

HOW MUCH VARIANCE IN INSULIN RESISTANCE IS EXPLAINED BY OBESITY?

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Purpose: Obesity is believed to be the major cause of insulin resistance, although many other obesity-independent signals are shown to affect insulin sensitivity. We address the degree to which variation in insulin resistance is explained by morphometric and biochemical measures of obesity. Methods: PubMed and Google Scholar were searched for epidemiological studies published between 1994 and 2015 that report correlations between at least one measure of obesity and that of insulin resistance. Results: A total of 63 studies satisfied inclusion criteria. Frequency distribution of coefficients of determination between morphometric measures of obesity and insulin resistance was skewed with the mode being less than 10%, class and median being 17.3%. Plasma leptin concentration, but not plasma non-esterified fatty acid level, was better correlated with insulin resistance, the median variance explained being 33.29% for leptin. Morphometric measures alone had a median variance explained of 16% only. Ethnicity explained part of the variance across studies with the correlation being significantly poorer in Asians. However, in all the populations coefficient of determination was small indicating that obesity explains only a small fraction of variance in insulin resistance. Conclusion: The extremely limited predictive power of morphometric and biochemical measures of obesity suggests that more research needs to focus on the obesity-independent signals that affect insulin sensitivity.