DEPRESSIVE SYMPTOMS ARE ASSOCIATED WITH HIGHER LEVELS OF PEAK PLASMA GLUCOSE CONCENTRATIONS IN HISPANICS WITH METABOLIC SYNDROME.

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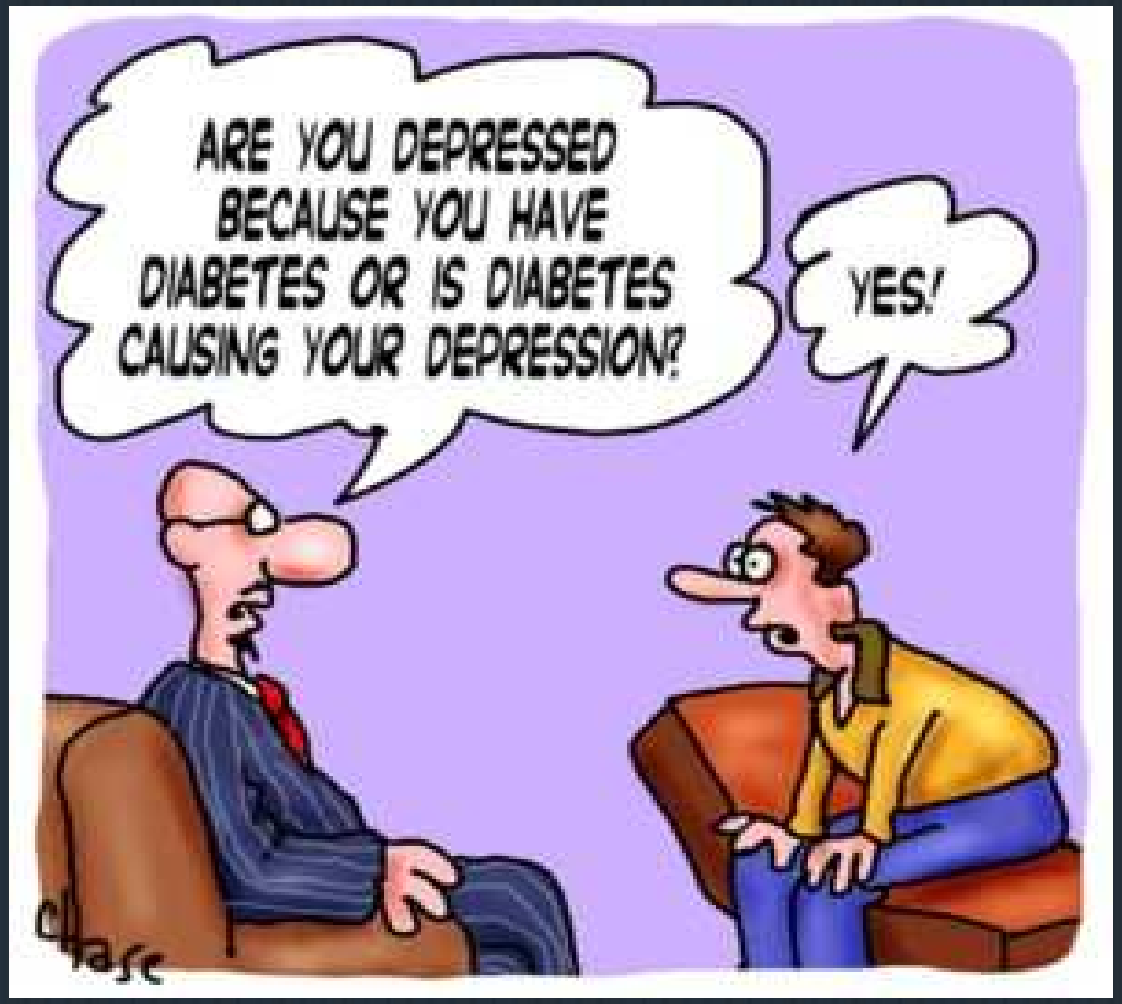
Context


ARE YOU DEPRESSED BECAUSE YOU HAVE DIABETES OR IS DIABETES CAUSING YOUR DEPRESSION?
YES!

Objective

- To determine if impaired glucose metabolism is associated with depressive symptoms in patients with metabolic syndrome.

Background

- Individuals with type-2 diabetes have an increased prevalence of depression.

