emergent
Life Sciences Research

Review Article

Effect of modern food and lifestyle on human biological clocks and health: A review

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Abstract

Today's hectic schedule, work pressure, and lack of awareness of nutritious and healthy food are creating not only physical and mental unhealthiness but also psychological issues. Our biological clock goes to be misalignment because of wrong food habits, wrong meals, and wrong sleep timing. As the modern world is taking us out of sync with our natural rhythms, we are slipping into the lap and trap of severe health diseases such as obesity, hypertension, hyperlipidemia, diabetes, cancer, etc. Modern foods are commonly known as Junk food which means zero-calorie food. In zero-calorie foods, important micro-nutrients that are required for bodily functions are absent, but this type of food is high in calories. This means, that the lack of micronutrients, amino acids or minerals, fiber, vitamins, etc. in the modern food items chosen by the consumer due to hectic lifestyle not only affects the normal functioning of the body but also invites serious diseases at times. Furthermore, our biological clocks which are made up of a series of clocks and a master clock, also affect the function of our body when misaligned due to an unhealthy lifestyle. The main function of biological clocks in our circadian system is to maintain or perform body function properly and to make us in a natural rhythm to feel healthy throughout the day. But eating late at night causes our biological clock to get misaligned and exacerbates the issue when our body is unable to process food effectively and efficiently. Misalignment results in heart disease, cancer, and other several diseases. The present study, thus, aims to strengthen the knowledge of the impact of modern food and biological clock misalignment and how to live with sync in our body clock.

Keywords body clock, diseases, human health, modern food, nutrition

Received: 11 March 2022
Accepted: 11 July 2022
Online: 14 July 2022

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Emer Life Sci Res (2022) 8(2): 1-13

E-ISSN: 2395-6658
P-ISSN: 2395-664X

DOI: https://doi.org/10.31783/elsr.2022.820113

Introduction

Today we are living in a concrete world enlightened by artificial light and surrounded by electromagnetic waves. Humans in this era are very fast, full of stress, skilled in artificial intelligence, and more aware of food quality. But, despite nutritional awareness, peoples are away from a healthy diet and healthy lifestyle due to their busy and hectic schedules. Unhealthy food choices and lifestyle has impacted badly the physical and mental health of human being. As a result, obesity is increasing day by day in India. In India, the current status of obesity is about 40.3%. Obesity in the south is highest (at 45.51%) while obesity is lowest in the east (at 32.96%). In addition, women (41.88%), urban people (44.17%), and peoples over 40 years (45.18%) are more obese than men (36.08%), rural

people (36.06%), and people less than 40 years (34.58%), respectively [1]. More obesity (44.6% college vs. uneducated) has been found among the more educated by Venkatrao et al., [1]. According to him, more obesity in educated people is due to their less physical activity. About 43.71% of the educated people remain inactive, while 32.56% remain active with great enthusiasm. Thus, increasing obesity is exerting an extra burden on our national health care spending or system. Obesity is now known to be a phenomenon that involves not only environmental factors, multiple organs, and commensal organisms, but also multiple genetics and epigenetics factors. However, initially, obesity was taken as to the result of common behavioral problems of over-nutrition [2].

Several studies have shown that good food choices and time-restricted diets (TREs) are beneficial to health and help to heal the body while poor diets, late eating, and wrong lifestyle have negative long-term effects [3]. Time-restricted eating has a profound effect on our overall health and well-being. In contrast, late eating (or eating during an uncertain period) causes a misalignment of biological clocks. Thus, misaligned biological clocks affect and disturb the function of our genes. Consequently, like a wrong watch, our sleep-wake cycle gets disrupted.

Most of the factors (about 60% as per the World Health Organization) that are responsible for the quality of life and individual health are related to our today's modern lifestyle [4]. Currently, several people are suffering from severe to acute disease/illness (such as cardiovascular: CVD, hypertension, joint pain, metabolic and skeleton problems, overweight, etc.), inability/disability, even violence, death, etc. due to wrong lifestyles. Malnutrition and an unhealthy diet among the several unhealthy lifestyles are more common. Consumptions of alcohol and drugs, bad smoking habits, unnecessary taken stress, etc. are the several factors responsible for an unhealthy lifestyle [5].

