



Research Article

Daily food intake habits, food intake timings and sleep-wakeful cycle of the children and teenagers: a pilot-study

Mousumi Dutta✉, Partha Sarathi Singha, Aspiya Khatun, Sayani Deb, Subhamay Samanta, Tufan K. Layek

Government General Degree College, Kharagpur-II, Ambegeria, Madpur,
Paschim Medinipur- 721149, West Bengal, India

✉ Corresponding author: duttamousumi10@gmail.com

Received: July 11, 2022 / Revised: Aug 1, 2022/ Accepted: Aug 10, 2022

Abstract

Human Behaviour and physiology are temporally controlled by circadian rhythms (24 hrs). Circadian rhythms are interrelated with sleep/wake cycles, so, disruption of one causes the alterations of another. A risk rose from the altered circadian rhythm and sleep cycle affects a huge part of the population. Alterations in the sleeping timings cause a profound change in dietary habits which may lead to myriad metabolic ramifications. The metabolic homeostasis within the physiological system is regulated by the molecular basis and alignment of the circadian clock. Negligence of this alteration may produce deleterious effects on human health. So, various behavioral changes should be implemented to manifest a correct alignment of circadian rhythms and to enhance sleep duration, and also to regularize food habits.

Keywords Circadian rhythms, Food habits, Sleep-wakeful cycle

Introduction

Environmental seasonal changes are being produced by Earth's rotation and the organisms always try to adopt these changes. Physical, mental, and behavioral changes that take approximately 24 hours duration are referred to as circadian rhythms (from Latin words 'circa' and 'diem', about a day). The anticipation of reliable patterns in the environment evolved through over two trillion day-night cycles (Patel et al., 2015). The molecular mechanism of circadian biology remains the same in various kingdoms of life such as protozoans, cyanobacteria, algae, plants, fungi, and animals (Schibler, 2006; Rosbash, 2009).

Circadian rhythms within an organism are essential to establish coordination between behavioral activities and social activities. The most important feature of an endogenous clock is the phase relationship between the rhythms it generates and those of the external environment. Daily fluctuations in input

and output of energy for circadian phases are the most important regulators of the primary metabolic functions in the peripheral tissues (Bass et al., 2010). Alterations in the cellular respiration process cause the formation of various unnecessary metabolites. The accumulation of these metabolites causes damage to the physiological system and this situation continuously tries to establish a synchronized balance with the compensation mechanisms, such as reactive oxygen species (ROS) scavengers (Eckel-Mahan et al., 2013) which may include various inhibitory feedback loops (Panda, 2016). For example, in mice, there is a synchronized mechanism between dark phase glycogenesis and light phase glycogenolysis, maintained by the hepatic clock (Koronowski et al., 2019).

Alterations in circadian rhythm and sleep disruption occur in the case of shift workers (the rest phase for humans, as diurnal organisms) (Folkard, 2008; Arendt et al., 2006). Gastrointestinal problems and various other issues including breast cancer and metabolic syndrome have been observed in

Shift workers (Knutsson et al., 2010; Wang et al., 2013). Findings from observational studies also suggest that circadian rhythm and sleep disruption are intertwined with some of these disorders: compared to day shift workers matched for body mass index (BMI), for example, some of the adverse metabolic consequences experienced by night shift workers are coincident with sleep disturbances (Schiavo-Cardozo et al., 2013). European workforce and US workforce contain 17% and 15% of shift workers, respectively. So, alterations in circadian system in shift workers may implicate consequences on the work strength. Disruption in circadian rhythms and sleep deprivation occurs in shift workers and the person affected by jetlag. Frequent equivocal health consequences can be observed in the case of jetlag-affected person (Hammer et al., 2014). It has been estimated that there will be > 831 million more air-bound passengers globally in 2016 compared to 2011 (IATA, 2013).

So, the main objective of this present study is to highlight the rhythm of daily food habits and the sleep-wakeful cycle of the subjects ranging from 4 to 22 years of age in West Medinipur district.