- The metabolic syndrome
  - Constellation of metabolic abnormalities associated with an elevated risk for type-2 diabetes and CVD.
  - Highly prevalent in Hispanics

Rationale for the Present Study

- According to DeFronzo and Abdul-Ghani (2009) peak 60 min. plasma glucose on an oral glucose tolerance test (OGTT) is associated with risk for future type-2 diabetes.
- The 60 min. plasma concentration correlates better than either fasting or 2-h plasma glucose concentrations with:
  - B-cell function
  - indices of insulin secretion and resistance

Research Question

- Is there an association between depressive symptoms and metabolic abnormalities (i.e., elevated 60 min. peak in OGTT) in patients with metabolic syndrome?

Hypotheses

- Severity of depressive symptoms will be associated with higher peak 60-min. plasma glucose concentrations.
- The relationship between depressive symptoms and poor glucose handling will hold after accounting for sociodemographic factors, health behaviors, and fasting plasma glucose concentration.

Methods

- The "Biobehavioral Bases & Management of Metabolic Syndrome" project (Goldberg and Schneiderman, PIs)
- Participants recruited from community clinics in Miami
- Comprehensive biological and psychosocial baseline assessment

Participants

- 115 Hispanic adults with ≥ 3 features of the NCEP ATP-III metabolic syndrome and a non-diabetic OGTT who completed the baseline assessment.

Characteristics of the Sample

	Mean (SD) / (%)
Age (years)	51.5 (8.1)
Gender Female (%)	52.5
BDI Total score	10.6 (9.3)
Using medication for depression (%)	12.7
Abdominal obesity above criterion	93.2 %
Weight (kg)	87.0 (12.4)
BMI (Kg/m^2)	32.4 (3.7)
Fasting Insulin (μ/mL)	16.1 (11.2)
Fasting Glucose (mg/dL.)	87.1 (10.2)
HOMA_IR (units)	3.1 (1.6)
Education: % < High school	57.6
Smoking (%)	44.9
Physical Activity self report (min/day)	66.1 (129.5)

Measures

- Oral glucose tolerance test (OGTT). Following a 12 hour fast blood was drawn at time 0. Blood specimens were obtained at 30 min, 60 min, and 120 min. after participants ingested a 75-g oral glucose load and assayed for plasma glucose and serum insulin concentrations.
- Beck Depression Inventory (BDI). Severity of depressive symptoms was assessed using the 21-item BDI. The BDI was designed to measure depressive symptomatology with the total score significantly associated with clinical measures of depression (Brown et al, 1995).