The consumption of fast food among the youth is increasing day by day. Many of these fast-food eaters, however, suffer from several health issues and even many young people can suffer from food allergies due to the amateur consumption of fast food [6]. As a result, the volume of the fast-food industry is also increasing continuously. For instance, according to the MoFPI (Ministry of Food Processing Industries), the size of the Indian snack food industry is more than 4 lakh tonnes while its value has been estimated at 100 billion. Fast industries are growing very fast over the last decade. About 10% growth in the size of the Indian snack food industry was recorded in the last three consecutive years [7]. Bakery products, potato, and banana chips, namkeens (salted and salted sweetened), ready-to-eat mixes, and various other light processed foods are the most popular snack foods in our country and consumption is growing rapidly. Moreover, the expectation of growth of the world food industry is about US$ 400 billion from US$ 175 billion by 2025. [8-9]. In addition, according to the NHLBI (National, Heart, Lung and Blood Institute), the tendency to frequent fast-food eating is one of the major causes of weight gain among teenagers. This habit of frequent fast food eating also results in the risk of developing insulin resistance among them. Consumption of several fast/junk food (fried and roasted) is responsible for the rising of diabetes and obesity among people [10]. The regular intake of these modern or junk foods and late-night diets disrupts our biological clocks and as a result, causes various health issues.

In the above context, this study is focused on modern food and its nutrition, modern food habit, and its impact on health and the biological clock

Modern/ fast food and its impact

The informal name of fast food is junk food. Most fast-food/junk food can make easily and consume quickly. In 1972, an American scientist 'Michael Jacobson' gave the term junk food. Junk foods are zero or little in nutritional value (i.e., proteins, vitamins, fiber, minerals, and other healthy attributes). But it has been reported by several researchers that junk foods have many times higher calories, fat, salt, and sugar than the required value. And, such types of fast food are called HFSS (high fat, sugar, or salt). In addition, it contains numerous food additives like monosodium glutamate (MSG), tartrazine, etc. MSG is a cancer-producing substance generally used in ready-to-eat foods and

snacks. Similarly, tartrazine is an artificial food color that can cause hyperactivity in children, allergy, and asthma. There are many other additives most of them are carcinogenic Fried fast food, carbonated drinks, and salted snacks are the most common junk foods in our society, in addition to fast food, processed food, and premade snacks. Some of these junk foods also have Tran's fats. These trans fats when getting into the body after consumption of such foods, they behave like saturated fats. Higher consumption of saturated fats chokes off the arteries of the human body and as a result plaque buildup contributes to the development of a symptom of various cardiovascular diseases and stroke [11]. Chicken, chocolate, products from the dairy industry (such as whole milk, butter, cream, sour cream and ice cream, cheese, etc.), ground beef, hot dogs, lard, pork (for instance, bacon, fatback, ribs, sausage, etc.), etc. are the major source of saturated fats. Similarly, crackers, chips, cookies, fast food such as French fries, muffins, crackers, shortening, and hydrogenated or partially hydrogenated oil are the major sources of trans fats. In the Indian food market, not only national players but also international brands are the big source of modern fast food. Bikanervala, coffee day group, Haldiram, Nirula's pizza corner, etc. are famous among national players while McDonald's, Yumi Brands (Kentucky fried chicken, Pizza Hut, etc.), Domino's, Subway, Taco Bell, Coca-cola and Barista are well known for fast food seller among the international players.

