

Infant Nutrition : Implications for Future Health

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Objectives

- Normal Growth in Infancy
- Implications of Altered Nutrition on Future Health
- Optimal Nutrition of Infant
 - Breastfeeding
 - Complimentary Nutrition
 - Childhood Nutrition

Growth of an Infant

- Weight doubles by 3-4 months and triples by 1 year
- Active brain growth in the first 2 years of life



Under-nutrition

- Malnutrition
 - impaired cognitive and social development
 - poor school performance and
 - reduced productivity in later life
- Iron or Iodine deficiency
 - Cognitive deficits/ delayed motor development

Current prevalence of Underweight children < 3years : 47%

Obesity in Infancy

- Obesity begets obesity
- Overfeeding in infancy has long term consequences
 - Obesity/overweight/adiposity
 - CAD/ Hypertension/Hyperlipidemia
 - Hyperinsulinemia/insulin resistance/Type 2 DM
 - Depression and low self esteem

LBW becomes Obese

- Destined to be small
- Early and excess catch up growth
 - Metabolic syndrome (thrifty Hypothesis)

Optimal Infant Nutrition

- Exclusive Breast Feeding for first 6 months
- Complimentary feeds from 6 months
- To continue Breastfeeding till 2 years of age and longer if mother and the baby desire

How: Breast Feeding

- Correct Position
- Correct Latching/ attachment
- Complete feeding from one Breast and then the other
- Alternate the feeding
- Average feeding time 10 to 15 minutes

How Breastfeeding

Good Position

- Neck is straight
- Body is close to mothers body
- Body turned towards mothers
- Whole body supported
- Eye contact between mother and baby



Fig. 9

How Breastfeeding

Good Attachment

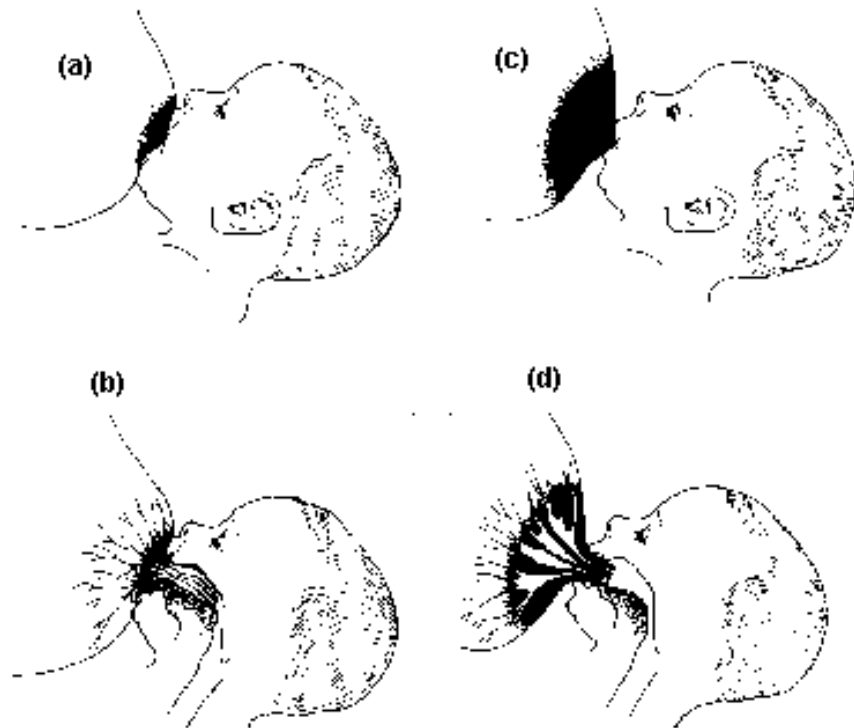
Chin touching the breast

Wide open mouth

More areola visible above than below

Low lip turned outward

No Pain





OK



Best

How Breastfeeding: Preterm



Clutch Hold



Dancers Hand Hold

Special Situations

- Preterm
 - Reduced NEC, bacteremia, Late onset sepsis
 - Improved feed tolerance (low GER)
 - Neurodevelopment
 - Decreased hospital admissions
 - Enhanced family bonding, maternal interactions
 - Enhanced maternal self esteem and role attainment

Special situations

- Preterm infant
 - Expressed breast milk
 - Manual expression or electric breast pumps
 - Quiet atmosphere
 - Soothing music
 - Relaxed mother
 - Breast massage
 - Warm fomentation
 - NNS and KMC

