

REVIEW ARTICLE

Biological Clock! Separate Day and Night

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ABSTRACT

Many diseases occur at certain times and after a specific process. Their treatment also needs to be done at a certain time. This is because external factors are among the causes of many diseases. Some seasonal times and environments make up diseases. In parallel with the type of illness, their treatment also requires a specific process and period. Treatments not made at the right time and in the right place do not yield results. Many factors affect human health, from his/her environment to the outside atmosphere, such as planets, sun, moon, and day and night. There are two hours of the day, day, and night, which we call biological hours for the treatment of diseases.

INTRODUCTION

It is known that there are a biological clock and circadian rhythm in line with the structure and environmental relationship of the human body. The biological clock is connected to all dimensions of human life. In this respect, the process of staying healthy and knowing the biological clock in the treatment of diseases and the treatment during these hours are the most significant factors in reaching a lasting result¹.

There are individual and orderly functioning in the physical and psychological functions of generally living beings, particularly humans. This is a phenomenon that surrounds the whole body and manages it with all its details. The biological clock happens in this natural control and timer

system. All phenomena and developments, such as the change and development of plants and the life cycle of animals, are directed, shaped, and happened by the biological clock, which is linked to its natural structure. Thanks to the biological clock, which is very important for the human body, the whole system works, working of the cells is regulated; activities such as body temperature, hunger, sleep always work according to this order. The proper functioning of the biological clock is essential for all organs of the body to function correctly and be healthy².

The findings of the studies on the effect size of age, gender, ethnic, genetic, and other factors in shaping the biological rhythm³ showed that each of these factors could not have a direct effect just to shape the outcome itself or to connect a specific reason. For example, when the cognitive process is discussed, research findings examining the relationship between the biological clock and cognitive processes are contradictory. These contradictory findings arise from the nature of the subject. Indeed, Liu's research showed this⁴. According to him, both biological clock and cognitive processes are affected by many factors, genetically and environmentally. Various factors may affect circadian rhythm and cognitive processes simultaneously and at different rates. Therefore, according to the research conducted by Crnko et al., it seemed very difficult to keep all of these factors under control⁵. This makes it difficult to determine the biological clock.

The effectiveness of internal and external factors in shaping the biological clock, external factors are more active here. According to researchers such as Paganelli et al., Liu and Chang, the internal clock was more driven by the influence and contribution of external phenomena^{6,7}.

External Factors and Biological Clock

According to Liu and Chang, study seasons, which are an external factor, influence the physiological and spiritual dimensions of people⁷. This situation affects as well as healthy people, also people with health problems more preponderantly.

The contribution of the season, which is the manifestation of a solar cycle as an external factor, to human health is accepted by researchers such as Meesters et al.⁸. According to similar studies⁹, seasonal environment, birth rate, and sperm count are influential in pneumonia, bronchitis, and the influenza epidemic. In some places and situations, the change in air temperature can have fatal consequences.

In addition to the seasonal effect of the sun's cycle, several researchers have suggested the impact of the moon's motion and cycle on the Earth, livings, and human beings¹⁰.

Due to the heterogeneity of samples related to the diversity, environmental and chronobiological conditions of species, the analysis and comparison of the lunar cycle rhythm and time are not precise, research on the interaction of circadian and lunar cycle times develops an exciting and unique perspective on the coordination between different timing mechanisms¹¹.

Seasonal changes and phenomena, findings of research on the lunar cycle, reveal the relationship and effect of the Moon and the livings in the world¹². The results of Reinberg et al. study suggested that the same biological cycle proliferation observed in some plants and aquatic animals may be preserved among various species, including *Homo sapiens*¹³. As a matter of fact, according to Yousfi et al., the lunar cycle is one of the main factors of variable human psychology¹⁴.

The relationship between the moon and living was the centre of interest for the classical Muslim physicians, and they considered this connection in their treatment¹⁵. For example, Akshamsaddin (d. 1459), who was Conqueror Sultan Mehmed's teacher and doctor, advised his patients to take drugs for medical purposes on an empty stomach every morning first new fifteen days of each month, that is, in the first half of the month¹⁶. Also, Al-Biruni (d. 1061), a philosopher and doctor, and Al-Kindi (d. 866), a philosopher and doctor, said that operations should be performed according to the cycle of the Moon¹⁷. According to Ibrahim Hakki, who is a medical scientist and from Erzurum (d. 1780) in the first half of the month, the brain tissues of living things increase, and in the second half, it decreases¹⁸.