In India, however, the definition of junk food is still not reported/ or undefined. Although, junk food is categorized as proprietary food according to the FSSI (Food Safety Standards of India). This means, that foods that are not standardized under the regulation are called proprietary or junk food. Proprietary food (i.e., un-standardized food) follows only the general rules and regulations under the food act. These foods are hoped for only to describe their composition or nature. Such types of foods do not fulfill the requirement regarding dietary use, medicinal purposes, health supplement, and functional and nutraceutical application. In contrast, junk foods are either banned or proposed to ban or has imposed tax at different levels in many countries such as Austria, Brazil, Britain, Canada, Denmark, European countries, Finland, Hungary, Mexico, Switzerland, Scotland, Taiwan, UAE: United Arab Emirates, US: United States, etc. For instance, fast food has been banned in all schools in Mexico since May 2010; soft drinks and junk food were banned in Abu Dhabi (UAE) in 2010; Ontario state (Canada) has banned fries, candy, chocolate, pop, and energy drinks in all schools. In addition, in May 2010, a law was proposed in United State for purpose of banning junk food in schools. However, the sale of junk food was already banned before lunch in elementary schools in the US. Further, countries like Denmark, Hungry, Europe, Finland, Romania, Brazil, Mexico, Taiwan, etc. either have imposed or have experimented with a fat tax on junk foods or considering imposing a similar tax. For instance, if junk foods like bacon, butter, cheese, ice cream, meat, processed foods, etc. have saturated fat of more than 2.3%, these foods are taxable in Denmark. Since Denmark had imposed a fat tax on such foods in October 2011. Similarly, alcohols, carbonated beverages, and energy drinks that have high caffeine levels, and high carbohydrates, fat, sugar, and salt are taxable in Hungary. Switzerland and Austria have banned trans fats; countries in Europe have experimented with similar taxes; while Finland, Romania, Brazil, Mexico, and Taiwan are considering imposing of fat tax. Several studies have proved that high consumption of junk food is creating problems not only in children but also in the youth and causing several diseases in the new generation. Due to this, several countries have banned even the advertising of junk foods in children's programs and have proposed fat or similar tax or laws to remove junk foods from schools.

Furthermore, it has been reported that mothers who consume more fast foods or foods with high sugar and fat during their pregnancy or breastfeeding/ lactating period, there is more possibility to become their children junk food lovers (i.e., junkies). The children of such mothers are more susceptible to face problems such as obesity, raised cholesterol, diabetes, high blood fat, etc. This occurs due to changes in the brain's (fetal) reward pathway and consequently changing food preferences caused by the consumption of high fat and high sugar [12-13]. For humans to survive, food consumption is of prime importance not only for energy and nutrients but also for responding to feelings of satiety and hunger. Satiety, the satisfaction of appetite, means the state of no hunger

between two eating occasions. Satiety strength generated by different macronutrients (i.e., carbohydrates, proteins, and fats) is different. The consumption of fats, carbohydrates, and proteins generates satiety power of varying strength such as low, intermediate effect, and high (most satiating power), respectively [14]. Balance among hunger, appetite stimulation, and food intake is controlled by the central nervous system. Various factors/determinants/terminologies and their effect on food choice are discussed in Table 1.

Table 1. Description of various factors/determinants/terminologies and their effect on food choice

