



Hospital Infant Feeding Network

Coordinated Audit – Early Excessive Weight Loss

Executive Summary

This coordinated set of local audits from 13 UK NHS Trusts showed no increase in rates of markers of dehydration among breastfed babies overall during the Covid-19 pandemic. The rate of weight loss $\geq 12.5\%$ of birth weight is estimated at 8 babies per 1000 births (0.8% of births), the rate of weight loss $\geq 15\%$ at 2 babies per 1000 births (0.21% of births) and the rate of hypernatraemia (high sodium in the blood) $\geq 155\text{mmol/l}$ at 1 baby per 1000 births (0.1% of births).

Introduction

In 2020/2021 the Hospital Infant Feeding Network coordinated a set of local audits with two aims:

1. Benchmark the rate of various markers of early dehydration associated with low milk transfer during breastfeeding
2. Look for any differences in weight loss before and during the Covid-19 pandemic

Background

All newborns pass extra fluid out as urine in the days after birth and therefore show a reduction in body weight in the first few days of life. Babies who are unable to establish effective breastfeeding and become dehydrated through low milk intake will have more pronounced weight loss¹ which, when severe, can be associated with raised sodium level in the blood (hypernatraemia)². In the most severe cases this can lead to renal failure, thrombosis (clots), coagulopathy (clotting difficulties), seizures and death - case studies of babies with serious sequelae of feeding-related hypernatraemic dehydration have documented sodium levels between 174mmol/l and 206mmol/l ³. Case reports of severe consequences from failure to establish lactation have accumulated since the 1970s and routine weighing of babies as a screening tool to identify dehydration at an earlier, pre-morbid stage is common in the UK to try and prevent these serious cases.

NICE guidance on faltering growth⁴ (including data on more than 130,000 breastfed babies) found that average maximum weight loss in an exclusively breastfed baby was between 5.5% and 8.6% of birthweight, between day 2 and 3 of life. Five percent of breastfed babies lose 11% or more of their birthweight and the 97.5th percentile for maximal weight loss was between 9.4% and 13.8% in different studies⁴. Although around 12% weight loss or higher is generally felt to be concerning, no difference in two-year neurodevelopmental assessments between babies with weight loss of 12% or more was found in a US study compared to 'normal' babies⁵.

While increased lactation support is almost universally targeted to 8 or 10% weight loss or more, there is more variability in clinical practice in the UK in the threshold for medical assessment and blood tests looking for hypernatraemia. It may be possible to assess the success of different approaches by looking at the rate of severe weight loss and hypernatraemia seen in different trusts. However there is minimal evidence on the expected frequency of severe weight loss such as 15% to use as a benchmark.

The frequency of significant hypernatraemia is also poorly described. Mild hypernatraemia of $145\text{--}150\text{mmol/l}$ is found at all levels of weight loss and is felt to be normal in this time period^{2,3} – it is likely that levels $>155\text{mmol/l}$ or 160mmol/l are a significant marker of dehydration. The prevalence

of sodium ≥ 160 mmol/l has been estimated at 5.4 to 9 cases per 100,000 live births (95% confidence interval), with no severe complications or death seen in a national case finding study⁶.

The Hospital Infant Feeding Network therefore planned a coordinated set of local audits to look at the frequency of various thresholds of weight loss and significant hypernatraemia. This was initially postponed due to the Covid-19 pandemic but was then expanded to include both pre-pandemic and pandemic time periods, to look for any changes related to the changes in breastfeeding support and clinical pathways seen during the time of significant stress on the NHS.

Method

Each trust registered the audit with their local governance systems and had permission to share aggregated, anonymous data. Each trust was aware that they needed to identify babies who might present with excessive weight loss in any setting – for example to ED/paediatric assessment units, via an infant feeding clinic or to the postnatal ward. One trust submitted data for one hospital based area only, as this operates independently apart from transfer for higher level care, which would not affect the identification of babies in the audit. Trusts were given guidance on Maternity and Badgernet codes that might be useful to identify babies (listed in the appendix) and advised that multidisciplinary contacts be made to reduce the chance of missing babies who present outside established referral pathways.

Core data requested was:

- Number of babies with weight loss of 12.5% or more in the first 3 weeks of life who were assessed or treated in a hospital setting
- Number of babies with weight loss of 15% or more in the first 3 weeks of life
- Number of babies with plasma sodium of 155mmol/l or more in the first 3 weeks of life
- Number of births covered by the Trust
- Information on the pathways of assessment for weight loss and Unicef Baby Friendly Initiative accreditation status

Trusts were asked to exclude babies who were preterm <34 weeks, exclusively formula fed before day 3 of life or had a known significant congenital anomaly before day 3 of life. Trusts were asked to report this data for a six month pre-pandemic period (Sept 2019 to February 2020) and optionally also for a six month period during the pandemic (April 2020 to Sept 2020).

The joint research office at Oxford University Hospitals confirmed that the questionnaire did not require independent ethical approval. Statistical analysis involved Wilcoxon signed rank test, Fisher's exact test and chi square test.

