

# The Use of Continuous Glucose Monitoring in Non-Diabetics: A Viable Method to Improve Metabolic and Mental Health?



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## INTRO

- **Continuous glucose monitoring (CGM)** is extensively used in diabetic populations but understudied in **non-diabetic patients**
- We sought to analyze the **effects of glycemic awareness via CGM-levels software** on measures of mental and metabolic health during a 12-week low-carbohydrate wellness program

## METHODS

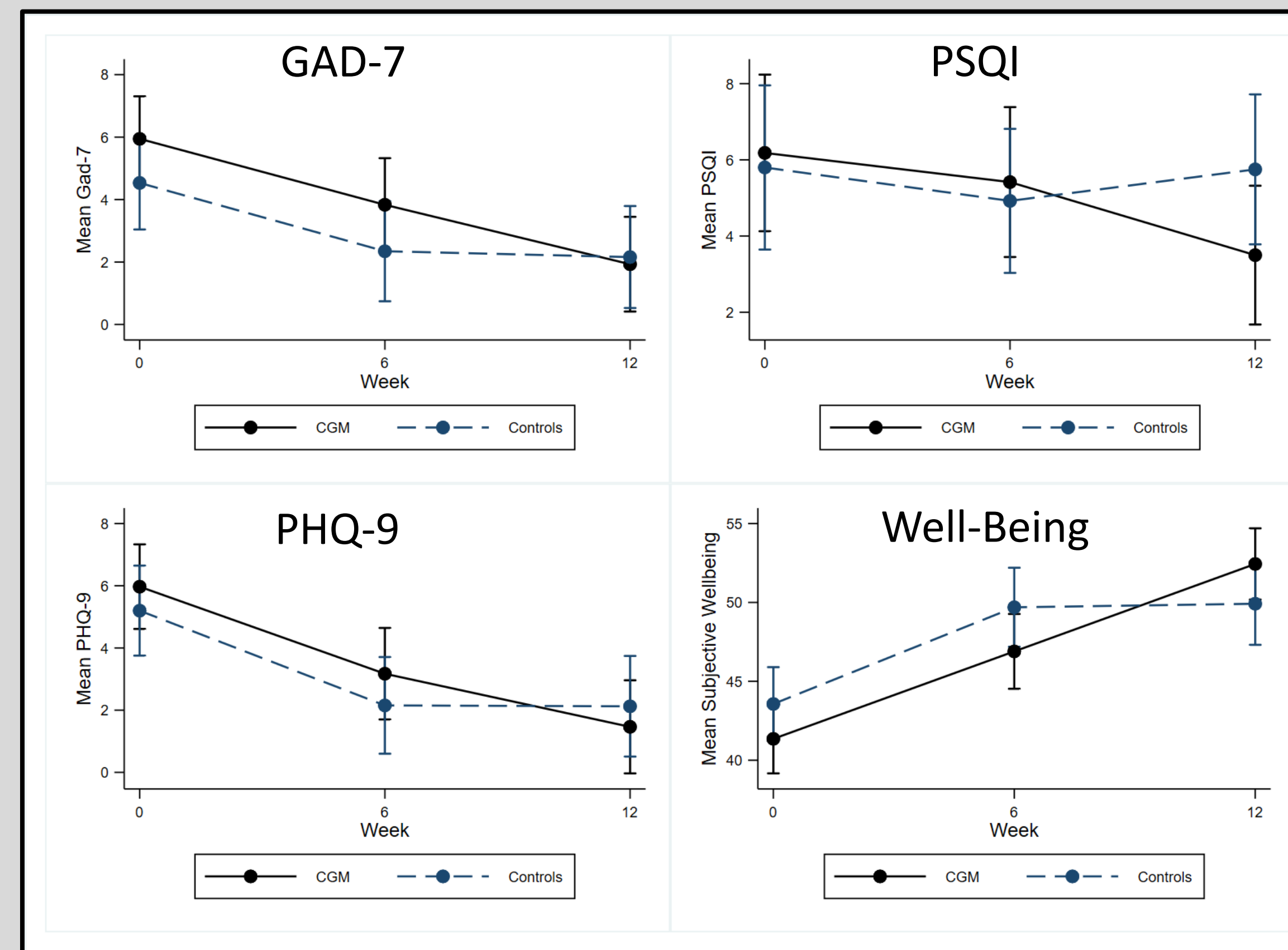
- **Randomized clinical trial** with patient asked to monitor glucose using a CGM with Levels software (**CGM, N=36**) or classic glucometer (**Ctrl, N=33**)
- **GAD-7 (anxiety), PSQI (sleep quality), well-being, and PHQ-9 (depression)** assessments were given at 0, 6, and 12 weeks of program
- **HbA1c, triglycerides, and insulin** were measured via a ZRT cardio-metabolic kits at 0 and 12 weeks

