

# Are those fringe eaters leading a healthy life or merely crazy ascetics?

Hui Lin

Department of Statistics, Iowa State University

February 28, 2016

# Population Map

Bread is the stall of life

---

<sup>1</sup>A 2008 Harris Interactive study of 5,050 respondents

<sup>2</sup>[http://www.vegetariantimes.com/features/archive\\_of\\_editorial/667](http://www.vegetariantimes.com/features/archive_of_editorial/667)

# Population Map

Bread is the stall of life

- FOOD IS IMPORTANT!!

---

<sup>1</sup>A 2008 Harris Interactive study of 5,050 respondents

<sup>2</sup>[http://www.vegetariantimes.com/features/archive\\_of\\_editorial/667](http://www.vegetariantimes.com/features/archive_of_editorial/667)

# Population Map

Bread is the stall of life

- FOOD IS IMPORTANT!!
- Vegetarian diets become popular<sup>12</sup>
  - ▶ 10% say they largely follow a vegetarian-inclined diet
  - ▶ 3.2% follow a vegetarian-based diet
  - ▶ 0.5% are vegans

---

<sup>1</sup>A 2008 Harris Interactive study of 5,050 respondents

<sup>2</sup>[http://www.vegetariantimes.com/features/archive\\_of\\_editorial/667](http://www.vegetariantimes.com/features/archive_of_editorial/667)

# Definition

## Three main kinds of modern diets

- Omnivoroues: eat everything that is edible
- Vegetarian:
  - ▶ Lactoovovegetarian: edible plant-derived material, eggs, dairy, honey; no meat or fish
  - ▶ Vegan: edible plant-derived material

# Why why why?

Is it fasion?

Reasons for being vegetarian (2002 poll of American adults) <sup>3</sup>:

## **Most important reason for becoming a vegetarian**

Health	32%
Because of chemicals and hormones in meat products	15%
Don't like the taste of meat	13%
Love of animals	11%
Animal rights	10%
Religious reasons	6%
Concern for the planet	4%
To lose weight	3%
To reduce hunger and famine worldwide	1%

---

<sup>3</sup>"TIME Magazine: Veggie Tales". Time. 2002-07-07. Retrieved 2010-05-14

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein



# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**
  - ▶ Vegan Diet= Nutritional Deficiency

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**
  - ▶ Vegan Diet= Nutritional Deficiency
  - ▶ Mom and Grandma's idea:

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**
  - ▶ Vegan Diet = Nutritional Deficiency
  - ▶ Mom and Grandma's idea:

If PHD = Permanent Head Damage,

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**
  - ▶ Vegan Diet = Nutritional Deficiency
  - ▶ Mom and Grandma's idea:

If PHD = Permanent Head Damage,

then Vegan + PHD = Permanent Head Destroyed

# Healthy or Crazy?

Crazy—— Chinese Culture

- According to Chinese culture.....
  - ▶ Vegetarians eventually become qi and blood deficient
  - ▶ Hard to make strong blood from plant sources of protein  
**(low birth weight, stupid children)**
  - ▶ Vegan Diet = Nutritional Deficiency
  - ▶ Mom and Grandma's idea:

If PHD = Permanent Head Damage,

then Vegan + PHD = Permanent Head Destroyed

=====>Suicide Mode

# Healthy or Crazy?

Crazy—— Some nutrition results

- Bone Mineral Density (BMD) significantly lower in long-term vegans<sup>4</sup>
- Risk of bone fractures (EPIC-Oxford Study)
- Vitamin D
- Fall short of Calcium

---

<sup>4</sup>Reference 41 and 42 in Winston2009

# Healthy or Crazy?

Crazy—— Some nutrition results

- Bone Mineral Density (BMD) significantly lower in long-term vegans<sup>4</sup>
- Risk of bone fractures (EPIC-Oxford Study)
- Vitamin D
- Fall short of Calcium
  - ▶ lead to risk of bone fracture

---

<sup>4</sup>Reference 41 and 42 in Winston2009



# Healthy or Crazy?

Crazy—— Some nutrition results

- Bone Mineral Density (BMD) significantly lower in long-term vegans<sup>4</sup>
- Risk of bone fractures (EPIC-Oxford Study)
- Vitamin D
- Fall short of Calcium
  - ▶ lead to risk of bone fracture
  - ▶ fracture rates: vegans with  $> 525$  mg calcium/d = omnivores

---

<sup>4</sup>Reference 41 and 42 in Winston2009

# Healthy or Crazy?

## Crazy—— Some nutrition results (cont)

- n-3 Polyunsaturated fat<sup>5</sup>
  - ▶ long-chain n-3 fatty acids,
  - ▶ EPA, 20:5 n-3
  - ▶ DHA; 22:6n-3
- Higher concentrations of plasma homocysteine.
  - ▶ risk factor for CVD and osteoporotic bone fracture