Special situations



28 weeks baby feeding from Breast

Special situations

- Working mothers
 - EBM at room temp 4-6hrs, refrigerator-24hours
 - Night feeds
 - Start EBM a week before starting for work
- Twins
 - Simultaneous feeding
 - Foot ball position



Special situations

Modified
cradle hold



Hypotonic Babies



Hypertonic Babies

Breastfeeding and Future Health

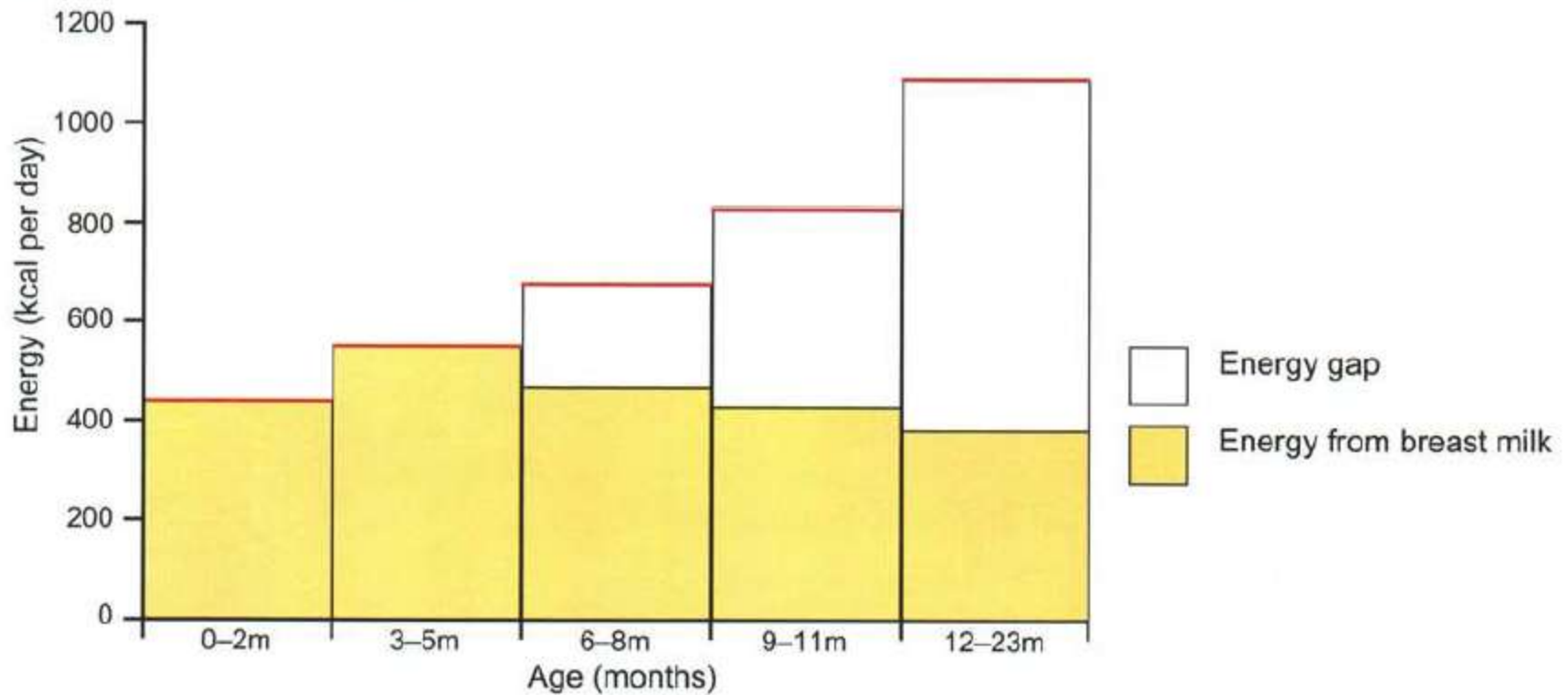
- Better IQs
- Lesser Allergies
- Lesser Cardiovascular diseases
- Lower risk of obesity and hence metabolic syndrome

