Implications of Mothers' Social Networks for Risky Infant Sleep Practices

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Objective To describe the structure of networks in a cohort of mothers and to analyze associations of social network characteristics and norms with infant sleep practices.

Study design We recruited a prospective cohort of mothers with infants <6 months of age from January 2015 to December 2016. Mothers completed a survey about their personal social networks and infant care practices. Latent class analysis identified unobserved network types. Binary statistics and path analysis were performed.

Results Overall, 402 mothers were surveyed. Latent class analysis identified 2 a priori unknown social network types: "exclusive" (restricted) and "expansive." Mothers who were black, younger, unmarried, less educated, and of lower socioeconomic status were more likely to have exclusive networks than expansive networks. Mothers with exclusive networks were more likely to be exposed to the norm of soft bedding (P = .002). Exposure to norms of non-supine infant placement, bedsharing, and soft bedding use within one's network was associated with engaging in these practices (P < .0001 for each). First-time mothers were more likely to pay attention to a non-supine norm and place infants in a non-supine position. Black mothers and first-time mothers were more likely to pay attention to the norm and use soft bedding.

Conclusions Both the type of networks mothers have and the norms regarding infant sleep practices that circulate within these networks differed by race. Network norms were strongly associated with infant sleep practices and may partially explain the racial disparity therein. *(J Pediatr 2019;212:151-8).*

Annually in the US, approximately 3700 infants die from sleep-related deaths, including sudden infant death syndrome, accidental suffocation and strangulation in bed, and ill-defined causes of death.[1] Despite the recommendations from the American Academy of Pediatrics,[2,3] the proportion of infants placed prone and in high-risk sleep environments has increased since 1993.[4-13] Furthermore, there are marked racial and ethnic disparities in the prevalence of both sleep-related deaths and the aforementioned risk factors.[4-7,14-18]

Practices regarding infant sleep are not based entirely on scientific information but also reliant on nonfactual information from mothers' social networks. Social networks influence perceptions of "normal" or prevalent behavior as well as perceptions of "acceptable" behavior; one is more likely to behave in a fashion perceived to be normal and acceptable to avoid judgment.[19,20] Social networks have been shown to influence a variety of health outcomes and health-related behaviors.[21-27] Social networks and their norms also influence parenting practices, such as breastfeeding initiation and continuation[28] and vaccination.[29] With respect to advice about sleep practices, some mothers consider their social networks to be a more trustworthy resource than medical providers.[9,10,30,31] When social network norms are contrary to recommendations, they can be major barriers to safe and healthy infant care practices.

Social network analysis identifies individuals who may influence each other's behavior, the nature of these connections, and network structural features that may dampen or accentuate these influences.[32] These network features include network size, kin composition, strength of ties (frequency and duration of contact), and internal interconnectedness/density (proportion of network members who know each other).[32] Large networks increase a person's exposure to a variety of social influences, thus reducing the influence of any one network member. Members with stronger network ties (eg, being kin, having frequent contact, having a long duration of relationship) or similar backgrounds (eg, race, socioeconomic status)[33-36] have increased influence.[21,37,38] Dense networks (those in which many members know each other) are usually more effective at shaping

LCA	Latent class analysis

and reinforcing behavior, presumably through pressure to conform to group norms.[39-43] Social network analysis examines characteristics of individuals' social networks and identifies "types" of networks based on common network features. Social network theory can then be used to deduce how these network types may influence behaviors.[44-49]

These findings raise the possibility that the networks of mothers of infants also may exhibit substantial variation. In this study, we conducted a social network analysis in a population of mothers of young infants to describe the predominant types of social networks and norms within these networks to better understand social influences on maternal decisions regarding infant sleep practices and how those influences vary by race/ethnicity.

Methods

We enrolled custodial mothers with healthy infants born at term who were <6 months of age in the metropolitan Washington, DC, region. Mothers were eligible if they were >18 years old, spoke English, self-identified as black or white, and their parents were born in the US. Mothers did not have to identify their ethnicity as Hispanic or non-Hispanic. To enroll a racially balanced sample with sufficient numbers of mothers who were adherent and nonadherent to safe infant sleep recommendations, we used a combination of hospital-based and chain-referral recruitment strategies; mothers who were recruited in the birth hospital comprised the population base for the chain-referred mothers. When the infant was at least 2 weeks old, research staff contacted the mother and administered a survey that used established, validated questions about their personal social networks[50-53] (adapted from the Social Networks module of the National Social Life, Health, and Aging Project,[50] modeled after the General Social Survey egocentric social network module[53]), the structural features of these networks (including size, density, kin composition, and strength of ties to alters),[50] perceived beliefs of network members about various infant care practices, and their own infant care practices.[54-56] This study was approved by the institutional review boards of Children's National Medical Center and the University of Virginia.

