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Each minute of the life of man is under the influence of a whole spectrum of biological rhythms with about hourly, 24 hourly, monthly and roughly seasonal periods. These rhythms have been given to human being by nature. They command his mood, determine his work efficiency and inclinations and also control his health.

As adaptive value of the living being and their system to the environmental rhythm was recognized, the theme of chronobiology was initiated. The deeper study in this direction revealed fascinating facts about not only adaptation of system to the external environmental variations but also to indigenous adaptation which were dependent upon internal timing mechanism. These observations have now been justified on the scale of statistics regarding their validity and at the same time, the rhythms of existing knowledge have been clearly defined. Its significance and practical importance in day to day life is giving greater and greater recognition to the science of chronobiology.

Chronobiology, is the science, dealing with the time as it is related to activities, right from the molecular level of a living being, from a unicellular organism to a complex organism as the human being. The investigation of biorhythms has revealed much valuable information about the functions of a living organism. Today it is known that rhythmicity of different physiological functions is inherited in every
biological system. Chronobiological hypotheses admit the possibility of obtaining at
different predictable times, dramatic differences in the extent of an effect and admit
even response to the identical stimulus and dose at different predictable times. Hence,
chronobiologic variations, if ignored, may confuse the testing of a given hypothesis. If
evaluated in work on drugs, chronobiologic information seems to be particularly
useful: it can now be documented that the same drug changes the sign of its effect
upon cancerous growth from enhancement to inhibition, as a function of timing along
two scales, circadian and circaseptan.

Chronobiology aims at studying the apparent matching or co-ordination in
times of diverse systems. Of course, the subject is complex, but is of great importance
in maintenance of health.

Now a further progress of medicine is unthinkable without a proper appraisal to
the changes in the condition of the organism during various times along the 24 hours
scale (circadian changes of a healthy organism). Such studies are of great importance
in the evaluation of the state of health of a person and particularly in arriving at a
diagnosis. The study of biorhythms of the body is helpful not only in diagnosis but it
also plays very significant role in the correct application of treatment at right time
during a 24 hour period. For example, it is established that in diurnally active,
o nocturnally resting human being, the pair of adrenal glands functions most actively
during the span from 0300 hr until 0700 to 0800 hr whereas during other times such
as the evening hours, their functions may be very low. Therefore, corticosteroid preparations should be given according to temporal indications. Another diagnostic use of knowledge of biorhythms lies in conditions where the presence or absence of a rhythm needs to be ascertained. The most familiar instance of these is in plasma cortisol level, which in adrenal deficiency is low throughout the 24 hours, in Cushing's syndrome it is high throughout the 24 hours period, while in the healthy subjects it oscillates between extremes so that the morning value may not be higher than that observed in Cushing's syndrome and the night value not lower than that observed in adrenal failure.

Overall developments in chronobiology have given us sufficient evidence to support following generalisations:

1. Oscillation is a fundamental characteristic of all living systems.
2. Rhythm can be found at all levels of organisation within an organism.
3. Rhythms are inherited, innate and indigenous
4. The circadian system serves to adjust the organism continuously, frequently in advance to the changing environment or social routine.
5. A wide range of rhythmic frequencies can be detected within an organism.

Because the biological system is rhythmically changing, it follows that the organism is biochemically different entity at different circadian phases. Therefore it reacts differently to the same stimulus at different times and under different
physiological conditions. This differential response to an identical stimulus at different phase of the circadian system repeatedly has been documented for a variety of stimuli. These include drugs, poisons, chemicals, physical agents such as noise, X-ray radiation, biological agents such as endotoxins and surgical stimulus.

In the last five years the chronobiological aspect has assumed an increasingly more general and decisive significance in clinical research. Chronobiology, in fact, has been transformed from being a new branch of biological research into a new method determining and modifying substantially all the traditional types of investigation. This has primarily occurred as a result of the demonstration that every biological function changes rhythmically with time, so destroying the biological myth of homeostasis. On the basis of the new parameter of ‘time’, current clinical research is re-examining the significance of so-called ‘normal values’, determining the existence of personal ‘temporal’ as well as anatomical features, and improving and augmenting diagnostic and therapeutic measures.

The rhythmic variations in several frequency ranges encountered in most metabolic functions are of considerable physiological and pathological interest and a chronologic approach to sampling and the evaluation of laboratory results relating to the metabolic system is essential to obtain meaningful results. The metabolic rhythms are synchronized and/or modulated by superimposed and juxtaposed controls and by feedback mechanisms. Rhythms of different endocrine functions may interact at
several levels, e.g. estrogens and prolactin interact both at the level of a hypothalamic pituitary feedback mechanism and in the epithelial cell of the breast.

The normal periodic changes of the different metabolic components is regarded as characteristic for the state of health and alterations of these variables by changes in the timing of one or the other metabolic rhythms can be traced to functional disturbances (Haus & Halberg, 1980 and Hermida et al., 1982) including mental disorders (Wetterberg, 1978 and Wehr et al., 1980) and to organic diseases (Tarquini, 1980; Tarquini et al., 1981 and Hermida et al., 1982).

