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Acceptability to nurses of reducing NICU light and noise levels during skin-to-skin care: A pilot study

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ABSTRACT

Introduction: Light and noise levels may influence preterm infants and their mothers when they are experiencing skin-to-skin contact [SSC] in the Neonatal Intensive Care Unit [NICU].
Methods: A pilot randomized controlled trial [RCT] of an intervention aiming at reducing light and noise levels during SSC was conducted. Twenty-one neonatal nurses from a level III NICU completed questionnaires assessing their acceptability of NICU light and noise levels reduction during SSC, whether it interfered with their care delivery, in addition to acceptability of specific interventions reducing these levels.
Findings: The majority of nurses considered that the reduction of NICU light and noise levels during SSC was acceptable in general, did not interfere with their care delivery, and that the nine selected interventions were also acceptable.
Conclusion and research implications: Nurses found it acceptable to reduce NICU light and noise levels during SSC. These findings support the conduct of a full-scale RCT to evaluate the effect of such an intervention on preterm infants and mothers' well-being.

1. Introduction

The control of light and noise levels in the Neonatal Intensive Care Unit [NICU] environment is an essential developmental care [DC] intervention promoting preterm infants' development (Kenner & McGrath, 2010). Promoting skin-to-skin contacts [SSC] between preterm infants and their mothers in the NICU is also a DC intervention included among the ten research priorities to improve the global health of newborns by 2025 (Yoshida, Martines, Lawn, et al., 2016). Yet, it appears that the light and noise levels in the NICU may influence preterm infants' and their mothers' outcomes while experiencing SSC. For example, during SSC, intense light is reported to interfere with preterm infants' quiet sleep (Ludington-Hoe, Johnson, Morgan, et al., 2006), while mothers find that noise prevents them from engaging in SSC with their preterm infants in the NICU (Blomqvist, Frölund, Rubertsson, & Nyqvist, 2013). Nurses have a strategic position to control preterm infants' exposure to light and noise levels, as well as to encourage and support SSC in the NICU. This manuscript summarizes the secondary outcomes of a pilot randomized controlled trial [RCT] evaluating the acceptability to nurses of NICU light and noise levels reduction during SSC, whether it interfered with care delivery, and the acceptability of specific interventions to reduce noise and light.

Abbreviations: SSC, skin-to-skin contact; NICU, Neonatal Intensive Care Unit; RCT, randomized controlled trial

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2. Methods

2.1. Design

A pilot RCT was conducted where mother-infant dyads were randomly allocated to an experimental group (NICU light and noise levels reduction during SSC) or to a control group (only SSC with no light and noise levels reduction). Mothers in each study group did three SSC sessions/week for one week. Nurses were invited to complete a questionnaire about light and noise levels reduction during SSC if they were providing care to a dyad participating in the experimental group of the pilot RCT. This study was reviewed and approved by the institutional ethics review board of the study university hospital center.

2.2. Setting and sample

The study took place in a level III NICU of a mother and child university hospital center with rooms composed of two to six beds. Twenty one nurses working day shifts and with a permanent position agreed to participate in this pilot RCT. Nurses were approached by a research assistant [RA] when they delivered care in a room where a mother was in a SSC session with her preterm infant. The RA explained the purpose of the study, and if the nurses agreed to participate, they signed a consent form and completed the questionnaire in the NICU at a convenient time following the SSC session.

2.3. Procedure

For all dyads participating in the study, the NICU nurses placed the preterm infants in SSC with their mother for a 1-hr period. In the experimental group, after the infants were placed in SSC, the RA reduced the NICU light and noise levels in the room with nine interventions if appropriate and with no definite order. Three interventions were aimed at reducing the NICU light levels, namely turning off ceiling lights, closing window blinds and procedural lamps. Noise levels were reduced by four interventions, which consisted of reducing volume of alarms of monitors and equipment (i.e. incubators and infusion pump) to a lower level, reducing volume of the telephone ringer, closing the preterm infants' room door, and posting a sign on the door to limit the entry of professionals in the room during the SSC session. At the end of the SSC session, the nurses reinstalled infants in their incubators.

2.4. Nurses' questionnaires

All neonatal nurses who consented to participate completed a 13-items questionnaire with 5-point Likert scale after the end of each SSC session. Seven nurses completed a questionnaire for two different SSC sessions, so at the end, a total of 28 questionnaires were filled out by 21 nurses and those questionnaires were treated independently in the data analysis. Nurses rated the acceptability (i.e. totally acceptable to totally unacceptable) of 1) NICU light and noise levels reduction during SSC in general (1 question) and 2) nine specific interventions aiming at reducing NICU light or noise (9 questions). Two other questions evaluated how often the nurses (i.e. very often to never) found that the reduction of NICU light and noise levels during SSC interfered with their care delivery. Nurses were also asked to list challenges they generally encounter in controlling NICU light and noise levels. Nurses filled out the questionnaire for every SSC session they were present for on different days.

