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External Factors that Direct the Biological Clock and Role in Treatment of Disease

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Abstract

Background: The purpose of this study was to identify the most suitable time periods for the treatment of diseases by considering human biological clocks and consider treatment recommendations in terms of such factors and how they influence human health and treatment. Specifically, we address how planetary rays impact specific time zones.

Methods: Reference sources come from the classical period in Islamic history where studies were done in the fields of medicine and astronomy. During a certain portion of the classical period, Islamic medical scientists were also at the same time interested in astronomy. Thus, they evaluated both astronomy and medical data in the course of treatment. This study has no connection with astrology.

Results: During the classical period of Islamic history, medical studies put forth that people are affected by environmental factors arising from the moon and the sun. Additionally, humans are at the same time affected by planetary movement in the solar system. To obtain an understanding of how such environmental factors influence our health, it is important to determine the operational mode and timing of hormones in relation to our biological clock, which manages bodily functions and timing of such functions in humans. Thus, the relationship between the moon, sun, and humans must be understood correctly. This study utilized modern studies of medicine and astronomy with data from classical astronomy and medicine to better understand such relationships. This approach is distinct and unrelated to astrology.

Conclusion: The thesis in our study offers theoretical information for future research. We believe that the data here will be a key resource for subsequent experiment-based studies.

Keywords Biological clock; Time zone; Moon; Solar; Planets; Colors

Introduction

There is a regular and orderly mode of work in the bodily functions of an overwhelming majority of living things, especially humans. This is linked to the presence of a phenomenon that encompasses the whole body, which manages and directs with all its details the body and organs. This natural control and timekeeping system takes place thru a biological clock. Thru a biological clock, the functions of cells are regulated, all bodily processes take place, and phenomena like birth, growth, and development occur in living beings. All phenomena and developments, such as the changes and development of plants, the life process of animals, sleep, and migration of some are directed, formed, and realized with a biological clock that acts in relation to various structures in organisms.

The biological clock found in organisms is a biological rhythm that reflects the oscillations of night and day. This forms the psychological and physical, and provides both stable regulation and oscillations that occur in living beings. It also shapes the way the body functions. A failure of this biological clock amidst this cycle within the operational shape of this rhythm is accepted as a basic factor of many diseases [1]. From this perspective, an improved understanding of the mechanisms behind the biological clock and an ability to determine accurate timing will shed light on the diagnosis and treatment of diseases.

According to a study by Reinberg [2], there are times when the organs of the body are active or vulnerable. There are also times and indicators that are more suitable for the diagnosis of diseases. Reinberg's study also suggests that there are time zone or zones that are most suitable for the realization of applications for the treatment of diseases and for the acquisition of an efficient result. Based on this premise there are time zones that need to be avoided when providing treatment.

According to some research, there are time zones such as for eating and drinking, sleeping, work, and for taking medication that are most suitable for healthier physical and mental development [3]. These various zones demonstrate that the body has a biological clock.

According to a study by Hirasawa [4], there is a relationship between the systems of the body, just like there is a direct

connection between the organs of the body. Indeed, there is a direct link between the digestive, circulatory, respiratory, excretory, and reproductive systems. As with every living thing, there is a circadian rhythm that forms the rhythm of positive and negative processes and the life course in the daily lives of people, and is called the biological clock.

A study that by Liu [5] suggested that both the biological clock and cognitive functions are influenced by numerous environmental factors. For example, factors such as age, gender, ethnicity, time of birth, sleeping habits, personality traits, intelligence, and measurement scales for capturing characteristics can influence time data and in different proportions the circadian rhythm and cognitive functions.

External Directing Factors in the Formation of Biological Clock

Dogutepe summarized research on internal and external factors in the formation of a biological clock, and found that external factors have a greater influence. Meanwhile, the “main clock” that executes the functions of the biological clock in the human body is a structure called the suprachiasmatic nucleus (SCN), which is found in the hypothalamus. The SCN comprises approximately 20,000 neurons and regulates the internal biological clock based on the cycle of night-day in the external environment [6].

