Evaluation of Safe Sleep Practices of Cribs for Kids Class Attendees

Halimat Adeshola Olaoluwa

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Evaluation of Safe Sleep Practices of Cribs for Kids Class Attendees

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Master of Public Health Program

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Bridget Hobbs – Reader
Acknowledgments

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Abstract

Sudden Infant Death Syndrome (SIDS) is a major cause of infant mortality, and sleep-related causes of SIDS are a focus of many strategies to combat infant mortality because they are largely preventable. One intervention that combines the distribution of a portable crib and safe sleep education to families that indicate a financial need is the Cribs for Kids program. The purpose of this study was to assess any changes in recommended safe sleep practices by Cribs for Kids attendees before and after the receipt of a portable crib and safe sleep education. Families who met eligibility criteria were enrolled in the program and provided with a Pack n’ Play portable crib. They completed a survey at the beginning of the class (pre-survey), and telephone surveys were conducted three months after the class (follow up survey). McNemar’s test was used to determine any significant differences between self-reported safe sleep practices during the pre-survey and follow up. A total of 94 matched pre-survey and follow up surveys were included in the analyses. Cribs for Kids was successful in providing a safe sleep option for families as significantly more families reported using a Pack n’ Play at night during their follow up than the pre-survey (28.7% vs. 51.1%, $p = .002$). However, there was a significant decrease in breastfeeding/combination (56.4% vs. 30.9%, $p < .001$). Other survey items were not significant. However, an increase in the proportion of families adhering to safe sleep recommendations was noted.

*Keywords*: sudden infant death syndrome (SIDS), sleep-related infant death, cribs for kids
Evaluation of Safe Sleep Practices of Cribs for Kids Class Attendees

Infant mortality is defined as the death of any child before age one, and the infant mortality rate (IMR) is the death of any child before age one per 1,000 live births (Centers for Disease Control and Prevention [CDC], 2018a). The IMR is important because it is a HealthyPeople 2020 leading health indicator, which means it reflects the health of the general population. According to the CDC (2018a), the IMR for the United States was 5.9 per 1,000 live births in 2016, and the Ohio Department of Health (ODH, n.d.) reports the IMR for Ohio as 7.4 per 1,000 live births in 2016. In Montgomery County, Ohio, the IMR in 2016 was 6.8 per 1,000 live births (Public Health – Dayton & Montgomery County [PHDMC], 2018). The HealthyPeople 2020 goal for IMR is six per 1,000 live births (PHDMC, 2018). Although the United States barely met this goal, Ohio and Montgomery County, Ohio did not.

The major causes of infant mortality include birth defects, preterm birth and low birth weight, sudden infant death syndrome (SIDS), pregnancy complications, and injuries such as suffocation (CDC, 2018a). SIDS occurs when infants die suddenly before their first birthday, with no explanation for the cause of death even after an investigation (Moon & American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome [AAP], 2016). It is usually classified under sudden unexpected infant death (SUID) which is the sudden death of infants where the cause of death is unknown prior to an investigation (Moon & AAP, 2016). SUID can be accounted for by causes such as suffocation, asphyxia, poisoning, or trauma after an investigation is conducted (Moon & AAP, 2016). Sleep-related SUIDs take place either during an infant's sleep or in an infant's sleep environment (Sauber-Schatz, Sappenfield, & Shapiro-Mendoza, 2015). The most recently released guidelines and recommendations for safe sleep practices include placing the infant in a supine position (on their back), on a firm sleeping
A racial disparity exists for infant mortality and sleep-related infant deaths in the United States, the State of Ohio, and Montgomery County, Ohio. As summarized below in Table 1, all three sets of data show Black infants having a mortality rate of more than twice that of their White counterparts before their first birthday. Some of the racial disparities could be explained by the variation in the percentage of White versus Black sleep supine positioning. The National Infant Sleep Position study reported 75% of White mothers placed their infants in a supine sleeping position, compared to 58% of Black infants (Colson et al., 2009).

Table 1

<table>
<thead>
<tr>
<th>Race</th>
<th>United States (CDC, 2018a)</th>
<th>Ohio (ODH, n.d.)</th>
<th>Montgomery County, Ohio (PHDMC, 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>11.4</td>
<td>15.2</td>
<td>12.6</td>
</tr>
<tr>
<td>White</td>
<td>4.9</td>
<td>5.8</td>
<td>5.0</td>
</tr>
<tr>
<td>All races</td>
<td>5.9</td>
<td>7.4</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Although some causes of infant mortality are inevitable, sleep-related infant deaths are largely preventable, making it a focus for strategies intended to decrease the IMR. Several efforts have been made to decrease the number of sleep-related deaths. In 1992, the American Academy of Pediatrics recommended a supine sleeping position for infants, and the Back-to-Sleep
campaign was initiated in 1994 to promote and advocate for supine sleep position (Moon & AAP, 2016). The United States experienced a decline in the SIDS rate from 120 deaths per 100,000 live births in 1992 to 40 deaths per 100,000 live births in 2013, with an increase in the use of a supine sleeping position (Moon & AAP, 2016). This decrease could also be accounted for by the re-classification of what would have been considered SIDS, as other causes of death including sleep-related causes of death (Moon & AAP, 2016). Other efforts include crib distribution programs such as Cribs for Kids and Bedtime Basics for Babies (Hauck, Tanabe, McMurry, & Moon, 2015). These programs provide safe sleep education and a free crib to eligible families (Hauck et al., 2015).