In Muslim medical studies in the classical period¹⁹, it is accepted that a certain period, which is shaped by the effect of planets, sun, and moon on the Earth, is the most appropriate time for the functioning of the human physiological structure. This is called the natural rhythm of the biological clock, according to modern medical data²⁰.

The biological clock shaped by the influence of planets, sun, and moon is also under the control of day and night. Certain times of both night and day have a positive-negative effect on human physiology. In this respect, the classical period physicians have emphasized that the treatment should be done in the last third of the night to obtain positive results in terms of health. However, performing this treatment should be in the first part of the month (first fifteen days), which includes phase after the full moon (this is the last fifteen days for surgery). According to these data, the time zone (biological time), which is suitable for the treatment of diseases, is the time when the night ends (Zodiacal light) and the time when the sun is about to sunset. It is also necessary to consider the variability of this period according to seasons and regions.

The biological clock, which is the most critical factor for the treatment of human life, health, and diseases, is found two times in a day as day and night, within 24 hours of the day. In this case, the time of the biological clock changes continuously in the day and night cycle according to the seasons. This reveals that the natural time of day and the biological time of night are different. Accordingly, contrary to opinions that the biological clock is only at one time of the day, the biological clock has two separate timings as night and day. The determination of the natural time of day and night varies according to seasons and regions.

Many studies have been done on the biological clock. These studies were mostly done with the titles of the biological clock, circadian rhythm, and circadian clocks. The overwhelming majority of these studies have suggested that there is a biological clock in only one-hour intervals on a 24-hour day. Among the so many studies on the biological clock, few researchers stated that there are two times a day, one for the night and one for the day. Among the many studies on natural time, some researchers agreed that there are two hours of biological time, one for the night and the other for the day^{21,22}.

Some investigators^{21,22} have stated that the biological clock does not have a single time within 24 hours, there are two different times in the day and night period and that the natural time containing the most suitable time for treatments exists in these two time periods. Recently, one study supported this statement²³. Studies to the Biological Clock/ Circadian Rhythm related to biological clock have been determined on a daily basis, mostly including 24 hours. For example, there is only a one-time zone per day, including day and night, for people like Pei and colleagues, who search for the biological clock during the day. On the other hand, according to Pei et al. and similar studies, the biological clock is available overnight within a 24-hour time frame²⁴.

Many studies have been conducted on the biological clock and the treatment of diseases. The most famous of these was done by Jeffrey Connor Hall, Michael Rosbash, and Michael Warren Young. This work earned them the Nobel Prize in Physiology and Medicine in 2017. In their work, the authors made inventions about the molecular mechanisms that regulate the circadian rhythm²⁵.

Besides, Gaikwad explained the interaction between the biological clock, transcriptional feedback loop, and neuroscience, in which they identify genes and proteins that work together in both humans and animals²⁶. One of the recent studies on the relationship between biological clock and therapy belongs to Ruben et al. In their study, Ruben et al. suggested that the treatment be carried out in a biological clock direction. However, he did not suggest a distinct time zone²⁷.

According to these studies, the Circadian rhythm is determined by an internal biological clock that predicts day/night cycles to optimize the physiology and behaviour of organisms. Various biological processes, such as sleep patterns, nutritional action, hormone release, blood pressure, and body temperature, follow this consistent rhythm.

In these and similar studies, although the biological clock was stated to be effective in treatment, they emphasized that treatment can be applied within a single day, regardless of day and night.

CONCLUSION

In scientific studies on the biological clock, it was emphasized that there are internal and external factors affecting the physical and psychological life of man. They divided the activities of the human body, organs, and hormones into certain time zones "daily". They made this distinction over 24 hours. In

these studies, on the biological clock, it was emphasized that the most efficient clock related to human health is in a single time frame per day. However, life consists of day and night. There are cells that workday and night. For example, the pineal body works at midnight. There are two different times in the day and night period and that the biological time containing the most suitable time for treatments exists in these two time periods. To get the best result of treatment, the most appropriate biological clock is the time closest to sunset and the last third of the night before sunrise. These two time periods change according to summer and winter, region and continent, the long and shortness of day and night.

CONFLICT OF INTEREST

The author declares that there are no competing interests in publishing this article.

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