S.No.	Factors	Descriptions	Referencse
1.	**Biological Factors**		
i.	Hunger, Apatite and satiety	Balance among the hunger, apatite stimulation and food intake is controlled by central nervous system. Low energy density diets generate greater satiety and high energy density diets. High energy density (high fat and/ or sigh sugar) foods can lead to passive consumption. Fat has lowest and protein has highest satiating power while carbohydrates have an intermediate effect.	[14,34]
ii.	Palatability	Pleasure, experienced after eating a particular food, is directly proportional to the palatability. Depends on taste, texture, smell, appearance, etc. Food intake increases as palatability increases but effects of palatability on apatite is not clear.	[35]
iii.	Taste	Taste is total sensory stimulation generated by ingestion of food. Another driving force after time that pushes peoples to eat junk food. Junk foods have great taste due to usage of oils, salts and sugars. Many people get addiction to the taste of junk food and they find it hard to think about the loss of nutrition due to junk food.Taste preferences and food aversions develop through experiences and are influenced by our attitudes, belief and expectations.	[36]
iv.	Shelf life	Junk food has long shelf life. Many junk foods may not require refrigerator for their storage for long periods	
2.	**Physical Factors**		
i.	Access	Depends on transportation, cost and geographical location.	[37]
ii.	Cooking skills	Cooking skills to prepare appropriate food an important role on food choice and thus health. Lack of cooking skills could impact on health and limits the food choice	[38]
iii.	Food variety	Food variety increases food and energy intake.Variety of food alters energy balance for short term while effect on long term is not known	[39]
iv.	Education	Education creates awareness and a level of education can influence dietary behavior during adulthood.	[40]
v.	Popularity	Advertising of junk food has a major role to increase it's the popularity. Popularity of junk food among children is cause of concern. Children are easy and potential target for junk food	
vi.	Time	Time constrains is the one of the main reason or driving force that pushes the peoples to eat the junk or unhealthy foods.Junk foods are easy to prepare and take very less/ or no time during their preparation.Junk foods are eaten by the people during hassles and time such as during TV watching, travelling, etc.	[41]
vii.	Transport	Transportation increase access to healthy food. Transportation and handling of junk food is easy due to its packaging and nature. Easy transportation, handling, and packaging make its availability easy both in urban as well as in rural areas.	[37, 40]
3.	**Economic Factors**		
i.	Cost	Cost depends upon socio-economic status and person's income. Often, the cost of junk food is less in comparison to healthy foods. Low cost and the attractive or comfortable price of junk food makes it accessible to all caste and classes/or communities	[42]
ii.	Income	Low income leads to consume unbalanced diets and especially, low consumption of fruits and vegetables. More foods come in the range of high-income group peoples.	[42]

iii.	Availability	Availability affects the cost of food and more availability means more access to low income groups too.	[37]
4.	**Social Factors**		
i.	Culture	Can lead restrictions on consumption of milk, meat and meat products. Influence of one culture, however, is changeable and amenable to adopt a particular food habits of the local culture when move to another new country.	[38, 43]
ii.	Family	Many food choices are made in the context of the family. Family food choices are simple rational decision based nutritional and palatability. Food choice in family is emotionally charged issue and thus family affects the food choice.	[44]
iii.	Peers and siblings	Both have important influence on food choices of children and adolescents. Peers, however, often found to be negative influence on healthy eating behavior.	[45]
iv.	Meal patterns	Quality and quantity of intake both affected by meal pattern. It is useful indicator of life style and marker of inappropriate dietary intake.	[46, 49]
5.	**Psychological Factors**		
i.	Mood	Has strong effect over the choice of food. Food has healing power and food is a tool to modify the temperament and mood. Influence of food on mood is related in part to attitudes towards particular foods.	[35, 50]
ii.	Stress	Individual, stressor and circumstances are the factors responsible of effects of stress on food intake. Some people eat more and some eat less than normal when get stress.	[51, 52]
iii.	Guilt	Today's more educational messages in public domain can cause unintended side effect and fuels feeling of guilt and worry about food.	[53]
6.	**Personal Factors**		
i.	Attitude	Attitude is relevant to implementing dietary recommendations ranges from general attitude (changing diets for heath purposes) to specific attitude (towards specific foods) Attitude change is an important mediating variable between the acquisitions of new knowledge to behavioral change.	[5]
ii.	Belief	Belief about the nutrition quality and health effects of food may more important than the actual nutritional and health consequences in determining consumer's choice.	[5]
iii.	Knowledge	Application of correct nutritional knowledge can lead to direct action about healthy diets. Nutrition related information when comes from several sources, is viewed conflicting and mistrusted thus discouraged the motivation to change the food.	[5]

Factors affect the food choice

India is the second-most populous country and it has had impressive economic growth in the last few decades. Still, there is a large opportunity for enormous growth in every field due to its vast heritability. Despite the availability of deep-rooted rich resources, extreme poverty, and food insufficiency are still big challenges were at one side of our country. The consumption of high fat, sugar, and fast food or junk food has created another big issue [12] on the other side. Consumption of fast food in a country like India is a growing trend among new generations. Consequently, fast or junk foods have now become an important part of the dietary system. In addition, the show of culture in our society is working as a fuel for the tendency to consumption of fast food. Several researchers have also reported on some factors that affect food choices.

