

EFFECTIVENESS OF A LIFESTYLE INTERVENTION PROGRAM IN IMPROVING MENTAL HEALTH OUTCOMES AMONG ADULTS WITH TYPE 2 DIABETES IN INDIA

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Introduction

- Type 2 diabetes (T2D) is a chronic metabolic disorder that has a significant impact on the mental health of an individual (1)
- Depression is 2-3 times more likely in people with diabetes, often undiagnosed (2, 3)
- People with diabetes are 20% more likely to experience anxiety at some point in their life than those without diabetes (4, 5)
- American Diabetes Association recommends screening of mental health and its treatment as an integral part of diabetes management (6)

Aim

To assess the effectiveness of a holistic lifestyle intervention program in improving mental health outcomes among adults with type 2 diabetes in India

Methods

Study Design: Quasi-Experimental study



- Participants completing a **one-year online diabetes management program** at Freedom from Diabetes Clinic, Pune (India) (N=698) from June 2021 and June 2023



- Individuals with HbA1c greater than 5.7%, age 18 to 65 years, and consent for participation
- Completed pre-post assessments on anxiety (GAD-7) and depression (PHQ-9)



- Data collected on: Socio-demography, Anthropometry, Biochemical parameters, Medical History, responses to GAD-7, and PHQ-9 (Baseline and Endline)



- Statistical analyses using IBM SPSS v21.0
- Significance set to $P < 0.05$

ONE-YEAR LIFESTYLE INTERVENTION

(Through Group Sessions And Customization)



Diet

- Plant-based Diet
- Juice Fasting & Intermittent Fasting
- Muscle Building



Physical Activity

- Lymphatic Circulation & Anti- Gravity
- Gaining Strength, Stamina, and Flexibility (Yoga)



Medical

- Daily Drug Dose Adjustments
- Supplements



Psychological

Group

- Affirmations
- Meditation
- Journal Writing
- Breathwork
- Progressive Muscle Relaxation
- Life Coaching
- SAAF Goal & Vision Board

Individual (Score ≥ 10)

- REBT
- CBT
- Clinical Hypnotherapy
- NLP
- Pranic Healing
- Mudras & Yoga Asanas

Score Interpretation of Tools Used

Interpretation of GAD-7 for Anxiety (Generalized Anxiety Disorder)	
0 to 4	Minimal
5 to 9	Mild
10 to 14	Moderate *
15 to 21	Severe *

Interpretation of PHQ-9 for Depression (Patient Health Questionnaire)	
0 to 4	None - minimal
5 to 9	Mild
10 to 14	Moderate *
15 to 19	Moderately Severe *
20 to 27	Severe *

*Categories with high cut-offs, need the expert's attention

- For analyses, the following was considered:
 - The score cut-off of ≥ 5 was considered to identify patients with mild to severe anxiety and depression (7,8)
 - A score cutoff of ≥ 10 was considered for individual therapy for both anxiety and depression (7,8)

Results

Baseline Characteristics

Fig. 1: Age Distribution

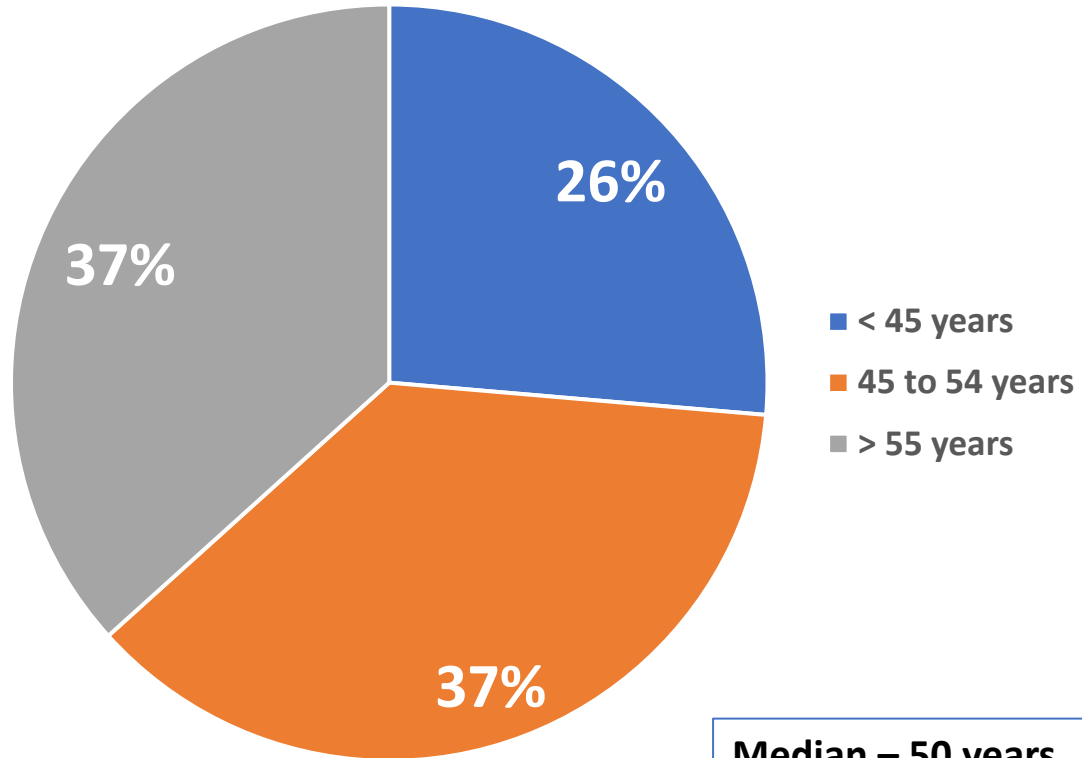
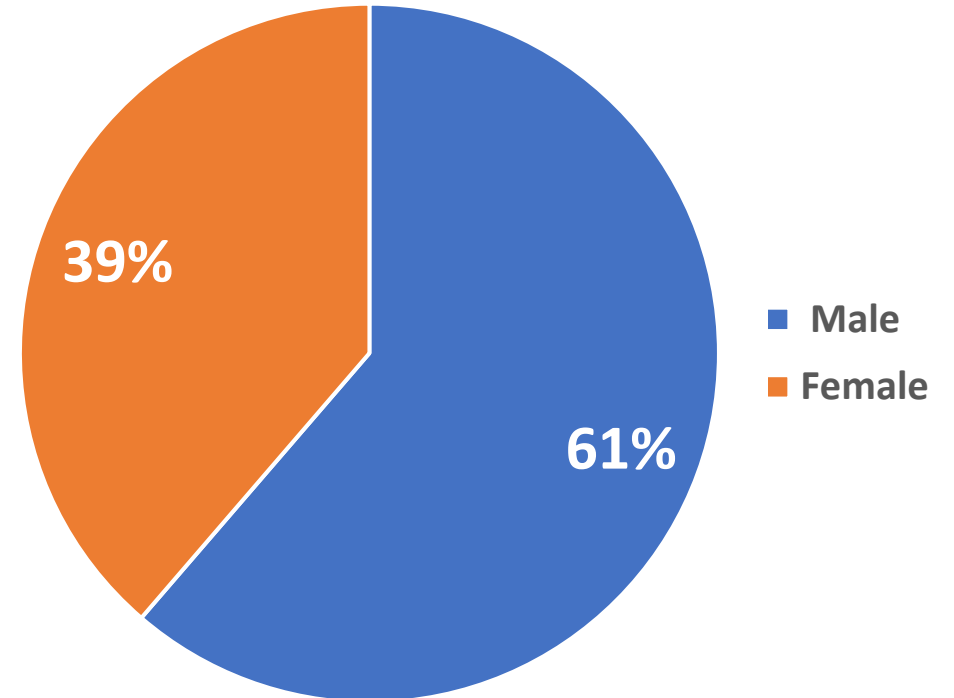
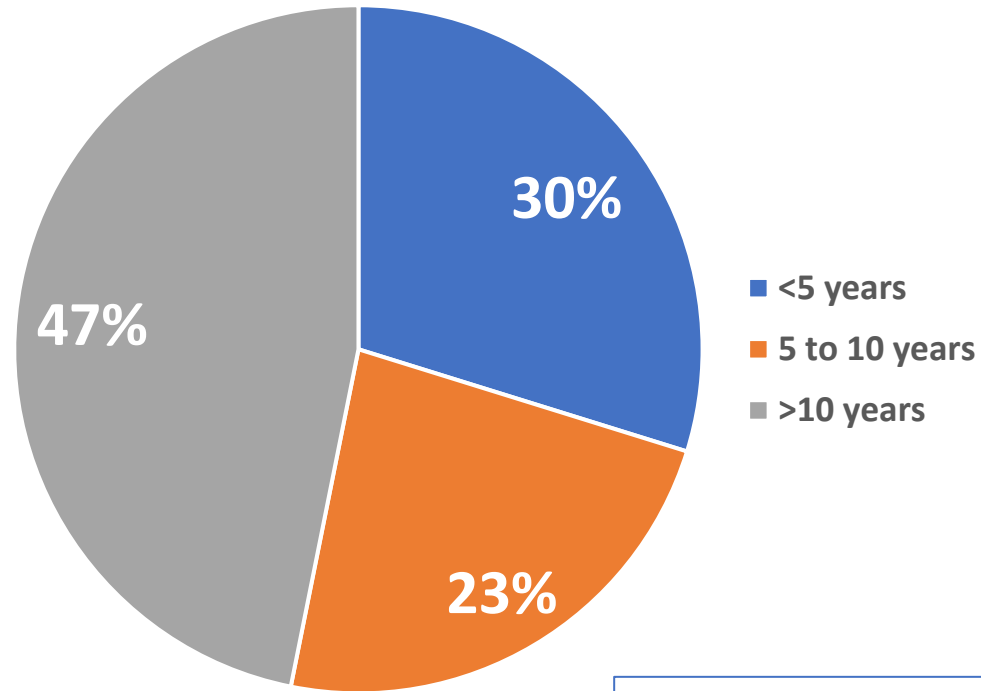