Dayton Children’s Hospital in Montgomery County, Ohio is a designated Cribs for Kids site. Families in need of a safe sleep option for their infants attend a one-hour class on safe sleep after which they receive a Cribette and a ‘Safe Sleep Survival Kit’. The ‘Safe Sleep Survival Kit’ includes a Halo Sleep Sack (wearable blanket) and a sheet for the Cribette.

Statement of Purpose

The purpose of this study was to evaluate the self-reported practice of Cribs for Kids class attendees on recommended safe sleep practices at the time of the class, and three months after they received a crib. The intent was to see if the education provided helped to improve their adherence to recommended safe sleep practices.

Literature Review

Sleep-related infant deaths account for about 3,500 deaths yearly of total infant mortality in the United States (CDC, 2018b). In Ohio, 117 sleep-related deaths accounted for total infant mortality in 2016 (ODH, n.d.). Common risk factors for sleep-related infant death include sleeping in a prone or side position, sleeping on a surface that is not a crib or bassinet, loose
bedding, co-sleeping, bed sharing, maternal smoking, and objects in the crib or bassinet (Moon & AAP, 2016). Risk factors of SIDS, racial disparities, caregiver behavior, and knowledge, and crib distribution programs are discussed below.

**Risk Factors**

Multiple studies found that prone sleeping position is associated with an increased risk of SIDS (Chu, Hackett, & Kaur, 2016; Hauck et al., 2002; Hauck et al., 2003). However, Hauck et al. (2002) did not find a statistically significant difference in SIDS for placing an infant on their side to sleep or prone sleeping prior to one-month-old. Other risk factors associated with SIDS include soft bedding, bed-sharing except with parents, maternal smoking, and pillow use (Hauck et al., 2003). The risk of SIDS with prone sleeping increased after adjusting for the use of soft bedding, bedsharing, pacifier use, and upper respiratory infections in the past two days (Hauck et al., 2002). However, pacifier use and breastfeeding resulted in a decrease in the risk of SIDS (Hauck et al., 2003). Hauck et al. (2003) also reported a protective factor for mother-infant bedsharing as mothers can check on their infants more frequently, and infants may not delve into a deep sleep as often while sleeping with their mothers (Hauck et al., 2003).

**Racial Disparities**

Studies have shown that African-American mothers are more likely to bedshare than other races (Lahr, Rosenberg, & Lapidus, 2007; Colson et al., 2013). In one of the studies, the authors found that both African Americans and Hispanics bedshared more frequently than Whites, yet Hispanics had a lower SIDS rate than Whites, and African Americans had a higher SIDS rate than both groups (Lahr et al., 2007). However, African Americans were more likely to smoke and place their infant in a prone sleeping position, which could explain the contradictory results (Lahr et al., 2007).
African Americans are also more likely to place their infant in a prone sleeping position than their racial counterparts (Hauck et al., 2002; Hauck et al., 2003). The risk attributed to SIDS from prone sleeping was higher in African Americans than other races (Hauck et al., 2002).

**Caregiver Behavior and Knowledge**

**Misconceptions.** Mothers believed an infant’s death was classified as SIDS when the cause of death remained unknown, so it was difficult to understand how a connection would exist for an unknown cause of death (Moon, Oden, Joyner, & Ajao, 2010). Consistent with the findings of Chu, Hackett, and Kaur (2015), several mothers also believed it was safer for their infant to sleep in the prone position because it prevents their infants from choking on any food spat back up (Moon et al., 2010). The mothers in the study also had the belief that SIDS was an unpreventable, random event, but they also believed suffocation as a cause of death could be prevented (Moon et al., 2010). Many mothers also believed being vigilant and watching their infant closely was more important than where the infant slept, the infant’s sleep position, or any other safe sleep practice recommendation; several mothers attributed a lack of vigilance to the racial disparity in SIDS (Moon et al., 2010). In another study by Mathews et al. (2016), African American mothers believed placing their infant in prone sleeping position, sharing a sleep surface with their infant, and use of soft bedding increased the risk of suffocation more than SIDS. They also had a higher self-efficacy in preventing suffocation that SIDS (Mathews et al., 2016).

Moon et al. (2017) followed up on a previous study with findings that revealed African-American mothers believed SIDS to be ‘fate’ or unpreventable but contrarily believed suffocation to be a preventable cause of death. The authors evaluated whether there would be a difference in the decision to bedshare among African-American mothers who receive safe sleep
messaging on SIDS generally and those who receive safe sleep messaging on suffocation (Moon et al., 2017). There was no significant difference between the two groups in terms of bedsharing (Moon et al., 2017). Mothers in both groups were less likely to bedshare if they believed outrightly that it would increase the risk of SIDS or suffocation, and if they believed that they could protect their infant from SIDS or suffocation up to three months of age (Moon et al., 2017). Mothers who room shared without bedsharing were more likely to place their infant in a supine sleeping position in a crib/playpen, without using soft bedding, as compared with mothers who bedshared to protect their infants from SIDS or suffocation (Moon et al., 2017). However, both mothers who bedshared and initially room shared were more likely to bedshare after three months to protect their infant from SIDS or suffocation (Moon et al., 2017).

