Dietary patterns in an elderly population and their relation with bone mineral density: The Rotterdam Study

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Objectives

1. To identify dietary patterns that are associated with bone mineral density (BMD) in elderly subjects with a relatively high dairy intake.

2. To assess whether the associations between dietary patterns and BMD were independent of body weight.

Background

It is unclear whether overall dietary patterns influence BMD in populations with a relatively high dairy intake. Studying overall dietary patterns (in contrast to single nutrients) accounts for potential interactions between nutrients.

Methods

Design: Prospective, population-based cohort of elderly subjects (≥ 55 years) of The Rotterdam Study (n = 5144) in the Netherlands

Baseline dietary assessment: food Frequency Questionnaire (FFQ) containing 172 food items, categorized into 23 food groups

Dietary pattern identification: principal component analysis on 23 food groups that were based on similarities in:
- nutrient composition (e.g. apples and pears) or
- culinary use (e.g. mixed meals)

BMD measurement: DXA scan of the femoral neck, using a Lunar DPXdensitometer and DPX-IQ and PRODIGY software
- At baseline (1989-1993) and
- at 3 follow up visits (between 1993 and 2004)

Results: dietary patterns identified

(by principal component analysis (PCA), only food groups with factor loadings > 0.2 and < -0.2 are shown)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>High in Unprocessed meat</td>
<td>High in Alcohol</td>
<td>High in Battered fish</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Processed meat</td>
<td>Fatty fish</td>
</tr>
<tr>
<td>Vegetable oils</td>
<td>Mixed meals</td>
<td>Poultry</td>
</tr>
<tr>
<td>Eggs</td>
<td>Eggs</td>
<td>Shell fish</td>
</tr>
<tr>
<td>Animal fats</td>
<td></td>
<td>Eggs</td>
</tr>
<tr>
<td>Low in Soy</td>
<td>Low in Fruits</td>
<td>Vegetables</td>
</tr>
<tr>
<td>Mixed meals</td>
<td>Low in Yoghurt</td>
<td>Alcohol</td>
</tr>
</tbody>
</table>

Results: associations between adherence to dietary patterns and BMD

Associations between dietary pattern adherence and BMD

Effects of adjustment for body weight and height

- Model 1: adjusted for age, sex, total intake of kilocalories, socioeconomic status, smoking, prevalent type 2 diabetes, physical activity and use of lipid lowering drugs
- Model 2: Additionally adjusted for body weight and height

Implications

Recommendations favoring a “Mediterranean-like” and minimizing a “Processed” dietary pattern should be part of the Food Group Based Dietary Guidelines targeting improved bone health as part of overall health.

Conclusions

1. A “Mediterranean-like” and “Traditional” dietary pattern may have benefits for BMD whereas adherence to a “Processed” dietary pattern may pose a risk for low BMD in elderly subjects with a relatively high dairy intake.

2. The associations of the “Mediterranean-like” and “Processed” pattern with BMD were independent of body weight.

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