Fig. 2: Gender Distribution



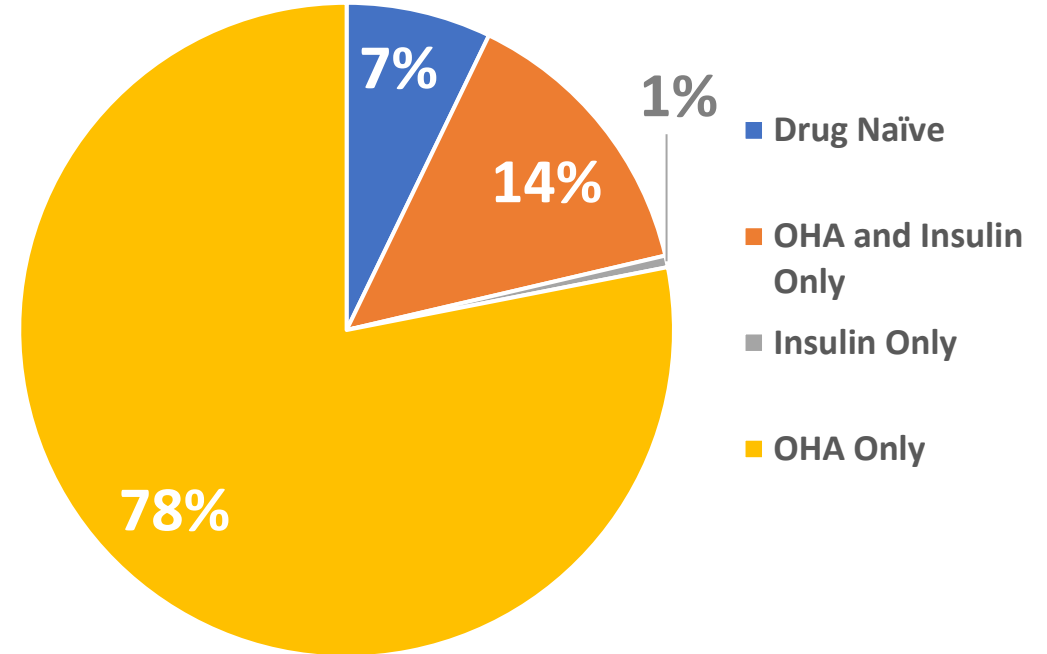
Baseline Characteristics

Fig. 3: Duration of Diabetes



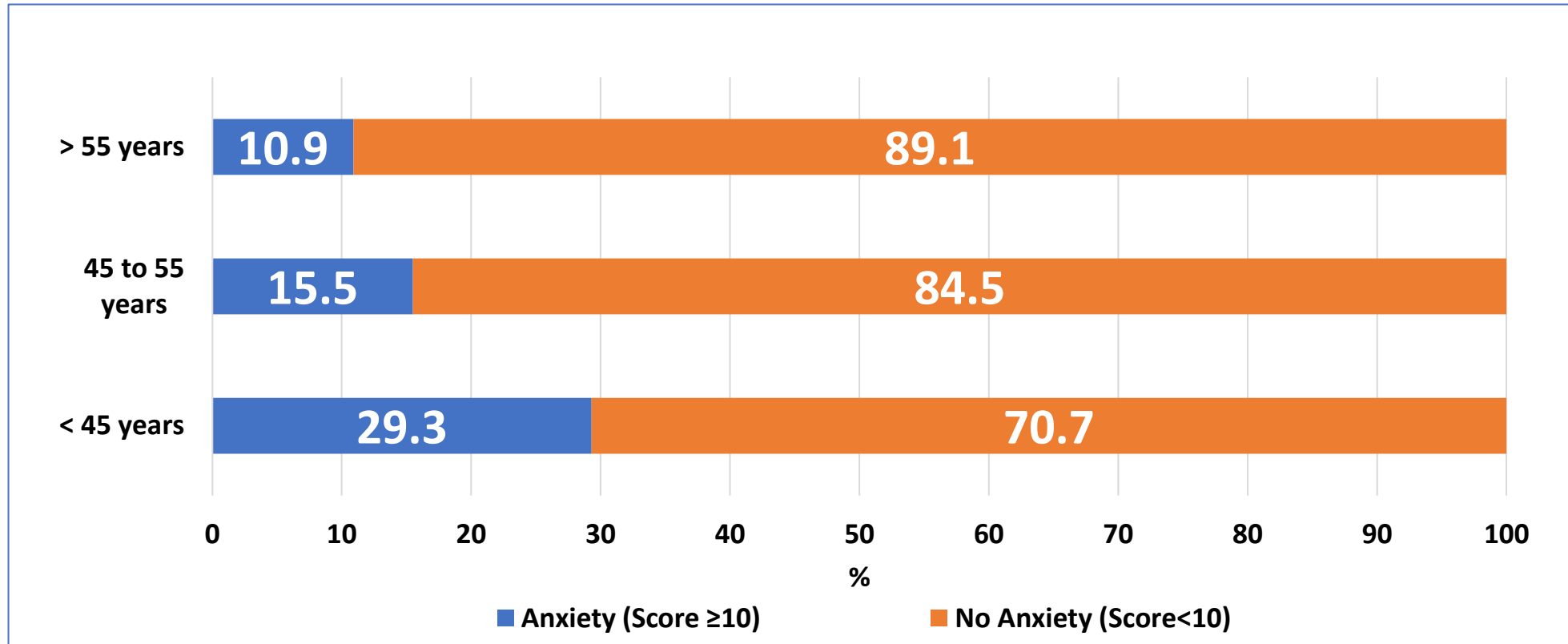
Median – 9.3 years

Fig. 4: Medication Status



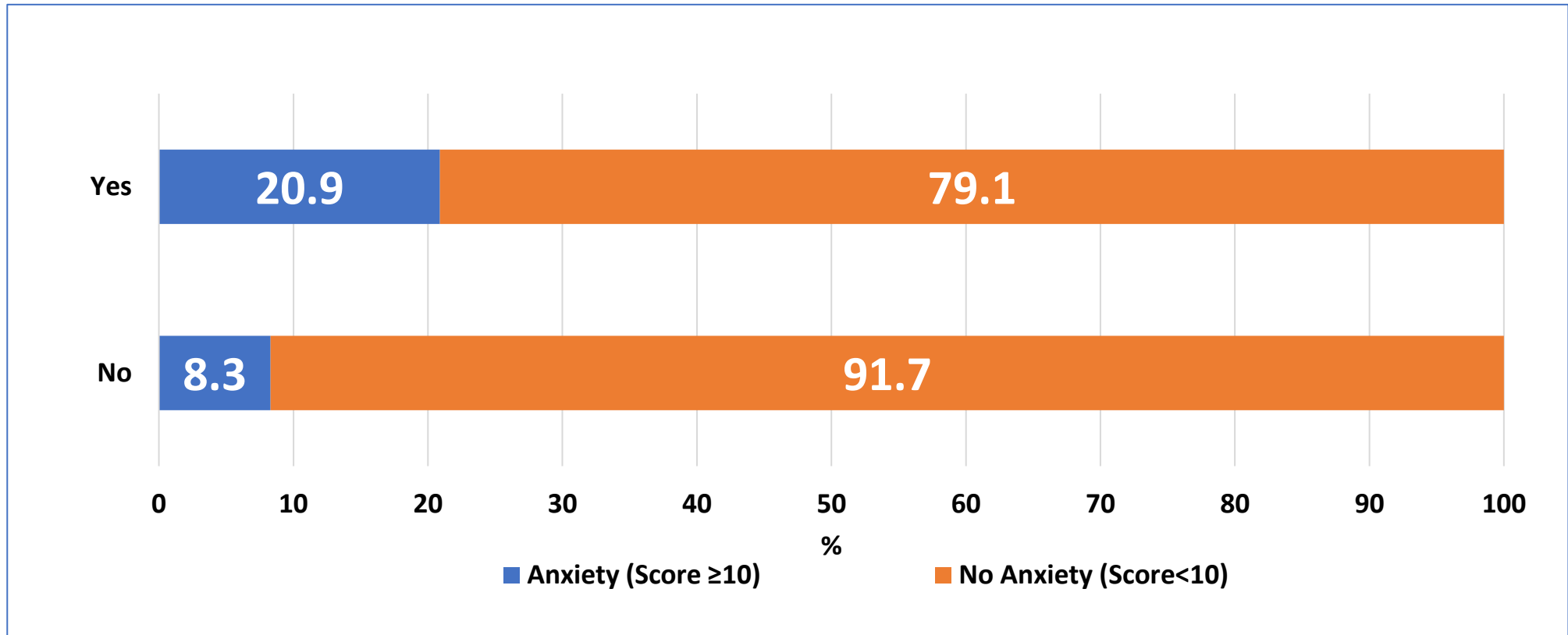
Anxiety & Its Associated Factors

Age