3. Findings

Nurses reported that in general the NICU light and noise levels reduction during the SSC was totally acceptable or acceptable (n = 25; 96.1%). For the three specific interventions aimed at reducing light levels, nurses responded that turning off ceiling lights (n = 28; 100%) and procedural lamps (n = 25; 92.9%) in addition to closing window blinds (n = 25; 92.6%) during SSC sessions were totally acceptable or acceptable. Only two nurses (n = 2; 7.1%) considered that it was unacceptable to turn off procedural lamps during the SSC sessions. For the four interventions reducing noise levels, the nurses rated that it was totally acceptable or acceptable to keep the door of the preterm infants' rooms closed (n = 27; 96.5%) and to reduce the telephone ringer (n = 26; 92.9%). In more than two thirds of the questionnaires, nurses found it totally acceptable or acceptable to reduce the alarm of the cardiorespiratory monitor (n = 23; 82.1%) and to limit the entry of professionals in the room during SSC (n = 24; 85.7%). In one session, a nurse found it was totally unacceptable to reduce the alarms of cardiorespiratory monitors during the SSC session (n = 1; 3.6%), in addition to another where a nurse rated that it was totally unacceptable to reduce the telephone's ringer (n = 1; 3.6%) as well as to limit the entry of professionals (n = 1; 3.6%). Nurses answered that reducing light and noise levels in the NICU during SSC rarely or never interfered with their care delivery in, respectively, 88.4% (n = 23/26) and 92.3% (n = 24/26) of the questionnaires.

Nurses commented that they were sensitive to the benefits that preterm infants and their mothers may experience during SSC in a quiet and dimmed environment. Some thought that reducing the level of light in the NICU did not allow them to properly evaluate the preterm infants' color during an event such as a bradycardia/apnea or during procedures such as inserting a nasogastric tube. Nurses identified that common sources of noise in the NICU were monitors' alarms and not responding to those quickly, while others specified that it is not always possible to respond quickly to alarms when they are providing care to other preterm infants. Other common sources of noise in the NICU were professionals and family members talking as well as professionals coming in and out of the infant's room. Although cited less frequently, infants' crying, mothers expressing their breastmilk and hand paper dispensers were also identified by nurses as contributing to the noise.

4. Discussion

4.1. Nurses' acceptability and challenges of NICU light and noise levels reduction during SSC

4.1.1. Light

The nurses' acceptability of closing ceiling lights was not surprising as this practice was already well-adopted in this NICU. A few nurses considered that closing procedural lamps was unacceptable, which may be because they could not see the infant's coloration when lighting is decreased in the NICU. While daylight is preferable to assess preterm infants' coloration (White, Smith, & Shepley, 2013), procedural lamps could be switched on in the NICU when needed, but should be closed immediately after their use as it should not be a part of the unit's ambient lighting (Lebel & Aita, 2011; White, Smith, & Shepley, 2013). Nurses commented that the control of lighting was easy in the NICU and was commonly not a challenge for them.

4.1.2. Noise

The majority of nurses found that all strategies related to NICU noise reduction were acceptable during SSC. Nurses also commented that noise is usually disturbing preterm infants, which may explain their acceptability of these interventions. Some nurses considered that reducing alarms of cardiorespiratory monitors and telephone was totally unacceptable. Reducing the telephone ringers and the equipment alarms (McMahon, Wintermark, & Lahav, 2012) in addition to addressing alarms quickly (Altimier, Kenner, & Damus, 2015) are recommended strategies to reduce noise levels in the NICU. The nurses did not explain why they considered these interventions as unacceptable; rather some commented that it was difficult to quickly address equipment alarms in a timely manner when providing care in the NICU. Accordingly, nurses could perhaps be supported in

organizing their care or trained about how to control at a distance the alarms of these equipment to decrease peak noises in the NICU. Nurses stated that reducing noise levels was a much more challenging task than reducing light in the NICU. Limiting the entry of professionals in the infants' room was the most frequent challenge they identified even though a sign was posted on the door. As cleaning staff was most frequently entering the room during the study and the noisiest according to the nurses, in a future RCT intervention study, a session should be organized including all NICU professionals and personnel to explain the importance of respecting the door sign and being quiet at all times in the unit.

4.1.3. Interference with care and practice implications

The majority of the nurses stated that the NICU light and noise levels reduction during the SSC sessions rarely or never interfered with their care. Nurses may have been predisposed to accept light and noise levels reduction during SSC and to perceive that it did not interfere with their care since the RA was the one reducing these levels for only a 1-hr duration. As nearly all of the nurses agreed that it was acceptable to reduce the light and noise levels during SSC and that it did not interfere with their care, they would probably be inclined and motivated to adopt these interventions in their NICU daily practice.

5. Conclusion and implications for nursing research

Findings of this pilot RCT suggest, in a single study, that reducing NICU light and noise levels during SSC sessions was acceptable to nurses. Therefore, findings encourage the conduct of a full-scale RCT to evaluate the effects of such an intervention on preterm infants' and mothers' health outcomes. Focus groups with nurses could also be conducted to explore barriers and facilitators in controlling light and noise levels in the NICU in general and during SSC sessions.

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