Statistical Analyses

Our primary outcome variables were 3 sleep practices for the last night before the survey: infant sleep position (supine vs non-supine), bedsharing (yes vs no), and soft bedding (use vs nonuse).

Social Network Analysis

A person's social network comprises the family members, friends, colleagues, and others (known as "alters") with whom this person (known as "ego") interacts. We collected data on aspects of social networks that are associated with health-related outcomes. Latent class analysis (LCA),[57-59] a data-reduction method, was conducted to postulate a categorical latent variable Prepresenting the unknown a priori social network types. Eight network-structural variables were used in the LCA: (1) network size (>5 alters vs ≤5 alters); (2) network density (all alters know each other vs not all alters knows each other); (3) relationship duration (has known alters for mean of 5+ years vs mean <5 years); (4) contact frequency (proportion of alters with whom ego communicates or has contact daily vs less frequently than daily); (5) racial heterogeneity, as measured by the index of qualitative variation (the probability that 2 alters, chosen randomly, would be of different races)[60]; (6) sex composition (all female vs not all female); (7) kin composition (majority kin vs otherwise); and (8) proportion of alters who are at least 15 years older than ego (majority vs otherwise). This last variable was used to identify the proportion of alters who were senior family members and friends, as the influential nature of this group on infant care decisions has been well documented.[61-64]

Several LCA models with increasing numbers of classes were created and compared to identify the optimal number of latent classes. Once the latent classes (or "network types") were identified, demographic characteristics for each network were compared, using ANOVA and Pearson χ^2 test. The minimal sample size needed for our LCA with 8 dichotomous items was $2^8 = 256$.[65,66] Our sample size enabled adequate statistical power to estimate the LCA.

To determine perceived social network norms, we assessed 5 norm constructs, based on previous findings,[9,67,68] for each of the 3 sleep practices and for each of the alters the respondent named in her network. These 5 constructs include perceived sudden infant death syndrome risk associated with a practice, the alter's concerns (safety, etc) regarding the sleep practice, mistrust of medical advice regarding the sleep practice, perceived lack of necessity to follow recommended sleep practice, and overall opposition to recommended sleep practice. Each of these items was reported using a 4- or 5-item ordinal response category (eg, "How often does [alter] encourage you to place your baby on side/stomach for sleeping?" Range: "never" [= 0] to "almost every day" [= 4]). To determine the normative beliefs in one's overall network regarding sleep practices, values for these items were then averaged across all alters.

The 5 norm constructs for a given sleep practice were then standardized and averaged together to form a scale. These scales have satisfactory reliability (for sleep position scale, $\alpha = 0.82$; for bedsharing scale, $\alpha = 0.75$; for soft bedding scale, $\alpha = 0.79$). Lower values on these scales were associated with recommended practices (supine position, room sharing without bedsharing, no soft bedding use), and greater values were inconsistent with recommended practices. Exposure to risker norms was defined by the magnitude of the value, ie, a more positive value for the sleep position norm indicated a stronger non-supine norm. Associations between alters' norms and the latent classes (social networks) were analyzed using an F-test.

Sleep Practice Analysis

Relationships of sleep practices with social network types and norms were first assessed using χ^2 and F-tests. Then, a multigroup mixture path analysis model was used to examine how a specific social network norm would influence each

Table I. Binary relationship of social network type with demographics and social network norms (N = 402)

