Lecture 18: Mothering/Parenting

• Field Studies of Lactation
• Neoteny
• Mother-Infant Bonding
  • The Role of Oxytocin
• Differential Maternal Investment
  • Neglect
  • Postpartum Depression
• Fathering
• Ethnopediatrics
  • Crying
  • Infant Holding
  • Parent-Infant Co-sleeping

Field Studies of Breastfeeding

Behavioral Biology of Women, 2007
Lactation in the !Kung

- Long interbirth intervals - 44.1 mths
- Patterning of lactation
  - 4.06 bouts/hour
  - 7.83 min/hour
  - 1.92 min/bout
- As child gets older — increase in length between bouts

Lactation in the !Kung

- Lower estradiol and progesterone in nursing mothers
- Correlated with age of infant and mean time between nursing bouts
- Suggested inter-bout interval key variable in lactation subfecundity

Prolactin & Nursing Bout Length

- Prolactin threshold for ovulation

Prolactin, # Nursing Bouts, & Time

- Nursing bouts per day
- Months postpartum
Edinburgh Study of Breastfeeding

Edinburgh Study

- Studied 27 breastfeeding and 10 bottle feeding mothers
- Lactation/supplementation diaries
- Measured urinary hormones
- Measure prolactin in blood

Supplementation & Ovarian Function

- Lactating women resumed ovarian function later postpartum than did bottle feeding women
Edinburgh Study

- Lactating women resumed ovarian function later postpartum than did bottle feeding women
- Frequency of ovulation increased with time as lactation was phased out
- Rapid resumption of ovarian function in bottle feeders; gradual resumption in breast feeders
- Importance of introduction of supplementary foods
- Women who conceived while nursing decreased the frequency to 3 or fewer times/day.

Lactation & Supplementation: The Gambia
Supplementation and Breast Milk

- Gave 130 women supplement increased calories from 1568 to 2291 + vitamin
- No effect on breast milk volume!!

Supplementation and Breast Milk

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- No effect on breast milk volume
- Protein content slightly increased (6.6%)
- Milk fat increase (7.9%)
- Lactose decrease (~7.6%)
- No change in calories
- Vitamin increase from supplement

Prolactin & Supplementation

Gambian Study

- Supplementation had only a small effect on quantity and quality of breast milk
- Supplementation had a dramatic effect on prolactin levels

Prolactin & Lactational Amenorrhea

- High levels of prolactin associated with reduced ability for egg to produce estradiol (in culture)

The Toba: Positive Energy Balance and High Nursing Frequency
Breast Feeding Hypotheses

- How to explain variation in duration of postpartum period of infecundity
  - Nursing Intensity Hypothesis
  - Metabolic Load Hypothesis

Nursing Intensity Hypothesis:

Nursing intensity hypothesis:
*The more intensive the nursing, the longer the period of lactational amenorrhea*

Relative metabolic load hypothesis:
*The higher the relative cost of nursing, the longer the period of lactational amenorrhea*
Physical activity postpartum

n = 70 women
Focal sampling
Toba women remain well-nourished during the entire postpartum period

WHO’s “normal” range

Valeggia & Ellison (2003)

Changes in energy balance in relation to time to first postpartum menses

!Kung-like nursing intensity

US-like nutritional status

Mean duration of postpartum amenorrhea
10 (± 4) months (n = 122)

Changes in energy balance in relation to time to first postpartum menses

Valeggia & Ellison (2003)

Lactational Amenorrhea in Toba

• Mean = 10.3 months

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• High nutritional status and high nursing intensity — leads to short periods of lactational amenorrhea

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- Thus, nursing intensity alone is insufficient explanation
- Interaction between nursing intensity and nutritional status

Why do we respond to babies?

The Evolution of Mickey Mouse: Neoteny
Maternal Instinct?

Females: Released during orgasm, parturition and breastfeeding.
**Oxytocin & Bonding**

- Females: Released during orgasm, partuision and breastfeeding
- Males: Released during orgasm

**Oxytocin & Bonding**

- Females: Released during orgasm, partuision and breastfeeding
- Males: Released during orgasm
- In sheep and rats necessary for maternal behavior

**Oxytocin & Bonding**

- In rats seems to inhibit some types of memory
  - May play a role in erasing memory of painful childbirth
  - Some studies of women suggest that women “forget” the pain of childbirth

**Differential Maternal Investment**

*Sex-Biased Investment*

**Trivers-Willard Hypothesis**

“Where variation in reproductive success is greater in one sex than for the other and where maternal investment can have an affect — mothers in good condition should favor the sex with the greatest variance in reproductive success, mothers in poor condition should favor the sex with the least variance”

**Sex Biased Investment in India**
Sex Biased Investment in India

- Women must marry ‘up’= ‘hypergyny’
- Brides must bring a dowry commiserate with social status
- Sons can have multiple wives

In highest social groups:

- Women must marry ‘up’= ‘hypergyny’
  - No where for daughters to ‘go’
- Brides must bring a dowry commiserate with social status
  - Dowries extremely expensive
- Sons can have multiple wives
  - Sons had very high reproductive success

Result:

- Sons had multiple wives from ‘lower’ social group each of whom would bring a dowry to the family
- Thus
  - Investment in sons
  - Female infanticide

Opposite pattern (preference for daughters) on bottom

Chewa (Malawi, Zambia) are typical matrilineal group:
- farmers, matrilocal residence, have no brideprice, female-biased wealth inheritance, high divorce rates and hate virginity

“Many girls have love affairs with young boys before they reach puberty, and at one time children build play-houses, after the manner of the Cewa, where they pretended to be adults playing at cooking and copulation. The Cewa encouraged this among their own children and at puberty Cewa girls, if not already deflowered, had their hymen forcibly ruptured in a prescribed manner. We have seen that the [patrilineal] Ngoni formerly expected girls to be chaste before marriage. Whilst the Cewa believed that if a girl did not copulate at puberty she would die.”