Methods

Selection of subjects

We conducted the study on 47 subjects ranging from 4 to 22 years of age in West Medinipur district of West Bengal, India. We selected healthy subjects for the study. Subjects with some chronic diseases were excluded from the study. Also, subjects who were on any kind of regular medication were not included in the study to ensure homogeneity of sample groups.

We measured certain basic parameters by using anthropometric instruments and a weighing machine to assess BMI of our subjects.

Measurement of Anthropometric variables

Height, Weight and Body mass index (BMI)

Height and weight were measured according to the standard protocol.

Body mass index (BMI)

Body mass index has been used as a simple anthropometric index which also reflects the current nutritional status of an individual. BMI was calculated by weight and height measurements using the following formula

$$\text{BMI} = \text{Weight (kg)} / \text{Height (cm}^2\text{)}$$

Questioner method

Questioner methods were used to assess the food habit and sleep-wake habit of the subjects.

Results and Discussion

Body Mass Index (BMI) of the subject was evaluated using their individual body weight and height. It was observed that when there is an alteration in the food habit then it affects the body weight of the individual (Vernia et al., 2021).

The survey depicts that in the case of a teenage person there are lots of disturbances in the food habits and also in the sleep-wakeful cycle. These alterations may affect the mental and physical health of the subject. The teenage subjects are very much addicted to the cell phone, internet surfing etc. which can hamper the timings of their food habits. Alterations in food habits also may affect the sleep cycle which may be responsible for the alterations in hormonal, and metabolic activities. This can be correlated with the changes in the body mass index (BMI). This scenario may be interconnected with the stress generation within physiological systems (Table 1).

The natural cycle of physical, mental, and behavior changes that the body goes through in a 24-hour cycle. Circadian rhythms are mostly affected by light and darkness and are controlled by a small area in the middle of the brain (Blume et al., 2019). They can affect sleep, body temperature, hormones, appetite, and other body functions. Obesity, diabetes, depression, seasonal affective disorder, and sleep disorders may be observed in the case of abnormal circadian rhythms. Circadian rhythm is sometimes called the “body’s clock” (Blume et al., 2019).

Circadian rhythms have an important purpose: they prepare your body for expected changes in the environment and, for example, the time for activity, time for sleep, and times to eat. External cues are important; the strongest is the sun’s light/dark cycle. Artificial light also influences the pacemaker.

The body’s circadian rhythms control the sleep-wake cycle. They play a role in sleep due to how the body and brain respond to darkness, which is when most humans feel tired and tend to sleep. As darkness sets in, the body’s biological clock instructs the cells to slow (Charles et al., 2002).

Circadian rhythms are 24 hours biological rhythms that are essential to optimize the physiological system (Charles et al., 2002). There are four biological rhythms: i) Circadian rhythms: the 24-hour cycle that includes physiological and behavioral rhythms like sleeping, ii) Diurnal rhythms: the circadian rhythm synced with day and night, iii) Ultradian rhythms: biological rhythms with a shorter period and higher frequency than circadian rhythms, iv) Infradian rhythms: biological rhythms that last more than 24 hours, such as a menstrual cycle (Charles et al., 2002).

Table 1: Various physiological parameters, food habits, food intake timings and sleep-wakeful cycle of the subjects