For example, according to Liu’s research, the seasons are an external factor and have an effect on the physiological and mental dimensions of humans. This context contributes a significantly greater impression on those with health problems, just as it can affect healthy individuals [5]. For example, acute respiratory tract diseases show seasonal characteristics. Thus, such timing is important in terms of strategies for the diagnosis and control of disease.

Meesters hence found relationships between physical activity models or physical activity with health, and that it is necessary to consider seasonality. Seasonality is an important factor in the increase or decrease of physical activity. The interaction between seasons and human health is a manifestation of the solar cycle [7]. Accordingly, the seasonal environment was influential in birth rate and sperm count, pneumonia, bronchitis, and influenza outbreaks. In fact, the changing of the air temperature in some places and situations may even at times result in fatalities. Brown [8] expressed this as “human and animal physiology is subject to seasonal, moon, and circadian rhythms”.

The Effect of the Moon and Planets on the Biological Clock

One set of researchers are interested in influences over the Earth, living beings, and humans due to the seasonal effect of the solar cycle along with the movements and the lunar cycle. Meanwhile, others are of the opinion that the moon does not have an effect. Others take a middle ground, and suggest various possibilities [9,10].

Animal studies conducted with regard to the influence of the moon showed that the lunar cycle may affect hormonal changes at the beginning of phylogeny. In birds and cows, for example, daily changes in melatonin and corticosterone are lost during the days of the full moon. It has been suggested that the secretion of neurohormones may be triggered by electromagnetic radiation and/or the gravitational force of the moon [11-13].

Observations of natural light levels indicate that they can suppress melatonin secretion in the *Sula granti* birds of the Galapagos Islands [14,15]. The research found that synoptic ribbons (a type of synaptic body) and levels of serum melatonin were higher in the winter and on days of the full moon. In line with this, data collected related to how the moon affects behavior and the physiology of living beings demonstrates that knowing the rhythms of the lunar cycle can be beneficial in hospital applications and in animal laboratory research.

In a study by Loughlin, Atlantic salmon begin migrating each year based on the lunar cycle. Another study by Besson et al. found that coral reef fish in five places that surround distinct islands of French Polynesia had larval settlement patterns that were generally correlated with the lunar cycle and that an abundance of the larvae was at its peak at the new moon. Raible conducted a study looking at the adaptation of animals to their biological rhythms in monthly (circalunar) or semi-monthly (circasemilunar) intervals. Systematic experimental research at the start of the twentieth century allowed scientists to distinguish between mythological beliefs and scientific truths regarding the effect of the lunar cycle on animals. Raible’s study showed that in many organisms, the transcript levels of circadian clock genes are affected by both light and endogenous lunar cycle oscillations. Similarly, the rhythms of the moon cycle affect the sleep and mental health of humans in pregnancy and even birth rates [16-18].

On the subject of a complete acquisition of data, even if analysis and comparison of the rhythm and clock of the lunar cycle does not achieve definitive clarity due to the heterogeneity of the samples with regard to the diversity of the species and environmental and chronobiological conditions, research on the interaction of circadian and lunar-cycle clocks is an interesting perspective on the coordination between different timing mechanisms.

According to Tokgoz, Ahmad and Saey who conducted the aforementioned research, physiological processes and behaviors generally appear at specific times. Many organisms are linked in a manner similar to human societies, which follow this clock. Calendars typically follow, with not only the regular cycles with which solar changes (daily and seasonal timing) occur in behaviors and physiologies, but also at the same time with timing for the moon [19-21].

According to similar studies [22,23], general biologic rhythms linked to the lunar cycle can be classified based on circular lunar rhythms related to period characteristics that reflect the emergence of specific events/situations once or twice at the start of the month, respectively. It should not be forgotten that these events/situations can be matched with any lunar phase.

For example being synchronized with the full or new moon. Lunar cycle rhythms are also linked with the lunar phase of reproductive cycles. Researchers have concluded that corals also have a circular lunar clock.