## POPULATION CRITERION

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|---|--|
| <p><b>Inclusion</b></p> <ul style="list-style-type: none"> <li>• Ages 18-69</li> <li>• BMI &gt; 20 kg/m<sup>2</sup></li> <li>• FBG of 85-125mg/dL</li> <li>• A1c of 5.0-6.4 %</li> </ul> <p><b>**No significant difference between groups at baseline</b></p> | <p><b>Exclusion</b></p> <ul style="list-style-type: none"> <li>• Type 1 or 2 DM.</li> <li>• Chronic Kidney Disease</li> <li>• End Stage Liver Disease or viral hepatitis</li> <li>• Alcoholism</li> <li>• Use of any weight loss medications currently or in the past 3 months</li> <li>• Anorexia or bulimia nervosa</li> <li>• Pregnant or breastfeeding females.</li> </ul> |
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## RESULTS

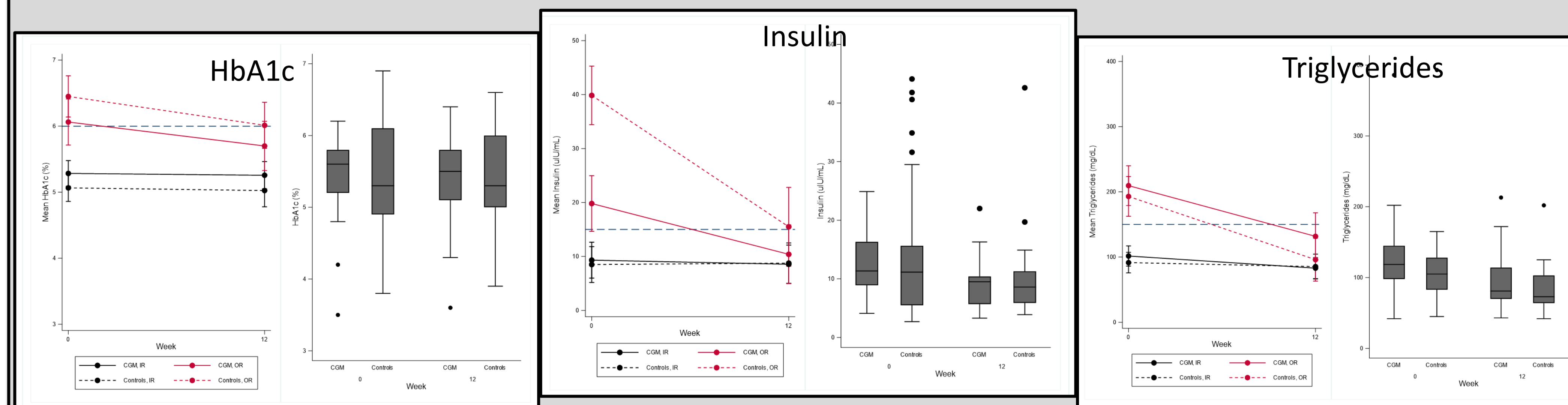
### Psychological Assessments at 0,6,12 Weeks: CGM (n=36) versus Control (n=30)



**Figure 1:** Gad-7, PSQI, and PHQ-9 scores showed significant improvement from baseline to 12 weeks ( $p < .001$ ,  $\eta^2 = .27$ ;  $p = .024$ ,  $\eta^2 = .17$ ;  $p < .001$ ,  $\eta^2 = .29$ ). Well-being assessment ( $\rho T = 0.82$ ) showed a significant improvement in CGM group compared to control ( $p < .001$ ,  $\eta^2 = .13$ )

