Oral Presentation 2

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OP 2-1 1. Behavior and Public Health for Obesity

Unravelling the impact of obesity and oxidative stress on reproductive health of infertile women

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Background: Obesity is associated with various reproductive disorders in women including reproductive impairment such as menstrual disorders, anovulation, unable to conceive, miscarriages /recurrent miscarriages, and pregnancy defects outcomes. Thus, obesity poses some severe challenges in women. The purpose of the study is to investigate the association of infertility with obesity and oxidative stress in women.

Methods: The clinical investigation was performed among infertile and healthy married female patients aged 18-45. Patients (50 fertile and 50 infertile women) were randomly selected from the Department of Obstetrics & Gynaecology, King George's Medical University, Lucknow, India. Written consent and lifestyle information of patients were collected during blood sample collection. Oxidative stress and antioxidants biomarkers were determined by Elisa sandwich method and data were statistically analyzed by t-test at $p < 0.05$.

Results: Demographically, it was observed that most of the subjects who belonged to the rural areas, were not literate, and most of the infertile patients were facing irregular menstrual cycles (48%) and imbalances in their reproductive hormone levels. Significantly the higher level of prolactin hormone was observed in our result, which indicated that ovulation may be suppressed due to oxidative stress. Body Mass Index (BMI of 27.72 ± 4.23) of infertile women was higher as compared to control subjects. The study observed glutathione peroxidase (GPx) and catalase (CAT) ($p<0.0001$) enzyme activities were significantly higher in infertile patients when compared with the control subjects. The Lipid peroxide levels were found to increase in cases compared to controls. The enzyme activity of superoxide dismutase (SOD) and glutathione reductase (GR) activity was declined in the case of subjects as compared to control subjects.

Conclusion: The results of this study suggested that obesity and oxidative stress affect fertility in infertile women. Infertile women who were overweight and obese were at high risk for reproductive disorders.

OP 2-2 2. Nutrition, Education and Exercise for Obesity

Beyond the Scale: The Effect of Trim and Triumph (TNT) Challenge on Metabolic Parameters in Overweight and Obese Office Workers.

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Background: Obesity is not only a global health challenge but also correlates with a sedentary lifestyle. Weight loss programs, that include structured training and a controlled diet, have been shown to lower the risk of developing obesity-related complications. Our study investigates the effectiveness of the TNT challenge on body fat, blood cholesterol, fasting blood glucose, high-sensitivity C-reactive protein (hs-CRP), and leptin levels, among overweight and obese office workers.

Methods: A total of 40 overweight and obese participants, with an average age of 35 ± 5.49 years old, and a body mass index (BMI) of 32.80 ± 5.75 kg/m2, were enrolled in the TNT challenge. This challenge comprises of 36 sessions featuring intense workouts, dietary guidance, and fitness assessments with the supervision of fitness trainers and a nutritionist. Anthropometry tests and blood tests were assessed before and after the challenge. Data were analysed by using the IBM SPSS Statistics version 29.0.1.1.

Results: After a 12-week weight loss program, significant differences were observed in weight (-5.62 ± 2.45 kg), BMI (-2.21 ± 0.99 kg/m2), body fat mass (-3.91 ± 2.19 kg), body fat percentage (-2.11 ± 2.12 %), total blood cholesterol (-0.41± 0.79 mmol/L), and LDL level (-0.28 ± 0.75 mmol/L) ($p < 0.05$), indicating decreases in these parameters. However, there were no significant differences in fasting blood glucose, hs-CRP, triglyceride, and leptin levels ($p > 0.05$).

Conclusion: Our findings show that the TNT challenge involving diet and lifestyle modification led to significant decreases in the weight, BMI, body fat mass, and blood cholesterol of the office workers. The implementation of this challenge would allow overweight and obese office workers to achieve improvement in weight-related outcomes, which could have long-term positive effects on their health and well-being.

OP 2-3 8. Pathophysiology of Obesity and Metabolic Syndrome

The Formation of Reward Memory through a Neuropeptide Y Spotlight in Nucleus Accumbens

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Background: The nucleus accumbens (NAc) has been recognized as a prime center for the reward. However, the mechanism by which neurons in NAc controls food-specific memory, especially for palatable food, remains unknown. Here, we demonstrated that NPY neurons in NAc control the formation of reward memory.

Methods: Experiments were conducted in mice utilizing photometry to observe real-time neural activity and optogenetics for neuromodulation. Furthermore, single-cell monitoring was performed using a miniscope, and electrophysiology was employed to examine the correlation with dopamine.

