset time and different color show different gender and age group; pink for young women, blue for young man, gray for older man. The color boxes describe moon classes like 1, 2, and 2. Moon class 1 shows it occurs -4 and +4 days around full moon. Class 2 show nights that occurs 5 to 9 days before and after the full moon. And moon classes 2 show night that occur 10 to 15 days before and after the full moon [1].

Full moon is often associated with insomnia, during full moon there is excessive light on outside that’s why people did not sleep well. But now days there is lot of artificial light outside so that full moon hardly cause sleep deprivation.

Several trials searched and reanalysis of pre existing database on human sleep for possible lunar effect. But the results are quite different. In some study the women’s are more affected than man during full moon. Analysis of two datasets, each including 30 to 40 volunteers during 2013-2014, and it is reported that there is no statistical significant relationship between human sleep and full moon [17]. A recent study with 5800 children’s of different country reported that the children’s slept 5 minutes less during full moon. The reason of these results may be the brightness of the full moon [7].

**On birth rate:** Studies reported that all mammalian cells seem possessed during biological clock [12] it is suggestive that reproduction and child birth may be influenced by lunar cycle. However, some earlier studies identified that there is no significant correlation

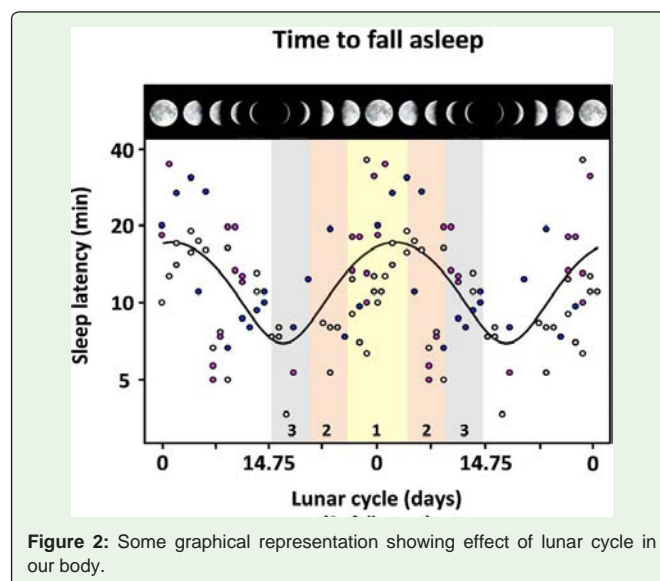


Figure 2: Some graphical representation showing effect of lunar cycle in our body.

between frequency of birth and lunar cycle [18,19]. Similar result was observed in a trial with 1009 cases in a private hospital in Japan where all were spontaneous labor without use of any inducing agent for delivery [18]. Earlier many studies tried to correlate gravitation of moon, the distance of the moon and the distance of the earth with the occurrence of different diseases but no effect resulted [13]. There is one more belief that during full moon more babies are born than other nights. But there is no scientific logic could be proved on this point. So these results suggest that the gravitation of the moon has an influence on frequency of birth. Some previous report has shown that there was a correlation between the lunar cycle and birth rates and some do not relate to frequency of birth rate [20-22].

**On cellular change:** The National Aeronautics and Space Administration of USA reported that the surface of the moon is covered by lunar regolith. Lunar regolith has been formed by the impact of meteoroids and solar and galactic charged particles breaking down surface rocks [3]. They thought that it causes some pulmonary changes if person inhales it. They focused on size and chemical component of particles. After study they reported that a regolith stimulant which means a ray which was fractioned 10-25 micrometer and particle size is 5-10 micrometer have little relation with the cellular effect of lunar regolith like cell membrane damage, mitochondrial dysfunction, pro-inflammatory effect, induction of oxidative stress.

**On endocrinology:** In some studies the authors discussed about the melatonin level. They said that serotonin level increase during exposure to light and decrease during dark cause it converted to melatonin [4]. They said melatonin level increased about 2 hours after bed time and decrease at morning. They inactivated into 6-hydroxyl melatonin and secreted through urine [4].

