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Early and Late Chronotype Have Similar Glucose Effectiveness in adults with Metabolic Syndrome

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Chronotype generally refers to the time of day in which someone prefers to perform specific activities. Early versus late chronotype is linked to lower risk of obesity and type 2 diabetes through, in part, insulin sensitivity. Low glucose effectiveness (GE), though, contributes to hyperglycemia, and it is unknown if there are differences in GE between chronotypes. **PURPOSE**: Determine whether GE differs between early (EC) and late chronotype (LC). **METHODS**: The Morningness-Eveningness Questionnaire (MEQ) was used to classify 30 participants with metabolic syndrome (ATP III criteria) as EC (n=14, 12F, MEQ=64.8±1.5, 54.6±1.4 yrs, 34.7±1.0 kg/m^2, VO_2max 23.9±1.2 ml/kg/min) or LC (n=16, 12F, MEQ=47.4±1.1, 54.6±2.9 yrs, 37.9±1.3 kg/m^2, VO_2max 21.4±1.0 ml/kg/min) chronotype. A 3-h 75g oral glucose tolerance test (OGTT) was used to assess GE along with fasting (HOMA-IR) and post-prandial (Matsuda Index) insulin sensitivity from plasma glucose and insulin. Sleep (Pittsburgh Sleep Quality Index), non-exercise physical activity (Minnesota Leisure Time PA questionnaire), body composition (DXA and waist circumference (WC)) along with aerobic fitness (VO_2max) were also determined. **RESULTS**: There were no differences in metabolic syndrome criteria, age, VO_2max, total body fat or FFM between groups. However, EC had a lower android-to-gynoid body fat (1.1±0.0 vs 1.2±0.0, P=0.04) than LC, which related to higher insulin area under the curve$_{180min}$ (r=0.46, P=0.01) as well as HOMA-IR (r=0.49, P=0.01) and lower post-prandial insulin sensitivity (r=-0.58, P=0.003). Despite no difference in GE between groups (P=0.31), low GE was associated with higher body weight (r=-0.41, P=0.02) and WC (r=-0.41, P=0.02). Furthermore, EC had better sleep quality than LC (0.5±0.2 vs 1.8±0.2, P=0.04) independent of sleep duration (P=0.26). Sleep quality correlated with higher VO_2max (r=-0.61, P=0.001) and lower LDL (r=0.44, P=0.03). **CONCLUSION**: Although there were no differences in GE between groups, EC had lower central obesity and better sleep quality. These may be relevant factors contributing to lower type 2 diabetes risk seen in EC through aerobic fitness, insulin sensitivity and lower LDL. Future research should assess how exercise alignment with chronotype may impact cardiometabolic health.