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Magic or Logic Role of The Full Moon in Medical Physiopathology: From Fertility to Psychology

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Abstract

The moon has long held a significant place in human culture, symbolizing mystery and power, particularly during the full moon phase. Throughout history, civilizations across the globe have attributed various physiological and psychological effects to the lunar cycle, believing it to influence behavior, health, and even the supernatural. This review explores both the historical context of these beliefs and the current scientific understanding of the moon's impact on human physiopathology. We examine ancient and modern cultural perceptions, discuss the evolution of scientific inquiry, and assess the evidence regarding the moon's effects on behavior, sleep, reproductive health, and medical incidents. Despite widespread myths, modern research largely refutes the notion that the lunar cycle has any substantial physiological influence on human health. By exploring the intersection of culture, science, and cognitive bias, this review aims to provide a comprehensive overview of the topic and highlight areas for future investigation. Ultimately, we find that the moon's influence is more rooted in cultural magic than in scientific logic.

Keywords: Full Moon, Lunar cycle, Human behavior, Sleep patterns, Reproductive health

Introduction

The moon has captivated human imagination for millennia, holding a prominent place in the mythologies, religions, and daily lives of cultures across the globe (1). From the earliest civilizations, the moon was seen not just as a celestial body, but as a powerful entity with the ability to influence life on Earth (2). The cyclical nature of the moon, with its phases of waxing and waning, was often associated with the rhythms of life, such as birth, growth, decay, and renewal (3).

In ancient Egypt, the moon was worshipped as a deity, often linked with the god Thoth, who was associated with wisdom, writing, and time (4) (Figure 1A). The Egyptians believed that the moon's phases could affect human fate and behavior, reflecting a cosmic balance that governed life on Earth. Similarly, in Mesopotamian cultures, particularly among the Sumerians, the moon held a central place in their cosmology (5) (Figure 1B). The Sumerians, one of the earliest known civilizations, revered the moon god Nanna (also known as Sin in Akkadian culture), who was considered one of the most important deities in their pantheon (6). Nanna was believed to reside in the great ziggurat of Ur, a major Sumerian city, where he was worshipped as the god of the moon, wisdom, and fertility (6). The Sumerians observed the moon's cycles closely, integrating them into their agricultural practices, religious festivals, and even their understanding of time (7). They believed that Nanna's presence and influence were strongest during the full moon, a time that was often marked by rituals and offerings to seek his favor (8).

The influence of the moon extended far beyond the Middle East. In ancient Greece and Rome, the moon was personified as the goddess Selene or Luna, who was believed to drive her chariot across the night sky (9) (Figure 1C). These cultures linked the moon to various aspects of human life, from the menstrual cycle to the tides, and considered its full phase a time of heightened energy and potential (3). The full moon, in particular, was thought to have the power to affect human emotions and behavior, a belief that persists in various forms even today (10).

Folklore and myths surrounding the full moon are widespread (14). In many cultures, the full moon was believed to bring about madness, giving rise to the term "lunacy," derived from Luna (15). Stories of werewolves and other creatures that transformed under the light of the full moon are deeply embedded in European folklore, reflecting fears of the unknown and the uncontrollable forces of nature (16). In Hinduism, the full moon day, known as Purnima, is considered auspicious, often associated with fasting and religious observances meant to cleanse the body and mind (17).

Religious beliefs also imbued the moon with sacred significance. In Islam, the lunar calendar dictates the timing of important rituals, such as Ramadan and Hajj (18).

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The sighting of the new moon is crucial in determining the beginning of these religious observances (19). Similarly, in Judaism, the moon plays a central role in the Hebrew calendar, with many holidays and rituals timed according to lunar phases (20).

In modern times, while science has demystified much of the moon's influence, cultural and religious practices continue to reflect humanity's deep connection to this celestial body (21).

The belief that the full moon can influence human behavior, health, and well-being persists, often fueled by anecdotal evidence and media representation (22). This enduring fascination with the moon, particularly the full moon, underscores its powerful place in human culture, straddling the line between magic and logic.

The purpose of this review is to critically examine the long-standing beliefs surrounding the full moon and its alleged influence on human health and behavior. By synthesizing historical accounts, cultural traditions, and contemporary scientific literature, this article aims to determine whether there is credible evidence to support the notion that the full moon exerts a significant impact on human physiopathology or if these beliefs are more likely rooted in myth and superstition. The review will explore the intersection of cultural history and modern science, seeking to clarify whether the moon's perceived effects on human physiology and psychology are based on observable phenomena or are simply the product of centuries-old folklore.

Figure 1. Moon in ancient civilizations beliefs. A) Thoth, the moon god in Ancient Egyptian mythology, was often depicted as a man with the head of an ibis in one of his forms (11); B) The Sumerian cylinder seal of King Ur-Nammu depicts the figure of the moon god Nanna, from the Mesopotamian era (12). C) Bust of Selene, the goddess of the moon in Roman mythology, depicted within a clipeus, a detail from a strigillated lenos sarcophagus (13).