Statistical Analyses

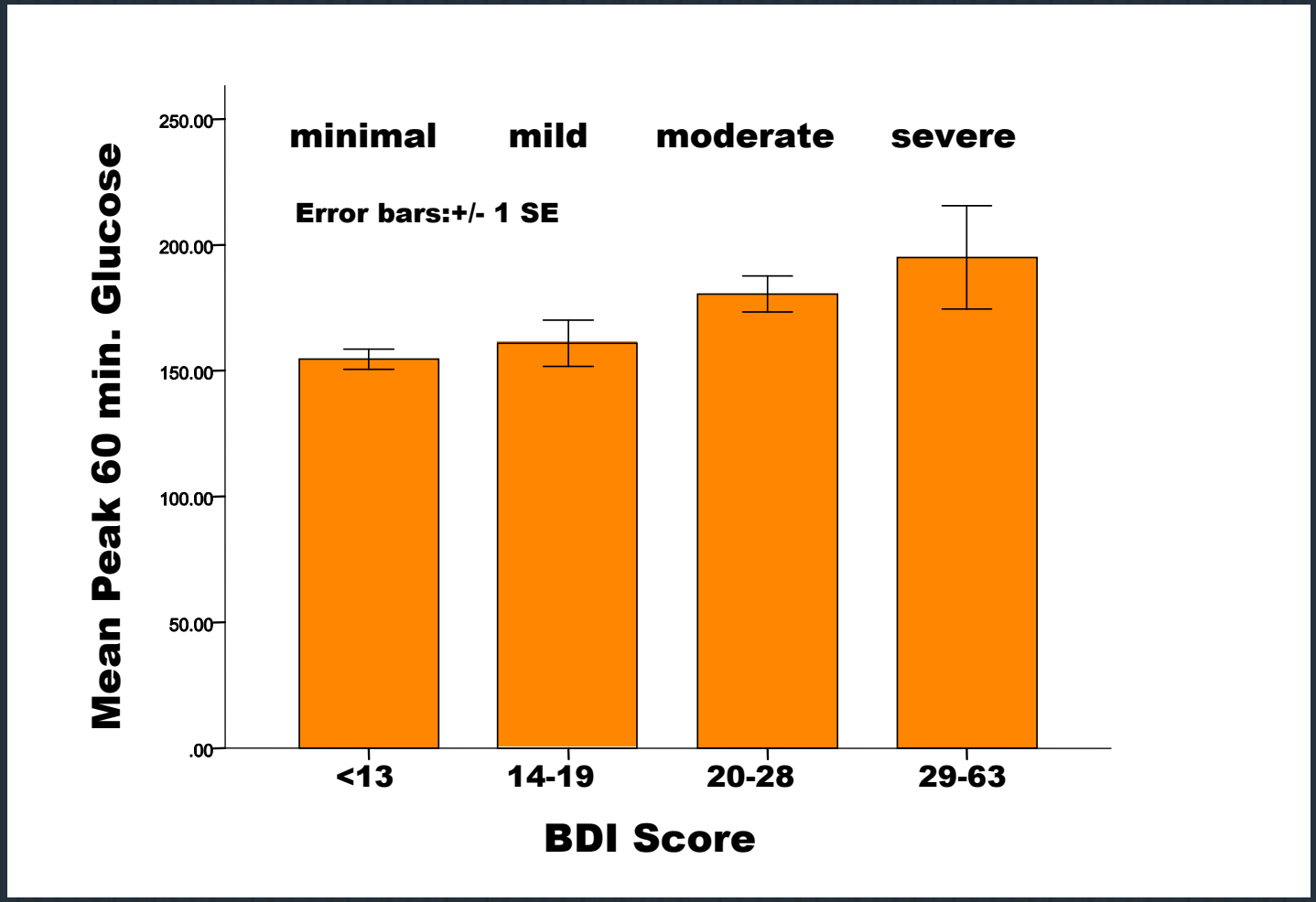
- Multivariate linear regression models were fit to peak 60-min plasma glucose with severity of depressive symptoms as the independent variable. BDI scores were included as a continuous variable on the basis of evaluating residuals for each model.
- The primary model controlled for age, gender, BMI, antidepressant medication use, physical activity, smoking and fasting glucose.

