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An Interprofessional and International Collaboration to Establish the Content Validity of the Checklist of NICU Caregiver Behaviors

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Introduction

The World Health Organization estimates that 15 million babies are born pre-term every year¹. “Preterm infants have a high risk of cognitive, neuromotor, and neurosensory problems after discharge from the Neonatal Intensive Care Unit (NICU).”² The outcomes associated with pre-term birth are influenced by early adverse experiences during critical care in a stressful NICU environment.³

Developmental care (DC) encompasses a broad array of interventions for developing infants which focus on minimizing the stress of the NICU.⁴ There are a number of approaches associated with DC. The Universe of Developmental Care model describes five core measures of developmentally care⁵.

Core Measures of Developmentally Care⁵

- 1) protected sleep
- 2) pain & stress assessment & management
- 3) activities of daily living
- 4) family-centered care
- 5) healing environment

Despite availability of interventions and practice guidelines, staff/caregiver implementation of DC continues to be challenging, intermittent, and inconsistent between settings and even between individuals within the same setting.⁶ Every person who interacts with babies in the NICU (nursing, family, therapists, medical providers) should be familiar with the core concepts of developmental (and neuroprotective) care, placing the baby at the center of all interaction.⁷

PURPOSE: To revise and validate a fidelity checklist for recording the quality and utilization of developmental care among NICU caregivers⁸ during their routine care and for use in both high and low resourced countries.

AIM 1: Revise the existing Checklist based on a comprehensive review and synthesis of the developmental care literature

AIM 2: Establish content validity of the revised Checklist.

Methods

Research Team: 3 occupational therapists, a neonatal nurse practitioner, and a physician from the United States and India, along with 4 occupational therapy graduate assistants.

Aim 1: Review and synthesis of literature

We used a modified scoping review method⁹ to conduct a structured literature review of DC related literature from 2010 to 2020.

The following steps were performed:

1. Finalize the research question
2. Identify relevant studies
3. Select studies that meet the criteria
4. Organize the data by behavioral indicators of developmental care
5. Interpret the results for use in revising the existing fidelity checklist

Aim 2: Establish content validity

We used a modified Delphi methodology¹⁰ to assess the fidelity content validity of the checklist.

The following steps were followed:

1. Develop data collection survey
2. Select diverse panel of experts
3. Distribute survey to experts
4. Analyze/summarize data, revise Checklist, develop follow-up questions for experts, distribute survey to experts
5. Repeat Step 4 until a consensus is reached across experts
6. Summarize consensus and provide feedback to the panel

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Results

Aim 1: Review and synthesis of literature

- Searched CINHAL, PUBMED, Hand Search
- 497 records were screened with full-text review for eligibility completed on 97 articles.
- Literature search and review yielded 54 studies that inform the revision process (Figure 1).
- The studies ranged from high to low levels of evidence with the two largest groups being Level I (n=14) and Level IV (n=14) (Table 1)

Aim 2: Establish content validity

- Expert reviewers from US and India; represented diverse professions and had high level of experience (Table 2)
- Round 1: 72 expert comments reviewed; of the actionable recommendations (n=53), 46 were addressed with revisions made (n=33) and not made (n=13) (Figure 2).
- Round 2: 22 expert comments reviewed; of the actionable recommendations (n=18), 18 were addressed with revisions made (n=13) and not made (n=5) (Figure 2).
- Expert review resulted in the division of the checklist into a collection of checklists organized by core measure.
- Round 3 resulted in consensus among experts.