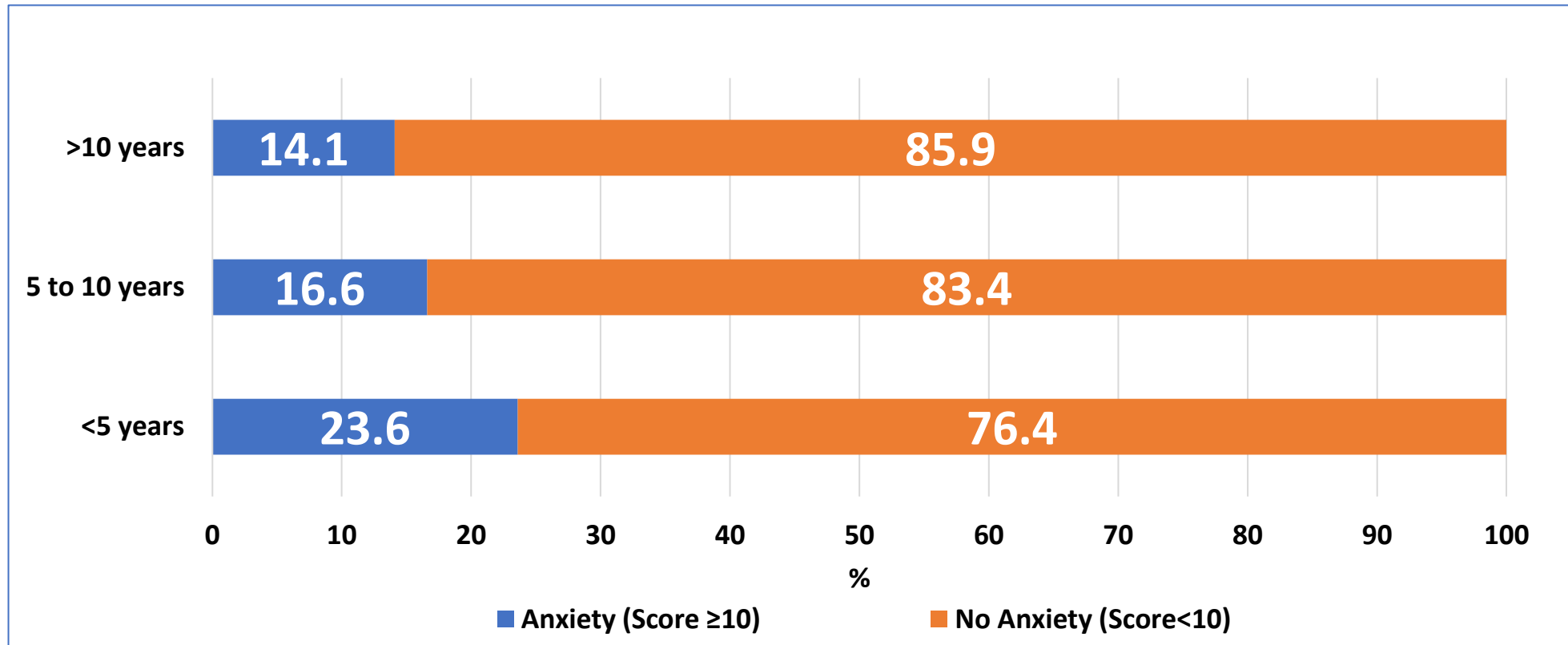
Younger patients (<45 years) showed higher anxiety than older patients (p<0.001)

Stress Before Diabetes (Self-reported)



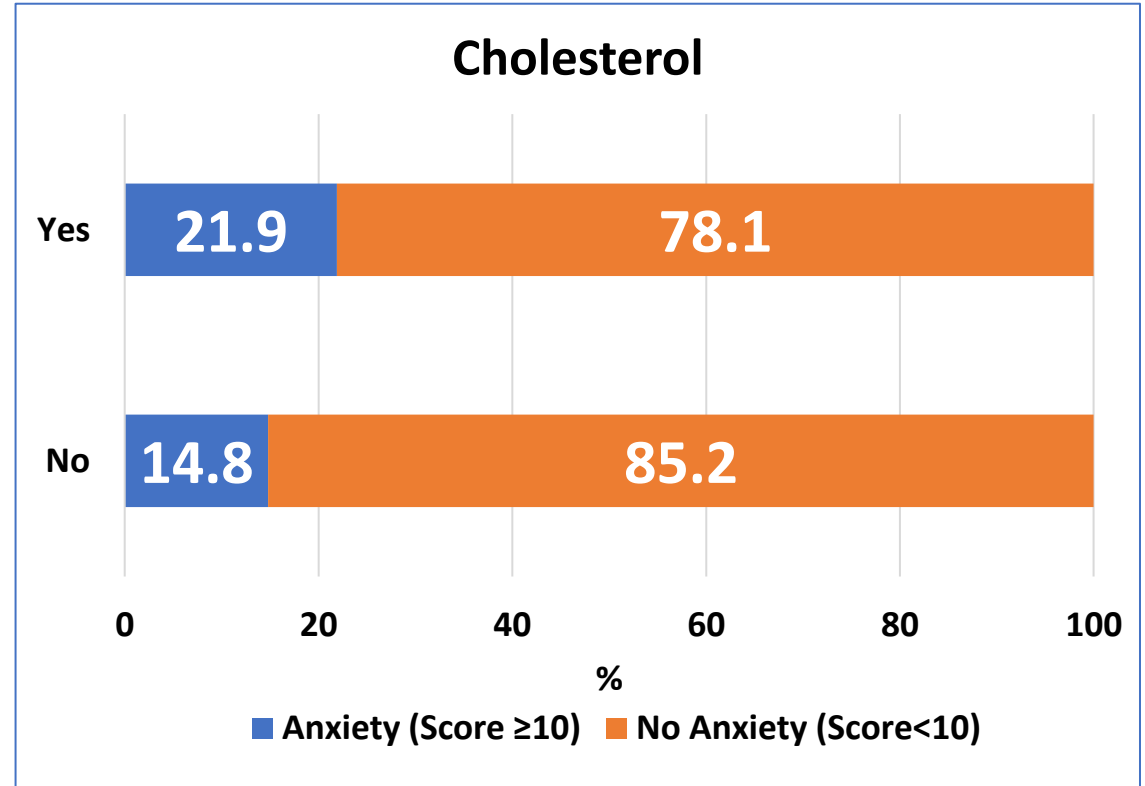
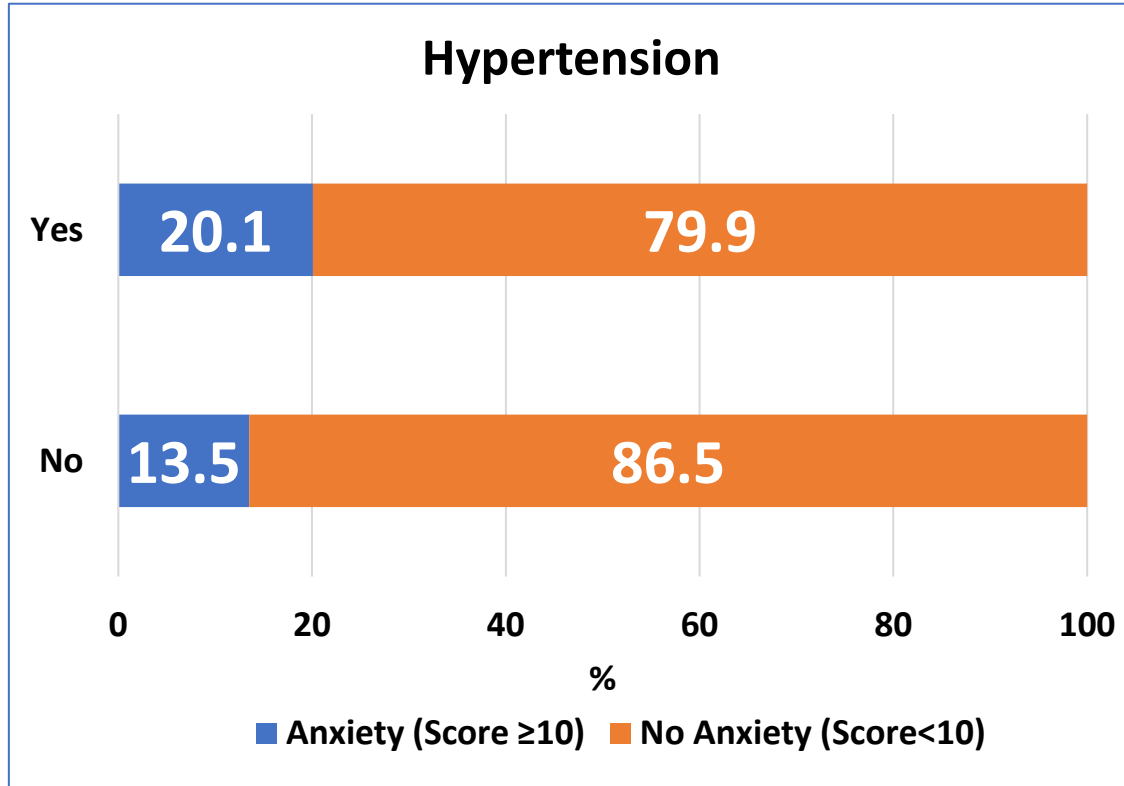
Those with self-reported stress before diagnosis showed higher anxiety ($p < 0.001$)

