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Relationship Between BMI, Exercise, and Milk Consumption

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Exercise Science and Sports Studies Department

Introduction

• Obesity is a multifactorial disease. Imbalances in energy intake and expenditure may be one of the major causes of obesity. Energy intake from beverages may especially go unaccounted for by many individuals.
• The USDA recommends that adults consume 24 oz of dairy per day. 24 oz of milk provides approximately 900mg of calcium.
• Researchers have noted that dairy calcium intake may help prevent excess weight gain and that milk consumption is inversely related to body fat (BF) and BMI in girls and college students. (Poddar,Abreu)
• The relationship between milk consumption and body fat has been researched in children, but is lacking in adult populations.

Methods

• 169 males and 344 females from a small college community were surveyed about their beverage consumption and exercise habits.
• The BevQ-15 was used to assess beverage consumption habits. Participants were asked to provide their height and weight as well as their average frequency, intensity, and duration of exercise.
• A bioelectrical impedance test for BF percentage was performed on a sub-group of volunteers from the survey sample.
• 98 sub-sample subjects were measured for height and weight. Bioelectrical impedance testing was performed with a BodyStat Quadscan 4000. All subjects were euhydrated at time of testing (urine specific gravity < 1.020).
• Pearson product moment correlation coefficients were used to examine the relationships among milk consumption, BMI, BF, and minutes of exercise per week.

Purpose

• The purpose of this study was to examine the relationship between dairy consumption, body composition, and physical activity in males and females.

Results

Table 2. The relationships between milk consumption, BMI, and minutes of exercise per week in survey data

<table>
<thead>
<tr>
<th>Milk (oz)</th>
<th>BMI (kg/m²)</th>
<th>Exercise (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>Pearson Corr.</td>
<td>N</td>
</tr>
<tr>
<td>BMI</td>
<td>Pearson Corr.</td>
<td>N</td>
</tr>
<tr>
<td>Exercise</td>
<td>Pearson Corr.</td>
<td>N</td>
</tr>
</tbody>
</table>

When the survey data was broken down by sex;
• Significant inverse relationship was found between milk consumption and BMI for females (r = -.015; p = .005), but not for males (r = -.142; p = .065).
• Weak significant relationship was found between milk consumption and exercise per week (min) for both males (r = .219; p = .004) and females (r = .152; p = .005).
• Significant relationship was found between BMI and exercise per week (min) in females (r = .265; p = .05) and the general survey (r = .209; p < .05) but was not found in males (r = -.097; p = .207).

Table 3. The relationships between milk consumption, BF, and minutes of exercise per week in the sub-sample

<table>
<thead>
<tr>
<th>Milk (oz)</th>
<th>% BF</th>
<th>Exercise (mins)</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>Pearson Corr.</td>
<td>N</td>
<td>1.0</td>
</tr>
</tbody>
</table>

When sub-sample data was broken down by sex;
• A weak non-significant inverse relationship was found between milk consumption and BMI for females (r = -.245; p = .064) and a non-significant inverse relationship for males (r = -.135; p = .05).
• A moderate significant inverse relationship was found between milk consumption and % BF in males (r = -.382; p < .005) but not in females (r = -.212; p = .10).
• A moderate significant relationship was found between milk consumption and exercise/week (min) in females (r = .336; p = .010) but not in males (r = .305; p = .056).
• Non-significant relationship was found between exercise per week (min) and BMI in both males and females.

Discussion

• Consistent with previous research, we found a significant, inverse relationship between milk consumption and BMI which was slightly stronger in women. 1,2
• Previously, researchers have suggested that calcium influences energy metabolism by decreasing fat absorption and increasing fat oxidation. 3
• Low fat dairy intake may be associated with better overall diet quality. (Poddar)
• Additionally, protein content in milk may suppress appetite. 2
• BF was significantly and inversely related to milk consumption in the sub-sample, but not significantly related to minutes of exercise per week.

Conclusions

• Milk consumption has a significant inverse relationship with BF and in adult females.
• Minutes of Exercise per week does not have significant relationship with percent body fat.

Literature Cited

5United States Department of Agriculture (n.d.). Choose My Plate. Retrieved from

Table 1. Descriptions of the two samples used in the study

<table>
<thead>
<tr>
<th>N</th>
<th>Survey Sample</th>
<th>Sub-Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>513</td>
<td>98</td>
</tr>
<tr>
<td>Females</td>
<td>344</td>
<td>58</td>
</tr>
<tr>
<td>Males</td>
<td>169</td>
<td>40</td>
</tr>
</tbody>
</table>

Milk consumption values include low fat, reduced fat, and whole milk.

Table 1. Descriptions of the two samples used in the study

<table>
<thead>
<tr>
<th>Milk (oz)</th>
<th>% BF</th>
<th>Exercise (mins)</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>Pearson Corr.</td>
<td>N</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Indicates significant results (p<0.05).