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RELATIONSHIP OF CORE BODY TEMPERATURE WITH SLEEP AND MENTAL HEALTH STATUS

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Abstract: psychogenic fever develops amongst those with high core body temperature with associated psychological stress and disturbed mental state. Also, animal studies showed that in extreme conditions of heat and cold temperature, it is difficult to maintain the normal state of mind and react to the environment stimulus. To deal with these, in this article we have explained a hypothesis that supports the extensive connection between body temperature and mental state, which is also influenced by sleep.

Key words: sleep, temperature, aggression, anxiety, depression, stress

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HYPOTHESIS

Mental health is an important topic amongst medical professionals. The importance of keeping the mind healthy is felt and factors affecting mental health are being diagnosed. Sleepiness and sleep propensity are strongly influenced by core of the body temperature (Lack et al., 2008). Relationship is also found between sleep, aggression, anxiety, depression and stress. However, definite pattern of their influence on each other has not yet been confirmed.

SLEEP

Proper quality and quantity of sleep are required for our body to function properly. Inadequate sleep may affect our mental health. Sleep problems and overall suicidality in adolescents are significantly connected (Zschoche et al., 2015).Depression causes increase in sleep duration; however, the situation is reversed in chronic depression.

Aggression is found to relate both the quantity and quality of sleep reported, with reduced quantity and quality predicted by increased overall aggression (Ireland et al., 2006).Rats, for example, show increase in aggression and defensive fighting after sleep deprivation

(Dahl et al., 2006).It was reported that human adults sleeping on average less than 5 hr per night were nearly three times likely to report losing their temper and engaging in a physical fight (Vaughn et al., 2015). It is seen that after one night of sleep deprivation healthy young men already scored higher on the aggression scale of mood check list (Roth et al., 1976).

MENTAL HEALTH (AGGRESSION, ANXIETY, DEPRESSION, STRESS)

Results showed a high interrelatedness between sleep and depressive/anxiety complaints. Both assessment and treatment of depressive and anxiety complaints should address sleep problems (Spoormaker et al., 2005).Also, neurocircuit for stress and aggression overlap (Summers et al., 2006).It is seen that aggression is supressed by acute stress but induced by chronic stress (Yohe et al., 2012).

TEMPERATURE

The sleep-wake cycle and body temperature rhythms have a stable internal phase relationship in normally entrained conditions with the timing of sleep highly correlated with the timing or phase of the circadian body temperature rhythm (Czeisler et al., 1980).

However, of particular relevance to insomnia are two zones of the CBT rhythm during which sleep is inhibited (Strogatz, 1986; Strogatz et al., 1987). One zone occurs in the early evening, about 6-9 h before the CBTmin and 1-4 h before habitual bedtime (18:00-22:00). It has been termed a 'wake-maintenance zone' (Strogatz et al., 1987), because sleep onsets are delayed during this period(Lack et al., 1996; Dijk et al., 1995).Another zone occurs in the morning about 4-7h after the CBTmin, typically between 08:00 and 11:00, and is associated with increasing wakefulness in sleep or with wake up (Strogatz et al., 1987; Dijk et al., 1995).

Animal studies have demonstrated that psychological stress increases Tc via mechanisms distinct from infectious fever. In contrast, repeated stress induces anticipatory hyperthermia, reduces diurnal changes in Tc, or slightly increases Tc throughout the day.

A study was performed to demonstrate that that a 15-year-old schoolgirl had high core body temperature on the days she went to school than other days, showings the interrelationship between mental health and core body temperature (Oka et al., 2015).

TESTING THE HYPOTHESIS

The body mechanisms to control temperature works in an efficient manner to protect the integrity of protein structures. Cases of fluctuating body temperature are found in extreme or chronic mental illness and restlessness. Targeting such an appropriate population to test the hypothesis is difficult and requires to include a large number.

Daily sleep requirements, in terms of hours, depend on various factors such as daily nutrition intake, calories burnt, stress, and most notably the age of the

individual. The younger age group requires more sleep hours than the older ones.

Also, core body temperature is high during daytime than at night. However, between 10 am and 2 pm, core body temperature almost remains constant (Lack et al., 2008). The body temperature must be monitored at regular intervals for the mental state may be conditioned according to the environment at that moment.

MEDICAL IMPLICATIONS

Correlation between these variables must be highlighted and in what proportion they have influence upon one another. This might indicate unusual state of the body and the factors affecting them. Also, it will be possible to calculate the hours of sleep needed to overcome those conditions. Devices will make our work easier, if the carry the information of how these variables are related, and will record body temperature at regular intervals.

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