Duration of Diabetes



Those with recently diagnosed diabetes showed a higher prevalence of anxiety (p<0.001)

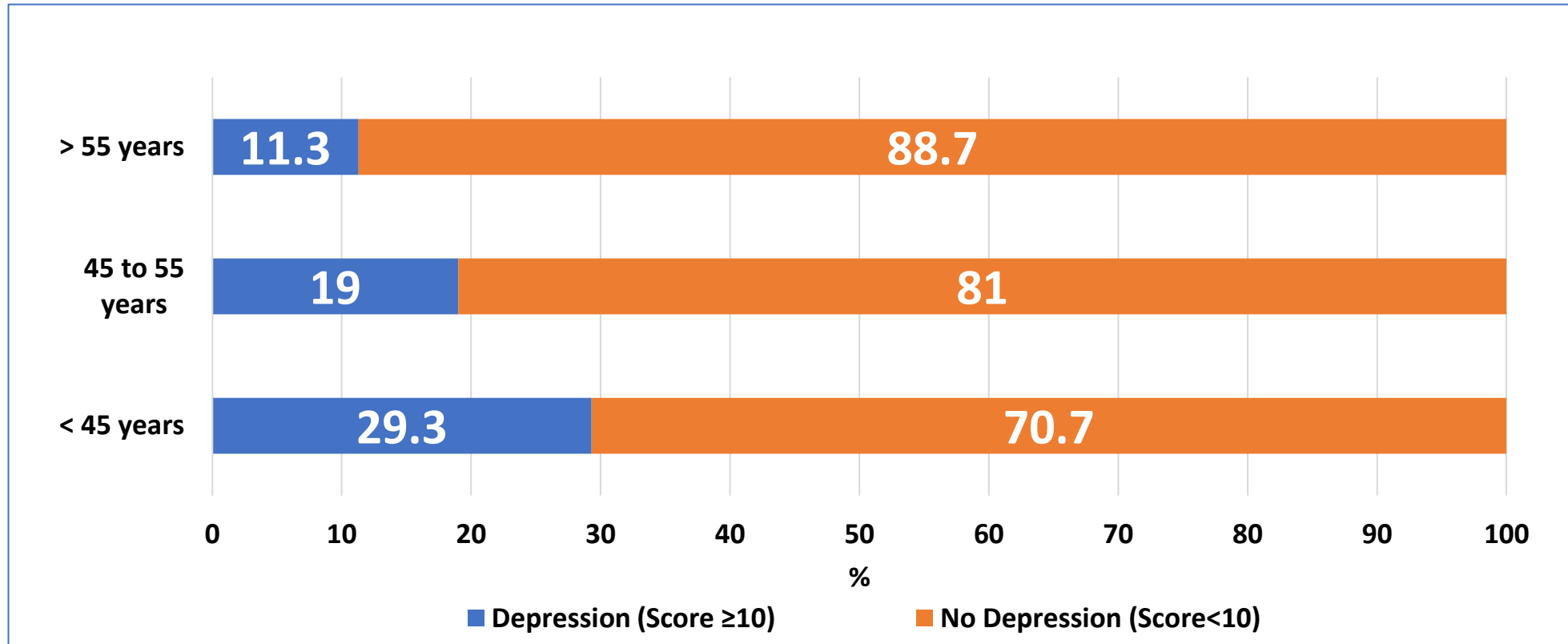
Co-morbidities



Those with co-morbidities showed a higher prevalence of anxiety ($p < 0.05$)