Melatonin has different effect on human behavior like vascular flow, reproductive system, on sleep [23]. In several experiments it is they shown melatonin had effect on renal or endocrine system [24] like change in the vascular flow in young women and men reduced renal blood flow and also effected cell apoptosis [25,26]. Some studies showed that there was no correlation with lunar cycle with renal colic but maximum frequency in lunar calendar in the middle of the month [27].

**On menstruation:** In these topics we can find speculation. Menstrual cycle of women with the average being about every 28 days, while the lunar cycle is quite set at 29.5 days. There is one study on 312 women that claims a connection between lunar cycle and menstruation. Further researchers found 40 percent of participants had the onset of menstruation within two weeks of the full moon which means 60 percent did not. Although next 3 plus decade nobody seems to produce a study that match with the author's claim [28].

**On behavioral change:** There was a myth about full moon that, full moon effects on human behavior. A study reported in journal General Hospital Psychiatry and it looked for correlations between phases of the moon and psychological problems such as panic attacks, anxiety or mood disorders and suicidal thoughts and by examine the previous records they found that there was no correlation between full moon and human pshycology. A paper published in the Journal of Emergency Medicine back in 1987 claimed to have found that 80 percent of randomly selected nurses and 64 percent of doctors in emergency rooms in an unnamed hospitals believed that lunar cycles

affect mental health. The belief is also common today. On a review in USA, 40 percent of general population and 80 percent of mental health professionals believed that phase of full moon effect the human behavior while 99 plus percent of the evidence says that the Moon has no effect on human behaviour [8]. During 1985 in the journal Psychological Bulletin, a scientist wrote that after analysis published and none published articles they observed that just 1 percent of the change in activities considered "lunacy", mental hospital admissions, psychiatric disturbances, crisis calls, homicides, and other criminal offenses, according to the researchers [7]. There were many studies showed different result about full moon and human behavior. During 2002-2004 year about 692 patients were admitted for self poisoning cases. Male and female ratio was 1:1.65. Maximum people took benzodiazepines and antidepressant as a substance. Their age was between 36 to 39 [6]. Finally their study could not find any link between paranormal suicide incidence and lunar cycle. In Anatomical forensic medicine in Madrid, another study was done on 897 suicidal cases and they analyzed the result by doing a premature test. In this study different testing method were used and their conclusion was that there was no relationship between suicide and lunar phase [7]. In 1993-2002 another study was conducted in the Naval Medical Centre. Their result showed that highest psychiatric patient admitted on particular phases of the moon. Recorded from 8473 patients there was secret information that there was no admission on full moon day, new moon day, any quarter of the moon, a waxing moon. Recorded from 1909 patient in 2002 and 2003 there was psychiatric evaluation that whether highest percentage patient were present but did not require hospitalization during a particular phase of moon. Their ultimate result was that there was no relation between lunar phase and psychiatric admission [29]. But in another study where they showed that there was possible relationship between seizure frequency and lunar cycle. A separate study showed that non epileptic seizure increases at full moon [30]. There was another lunar hypothesis was rested by time series analysis. The hypothesis was not supported. [31]. The Northern Sydney Area Health Service prospective data was collected. Lunar phases were clearly defined and Poisson's regression used to examine relationships between lunar phase and violence. Their result said that there was no relationship between lunar phase and aggressive behavior of people [32].

**Crisis call and the lunar cycle:** The study showed that there are not well foundation exist to believe that the lunar cycle is related to frequency of crisis call [31,33,34].

## Conclusion

At the end of their view article it is observed that in maximum cases there is no relationship between full moon and human health. In normal life people believe that during full moon body pain increases. But in medical science scientist could not find any kind correlation between body pain and the full moon. In future scope is there to undertake further studies about full moon scientifically so that we can unearth the facts on effect of full moon on different aspects of human health that may ultimately prove the belief on the conventional myths.

## Acknowledgement

Authors are thankful to their respective departments and colleges for constant encouragement and guidance during the course of studies.

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