Sociodemographics	Total (N = 402)	Social network type		P value
		Exclusive (n = 253)	Expansive (n = 149)	
Mother age, y, mean (SD)	29.3 (5.9)	27.9 (5.6)	31.6 (5.5)	<.001
Alter age, y, mean (SD)	43.8 (12.8)	45.1 (13.1)	41.6 (11.8)	.007
Infant age, d, mean (SD)	47.4 (43.3)	45.2 (40.8)	51.1 (47.3)	.2
Mother ever married, n (%)	207 (51.5)	112 (44.3)	95 (63.8)	<.001
Mother graduated from vocational/technical school or 4-y college, n (%)	199 (49.5)	97 (38.3)	106 (71.1)	<.001
Black race, n (%)	269 (66.9)	193 (76.7)	76 (51.0)	<.001
White race, n (%)	133 (33.1)	60 (23.7)	73 (49.0)	<.001
Commercial insurance, n (%)	234 (58.2)	125 (49.4)	109 (73.2)	<.001
WIC recipient, n (%)	169 (42.0)	126 (49.8)	43 (28.9)	<.001
First-time mother, n (%)	241 (60.0)	137 (54.2)	104 (69.8)	.002
Social network norm*				
Supine sleep position, mean (SD)		0.04 (0.81)	−0.07 (0.59)	.1
Bed sharing, mean (SD)		0.01 (0.69)	−0.01 (0.60)	.8
Soft bedding, mean (SD)		0.08 (0.77)	−0.14 (0.62)	.002

WIC, Special Supplemental Nutritional Program for Women, Infants, and Children.
*Lower norm values are consistent with recommended sleep practices (supine position, roomsharing without bedsharing, no soft bedding use), whereas greater norm values are inconsistent with recommended sleep practices.

specific sleep practice and how it would mediate the effects of sociodemographics (eg, race, mother's age, education, marital status, parity, and medical insurance) on the sleep practice. In such a model, the social network types estimated from the LCA model was treated as a known group, and the direct and indirect effects (ie, via norms) in the path analysis model were allowed to vary across the social network groups.[69] Indirect effects were tested using Delta method. The Kim method[70] was used to estimate sample size needed for path analysis models based on model fit index of the root mean square error of approximation. For a given power of 0.80 and α = 0.05, the estimated sample size to achieve root mean square error of approximation = 0.05 (close fit) varied from n = 243 to n = 163 when model degrees of freedom changed from 50 to 100.

Results

A total of 402 women with infants <6 months of age were surveyed. Demographics for the total sample and stratified by social network type are shown in **Table I**. At the time of the survey, infants had a mean age of 47.4 days (SD 43.3); because mothers recruited by chain-referral had to be referred by other mothers, these infants were older (97 days vs 31 days) than those of hospital-recruited mothers ($P < .0001$).
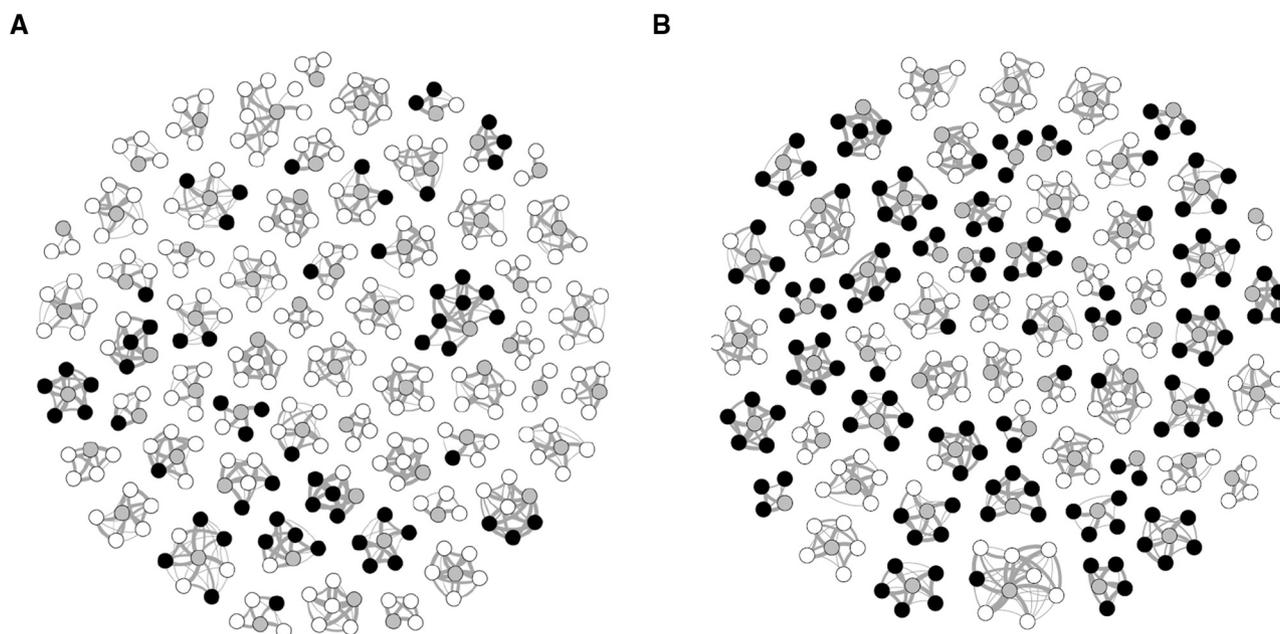
Social Network Types
The 2-class LCA model had lower Akaike information criteria, Bayesian information criteria, and sample-size adjusted Bayesian information criteria, compared with all other models, and the bootstrapped likelihood ratio test for the 3-class LCA model could not reject the 2-class model; therefore, the 2-class model is in favor. The quality of class classification of the model is very good (entropy = 0.89). The 2 latent classes, representing 2 social network types, are summarized as "exclusive" (62.9%) and "expansive" (37.1%). Exclusive networks were large (57.6% had >5