Although the adrenals were known since long, but their physiological significance could be realised only after the description of a clinical syndrome resulting from the destruction of adrenals by Addison in the year 1855. Following these observations Brown Sequard (1856) experimentally showed that adrenalectomy resulted in the death of various animals. He concluded that adrenal glands were essential for life. Later on, it was generally accepted that adrenal cortex, rather than medulla, was essential for maintenance of life. Subsequently adrenalectomized animals were found to exhibit a number of physiological abnormalities. These included excessive sodium excretion (Harrop et al., 1933), depletion of carbohydrate stores (Coni & Coni, 1927) and hypoglycemia (Porges, 1910). Loss of adrenal cortex either by surgery or by disease induced profound changes in biochemical and physiological function of the body (Ingle, 1944). All these alterations in physiological
functions can be reversed to normal by the administration of corticosteroids. Further progress in this field resulted in development of more potent synthetic analogues of adrenocorticoids which have a wide range of therapeutic use especially as anti-inflammatory agents. However, in normal conditions administration of adrenocorticosteroids resulted in hyperglycemia, water and sodium retention, hypertension, oedema, negative nitrogen balance and muscular wastings. On the other hand adrenal gland itself appears to be quite sensitive to a variety of stimuli and pathological states. Almost all types of stressful stimuli and certain diseases have been shown to alter the adrenocortical functions.

Adrenal cortex contains three different zones i.e. zona glomerulosa, zona fasciculata and zona reticularis. The outer most zone (zona glomerulosa) is the thinnest and consists of columnar cells arranged in groups or curbed columns. The middle zone (Zona fasciculata) is broadest and consists of large polyhedral cells arranged in parallel strands or columns. The inner most (zona reticularis) consists of cells which are arranged irregularly.

Alterations in corticosteroid metabolism have been reported in health and disease (Mills, 1966 and Nicolau et al., 1982; Nicolau et al., 1984; Krieger, 1974, 1979; Singh et al., 1975 and Singh and Udupa, 1977; Allen et al., 1957; Bulbrook et al., 1962). Similarly abnormalities of adrenocortical function have been observed in hypertension (Kornel and Motohashi, 1965), Leukemia (Dobriner et al., 1954),
obesity (Cohen, 1958 and Simkin, 1961), psychiatric disorders (Bliss et al., 1956), peptic ulceration (Green and Pulvertaft, 1962; Stock Bull, 1964 and Moore, 1963), pulmonary tuberculosis (Brahul et al., 1963) and tropical pulmonary eosinophilia (Singh et al., 1987). Corticosteroids are finding very important place amongst the various therapeutic agents and are being prescribed in many clinical conditions. Taking into account the wide application and use of corticosteroids and their analogues, it appeared quite reasonable to study the circadian variations of adrenocortical functions in terms of secretory and excretory products in healthy young volunteers and in various pathological states where the therapeutic efficacy of corticosteroids is well proved and/or the direct involvement of adrenal cortex is obvious. Rhythms are continuously modulated, modified and adjusted in time or synchronized by periodic events in the environment. The influence and importance of different synchronizers vary from function to function and region to region. There is no mention in available literature regarding circadian variations and amplitude test in young healthy Indians and patients suffering from carcinoma of breast, tropical pulmonary eosinophilia and pulmonary tubercular patients in tropical conditions. Nutritional status, social traditions and environmental factors in a country like ours are quite different from other parts of the world especially the Western countries. Quite possible ethnic and geographic differences including climatic and dietary factors may influence and/or alter the usual values as reported in Western literature
and circadian rhythmic patterns of endocrine and metabolic function in physiological and pathological conditions.

The circadian rhythm in Diabetes mellitus is mainly correlated to its linkage with the diverse metabolic function. Considering the normal sleep cycle, a patient with diabetes taking dinner at 20:00-22:00 hrs with insulin injection just before meal may show decreased blood sugar in early morning hours (3:00 hrs) (Foster DW et al., 1990). This may be because of expected insulin action. But on the other hand, the same patient may show early morning hypoglycemia followed by morning hyperglycaemia (due to counterregulatory growth hormone release) at 7:00-8:00 hrs. This is called Dawn Phenomenon.

Blood pressure has a circadian rhythm rises in morning and gradually declines to become minimum in evening (Williams GH, 1989). During sleep BP decreases during NREM sleep (non-rapid eye movement) and is variable during REM sleep. BP rise in the morning hours may be because of the elevated corticosteroids at that time. Neurotransmitters involved in sleep (serotonin and norepinephrine) and hypothalamic sleep centers may play a role. Nothing is substantially proved (Dahlof, 1992).

It has been seen that incidence of strokes and myocardial infarction is higher in the morning hours (Petroff J, 1983) and in the winter season. Vasoconstriction
secondary to a feeling of cold in the morning and in the winter has been implicated as the cause. Vasospasm may produce transient ischemia of the arterial territory.

Therefore, the main aim of present study was planned to re-examine and explore the circadian changes, if any, in endocrine and metabolic function in health and disease in order to have a better understanding of the functioning of normal and abnormal endocrine and metabolic system (values) in various pathological conditions and its rhythmic variations during 24-hour light-dark period in tropical conditions.

These observations may probably be helpful in diagnosis and management of organic disorders.