African American and American Indian parents' decisions on where they placed their infant to sleep and in what position depended on their perception of their infant's comfort as well as their perception of safe sleep practices (Herman, Adkins, & Moon, 2015). The mothers' perceptions of safe sleep practices included believing their infants were safer if they bedshared because they were within reach, and/or being worried about the safety of cribs (Herman et al., 2015). Some mothers in the study also believed in a maternal instinct that would prevent a mother from rolling onto her child while bedsharing (Herman et al., 2015). Mothers who bedshared with their previous children without any negative consequences tended to believe it was okay to bedshare or deviate from safe sleep recommendations (Herman et al., 2015). Contrarily, mothers expressed unease about the risk of suffocation (Herman et al., 2015). However, several mothers still bedshared when they were tired, even while being aware of the risk of suffocation (Herman et al., 2015). Some worried about falling asleep while breastfeeding, which would lead to accidental suffocation (Herman et al., 2015). Some mothers reported their
decision to bedshare was a result of wanting to sleep and doing whatever was necessary to get their infant to sleep (Herman et al., 2015).

**Inconsistent recommendations.** Mothers in multiple studies expressed uncertainty about the safe sleep recommendations because the guidelines have changed over the past 30 years (Herman et al., 2015; Moon et al., 2010) and healthcare providers provide inconsistent views and practices (Herman et al., 2015; Moon et al., 2010; Krouse et al., 2012).

In the study by Hauck et al. (2002), mothers reported being told to place their infant in the side sleeping position, with the prone position being the second most recommended; African Americans in the study, however, reported being told to place their infant in the prone position more than other races.

**Failure to utilize crib or bassinet.** It has been noted in different studies that parents fail to utilize a crib or bassinet in spite of its availability (Chu et al., 2015; Chu et al., 2016; Krouse et al., 2012). Chu et al. (2016) found that factors such as crowded living conditions, room temperature concerns, and rodent/pest infestations hindered families from utilizing their crib or bassinet for their infant. Families with crowded living conditions often used the crib or bassinet for extra storage, and slept with their infant in an adult bed; families with temperature concerns placed their infant in an adult bed for warmth if they had no heat during the colder months, or in a room with air conditioning during the warmer months; families with rodent/pest infestations did not use their crib/bassinet due to fear of their infant being bitten (Chu et al., 2016).

Mothers also cited situational care (Chu et al., 2015; Krouse et al., 2012), preference (Chu et al., 2015; Krouse et al., 2012), and safety misconceptions as reasons why they bedshared. With situational care, adults removed infants who typically slept in their crib or bassinet, either to breastfeed or soothe them, but proceeded to fall asleep with the infant on an
unsafe sleep surface like a couch or adult bed (Chu et al., 2015; Krouse et al., 2012). Caregivers also engaged in unsafe sleep practices as a result of their infant seeming inconsolable after being placed in a crib or bassinet (Krouse et al., 2012), or co-slept because they wanted to bond with their infant (Chu et al., 2015). Caregivers had several dangerous misconceptions pertaining to safe sleep practices; some caregivers believed placing their infant in the prone position after eating would prevent the infant from choking on their vomit, while others barricaded their infants with pillows or wedges to prevent them from rolling off the bed or turning to a different position (Chu et al., 2015). Consistent with Herman, Adkins, and Moon (2015), caregivers also reported fatigue as a factor in unplanned bed-sharing (Krouse et al., 2012).

Mothers reported safe sleep education and family and friends as influential factors towards their decisions to follow safe sleep recommendations (Herman et al., 2015). Mothers generally did not believe their infants were at risk for SIDS, and personally knowing someone whose infant suffered a sleep-related death was not enough to make mothers follow safe sleep guidelines (Herman et al., 2015).

Crib Distribution Programs

Very few studies that evaluate crib distribution programs exist in the United States. Hauck et al. (2015) carried out a study evaluating Bedtime Basics for Babies (BBB), a crib-distribution program in Washington, D.C., Washington, and Indiana. Families completed a survey either before their baby was born (prenatally) or after their baby was born (postnatally), and an additional follow-up survey one to three months after the receipt of a crib (Hauck et al., 2015). At the follow-up, significantly more mothers (87%) reported they placed their infant in the back-sleeping position the night prior (Hauck et al., 2015).
More mothers in the postnatal group bedshared than those in the prenatal group who stated they planned on bedsharing and fewer mothers reported bedsharing from the postnatal survey to the follow-up survey (Hauck et al., 2015). Fewer postnatal mothers used a pacifier and breastfed than prenatal mothers who planned on using a pacifier and breastfeeding, and the rate did not change significantly from the postnatal group to the follow-up survey (Hauck et al., 2015). Fewer mothers in the postnatal group also reported placing their infant in a crib/bassinet to sleep compared to mothers in the prenatal group who planned on placing their infant in a crib/bassinet to sleep (Hauck et al., 2015). However, during the follow-up survey and after the receipt of a crib, significantly more mothers reported using placing their infant in a crib/bassinet to sleep (Hauck et al., 2015).