Complimentary Feeding

Giving other foods in addition to breast milk

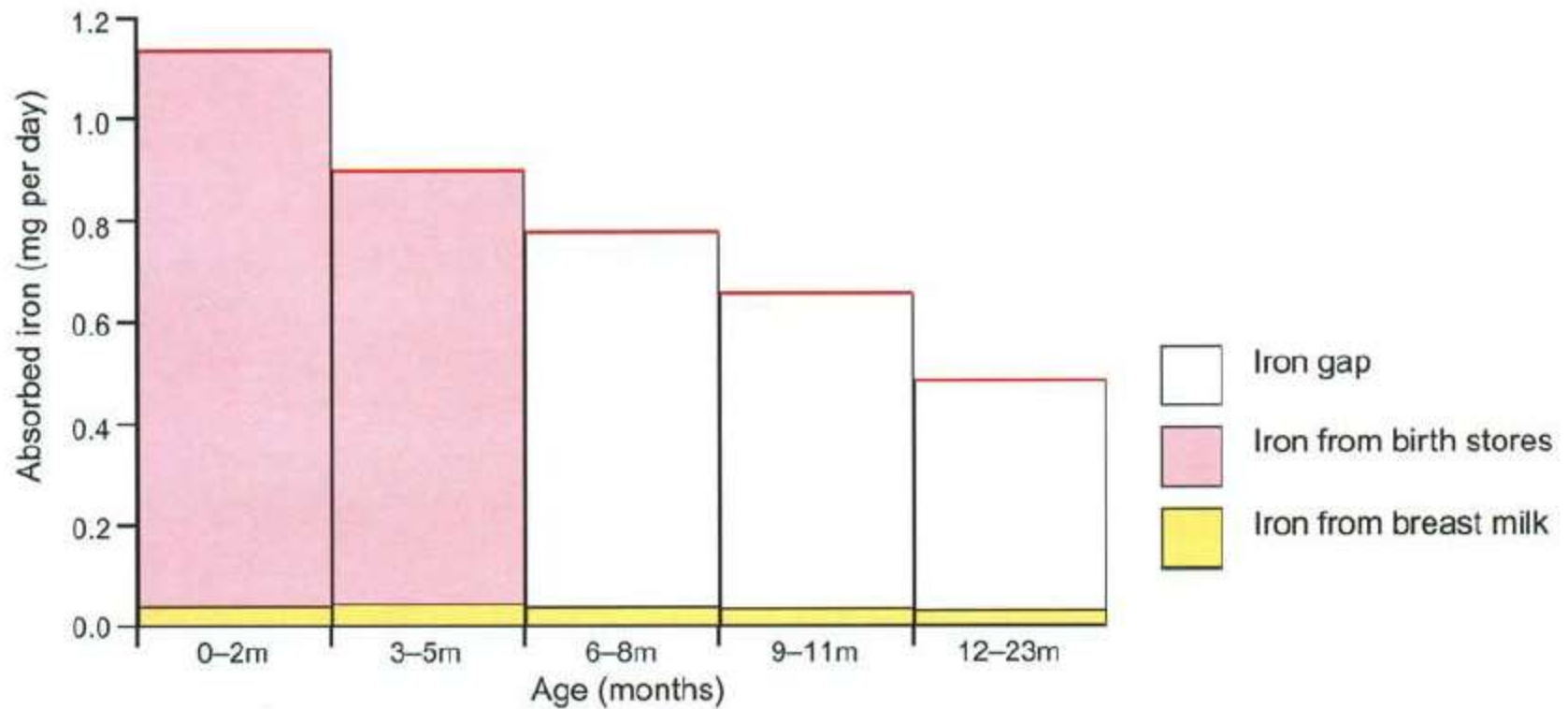
Why Complimentary feeding

1 Energy required (top line) and the amount from breast milk.



Why Complimentary feeds

Absorbed iron needed (top line) and the amount from breast milk and body stores at birth.



Such Nutrient gaps exist for Zinc, Vitamin A and Calcium

Complimentary feeds: When

At 6 months of age and earlier if weight gain is inadequate

- Can control tongue movements better
- Start to make up and down munching movements
- Start to get teeth
- Like to put things in their mouth
- Are interested in new tastes

Why not early or late

Early

- Does not need them and they replace BM
- Less BM and hence increased infections
- Increased Diarrhea as CF is not as clean as BM
- CF is too thin, watery porridges or soups which fills the stomach but are not nutritious
- Mothers become pregnant

Late

- Does not get the energy and nutrient gaps
- Stops growing or grows slowly
- Risk of malnutrition and micronutrient deficiencies