alters), kin-centric (96.9% had majority kin), with older alters (30.1% had majority of alters ≥15 years older), high racial homogeneity (91.6% had all alters of same race/ethnicity), and with ties that were strong (65.1% had known alters for mean 5+ years, and 40.3% had daily contact with most alters), and dense (32.0% had all alters knowing each other). Expansive networks were also large (58.0% had >5 alters), but not kin-centric (0.8% had majority kin), with few older alters (2.5% with majority alters ≥15 years older), less racial homogeneity (85.9% with networks in which all alters were of same race/ethnicity), and with weaker ties (46.5% had known alters for mean 5+ years, and 24.2% had daily contact with most alters), and less dense ties (14.7% of alters knew each other). **Figure 1** (available at www.jpeds.com) depicts representative exclusive and expansive networks.

Important differences were found when comparing the egos (mothers) with the 2 social network types (**Table I**). Egos (mothers) in the expansive networks, compared with those in the exclusive networks, were more likely to be older, married, first-time mothers, with greater levels of education, and commercial insurance; they were less likely to be recipients of Special Supplemental Nutrition Program for Women, Infants, and Children or black ($P < .05$ for each).

Relationship between Network Norms and Sleep Practices
The norms in both exclusive and expansive social networks generally involved following recommended practices—to place infants supine, not to bedshare, and not to use soft bedding. With regard to sleep position and sleep location, the levels of exposure to norms involving riskier sleep practices were not statistically different; the mean score of the standardized sleep position norm scale was 0.04 (SD 0.81) for mothers with exclusive networks and −0.07 (SD 0.59) for those with expansive networks ($P = .11$). Similarly, for the bedsharing norm scale, the mean scores

A   **B**

Figure 2. The presence of social network members who practice unsafe (*dark*) sleep practices. **A,** Among a random subset of mothers (n = 61) who placed their infants on their backs last night. **B,** Among mothers (n = 61) who placed their infants on their sides or stomachs last night. *Light gray* nodes represents the respondents ("egos"), *white* nodes represent egos' confidants who "never" encouraged them to place their infants on their sides or stomachs for sleep, and *dark gray* nodes represent egos' confidants who "sometimes" or "many times" encouraged them to place their infants on their sides or stomachs for sleep. *Gray lines* that appear between egos and alters represent social relationships that exist within the networks, as reported by respondents. Line thickness is proportional to the frequency of interaction between the egos/alters in question, with *thicker lines* representing more frequent contact.

were 0.01 (SD 0.69) and −0.01 (SD 0.60) for mothers with exclusive and expansive networks, respectively (P = .80). However, for soft bedding use, mothers with exclusive networks were statistically more likely to be exposed to norms inconsistent with recommended practices than those with expansive networks (0.08 [SD 0.77] vs −0.14 [SD 0.62], respectively) (P = .002).

