

# Abnormal Glucose Breath Test Does Not Correlate with Patient's Self-Reported Symptoms and Their Severity

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## Background and AIM

- Glucose Hydrogen Breath Testing (GBT) is commonly used for diagnosing Small Intestinal Bacterial Overgrowth (SIBO).
- Patients present with clinical symptoms (sx) and their predictive value for a positive (pos) GBT remains unclear.
- AIM: To assess the prevalence of self-reported GI sx profiles in adults with unexplained upper GI symptoms and correlate this with GBT.

## Methods and Materials

- Retrospective analysis of adult patients presenting to single medical center from 6/20 –12/21 for GBT.
  - N = 184
- A pos GBT for SIBO was defined by the North American Consensus ( $\geq 20$  ppm H<sub>2</sub> increase over basal within 90 minutes (mins) and/or  $\geq 10$  ppm CH<sub>4</sub> at any time).
- Pts completed a GI questionnaire assessing 17 GI symptoms:
  - Regurgitation; Chest Pain; Heart Burn; Belch; Abdominal Pain; Bloating; Gas; Nausea; Vomit; Abdominal Cramps; Indigestion; Distension; Fullness; Early Satiety; Diarrhea; Constipation; Fatigue.
- GI symptoms were assessed (%) between negative and positive GBTs.
- GI symptoms were measured by Frequency, Intensity, and Duration:
  - Frequency:**
    - None
    - Less Than 1/Week
    - 1/Week
    - $\geq 1$ /Week
  - Intensity:**
    - None
    - Mild
    - Moderate
    - Severe
  - Duration:**
    - None
    - Less Than 10 Minutes
    - 10 – 30 Minutes
    - $\geq 30$  Minutes
- Sub-Group Analysis, Gastroesophageal Reflux (GERD), Dyspeptic, and Irritable Bowel Syndrome, were constructed assessing Frequency, Intensity, and Duration mean summation scores between negative and positive GBTs.
  - GERD:** Regurgitation + Chest Pain + Heart Burn.
  - Dyspeptic:** Abdominal Pain + Bloating + Gas + Nausea + Fullness + Early Satiety.
  - Irritable Bowel Syndrome:** Abdominal Pain + Diarrhea + Constipation.
- Univariate analysis and logistic regression analysis was performed. A p-value of  $<0.05$  was considered statistically significant.

