Glucose Levels of Students after Type 2 Diabetes Mellitus Glucose Tolerance Test

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Introduction
Type 2 Diabetes Mellitus (T2DM) is an important health problem in the United States. The economic cost of obesity-related diseases, such as T2DM, in the United States is more than $20 billion annually (Magoc et al. 2010). According to the American Diabetes Association, Type 2 Diabetes Mellitus occurs when the body does not produce enough insulin or the cells ignore the insulin signal. Insulin plays a major role in regulating glucose metabolism. Brigham Young University Hawaii is attended by students from around the world. Kim et al. (2008) found that ethnicity is a stronger risk factor for T2DM than dietary patterns when energy intake is adjusted. The purpose of this study was to determine the degree of glucose tolerance in college students from different ethnic groups at BYU – Hawaii.

Method
Participants
Eighteen volunteers participated in this study. Volunteers included those Polynesians (Samoan or Tongan, born and raised in native country), East Asians (Taiwanese, Chinese, Japanese, Hongkongese, and Korean with three grandparents who were born and raised in country), and Caucasian ancestry (with European either English, French, German, Italian, Polish, Swedish, Scottish, or Slovakian background). Six individuals from each ethnicity, ranging between ages 19-26 years were tested for blood glucose using a One Touch Glucose meter.

Procedure
Three tests were administered, a Normal Glucose Tolerance Test (NGT), an Impaired Glucose Tolerance Test (IGT), and an Impaired Fasting Glucose Test (IFG). Blood was obtained by pricking the side of the second finger of subjects, using the sterile lancet provided in the blood glucose kit. After measuring the normal glucose concentrations, subjects were given ten ounces (290 milliliters) of a Glucose Beverage (Azer Mart, Item #: 10-SP-075) containing 75 grams of glucose with artificial flavor and coloring. After an hour the IGT readings were recorded. The following morning, before the consumption of food, the IFG reading data were taken. Data were analyzed by repeated measures ANOVA.

Results
Polynesians had the highest normal levels of glucose (97.67mg/ml) while Caucasians had the lowest (78.67mg/ml) (Table 1). These differences were not statistically significant. While there were numerical differences between Asians, Caucasians and Polynesians in the Impaired Glucose Tolerance Test (IGT) these differences were not significant (Table 1). The Impaired Fasting Glucose Test (IFG) also showed no significant difference among Asians, Caucasians and Polynesians (Table 1).

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Pre-NGT (mg/ml)</th>
<th>Post-IGT (mg/ml)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian (n=6)</td>
<td>94.17 (12.29)</td>
<td>97.67 (12.01)</td>
<td>0.142</td>
</tr>
<tr>
<td>Polynesian (n=6)</td>
<td>117.50 (46.82)</td>
<td>117.67 (27.25)</td>
<td>0.511</td>
</tr>
<tr>
<td>Caucasian (n=6)</td>
<td>77.50 (7.89)</td>
<td>77.50 (7.89)</td>
<td>0.442</td>
</tr>
</tbody>
</table>

TABLE 1. Normal Glucose Tolerance Test (NGT), Impaired Glucose Tolerance Test (IGT), and Impaired Fasting Glucose Test (IFG) factor scores by different ethnicities.

Conclusion
The glucose challenge resulted in significant elevations in blood glucose in Polynesians and Caucasians but not in Asians. This was the result of a blunted response in the Asian group. These results may be due to a small sample size or may indicate a metabolic difference among individuals. Without further testing, it is not possible to determine. The comparisons across groups suggest no significant differences in the group’s initial glucose status or in the fasting response. While Caucasians had a lower initial value the differences were not significant suggesting that all three groups shared similar metabolic profiles. None of the individuals who participated in this study showed a propensity to early onset Type II diabetes. While ethnicity has been shown to affect glucose response, it was not possible to make such a conclusion from these data.

Reference