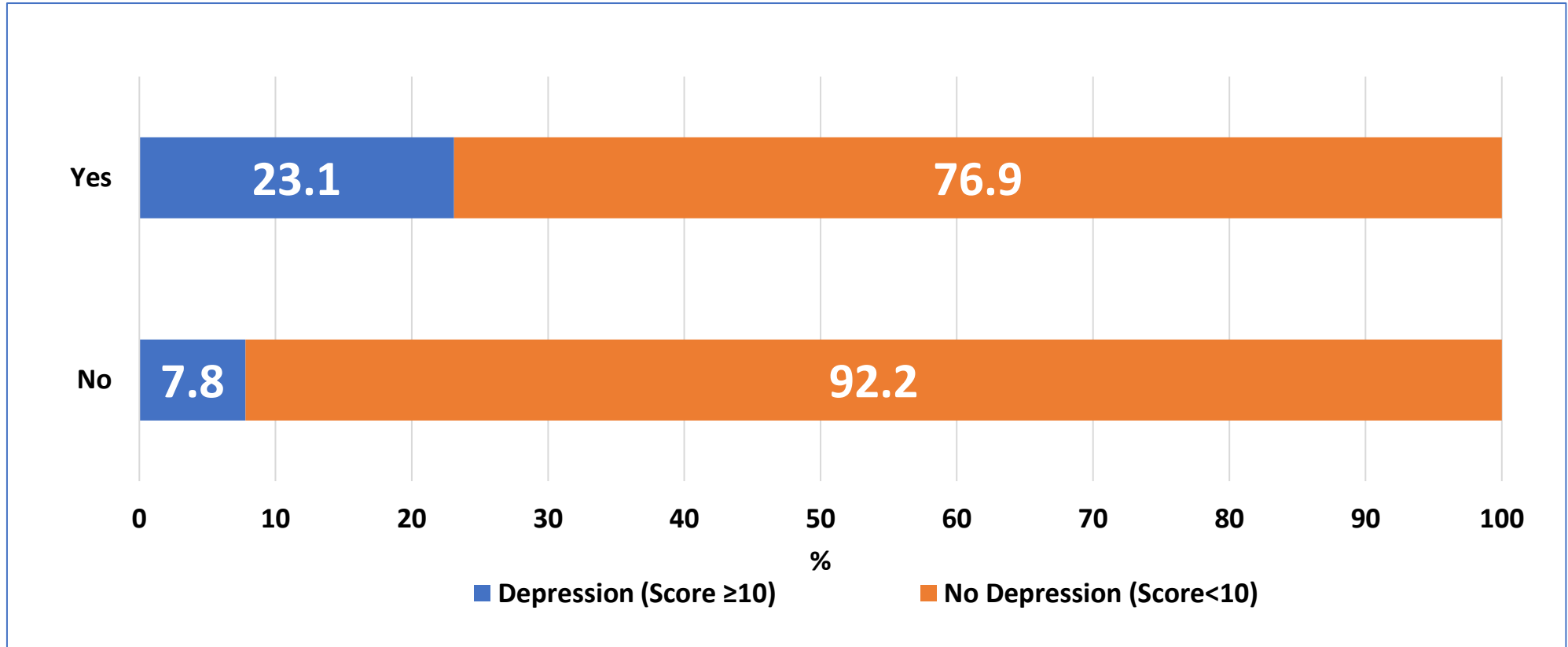
Depression & Its Associated Factors

Age



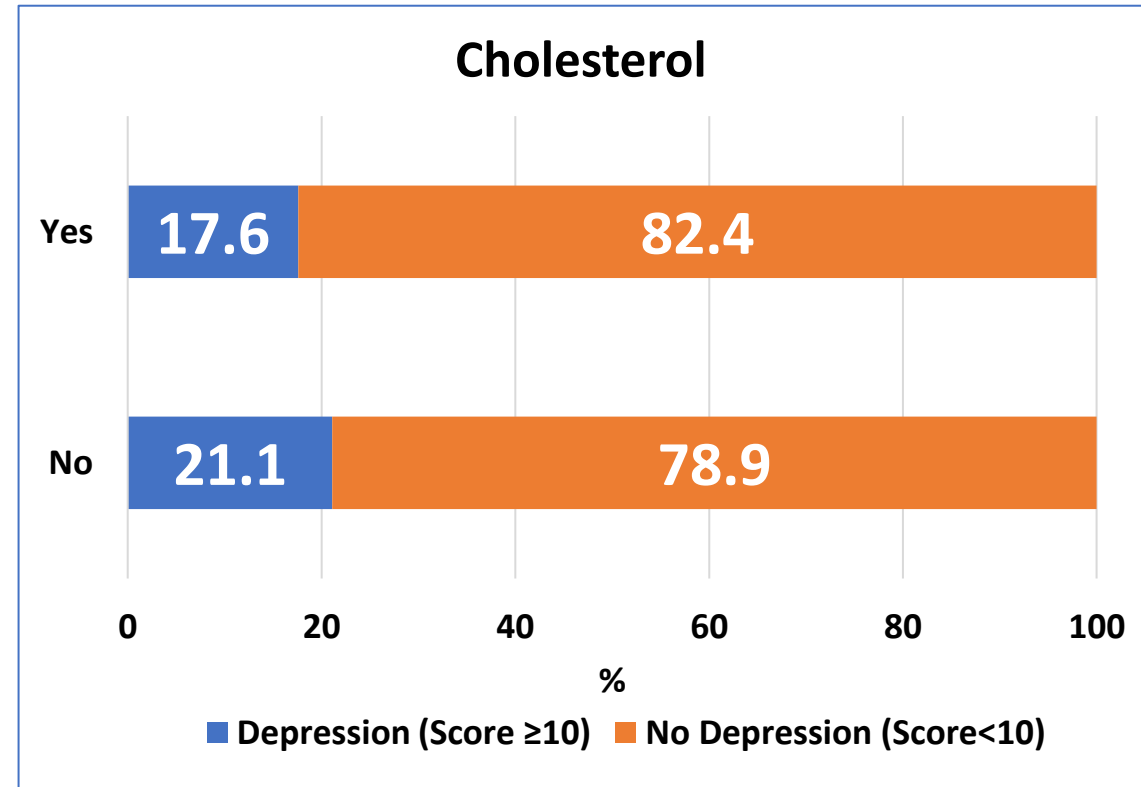
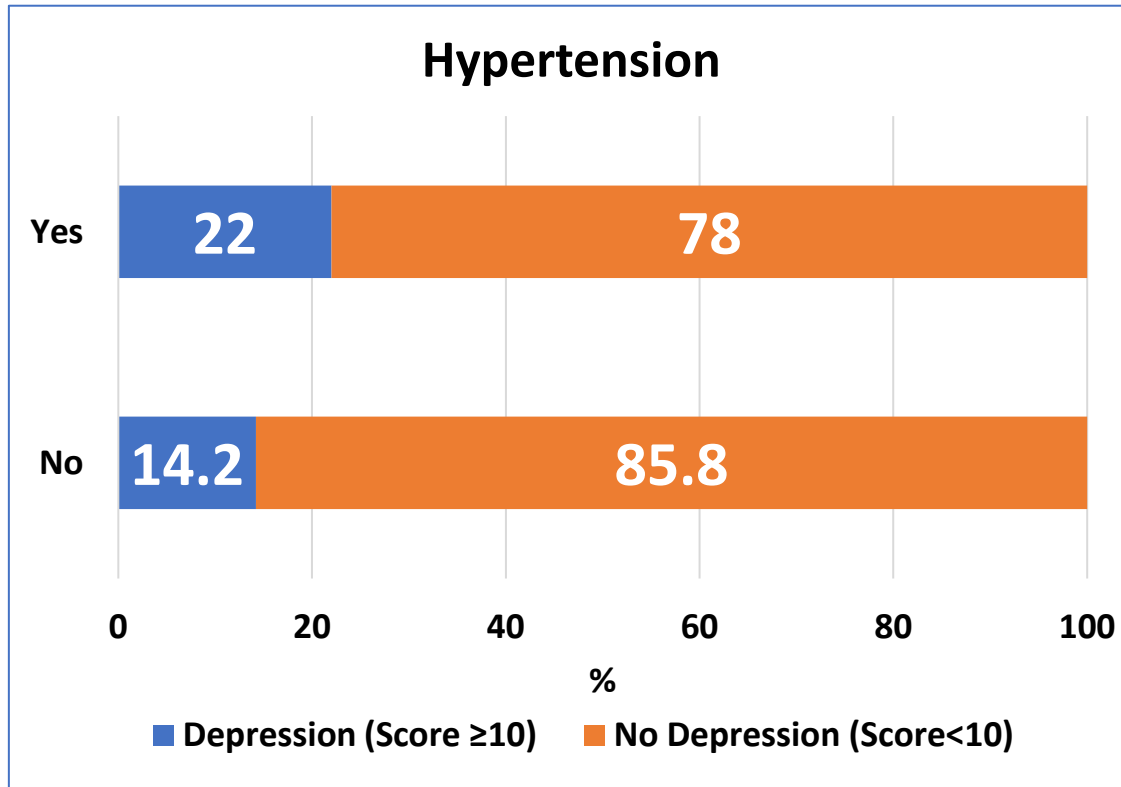
Younger patients (<45 years) showed higher depression than older patients ($p < 0.001$)

Stress Before Diabetes (Self-reported)



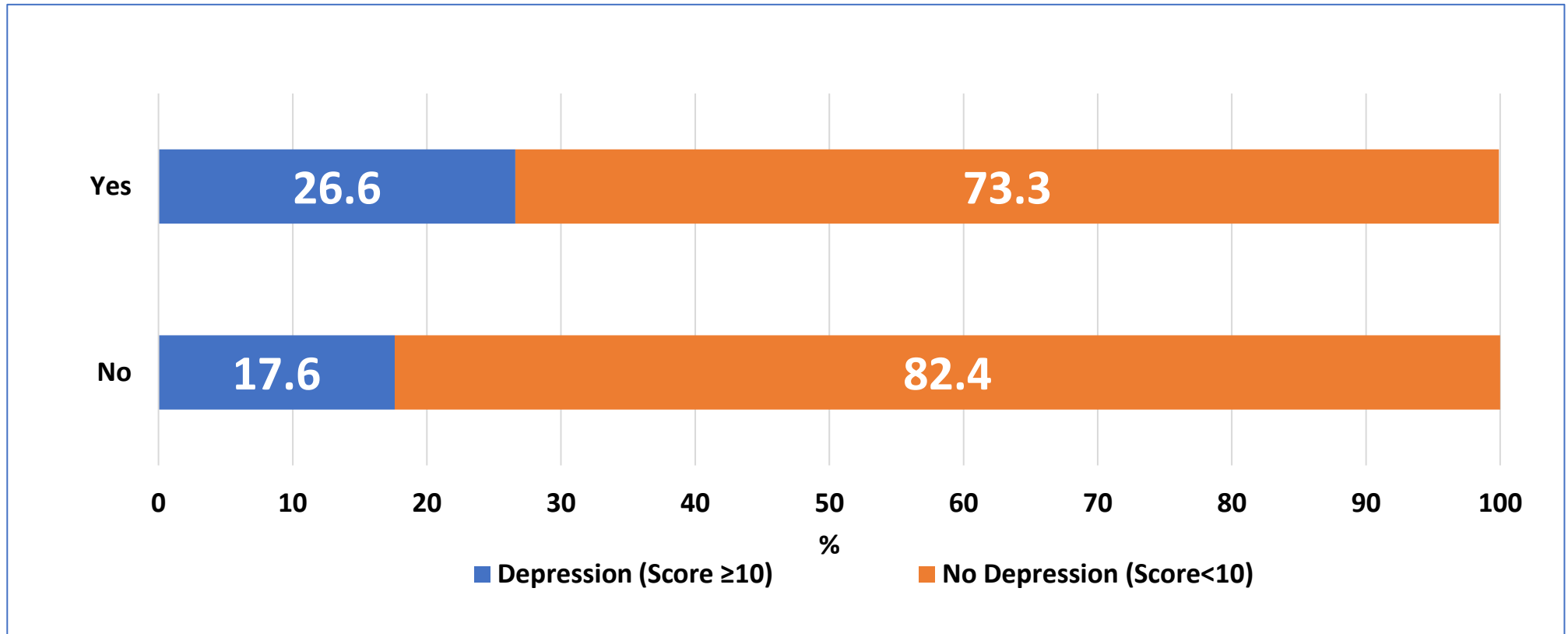
Those with self-reported stress before diagnosis showed higher depression ($p < 0.001$)