---

5

- ▶ eicosapentaenoic acid ; docosahexaenoic acid

# Healthy or Crazy?

## B12—A headache

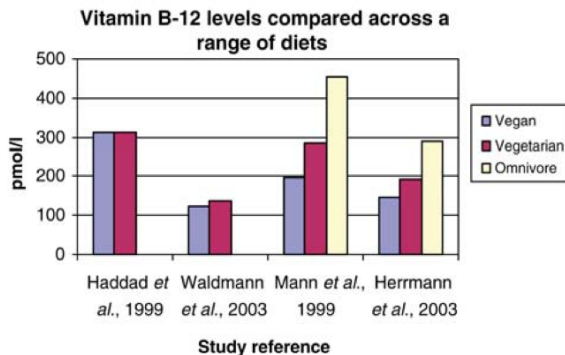
- B12 deficiency

- ▶ megaloblastic anaemia
- ▶ abnormal neurologic and psychiatric symptoms

(ataxia, psychoses , paresthesia, disorientation, dementia, mood and motor disturbance, difficulty with concentration )

# Healthy or Crazy?

**Figure :** Pooled results of studies providing data of plasma B12 concentrations for trial participants (male and female) across the vegan-vegetarian-omnivore diet range



Haddad *et al.*, 1999<sup>(1)</sup>  
Vegan ( $n=25$ ) ( $312 \pm 125$ )  
Vegetarian ( $n=20$ ) ( $313 \pm 99$ )

Waldmann *et al.*, 2003<sup>(7)</sup>  
Vegan ( $n=86$ ) ( $185; 97.6, 689$ )  
Vegetarian ( $n=45$ ) ( $122; 71.2, 276$ )

Mann *et al.*, 1999<sup>(8)</sup>  
Vegan ( $n=18$ ) ( $196 \pm 92$ )  
Vegetarian ( $n=43$ ) ( $285 \pm 132$ )  
Omnivore\*\*\* ( $n=60$ ) ( $452 \pm 134$ )

Herrmann *et al.*, 2003<sup>(16)</sup>  
Vegan ( $n=29$ ) ( $148; 99, 314$ )  
Vegetarian ( $n=66$ ) ( $127; 450$ )  
Omnivore ( $n=79$ ) ( $287; 190, 471$ )

\*\*\* Moderate meat eaters (high meat eaters =  $544 \pm 228$ )

# Healthy or Crazy?

Healthy? Kind of.....

- High
  - ▶ Fiber, folic acid, vitamins C and E, potassium, magnesium, phytochemicals
- Low
  - ▶ Calories, saturated fat, cholesterol, fat content that is more unsaturated

# Healthy or Crazy?

## Vegan and cancer

- Thin v.s. Obesity
- Adventist Health Study: colorectal and prostate cancer<sup>6</sup>
- Cancer-protective factors
  - ▶ legumes: stomach and prostate cancer
  - ▶ fiber, vitamin C, carotenoids, flavonoids and other phytochemicals: protect against various cancers
  - ▶ garlic: colorectal cancer
  - ▶ lycopene (tomatoes): protect against prostate cancer

---

<sup>6</sup>Reference 23,24, and 25 in Winston2009

# Healthy or Crazy?

Some other benefits (may or may not)

- Healthy skin: Nuts, vitamin A and E play a role
- Longer life
- Body odor: smell better??
- Hormone consumption
- Eating out: a lot less of the bad things in the food you choose

# Suggestions

Happy vegan : )

- B-12 fortified food (soy, rice, beverages, cereals)/ supplement
- Ca
  - ▶ Traditional sources: green leaf vegetable, tofu, tahini
  - ▶ Ca fortified: a lot .....
- Vitamin D
  - ▶ when fortified foods not available, a daily supplement of 5-10  $\mu\text{g}$
  - ▶ supplement is desirable for elderly vegan



# Suggestions

## Fatty acids

- n-3 fatty acid ALA: ground flaxseed, walnuts, canola oil, soy products
- long-chain n-3 fatty acid DHA: soy milks, cereal bars
- For pregnant and lactating women: extra supplement

# Futhure Work

- Effects of vegan for type 2 diabetes
- involve only small number of subjects
- long-term vegan ( $>5y$ )
- age at which a vegan diet is adopted

# My questions

- Dietary Records: how much do they tell you the truth?
- P-value: long term debate
- Other combined life style: moderate, non-smoking, even-tempered
- Effects on offspring

Life is beautiful

Life is beautiful

Thank you!