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Household Income, Psychosocial Stressors, and Risk Factors for Sleep-Related Infant Deaths

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BACKGROUND

- Sleep-related infant deaths (e.g., SIDS, accidental suffocation, undetermined) are the leading cause of postneonatal mortality.
- Infants from low income families have higher rates of sleep-related deaths.
- Other risk factors for sleep-related death include supine & side sleep positions, bedsharing, maternal smoking, sleeping in separate room, soft bedding, and breastfeeding <8 weeks.
- Little is known about how these risk factors vary by income or if vary psychosocial stressors, social services, and education of parents from healthcare providers about risk factors influence these risks among low income families.

AIMS

- Aim 1: Describe differences in risk factors for sleep-related infant death by family income.
- Aim 2: Among low income families, describe differences in risk factors by psychosocial stressors, services, and risk-factor education.

METHODS

- **Data Source, Participants, & Time Period:** 2016-2017 CDC Pregnancy Risk Assessment Monitoring Study (PRAMS) data in 47 states.
 - **Aim 1:** All PRAMS participants.
 - **Aim 2:** Participants <185% of the federal poverty limit.
- **PRAMS:** PRAMS questions mothers of infants regarding infant sleep practices, smoking, income, psychosocial stressors (e.g., financial stress, domestic violence), services (e.g., WIC), and risk-factor education.
- **Main Predictors:**
 - **Aim 1:** Household Income, categorized according to the federal poverty limit (FPL): <185%FPL, 186-399% FPL, ≥400% FPL.
 - **Aim 2:** Psychosocial stressors, services, and risk-factor education (See Table 1).
- **Main Outcome:** Risk & protective factors for infant sleep-related death:
 - Sleep position (back vs. other)
 - Sleep surface (crib/bassinet/play yard vs. other)
 - Sleep location (room sharing vs. not)
 - Soft objects in the sleep area (no vs. yes)
 - Breastfeeding duration (≥8 weeks vs. <8 weeks)
 - Maternal smoking (no vs. yes)
- **Analysis:** X² test for bivariate analyses & multivariable logistic regression adjusting for infant and maternal age, maternal race/ethnicity, gestational age, state, maternal insurance, & timing of prenatal care.

Table 1: Aim 2 Main Predictors (Participants <185% Federal Poverty Line)

Psychosocial Stressors	Services & Benefits	Safe Sleep Education from a Healthcare Provider
<ul style="list-style-type: none"> • Domestic violence • Maternal depression • Emotional stress • Financial stress • Partner-related stress • Traumatic stress 	<ul style="list-style-type: none"> • Maternal health insurance • Home visitation • WIC enrollment 	<ul style="list-style-type: none"> • Sleep position • Sleep surface • Bedsharing • Soft objects in sleep area

Table 2. Aim 1 - Adjusted Odds Risk and Protective Behaviors for Sleep-Related Infant Death by Household Income

Household Income	Supine Sleep Position (referent = side/stomach)	Separate Approved Sleep Surface (referent = no)	Room Sharing Without Bed Sharing (referent = no)	No Soft Objects in Sleep Area (referent = soft objects present)	Breastfeeding for ≥ 8 Weeks (referent = no)	No Maternal Smoking (referent = Current Smoker)
<185% FPL	0.36 (0.07, 1.95)	0.21 (0.03, 1.26)	12.70 (1.66, 97.04)	5.18 (0.88, 30.57)	0.04 (0.004, 0.46)	<0.001 (<0.001, <0.001)
186-399% FPL	0.314 (0.06, 1.80)	0.20 (0.03, 1.29)	8.52 (1.07, 67.93)	7.63 (1.24, 46.83)	0.08 (0.01, 0.92)	<0.001 (<0.001, <0.001)
≥400% FPL	Referent	Referent	Referent	Referent	Referent	Referent

Table 3. Aim 2 – Adjusted Risk & Protective Factors Among Mothers from Households <185% Federal Poverty Limit for Sleep Position, Separate Sleep Surface & Room Sharing