Participants of another crib distribution program in Fulton County, Georgia demonstrated significant changes in safe sleep practices between the pre- and post-tests (Salm Ward, McClellan, Miller, & Brown, 2018). Significantly more participants responded correctly to placing an infant on their back, alone in their crib, and without any items in the sleep environment (Salm Ward et al., 2018). No significant differences existed for room sharing or breastfeeding (Salm Ward et al., 2018). No significant differences existed between post-test and follow up surveys on safe sleep practice responses for placing an infant on their back, alone in their crib, room sharing, smoking, and no use of soft bedding, indicating participants retained their knowledge and practice over the ten-week period (Salm Ward et al., 2018).

**Methods**

**Study Sample**

The Cribs for Kids program at Dayton Children’s Hospital serves families that meet certain eligibility criteria. These criteria include: (1) a mother/caregiver in her third trimester of
pregnancy or with a child younger than four months old; (2) attendance of one-hour long class with education on safe sleep, proper use of Pack n’ Play, and use of other materials in the survival kit, and (3) Women, Infants, and Children (WIC) program eligibility. Eligible families received a Cribette Pack n’ Play portable crib and a ‘Safe Sleep Survival Kit’ (one crib sheet and one wearable blanket) after the class. Fifteen classes were held at the Dayton Children’s Hospital distribution site in 2017 and all participants attended the classes on a voluntary basis. The study was exempt from review by the Wright State University Institutional Review Board (see Appendix A).

**Data Collection**

One parent/caregiver from each family was given the Ohio Department of Health Safe Sleep Assessment Tool (see Appendix B) prior to the start of the class (pre-survey). This tool assessed demographic information (infant’s race and ethnicity, and zip code), availability of a safe sleep option for their infant, and several practices related to the care of their infant. Families were contacted via telephone by Dayton Children’s Hospital Family Resource Connection staff three months after they received a crib to complete the assessment tool again (follow-up survey). All data were de-identified prior to any statistical analyses.

**Statistical Procedures**

The study variables were summarized using frequency distributions for race, ethnicity, and safe sleep options available. McNemar’s test was conducted to analyze differences in responses on safe sleep practices during the pre-survey and follow-up survey. Sleep location for naps and at night, items in sleep environment, sharing sleep surface, sleep position, smoking, breastfeeding, pacifier use, and tummy time were the variables compared at the time of the class (pre-survey) and three months after the class (follow-up). Pacifier use and smoking
were categorized into ‘Yes’ or ‘No’. All responses classified as N/A were excluded from individual variable analyses. All analyses were carried out using the Statistical Package for the Social Sciences (SPSS) (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp., 2016). All tests were conducted at the $\alpha = 0.05$ level of significance.

**Results**

**Description of the Study Sample**

A total of 261 families completed the pre-survey and received a Cribette Pack n’ Play portable crib. Of the participants, 117 were excluded because they could not be contacted to complete the follow-up survey, and an additional 49 participants were excluded for having one or more missing/unknown responses resulting in a total of 94 participants. The infants of participating families were predominantly Black/African American (70.2%) and non-Spanish/Hispanic/Latino (93.8%) (Table 2). During the follow-up survey, there was a significant increase in families reporting having at least a crib (27.7% vs. 53.2%, $p < .001$) or Pack n’ Play (16% vs. 86.2%, $p < .001$) from the pre-survey. No family at the follow-up stated they did not have at least one safe sleep option for their infant.
Table 2

*Characteristics of Dayton Children’s Hospital Cribs for Kids Attendees in 2017*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pre-survey</th>
<th>Follow-up</th>
<th>( p )-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infant race, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>23 (24.5)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Black/African American</td>
<td>66 (70.2)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>7 (7.4)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Native American</td>
<td>0 (0)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>0 (0)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Infant ethnicity, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish/Hispanic/Latino</td>
<td>4 (6.3)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Not Spanish/Hispanic/Latino</td>
<td>60 (93.8)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Safe sleep options available, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crib</td>
<td>26 (27.7)</td>
<td>50 (53.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Bassinet</td>
<td>29 (30.9)</td>
<td>32 (34)</td>
<td>0.710</td>
</tr>
<tr>
<td>Pack n’ Play</td>
<td>15 (16)</td>
<td>81 (86.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>None</td>
<td>39 (41.5)</td>
<td>0 (0)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Note.* Infant race and ethnicity were obtained during the pre-survey only; reported results are for matched pre-survey and follow up surveys. Respondents could check multiple options in the racial and available safe sleep options categories.

*p-values for the difference between responses during the pre-survey and follow-up survey used the McNemar’s test.