There were statistically significant racial differences in levels of exposure to norms involving riskier sleep practices. The mean score of the standardized sleep position norm scale was 0.07 (SD 0.85) for black mothers and −0.15 (SD 0.37) for white mothers (P < .001). Similarly, for the soft bedding use norm scale, the mean score was 0.14 (SD 0.79) for black mothers and −0.29 (SD 0.45) for white mothers (P < .001). Thus, in this sample, black mothers, compared with white mothers, were exposed to more negative norms (ie, norms inconsistent with recommended practices) regarding both sleep position and soft bedding use. That is, they were more often advised by their alters to place their infants non-supine and to use soft bedding with their infant than were white mothers. However, for sleep location, the mean norm was 0.01 (SD 0.70) for black mothers and −0.04 (SD 0.56) for white mothers (P = .44), which is not a statistically significant difference.

Further, binary statistics showed that these norms (ie, perceived beliefs of mothers' alters) were significantly associated with the mothers' sleep practices (**Table II**; available at www.jpeds.com). Mothers in this sample who had greater exposure to norms that were consistent with the recommended practices of supine positioning, room sharing without bedsharing, and avoidance of soft bedding were more likely to engage in these practices (P < .0001 for all).

To help illustrate the link between network norms and mothers' behavior, **Figure 2** compares the egocentric networks of randomly selected mothers in the sample who placed their children supine for sleep last night (left panel) vs an equal number of mothers who placed their children prone (right panel).

In multigroup mixture path analysis testing the effects of covariates on sleep practice within the separate network types (**Tables III, IV**, and **V**; **Table V**; available at www.jpeds.com), non-supine, bedsharing, and soft bedding norms were associated with a significantly greater odds of these practices last night by mothers in this sample, regardless of social network type. However, network type was important for first-time mothers; those with expansive networks had >7 times the odds of placing their infant supine (direct

Table III. Multigroup mixture path analysis model*: comparing covariates' effects on supine sleep position between different network types (N = 402)

| Covariates | Exclusive social network (n = 253) | | Expansive social network (n = 149) | |
| | Norm of non-supine position | Supine position | Norm of non-supine position | Supine position |
	β (P value)	OR (95% CI)	β (P value)	OR (95% CI)
Alters' norm for non-supine position		0.12 (0.06-0.22)		0.14 (0.03-0.38)
Mother's age, y	−0.01 (0.61)	1.05 (0.94-1.18)	−0.01 (0.69)	1.01 (0.86-1.19)
Race				
Not black	Reference	Reference	Reference	Reference
Black	0.22 (0.15)	0.62 (0.10-4.02)	0.29 (0.09)	0.25 (0.02-3.48)
Mother did not graduate from 2-y or 4-y college				
No	Reference	Reference	Reference	Reference
Yes	−0.08 (0.56)	0.26 (0.05-1.47)	−0.11 (0.57)	1.01 (0.14-7.3)
First-time mother				
No	Reference	Reference	Reference	Reference
Yes	0.26 (0.01)	2.02 (0.58-7.01)	−0.03 (0.80)	7.53 (1.13-50.32)
Medicaid insurance				
No	Reference	Reference	Reference	Reference
Yes	−0.18 (0.16)	1.31 (0.36-4.81)	0.25 (0.23)	2.04 (0.29-14.50)
Marital status				
Married	Reference	Reference	Reference	Reference
Never married	−0.14 (0.28)	0.42 (0.11-1.65)	0.09 (0.63)	2.39 (0.28- 20.69)

| | Significant indirect effect on supine sleep position through norm of non-supine positioning | |
| | Exclusive social network (n = 253) | Expansive social network (n = 149) |
Covariates	OR (95% CI)	OR (95% CI)
First-time mother		
No	Reference	
Yes	0.57 (0.36-0.92)	

*The categorical latent variable representing latent classes of social network estimated in LCA model was treated as known class (group) membership for multigroup analysis of each sleep practice.[69]

effect), whereas those with exclusive networks had significantly lower odds of placing their infant supine, mediated by a non-supine norm (Table III). With regards to bedsharing, first-time mothers with exclusive networks were more likely to be exposed to bedsharing norms, but this did not have an effect on bedsharing behavior (Table IV). Older mothers were less likely to bedshare despite a bedsharing norm. Black mothers, regardless of social network type, had greater odds of soft bedding use, mediated through the norm of soft bedding use (Table V). First-time mothers with exclusive social networks had greater odds of using soft bedding, mediated through the norm of soft bedding use.

Discussion

Because behaviors are generally influenced by the perceived beliefs and behaviors of one's social network members,[20,21,23,71] it is important to understand parents' social networks to understand and potentially influence parenting practices. We identified 2 distinct social network types (exclusive and expansive) in a sample of mothers of young infants. In addition, we found extremely strong associations between social network norms and all of the measures of mothers' sleep practices examined here. Indeed, there were multiple models in which social network norms played some mediating role.