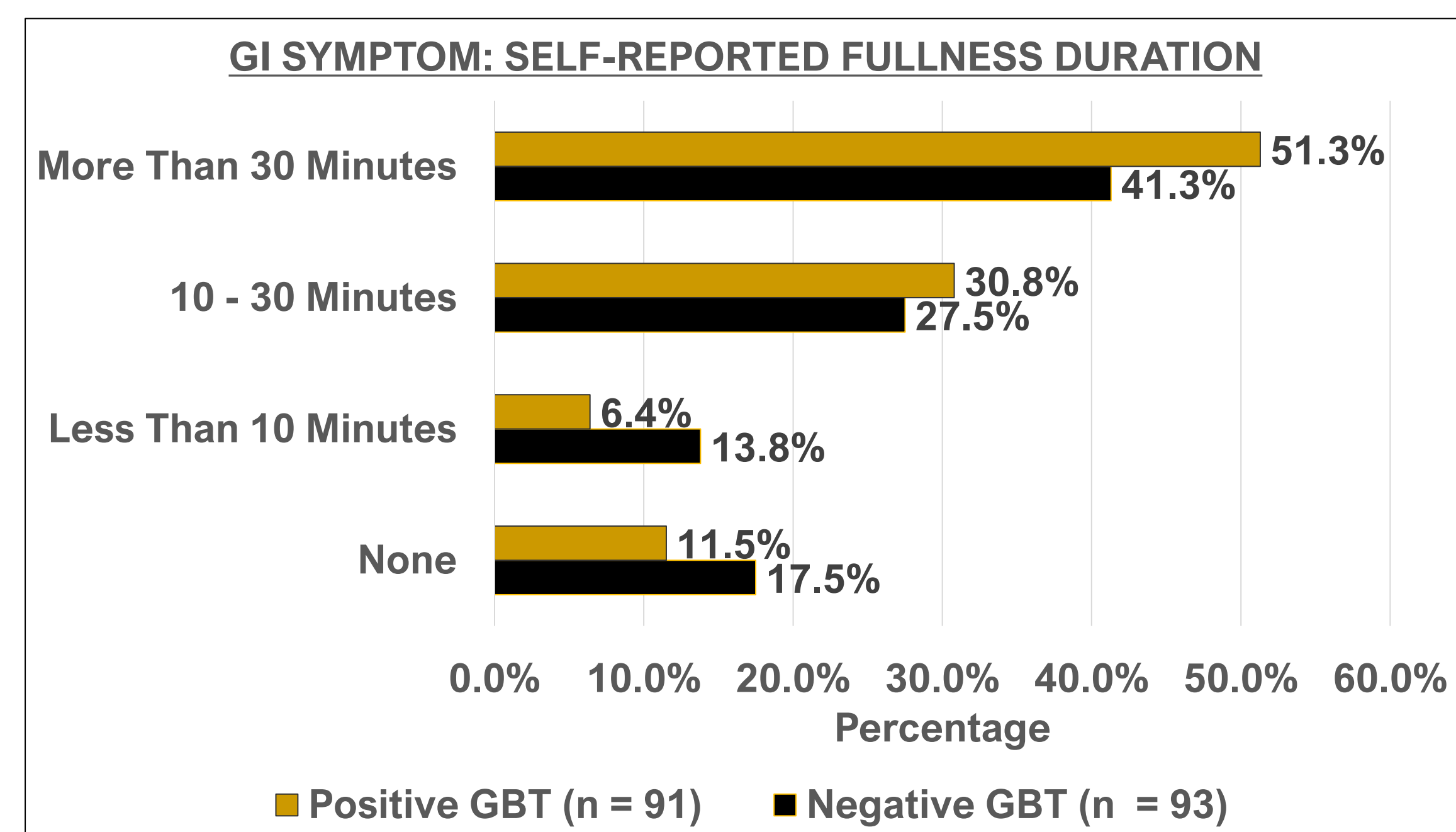
## DEMOGRAPHICS

Demographic Variable	Negative GBT (n = 93)	Positive GBT (n = 91)	P - Value
Mean Age	49.4 (16.1)	54.0 (17.2)	0.06
Sex	77.4% Female/ 22.6% Male	79.1% Female/ 20.9% Male	0.36
Mean Body Mass Index	28.9 (10.6)	26.2 (5.6)	0.36
Race	80.0% Caucasian	84.2% Caucasian	0.89