**Changes in Practice**

No significant differences existed in the pre-survey and follow up survey for placing infants in crib or bassinet for naps (33% vs. 25.5%, \( p = .230 \); 39.4% vs. 27.7%, \( p = .054 \)) (Table 3). A significantly higher number of families reported placing their infant in a Pack n’ Play for naps (38.3% vs. 61.7%, \( p = .001 \)) and at night (28.7% vs. 51.1%, \( p = .002 \)) between pre-survey and follow up survey. The use of bassinet for infant’s sleep at night also significantly decreased between pre-survey and follow up survey (40.4% vs. 27.7%, \( p = .045 \)). No other sleep location had a significant change between pre-survey and follow-up survey, but the percentage of use of non-safe sleep options decreased for both naps and at night.
Table 3

Comparison of Safe Sleep Practices by Cribs for Kids Attendees in 2017

<table>
<thead>
<tr>
<th>Practices</th>
<th>Pre-survey N = 94</th>
<th>Follow-up N = 94</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sleep location (naps), n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crib</td>
<td>31 (33)</td>
<td>24 (25.5)</td>
<td>.230</td>
</tr>
<tr>
<td>Bassinet</td>
<td>37 (39.4)</td>
<td>26 (27.7)</td>
<td>.054</td>
</tr>
<tr>
<td>Pack n’ Play</td>
<td>36 (38.3)</td>
<td>58 (61.7)</td>
<td>.015</td>
</tr>
<tr>
<td>Couch</td>
<td>3 (3.2)</td>
<td>0 (0)</td>
<td>.250</td>
</tr>
<tr>
<td>Recliner</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Swing</td>
<td>8 (8.5)</td>
<td>4 (4.3)</td>
<td>.344</td>
</tr>
<tr>
<td>Car seat</td>
<td>2 (2.1)</td>
<td>0 (0)</td>
<td>.500</td>
</tr>
<tr>
<td>Bouncy seat</td>
<td>5 (5.3)</td>
<td>1 (1.1)</td>
<td>.125</td>
</tr>
<tr>
<td>Floor</td>
<td>2 (2.1)</td>
<td>1 (1.1)</td>
<td>1.000</td>
</tr>
<tr>
<td>With an adult, child, or pet</td>
<td>4 (4.3)</td>
<td>0 (0)</td>
<td>.125</td>
</tr>
<tr>
<td>Other</td>
<td>6 (6.4)</td>
<td>2 (2.1)</td>
<td>.219</td>
</tr>
<tr>
<td>Bed</td>
<td>2 (2.1)</td>
<td>1 (1.1)</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Sleep location (night), n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crib</td>
<td>38 (40.4)</td>
<td>33 (35.1)</td>
<td>.458</td>
</tr>
<tr>
<td>Bassinet</td>
<td>38 (40.4)</td>
<td>26 (27.7)</td>
<td>.045</td>
</tr>
<tr>
<td>Pack n’ Play</td>
<td>27 (28.7)</td>
<td>48 (51.1)</td>
<td>.002</td>
</tr>
<tr>
<td>Couch</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Recliner</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Swing</td>
<td>2 (2.1)</td>
<td>2 (2.1)</td>
<td>1.000</td>
</tr>
<tr>
<td>Car seat</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Bouncy seat</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Floor</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>With an adult, child, or pet</td>
<td>5 (5.3)</td>
<td>0 (0)</td>
<td>.063</td>
</tr>
<tr>
<td>Other</td>
<td>5 (5.3)</td>
<td>1 (1.1)</td>
<td>.125</td>
</tr>
<tr>
<td>Bed</td>
<td>3 (3.2)</td>
<td>0 (0)</td>
<td>.250</td>
</tr>
<tr>
<td><strong>No items in sleep environment, n (%)</strong></td>
<td>84 (89.4)</td>
<td>90 (95.7)</td>
<td>.688</td>
</tr>
<tr>
<td><strong>Share sleep surface with adult/sibling/pet, n (%)</strong></td>
<td>9 (9.6)</td>
<td>5 (5.3)</td>
<td>.109</td>
</tr>
<tr>
<td><strong>Share sleep surface in bed/couch/recliner/other, n (%)</strong></td>
<td>8 (8.5)</td>
<td>10 (10.6)</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Back position (naps), n (%)</strong></td>
<td>87 (92.6)</td>
<td>89 (94.7)</td>
<td>.727</td>
</tr>
<tr>
<td><strong>Back position (night), n (%)</strong></td>
<td>87 (92.6)</td>
<td>90 (95.7)</td>
<td>.508</td>
</tr>
<tr>
<td><strong>No smoking</strong></td>
<td>73 (77.7)</td>
<td>77 (81.9)</td>
<td>.344</td>
</tr>
<tr>
<td><strong>Change clothes after smoking outside, n (%)</strong></td>
<td>23 (24.5)</td>
<td>14 (14.9)</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Dressed for temperature of home, n (%)</strong></td>
<td>81 (86.2)</td>
<td>93 (98.9)</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Breastfeeding only and combination, n (%)</strong></td>
<td>53 (56.4)</td>
<td>29 (30.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Pacifier use, n (%)</strong></td>
<td>52 (55.3)</td>
<td>70 (74.5)</td>
<td>.375</td>
</tr>
<tr>
<td><strong>Tummy time, n (%)</strong></td>
<td>64 (68.1)</td>
<td>87 (92.6)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note. Respondents could check multiple options in the sleep location categories.

*p-values for the difference between responses during the pre-survey and follow-up survey used the McNemar’s test.
The percentage of responses increased for no items in the infant’s sleep environment, share sleep surface in bed/couch/recliner/other, the back position for naps and at night, no smoking, dressed for the temperature of the home, pacifier use, and tummy time, but they were not significant. There was also a non-significant decrease in the percentage of responses for share sleep surface with adult/sibling/pet, and change clothes after smoking outside. There was a significant decrease in breastfeeding only and a combination of breastfeeding and formula from the pre-survey to the follow-up survey (56.4% vs. 30.9%, p < .001).