What Complimentary feeds

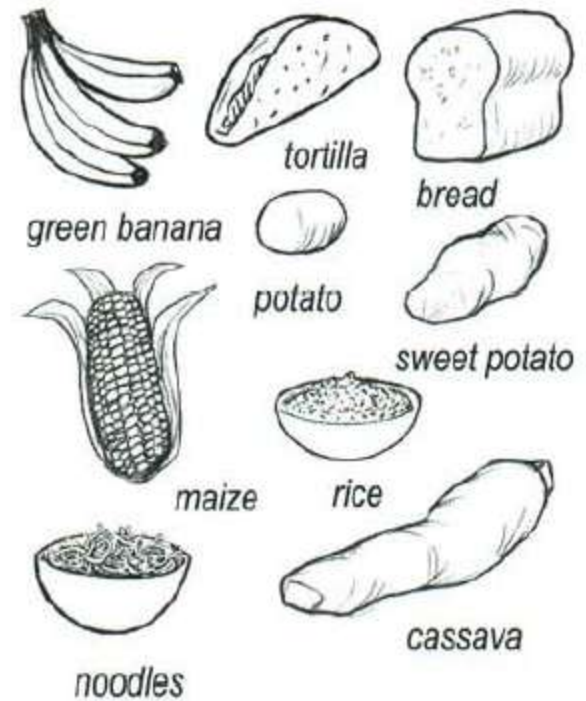
- Rich in Energy, Protein and micronutrients (Iron, Zinc, Calcium, Vitamin A, Vitamin C and folate)
- Clean and safe
 - No pathogens
 - No harmful toxins, chemicals and toxins
 - No bones or hard bits that can choke the infant
 - Not boiling hot
- Not peppery or salty
- Easy for the child to eat
- Liked by the child
- Locally available, easily preparable and affordable

What complimentary feeds

- For Energy and Protein
 - Staples (cereals and starchy fruits)
- For other nutrient gaps
 - Pulses and oil seeds
 - Foods from Animals
 - Dark green leaves and orange colored fruits and vegetables
 - Oil, fats and sugar

Staples

- Cereals : Rice, wheat, maize, millet
- Roots : Potato
- Starchy foods: Plantain
- Provide energy and proteins
- Poor source of iron, calcium and Zinc (phytates)
- Yellow varieties of maize, sweet potato and plantain provide vit A



Staple foods.

Staples

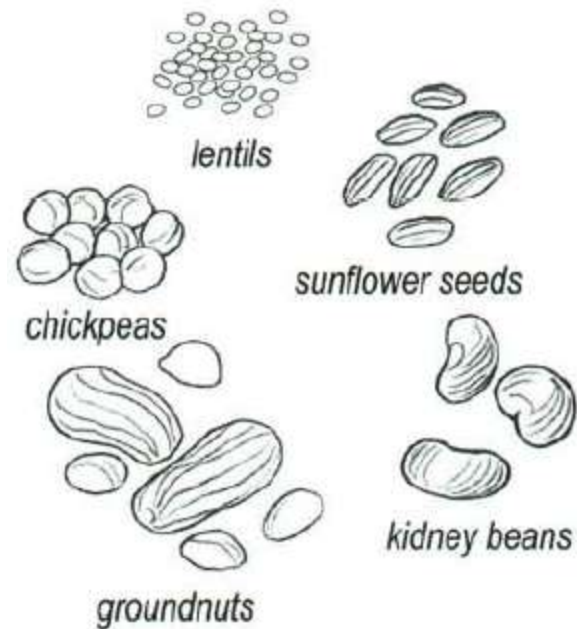
- Should be given as a thick porridge
- Add oil, butter, ghee or sugar to enrich them
- Avoid soups
- Energy and nutrient rich porridges
 - Make thick porridge
 - Replace some of the water with milk
 - Toast cereal grains before making flour



Porridge should be thick enough to stay easily on the spoon.