Candidate's Name	Age (Yrs)	Sex	Height (cm)	Weight (kg)	BMI (kg/cm ²)	Morning wake up	Breakfast		Lunch		Noon sleep time	Dinner		Sleep time
							Time	Food	Time	Food		Time	Food	
Supratim Dolai	4	Male	145	17	509.36	6:00 a.m	6:15 a.m.	Horlicks, Biscuit, Milk	12.00 p.m.	Rice, dal, fish curry	2pm	9.30-10.00 p.m.	Roti, Veg curry	10:00-11:00p.m
Sohali Karmakar	4	Female	143	23	776.16	4:30 a.m.	5:30 a.m.	Horlicks, Maggi	12.30 p.m.	Rice, dal, fish curry	1:30pm	10:00 p.m.	Roti ,Dal	10.30 pm
Anindita Bhunia	4	Female	144	27	816.25	6:00 a.m	6:15 a.m.	Biscuit	1:00 p.m.	Rice, veg, egg	-----	10:00 p.m	Rice, Veg	10:30 p.m
Sumana Bera	5	Female	160	34	926.22	5:30 a.m	6:00 a.m.	Biscuit, Milk	1:00 p.m.	Rice, veg, egg	-----	10:30 p.m.	Roti, Curry	11:00 p.m
Kingsuk Dolai	6	Male	166	30	772.94	5:00 a.m	6:00 a.m.	Milk, Biscuit	12:30 p.m.	Rice, meat	1:00p.m	9:30 p.m.	Roti, Curry	10:30 p.m
Sudipta Dolai	6	Female	167	35	952.82	5:00 a.m	5:10 a.m.	Puffed Rice	1:00 p.m.	Rice, veg	-----	9:45 p.m.	Rice, Veg, curry	11:00 p.m
Bristi Pal	6	Female	166	34	940.48	5:00 a.m	5:10 a.m.	Biscuit	1:00 p.m.	Rice, Veg egg	-----	10:00 p.m.	Rice, Meat	10:30 p.m
Imon De	7	Male	168	40	997.83	5:00 a.m	5:15 a.m.	Milk, Biscuit	12:45 p.m.	Rice, Veg, Fish	12:45p.m	10:00 p.m.	Roti, Curry, Milk	11:00 p.m
Prathusha Sinha	10	Female	142	39	1111.90	4:45 a.m	5:22 a.m.	Milk, Biscuit	1:30 p.m.	Rice veg, Fish	2:00p.m	10:00 p.m.	Roti, Milk	12:30 p.m
Babai Bera	10+	Male	140	42	1279.59	6:00 a.m	6:25 a.m.	-----	1:30 p.m.	Rice ,Veg, Fish	-----	10:00 p.m.	Roti, Veg curry	11:45 p.m
Ayan Layek	10	male	134	48	1331.18	7:30 a.m.	7:45 a.m.	Roti, Tea	1:30 p.m.	Rice, Veg	-----	9:00 p.m.	Roti, Curry.	11:00 p.m.
Piu Maji	11+	Female	144.	35	1169.72	6:30 a.m.	7:50 a.m.	Tea	1.00 p.m.	Rice, Curry	-----	9:30 p.m.	Roti, Curry.	10:30 p.m.
Arun Patra	11+	Male	138	30	1090.08	6 am	7.00 a.m.	Tea, Biscuit	2.00 p.m.	Rice, Curry	-----	10.00 p.m.	Rice, Dal	11.00 p.m.
Suvoshree Layek	11+	Female	140	28	1092.60	6 a.m.	6:30 a.m.	Muri	1:30 p.m.	Rice, Pure Veg	-----	9:00 p.m.	Roti, Dal	10:00 p.m.
Priti Maji	14+	Female	153	38	1212.35	6 a.m.	7.00 a.m.	Muri	12:30 p.m.	Rice, Dal	-----	9:30 p.m.	Rice, Curry.	10:30 p.m.
Samir Layek	14+	Male	167	49	1466.77	6:-30 a.m.	7:30 a.m.	Muri, Tea	1:30 p.m.	Rice, Veg	-----	8:30 p.m.	Rice. Fish curry	9:00 p.m.
Anushri Devnath	14+	female	149	36	1181.47	6:30 a.m.	7:00 a.m.	Juice, Muri	1:30 p.m.	Rice, Curry	-----	9:30 p.m.	Rice, Curry.	10:00 p.m.
Anushree Layek	15+	Female	156	49	1319.03	6:30 a.m.	7:30 a.m.	Tea, Biscuit	1:30 p.m.	Rice, Curry	-----	10.00 p.m.	Roti, Milk.	11:30 p.m.
Sathi Patra	16+	Female	154	45	1271.52	7 a.m	7:30 a.m.	Biscuit	12:30 p.m.	Rice, Fish	-----	11.00 p.m.	Roti, Curry.	11:30 p.m.
Ganesh Hemram	16+	Male	166	52	1490.80	6:30 a.m.	7.00 a.m.	Tea	1.00 p.m.	Rice, Meat	-----	10:30 p.m.	Rice, Meat	11.00 p.m.
Sathi Hemram	17+	Female	150	55	1347.27	6 a.m.	7:30 a.m.	Biscuit	1:30 p.m.	Rice, Veg	4p.m.	10.00 p.m.	Puffed rice.	12.00 a.m.
Avijit Layek	17+	Male	170	62	1638.29	5:30 a.m.	7.00 a.m.	Bread, Butter	12:30 p.m.	Rice, Veg, Egg	-----	10.00 p.m.	Rice, Curry.	11 p.m.
Pabitra Samanta	19	Male	163	55	1499.57	7:00 a.m	9:30 a.m.	Juice, Muri	1:30 p.m.	Rice, Veg	2-3p.m.	9:30 p.m.	Ruti, Curry	1:30-2 a.m.