Co-morbidities



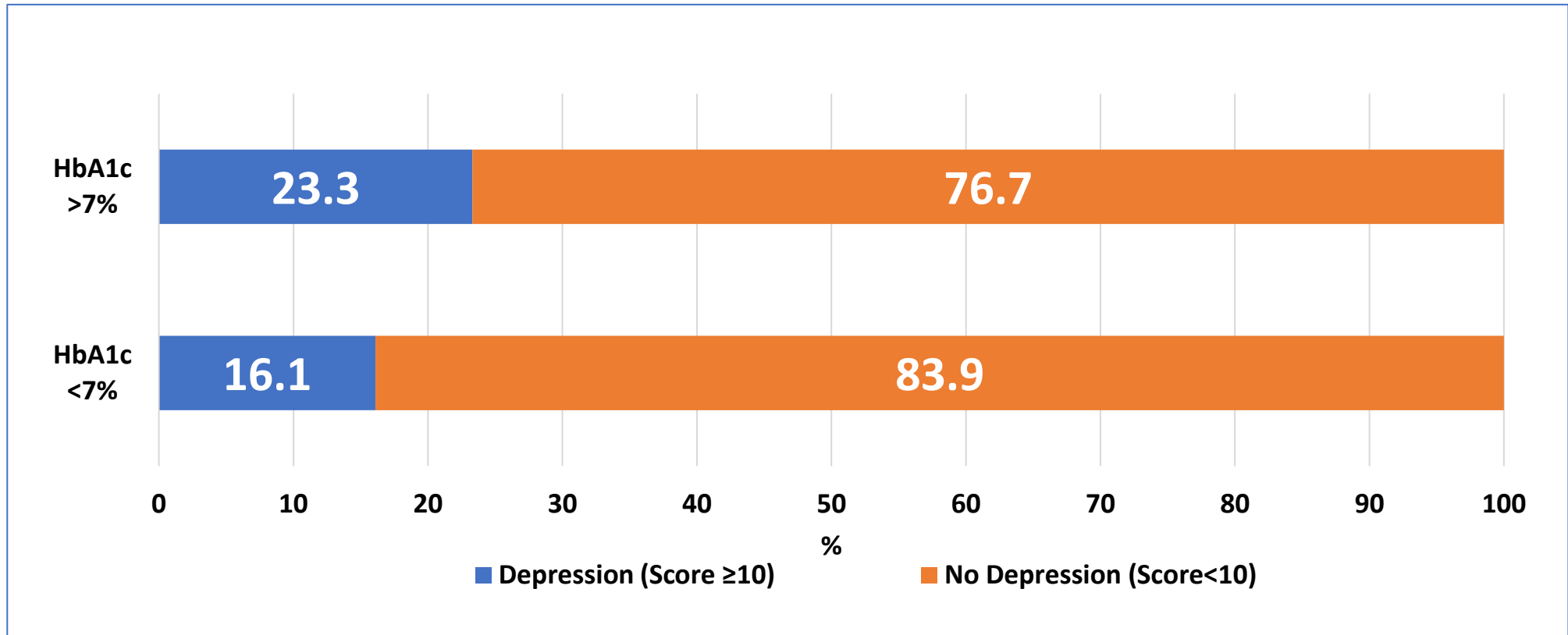
Those with co-morbid hypertension showed a higher prevalence of depression ($p < 0.05$)

Insulin Therapy



Those on Insulin therapy showed higher prevalence of depression ($p < 0.05$)

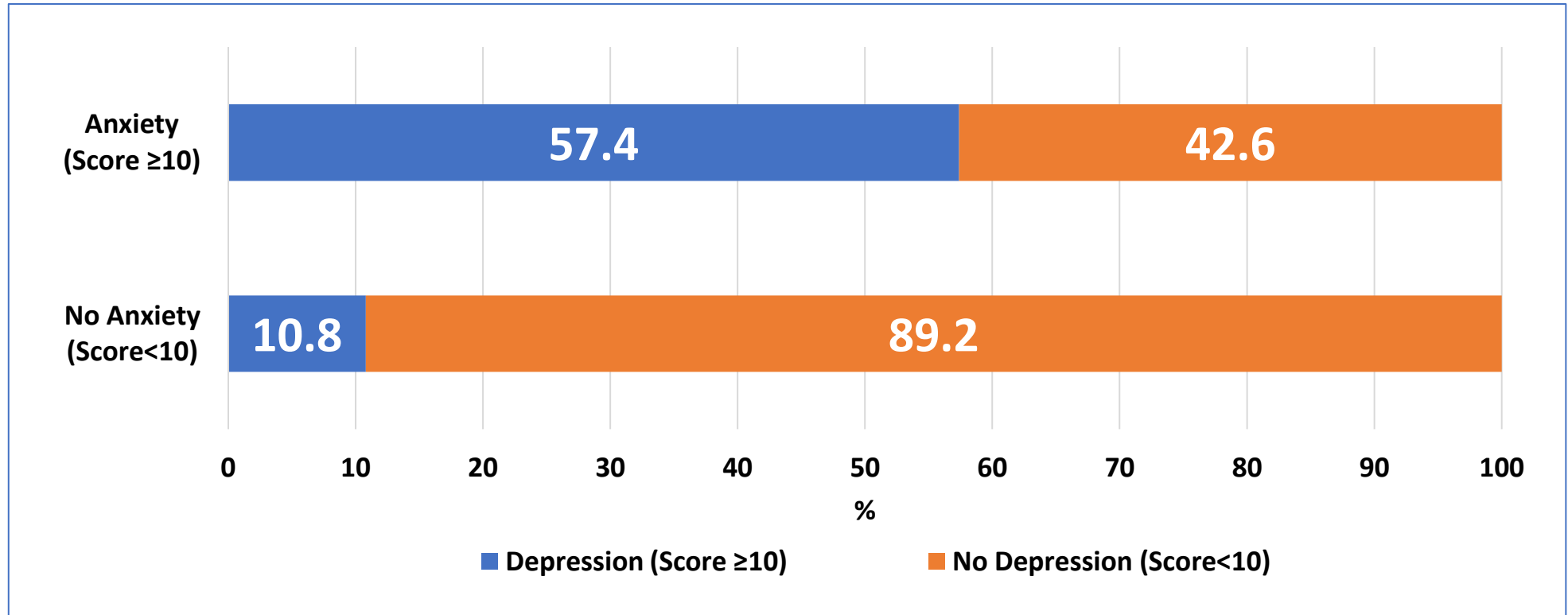
Glycemic Control



Those with poor glycemic control showed a higher prevalence of depression ($p < 0.05$)

Associations Between Mental Health Issues

ASSOCIATION BETWEEN ANXIETY AND DEPRESSION



**Individuals with anxiety showed a higher prevalence of comorbid depression
($p < 0.001$)**

Table 1. Change in Anthropometric and Biochemical Parameters (Pre- and Post-Intervention)

Parameters	Pre	Post	Difference*
HbA1c (%)	7.6 (6.7 - 8.9)	6.5 (6 - 7.1)	1.31
Weight (Kg)	71 (63 - 80)	67 (60 - 74)	4.46
BMI (Kg/m ²)	25.6 (23.4 - 28.6)	23.8 (22.2 - 26.5)	1.64
Fasting Insulin (μU/ml)	8.75 (5.6 - 13.1)	6.70 (4.22 - 10.8)	2.06
Fasting Blood Sugar (mg/dL)	131 (107.7 - 155.6)	119 (103.2 - 138.1)	13.29

*Data are presented as median (Interquartile range); *P<0.001*

Anxiety and Depression: Prevalence & Improvement

Prevalence of Anxiety

Fig. 5: Pre-Intervention

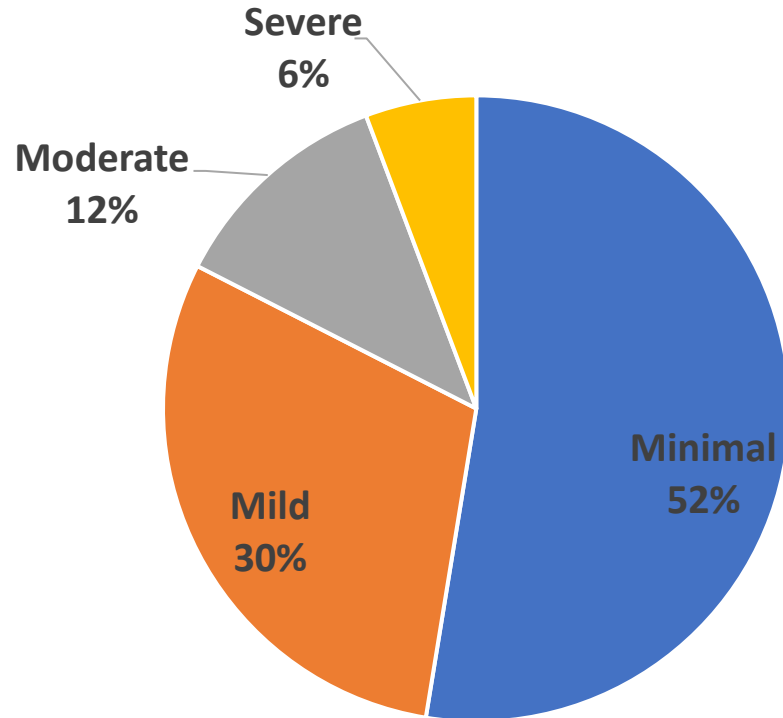
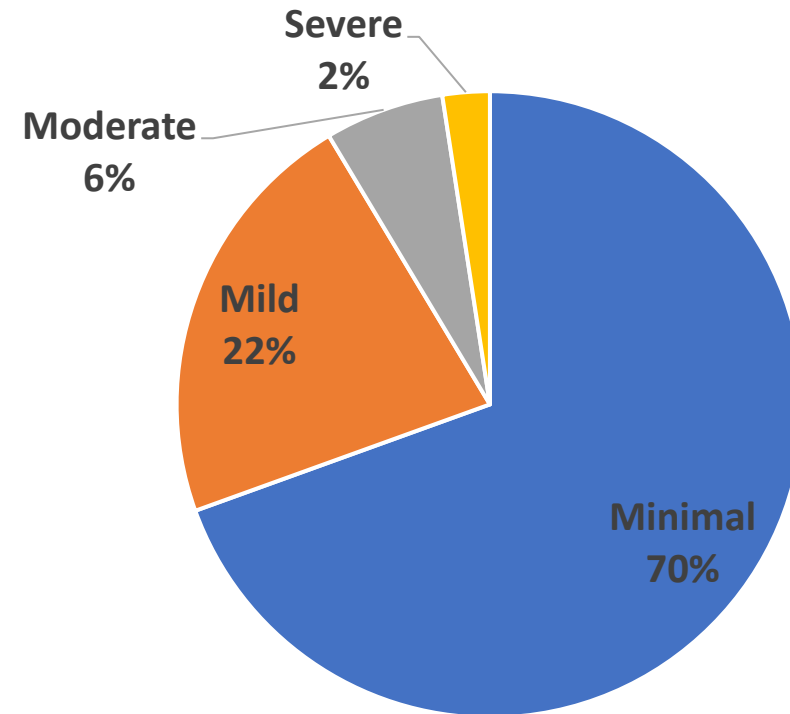