A study by Reinberg looking at the relationship between biological rhythm and the moon, assumed that biological rhythms are an advantageous genetic adaptation and has a life value that results from the evolution of life forms in a changing environment thru the predictable cycles of 24-hour, month, and year. Of these periods, the 24-hour cycle of light/dark is the principle synchronizer. Circadian, monthly, and circannual rhythms (yearly cycle) are also the basic focus of considerable research. Indeed, the finding from Reinberg suggests that the reproduction over the same biological cycle observed in some plants and water-borne animals can be maintained between various species, including *Homo sapiens* [24].

Some researches finding regarding seasonal change and phenomena and the lunar cycle reveal a relationship and effects in relation to the moon and the living creatures on Earth. As a matter of fact, the lunar cycle is one of the basic factors of variable human psychology, according to the results of the study by Chakraborty [25].

Unfortunately, many of the studies looking at how monthly rhythms are triggered or synchronized by the lunar cycle or light of the full moon at night are prejudiced in their understanding because of beliefs regarding mythology and/or naturalistic concepts.

Meanwhile, studies looking at physiological and psychological changes and the effect of the moon have been correlated with a subjective decrease in the quality of sleep and a decrease in the levels of endogenous melatonin. Separate studies by Della and Altanay found reliable evidence that the rhythm of the moon can modulate sleeping patterns in humans, even when measured under highly-controlled conditions in a circadian laboratory study, without time clues [26,27].

Some researchers reviewed data for 34, 318 crimes committed on the days that the moon became a full moon and during the phases of the full moon. There were nine categories of crimes over a wide metropolitan area throughout a year. Eight of the categories, rape, robbery and assault, theft, automobile theft, crimes against families and children, intoxication, and irregular behavior, occurred more frequently during the phase of the full moon than during the rest of the year. The researches finding led to the conclusion that more research is necessary regarding cosmic effects on human behavior [28,29].

Bunevicius and Karla looked at the effect of the lunar cycle on human health, and there is growing evidence that there is a common belief in the medical community that the phases of the moon may predict the risk of the development of acute neurological and vascular disorders [30,31]. This is important in terms of the early diagnosis of diseases.

The relationship between the moon and living beings was a focus of interest for classical period Islamic physicians like Ibn Sina, Biruni, and Muhammad, they considered such a connection in their treatments [32]. For example, Akshamsaddin

recommended to patients that they take medicines each morning on an empty stomach during the fifteen days before the day of each new moon, which is the first half of the month.

At the same time, Al-Biruni and Al-Kindi said that surgery must be performed based on the lunar cycle [33,34]. According to Erzurumlu (d. 1194/1780), the brain tissues of living creatures increases in the first half of the month and decreases in the second half. According to him, insects emerge and disperse in the first half of the month. Predatory animals are also very ambitious in pursuing prey during this time. The opposite is true in the second half of the month. Again according to Erzurumlu, trees planted in the first half of the month grow and develop more quickly. Trees planted in the second half of the month are weak or dry. All fruits, flowers, and herbs grow and develop and become colorful in the first half of the month [35]. We encounter similar statements with Ibn Sina.

According to researchers like Kwon and Song, the biological clock contains 24-hour night and day intervals. Similar results were proposed in the classical period. For example, physician Nasrullah said that studies for treatment conducted in the final third of the night is the most suitable time to obtain efficient results, and engaged in this approach in line with the biological clock data indicating that this is the most suitable time for bodily hormone functioning [36]. Again according to Nasrullah, daily treatment in line with the lunar cycle must be in the early morning hours, in the midst of morning, which is the time zone that lasts from dawn until the sun rises. He again stated that more effective results can be obtained from food and medicine that are taken during the time between dawn and the rising of the sun [37].

Some classical period Islamic scholars created tables based on the data of daily rhythms for health practices. These are similar tables to those that classical period scholars like Erzurumlu prepared, which are now being subjected to contemporary scientific research [38].

In classical period medical studies, like Ibn Sina, Akshamsaddin, Erzurumlu and Muhammad [32], time zones were related to the locations and movements of the sun, the Earth, the moon, the planets, and the rays that they emit and the effects of these factors over living creatures. Along with applying a 24-hour time zone, there were descriptions like *imsak*, dawn, mid-morning, noon, midday, mid-afternoon, evening, *isha*, and midnight rather than the contemporary 60-minute time zones we now typically use to define daily life.