Shanarul Rahaman	19+	Male	165	58	1549.36	9:00 a.m	-----	-----	3:00 p.m.	Rice, Veg	-----	9:00 p.m.	Rice, Curry.	12:00 a.m.
Juli Das	19+	Female	162	76	1569.97	7:00 a.m.	8:00 a.m	Bread, Butter	1:30 p.m.	Rice, Fish, Veg	-----	9:30 p.m.	Ruti, Curry	12:00 a.m.
Sangita Dey	20+	Female	162	48	1306.73	7:00 a.m	7:30 a.m.	Bread, Egg	1:00 p.m.	Rice, Fish, Veg	-----	9:00 p.m.	Rice, Curry,	12:00 a.m.
Sangita Das	20	Female	163	42	1254.34	6:45 a.m	8:00 a.m	Bread, Butter	1:00 p.m.	Rice, Veg	2:00p.m.	9:30 p.m.	Ruti	12:30 a.m.
Muskan Khatun	20	Female	164	50	1331.42	6:30 a.m.	7:00 a.m.	Tea, Bread	2:30 p.m.	Rice, Veg	-----	10:00 p.m.	Rice, Curry	11:00 p.m.
Anita Mandal	20	Female	162	54	1362.21	5:30 a.m.	6:30 a.m.	Fruit, Bread	1:00 p.m.	Rice, Fish, Veg	-----	10:30 p.m.	Ruti, Veg	11:30 p.m.
Sumana Das	20	Female	165	44	1279.03	6:45 a.m.	8:00 a.m	Tea, Bread	1:30 p.m.	Rice, Fish, Veg	2:00p.m.	9:30 p.m.	Ruti, Fish	11:30 p.m.
Salina Naz	20+	Female	164	50	1331.41	8:00 a.m.	8:30 a.m.	Bread, Coffee	1:00 p.m.	Rice, Curry, Meat	3:00p.m.	9:30 p.m.	Ruti, Rice, Curry	1:00 p.m.
Paramita Pal	21	Female	164	54	1364.07	6:30 a.m.	8:00 a.m.	Muri, Tea	1:00 p.m.	Rice, Fish	2:00p.m.	9:30 p.m.	Ruti, Dal	10:30 p.m.
Sayani Deb	21	Female	160	54	1351.68	5:00 a.m.	10:00 a.m.	Biscuit, Milk	1:30 p.m.	Rice, Curry, Meat	-----	9:00 p.m.	Ruti, Dal	11:00 p.m.
Aspiya Khatun	21	Female	165	70	1515.12	8:00 a.m.	8:30 a.m.	Tea, Bread	1:30 p.m.	Rice, Fish, Veg	4:00p.m.	10:00 p.m.	Rice, Curry,	12:00 p.m.
Subhankar Sasmal	21	male	170	64	1642.38	7:30 a.m.	9:00 a.m.	Fruit ,Biscuit	12:00 p.m	Rice, Veg.	1-2p.m.	10:00 p.m	Ruti, Curry	12:00 p.m.
