Lactogenic Foods for Milk Production

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I have no disclosures of financial or other conflicting interests to make.

Objectives

1. Define the term *functional foods*
2. List at least 3 nutrients essential for good milk production
3. Name 2 foods that have research support for their galactogogue properties

Can what we eat make a difference?

Background
Nutrients
Cultural Foods
Placental Extract
Lactogenic Drinks
Wisdom from the dairy?
Fats
Malunggay

The Assumptions:

Today’s mother is so well-nourished that we don’t have anything to worry about.

Good nutrition is good for breastfeeding but it isn’t *that* important.

Nutrition: a historical approach

Most traditional societies view foods as part of their health strategy.
Women have always had traditional foods for reproduction, and especially for milk production.
Experience based- little research.
Foods vs Herbs:

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Wisdom of the ages...

“It is well known that diet has a profound effect on lactation and that the satisfactory secretion of milk is only possible in the presence of certain known dietary factors in adequate quantities.”
– Folley, 1938

“Insufficiency of food must produce insufficiency of milk.”
– Routh, 1879, p.57

Functional Foods

Foods that have a potentially positive effect on health..... are generally considered to offer additional benefits that may reduce the risk of disease or promote optimal health...
– MayoClinic.com

Front door vs Back door evidence

Some diagnoses are made by exclusion:

What happens if nutrient X is missing?

Wisdom: Trouble shooting problems

Governing Rationales
Poor diet affects gut health → immune system → infections/mastitis → decreased production
Poor diet affects gut health → nutrient uptake → inadequate substrates → decreased production

Nutrients associated w/ good milk production and composition

- Protein
- Iron
- Iodine
- Omega-3 fatty acids
- B-vitamins
- Calcium
- Zinc

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Proteins

Essential building blocks


Edozien, J Nutr 1976. “…supplement was fed to lactating women to raise the protein content of their energy adequate diet from 25 or 50m to 100mg/d…. Amount of milk secreted... increased significantly.”

Donnen, Trop Med & Int’l Health, 1997. Results in a situation where protein rather than energy deficiency occurs show that supplementation during lactation is...unlikely to increase breast-milk output.

Iron

Anemia is a risk factor for low supply

Henly et al, Birth, 1995. “study results suggest that anemia is associated with the development of insufficient milk....”

Toppare et al, Indian J of Ped, 1994. “low PRL, low serum iron and ferritin levels.... Were associated w/significantly increased risk of deficient lactation”

Mathur et al, Indian Pedr, 1992. “out of 4 cases of complete lactational failure, 1 had severe anemia w/hypoproteinemia...”

O’Connor, British J Nutr, 1988. Impact of maternal iron deficiency on quality and quantity of milk ingested by neonatal rats. Lower fat content of milk needed more milk to compensate

Iodine

Essential for proper thyroid function

- Thyroid directly affects pituitary, prolactin, oxytocin

Iodine deficiency:

a possible underlying cause

Iodine Rich Foods

- Seaweed
- Seaweed
- Strawberry

Not a general galactogogue

Robinson 1947: tested iodine in LMS mothers because of positive experience with dried thyroid hormone: “helpful”

Nicholson 1948- “no improvement” in LMS mothers

Dean 1950- “did not improve lactation”

Good Fats/Omega-3s

Affect fat composition

**Nutrition: Can fats be manipulated?**

Dairy Research: inducing milk fat depression
- Diets high in simple carbs and low roughage/fiber (including chopped)
- Diets high in PUFAs (polyunsaturated fatty acids)
- TFAs (Trans fatty acids) > pattern of trans isomers, was related to low roughage
- Biohydrogenation theory—certain conditions result in fatty acids that inhibit milk fat synthesis (Griinari 2001)
- Trans-10, cis-12 CLA (conjugated linoleic acid)

**Fats: Human research**

Mixed results of CLA supplementation on milk fat content
- BUT
- Reg margarine vs low TFA margarine vs butter
- TFAs matter for lean women
- Obese women pull from fat stores

Manipulation of maternal diet for infant...