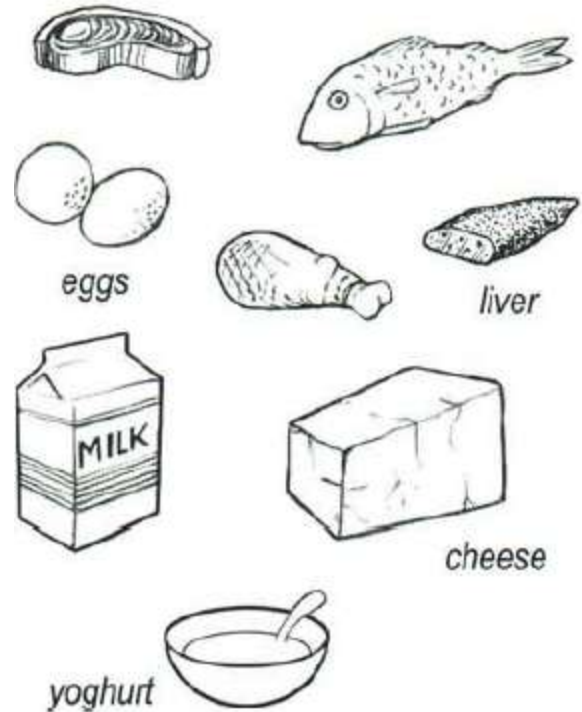
Pulses And Oil Seeds

- Source of protein and energy
- Lack vitamin A, Vitamin C (when dried)
- Poor source of iron, Zinc and calcium (phytates and Antinutrients)
- Soaking of peas and beans and throwing of water followed by thorough cooking destroy phytates and antinutrients



Foods from Animals

- Meat, organs/offal's (liver, heart, blood), milk, yogurt, cheese and eggs are good sources of protein
- Flesh and organs of animals, birds and fish are best sources of iron and Zinc
- Redder the flesh and organs when raw, more the iron they contain



Food from Animals

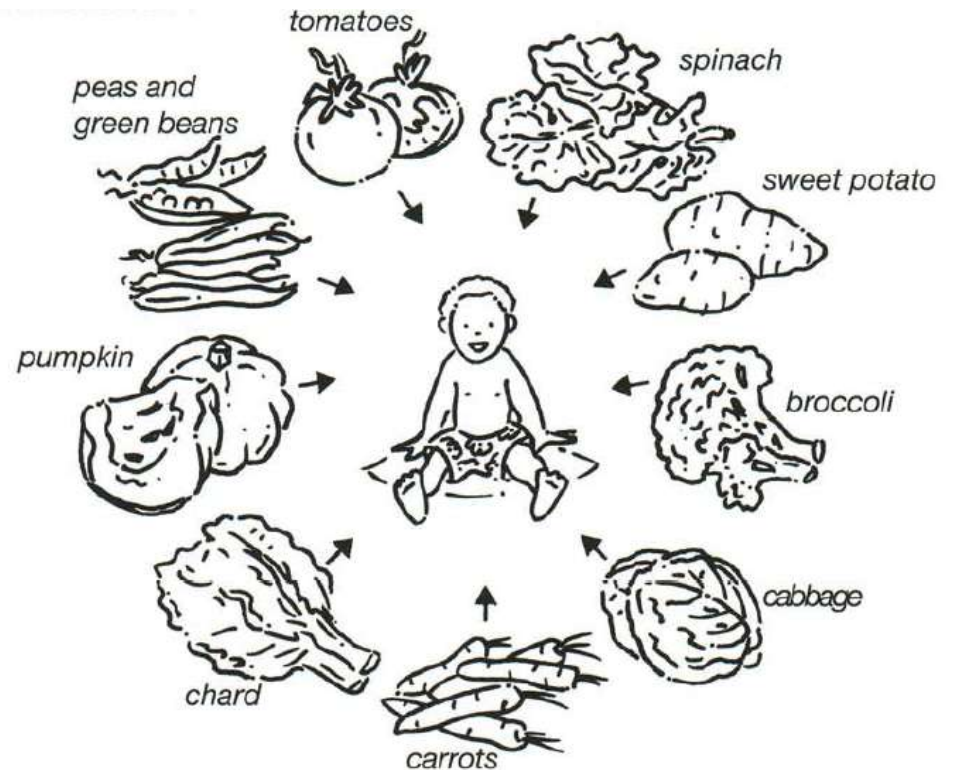
- Animal liver is a rich source of iron, vitamin A and Folate
- Egg yolk also a rich source of vitamin A
- Milk cream also contains vitamin A
- Foods made from Milk and those containing bones (small fish, canned fish or pounded dried fish) are good sources of Calcium
- So a small amount of flesh, liver and milk would be sufficient to meet the iron, zinc, Vitamin A and calcium needs of infants

What about vegetarians

- Do not worry
- Jaggery, Peanuts, milk and green leafy vegetables are iron rich
- The absorption can be improved by feeding Vitamin C rich foods simultaneously
- Guava, mango, orange, citrus fruits and pineapple are vitamin C rich
- Fermented cereals (idlis, Dosas) are iron rich