Discussion

The purpose of this study was to analyze changes in self-reported safe sleep practices by families after receiving a Cribette and attending a safe sleep class. The results of this study showed significantly more families reported the availability of a crib and Pack n’ Play three months after attending the Cribs for Kids class than on the day of the class. Significantly more families also reported using a Pack n’ Play during the follow up than the pre-survey, indicating most families retained knowledge on recommended safe sleep location for infants. This finding is consistent with the study by Hauck et al. (2015), and inconsistent with a study by Salm Ward, McClellan, Miller, and Brown (2018) who reported a significant decrease in the use of a crib, bassinet, and cradle at the time of the follow-up survey.

A higher proportion of families also reported following safe sleep recommendations such as no items in the infant’s sleep environment, back position for naps and at night, dressing for the temperature of the home, pacifier use, and tummy time during the follow-up survey, but this difference was not significant. Although these results were not statistically significant, the proportion of families following safe sleep recommendations increased during the three-month follow up, indicating participants retained knowledge and did not change self-reported practices.
The lack of significance for these variables could be a result of the small sample size. A significant decrease was reported for breastfeeding and combination breastfeeding/formula during the follow-up survey. This is inconsistent with the study by Salm Ward et al. (2018) which indicated a significant increase in breastfeeding during the follow-up survey.

**Limitations**

A strength of this study is the utilization of matched pre-surveys and follow-up surveys. This study is limited by primarily including families that indicated a financial need, decreasing its generalizability to the general population and other income levels. It is also limited by the self-reporting nature of the study as respondents’ answers may be influenced by social desirability; families may feel inclined to report recommended practices as opposed to their actual practices. Additionally, the parent/caregiver who attended the class and completed the pre-survey may not be the same parent/caregiver contacted during the follow-up; results should be interpreted with caution. Potential confounding factors such as age, level of education, and cultural practices were not measured and could have an impact on the results. Furthermore, the impact of any safe sleep advertisements outside the Cribs for Kids program is not assessed, which could influence adherence to safe sleep practices.

**Recommendations for Public Health**

Crib distribution programs are an effective way of promoting and encouraging safe sleep practices as they combine both education and providing a safe sleep option for infants (Moon, Hauck, & Colson, 2016). Families in this study mostly demonstrated following safe sleep recommendations during their follow up survey, although some practices were not significant.

One of the exceptions to following safe sleep recommendations was a significant decrease in breastfeeding and combination breastfeeding/formula. Breastfeeding is one of the
safe sleep practice recommendations by Moon and AAP (2016), so more emphasis could be placed on breastfeeding during the Cribs for Kids class. Similarly, there was a non-significant increase in the percentage of participants who reported their infant shared a sleep surface in a bed/couch/recliner/other between the pre-survey and follow up (8.5% vs. 10.6%, \( p = 1.00 \)). Participants may benefit from further emphasizing the importance of placing their infant alone and in their crib.

It would also be advantageous to ask participants why they are not utilizing the provided safe sleep option or following recommended safe sleep practices. Developing a better understanding of barriers to following recommended safe sleep practices will aid in addressing barriers specific to each family.

**Conclusion**

The Cribs for Kids program was beneficial in providing a safe sleep option for families and significantly more families utilized their Pack n’ Play at the time of the follow up than the day of the class. However, a greater emphasis should be placed on the benefits of breastfeeding because there was a significant decrease in breastfeeding and breastfeeding/formula combination during the three-month follow up. It would also be beneficial to address the reported reasons why families are not following safe sleep recommendations during their follow-up survey.
References


https://www.phdmc.org/epidemiology/health-profiles/774-2016-montgomery-county-infant-mortality/file


Appendix A - Human Subjects Regulations Decision Chart

Chart 1: Is an Activity Research Involving Human Subjects Covered by 45 CFR part 46?

Start here: Is it research?

- Is the activity a **systematic** investigation **designed** to develop or contribute to **generalizable knowledge**? [45 CFR 46.102(d)]
  - NO: Activity is not research, so 45 CFR part 46 does not apply.
  - YES: Activity is research. Does the research involve human subjects?

- Does the research involve **obtaining information about living individuals**? [45 CFR 46.102(f)]
  - NO: The research is not research involving human subjects, and 45 CFR part 46 does not apply.
  - YES: Does the research involve **intervention or interaction** with the individuals? [45 CFR 46.102(k)(1), (2)]
    - NO: Is the information **individually identifiable** (i.e., the identity of the subject is or may readily be ascertained by the investigator or associated with the information)? [45 CFR 46.102(k)(2)]
      - NO: Is the information **private**? (About behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, or provided for specific purposes by an individual and which the individual can reasonably expect will not be made public.) [45 CFR 46.102(k)(3)]
        - NO: Go to Chart 2 AND Other Federal, State and local laws and/or regulations may apply to the activity. [45 CFR 46.101(h)]
        - YES: The research involving human subjects is covered by the regulations.
    - YES: Is it conducted or supported by HHS? [45 CFR 46.102(a)(1)]
      - NO: Does the institution hold an FWA under which it applies 45 CFR 48 to all of its human subjects research regardless of the source of support?
        - NO: The research involving human subjects is NOT covered by the regulations.
        - YES: The research involving human subjects is covered by the regulations.
      - YES: The research involving human subjects is covered by the regulations.
Chart 2: Is the Research Involving Human Subjects Eligible for Exemption Under 45 CFR 46.101(b)?