Figure 2. Figure 2. A) Madness, giving rise to the term "lunacy." B) Werewolves and other creatures that transformed under the light of the full moon. Both images generated by AI.

1. Historical perspective

1.1 Ancient beliefs and cultural significance

The moon has been a central figure in the mythology and cultural practices of various civilizations throughout history, often believed to hold a profound influence over human health and behavior (2). These beliefs have been shaped by observations of the moon's cycles and their apparent correlation with natural and human events (23).

In Greco-Roman culture, the moon was personified as the goddess Selene (Luna in Roman mythology), who was thought to traverse the night sky in her chariot, illuminating the darkness (24). The Greeks and Romans believed that the moon had the power to influence a range of human experiences, from mental health to fertility (25).

The term "lunacy" originated from the belief that the full moon could induce madness, a concept that persisted for centuries and influenced medical thinking well into the Middle Ages (25). The moon was also associated with the menstrual cycle, which roughly coincides with the lunar month, leading to the belief that lunar phases could affect women's reproductive health (26).

In ancient India, the moon, known as Chandra, was regarded as a god who governed the mind and emotions (27) (Figure 3A). The full moon, or Purnima, was considered a time of heightened spiritual energy, and many religious observances and rituals were conducted on this day (28). The connection between the moon and the mind was emphasized in Ayurvedic medicine, where it was believed that the moon's phases could influence mental health and emotional well-being (27). The full moon was seen as a time of balance and renewal, offering opportunities for healing and spiritual growth.

In Chinese culture, the moon was deeply intertwined with concepts of harmony and balance, particularly through the yin-yang philosophy (29). The moon, representing yin, was associated with femininity, passivity, and the night (30). The Chinese believed that the full moon was a time of increased energy and potential, often celebrating it with festivals such as the Mid-Autumn Festival, which honors the moon's role in promoting unity and fertility. Traditional Chinese medicine also incorporated the moon's cycles, with certain treatments and practices timed according to the lunar calendar to optimize health outcomes (31).

Indigenous cultures across the world have also attributed significant power to the moon (32). For instance, Native American tribes often used the moon to track time and guide their agricultural practices (33). The full moon was thought to have the ability to influence weather patterns, animal behavior, and human health (34). Some tribes believed that the full moon could cause heightened emotional states or exacerbate certain illnesses, leading to the practice of performing specific rituals or seeking the guidance of shamans during this lunar phase (35).

In addition to these specific cultural beliefs, the idea that the moon influences childbirth has been widespread across many societies. The full moon has long been associated with an increase in births, likely due to the belief that the gravitational pull of the moon could somehow affect the onset of labor (36). Although scientific evidence for this claim remains inconclusive, it has persisted as a popular belief in both folklore and modern culture.

Overall, these ancient beliefs illustrate the deep connection between the moon and human life, with the full moon in particular being seen as a powerful force capable of influencing a wide range of physiological and psychological processes. These cultural perspectives laid the groundwork for many of the myths and superstitions that continue to surround the moon today, and they provide important context for understanding the ongoing fascination with the moon's potential impact on human health.

1.2. Evolution of scientific Iinquiry

The fascination with the moon's potential effects on human health and behavior, deeply rooted in ancient beliefs and folklore, gradually evolved into a subject of scientific curiosity (34). Over the centuries, as natural philosophy gave way to more empirical scientific methods, researchers began to question and investigate the validity of claims surrounding the moon's influence on human physiopathology (37).

1.3. Early observations and studies

The earliest scientific inquiries into the moon's effects were often influenced by prevailing cultural beliefs. During the Renaissance and early modern periods, scholars and physicians began to explore the possible connections between lunar phases and human health, particularly focusing on phenomena like madness, epilepsy, and childbirth, which were historically linked to the full moon (37).

One of the earliest known studies on this topic was conducted by the physician Paracelsus in the 16th century (38). Paracelsus, known for his work in toxicology and medicine, believed that the moon exerted a profound influence on the human body, particularly on fluids like blood and bile. He hypothesized that the moon could affect the balance of these humors, potentially leading to physical and mental illnesses during certain lunar phases. This idea was consistent with the broader medical beliefs of the time, which often attributed health and disease to the balance of bodily humors influenced by celestial bodies.

As the scientific revolution advanced, the 17th and 18th centuries saw more systematic attempts to study the moon's impact on human behavior. However, these early studies were often limited by the lack of rigorous methodologies and were heavily influenced by anecdotal evidence. For example, Richard Mead, an English physician, speculated that the moon's gravitational pull might influence brain fluid dynamics, contributing to conditions like epilepsy or madness during the full moon (39). Although Mead's ideas were speculative and not based on empirical evidence, they reflected the growing interest in understanding natural phenomena through the lens of science rather than mythology.

1.4. 19th and 20th century studies

By the 19th century, the development of statistical methods enabled more structured investigations into the moon's effects (40). Researchers began to collect and analyze data to test the hypothesis that the full moon was linked to an increase in certain behaviors or health events, such as criminal activity, psychiatric admissions.

