Adipose Tissue, Appetite, and Obesity
INTEGRATED PHYSIOLOGY OF OBESITY AND METABOLIC DISEASE

Engagement in a Multi-Feature Digital Health Lifestyle Change Program as a Predictor of Weight Loss

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Background: Modern digital health interventions targeting weight loss employ multiple evidence-based strategies, including nutrition tracking, coaching, and activity monitoring, providing users with choice as they set and achieve their own goals. Still, limited research exists on the partial effects of each component of such interventions, and whether participants choose to use all of the features of a program. The objective of this study was to test the individual components of a fully-featured digital health lifestyle intervention as predictors of weight loss in a single statistical model. **Methods:** Participants in the study (N=25,273) were enrolled in the Livongo for Weight Loss program as part of their employee wellness benefit across 57 states/territories of the US from April, 2019 to January, 2021. Participants received a cellular-connected scale to use daily in the program; they were asked to track their eating via the app and physical activity via smartphones or wearables. Additionally, participants could engage with coaches voluntarily or by receiving feedback from coaches on their recorded food logs. A mixed-effects generalized linear model was used to test the effects of scale usage, physical activity, human telephonic coaching, and food logs without and without coaching feedback on the percent weight loss the following month. Predictors were disaggregated into between- and within-subject components to understand the impact of each component relative to one's own mean. The month in the program and whether or not that month occurred during the COVID-19 pandemic were entered as time-varying covariates. Baseline age, gender, and BMI were entered as time-invariant covariates. **Results:** Participants were 45% male and had average age of 54.3 years old (SD =11.4), with an average BMI of 33.10 kg/m^2 (SD: 6.2). On average, participants were enrolled in the program for 10.4 months (SD: 5.1). Each additional use of the scale above one's own average was associated with an overall 7.4% weight loss (z=21.06,p<0.001). Similarly, each additional minute of moderate-vigorous physical activity (MVPA) above one's own average was associated with an overall 2.4% weight loss (z=3.14, p<0.01). Lastly, coaching and food logging with coaching feedback at a frequency above one's own average were associated with approximately a 6% weight loss throughout the program (z=3.08 and 2.35, respectively; p<0.05 for both). **Conclusion:** We found that frequency of use of a scale in a weight loss intervention was most predictive of weight loss, followed by human coaching interaction and physical activity. However, food logging without feedback did not significantly impact weight loss among participants. Additional work is needed to understand drivers associated with increased utilization of beneficial program features, including optimizing the use of coaching, which offers great benefit, but may be costly to scale.

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Fetal Growth Disorders and Influence of Maternal Adiposity

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Introduction: Infant birth weight is recognized as the leading indicator of health among infants and affects a wide range of subsequent outcomes later in life. The incidence of neonates with high birth weight has increased in recent years. Many studies in the past have revealed that high birth weight is associated with neonatal morbidity and mortality and associated with complications in later life. These complications include shoulder dystocia, birth trauma, asphyxia, and neonatal deaths. In the later life these neonates have high risk for obesity, hypertension, diabetes mellitus and cancer. High pre-pregnancy body mass index (BMI) has been reported as a well-established risk factors for adverse pregnancy outcomes. Despite the high prevalence of maternal obesity in the gulf region, only a few studies in this regard have been published. **Methods:** A retrospective service evaluation was conducted at a secondary hospital to evaluate the effect of pre-pregnancy BMI on neonatal birth weight. 950 women were randomly selected from women delivered at or more than 37 weeks gestation and grouped on the basis of pregnancy BMI as group A-BMI 18.5–24.9 kg/m2, group-B- BMI 25–29.9 kg/m2 and group C-BMI >30 kg/m2. Infants were grouped according to birth weight as low birth weight(<2500 g), normal birth weight (2500–3999 g), and high birth weight >4000g and correlation was studied with maternal body mass index. Chi square test was used for statistical evaluation using Medcal online software. **Results:** In the study group, 34.43% women had normal body mass index, 37.21 % women were overweight and 28.36 % were obese. In group A, 6.50% and 4.64 % infants were with low and high birth weight, respectively. In group B, 4.3% and 5.73 % were with low and high birth weight, respectively. In group C, 4.51% and 20.33 % infants were with low and high birth weight, respectively. In comparison to women with normal BMI, low birth weight infants in group B (OR-0.922, 95% CI- 0.327–1.275) and group C (OR- 0.679, 95% CI-0.682–1.572) were not statistically significant. High birth weight infants in group B (OR- 1.2482, 95% CI- 0.3270 to 1.2756, p = 0.2080) and group C (OR-5.230, 95% CI-2.875–9.512, p= < 0.0001) were positively correlated with pre-pregnancy BMI. Pre-pregnancy overweight and obesity increased the risk of high birth weight (OR- 1.248 and 5.230 respectively). The results were statistically significant in obese women (p=< 0.0001). **Conclusion:** Women with pre-pregnancy overweight and obesity have higher likelihood of high birth weight in infants. Pre-pregnancy weight loss is the key to reduce maternal and fetal complications. Early pregnancy booking and antenatal fetal surveillance is recommended for all women with high body mass index.