In several studies, it has been reported that the content of salt, free sugar, fats (saturated fats, trans fats), calories, carbohydrates, preservatives, etc. in fast food is high than the level. The high content of these ingredients in fast foods is causing several health issues. For instance, according to Kaushik et al. [15], the deep frying method of cooking is more common in India. This method is used mostly for the preparation of several fast foods including bhature (which is famous by the name

chhole-bhature), paratha, and pooris almost in every part of India. Trans fat content, as a result, in bhature (9.5%), paratha (7.8%), and puris (7.6%) is very high in comparison to French fries (4.2-6.1%), a much-known western fat food. Mean to say that Indian fast foods have a higher content of trans fat and worse in comparison to western fast foods. The high trans-fat in Indian fast food is perhaps one of the main reasons for becoming India the hub of patients with diabetes and coronary heart diseases (CVD). Nowadays, India is a leading country having the highest case of the acute coronary syndrome and STEMI (St-segment Elevation Myocardial Infection) [16]. The recommended level of major nutrients and their availability in some fast foods is, therefore, presented in Table 2 for more understanding.

What is biological clock?

Biological clocks, composed of proteins (i.e., specific molecules), are an organism's innate timing device found in nearly every tissue and organ and are fundamental to the functioning of lives and to the organization and coordination of behavior. However, the simple behavioral functions (i.e., timing active and inactive periods) rely on internal clock functions during the day/night cycle for maximizing productivity and minimizing the risk [17]. The specific molecules interact in cells throughout the body. Similar genes are also reported by researchers in fruit flies, fungi, mice, people, and several other organisms that are responsible for the structuring of the biological clock's components [18]. All biological clocks, in every living thing, however, are coordinated by a master clock in the brain and maintained in sync. Sync means to work together: to operate a system, the coordination of events in unison. The master clock (in human and invertebrate animals) is a cluster of about 20000 neurons (nerve cells) that make a structure known as the suprachiasmatic nucleus (or SCN i.e., a bilateral structure) located at the base of the anterior hypothalamus in the brain, receives the direct input from eyes and controls the circadian system. The biological clocks, thus, produce not only the circadian rhythms but also regulate their timing [17-18].

Table 2. Recommended level of major nutrients and their availability in fast foods.

S.No.	Major Nutrients		Recommended level	Fast foods and availability of major nutrients	Reference
1.	Fats	Total Fat	15-30% of total intakes of calories including maximum recommended level of sat. fat and trans fat (as NIN)	Potato-Chips:33g/100g, Indian snacks:36.9g/100g,Instant-noodles:14.1g/100g,Burger: 11.9g/100g,Pizza:7.1g/100g and Fries 19.9g/100g.	[11]
		Saturated Fat	Not more than 10% (as per NIN)	Haldiram-Bhujia:6.32%; Kurkure:16.6%;Potato-chips(Lays):16.6%;Yippee-noodles: 10.21%	[12]
		Trans Fat	1-2 % (as per NIN) or 1.0% (as per WHO) of total fat	Potato chips:4.5%; Fries: 8.1%; Instant Noodles:4.6%; Indian snacks: 4.3%; Burger: 3.5%; Fried chicken: 2.9%; Pizzas: 1.1% and KFC French Fries: 9.2%.	[11]
2.	Carbohydrate		50-60%total energy intake (as per NIN)	Potato-chips:57.5g/100g; Indian-snacks: 49.9g/100g; Instant-noodles:71.6g/100g; Carbonated-drinks:14.4g/100g; Veg.-Burgers:43.4g/100g; Non-vegBurgers:32.9g/100g; Pizzas: 50.3 g/100g; Fries: 56.5 g/100g; Top Ramen-noodles:73.3g/100g and Fried chicken: 14 g/100g.	[11]
3.	Salt		0.6g/Person/day (as per NIN)	Maggi masala:42 g/100g;	[11]