Figure 1:
Structured Literature Search Flow Diagram

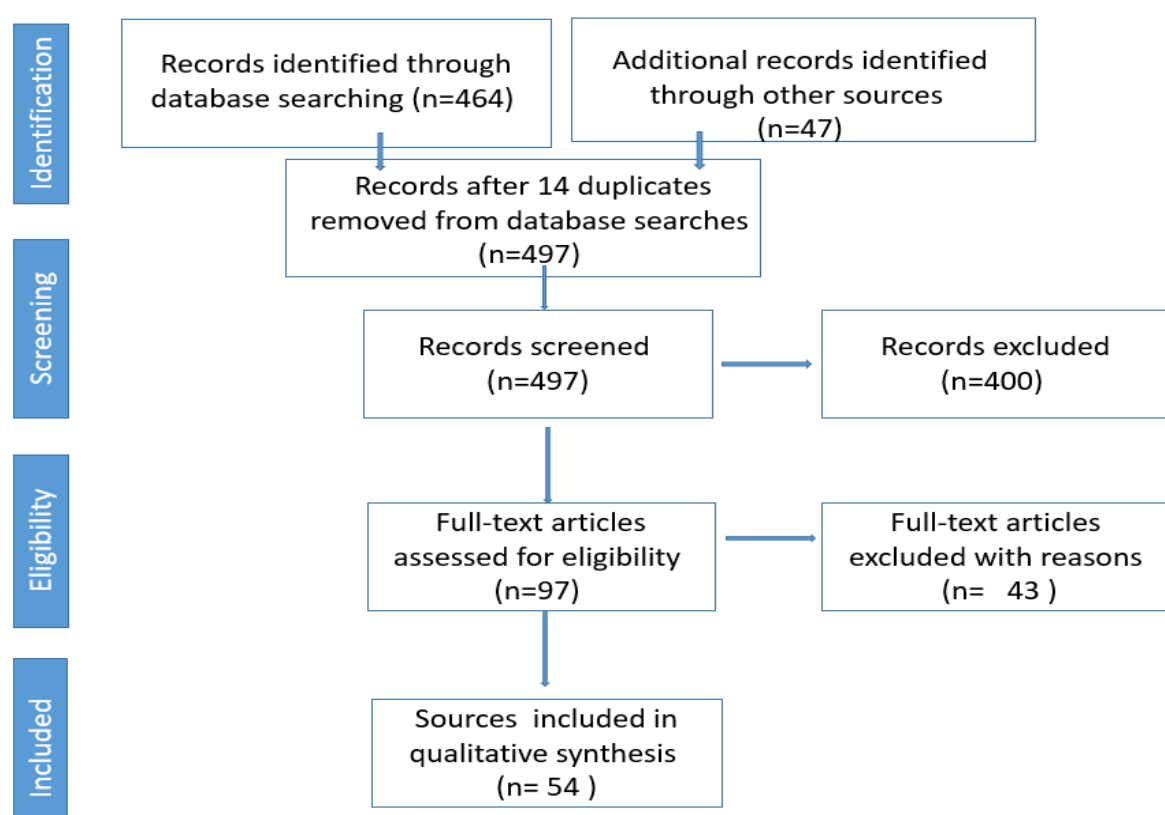


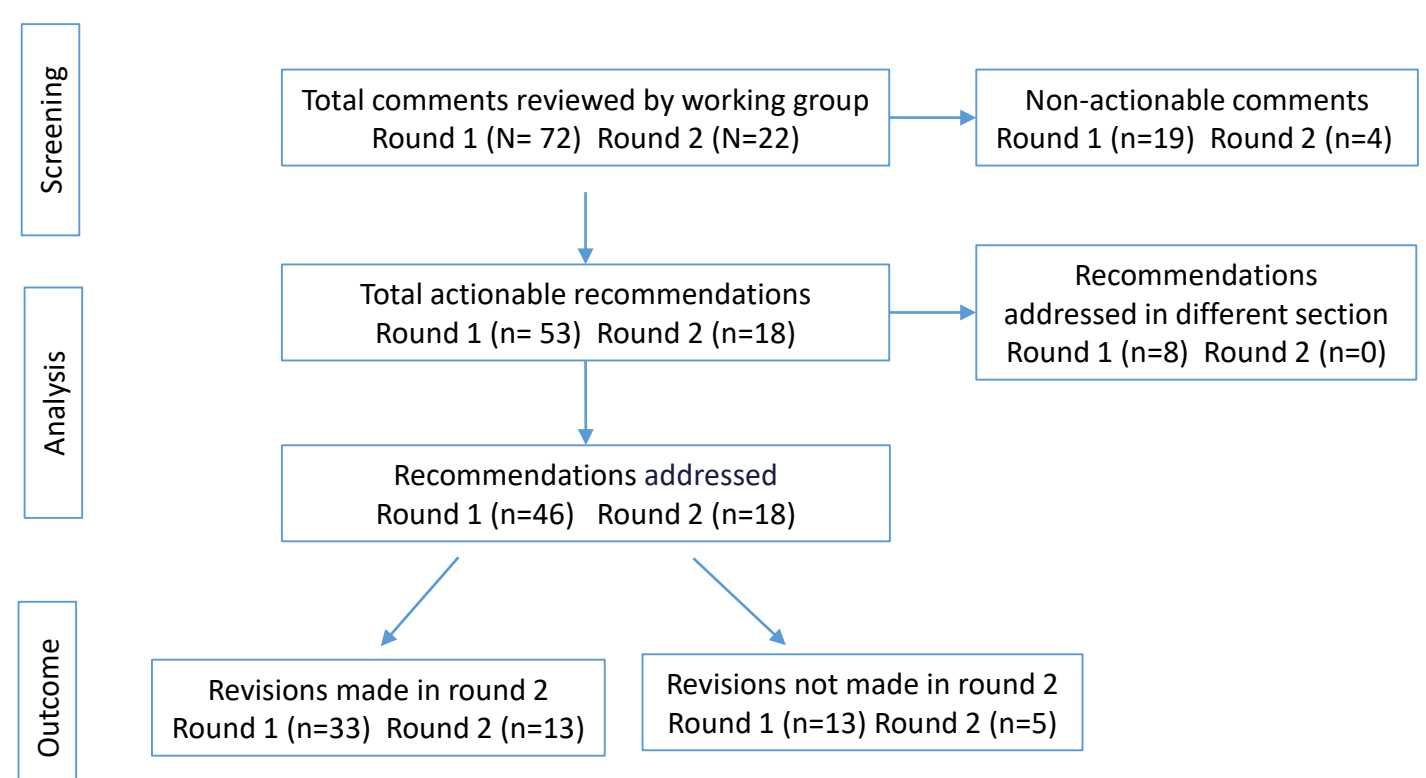
Table 1:
Level of Evidence for Included Studies

Level	Definition	Included Texts (n=54)
Level I	Experimental study, RCT, Systematic review of RCTs, with or without meta-analysis.	14
Level II	Quasi-experimental study, systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis	7
Level III	Non-experimental study, systematic review of a combination of RCTs, quasi-experimental and non-experimental studies only, with or without meta-analysis	11
Level IV	Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence. Include: Clinical practice guidelines & consensus panels	14

Table 2:
Demographic Characteristics of Expert Reviewers by Round

Profession	Number of respondents by round (R)		
	R1 (n=9)	R 2 (n=7)	R 3 (3)
Neonatologist	2		
Pediatrician		1	
Neonatologist, pediatrician, pediatric intensivist	1	1	
Nurse	1	1	
Clinical Nurse Specialist	1	1	1
Occupational Therapist	4	3	2
Experience in neonatal care (yrs.)			
3-10	2	1	1
11 or more	7	6	2
Experience with DSC in the NICU (yrs.)			
3-10	6	4	2
11 or more	3	3	1
Infants seen on the NICU annually			
Less than 10		1	
10 to 50	1		1
Greater than 50	8	6	2
Country			
India	4	3	1
US	5	4	2

Figure 2:
Round 1 & Round 2 -Expert Reviewer Comments Flow Diagram



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Conclusions

The Neonatal Intensive Care Unit Caregiver Behavior Checklists (NICU-CBC) is a validated collection of Checklists designed to record the application of DC practices by NICU personnel during routine care interaction to serve as one indicator of fidelity and to guide quality improvement. The NICU-CBC includes individual sets of Checklists representing five core measures of DC: (1) protective sleep; (2) activities of daily living; (3) pain and stress; (4) healing environment; and (5) family-centered care. The Activities of Daily Living and Healing Environment core measures include multiple subsets of checklists. More research is needed into feasibility of use across a variety of NICU settings.

Implications:

The NICU-CBC was validated by NICU professionals with expertise in DC practicing in the United States and India. The Checklists may be useful to NICU professionals wishing to champion use of DC in both high and low resourced settings as part of a quality improvement or education process.

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The *NICU-Caregiver Behavior Checklist* is available on the Thomas Jefferson University Institutional Repository.



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