**B-Complex**

Part of building blocks of milk synthesis

Sure, B. Dietary requirements for fertility and lactation, J of Nutr, 1941. Rat study: “Lactation factor...may properly be described as associated with B complex.”

Grace 2012 Dairy: “unlikely to improve the milk production of grazing cows when concentrations of vitamin B₁₂ in serum are >128 pmol/L.

**Calcium**


**Calcium/Magnesium**

- When supply seems to dip around time of period
- May be related to lower calcium levels
- 1500mgCa/750mgMg daily
- Start mid-cycle, continue through period

Patricia Gima IBCLC

**Zinc**

“Zinc deficiency during lactation rapidly reduced maternal blood plasma zinc concentration and caused an impairment in milk production which was specifically due to the lack of zinc rather than to inanition.”


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**Roughage**
- Manipulated for milk volume, cream content

**Barley** *Hordeum vulgare*
Galactogogue property found in polysaccharide* in barley plant, appears to increase prolactin

*Koltezko 2000; Farnsworth

*Nguyen, US patent 4948785, 3/14/90. Plant polysaccharide fractions inducing prolactin in mammals

**Quinoa**, uncooked

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount (mg)</th>
<th>% of DV</th>
<th>World's Healthiest Foods Rating</th>
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</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>18.0</td>
<td>1.7</td>
<td>good</td>
</tr>
<tr>
<td>Iron</td>
<td>5.18</td>
<td>0.7</td>
<td>good</td>
</tr>
<tr>
<td>Magnesium</td>
<td>281.30</td>
<td>28.1</td>
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</tr>
<tr>
<td>Phosphorus</td>
<td>118.40</td>
<td>9.4</td>
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</tr>
<tr>
<td>Potassium</td>
<td>21.9</td>
<td>1.2</td>
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<tr>
<td>Zinc</td>
<td>0.26</td>
<td>0.2</td>
<td>good</td>
</tr>
</tbody>
</table>

"Special soaked grain preparations of high mineral content—particularly millet and quinoa—were fed to lactating women to increase milk supply." -Fallon, 1999

**Cultural favorites**

**Oats**
- High in iron, fiber
- Listed as a galactogogue in botanical surveys

Properties:
- Antidepressant
- Antianxiety
- Diuretic
- Thyroid/pituitary supportive

Abu-Rabia, 2005: Herbs as a Food and Medicine Source in Palestine

Acharya 2010: Traditional Knowledge on medicinal plants used for the treatment of livestock diseases in Sarkhkhola VDC, Rasu, Nepal

**Sesame seed, Tahini**
- Calcium

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Cultural Favorite Foods

**Lentils**


High in fiber, protein, iron, B-1, folate, magnesium

**Green papaya (B) Carica papaya**

Traditional use across Asia, frequently in soups

Vitamins & minerals including C, A, B, & E

Must be hard, unripe, then cooked

Or can be taken as supplement

Caution for women taking warfarin or allergic to latex

Y- Sayed, 2006. Herbal remedies used by Warlis of Dahanu to induce lactation in nursing mothers. Indian J of Traditional Knowledge


**Torbangun research**

Three groups of 25 each (Moloco reference)

Moloco+B-12 (placental extr 15mg, B-12 20μg) 1 TID

Torbangun soup - 150g leaves/day of soup

Fenugreek capsules – 1 600mg cap TID

30 day supplement started day 2, 60 day tracking

Reported results:

- Fenugreek group ↑ 20%
- Moloco group up ↑ 10%
- Torbangun ↑ 65%

Damanik, 2006

**Beer:**

Myth or Fact?


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**Hops** *(B)* *Humulus lupulus*

Properties
- Diuretic
- Estrogenic & Bust-enhancement *(Cassie, 2005)*

Considered sedating
- Lactogenic ability tested, not proven; does not stimulate prolactin

Caution: do not use too much or for too long; contraindicated w/depression

**Brewers Yeast** *Saccharomyces cerevisiae*

- One-celled fungus used to make beer
- Good source of many B-Vitamins, but not B-12.
- May help with fatigue, depression, irritability
- Rat lactation studies in 30’s & 40’s
- Some recent dairy studies show increase in milk yield, milk fat

"Proposed complex method of hypogalactia treatment does not exclude possibility of simultaneous use of the such products as walnuts (when there is no allergy to them), brewer yeast, etc that are commonly used for the stimulation of lactation....." *Zeits 1990*

**Cultural Favorite Drinks**

Green drinks- reputed to increase fat in milk. May include barley-grass, malt, alfalfa leaf, spirulina, kelp, oat-straw, etc.