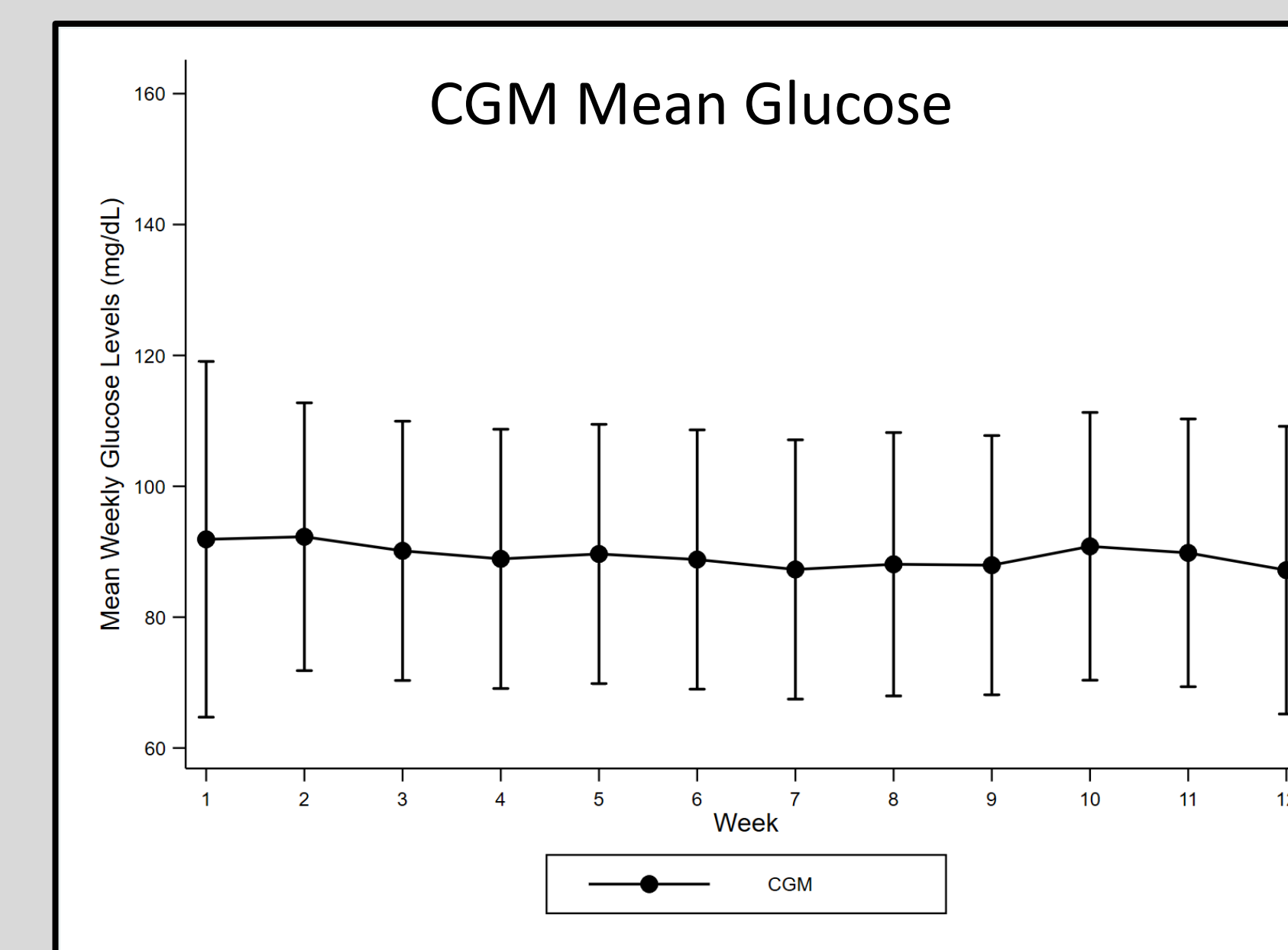
OR= Out of range associated with the test  
IR= In the range associated with the test

### HbA1c, Insulin, and Triglycerides at 0,6, and 12 weeks: CGM (n=34) vs Control (n=33)



**Figure 3:** HbA1c significantly improved for individuals that started out of range (OR) by decreasing over time ( $N = 15$ ;  $p = .012$ ). Insulin significantly improved for individuals that started OR by decreasing over time ( $N = 9$ ;  $p = .031$ ). Triglycerides significantly improved for all individuals by decreasing over time ( $p < .001$ ;  $\eta^2 = .20$ ) and in individuals who started OR ( $N = 9$ ;  $p = .031$ )

### Mean Glucose (mg/dL) from 1-12 Weeks: CGM (n=21)



**Figure 2:** Mean glucose for the CGM group remained consistent from 1-12 weeks

## DISCUSSION

- **Sleep quality, anxiety, and depression improved** in both groups over time (Figure 1)
- The CGM-levels group showed a significant improvement in well-being compared to control (Figure 1)
- **CGM-levels** was endorsed by patients to be **more comfortable and easier to use** than finger stick glucometers
- **CGM-levels showed a consistent mean glucose trend from 0-12 weeks**, however, it is unclear whether it is due to more data points or an effect of glycemic awareness (Figure 2)
- **Significant** time effect found for both the CGM-Level and control groups' triglycerides (decreased), and those who started out of range for **HbA1c (decrease), insulin (decrease), and triglycerides (decrease)** (Figure 3)

## SUMMARY

- 12-week low-carbohydrate wellness program improved measures of mental and metabolic health in both groups
- Well-being significantly improved in CGM-levels group compared to control
- Larger quantity of glucose readings via CGM-levels may provide a more accurate account of glycemic variability and better understanding of metabolic health

CGM with Levels software appears to be an equally viable for improving physical and mental health compared to a traditional glucometer in a non-diabetic population, however, it may be more sought out for its ease of use and comfortability.