		or 0.5g/Person/day (as per WHO	Top Ramen noodles: 32 g/100g;Potato chips: 1.2-3.5 g/100g Veg. Burgers: 1.7 g/100g Non-veg. Burgers: 1.5 g/100g Pizzas: 1.0 g/100g Fries: 0.4 g/100g and Fried Chicken: 0.9 g/100g	
4.	Protein	10-12% of dietary calories (NIN)	Haldiram Bhujia: 16g/100g Kurkure: 5.8 g/100g; Potato chips (Lays): 6.9 g/100g Yippee noodles: 8.8 g/100g	[12]
5.	Free Sugar	10% of total energy intake (WHO & NIN)	Soft drinks, cordials, biscuits, cakes, etc.	
6.	Dietary Fibre	40g/ 2000 Kcal diet as per ICMR)	-	[54]

Changes (physical, mental and behavioral) that follow a 24-hour cycle are called circadian rhythms [17]. Sleep-wake cycle, secretion or release of hormones, body temperature, eating habits, digestion, and other important diverse biological functions (such as hungry, resting, thirst, urine passing, etc.), behavioral and emotional bodily functions can be influenced by the circadian rhythms. The slow or fast running of biological clocks (i.e., composed of specific molecules) can disrupt the circadian rhythms. Thus, disrupted or abnormal circadian rhythms can result in various chronic health issues. Several studies have reported that irregular rhythms are closely related to obesity, bipolar disorder, sleep disorders, diabetes, depression, seasonal affective disorder, etc. like diseases [19].

The circadian word is, however, made of two Latin words 'Circa and Diem". Both 'Circa' and 'Diem' in combination formed Circa Diem and transformed into "Circadian" which meant "around the day". Circadian rhythm is, thus, the routine biological process around the day (24-hour cycle) followed by the human body [19-20].

Factors affecting biological clock

As it was discovered that the biological clocks are composed of specific molecules i.e., clock proteins, the significant effects of circadian clocks on metabolism were also confirmed. Clock proteins are the main building blocks of biological clocks and are responsible for creating self-sustaining transcriptional rhythms or the cell-autonomous creation of their protein levels. In addition, cell proteins are responsible for controlling the circadian rhythm of many target genes [21]. Several events (arousal stimuli, light, temperature, food/feeding, etc.) which are temporarily external events can be synchronized significantly by them [22]. For instance, the melatonin hormone, which is derived from a pineal gland, plays a significant role in the synchronization of the sleep-wake cycle and the circadian clock. It has been reported by several researchers that the secretion of melatonin hormone is generally regulated by exposure to environmental light. Therefore, it can be said that external light affects the production of melatonin. Similarly, sleep which is an essential activity for carrying out good metabolic health [23] can be facilitated by removing the waste byproducts and restoring the important metabolites [24]. The signal transduction pathway, where visible light is perceived by the eyes, is mediated by the changes in pineal melatonin production. It has been reported that the visible light in the wavelength range 460-480 nm is inhibitory to the production of pineal melatonin.

Several hormones secreted from pituitary glands are circadian. Among these circadian hormones, plasma levels of cortisol, thyroid-stimulating hormone (TSH), prolactin, and growth hormones are more common. These hormones oscillate throughout the day and their secretion varies during the 24-hour oscillation with different levels. For instance, the secretion of growth hormone,

thyroid-stimulating hormone and prolactin are high at night while the plasma level of cortisol is reported high in the morning. However, the plasma glucose levels in non-diabetic participants have been reported high in the evening in comparison to the morning. It means that with the time of day, the response to a glucose challenge is very different.

The response to glucose challenge in non-diabetic adults is different concerning the different times of day and independent of the route of administration. The plasma glucose level has been reported higher in the evening session in comparison to the morning time [25]. In addition, the secretion of insulin levels after meals also oscillates during the 24-hour day/night cycle. For instance, the post-meal insulin level decreases in the morning while increasing in the evening. There are various environmental, applications, and practice-related factors [20] that affect our circadian rhythm. Some of them are light, weather conditions, social situations such as deaths, injury of others, etc (environment); diet, sleeping time, exercising, working, eating time (practice); mobile, laptop, tablets, television, etc. (applications), etc. Light is a photonic element and key factor affecting the biological clocks and serves as a stimulus to induce responses. Light can turn on/off genes responsible for controlling the biological clock's molecular structure. Variation in the light/dark cycle can cause changes (slowing down/or speeding up/ or re-setting) in biological clocks or circadian rhythms. Exposure to light suppresses the melatonin secretion and shifts the circadian phase. For instance, light (morning) in the morning advances the clock, while light in the evening and night delays the biological clock. Similarly, the circadian phase can also be affected and shifted by exposure to intermittent bright light [26] and only five minutes of multiple time exposures to bright light can integrate the human circadian system [27].