Risk & Protective Factors (Ref = No)	Supine Sleep Position (referent = side/stomach)	Separate Approved sleep Surface (referent = no)	Room Sharing Without Bed Sharing (referent = no)
Psychosocial Stressor (Ref=No)			
Domestic violence	0.74 (0.49, 1.12)	0.55 (0.35, 0.86)	1.17 (0.76, 1.79)
Maternal depression	0.87 (0.60, 1.26)	1.02 (0.70, 1.48)	0.86 (0.59, 1.24)
Emotional stress	1.19 (0.90, 1.57)	1.09 (0.85, 1.41)	1.18 (0.90, 1.54)
Financial stress	0.93 (0.71, 1.23)	0.84 (0.66, 1.06)	0.80 (0.61, 1.05)
Partner-related stress	1.06 (0.80, 1.41)	0.85 (0.65, 1.11)	0.85 (0.64, 1.13)
Traumatic stress	0.76 (0.54, 1.06)	0.75 (0.51, 1.09)	1.09 (0.76, 1.58)
Benefits & Services (Ref=No)			
Current maternal health insurance	1.07 (0.77, 1.50)	0.95 (0.69, 1.30)	1.05 (0.75, 1.46)
Postpartum Home visitation	1.14 (0.63, 2.05)	0.96 (0.59, 1.57)	1.25 (0.71, 2.21)
Prenatal WIC enrollment	0.99 (0.75, 1.30)	1.04 (0.80, 1.34)	0.9 (0.76, 1.30)
Safe Sleep Advice from Healthcare			
Sleep position	2.53 (1.65, 3.87)	-	-
Sleep surface	-	1.17 (0.80, 1.73)	1.25 (0.86, 1.82)
Room sharing	-	-	1.26 (0.98, 1.63)
Objects in sleep area	-	-	-

Table 4. Aim 2 – Adjusted Risk & Protective Factors Among Mothers from Households <185% Federal Poverty Limit for Soft Objects, Breastfeeding, & Smoking

Risk & Protective Factors (Ref = No)	No Soft Objects (referent = soft objects present)	Breastfeeding for ≥ 8 Weeks (referent = no)	No Current Maternal Smoking (referent = current maternal smoking)
Psychosocial Stressor (Ref=No)			
Domestic violence	0.81 (0.54, 1.21)	1.54 (1.05, 2.26)	1.63 (1.07, 2.49)
Maternal depression	1.31 (0.92, 1.86)	1.05 (0.75, 1.47)	0.95 (0.64, 1.42)
Emotional stress	1.11 (0.87, 1.41)	0.96 (0.76, 1.22)	0.82 (0.62, 1.10)
Financial stress	1.24 (0.98, 1.58)	0.93 (0.74, 1.18)	0.67 (0.50, 0.94)
Partner-related stress	0.82 (0.63, 1.06)	1.12 (0.87, 1.44)	0.62 (0.46, 0.83)
Traumatic stress	0.56 (0.39, 0.80)	0.78 (0.57, 1.07)	0.58 (0.41, 0.81)
Benefits & Services (Ref=No)			
Current maternal insurance	1.46 (1.08, 1.98)	0.99 (0.74, 1.32)	0.75 (0.50, 1.13)
Home visitation	0.86 (0.53, 1.38)	0.86 (0.54, 1.35)	0.72 (0.39, 1.34)
Prenatal WIC enrollment	0.93 (0.74, 1.18)	0.57 (0.44, 0.72)	0.64 (0.46, 0.87)
Safe Sleep Advice from Healthcare			
Sleep position	-	1.19 (0.74, 1.90)	1.51 (0.83, 2.74)
Sleep surface	-	0.99 (0.67, 1.46)	0.98 (0.57, 1.68)
Room sharing	-	0.96 (0.77, 1.21)	0.93 (0.69, 1.24)
Objects in sleep area	1.17 (0.82, 1.65)	0.89 (0.59, 1.32)	0.78 (0.48, 1.26)

RESULTS

- **Overall:** 1.8 million weight respondents.
- **Aim 1:** Low income mothers had 12x higher odds of room sharing without bedsharing, 96% lower odds of breastfeeding ≥8 weeks and >99% lower odds of not currently smoking (Table 2).
- **Aim 2:** Among respondents <185% of the federal poverty limit (Table 3 & 4):
 - Domestic violence during pregnancy was associated with ~50% decreased odds of using a separate approved sleep surface, but ~50% increased odds of breastfeeding for ≥8 weeks & ~60% increased odds of not smoking (Table 4).
 - Financial, partner-related, and traumatic stress was associated with decreased odds of no maternal smoking.
 - Respondents who received education on sleep location had 2.5x increased odds of a supine/back sleep position.

CONCLUSION

To decrease disparities in sleep-related infant deaths, interventions should support breastfeeding and smoking cessation, as well as support low income mothers facing certain stressors related to finances, trauma, and their partners.

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