2. Physiopathological impacts

2.1. Behavioral changes

Several studies have explored the relationship between the full moon and human behavior (Table 1), seeking to verify long-standing beliefs about increased aggression, anxiety, or other mood disturbances during this lunar phase (41). While anecdotal evidence has long supported these associations, the scientific literature presents mixed results.

Some studies suggest that the full moon may have a modest influence on human mood and behavior. For instance, a few investigations report increased reports of agitation or aggression during full moon phases, particularly in patients with psychiatric conditions or in

institutional settings such as hospitals and prisons (42). However, these findings are often inconsistent, and other studies fail to observe any significant behavioral shifts during the full moon. Some researchers speculate that confirmation bias may play a role in perpetuating the myth, as people tend to remember unusual behavior during a full moon and disregard it at other times (43).

A meta-analysis of several studies on lunar cycles and psychiatric conditions concluded that while some studies suggest a slight increase in aggressive or violent behaviors during full moon periods, the overall effect is weak and often not statistically significant (44). The results indicate that there may be minor behavioral fluctuations, but no conclusive evidence supports the notion of widespread changes in human behavior based solely on the lunar phase.

Table 1. Summary of Studies on the Full Moon's Impact on Human Behavior

Study Author(s)	Year	Study Design	Outcome Measures	Key Findings	Reference
Rotton & Kelly	1985	Meta-analysis	Various behaviors	No significant correlation between lunar phases and human behavior	(44)
Casiraghi et al.	2021	Observational	Sleep patterns	Observed synchronization of sleep with lunar cycle; less deep sleep during full moon	(45)
Gupta et al.	2019	Observational	Psychiatric admissions, discharges, and length of stay	No significant association with lunar phases	(46)
Haba-Rubio et al.	2015	Observational	Sleep quality	No significant effect of lunar phases on sleep quality	(47)
Chaput et al.	2016	Observational	Sleep and activity behaviors	No significant association with lunar phases	(48)

2.2. Sleep and circadian rhythms

The influence of lunar cycles on sleep quality and circadian rhythms has gained increasing attention in recent years, with several studies investigating whether moonlight or gravitational forces affect sleep patterns (45). One study found that participants slept an average of 20 minutes less during the full moon compared to other lunar phases, and their sleep quality was reportedly poorer (37). They reported that deep sleep (slow-wave sleep) duration decreased during full moon nights, suggesting that the lunar cycle might affect sleep depth (37).

A common hypothesis is that increased moonlight during the full moon phase could disrupt melatonin production, a hormone responsible for regulating sleep (49). Melatonin levels are typically higher in darkness, and the brightness of the full moon may inhibit its secretion (45). However, more recent studies using controlled environments, where participants were isolated from external light sources, have cast doubt on this theory (50). These findings suggest that the moon's effects on sleep are not as straightforward as previously thought and may involve other factors, such as individual susceptibility or cultural expectations surrounding the full moon.

Despite the inconsistencies in the data, the idea that the moon can impact sleep remains popular, especially in folklore and traditional medicine. Further research using more rigorous methodologies is needed to clarify the true relationship between the lunar cycle and sleep.

2.3. Reproductive health

The connection between the lunar cycle and reproductive health, particularly menstruation, fertility, and birth rates, has been a subject of scientific inquiry for decades (51). The belief that the lunar cycle, particularly the full moon, influences menstruation is widespread across many cultures, likely due to the close alignment of the lunar month (approximately 29.5 days) with the average menstrual cycle length (52). However, studies on this topic have produced conflicting results.

While some studies have reported a weak correlation between the full moon and menstruation, these findings are often difficult to replicate (53). A large-scale analysis of menstrual cycle data found no consistent pattern between menstrual onset and the lunar cycle, suggesting that any perceived connection may be coincidental or influenced by cultural factors rather than biology (53).

Similarly, the idea that fertility or birth rates are higher during the full moon has not been strongly supported by scientific evidence (54). Early studies indicated a possible increase in births during the full moon, but more recent analyses with larger datasets and more sophisticated methodologies have found no statistically significant correlations between the lunar phase and birth rates (55).

Despite the lack of robust scientific support, the belief in lunar influence on reproduction persists, particularly in holistic and alternative medical practices. While the moon's gravitational effects are known to influence tides and other natural cycles, their impact on human reproductive physiology remains largely speculative.

Conclusion

The evidence gathered throughout this review presents a clear distinction between historical beliefs and modern scientific understanding regarding the moon's impact on human health. Historically, cultures around the world have attributed significant mystical and physiological power to the moon, particularly the full moon, linking it to phenomena such as madness, fertility, and even natural disasters. These beliefs, deeply rooted in folklore, religion, and early attempts to understand nature, have shaped humanity's relationship with the moon for

millennia. Modern scientific inquiry, however, has largely debunked these myths. Studies on sleep patterns, psychiatric conditions, reproductive health, and medical incidents during full moons have consistently shown weak or nonexistent correlations with lunar phases. While a few studies suggest subtle effects on sleep or behavior, these are often attributed to external factors such as light exposure or cognitive biases like confirmation bias. Overall, the weight of scientific evidence leans heavily toward the conclusion that the moon's influence on human physiopathology is minimal, if present at all.

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