These models suggest that more exclusive, kin-centric social networks are more influential and may be more constraining in terms of their effects on mothers' practices than are expansive, friend-based social networks. Friendship ties are voluntary relationships that may change over time, particularly if they are relationships from work or the neighborhood, and are maintained if they continue to be beneficial,[72,73] whereas family ties are deeply embedded and, even if they are problematic, are difficult to break.[74,75] Therefore, mothers with a more closed, kin-centric network may find it more difficult to ignore their network influences. In addition, mothers in our sample who had exclusive networks tended to be younger, and there was a larger age difference between mothers and their network alters, suggesting that these alters are more likely grandparents and older relatives, rather than friends. This may increase the likelihood of the mother's deferring to the opinions of the older alters. Social networks and the norms within these networks may also at least partially explain the black—white disparity in sleep-related deaths.

In our sample, black mothers were more likely to have exclusive social networks, as were mothers at lower educational and socioeconomic levels (as measured by Special Supplemental Nutrition Program for Women, Infants, and Children or Medicaid enrollment), and previous studies have shown that adherence to safe sleep recommendations is lower, and rates of sleep-related

Table IV. Multigroup mixture path analysis model[*]: comparing covariates' effects on bed-sharing between different network types (N = 402)

| | Exclusive social network (n = 253) | | Expansive social network (n = 149) | |
| | Norm of bed-sharing | Bed-sharing | Norm of bed-sharing | Bed-sharing |
Covariates	β (*P* value)	OR (95% CI)	β (*P* value)	OR (95% CI)
Alters' norm for bed sharing		3.15 (2.01- 4.92)		4.98 (2.39-10.38)
Mother's age, y	−0.02 (0.02)	0.99 (0.86-1.00)	−0.00 (0.72)	1.08 (0.97-1.19)
Race				
Not black	Reference	Reference	Reference	Reference
Black	0.02 (0.87)	1.11 (0.43-2.85)	0.06 (0.69)	2.02 (0.61-6.75)
Mother did not graduate from 2-y or 4-y college				
No	Reference	Reference	Reference	Reference
Yes	−0.20 (0.13)	0.88 (0.34-2.28)	−0.08 (0.68)	0.84 (0.21-3.30)
First-time mother				
No	Reference	Reference	Reference	Reference
Yes	0.20 (0.04)	1.98 (0.98-3.99)	−0.09 (0.47)	2.17 (0.74- 6.32)
Medicaid insurance				
No	Reference	Reference	Reference	Reference
Yes	0.08 (0.47)	0.63 (0.27-1.45)	−0.10 (0.58)	1.24 (0.29- 5.26)
Marital status				
Married	Reference	Reference	Reference	Reference
Never married	0.05 (0.65)	1.87 (0.74-4.70)	−0.20 (0.22)	0.96 (0.25-3.67)

| | Significant indirect effect on bedsharing through norm of bedsharing | |
| | Exclusive social network (n = 253) | Expansive social network (n = 149) |
Covariates	OR (95% CI)	OR (95% CI)
Mother's age, y	Reference 0.97 (0.95-0.99)	

*The categorical latent variable representing latent classes of social network estimated in LCA model was treated as known class (group) membership for multigroup analysis of each sleep practice.[69]

death greater, in families who share these demographic characteristics.[14]

Nearly all of the research on social network "types" has used data on older adults and found that "friend-focused" and "diverse" (ie, composed of both friends and kin) networks tend to have more beneficial health outcomes (eg, increased exercise frequency[76]) than "family-focused" or "restricted," ie, lower than average levels of contact with friends and kin networks.[44-48,74] This may in part be because those with multiple social resources are exposed to a variety of opinions and more sources of health-relevant information,[77] and it has been proposed that this creates more positive pressure to adopt health-promoting behaviors or avoid health-damaging behaviors.[78-80] In addition, distant alters (eg, those with whom one has less frequent contact) can have an important effect on mothers' beliefs and behaviors, as it is often through weak ties that they get new information.[81,82] This may explain why the social network norms within expansive networks seen in our sample were less negative toward recommended safe sleep practices.

