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Glycemic Markers and Insulin-related Parameters in the Progression of Diabetes and Lower Extremities Complications: A Pilot Study in Mexican Americans from Starr County

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INTRODUCTION/BACKGROUND

- Type 2 Diabetes (T2D) is a chronic disease involving alteration in glucose metabolism and uptake, often resulting in an uncontrolled hyperglycemic state
- Metabolic alterations can lead to neurologic and vascular compromise, allowing progression into lower extremity complications, like diabetic foot ulcers
- **Research Gap:** Guidelines linking glycemic metabolic parameters to disease progression remains limited. The extent to which markers can predict the progression of diabetes to lower limb complications has yet to be fully explored

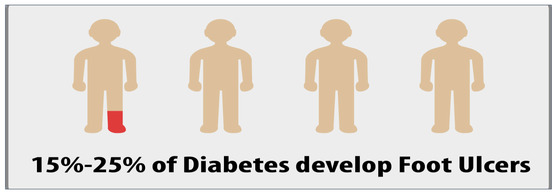

Figure 1. 15-25% of diabetic patients may develop foot ulcers (1)

Figure 2. Diabetic foot ulcer on plantar aspect of hallux. (*Photo Courtesy of Dr. Luis Venegas*)

POPULATION AND COLLECTION DATA

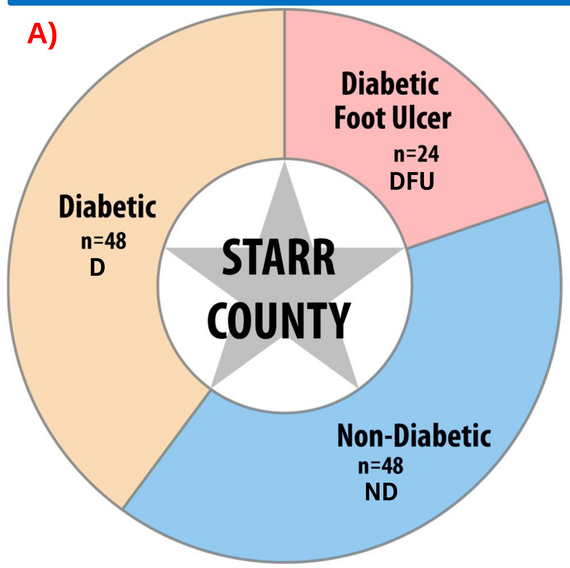

Figure 3. A) Descriptive analysis for a sample of 48 diabetic individuals (D), 48 non-diabetic individuals (ND), and 24 diabetic foot ulcer individuals (DFU). B) Age of the participants by time of data collection, C) Body Mass Index (BMI) D) Distribution of male and female. Values collected by the time of data collection . IRBs for this study HSC-SPH-06-225 and UTRGV-IRB22-0273

HYPOTHESIS AND AIM

- **AIM:** To evaluate metabolic parameters in a Mexican American cohort of diabetics with foot ulcers (DFU), diabetic controls (D), and Non-diabetics (ND) from Starr County.

HYPOTHESIS: Disease development and progression to DFU is associated with imbalance in glycemic markers and insulin-related parameters from pre-diabetic to diabetic patients with DFUs.

MARKERS MEASURED

- Fasting Glucose
- HbA1C
- Fasting Insulin
- Use of Diabetic Medications
- Metformin Use
- C-Peptide Levels

STATISTICAL ANALYSIS

- Analysis of variance (ANOVA)with the post hoc Tukey's test and Kruskal-Wallis with Dunn's for significance was used for multiple comparisons.
- Chi-squared or Fisher's exact test for categorical variables.