Similarly, nearly all the data in the study *The Body Clock Guide to Better Health: How to Use your Body's Natural Clock to Fight Illness and Achieve Maximum Health* (2001, Holt Paperbacks) by Smolensky and Lamberg is also available in classical period works. Although there are differences of expression and phrasing in the data directed towards the utilization of daily rhythms in modern and classical studies, the time zone data remains in the foreground.

Similar investigations were pursued in studies entitled, "Clock stars: Astrocytes keep time for brain, behavior" and "Scientists map the wiring of the biological clock" by Washington University-based Diana Lutz. The daily manifestation of the

circadian rhythm formed from data belonging to the classical period is also reflected in some modern academic studies [39].

Just like the effects of the sun and the moon act as environmental factors all over the world and its inhabitants, such influences are mentioned in regards to some planets in studies conducted in the classical period. During the rotation of the Earth around the axis of the sun, an orbital connection is also formed with other planets. Early scholars established a daily connection related to planets in the monthly and weekly Earth cycle. They later separated such data into 24-hour planetary intervals, 12 days and 12 nights. In modern research, such cycles have been given contemporary terms, such as "daily shift of the body". In line with classical period medical data, it is believed that along with the effect of the moon and sun on the physiological and psychological structure of living creatures and humans, the planets also have an effect [40].

The various bodies in the solar system are named as the sun, the moon, Merih (Mars), Utarit (Mercury), Musteri (Jupiter), Zuhre (Venus), and Zuhal (Saturn). Early scholars accounted for planets separately for day and night for the days of the week [41].

In such a paradigm, there are time zones adapted to seven entities, the five planets, the sun and moon, in the 12-hour time zone for each day, together with the change from night to day. The entities fall into agreement with the divided time changes based on day and hour, in the context of night and day, in 12-hour world time zones.

According to classical period Islamic physicians, humans are exposed to positive or negative contributions from the planets based on which time zone they are in. Classical period Islamic scholars who accept this directional influence emphasized that week, day, and hour can result in a positive contribution for people, especially in terms of health.

The sun, Jupiter, and Mercury were identified as an entity and planets that have a more positive contribution in the solar system. Based on these data, it is accepted that the predicted day, and the Earth in the orbit of Jupiter is more prominent on Thursday in terms of being able to obtain positive results, especially in terms of health.

The Effect of the Rays and Colors of External Factors on the Biological Clock

According to recent studies like Warter, Kanmaz and Break, light and color are among the various important factors that play a role in the rhythm of human physiology. For example, light is used in modern medicine in the treatment of many diseases [42-44]. According to a study by Tuzun and Cesare different color fluorescences can be obtained when examining various diseases with a Wood light (black light), which is a fluorescent lamp that emits a purple light. The best-known of these is the yellow-green fluorescence observed in *Pityriasis versicolor* disease. Red fluorescence has also been observed in the treatment of acne. The granules that emit yellow sulfur colored fluorescence are detected in deep mycoses. Studies conducted with bacterial rhodopsin that demonstrate the properties of emitting

fluorescence in various colors provides research clues about the reasons for the changes of the colors blue and purple [45].

Indeed, Nobel Prize winner Aziz Sancar revealed that the photolyase enzyme repairs the damage that ultraviolet rays from sunlight cause in the DNA of the thymine dimer [46]. According to classical period Islamic physicians, rays and color have positive and negative effects on humans. In particular, each planet has its own unique light/ray and color. These rays reach the Earth and impact living creatures. The color rhythm of each planet in the solar system has a positive or negative influence. For example, Erzurumlu thinks that this effect varies according to region, in line with the shape of the reflection in a particular latitude and longitude of the Earth. Erzurumlu created positive and negative tables that specified the health of those living in various regions and the diseases that they were exposed to [46].

Studies relating to the unique colors and rays of planets and to the color and ray fluctuations they reflect on the world have a history, but can also be considered as a new research area. For example, NASA found that there is a purple light, which is created by nitric oxide, and on Mars it produces its own light [47-50].