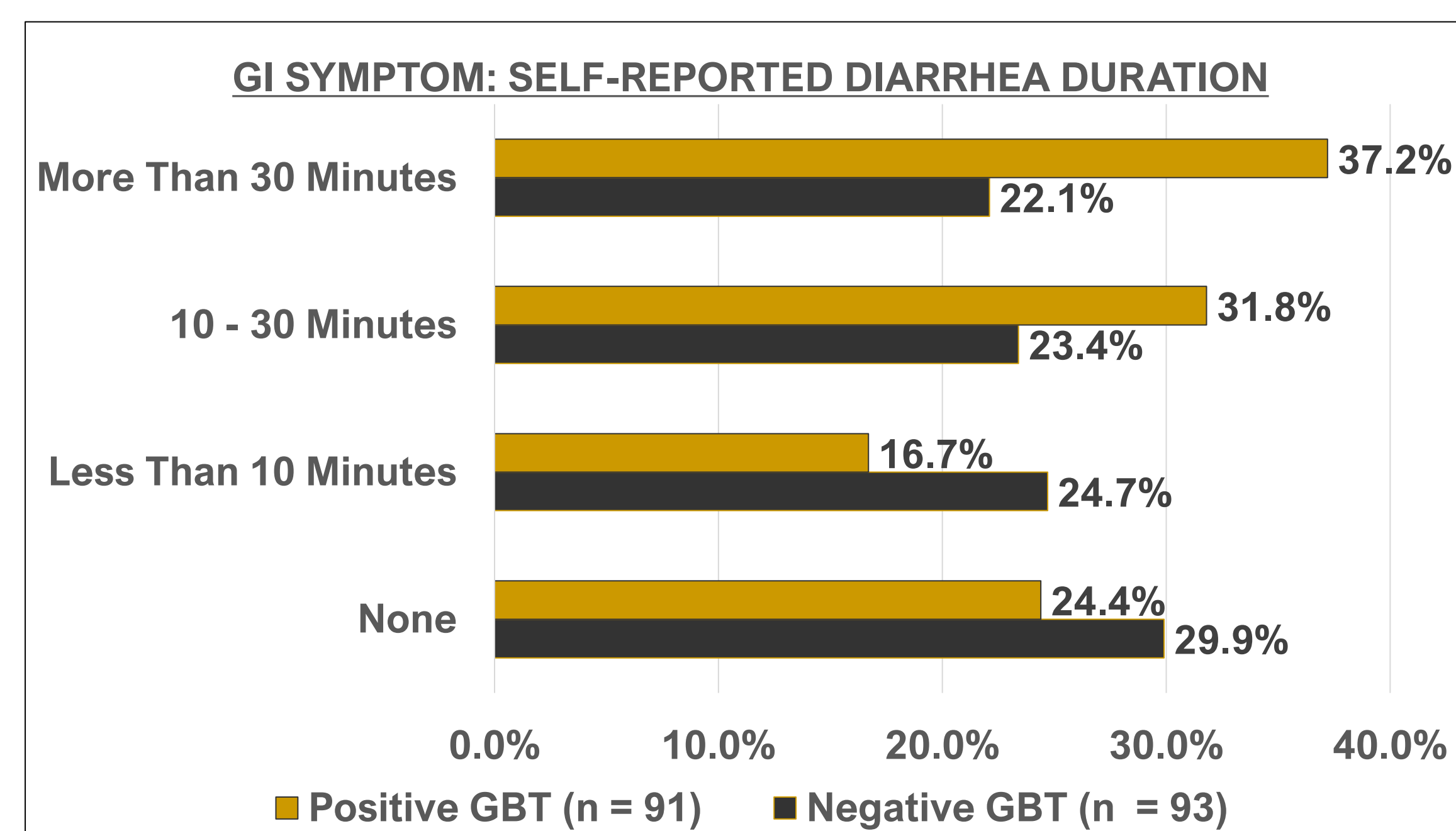
## GI SYMPTOMS: NEGATIVE VS. POSITIVE GLUCOSE HYDROGEN BREATH TEST

GI Symptom	Negative GBT (n = 93)	Positive GBT (n = 91)	P - Value
Regurgitation	42.2%	42.7%	0.95
Chest Pain	38.8%	38.8%	1.00
Heart Burn	63.1%	58.3%	0.53
Belch	74.7%	81.2%	0.31
Abdominal Pain	80.5%	78.0%	0.70
Bloating	88.9%	87.5%	0.77
Gas	92.1%	93.3%	0.77
Nausea	60.5%	66.3%	0.42
Vomit	15.5%	21.2%	0.34
Abdominal Cramps	73.8%	70.6%	0.64
Indigestion	68.7%	73.2%	0.53
Distension	70.6%	72.6%	0.77
Fullness	77.9%	84.7%	0.25
Early Satiety	58.8%	65.1%	0.40
Diarrhea	66.3%	69.3%	0.67
Constipation	67.4%	72.4%	0.48
Fatigue	84.1%	78.4%	0.33