- Chlorophyll supplements

**Barley Water**

½ cup barley in 3 cups water overnight
Or Boil 20 min
Strain
Pour 1 cup over 1 tsp fennel seeds & steep 30 min
Can sweeten with cinnamon

**Coffee substitutes**

Common ingredient: *Barley*

**Malunggay** *moringa oleifera*
also known as drumstick, horseradish tree, kelor

Properties: highly nutritive, estrogenic
- Found in the Philippines, India, AF
- Increases prolactin
- Decreased T4→T3 conversion in rats, may not be good w/hypoT *(Tahiliani 2000)*

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Double-blind RCT, term mothers w/ uncomplicated pregnancies. 250 mg caps started 6 hrs after delivery, then taken q12hrs for 4 months

<table>
<thead>
<tr>
<th>Group</th>
<th>Placebo (58)</th>
<th>Natalac (58)</th>
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<tbody>
<tr>
<td>Birth weight kg</td>
<td>3.041</td>
<td>3.001</td>
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<tr>
<td>1 week</td>
<td>2.964</td>
<td>3.041</td>
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<tr>
<td>2 weeks</td>
<td>3.237</td>
<td>3.205</td>
</tr>
<tr>
<td>1 month</td>
<td>3.897</td>
<td>3.563</td>
</tr>
<tr>
<td>4 months</td>
<td>6.646</td>
<td>5.304</td>
</tr>
</tbody>
</table>

*** Did not measure milk output/transfer


Double-blind RCT, (BP>140/90) pg moms 28-40 wks gestation. Caps given after delivery then q12hrs for 4 months

<table>
<thead>
<tr>
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Goal: Increased milk in early postpartum to reduce early supplementation

RCT. Enrolled pg women >35wks; gave placebo, placebo or Prolacta (malunggay leaves) 350mg 2 TID till birth. No bfg first 2d- Pumped at 6th hr then q4hrs to 46th

Potential risks noted: some toxicity of root extract-hepatic; anti-fertility, oxytocic from roasted seeds


Subjects: 82 full term moms for single-blind RCT

Dosage: 2 x 350mg (moringa or flour) daily day 3pp for 8 days

Method: Mothers used manual pump q4hrs for >5 minutes

*Did not say if babies nursed

*Interesting comment: “The state of the prolactin receptors number and degree of sensitivity to stimulation are said to be the controlling factor in the amount of breastmilk rather than the amount of serum prolactin. After age 35, these receptors become less sensitive to stimulation. Increased number of receptors is found among multiparous women.”

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Subjects: health exclusively bfg mothers
Design: Double blind RCT
Dosage: 250mg (Natalac or placebo) either once or twice daily
Outcome measurement: infant weight and length gain
Mothers used manual pump q4hrs for >5 minutes *Did not say if babies nursed
Results: In one month, average infant weight increase was 59% for one of capsule Natalac and 72% for 2 capsules daily.

Interesting comment: Length and weight are valid outcome measurements until 6 months of age, after which genetic factors begin to exert their effect.

Interesting mother reports...


Galactogogue Control

| Breast fullness/heaviness @48hrs | 72% | 57% |
| Wt loss >7% within 48hrs | 15% | 24% |


Hot basil, lemon basil, sweet basin, banana blossom, garlic, garlic chives, ginger, pepper.
First line of defense for milk production is frequent & effective milk removal.”
- Lactogenic Foods support milk production in the context of good management.
- Lactogenic Foods are NOT a substitute for good management.
- Lactogenic foods can help increase milk supply for some women.
- Lactogenic foods are low risk and nutritively beneficial.

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