Breastfeeding Behavior and Sleep of New Mothers in a Predominantly Low-Income and Ethnically Diverse Sample

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Learners' Objectives

1. Identify breastfeeding as a health behavior
2. Recognize disparity in breastfeeding behavior among populations in the United States (US)
3. Examine objective and subjective sleep variables in relation to breastfeeding behavior
4. Apply research findings to promote breastfeeding for mother-infant dyads from vulnerable populations

Conceptualization of Breastfeeding

Breast: "a source of nourishment"
"the center of affection and emotion"
Feed: "to give food to," "to eat" and "to be nourished or supported."

Breastfeeding: providing and receiving food coming from mother's breast, center of affection and emotion

Doan (2009)

Breastfeeding is a Health Behavior

☼ **Infants: optimal nutrition, metabolic/ neurological development, + nurturing**

☼ **Mothers: ↓ health risks, ↑ well-being**

→ Economy: ↓ healthcare costs ($13 billion/yr)

→ Ecology: ↓ global warming; no waste

☼ **Benefits ↔ duration, exclusive breastfeeding**

Exclusive breastfeeding (EBF) is defined as ONLY breast milk:
NO solids, no water, and no other liquids

Kramer & Karuma (2012); Bartick & Reinhold (2010)

Disparity in Breastfeeding Behavior

Breast-feeding Criteria	U.S. Target (%)	Current U.S. National (%)	U.S. Rate by Income Ratio (%)			
			Higher income, or ≥350% FDLP*	Low-income		
				<100%	100%-184%	185%-349%
Ever	81.9	76.9	84.4	**67.0**	71.2	77.7
At 6 months	60.6	47.2	54.0	**34.7**	36.9	45.0
Exclusively through 3 months	46.2	36.0	41.1	**25.0**	31.7	36.0
Exclusively through 6 months	25.5	16.3	17.6	8.6	12.7	14.6

Healthypeople.gov; cdc.gov

Disparity in Breastfeeding Behavior

U.S. Breastfed Infant supplemented with infant formula	U.S. Target (%)	Current U.S. National (%)	U.S. Rate by Income Ratio (%)			
			Higher income, or ≥350% FDLP*	Low-income		
				<100%	100%-184%	185%-349%
Before 2 days		24.6	21.3	**32.4**	24.5	20.3
Before 3 months		36.9	35.6	**42.0**	33.8	33.9
Before 6 months		42.6	42.6	**48.7**	41.6	39.9

Healthypeople.gov; cdc.gov

Breastfeeding Behavior

- Greatest ↓ in EBF occurs in 1st month postpartum
- Formula supplementation ⟶ early breastfeeding cessation
- A bottle (formula) at bedtime: Popular practice at night time
- Low-income, ethnically diverse women are more likely to supplement

Doan et al. (2007); Healthypeople.gov (2012); cdc.gov (2012)

Research questions

1) Is there a difference in night-time sleep of new mothers who breastfed exclusively and mothers who used formula at night (9 pm to 9am)?
2) Are there differences in sociodemographic characteristics?

The setting

San Francisco Bay Area

Study Design & Method

- Longitudinal, comparative
- Part of a randomized clinical trial
- Recruitment from prenatal clinics and free childbirth preparation classes
- Target population: Low-income women

Inclusion Criteria

English-speaking women

expecting first child,

at least 18 years of age,

not working night shift,

not taking sleep medication,

and no history of diagnosed sleep or affective disorder.

Measures

Breastfeeding Behavior determined from infant sleep and feeding diary 9pm - 9am over 3 nights,

categorized as:

Exclusive Breastfeeding (EBF): 100% breastfeeding or breast milk feeding

Formula: any formula

Measures, cont.

Sociodemographic Characteristics:

Age

Race

Marital status

Relationship status

Education

Monthly household income

Employment status

Sleep Measures

Objective Measures of Sleep - obtained by actigraph:

1) ***total sleep time at night (TST-night)*** = average minutes of sleep between 21:00 and 08:59 over 3 nights,
2) ***total sleep time during the day (TST-day)*** = average minutes of sleep between 09:00 and 20:59 over 3 days,
3) ***wake after sleep onset (WASO) as % of TST***

Wrist Actigraphy

Counts movements from an extremity

Estimates acceleration of the movement

Uses movement and speed of movement to estimate total sleep time (TST) and wake time after sleep onset (WASO)