RESULTS

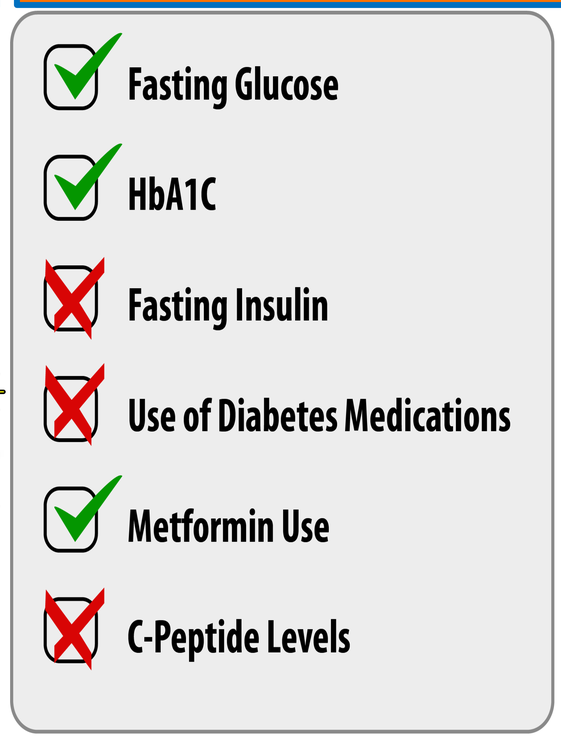

Figure 4. Depiction of glycemic markers that were statistically significant and insignificant. Green checks indicate significance and red X's indicate insignificance.

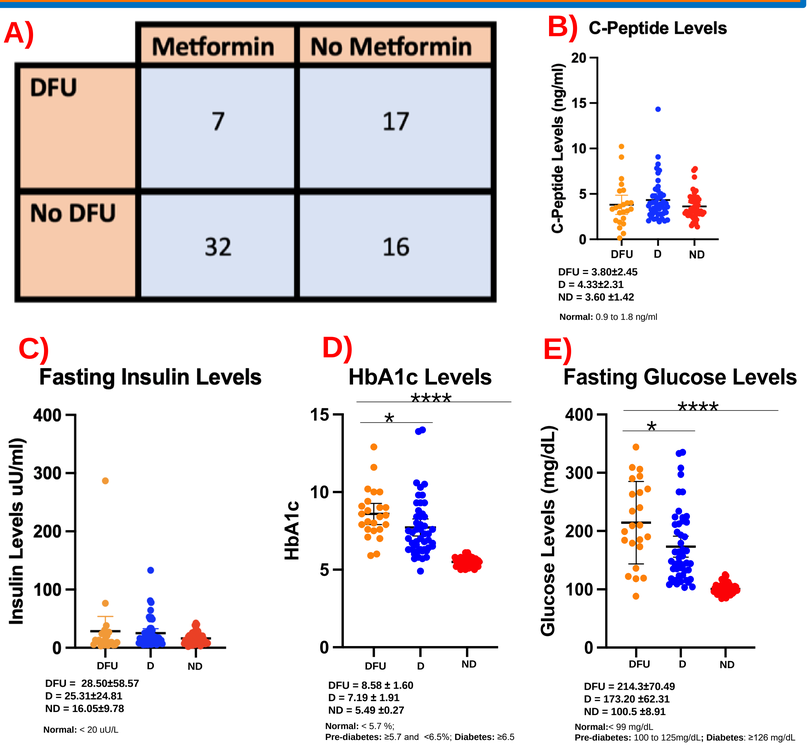

Figure 5. A) Contingency table of metformin use in DFU and D cohorts. B-E) Scatter plot representation with median and standard deviation for glycemic markers in ND (Non Diabetic), D (Diabetic Controls without foot ulcers), and DFU (Diabetics with foot ulcers). Statistical significance ($p < 0.05$) and demonstrated by symbol *.

CONCLUSION/FUTURE WORK

DFU individuals had elevated FG and HbA1c levels, as well as reduced use of metformin compared to D controls.

- Larger sample study would be required to validate our findings to establish if HbA1c, metformin use, and fasting glucose levels can be used as clinical predictors of diabetes progression into foot ulceration.

REFERENCES

1. Yazdanpanah L, et al. (2018). Incidence and Risk Factors of Diabetic Foot Ulcer: A Population-Based Diabetic Foot Cohort (ADFC Study)-Two-Year Follow-Up Study. International journal of endocrinology, 2018, 7631659.

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