Dipan Das	21+	Male	167	58	1547.60	6:00 a.m.	7:30 a.m.	Tea, Biscuit	1:30 p.m.	Rice, Veg.	-----	8:00 p.m.	Ruti, Curry,Rice	12:00 p.m.
Sourav Mandal	21+	Male	168	66	1659.58	6:30 a.m.	8:30 a.m.	Tea, Biscuit	1:00 p.m.	Rice, Veg.	1-2p.m.	8:30 p.m.	Ruti, Curry	12:30 p.m
Arijit Maity	21+	Male	165	56	1511.21	7:00 a.m.	8:00 a.m.	Tea, Biscuit	1:30 p.m	Rice, Veg.	-----	8:30 p.m.	Ruti, Curry	12:30 p.m.
Subham Ghosh	21+	Male	16	55	1493.01	7:00 a.m.	8:30 a.m.	Tea, Biscuit	12:00 p.m.	Rice, Curry, Veg.	-----	9:30 p.m.	Rice, Curry.	11:30 p.m.
Animesh Jana	21+	Male	170	57	1548.60	6:00 a.m.	7:30 a.m.	Tea, Biscuit	1:00 p.m.	Rice, Curry, Meat	-----	9:30 p.m.	Ruti , Curry	12:00 p.m.
Ranjan Panja	21+	Male	166	68	1676.78	6:30 a.m.	7:30 a.m.	Tea, Biscuit	12:00 p.m.	Rice ,Curry, Egg	-----	10:00 p.m	Ruti, Curry	1:00 p.m.
Amit Pattanayak	21+	Male	165	54	1484.42	6:30 a.m.	7:30 a.m.	Tea, Biscuit.	12:00 p.m.	Rice, Curry, Veg.	-----	9:30 p.m.	Ruti, Curry, Rice	11:30 p.m.
Tufan Kumar Layek	22+	Male	165	60	1559.12	4:00 a.m	7:00 a.m.	Bread, Butter.	1:30 p.m	Rice, Fish, Curry	-----	9:30 p.m.	Ruti, Curry	11:30 p.m.
Ritam Hait	22+	Male	175	71	1754.48	7:00 a.m	8:30 a.m.	Tea, Bread	12:00 p.m	Rice, Fish, Curry	-----	9:30 p.m.	Ruti, Curry,rice	11:30 p.m.
Rohan Samanta	22+	Male	155	49	1363.77	7:00 a.m.	8:30 a.m.	Tea, Bread	12:00 p.m	Rice, Fish, Curry	-----	8:45 p.m.	Ruti, Curry, Rice	11:30 p.m.
Priyanka Chakraborty	22+	Female	152	49	1276.33	6:30 a.m.	7:30 a.m.	Tea ,Bread	1:30 p.m.	Rice, Fish, Curry	-----	10:00 p.m.	Rice, Veg	11:30 p.m.
Pranab Banerjee	22+	Male	175	76	1821.46	6:00 a.m.	6:15 a.m.	Bread, Tea	2:00 p.m.	Rice, Veg	-----	10:00 p.m.	Ruti, Curry,Rice	12:00 a.m.