NASA has discovered that there are passages (portals) in Earth's magnetic field. These are at places where the magnetic field of Earth unites with that of the Sun and can extend for 150 million kilometers from our planet to the atmosphere of the Sun. The passage comes together in a manner that creates an uninterrupted road. Moreover, energy particles transfer thru the magnetic field over X-points from the Sun to the Earth [51].

Moreover, the harmonic and bioharmonic resonances of planets can withstand the near-resonance between, for example, rotation harmony and sidereal period harmony. Based on this, planets have both color waves and sound waves. The different harmonic parameters of a planet have different effects [52].

According to classical period Islamic scholars like Suleiman (date unknown), there is a color belonging to each planet. The colors of the light of Saturn are accepted as black, Jupiter as green, Mars as red, the Sun as yellow, Venus as blue, Mercury as varying in color, but usually close to purple, and the moon as white.

Discussion

Data from modern researchers related to the biological clock and theories proposed by classical period Islamic medical scholars appear to have similar results. The data of the classical period Islamic medical scholars that we used in our study have no connection with astrology. As a matter of fact, Ibn Sina, Kindi, Biruni, and Erzurumlu İbrahim Hakkı do not accept astrology. The conclusions they reached were shaped in the line with their observations of medical and astronomical data [32].

Our belief is that a definitive evaluation cannot be done because modern research has not yet reached an adequate level. Classical period studies were mostly based on observation. In this respect, the demonstration and adaptation of classical period data might be possible with the progression of modern-

day studies. As new data is found, the views of classical period Islamic scholars have the potential to be accepted.

In classical period Islamic medical studies, Like Ibn Sina, Akshamseddin, Erzurumlu and Muhammad [32], it is accepted that a specific time interval of the day forms with the effect of the moon and planets on the Earth. Moreover, there are times that are more or less suitable in the functioning of the physiological structure of humans. This is called the natural rhythm of the biological clock when discussed in terms of modern medical data.

Classical period Islamic physicians emphasized with care the issue of carrying out treatments in the final third of night to acquire positive data in terms of health. With reference to these data, we believe that the time of connection of Jupiter and Mercury between the planets and their associated rays on the Earth - the hour of Mercury - corresponds with the final third of a Thursday night and appropriately falls on the 10th hour of the 12-hour zone. This is the most efficient time zone, or time for treatment, in studies of treatment. However, to carry out this treatment, it should also be in the first section (first fifteen days) that includes the phase that lasts from the start of the appearance of the moon until the full moon.

As for the circadian clock of daytime, our conclusion is that the time of Jupiter, which corresponds with the 8th hour of the daytime of the day of Jupiter, is the most suitable time period for treatment. Investigation of this most opportune time may yield the most results.

A summary description of the results so far: Daytime begins with the rising of the sun and ends with its setting. Night begins with the setting of the sun and ends with its rising. The time in this rise-set, set-rise process is divided into 12-hour intervals. The separation into 12 of the time intervals during the day and at night are calculated by considering the changes in the period of day and night in summer and in winter. In this respect, the 8th interval of the summer hour and the 8th interval of the winter hour are not the same duration.

For example, when the sun rises at 06:00 and sets at 20:30, the total duration of nighttime is 570 minutes. When divided into 12, each time interval is 47.5 minutes.

On the other hand, at the point of where the relationship with the planets in question is considered during the rotation of the Earth, treatment practices may also be implemented by considering factors such as the color of that planet. This may propound a difference based on continent and region in accordance with the cycle of the Earth. As a result of the intersection of the orbit of the Earth and a certain planet, the color of the light and wave length to be implemented in treatment for the people of a continent or region may differ from that of another continent and region.

We believe that the associated light belonging to a particular planet and their rays reflecting on the atmosphere have a significant, positive effect in treatment by means of activating frequency vibrations. In line with the physical structures of some humans, classical period medical scholars have recommendations in terms of needing to live in certain places.