The pressure to conform to social norms can be quite influential for mothers of young infants, as conformity with social network norms may be important in the mother's perception that she is a "good mother."[83] This may be particularly true for first-time mothers, who often feel less comfortable with making decisions independently and are likely to look to the social network for guidance more frequently than experienced mothers. Indeed, we found that social network norms were particularly strong influences for first-time mothers. First-time mothers in our sample who had exclusive networks had lower odds of supine placement, and this was indirectly through the influence of a norm of non-supine placement. Similarly, an increased odds of soft bedding use for first-time mothers in our sample who had exclusive networks was indirectly through the influence of a soft bedding norm. However, first-time mothers in our sample who had expansive networks had greater odds of supine placement, and this was not because of any norm. It is possible that other influences, such as medical advice, may be important for this population. It should be noted that, in our sample, first-time mothers were more likely than multiparous mothers to have greater socioeconomic and educational levels, and these characteristics have consistently been associated with greater rates of supine placement.[4,84]

In this study, we used last night practices as our outcome measures. Research on infant sleep practices typically uses both "last night" and "usual" practice, as this may produce more forthcoming responses. However, "usual" practice made the models more vulnerable to endogeneity. By asking about "last night" only, we reduced the possibility of reverse causation or more subtle processes whereby one's sleep practices might actually affect one's network (eg, by alienating one's more disapproving network members).

We acknowledge limitations of this analysis. First, there are inherent limitations in social network surveys, in that we were reliant on the ego (mother) to report ties between other

network alters and the alters' beliefs and practices. Although there were no objective measures of these beliefs and practices, the individual's perception of these beliefs and practices is what is important, as this is what the individual is acting upon. Indeed, the definition of social norms is the perception, not necessarily factual, of the beliefs and actions among one's alters. Second, because there are often striking differences in infant care practices of white and black parents,[4,6-8,15,18] participation in this study was limited to English-speaking women who self-identified as white or black; mothers did not have to identify their ethnicity as being Hispanic or non-Hispanic. In addition, to limit the influence of other ethnic traditions, first generation US-born mothers also were excluded. We did not stratify the analysis by infant age. Finally, participants were recruited from a single geographic metropolitan region. Further studies are needed to confirm these findings and to determine whether they are consistent in other geographic and racial or ethnic populations.

In conclusion, there are distinct types of social networks among new mothers, and the norms within these social networks are strong influences on safe sleep practices. These social networks and norms may at least partially explain the black–white disparity in sleep practices. Interventions to improve safe sleep practices will need to impact social networks and norms to be effective. ∎

Data statement

Data sharing statement available at www.jpeds.com.

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Panel 1: Exclusive

Panel 2: Expansive
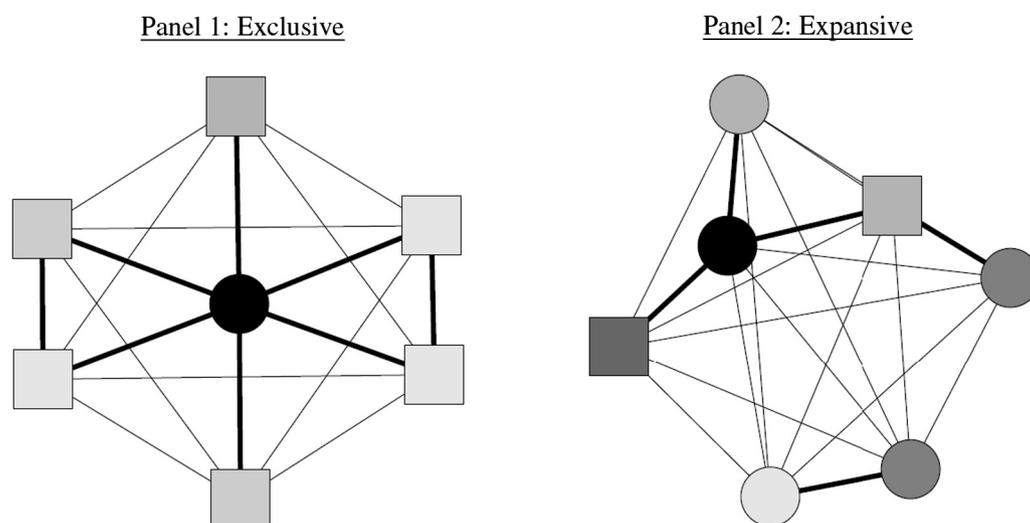
Figure 1. Representative "exclusive" and "expansive" social networks of mothers. Each network is selected from the group it represents, and is the "medoid" case from that group, which means that it has the lowest average difference from the average large network in that group with respect to the 8 dimensions of network structure. The interviewee is represented as a *dark centered circle*. *Squares* represent alters who are kin, and *circles* represent non-kin. Alters are *shaded* according to their age (*darker shapes* = older adults). Lines are weighted according to the frequency of interaction that occurs between the actors depicted. For examples, *thick black lines* indicate dyads that interact with each other several times a week or daily. *Nodes* are placed closer to other *nodes* with whom they have stronger ties. Both networks are maximally dense, but the "exclusive" network is composed entirely of kin, has greater contact frequency between ego and her alters overall, has greater frequency of contact among alters, evinces less heterogeneity with respect to alter age (ie, less variation in node color), and has less variation with respect to alter race (not shown). Exact values for these dimensions are available on request.

