Contextual factors associated with pain response of preterm infants receiving non-pharmacologic pain relief interventions for heel-stick procedures

Gila Sellam, MNS, RN1; Sandra Engberg, Prof., PhD, CRNP, FAAN1,2; Kris Denhaerynck1 PhD, RN; Eva Lucia Cignacco, PhD, RM3

1Institute of Nursing Science, University of Basel, Switzerland; 2Division of Neonatology, Children’s Hospital, University Hospital Bern, Switzerland; 3School of Nursing, University of Pittsburgh, Pennsylvania, USA

Background
• Enormous advances have been made in pain assessment of preterm infants over the past quarter century by developing valid tools for the evaluation of a pain status. However, the challenges remain, as assessors must rely on behavioral and physiologic non-verbal cues of pain in this population.
• While there is evidence indicating that medical and demographic contextual factors (cFs) impact pain responses in preterm neonates, less is known about their impact on the effectiveness of non-pharmacologic pain relieving interventions.

Objective of the study
To explore the effect of cFs on the impact of non-pharmacologic interventions on pain response of preterm infants during repeated routine heel-stick procedures.

Methods
• An observational study as part of a randomized controlled trial examining pain reactivity to non-pharmacologic interventions across repeated heel-sticks in preterms (Cignacco et al, 2012).
• Seventy-one premature infants, 24-32 weeks of gestation, were randomized to 3 groups: sucrose, facilitated tucking, or a control group.
• Both heel-sticks were performed at the “Bernese Pain Scale for Neonates” (BPSN) by 4 raters blinded to three phases (baseline, heel-stick, and recovery).
• Demographic and medical cFs were extracted from medical charts.
• Mixed single and multiple regression models were performed controlling for the intervention group, site, and heel-stick phase.

Table 1: Pain scores for all raters across all heel-sticks measured by the BPSN

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Contextual factor</th>
<th>β</th>
<th>SE</th>
<th>df</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-BPSN</td>
<td>Gender</td>
<td>0.97</td>
<td>0.49</td>
<td>62.36</td>
<td>1.931</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>Apgar (5 min)</td>
<td>-0.32</td>
<td>0.13</td>
<td>63.28</td>
<td>-2.45</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>Number of accumulated painful procedures</td>
<td>0.003</td>
<td>0.000</td>
<td>64.18</td>
<td>3.62</td>
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Table 2: Contextual factors influencing pain response multivariate mixed regression model

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Conclusions
• Higher exposure to painful procedures, male infants, and having CPAP or mechanical ventilation were cFs being associated with physiologic response. The only variables significantly associated with total and behavioral BPSN scores were Apgar scores, but these relationships were not consistent. Further research with large samples is needed to permit the examination of multiple cFs and their influence on both behavioral and physiological aspects of pain.

References

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Correspondence: gila.sellam@unibas.ch
Institute of Nursing Science