From Chart 1

Has HHS prohibited exemption of the human subjects research? (All research involving prisoners, some research involving children.) [Footnote 1 to 45 CFR 46.101(i), 45 CFR 46.101(b)]

NO

Will the only** involvement of human subjects be in one or more of the following categories?

Research conducted in established or commonly accepted educational settings, involving normal education practices?

If not exempt under (b)(1)

Research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior?

If not exempt under (b)(2) or (b)(3)

Research involving collection or study of existing data, documents, records, or pathological or diagnostic specimens?

If not exempt under (b)(4)

Research studying, evaluating, or examining public benefit or service programs?

If not exempt under (b)(5)

Research involving taste and food quality evaluation or consumer acceptance studies?

If not exempt under (b)(6)

YES

Exemption 45 CFR 46.101(b)(1) may apply.

Go to Chart 3

Exemption 45 CFR 46.101(b)(2) or (b)(3) may apply.

Go to Chart 4

Exemption 45 CFR 46.101(b)(4) may apply.

Go to Chart 5

Exemption 45 CFR 46.101(b)(5) may apply.

Go to Chart 6

Exemption 45 CFR 46.101(b)(6) may apply.

Go to Chart 7

No exemptions to 45 CFR part 48 apply. Provisions of 45 CFR subpart A apply, and subparts B, C and D also apply if subjects are from covered vulnerable populations.

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** "Only" means that no non-exempt activities are involved. Research that includes exempt and non-exempt activities is not exempt.
Chart 4: Does Exemption 45 CFR 46.101(b)(2) or (b)(3) (for Tests, Surveys, Interviews, Public Behavior Observation) Apply?

February 16, 2016

- Does the research involve only the use of educational tests, survey procedures, interview procedures, or observation of public behavior? **YES**
  - Does the research involve children to whom 45 CFR part 46, subpart D applies? **YES**
    - Is the information obtained recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects, and could any disclosure of the human subjects’ responses outside the research reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation? **YES**
      - Research is not eligible for exemption under 45 CFR 46.101(b)(2).
      - However, the 45 CFR 46.101(b)(3) exemption might apply.
    - **NO**
      - Are the human subjects elected or appointed public officials or candidates for public office? (Applies to senior officials, such as mayor or school superintendent, rather than a police officer or teacher.)
        - **YES**
          - Research is eligible for exemption under 45 CFR 46.101(b)(3) from 45 CFR part 46 requirements.
        - **NO**
          - Does any Federal statute require without exception that the confidentiality of personally identifiable information will be maintained throughout the research and thereafter? **YES**
            - Research is eligible for exemption under 45 CFR 46.101(b)(4) exemption applies.
          - **NO**
            - Return to Chart 2 and consider whether 45 CFR 46.101(b)(2) or (b)(3) exemption applies.

- **NO**
  - Only research involving only educational tests or observation of public behavior without participation by the investigator in the activities being observed is exempt under 45 CFR 46.101(b)(2).
  - Research is not eligible for exemption under 45 CFR 46.101(b)(2) or (b)(3).
Chart 5: Does Exemption 45 CFR 46.101(b)(4) (for Existing Data Documents and Specimens) Apply?

From Chart 2

- Does the research involve only** the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens? * ("Existing" means existing before the research is proposed to an institutional official or the IRB to determine whether the research is exempt.)

  - YES
    - Are these sources publicly available?
      - YES: Research is eligible for exemption under 45 CFR 46.101(b)(4) from 45 CFR part 46 requirements.
      - NO: Will information be recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects?
        - YES: Return to Chart 2 and consider whether 45 CFR 46.101(b)(5) exemption applies.
        - NO: Research is not eligible for exemption under 45 CFR 46.101(b)(4) from 45 CFR part 46 requirements.

** "Only" means that no non-exempt activities are involved. Research that includes exempt and non-exempt activities is not exempt.

* Note: See OHRP guidance on research use of stored data or tissues and on stem cells at http://www.hhs.gov/ohrp/regulations-and-policy/guidance/guidance-on-research-involving-stem-cells/index.html, and on coded data or specimens at http://www.hhs.gov/ohrp/regulations-and-policy/guidance/research-involving-coded-private-information/index.html for further information on those topics.
Chart 6: Does Exemption 45 CFR 46.101(b)(5) (for Public Benefit or Service Programs) Apply?

From Chart 2

Is the research or demonstration project conducted or approved by the Department or Agency Head?

YES

Does the research or demonstration project involve only** the study, evaluation, or examination of:

Public benefit or service programs;

YES

Research is eligible for exemption under 45 CFR 46.101(b)(5) from 45 CFR part 46 requirements.