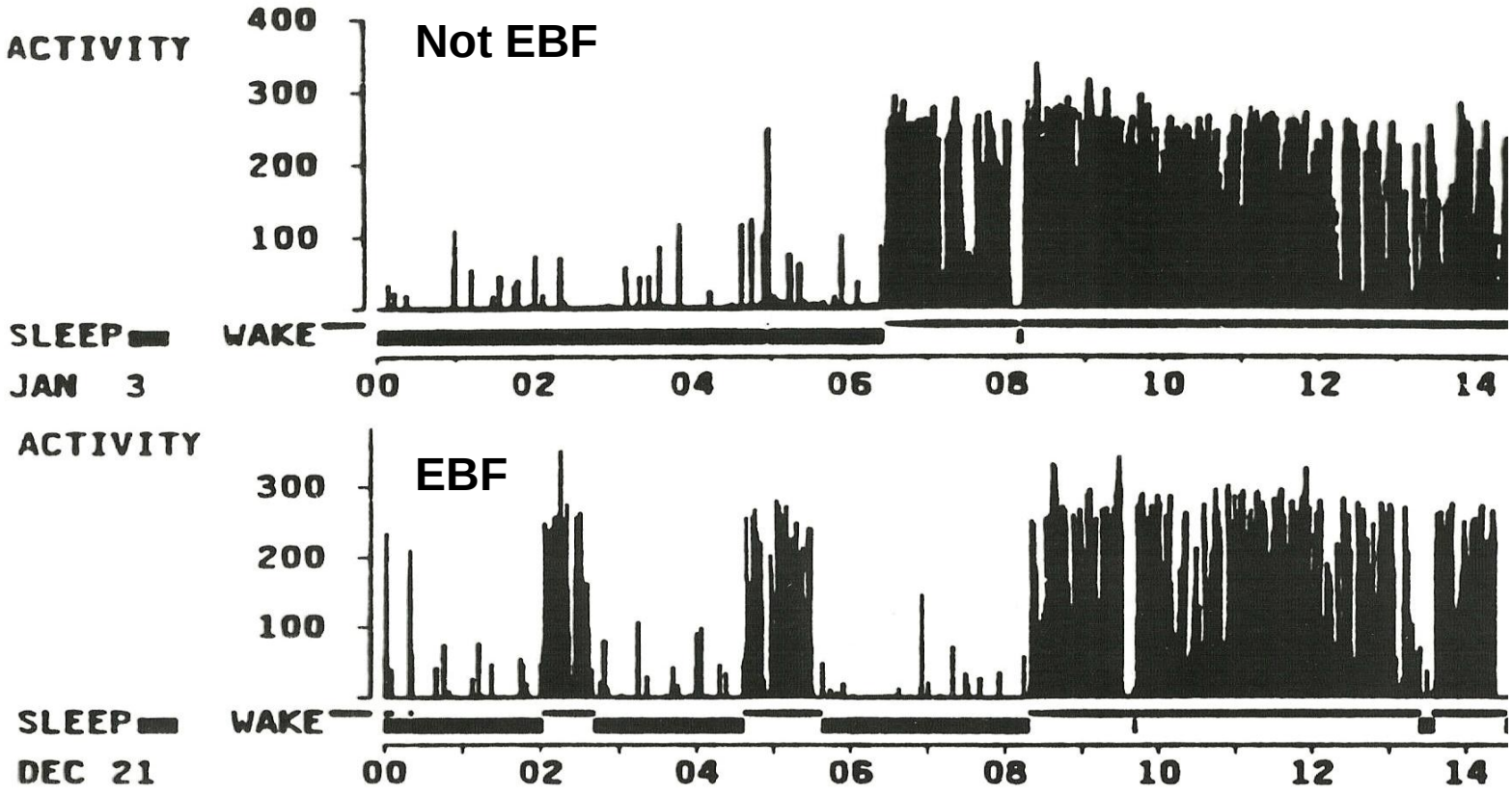
Under-estimates sleep in active sleepers