Biological rhythm is a phrase often used interchangeable with circadian rhythm. These rhythms are a series of bodily functions regulated by your internal clock (Serin et al., 2019). They control cycles like sleep and wakefulness, body temperature, hormone secretion, and more. Your body maintains its biological rhythms through a variety of chemicals at the molecular level in response to your environment (Zheng et al., 2021). Your light exposure, eating habits, and other environmental cues can maintain or disrupt your biological rhythms. Disrupting your biological rhythms can lead to serious health problems. Your biological rhythms are tied to an internal clock in your brain called the Suprachiasmatic nucleus (SCN). It is located in hypothalamus. This is the area of your brain that manages the automatic nervous system and the pituitary gland. SCN sends signals throughout the day to regulate body's activity (Serin et al., 2019).

The time gap between one peak to another one of various physiological activities that comprise the circadian rhythms is about 24 hours. These circadian rhythms underline "permissive homeostasis". Any alteration in the time gap may be occurred due to increased energy demand or stress. This situation may enhance the function of individual cells, organ systems, or whole organisms (McKenna et al., 2017). Many physiological variables related to survival during critical illness have a circadian rhythm, including the sleep/wake cycle, hemodynamic and respiratory indices, immunity, and coagulation, but their clinical significance remains underappreciated critically ill patients suffer from circadian dysrhythmia, manifesting overtly as sleep disturbance and delirium but with widespread covert effects on cellular and organ function. (McKenna et al., 2017).

Food habits as circadian rhythm

The circadian rhythm diet, also known as the body clock diet, is a form of time-restricted eating plan where you eat in sync with this internal clock. "This means that you eat during the daylight hours, within a window of 12 hours or less, and fast for the remaining 12 or more hours each day". Time of eating is more important than the food quality along with food quantity. Circadian rhythm may affect metabolic homeostasis. On a circadian rhythm diet timing, your meals earlier in the day may help you lose weight. According to scientific research meantime directly affect the body's circadian rhythm; ask for the natural physical, mental, and behavioral changes that follow a 24-hour cycle. The connection affects health in both short- and long-term ways. These rhythms can be synced with hormones body temperature, eating, and fasting circadian fasting describes a pattern of eating and fasting that may help sync those rhythms that focus on eating primarily during the daylight hours and fasting overnight (Table 2).

Table 2: Net surfing habit and timings of net surfing of the subjects

Candidate's Name	Age (Yrs)	Sex	Net surfing (Yes/No)	If yes the timings of net surfing
Supratim Dolai	4	Male	NO	
Sohali Karmakar	4	Female	NO	
Anindita Bhunia	4	Female	NO	
Sumana Bera	5	Female	NO	
Kingsuk Dolai	6	Male	NO	
Sudipta Dolai	6	Female	NO	
Bristi Pal	6	Female	NO	
Imon De	7	Male	NO	
Prathusha Sinha	10	Female	NO	
Babai Bera	10+	Male	YES	1hr /day
Ayan Layek	10	male	NO	
Piu Maji	11+	Female	NO	
Arun Patra	11+	Male	NO	
Suvoshree Layek	11+	Female	YES	1-2 hr/day
Priti Maji	14+	Female	NO	
Samir Layek	14+	Male	YES	2hrs /day
Anushri Devnath	14+	female	NO	
Anushree Layek	15+	Female	NO	
Sathi Patra	16+	Female	YES	5-6 hrs/day
Ganesh Hemram	16+	Male	YES	5-6hrs/day
Sathi Hemram	17+	Female	YES	>8 hrs/day
Avijit Layek	17+	Male	YES	7-8 hrs/day
Pabitra Samanta	19	Male	YES	5-6 hrs/day
Shanarul Rahaman	19+	Male	YES	5-6 hrs/day
Juli Das	19+	Female	YES	10 hrs /day
Sangita Dey	20+	Female	YES	10hrs/day
Sangita Das	20	Female	YES	>9hrs/day
Muskan Khatun	20	Female	YES	5-6 hrs/day
Anita Mandal	20	Female	YES	5-6hrs /day
Sumana Das	20	Female	YES	7-8hrs/day
Salina Naz	20+	Female	YES	>6hrs/day
Paramita Pal	21	Female	YES	>8hrs/day
Sayani Deb	21	Female	YES	10 hrs/day
Aspiya Khatun	21	Female	YES	10 hrs/day
Subhankar Sasmal	21	Male	YES	7-8 hrs/day
Dipan Das	21+	Male	YES	10hrs/day
Sourav Mandal	21+	Male	YES	10 hrs/day
Arijit Maity	21+	Male	YES	>6 hrs/day
Subham Ghosh	21+	Male	YES	>8 hrs/day
Animesh Jana	21+	Male	YES	7-8 hrs/day
Ranjan Panja	21+	Male	YES	>9 hrs/day
Amit Pattanayak	21+	Male	YES	>8 hrs/day
Tufan Kumar Layek	22+	Male	YES	9 hrs/day
Ritam Hait	22+	Male	YES	10 hrs/day
Rohan Samanta	22+	Male	YES	10 hrs/day
Priyanka Chakraborty	22+	Female	YES	8-9 hrs/day
Pranab Banerjee	22+	Male	YES	7-9 hrs/day