Results: summary

13 UK NHS Trusts submitted data, covering more than 29,900 births in each six month period reported. The 13 trusts involved covered a broad area of England and Northern Ireland. Four were in

the greater London area and nine were from the South of England. No trusts from Scotland or Wales submitted data, as shown in Figure 1:



Figure 1: Location of NHS Trusts submitting local data

All trusts submitted data for the pre-pandemic period and 11 trusts also submitted data for the pandemic period. One trust did not submit data on plasma sodium levels, and one did not submit data on weight loss of 12.5% or more.

All trusts were on the BFI accreditation pathway, with half at stage 3 (Figure 2) and only 30% at stage 2 or below. The trusts reported between 2000 and 10000 births per year - the average was 5000 births annually.

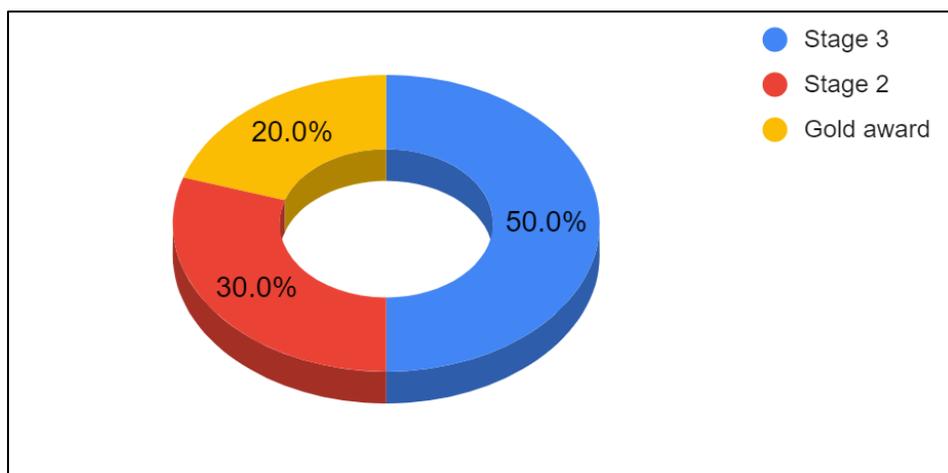


Figure 2: Unicef Baby Friendly Accreditation status of submitting trusts

One trust does not routinely weigh babies to screen for excessive weight loss and very low numbers of babies with excessive weight loss were reported from this trust. This data was therefore excluded from the summary statistics due to the higher chance of unidentified excessive weight loss and hypernatraemia.

There was no statistical difference in the rate of excessive weight loss or hypernatraemia in the pandemic period compared to the pre-pandemic period:

	≥12.5% weight loss		≥15% weight loss		Na ≥155mmol/l	
	Pre-pandemic	Pandemic	Pre-pandemic	Pandemic	Pre-pandemic	Pandemic
Mean ± SD (rate as % of births)	0.85 ± 0.50	0.74 ± 0.46	0.17 ± 0.10	0.25 ± 0.14	0.08 ± 0.08	0.12 ± 0.11
Range (rate as % of births)	0.28 - 1.82	0.13 - 1.69	0.00 - 0.40	0.11 - 0.53	0.00 - 0.26	0.00 - 0.29
No. babies in six months (total, range per trust)	175 (6 - 41)	158 (2 - 28)	52 (0 - 10)	60 (2 - 18)	20 (0 - 6)	30 (0 - 10)

Figure 3: Rates of excessive weight loss and significant hypernatraemia. SD = standard deviation

Because no differences were seen between the two periods, the data can be combined for a more precise estimate of overall rates. The combined data shows that ≥12.5% weight loss was seen in 8 babies per 1000 births (0.8% of births), which places this threshold at approximately the 99th centile. ≥15% weight loss was seen in 2.1 babies per 1000 births (0.21%), placing this threshold at approximately the 99.8th centile. Hypernatraemia ≥155mmol/l was seen in 1 baby per 1000 births (0.1%).

Results: relationships between trust characteristics and excessive weight loss outcomes

No relationship was found between markers of dehydration and Baby Friendly Initiative status of the Trust. A planned analysis of results according to weight loss threshold used to trigger medical assessment was not carried out as only one unit contributed full data with a 10% trigger and one unit with a 15% trigger so there would be a high risk of bias.

Results: variability in clinical management

Most trusts submitting data used 12.5% as a threshold for medical assessment of a baby with weight loss – others used 10% or 15% (figure 4):