Fig. 6: Post-Intervention



Prevalence of anxiety (mild to severe; score ≥ 5) dropped from **48%** to **30%**
Prevalence of anxiety (moderate to severe; score ≥ 10) dropped from **18%** to **8%**

Prevalence of Depression

Fig. 7: Pre-Intervention

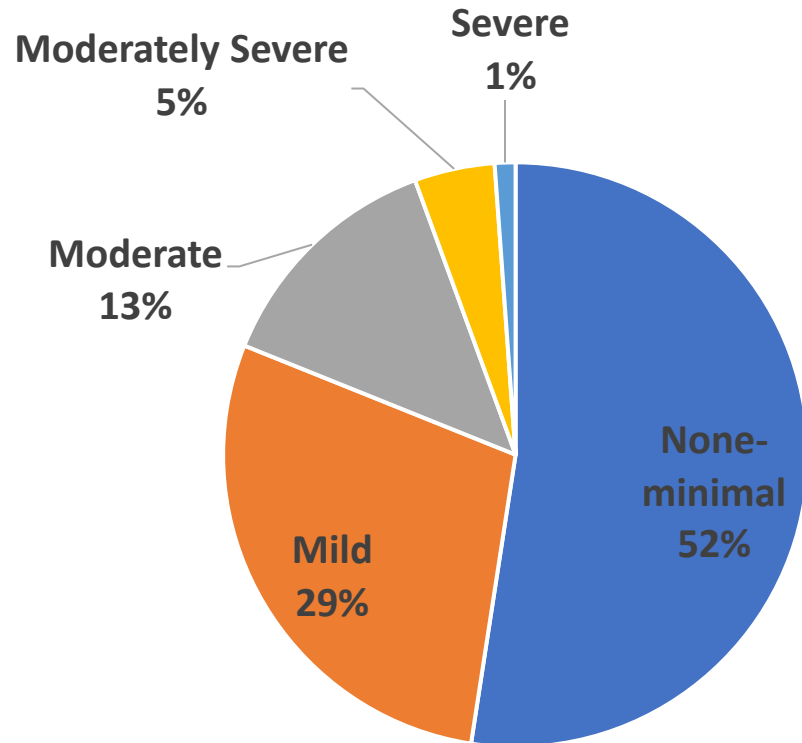
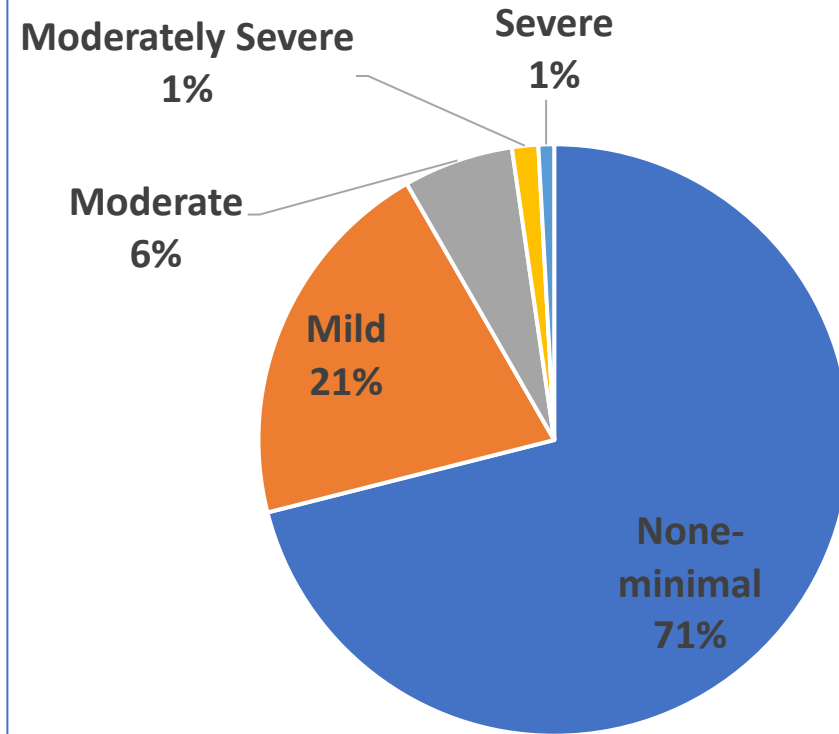


Fig. 8: Post-Intervention

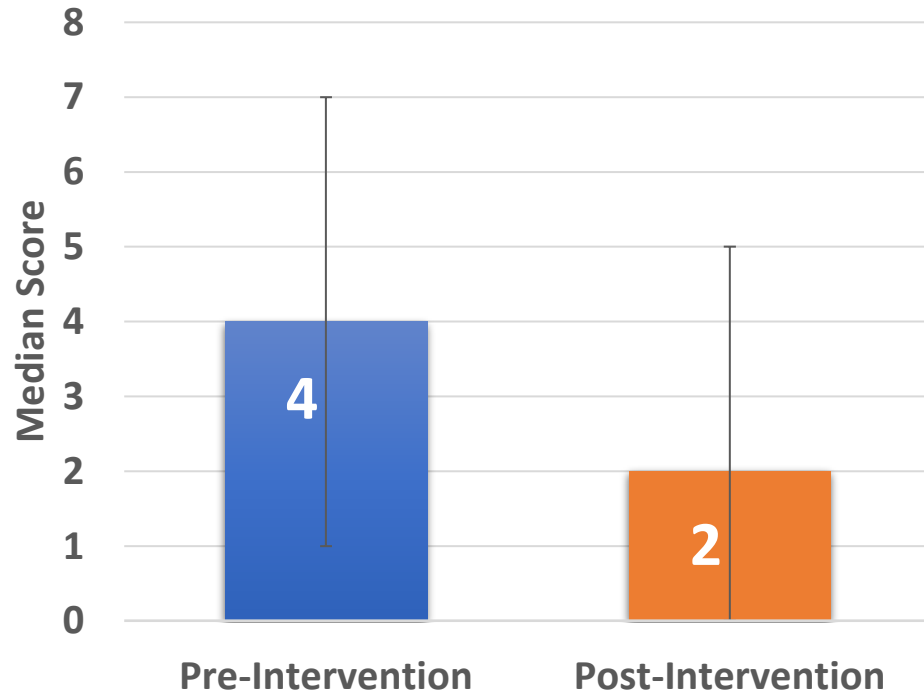


Prevalence of depression (mild to severe; score ≥ 5) dropped from **48%** to **29%**

Prevalence of depression (moderate to severe; score ≥ 10) dropped from **19%** to **8%**