Over-estimates sleep in sedentary persons

Less invasive than PSG

Not able to discern stages (REM or nonREM) of sleep

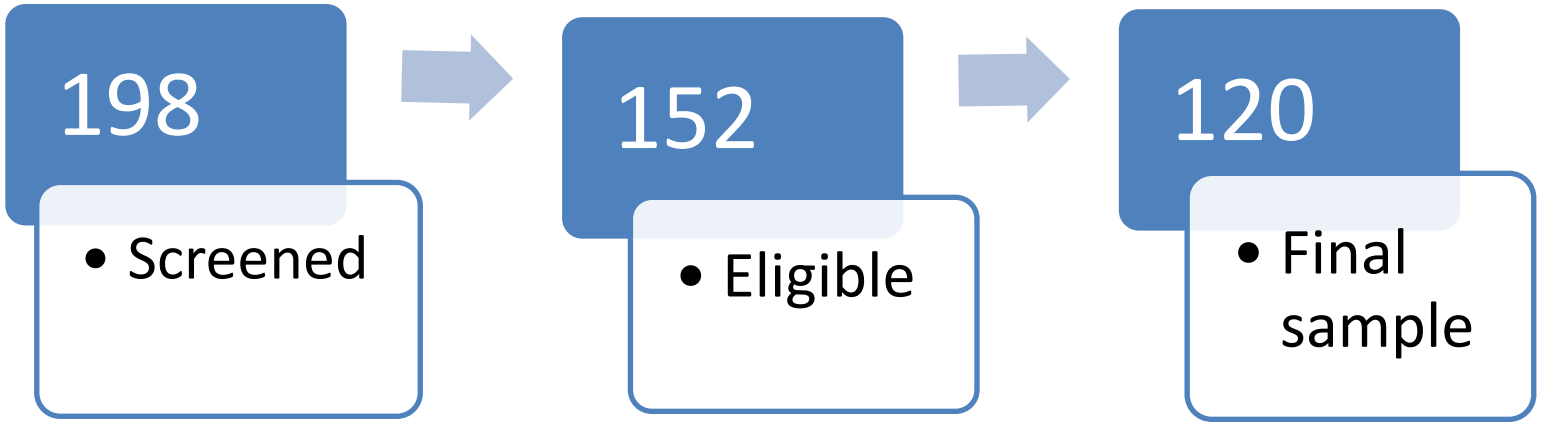
Actigraphy Example: 4 weeks postpartum



Data analysis

- Descriptive means and standard deviations (SD)
- Repeated measures analysis of variance (RMANOVA)
- Independent t-test
- Chi-square test

Results



Sample characteristics by type of nighttime feeding

VARIABLE (Mean±SD) or n(%)	EBF at night (N = 66)	FORMULA at night (N = 54)
Age in years *	27.9 ± 6.1	24.9 ± 6.7
Race **		
African American:13%	5 (33%)	10 (67%)
Asian: 32%	19 (49%)	20 (51%)
Caucasian: 24%	23(79%)	6 (21%)
Latina: 22%	14 (54%)	12 (46%)
Mixed/ Other: 9%	5 (45%)	6 (55%)
Currently married	20 (30%)	18 (33%)
In relationship**	59 (89%)	40 (74%)

*** t-statistic significant (p= 0.01)**

**** Chi-square significant (p< 0.05)**

Sample characteristics by type of nighttime feeding

VARIABLE (Mean±SD) or n(%)	EBF at night (N = 66)	FORMULA at night (N = 54)
Completed college	27 (41%)	16 (30%)
Household income <$2,000/month	41 (65%)	34 (71%)
Working at 36 weeks pregnant**	14 (21%)	4 (7%)
Working at 1 month postpartum**	0	4 (7%)

****Chi-square significant ($p < 0.05$)**

Sample characteristics by type of nighttime feeding

VARIABLE (Mean±SD) or n(%)	EBF at night (N = 66)	FORMULA at night (N = 54)
Intention to breastfeed ** Duration in months	66 (100%) 8.8 ± 3.8	50 (93%) 8.2 ± 4.9
Help with infant care every night **	13 (20%)	19 (35%)
Assigned to intervention group	41 (62%)	40 (74%)

**** Chi-square significant ($p < 0.05$)**

Comparison of sleep quantity & quality by time and night feeding group

VARIABLE	EBF at night	FORMULA at night
TST-night* (minutes)	*N=66*	*N=52*
last mo. pregnant	407 ± 85	418 ± 88
1 mo. postpartum	386 ± 66	356 ± 67
TST-day (minutes)	*N=63*	*N=51*
last mo. pregnant	79 ± 61	86 ± 60
1 mo postpartum	90 ± 64	90 ± 73