Sleep cycle as circadian rhythm

Circadian rhythms are the most important background of various essential functions and biological processes. Sleep-wake cycle is one of the most important and well-known circadian rhythms of human physiology.

Most people notice the effect of circadian rhythms on their sleep patterns. Melatonin secreted from SCN controls the sleep cycle. Optic nerves receive the light from the environment and then this signal is transmitted to the brain. The activation of the brain causes the activation of SCN (Vernia et al., 2021).

Circadian fasting is a method of eating to align with your body's internal clock. Circadian rhythms are capable of adapting to biological and environmental changes that may become disruptive and misalign circadian rhythms. Say a college is regularly up until 2 a.m. studying. Late night scene also led to late night snacking, increasing insulin, and giving the body energy during a time, when it's physiologically more primed for rest and recovery. One way to potentially prevent this disruption and synchronize your internal clocks is through circadian fasting. It may improve measures of metabolic health. Meal timing has been most studied for its role in energy regulation, weight, and body Mass Index (BMI). Conversely a higher percentage of daily calories consumed at night and food intake after 8p.m. are associated with higher BMI and body fat (Serin et al., 2019). And that may be due to favorable metabolic changes that occur are not well understood. These changes include: Improve blood sugar control-increased thermic effect of food (the body spends more energy breaking down food), and enhanced absorption of nutrients in the intestine (Table 2).

People progress through a series of distinct physiological stages of quiet sleep alternative with periods of REM sleep. Quiet sleep is important because it helps restore the body while REM sleep (Vyazovskiy, 2015). The rest of the mind which is important for both learning and memory contain brain structures and chemicals that produce the states of sleeping and waking. For instance, a peacemaker-like mechanism in the brain regulates circadian rhythms. This internal clock which gradually becomes established during the first months of life, controls the daily ups and downs of biological patterns, including body temperature, blood pressure, and the release of hormones circadian rhythms make people's desire for sleep strongest between midnight and dawn and to a lesser extent in mid-afternoon. In one study people tried to stay awake for 24 hours (Vyazovskiy, 2015). Not surprisingly many slipped into naps occurred, they found peaks between 2 a.m. and between 4 a.m. and between 2 p.m. and 4 p.m. Circadian rhythms although many who work on weekdays nap in the afternoon on the weekends (Vyazovskiy, 2015).

Conclusion

From the findings, it can be concluded that the food habit, timings of food intake, and sleeping time are being altered in the case of teenage people rather than small-aged children. The teenage person is being habituated to various electrical gadgets and social sites which may hamper their daily lifestyle rhythms. This alteration may be correlated with different physiological alterations and mental distress.

Whereas the small aged children lead their life under the supervision of parents and are not habituated with electrical gadgets or social sites.

Acknowledgement

Dr. PSS acknowledges the Department of Chemistry, Govt. General Degree College, Kharagpur II West Bengal, India. Dr. MD acknowledges the Department of Physiology, Govt. General Degree College, Kharagpur II West Bengal, India.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication

