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Association of fasting plasma glucose levels with wake-up timings in diabetic patients in India

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Background
The median sleep time per night has been declining in the world consistently over last 5 decades. The timing of sleep is distinct characteristic of sleep patterns that may impact metabolic disease risk independent of sleep duration, possibly through the effects of circadian rhythms on metabolism. The sleep and wake up timings are driven by both endogenous circadian rhythms that regulate sleep propensity, energy homeostasis and metabolism as well as by sociocultural factors that influence behaviour. As diabetes mellitus carries a high risk of cardiovascular-related mortality, the impact of sleep deprivation on glucose regulation suggests a mechanism whereby short sleep time might increase mortality.
Aim
Aim of our study was to determine the association of wake-up timings with fasting plasma glucose levels in rural Indians.
Materials and Methods
512 diabetic patients between age group 25 years to 75 years who visited our hospital in rural India from September 11, 2020 to June 15, 2021 were studied. Sleep timings and wake up timings were noted. Fasting plasma glucose levels were obtained by venepuncture after an overnight fast of at least 8 hours and blood glucose estimation done by the hexokinase method. One way ANOVA and post hoc Tuckey test were used for analysis.
Results
We found that fasting plasma glucose was significantly higher in patients who wake up after 0700 hours compared with patients who wake up early before 0600 hours. This difference was statistically significant with *P* value of less than 0.001. Furthermore, fasting plasma glucose values were significantly less (better) in the patients who wake up before 0500 hours.
Conclusions
Our study supports that waking up early (before 0600 hours) in the morning can lead to better fasting glucose levels compared to those who wake up after 0700 hours. One possible explanation for these associations is circadian disruption, which occurs when different endogenous circadian rhythms are not synchronized with one another and/or with the external world. Circadian disruption could occur when the timing of volitional behaviours, including sleeping and eating, are not aligned with the endogenous circadian rhythms of associated physiological processes, such as sleep propensity, insulin sensitivity, or glucose metabolism. Waking up early provides more time to do physical activity and also for recreational purpose which leads to better fasting blood glucose levels. Further research is necessary to determine whether sleep and wake up timings do in fact lead to alterations in glucose metabolism.

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The role of deferoxamine (DFO) in insulin resistance and diabetes

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Iron also plays an important role in many physiological processes, including redox balance, inflammation, and metabolism. It is reported perturbation of iron (Fe) homeostasis has also been associated with metabolic diseases. Iron reduction, with iron chelator, has preventive effects in cardiovascular remodeling and obesity. On the other hand, deferoxamine (DFO) increases hypoxia and collagen production in the kidney. Thus, the effects of DFO on metabolic disease remains controversial. As a result, we investigated the effects of DFO on obesity, inflammation, insulin resistance, and diabetes in db/db mice models with type 2 diabetes. An in vivo study was performed on 7-week-old db/db mice. Mice were treated with DFO (100 mg/ kg) or placebo every other day for 16 weeks. After treatment, an intraperitoneal glucose tolerance test and immunohistological examinations were performed. Fasting insulin and serum lipid levels were measured at the end of the study. Also, genes involved in inflammation and lipid metabolism were analyzed by real-time PCR. The DFO treated mice showed improved obesity, insulin resistance, and decreased levels of plasma inflammatory cytokines, total cholesterol, free fatty acid, and triglycerides. Fasting glucose in mice was also reduced by DFO treatment. Immunoblot analysis shows transferrin receptor 1 (TfR1) levels were increased in skeletal muscles of db/db mice models with type 2 diabetes. But DFO treatment decreased transferrin receptor 1 (TfR1) levels in skeletal muscles. DFO treatment also attenuated inflammatory cytokines and lipid deposition in the liver. Therefore, we consider the fine tuning of iron levels through DFO treatment as highly suggestive for preventing and/or treating insulin resistance and diabetes.

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Assessment of hypoglycemic properties of extracts from some medicinal plants in the experimental diabetes model

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Phytotherapy is the integral part of the combined treatment for diabetes mellitus. A large number of plants possessing hypoglycemic activity are described in the literature, but only small part of them is in use. Hypoglycemic effect of medicinal plants is preconditioned by the wide spectrum of compounds with biological activity in their composition. Flowers of carthamus (*Carthamus tinctorius*) and leaves of celery (*Apium graveolens*) are known to possess a number of therapeutic effects. In combination, bioactive compounds are known to amplify each other's effects. In this connection, we have studied hypoglycemic activity of aqueous extracts of carthamus flowers and celery leaves, as well as the mixture of their extracts in rats with alloxan diabetes. The extracts were administered intragastrically for 2 weeks. The experimental animals were divided into 5 groups. Intact animals were included into the 1st group, the 2nd groups consisted of animals with alloxan diabetes (alloxan controls), the 3rd one included those administered with carthamus flowers, the 4th group consisted of those administered with celery leaves; animals with alloxan diabetes administered with the mixture of carthamus flowers and celery leaves (1:1) were included into the 5th one. Our findings demonstrated the reduction in the blood glucose of all animals with experimental diabetes after a course administration of the extracts, as compared to the alloxan controls. Thus, blood glucose in rats with alloxan diabetes for 2 weeks administered with the mixture of carthamus flowers and celery leaves was found to reduce from 18.4 mmol/l to 5.7 mmol/l and 8.5 mmol/l. respectively, while in rats with alloxan diabetes it declined due to regeneration of β-cells to 13.5 mmol/l. Following the course administration of the extracts, the blood glucose in animals similarly reduced reaching the normal parameters. Hypoglycemic effect of the extracts under study increased in this order: celery extract, carthamus-celery mixture and carthamus extract.

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Patient with pancreatic diabetes and insulin pump

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Introduction
Pancreatic diabetes is a special category of diabetes due to diseases of the exocrine pancreas, characterized by both insulin and glucagon deficiency and clinically could be very challenging to control. We present a case of a woman with pancreatic diabetes treated with sensor augmented pump therapy after undergoing total pancreatectomy for a nonfunctional pancreatic neuroendocrine tumor (NET).
Presentation
A sixty-one years old woman underwent two years ago total pancreatectomy for a non-functioning neuroendocrine tumor. Consequently she developed pancreatic diabetes and was treated with a basal - bolus insulin regime. Her diabetes was poorly controlled despite all efforts due to severe, frequent and sudden hypoglycaemic attacks, affecting her quality of life. Her HbA1c was 8.5% and