Reducing Leakage, Blowouts and Skin Contact with BM via Diaper Design Features

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DIAPER LEAKAGE

Diaper leakage and blowouts can cause delays and stress for nursing staff in hospitals and for parents at home. Based on a recent North American survey, more than half of moms reported BM leaks at least once a week, with up to nearly 20 percent experiencing leakage on a daily basis. Breastfed infant stool is notorious for being difficult to contain in diapers. Babies who are exclusively fed breast milk tend to produce stools with a liquid consistency, which can impact the ability of a diaper to absorb and immobilize BM effectively. One key factor impacting immobilization is the liquid consistency, which can impact the ability of a diaper to absorb and immobilize BM effectively.

LEARNING OBJECTIVE

To understand the impact of diaper design features on the absorption of BM, diaper leakage and risk to infants with different BM characteristics.

BACKGROUND

The ability of a diaper to absorb and immobilize BM effectively is critical for preventing diaper leakage and blowouts. This is especially important for breastfed infants who tend to produce BM with a liquid consistency, which can be difficult to contain. The design and structure of the diaper can play a significant role in how effectively BM is handled, with features such as the topsheet design impacting BM penetration and absorbency.

METHODS & RESULTS

AT HOME BM LEAKAGE DIARY STUDY

• The at-home diary study was a blinded, cross-over comparison study completed by 365 infants (aged 0 to 6 months, bottle-fed, breastfed and mixed diet) in 11 geographically dispersed markets throughout the U.S.
• Moms completed an online diary of daily diaper changes using disposable diapers (either the non-apertured or mesh-like apertured design) that were removed from their original packaging and reweighed in plain white packaging.
• Moms were instructed that products were used at each diaper change. Including the diaper leak at 1% daily study to relate infant stool or retained in the diaper during the study period. A scale was used to help mothers address the location of the BM at the diaper change, ranking whether it was on the skin, mostly in the diaper, or half on the skin, half in the diaper.
• The results were analyzed for the entire population and by diet type.
• Results: The online diary results showed that the mesh-like design offered significantly better protection than the non-apertured design, with leakages (Table VI) and skin contact (Table VIII) were significantly greater for the non-apertured diapers compared to mesh-like apertured diapers for infants with all diets. Among exclusively breastfed infants, the apertured design was also significantly better for BM leak prevention versus the non-apertured design.

BENCHTOP BREASTFEED BM ABSORPTION STUDY

Both studies demonstrated that diapers with a mesh-like topsheet design allowed for better containment and fewer leaks in babies 0 to 6 months of age regardless of their diet. Breastfed infant stool is notorious for being the most difficult to contain from leakage and blowouts, due to its liquid consistency. In this investigation, the mesh-like apertured topsheet diaper design was found to be superior for handling newborn infant stool and, in particular, for handling to contain newborn breastfed stools because it allowed for BM to pass through the topsheet and be immobilized in the diaper core, as opposed to being immobilized in the topsheet. We propose that more efficient containment and absorption of BM and the resultant reduction in BM leakage, blowouts and skin contact for parents by preventing diaper leakage.

CONCLUSIONS

• The benchtop study was conducted using two types of feed-BM sample (watery and mucousy) from breastfed infants.
• Using previously employed methods; BM samples were collected into sterile pediatric urine collection bags that were attached around the anus. Pediatric collection bags were also attached to the genital area of the baby to collect and keep urine separate and avoid contamination of the BM samples.
• A modified diaper was applied over the bag, which had a portion of the core removed and a clear plastic bag attached to the back to allow for the collection bags to extend while being filled. Trans topsheet capacity was measured by peeling BM samples into a cylinder apparatus and placing a weight within the cylinder. The weight may also have a handle (H) for easy insertion and removal.

Table 1. Real World BM Containment Consumer Diary Testing

<table>
<thead>
<tr>
<th>Type of Diaper</th>
<th>Number of Infants</th>
<th>Number of Diaper Changes</th>
<th>BM Leakage</th>
<th>BM Skin Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-apertured</td>
<td>86</td>
<td>675</td>
<td>5.6%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Mesh-like apertured</td>
<td>354</td>
<td>2342</td>
<td>1.5%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Table 2. Mesh-like Apertured Diapers Allow Significantly More Breastfed BM to Pass Through the Topsheet vs. Non-apertured Diapers

<table>
<thead>
<tr>
<th>BM Type</th>
<th>Product</th>
<th>Trans Topsheet Capacity (Percent of BM passed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-apertured</td>
<td>Mesh-like apertured</td>
<td>86%</td>
</tr>
<tr>
<td>Non-apertured</td>
<td>Mesh-like apertured</td>
<td>86%</td>
</tr>
</tbody>
</table>

RESULTS: While watery and mucousy breastfed BM leaked in size 1 diapers to represent both the non-apertured and mesh-like apertured diaper, the rate of BM leakage was at least 8% per product per condition, and results are statistically significant (p<.05).

Figure 1. The Anatomy of a Disposable Diaper

Figure 2. Topscan CT Images

Figure 3. Measuring Trans Topsheet Capacity

Figure 4. CT Images of BM Penetration

Figure 5. Measuring BM Penetration

References