

Citation:

Shea S, Basch CE, Stein AD, Contento IR, Irigoyen M, Zybert P. Is there a relationship between dietary fat and stature or growth in children three to five years of age? *Pediatrics*. 1993; 92: 579-586. *Columbia University Study of Childhood Activity and Nutrition*.

PubMed ID: [8414831](#)

Study Design:

Cohort Study

Class:

B - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To determine whether a moderately reduced fat diet affects the stature or growth of healthy pre-school children.

Inclusion Criteria:

Families with a healthy child between three and four years of age at entry.

Exclusion Criteria:

- Families were excluded if the mother was pregnant or post-partum by less than six months
- Children with major illness, including personality disorders and severe behavioral problems.

Description of Study Protocol:

- Subjects were drawn from children participating in the Columbia University Study of Childhood Activity and Nutrition
- Families were recruited during 1985 and 1986, mainly through a pediatric practice at The Presbyterian Hospital
- Only one child per family was eligible.

Data Collection Summary:**Dependent Variables**

- Stature: Height, weight and BMI at baseline, calculated as means of all measurements occurring between first and fourth diet recalls in the first year of the study (measured

following standardized techniques)

- Growth: Change during follow-up in height, weight and BMI (computed by linear regression using all available data points for each child)
- The mean time between the first and last measurements of stature was 25.3 months.

Independent Variables

- Fat: % of total kcal
- Saturated fat: % of total kcal
- Cholesterol: mg per 1,000kcal

*Determined by four 24-hour recalls (elicited orally from the mother of the study child) and three Willett semi-quantitative food frequency questionnaires (administered orally to mothers who were asked to recall the child's habitual diet).

Control Variables

- Age in months at first 24-hour recall
- Sex
- Race/ethnicity
- Total energy intake

*Change in height, weight and BMI were adjusted for baseline values of these variables.

Statistical Analysis

- Analysis of Variance (ANOVA)
- Multiple linear regression analysis.

Description of Actual Data Sample:

- *Initial N*: 238 children
- *Final N*: 215 children (105 males; 110 females)
- *Withdrawals/Drop-outs*: Not specified. 215 children (105 males; 110 females) were followed for at least 12 months, had at least five measures of height and weight and completed the first four 24-hour recalls and the first three Willett semi-quantitative food frequency questionnaires.
- *Location*: Northern Manhattan, New York City
- *Race/Ethnicity*: Predominately Hispanic group with small percent of African-American children
- *SES*: Predominately low-income
- *Age*: Children aged three to four years at baseline.

Summary of Results:

- Mean total fat intake was 32.5% of total calories based on 24-hour recalls and 33.4% of total calories based on the Willett semi-quantitative food frequency questionnaire (FFQ)
- Total fat intake expressed as a nutrient density varied by more than 40% from the lowest; highest quintile of intake
- Longitudinal results: There were no differences in stature or growth across quintiles of children defined by consumption of total fat (% total kcal from fat), saturated fat (% total

kcal) or cholesterol (mg per 1000kcal)

- Based on the 24-hour recalls, there were no differences in stature or growth between the group of children consuming less than 30% of calories from total fat compared with the group consuming 30% or more
- Based on the semi-quantitative FFQ, there were no differences between these groups in height or weight or change in height, weight or body mass index
- Cross-sectional results: Baseline BMI was approximately 5% greater in the group consuming less than 30 calories from total fat ($0.01 < P < 0.05$). This difference was of small magnitude, was marginally significant, was in the opposite direction of the expected reduction of stature among children eating a reduced-fat diet and was one of many comparisons (17.5 vs. 16.6, $P < 0.05$ using FFQ). No significance difference was noted using 24-hour recall.
- Children who consumed a diet lower in total fat density also consumed significantly less total calories, saturated fat, cholesterol, calcium and phosphorus. On the other hand, children who consumed a diet lower in total fat density consumed significantly more carbohydrates, iron, thiamine, niacin and vitamins A and C.
- Based on data from the 24-hour recalls, children in the lowest two quintiles of fat intake had mean calcium intakes below RDA.

Author Conclusion:

These data support the safety of a moderately reduced fat diet in healthy pre-school children.

Reviewer Comments:

- *Use of both multiple 24-hour recalls and FFQ*
- *Mean follow-up time was 25 months*
- *Possibility that the effects on growth of a reduced-fat diet take longer to become apparent.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

- | | | |
|----|---|-----|
| 1. | Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies) | Yes |
| 2. | Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about? | Yes |
| 3. | Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice? | Yes |
| 4. | Is the intervention or procedure feasible? (NA for some epidemiological studies) | Yes |

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes

4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	Yes
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	Yes
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	Yes
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes

7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	Yes
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	Is bias due to study's funding or sponsorship unlikely?	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes

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