Vegetables

- Addition of vegetables meets most of the micronutrient needs
- A small amount of vegetable is sufficient to meet the Vitamin A requirement



Complex food the ideal

- Nonvegetarian: Rice/wheat/potato and flesh and liver and milk and vegetables and oil/sugar/fats
- Vegetarian : Rice/wheat/potato and milk and vegetables and oil/sugar/fats and jaggery/fermented cereals with guava/mango/citrus fruits
- Iron fortified cereals can also advised as an additional diet but not as replacements

Typical AP Diet for Infants

- Uggu/Gulati
- Idli
- Rice with ghee and salt
- Banana
- Kichri
- Fruit pulps (apple, sapota, oranges etc)
- Liver/egg yolk/red meat

Complimentary feeds : How much and how often

- Start with a single food and persist with the same food for 3 to 5 days
- Once one food is accepted add a second food
- By a month the child starts accepting most of the food
- Initially give small amounts more frequently
- As age increases, increase the amount that the child accepts
- By 9 months give 3 feeds and by 12 months give 5 feeds
- Till 6 to 8 months give soft food then introduce some texture to the food

Some Dos And Don'ts

- Start with cereals, add pulses then fruits and vegetables and then meat
- Initially soft, then with texture
- Keep the food in separate bowl
- Not to hurry
- Give some foods which child can hold and bite
- Mix liked food with unliked
- Liquids should not replace, may supplement
- Limit cows milk till 1 year
- Avoid egg white till 1 year
- In allergenic families, avoid egg/fish/wheat/peanuts
- Avoid garlic and spices from mothers diet if infant has colic

Children > 1yr of age

Toddler Nutrition

- Semisolid to finger feeding to spoon feeds
- From Fatty food (50%) to low fat food (35%)
- Gradual reduction of energy-dense, fat-containing foods and the introduction of lower-fat foods
- Full fat milk to half skimmed milk and skimmed milk

Toddler Nutrition

- Yoghurt and cheese may be preferred over milk
- Promote 3 meals and 3 snacks habit
- Feeding with the family
- Iron rich foods (fruits, jaggery, meat) & Water
- Avoid chips/kurkure/chocolates/maggi/Fast foods

Take Home

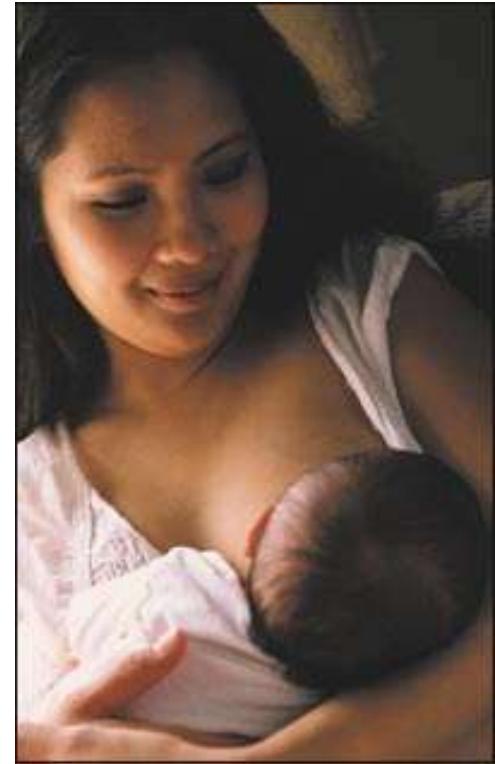
- Avoid Malnutrition/ Obesity in First One year
- Avoid Junk foods/Fast Foods
- Energy dense food to be replaced with low fat but protein and iron rich food

Take Home Message

- Optimal infant nutrition could decrease under five mortality by 19%
- Promote exclusive breastfeeding till 6 months and continue it till 2 or longer as desired
- Exclusive breastfeeding and prolonged breastfeeding has both immediate and long term beneficial effects
- Teach mother the correct position and correct attachment (avoids breastfeeding problems)

Take Home Message

- Start complimentary feeding after 6 months
- Ensure a mixed feed
(cereals,pulses,oil,fats,vegetables,fruits,meat and milk or milk products)
- Think of filling the energy, protein, iron, zinc, calcium, vitamin A and folate gaps
- Infant formulas to used along with home made CFs but should not replace home made CFs.



East or West, Breastfeeding is the best