## GI SYMPTOM DURATION RESPONSE: NEGATIVE VS. POSITIVE GLUCOSE HYDROGEN BREATH TEST

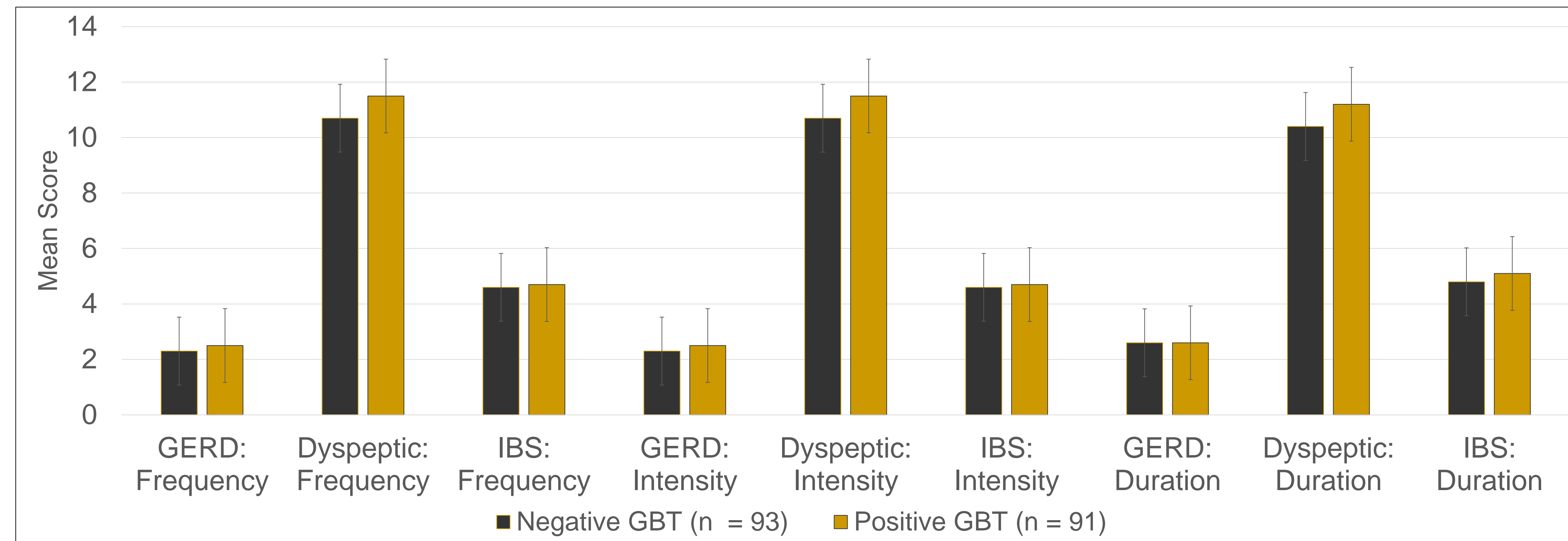


Category Distribution; p = 0.09



Category Distribution; p = 0.07

## MEAN SUMMATION SCORES FOR SELF-REPORTED FREQUENCY, INTENSITY, AND DURATION RESPONSE TO GI SYMPTOMS: GERD, DYSPEPTIC AND IBS SUB-GROUPS



No Significant Differences between Negative vs. Positive GBT Relative to GERD, Dyspeptic, and IBS Sub-Groups and Frequency, Intensity, and Duration Responses.

## LOGISTIC REGRESSION ANALYSIS: SIGNIFICANT TREND FOR A POSITIVE GLUCOSE HYDROGEN BREATH TEST

GI Symptom	Negative GBT (n = 93)	Positive GBT (n = 91)	$\beta$	P-Value	Odds Ratio (OR)	95% CI (Lower, Upper)
Vomit Frequency: Less Than 1/Week	4.8%	13.1%	1.10	0.07	2.99	0.91, 9.83
Nausea Intensity: Severe	12.8%	21.8%	0.81	0.09	2.24	0.86, 5.84

## SUMMARY

- No significant differences in binary response to GI symptoms between patients with negative vs. positive Glucose Hydrogen Breath Tests.
- Self-reporting of Frequency, Intensity, and Duration categories of 17 GI symptoms were not significant between patients with negative vs. positive Glucose Hydrogen Breath Tests.
  - A trend for a higher percentage of positive Hydrogen Glucose Breath Test were self-reported in patients with Fullness (p=0.09) and Diarrhea (p=0.07) in the Duration categories of 10 -30 mins (FL: 30.8% vs. 27.5%; DR: 31.8% vs. 23.4%) and  $\geq 30$  mins (FL: 51.3% vs. 41.3%; DR: 37.2% vs. 22.1%).
- Logistic regression analysis showed a trend toward a positive Glucose Hydrogen Breath Test for the GI symptom of Vomit Frequency of Less than 1/Week (p = 0.07; OR = 2.99; 95% CI: 0.91, 9.83) and Nausea intensity of Severe: (p = 0.09; OR = 2.24; 95% CI: 0.86, 5.84).
- No differences in GI symptom Frequency, Intensity, and Duration were seen between the GERD, Dyspeptic, and IBS sub-groups between patients with a negative vs. positive Glucose Hydrogen Breath Test.

## CONCLUSION

- The pre-test probability of self-reported common GI symptoms are an unreliable predictor for a positive Hydrogen Glucose Breath Test.
- GI symptoms relative to Frequency, Intensity, and Duration have limited pre-test probability for determining a positive Hydrogen Glucose Breath Test.
- Gastroesophageal Reflux, Dyspeptic, and Irritable Bowel Syndrome groups have similar self-reported responses to Frequency, Intensity, and Duration of GI symptoms.
- When the index of clinical suspicion is high for Small Intestinal Bacterial Overgrowth, clinicians should consider objective diagnostic testing with a Hydrogen Glucose Breath Test rather than empiric antibiotic treatment.