Several studies have reported that physical and mental health is highly dependent on sleep [5]. If there is a problem with sleeping, there is more chance of suffering from anxiety, depression, etc. Sleep is influenced by lifestyle. For instance, a lifestyle with regular exercise or physical work results in good sleep due to entraining of the circadian clocks in peripheral tissues (such as muscle, liver, lung, etc.) via the sympathetic nervous system. As skeletal muscle has a strong circadian profile and exercise is a potent modulator for skeletal muscle metabolism, the well-characterized exercise has, thus, been reported as a crucial intervention in the prevention and treatment of metabolic diseases. Exercise can therefore act as Zeitgeber. Zeitgeber means a rhythmically occurring cue that can be used as a tool to combat metabolic diseases [28]. In contrast, electronic gadgets which are important parts of modern life may change the pattern of sleep and disturb sleep, and late-night mobile may cause symptoms of depression [29].

Further, the busy schedule and hectic lifestyle have now compelled so much that one has so little time to think whether what he is eating is a healthy diet or not. In addition, there are many adverse effects on human health due to the consumption of food items in the modern system. Globalization has seriously affected one's eating habits and enforced many people to consume fancy and high-calorie fast foods, popularly known as Junk foods [30]. Many factors such as household income, cost of food, lack of knowledge, loss of cooking skills, lack of time, etc. cause people particularly young and well-educated people not to follow the nutritional advice and their interest in contrast shifted towards the modern food/fast food/junk food/or zero-calorie food.

Many researchers now believe that a decrease in life expectancy depression and chronic health problems are partly related to diet. But a single gene mutation is responsible for diseases like stroke, certain cancers, heart diseases, and type-II diabetes. These are responsible for the dysfunction of biological networks. Furthermore, our diet, which is lacking in essential nutrients, appears to play a significant role in the dysfunction of biological networks. Timing of food intake has as much influence on energy homeostasis as the nutritional content of diet and gut signaling.

The timing of food intake has as much of an impact, if not more, on energy homeostasis as the nutritional content of the diet and gut signaling. Recent studies have shown that meal timing (TRF) is diverse in the general population, indicating that more precise medicine is needed to identify those

with poor eating patterns [31]. Additionally, selective behavioral changes are recommended in these people to improve their metabolism. The ongoing effort to monitor food intake and daily patterns of sleep and other activities such as the time phase of smartphone use lead to significant gains in metabolism [32]. TRF not only prevents obesity but also improves glucose and lipid homeostasis. Additionally, it has beneficial effects on other metabolic organs such as the liver, heart, and brown adipose tissue.

These effects are accompanied by synchrony and more robust oscillation between circadian effectors and metabolic regulators. These effects result in entraining of feeding and fasting cycles. Although restoration of circadian and metabolic synchrony correlates with improved metabolism, the mechanism by which it improves is still not fully understood.

Remedies to Protect Circadian Rhythm

The disturbance of our circadian rhythm is caused due to several factors as discussed above. For instance, the light and dark cycle in our daily routine affects the environmental factors: temperature and humidity which stimulate the different functions of the human body such as body temperature, blood pressure, digestion, sleep hormones (melatonin), etc. the modern lifestyle, thus, if disturbs our daily routine, there would be more chance of disturbing of our blood pressure, digestion, sleep-wake cycle, etc. and consequently, the possibility of an attack of various diseases is also increased.