Results: Using calcium imaging, we demonstrated that NAc^{NPY} neurons encode the expected value and current value of food. Using miniscope, we also discovered that NAc^{NPY} neurons track the changes in value representations, with the role of updating value extinction. Optogenetic experiments showed that NAc^{NPY} neurons bidirectionally regulate feeding behavior by controlling food-liking. Furthermore, NAc^{NPY} neurons are sufficient and necessary for the formation of contextual and flavor reward memories. Interestingly, these effects are specific to the high-value condition (palatable food), not in the low-value condition (chow). The NAc^{NPY} neurons indirectly receive input signaling from dopamine.

Conclusion: In conclusion, these experiments provide strong evidence that NAc^{NPY} neurons encode positive memory for palatable food. Our findings could lead to the development of novel therapeutic strategies to prevent and treat obesity and food addiction.

OP 2-4 1. Behavior and Public Health for Obesity

Poor sleep quality and gestational weight gain across trimesters

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Background: Sleep quality has been reported as an emerging factor to prevent excessive gestational weight gain. However, the critical timing of which trimester where poor sleep quality influences GWG remains unclear. Hence, this study aims to determine the association between sleep quality across trimesters with GWG during pregnancy.

Methods: This was a prospective cohort study where 316 pregnant women at second trimester were recruited from maternal and child health clinics in Kuala Lumpur, Malaysia via convenience sampling. A total of 276 pregnant women completed assessment of sleep quality at both trimesters using the Pittsburgh Sleep Quality Index (PSQI), while total GWG was taken from antenatal health records.

Results: Prevalence of inappropriate GWG was 68%, with 29% inadequate GWG and 39% excessive GWG. Sleep latency, subjective sleep quality, sleep duration, and sleep quality was significantly deteriorated across trimesters ($p<0.001$). Second trimester sleep latency score was significantly higher for inadequate GWG ($F=4.396$, $p=0.013$). Third trimester subjective sleep quality score was significantly higher for inadequate GWG ($F=5.498$, $p=0.005$). Poor sleep quality was increased from second (62%) to third trimester (64%). During the second trimester, only increased sleep latency was observed to increase GWG ($\beta=-0.231$, $p<0.001$). However, during the third trimester, poor subjective sleep quality ($\beta=-0.207$, $p<0.001$), increased sleep latency ($\beta=-0.192$, $p=0.001$), and poor sleep quality ($\beta=-0.116$, $p=0.045$) was associated with increased GWG.

Conclusion: Poor sleep quality poses an increased risk of excessive GWG, especially during the third trimester. Future interventions should focus on addressing disturbed sleep during the late pregnancy period for optimum gestational weight management.

OP 2-5 2. Nutrition, Education and Exercise for Obesity

Different Individual Glycemic Response to Meal Composition and Type in Korean adults

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Background: The regulation of postprandial glycemic is complex, but meal composition and meal types are major determinants. Despite high variability between individuals, specific nutrition strategies can be developed based on individual glycemic responses. The aim of this study is to explore factors affecting postprandial glycemic response to typically consumed meals in apparently healthy Korean adults, in order to develop individualized nutritional strategies.

Methods: To monitor postprandial glucose levels, participants wore continuous glucose monitoring (CGM) for two weeks. During the intervention periods, three standardized mixed meals and a 75g glucose were administered on separate days following an 8-hour fast. The rice-based meal (typical Korean-style) contains 96.4g carbs, 15.3g protein, 15.6g fat, totaling 582 kcal. The bread-based meal (sandwich and mixed grain beverage) contains 77.1g carbs, 19.9g protein, 18.0g fat, totaling 550 kcal. The salad meal (fresh salad with chicken and drinking yogurt) contains 67.5g carbs, 28.8g protein, 24.7g fat, totaling 551 kcal.

Results: The average glycemic responses of the three meals corresponded to their carbohydrate contents. However, the postprandial responses of the rice-based meal and the bread-based meal were similar, despite their differing carbohydrate contents (96.4g vs 77.1g) and proportion (65.7% vs 56.1%). When the area under the curve (AUC) of postprandial glucose up to 180 minutes was calculated, the average AUC was 1166.4±181.9 mmol/L for the rice meal and 1171.0±162.2 mmol/L for the bread meal. Participants were categorized into two groups based on their higher response to either the rice meal (n=22) or the bread meal (n=25) according to the AUC of each meal. There were no differences in sex or age between the groups. However, individuals with a higher response to the bread meal showed a greater postprandial glycemic response to a 75g glucose load, with a higher coefficient of variation than those with a higher response to the rice meal (18.0% vs 13.8%). The bread meal has lower carbs contents than the rice meal. However, the mixed grain beverage as liquid form comprises half of the carbohydrate contents, which may lead to higher postprandial response in some individuals.

Conclusion: The postprandial response to mixed meals depends on meal contents and meal type, including the physical form (solid or liquid), and its effect varies by individual. Specific nutritional recommendations should be individualized based on each person's postprandial response to