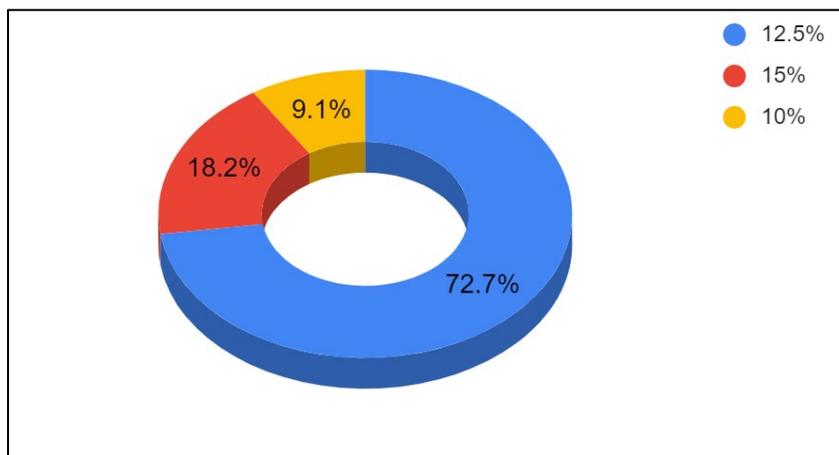


Figure 4: Weight loss threshold triggering medical assessment

As noted, one trust does not routinely weigh healthy, term babies but targets weighing at those with suspicion of feeding concern. Half the trusts routinely weigh healthy, term babies on day 5 (a third of these specified that they would weigh earlier if concerned about feeding), the remainder do so on day 3 or a mixture of day 3 and 5 because of multiple community midwifery teams involved. Only two of the twelve trusts reported a change during the pandemic, which was moving from day 3 to day 5 weights.

When babies need medical assessment in working hours, three trusts do this on the postnatal ward/transitional care unit, three on a paediatric unit and four in the emergency department (with the latter divided between subsequent admissions to postnatal or paediatric wards). One unit would assess either on transitional care or a paediatric unit depending on the baby's age with a cut-off of 10 days of age. Out of hours pathways were predominantly the same. One trust reported a change during the pandemic, which was that if a family was self-isolating they would be seen in paediatrics rather than transitional care. Two trusts reported that they were more likely to try and manage cases by phone.

All units reported that professionals with specialist training in breastfeeding support were available to come to the ward for assessment and advice, although sometimes this was a backup and the family attending a feeding clinic was preferred. Three trusts had this service 7 days a week and the remaining nine did not – one unit reported that it usually took several days to access specialist support. Some units considered nursery nurses to have this specialist training whereas most interpreted it as infant feeding team/specialist midwives. Three trusts reported a reduction in availability during the pandemic due to staff shielding and redeployment. Five trusts also reported a large reduction in community breastfeeding support available with support moving to virtual settings or being suspended.

Conclusion

This coordinated audit has allowed an estimation of the average rate of excessive weight loss in UK NHS trusts for the first time – 8 babies per 1000 births with $\geq 12.5\%$ weight loss (99th centile), 2.1 babies per 1000 births with $\geq 15\%$ weight loss (99.8th centile) and 1 baby per 1000 with hypernatraemia $\geq 155\text{mmol/l}$ (99.9th centile). Contributing units were mostly in Southern England and stage 3 or Gold accredited with the Unicef Baby Friendly Initiative so this may not be representative of weight loss in all trusts. These estimates are also limited by the trusts' ability to identify all babies with these characteristics, although it is unlikely that babies with significant sequelae of excessive weight loss would be missed.

Despite these potential biases, the reported rate of weight loss of 12.5% or more is consistent with that found in the evidence review for the NICE guidance on early weight loss¹, which reported that the 97.5th percentile was between 9.4% and 13.8%. The rate of significant hypernatraemia found here was much higher than a national case finding study using surveillance reporting – but this study used a higher threshold of 160 mmol/l and may have missed asymptomatic cases managed on postnatal wards⁶.

Although the number of units submitting data was a small percentage of UK trusts, no significant changes in rates of early dehydration were seen during the Covid-19 pandemic, despite an acknowledged reduction in both hospital based and community breastfeeding support available. This is in contrast to reports of specific episodes of severe dehydration because of changes in support due to the pandemic seen in some units and therefore may represent that although some babies presented with severe dehydration due to reduced support, there were also other babies with increased hydration. This could be due to increased use of formula (because of reduced breastfeeding support), or to improved breastfeeding efficacy because of reduced competing demands on the postnatal ward and at home. For example, other work has shown that a significant minority of mothers felt that breastfeeding was protected due to lockdown, whereas other struggled to get support and stopped breastfeeding before they were ready⁷.

This study showed no impact of BFI status on markers of dehydration, but as events are rare this was an underpowered analysis.

This data will be useful for individual trust benchmarking – contributing trusts have received individual reports showing their performance against the full range of units.

References

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Appendix 1: Example Codes provided to help trusts identify babies for their audit

Badgernet (neonatal unit admissions):

'hyponatraemia'

'hyponatraemic dehydration'

'dehydration'

'dehydration of newborn'

'feeding problem newborn: lactation problem'

'feeding problem newborn: tongue tie'

'feeding problems (breast fed)'

'poor feeding - newborn'

'slow feeding'

'underfeeding of newborn'

'poor weight gain (postnatal)'

'weight loss'

'weight loss - 12 percent or more'

'suppressed lactation (insufficient milk supply)'

Maternity codes

'abnormal weight loss'

'hyperosmolality and hyponatraemia'

'feeding problem of newborn, unspecified'

'other feeding problems of newborn'

'neonatal jaundice, unspecified'

'neonatal jaundice from other specified causes'