Based on this, the correct light needs to be used in the correct place. According to the study carried out by Popp and Mei, the human body comprises certain frequencies. Diseases, however, originate from the degeneration of such frequencies. A healthy body is formed with the appropriate use of these frequencies [53,54]. The realization of such influences materializes in a specified time zone and in terms of conditions for the treatment.

We are of the opinion that treatment should consider and is best done by considering the emitting time and planet colors that reach the Earth. Variables according to the hour based on country must also be taken into consideration while doing this. In this respect, we think that the color of rays/light that will be implemented in the treatment of diseases needs to be based on the region in question.

For example, Erzurumlu has linked the connections between planets, colors and the earth's regions in the direction of latitude and longitude. Erzurumlu has made a detailed classification regarding the world regions and countries. However, the following data represents a general classification. Namely [55]:

- North and West European region: Night, Jupiter and Mars; Green and Red
- Italy and France region: Sun; Yellow
- Spain region: Jupiter; Green
- Aegean and Mediterranean coastal regions: Venus and Mercury; Blue and variable color
- South and East Asia region: Day, Venus and Saturn; Blue-black
- Hind and Sind region: Saturn: Black
- Arabian Peninsula and Middle East region: Jupiter, Mars, and Mercury: Green, Red and Variable color
- Caucasus and Turkistan region: Saturn, Jupiter, and Mercury; Black, Green, and variable color
- Mongolia region: Saturn; Black
- The northern region of Africa: Day, Mars and Venus; Red and Blue
- Far West countries region: Mars; Red
- Central African region: Saturn; Black

Accordingly, the color of the ray/light, to be applied for the treatment of diseases, should be shaped based on the regions and concerning the color direction of the planet reaching that region. Such statements made by Erzurumlu and others are given by the known lands of the world of their time. Moreover, they have discussed the main colors. Thus, purple color, for example, is not included in their literature but considered as a main color.

There are studies into the disease patterns of people who live in specific regions. Such research demonstrates that even if factors like human behavior, travel, climate change, and globalization are brought forward in terms of the existence or prevalence of a disease in a local area [56], the fact that this direction of diseases existed before considering such factors, suggests that these justifications are inadequate. Again, in evaluations conducted in a manner in which diseases do not show variables despite there being variables in economic status

themselves, demonstrates that the same diseases are present at different segments of income. This shows that there are other factors apart from the justifications that are put forward.

Conclusion

Paraphrasing an expression by Ibn Sina [32], a doctor does not simply obtain results based on findings within the body of the patient, but also pursues good detection of the nature that is a factor in the disease. Taking a similar approach, from our review of medical studies from the classical period in Islamic history and modern medical studies, it became evident that a suitable time zone and the biological clock that constitutes this time zone are important in the treatment of diseases. In this study, the planets were adjusted based on the position of each region relative to night and day. Moreover, it is evident that with whichever planetary cycle that a region enters, disease treatment can be done with the appropriate color of that light based on the determined biological clock.

Based on our study, there is a connection between light and the frequency of planets that is found on the Earth along with effects from the moon and sun. The direct effect on the regions of the world is the point in question. The shape of this effect materializes with the type of ray and color frequency. As a matter of fact, the latest research indicates that blackholes are radio echoes and that they release jets of energy into the universe. Based on this, it is likely that the light emitted into the universe affects the Earth. For example, charged particles in space affect the magnetic field of Earth. Similarly, a mass in space that emits light and energy into the universe toward Earth will certainly play a role in Earth processes.

This is the point in question for the solar system. However, there is a need for more scientific research to provide sufficient data and testable metrics. In our view, the planets are different in that they may affect the Earth differently and the areas and times of the effects from each planet may impact cycles of the Earth in unique ways. Time zones of a region are different based on a similar line of reasoning. The time zones that we specified were arranged based on the cycles of night and day and on the position of each region. We are of the belief that whichever planetary cycle on whichever day and hour that a region enters, a treatment can be administered that is in line with the color frequency of that light wave emitted from the planet on the prominent biological clock. This will improve treatment efficacy.

The thesis in our study offers theoretical information for future research. We believe that the data here will be a key resource for subsequent experiment-based studies.

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