*** Time, F(1,116)= 28.4, p<.001, η2= .197**
*** TxG, F(1,116) = 6.8, p=.01, η2= .055**

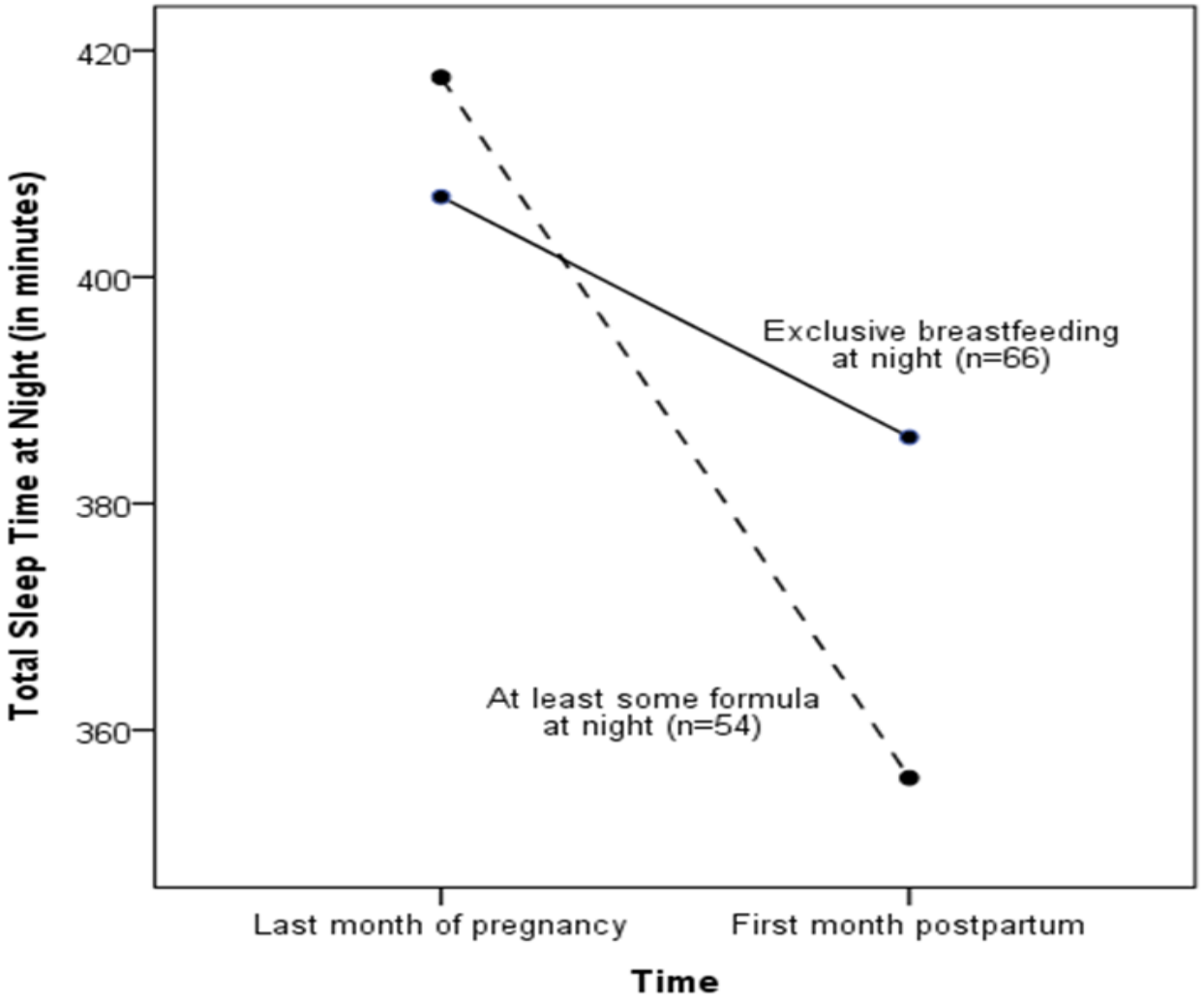
Comparison of sleep quantity & quality by time and night feeding group

VARIABLE	EBF at night	FORMULA at night
WASO%*	*N=66*	*N=53*
last mo pregnant	21.1 ± 11.6	20.3 ± 13.5
1 mo postpartum	26.7 ± 9.8	28.7 ± 10.3
GSDS Score**	*N=66*	*N=54*
last mo pregnant	46.5 ± 15.6	42.9 ± 16.9
1 mo postpartum	49.7 ± 15.5	51.1 ± 15.4

***Time, $F(1,117) = 33.9$, $p < .001$, $\eta^2 = .225$**

****Time, $F(1,118) = 12.8$, $p < .001$, $\eta^2 = .098$**

Total sleep time at night by time and feeding group



Conclusions and Implications for Practice

- Exclusive breastfeeding first-time mothers averaged 30 minutes more nocturnal sleep than women who used formula at night.
- New mothers should be encouraged to breastfeed exclusively since breastfeeding may promote sleep during postpartum recovery

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