

Abstract

Contributors to Insulin Resistance in the Jamaican Population

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The association of decreased glucose tolerance with increasing obesity and age and the higher prevalence in females have been well documented in several populations. The objective of this study was to investigate these associations in the Jamaican population. Basic anthropometric data, fasting glucose and 2 hour glucose levels were measured for 469 men and 704 women from a population sample. In addition, fasting insulin and fasting C-peptide levels were measured for the subjects who fell within the top 15% (obese, above 32 kg/m²) and bottom 15% (below 21 kg/m²) of the BMI curve. Insulin was measured using the MEDGENIX INS EASIA kit which is specific for insulin and does not detect pro-insulin. C-peptide was measured using the MEDGENIX C-PEPTIDE EASIA kit. Derived anthropometric units were used in analysis; these were: waist divided by hip (WHR), WABMI (waist divided by BMI) and conicity (Conicity = $\sqrt{0.109 \times \text{Weight/Height}}$ × Waist circumference). The glucose/insulin ratio was used as an approximate measure of insulin resistance and the C-peptide/insulin ratio was used as an approximate measure of hepatic extraction of insulin. We found that the group at the top 15% of the BMI curve all had BMIs over 32 kg/m² (obese group) and the BMIs for the bottom 15% (thin group) all had BMIs below 20 kg/m². The number of hyperinsulinemic subjects found in the obese group (46%) was significantly higher than that found in the thin group (25%). In addition, the obese normoglycemic had higher fasting glucose and 2 hour glucose than the thin normoglycemic. The obese group also had higher levels of fasting glucose, post challenge 2 hour glucose, fasting insulin, fasting C-peptide, hepatic extraction and lower glucose insulin ratios than the thin group. Within the obese group there were no correlations of glucose levels or insulin secretion with BMI. However correlations were found for WHR, waist and conicity. In

the thin group, despite their low BMI, correlations were nevertheless found for WHR and glucose levels. The number of women who were hyperinsulinemic was significantly higher than the number of men. Age correlated positively with fasting glucose, post challenge 2 hour glucose and C-peptide in each group and negatively with insulin in the composite of the two groups. An age threshold, lying in 40-45 age group was found above which glucose tolerance decreased.

Conclusions: Higher fasting glucose and post challenge 2 hour glucose levels in obese normoglycemic subjects than in thin normoglycemic subjects, suggests that the mechanism responsible for the association between obesity and hyperinsulinemic may already be acting in those subjects. Within both obese and thin groups, glucose levels increased with increasing WHR and conicity but were not related to BMI. This suggests that central tendency may be a more useful indicator of glucose intolerance than BMI.

Higher fasting glucose levels, higher post challenge 2 hour glucose levels and higher fasting levels of insulin as indicated by both insulin and C-peptide measurements suggest greater insulin resistance and glucose intolerance in the obese group which is consistent with results from other populations. The higher glucose insulin ratio found in our obese population compared to other obese populations suggests a lower degree of obesity- associated- insulin resistance in our population. The use of a nonparametric test indicated that this result was not affected by the higher prevalence of hyperinsulinemia in the obese group.

The finding in this study of a higher hepatic extraction in the obese group compared to the thin group does not support the theory that the hyperinsulinemia of obesity is due to low hepatic extraction.