*Analyses were conducted using SPSS

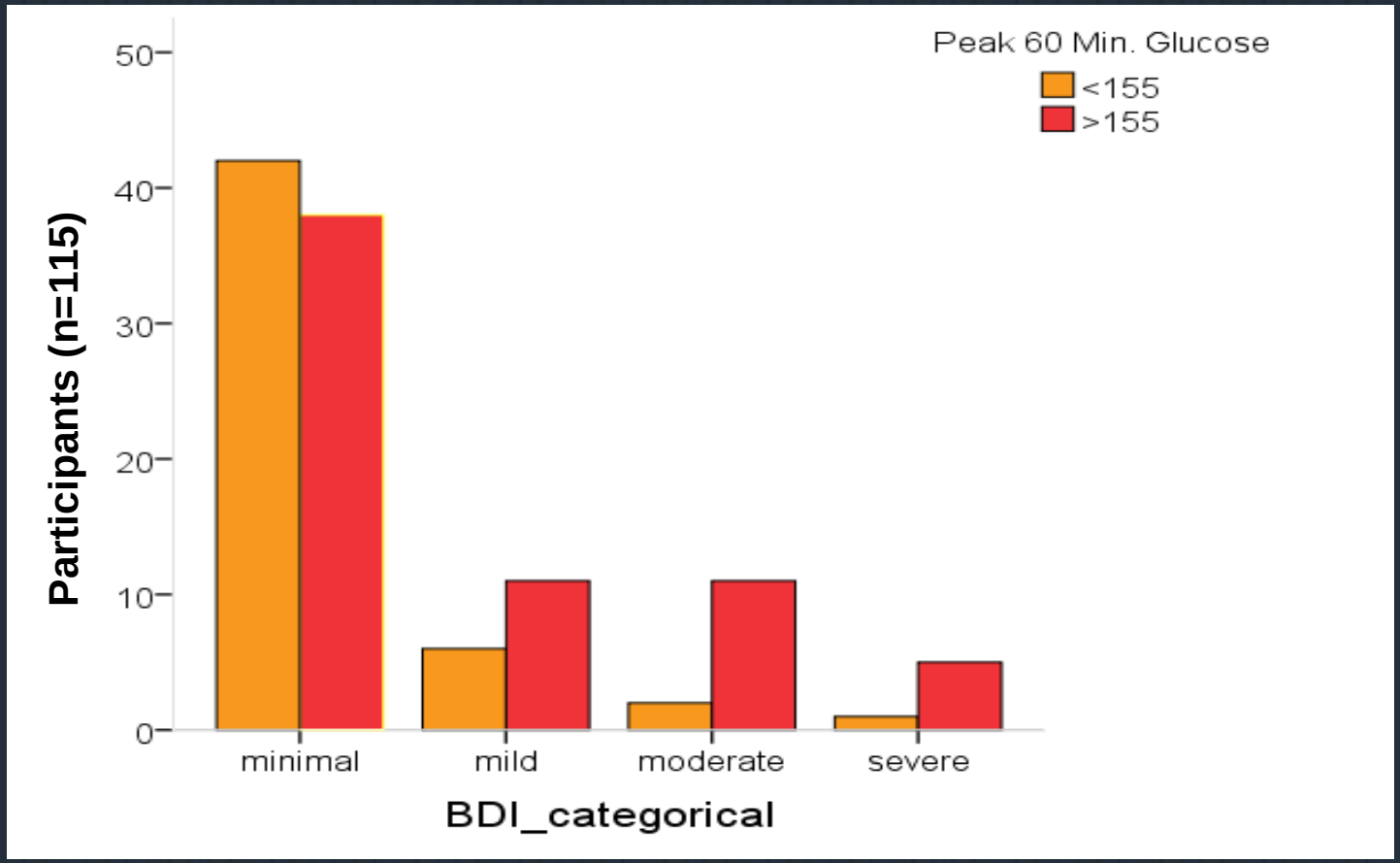
Results: Primary Model

	Peak 60-min Plasma Glucose				
	B (SE)	β	R^2	ΔR^2	t(113)
BDI Total Score	1.08 (.39)	.26	.30	.05	2.75**
Age	.85 (.40)	.18	.30	.06	2.12*
Gender (F< M)	-.84 (6.56)	-.01	.30	.00	-.13
BMI (Kg/m^2)	.95 (.85)	.10	.30	.04	1.12
Antidepressant	-6.72 (10.21)	-.06	.30	.00	-.66
Physical activity	11.33 (6.43)	.15	.30	.01	1.76
Smoking	6.61 (6.25)	.09	.30	.01	1.06
Fasting Glucose	1.20 (.31)	.33	.30	.13	3.82**

Depression and Mean Peak Plasma Glucose



Depression and Peak Plasma Glucose (Based on Risk for Type-2 Diabetes)



Cognitive vs. Somatic BDI Subscales

- Both Cognitive and Somatic Subscales were each related to peak 60-min plasma glucose values ($p<.01$) when physical activity and smoking were included as covariates.

Discussion

- Consistent with finings from Abdul-Ghani and DeFronzo (2009) we found a correlation between peak 60 min. plasma glucose concentration and depressive symptoms after controlling for covariates.
  - Neither fasting nor 2-h plasma glucose concentration were related to depressive symptoms.

Limitations of Present Study

- Cross-sectional data
  - Directionality between glucose dysregulation and depressive symptoms require longitudinal study
- Self-report vs. objective measures of depression
  - Present study looked at depressive symptoms rather than a diagnosis of depression

Future Directions

- Longitudinal studies are needed to determine in subjects with metabolic syndrome whether:
  a) Depression leads to glucose dysregulation
  b) Glucose dysregulation leads to depression
  c) Progression from impaired glucose tolerance to type-2 diabetes is moderated by depression
- Explore plausible biological mechanisms
  a) HPA axis dysregulation (i.e., elevated cortisol)
  b) Inflammation (elevated pro-inflammatory cytokines)

Conclusions

- This study confirms the association between depressive symptoms and impaired glucose metabolism in Hispanics with metabolic syndrome .
- Results show that depressive symptoms and peak plasma glucose concentration are related in individuals who are already at an increased risk for developing type-2 diabetes.
- Implications of this findings suggests the importance of developing interventions that target depressive symptoms in people with metabolic syndrome.

THANK YOU!