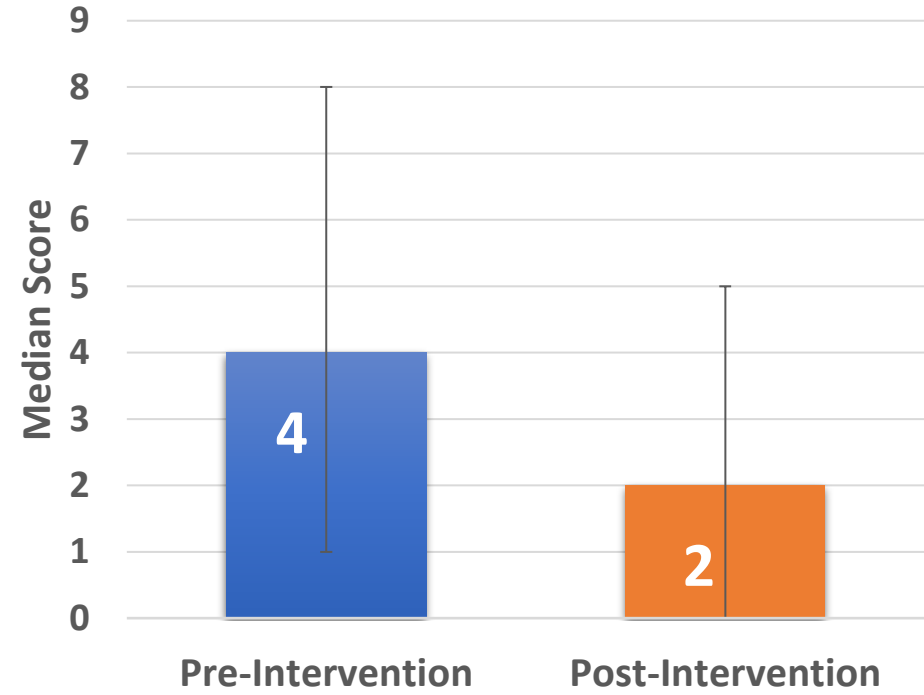
Change in Anxiety and Depression Scores

Fig. 9: Change in Anxiety Score for overall Cohort



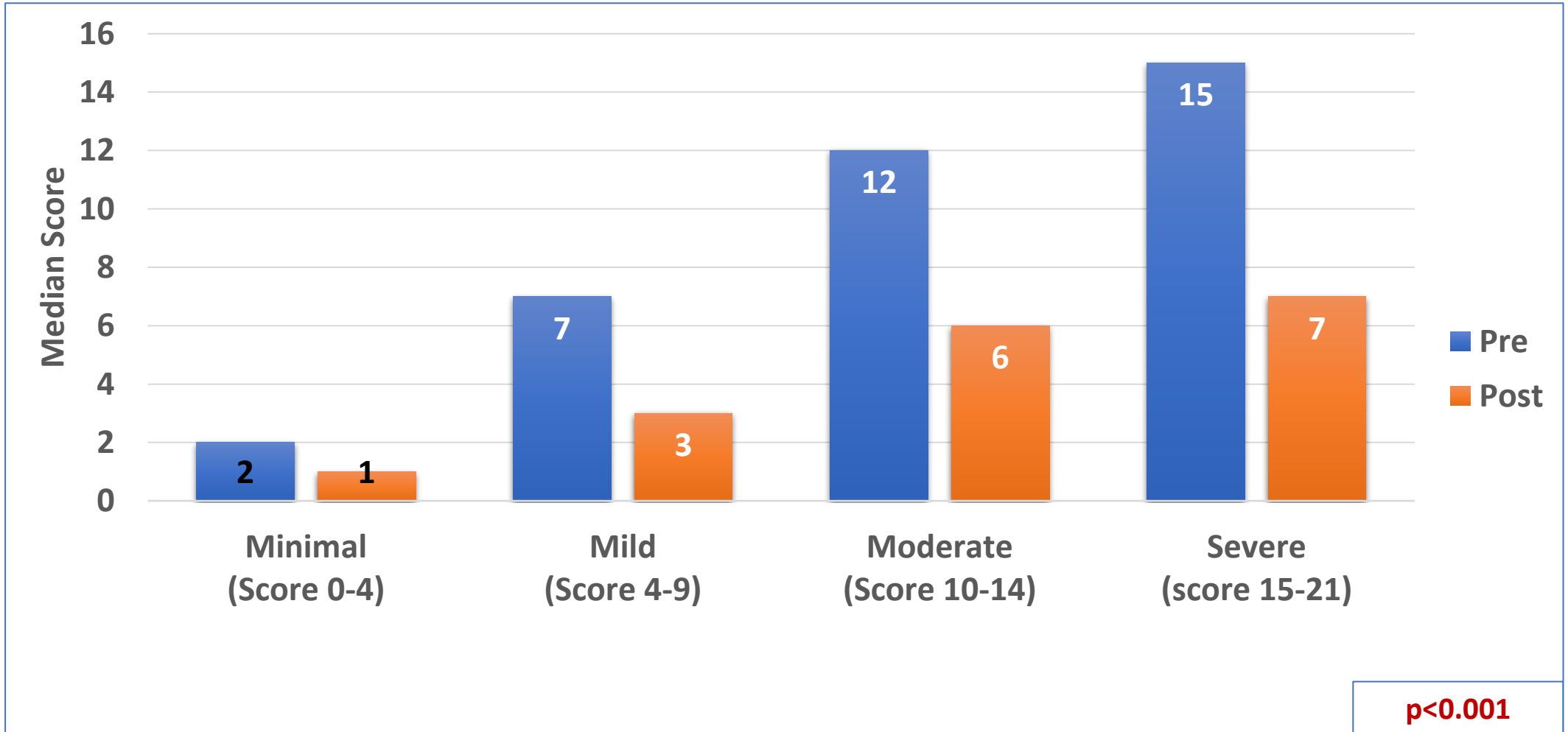
p<0.001

Fig. 10: Change in Depression Score for overall Cohort

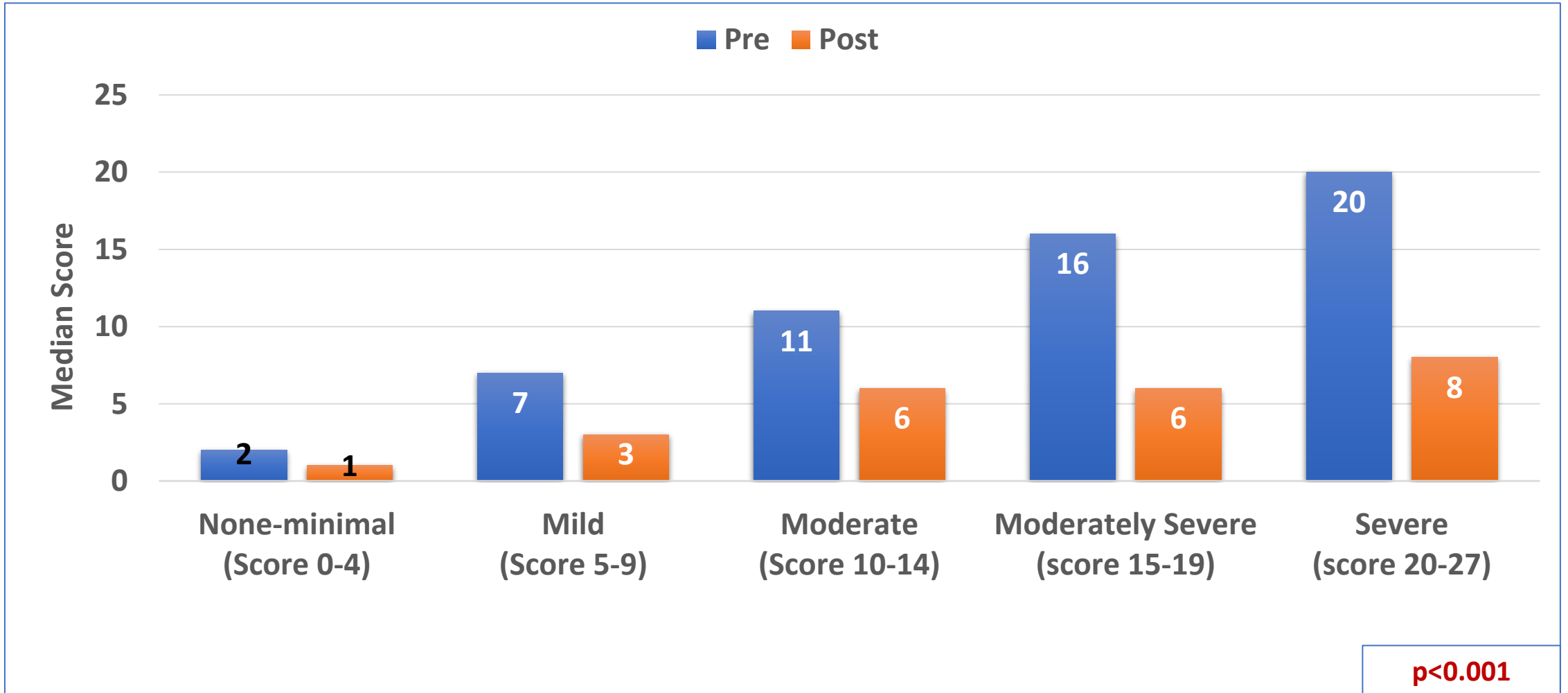


p<0.001

Change in Anxiety Scores by Severity



Change in Depression Scores by Severity



Conclusions

- Age, stress before diabetes, and the presence of comorbidities were the common factors linked to both anxiety and depression
- An overall improvement in anxiety and depression status along with a reduction in HbA1c, weight, BMI, Fasting Insulin, and Fasting Blood Sugar was observed
- 1 in every 2 patients with moderate to severe anxiety and depression shifted to the none-minimal category
- Including mental health support as a component of diabetes management warrants serious consideration
- Further large-scale studies may help corroborate our findings

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Thank you!

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