Table II. Binary relationships of sleep practice last night with social network type and social network norms (N = 402)

	Sleep practice last night					
	Supine sleep position		Bed sharing		Use soft bedding	
	Yes (n = 356)	No (n = 46)	Yes (n = 113)	No (n = 289)	Yes (n = 240)	No (n = 162)
Variables	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Social network type						
Exclusive (n = 253)	219 (86.6)	34 (13.4)	78 (30.8)	175 (69.2)	165 (65.2)	88 (34.8)
Expansive (n = 149)	137 (91.9)	12 (8.1)	35 (23.5)	114 (76.5)	75 (50.3)	74 (49.7)
P value for Pearson χ^2 test	.1		.1		.003	
Alter's norm*	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
Sleep position	−0.16 (0.44)	1.26 (1.21)				
P value	<.001					
Bed sharing			0.42 (0.79)	−0.16 (0.52)		
P value			<.001			
Soft bedding					0.22 (0.81)	−0.33 (0.39)
P value					<.001	

*Lower norm values are consistent with recommended sleep practices (supine position, roomsharing without bedsharing, no soft bedding use), whereas greater norm values are inconsistent with recommended sleep practices.

Table V. Multigroup mixture path analysis model*: comparing covariates' effects on soft-bedding between different network types (N = 402)

| | Exclusive social network (n = 253) | | Expansive social network (n = 149) | |
| | Norm of soft-bedding | Soft bedding | Norm of soft bedding | Soft bedding |
Covariates	β (P value)	OR (95% CI)	β (P value)	OR (95% CI)
Alters' norm of soft bedding		4.56 (2.48-8.42)		4.51 (1.88-10.83)
Mother's age, y	0.00 (0.99)	1.01 (0.94-1.08)	0.00 (0.84)	0.96 (0.89-1.04)
Race				
Not black	Reference	Reference	Reference	Reference
Black	0.58 (<0.001)	1.52 (0.59-3.91)	0.42 (0.01)	1.08 (0.37-3.15)
Mother did not graduate from 2-y or 4-y college				
No	Reference	Reference	Reference	Reference
Yes	−0.13 (0.36)	1.03 (0.39-2.71)	−0.09 (0.66)	2.38 (0.69-8.22)
First-time mother				
No	Reference	Reference	Reference	Reference
Yes	0.28 (0.005	0.95 (0.48-1.87)	0.001 (0.94)	1.27 (0.54-2.97)
Medicaid insurance				
No	Reference	Reference	Reference	Reference
Yes	−0.11 (0.337)	0.98 (0.41-2.34)	0.16 (0.44)	0.84 (0.23-3.10)
Marital status				
Married	Reference	Reference	Reference	Reference
Never married	−0.01 (0.97)	0.52 (0.22-1.23)	−0.01 (0.94)	1.04 (0.33-3.21)
	Significant indirect effect on soft bedding use through norm of soft bedding use			
	Exclusive social network (n = 253)		Expansive social network (n = 149)	
Covariates	OR (95% CI)		OR (95% CI)	
Race				
Not black	Reference		Reference	
Black	2.42 (1.39-4.22)		1.88 (1.02-3.46)	
First-time mother				
No	Reference			
Yes	1.53 (1.09-2.17)			

*The categorical latent variable representing latent classes of social network estimated in LCA model was treated as known class (group) membership for multigroup analysis of each sleep practice.[69]