Source “Marriage in a changing society” J A Barnes 1950. (re the Ngoni moving into a Chewa area) p.33

Gabra (northern Kenya, southern Ethiopia) are typical of patrilineal groups in Africa:
- pastoralists
- patrilocal residence
- brideprice and resource holding polygyny
- male-biased wealth inheritance
- divorce is not recognised
- insist on virginity at marriage
Birth stopping behaviours: post-reproductive women whose children are all of one sex

Sex of children

Postpartum Depression

40-80% of women experience postpartum mood changes - Elation or Depression

Postpartum Psychiatric Disorders

• Maternity Blues: mild mood disturbance that resolves within a few hours to a few days; 1 in 2 births

• Postpartum Depression (PPD): 1 in 5 births

• Postpartum Psychosis: 1 in 1000 births

Clinical Definition of PPD

• No different clinically from other forms of depression except for its “postpartum onset” (from immediately after birth to 4 weeks after birth)

• For a diagnosis of PPD, 5 of the following symptoms must be present for 2 weeks and represent a change from previous levels of functioning (at least 1 of the symptoms must be either depressed mood or diminished interest or pleasure):
  • Depressed mood, nearly every day during most of the day
  • Marked diminished interest or pleasure in almost all activities
  • Significant weight loss (when not dieting), weight gain, or a change in appetite
  • Insomnia or hypersomnia (excess sleep)
  • Psychomotor agitation or psychomotor retardation
  • Fatigue or loss of energy
  • Feelings of worthlessness or inappropriate guilt
  • Impaired ability to concentrate or indecisiveness
  • Recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide

Cross-Cultural Incidence

• PPD was once thought to be a culture-bound illness found only in Western countries because of the absence of a social support structure (Stern and Kruckman, 1983)

• However, mounting evidence suggests that women around the world experience PPD, with prevalence rates ranging from 0% to 40%
PPD Risk Factors in Sample Population in Goa, India

- Maternal employment
- Antenatal psychiatric morbidity
- Unplanned pregnancy
- Problems with breastfeeding infant
- Infant hospital admission
- Sadness about infant’s gender

PPD Protective Factors

- Maternal Education
- Paternal Employment

Hypotheses explaining PPD

- Dysregulation of mechanisms underlying normal mood variation
- “Psychological Pain” Hypothesis: negative affect is associated with social circumstances that were reproductively costly in ancestral environments; mothers will take actions to reduce their levels of psychological pain
  - Accounts for minor depression, but not most debilitating symptoms of depression
- Social Navigation Hypothesis: depression induces cognitive changes that focus and enhance capacities for accurate analysis and solution of key social problems=social rumination function; costs associated with depression can persuade social partners to provide help=social motivation function

Fathering

Hormonal Changes in Fathers

- Study Design:
  - 34 couples
  -watched 5 min. video of breastfeeding
  - Held a doll in ‘used’ blanket
  - Listened to tape of distressed newborn
  - Postnatal group fathers held own babies
- Highest prolactin in Late- prenatal group
- Highest cortisol in late prenatal stage

Hormonal Changes in Fathers

- Highest prolactin in Late- prenatal group
- Highest cortisol in late prenatal stage

Fathers Changed hormonal levels even before became fathers!
**Hormonal Changes in Fathers**

- Highest prolactin in late-prenatal group
- Highest cortisol in late prenatal stage
- Drop in testosterone from prenatal to postnatal period.

**Testosterone and Fatherhood**

Fathers had significantly lower evening testosterone levels

**Ethnopediatrics**

**Response to Infant Crying**

- America, Holland & Kung: babies cried with equal frequency
- Difference is duration of crying

**Response to Infant Crying**

- Colic = Excessive crying thought to be caused by gas
- 10-20% of western babies described as colicky
- Korea: study of 160 Korean infants, none could be classified as colicky
Response to Infant Crying

- American mothers didn’t respond to crying in 46% of episodes the first 3 months of baby’s life
Effects of babywearing

• Quicker day/night regulation
• Stimulates vestibular system

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• Less time crying/fussing
• Soothes baby
• Visual/auditory stimulation
**Parent-Infant Co-sleeping**

- Of 186 non-industrial cultures — 100% of babies sleep in the same place as their mothers at least until 1 year of age

- Of 172 societies, all infants slept with mothers at least part of the night

- The US stands out in that babies are normally placed in other rooms

**American Pediatricians Recommendations**

- Regular Bed time
- Ritualized Bed time
- Baby should sleep in another room
- No parental contact in night

**Co-Sleeping in English Parents**

- 3 Months Breast feeders

**What is SIDS?**

- Sudden Infant Death Syndrome
- No characteristics to detect it -- babies stop breathing
- In U.S. 1.5/1000 live births
- Hong Kong: 0.4/1000 live births
Does Co-sleeping Protect against SIDS?

• Cultures in which mothers sleep with babies have lower SIDS rate

• Position of the baby -- prone position

• Mother’s breath (CO2) stimulates breathing

• Skin-to-skin contact increases skin temperature

• Contact stabilizes infant heart rate

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• Wake up more frequently, avoid deep sleep stages
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- Wake up more frequently, avoid deep sleep stages
- More attention from parent

Next time ...

- Menopause & Aging
- Changes with Female status and age
- Evolution of long lifespan in humans