Funding support

The author declares that they have no funding support for this study

References

- Arendt, J., Middleton, B., Williams, P., Francis, G., & Luke, C. (2006). Sleep and circadian phase in a ship's crew. *Journal of Biological Rhythms*, 21(3), 214-221.
- Bass, J., & Takahashi, J. S. (2010). Circadian integration of metabolism and energetics. *Science*, 330(6009), 1349-1354.
- Blume, C., Garbazza, C., & Spitschan, M. (2019). Effects of light on human circadian rhythms, sleep and mood. *Somnologie*, 23(3), 147-156.
- Charles, A., & Patrick, M., (2002). Encyclopedia of the Human Brain.
- Eckel-Mahan, K., & Sassone-Corsi, P. (2013). Metabolism and the circadian clock converge. *Physiological reviews*, 93(1), 107-135.
- Folkard, S. (2008). Do permanent night workers show circadian adjustment? A review based on the endogenous melatonin rhythm. *Chronobiology international*, 25(2-3), 215-224.
- Hammer, G. P., Auvinen, A., De Stavola, B. L., Grajewski, B., Gundestrup, M., Haldorsen, T., ... & Blettner, M. (2014). Mortality from cancer and other causes in commercial airline crews: a joint analysis of cohorts from 10 countries. *Occupational and environmental medicine*, 71(5), 313-322.
- Knutsson, A., & Bøggild, H. (2010). Gastrointestinal disorders among shift workers. *Scandinavian journal of work, environment & health*, 85-95.
- Koronowski, K. B., Kinouchi, K., Welz, P. S., Smith, J. G., Zinna, V. M., Shi, J., ... & Sassone-Corsi, P. (2019). Defining the independence of the liver circadian clock. *Cell*, 177(6), 1448-1462.
- McKenna, H. T., Reiss, I. K., & Martin, D. S. (2017). The significance of circadian rhythms and dysrhythmias in critical illness. *Journal of the Intensive Care Society*, 18(2), 121-129.
- Panda, S. (2016). Circadian physiology of metabolism. *Science*, 354(6315), 1008-1015.
- Patel, V. R., Ceglia, N., Zeller, M., Eckel-Mahan, K., Sassone-Corsi, P., & Baldi, P. (2015). The pervasiveness and plasticity of circadian oscillations: the coupled circadian-oscillators framework. *Bioinformatics*, 31(19), 3181-3188.
- Rosbash, M., & Young, M. (2009). The implications of multiple circadian clock origins. *PLoS biology*, 7(3), e1000062.
- Schiavo-Cardozo, D., Lima, M. M., Pareja, J. C., & Geloneze, B. (2013). Appetite-regulating hormones from the upper gut: disrupted control of xenin and ghrelin in night workers. *Clinical endocrinology*, 79(6), 807-811.
- Schibler, U. (2006). Circadian time keeping: the daily ups and downs of genes, cells, and organisms. *Progress in brain research*, 153, 271-282.

- Serin, Y., & Tek, N. A. (2019). Effect of circadian rhythm on metabolic processes and the regulation of energy balance. *Annals of Nutrition and Metabolism*, 74(4), 322-330.
- Vernia, F., Di Ruscio, M., Ciccone, A., Viscido, A., Frieri, G., Stefanelli, G., & Latella, G. (2021). Sleep disorders related to nutrition and digestive diseases: a neglected clinical condition. *International journal of medical sciences*, 18(3), 593.
- Vyazovskiy, V. V. (2015). Sleep, recovery, and metaregulation: explaining the benefits of sleep. *Nature and science of sleep*, 7, 171.
- Wang, F., Yeung, K. L., Chan, W. C., Kwok, C. C. H., Leung, S. L., Wu, C., ... & Tse, L. A. (2013). A meta-analysis on dose-response relationship between night shift work and the risk of breast cancer. *Annals of oncology*, 24(11), 2724-2732.
- Zheng, X., Zhang, K., Zhao, Y., & Fent, K. (2021). Environmental chemicals affect circadian rhythms: An underexplored effect influencing health and fitness in animals and humans. *Environment International*, 149, 106159.

How to cite this article

Dutta, M., Singha, P.S., Khatun, A., Deb, S., Samanta, S., and Layek, T.K. (2022). Daily food intake habits, food intake timings and sleep-wakeful cycle of the children and teenagers: a pilot-study. *Science Archives*, Vol. 3 (3), 151--157 <https://doi.org/10.47587/SA.2022.3302>

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)



Publisher's Note: MD International Publishing stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.