NO

Procedures for obtaining benefits or services under public benefit or service programs;

YES

NO

Possible changes in or alternatives to programs or to procedures for obtaining benefits or services under public benefit or service programs;

YES

NO

Possible changes in methods or levels of payment for benefits or services under those public benefit or service programs?

YES

NO

Research is not eligible for exemption under 45 CFR 46.101(b)(5).

NO

Return to Chart 2 and consider whether 45 CFR 46.101(b)(6) exemption applies.

** "Only" means that no non-exempt activities are involved. Research that includes exempt and non-exempt activities is not exempt.


February 16, 2016
## Appendix B - Ohio Department of Health Safe Sleep Assessment Tool

### ODH Safe Sleep Assessment Tool

**Parent/Caregiver Name:**

<table>
<thead>
<tr>
<th>Infant's Race:</th>
<th>Infant's Ethnicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ White</td>
<td>□ Spanish, Hispanic or Latino</td>
</tr>
<tr>
<td>□ Black/African American</td>
<td>□ Not of Spanish, Hispanic or Latino</td>
</tr>
<tr>
<td>□ Other</td>
<td>□ Not specified</td>
</tr>
</tbody>
</table>

1. **What safe sleep options are in the home?**
   - □ Crib
   - □ Bassinet
   - □ Pack'n Play
   - □ None
   - □ Observed Parent/Caregiver reported
   - □ Education Provided

   **Sleep environment should be placed away from drapes or curtains, window blinds or shutters, electric cords, furnace vent or radiator, space heater or other heat sources, infant monitor, any other item that could burn, cut, or become wrapped around your infant.**

2. **Where does infant usually sleep/Where will infant sleep?**
   - □ Crib
   - □ Bassinet
   - □ Pack'n Play
   - □ Couch
   - □ Recliner
   - □ Swing
   - □ Car Seat
   - □ Bouncy Seat
   - □ Floor
   - □ With an adult, child or pet
   - □ Other
   - □ Observed Parent/Caregiver reported
   - □ Education Provided

3. **Are there stuffed animals, toys, pillows, quilts, blankets, wedges, positioners, other loose bedding or bumpers in the infant’s sleep environment?**
   - □ Yes
   - □ No
   - □ N/A
   - □ Observed Parent/Caregiver reported
   - □ Education Provided

4. **Does infant ever share a sleep surface with a sibling, adult or pet?**
   - □ Yes
   - □ No
   - □ N/A
   - □ Observed Parent/Caregiver reported
   - □ Education Provided

5. **Does your infant ever share a sleep surface in a bed, couch, recliner, or other?**
   - □ Yes
   - □ No
   - □ N/A
   - □ Observed Parent/Caregiver reported
   - □ Education Provided

6. **When infant sleeps, he/she is placed on:**
   - For Naps: □ Back
   - □ Side
   - □ Stomach
   - For Night: □ Back
   - □ Side
   - □ Stomach
   - □ Observed Parent/Caregiver reported
   - □ Education Provided
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Education Provided</th>
<th>Observed Parent/Caregiver reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Do you and/or other caregivers smoke?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>8. If you smoke outside, do you change your clothes before holding your infant?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>9. Is the infant dressed for the temperature of the home?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>10. Is the infant breastfeeding?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>11. Does your infant use a clean dry pacifier that is not attached to a string or a stuffed animal?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>12. Do you provide supervised tummy time while the infant is awake?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>13. Staff presented and reviewed ODH ABCs of Safe Sleep materials.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>14. How did you hear about this program?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>
ODH Safe Sleep Assessment Tool

15. Home visiting program participation status:
   - □ Currently enrolled
   - □ Home Visiting Referral made
   - □ Parent/Caregiver declined
   - □ Information Provided

Recipient Name (print):

Phone No. (___) __________ - __________ Email: __________________________

Home address:
   Street __________________________ City __________ State __________ Zip Code

I hereby acknowledge receipt of a portable crib from the Cribs for Kids program for this

pregnancy or child __________________________ on __________.

(Signature of Recipient) __________________________ (Date) __________________________

Staff Name (print): __________________________ Date: __________________________
Appendix C: List of Competencies Met in Integrative Learning Experience

CEPH Foundational Competencies

<table>
<thead>
<tr>
<th>Evidence-based Approaches to Public Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Select quantitative and qualitative data collection methods appropriate for a given public health context</td>
</tr>
<tr>
<td>3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate</td>
</tr>
<tr>
<td>4. Interpret results of data analysis for public health research, policy or practice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning &amp; Management to Promote Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Assess population needs, assets and capacities that affect communities’ health</td>
</tr>
<tr>
<td>11. Select methods to evaluate public health programs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Communicate audience-appropriate public health content, both in writing and through oral presentation</td>
</tr>
</tbody>
</table>

WSU MPH Population Health Concentration Competencies

<table>
<thead>
<tr>
<th>2. Demonstrate application of an advanced quantitative or qualitative research methodology.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Demonstrate the ability to contextualize and integrate knowledge of specific population health issues.</td>
</tr>
<tr>
<td>4. Address diversity when evaluating population health issues related to improving population health, reducing disparities, or increasing equity.</td>
</tr>
<tr>
<td>5. Analyze public health as part of larger inter-related systems of organizations that influences population health at the local, regional, national, and global levels.</td>
</tr>
</tbody>
</table>