Obesity, jet lag, sleep, mental disorders, etc. thus, can be treated by understanding what can make our biological clock in alignment. Understanding the biological system, however, can be enhanced by deep learning about the genes responsible for the circadian rhythms [33]. According to WHO, genetic disease can be reduced by the reformation of an unhealthy lifestyle. Several researchers have reported several tips for maintaining a healthy circadian rhythm. Table 3 is displayed some obvious and less obvious recommendations for maintaining a healthy circadian rhythm.

Table 3. Remedies to misaligned circadian clocks.

S.No.	Factors	Action needed	Description
1.	Mobile, computer, tablet, etc.	Stay off before bedtime	Try to avoid, if it can't be avoided, should not go over more than 2hrs and dim the screen as much as possible.
2.	Television	Don't watch late night sports/ news	Sports and news are full of stress should be avoided. For instance, sports may cause you revived-up, especially, when you are a fan of a particular team.
3.	Activities before bed	Settle in, wind down	To diffuse the agitated and stressed mind meditation, prayer, listening music, etc., should try to practice before going to the bed.
4.	Sleeping time	Go to bed no later than 11:00 p.m	Aristotle, a Greek Philosopher, has already said that it is well to be up before daybreak, since such habits contribute to health, wealth and wisdom."Early to bed and early to rise, makes a man healthy, wealthy and wise" is the great version of Benjamin Franklin.So we should be tuned to nature and try to be in bed by 11.00pm. Try to be consistent with your bedtime.
5.	Eating time	Eat lightly or not at all in the evening	To support our circadian rhythm we should avoid heavy meals at night and thus try to downshift at night.Triggering of insulin and energy spike, responsible for serious tossing and turning, can be stopped by avoiding refined sugar. As tryptophan, a calming amino acid, in milk is beneficial our body, we can use a glass of warm milk to satisfy late night hunger.
6.	Electric lighting	Keep your bedroom free of light sources	For proper production of melatonin, the sleep hormone, we need to be surrounded by darkness.
7.	Earthing (grounding)	Connect yourself with the earth's gentle	To reduce inflammation and pain, to promote blood flow and normalization of natural circadian pattern of

		energy either by bare foot outdoors or in contact with conductive bed sheets and mats indoors	stress hormone cortisol which is often out of sync, and to calm the nervous system regular earthing is important. 20 minutes walking barefoot on grass or concrete just after flying over multiple time zones is a good way to deal with the jet jag and helps in the aligning of the biological clock with the local time zone. Voltage in our body that is induced AC current appliances and wiring can be eliminated.
8.	Electromagnetic fields	Minimize ambient electromagnetic fields	Avoid disturbance due to radiations from electromagnetic appliances and wires in bedroom. Sometimes, sleep disturbances caused by them. So, try to remove electronic gadgets such as (radio, TV, tablets, PC, etc.) from bedrooms and keep these away from sleeping places. In addition, it would be better to remove the plug of lamp near to bed instead of turn off.

Conclusion

This article has discussed the effect of various factors including modern lifestyle affecting food choices and circadian rhythm. The choice of fast food and its consumption trend in today's lifestyle due to several reasons or determinants of factors is creating not only health issues among children and adults but also creating an extra burden on the health system of our country. Since, the availability of some major nutrients such as total fat, trans fat, saturated fat, free fatty acids, free sugar, carbohydrate, salt, etc, in most fast food is noticed higher while the amount of protein, dietary fiber, antioxidants (Vit. C & E, Beta Carotene, Riboflavin, selenium, etc), phytochemicals (polyphenols, flavones, etc), etc. is noticed lower than the recommended daily allowance. The high and low levels of the above-discussed contents and misaligned circadian rhythm are responsible for various non-communicable coronary diseases such as cardiovascular disorder, cancer, type-2 diabetes, obesity, weight gain, etc. However, we can improve our health and can live in sync with our circadian rhythms by adopting nutritious healthy diets and following recommendations given by several researchers, and consequently, we can lead a meaningful life in terms of health. This review article, thus, provides very useful and important information for human well beings in one place and could be more beneficial to people who suffer from disturbed biological clock and various non-communicable cardiovascular diseases (CVD).

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