

Infant behaviour, breast milk composition at 6 weeks and breastfeeding outcomes at 6 months of age: A four country study

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Introduction

Few studies have investigated how different cultural practices may influence infant behaviour and subsequent breast-feeding practices.

We collected detailed infant behaviour data when infants were 6 weeks old from 4 countries, two where traditional confinement practices were followed; and explored associations between infant behaviour and i) breast milk composition at 6 weeks and ii) infant feeding at 6 months.



Methods

Exclusively breastfeeding (EBF) mothers of healthy term infants were recruited for two infant feeding studies: Study 1 in UK (n=50), Russia (n=46) and China (n=45) and Study 2 in Malaysia (n=33). Background data regarding delivery and maternal factors was collected.

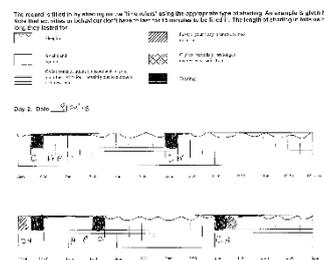
At 6 weeks post-partum, mothers completed a validated infant behaviour diary, translated into Russian, Malay and Chinese as required (Figure 1). 24 hours of infant behaviour was recorded over 3 days, in 5 minute Epochs, classified into four categories: **Sleeping, Feeding, Awake and Content or Crying** (including fussing and colic).

Fore- and hind- breast milk samples were collected from UK and Malaysian mothers at 6 weeks post-partum. Fat, carbohydrate and energy content of each sample was assessed using a MIRIS infra-red analyser.

At 6 months post-partum, mothers in Study 1 (UK, Russia and China) completed a questionnaire regarding how they were feeding their infant. Data were categorised as:

i) EBF; ii) mainly breast-feeding with/without complementary feeding (BF+/-CF); iii) mainly formula feeding with/without complementary feeding (FF+/-CF).

Figure 1: Behaviour diary



Results

174 mothers from the four centres completed the 3-day behaviour diary (Figure 2).

Baseline data:

- Maternal age was positively correlated with crying time ($r=0.25$, $p=0.001$)
- Maternal age correlated negatively with time spent awake and content $r=-0.23$, $p=0.003$
- First born infants spent significantly more time awake and content than non-first born infants (298(126) vs 253(93) mins/24hrs, $p=0.02$)
- First born infants spent less time asleep than non-first born infants (843(137) vs 898(119) mins/24hrs, $p=0.02$)
- Birthweight did not correlate with infant behaviours at 6 weeks

Country comparisons (Figure 3):

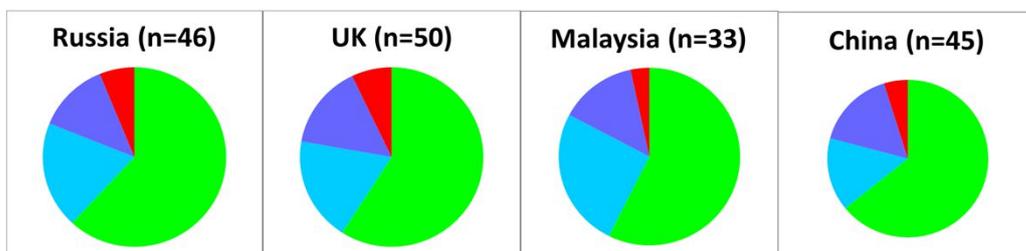
After adjusting for maternal age, birthweight and parity, we found:

- Chinese infants spent the longest time sleeping (923(23) mins/24hrs), significantly longer than Malaysian (826(26)mins/24hrs, $p=0.002$) and UK (851(19)min/24hr, $p<0.001$) infants.
- Russian infants spent significantly less time feeding (183(11)mins/24hrs) than Chinese (231(13)mins/24hr, $p<0.01$) and UK (218(11), $p<0.05$) infants.
- Malaysian infants spent significantly longer periods awake and content (366(23)mins/24hrs) than infants from: Russia (277(17) mins/24hrs, $p=0.03$), China (216(20)mins/24hrs, $p<0.001$) and UK (270(16)mins/24hrs, $p=0.001$).
- Malaysian infants cried less (48(15)mins/24hr) than Russian (89(11)mins/24hrs, $p=0.04$) and UK (102(11)mins/24hrs, $p<0.01$) infants.

Figure 2: Distribution of mothers participating in Infant Behaviour Study



Figure 3: Proportion of time spent in each behaviour by country



Proportion of time spent:
Sleeping (Green)
Feeding (Blue)
Awake + content (Yellow)
Crying (Red)

Infant behaviour and breast milk composition at 6 weeks (UK + Malaysia only)

Hind milk fat and energy from UK mothers was significantly higher than Malaysian mothers (fat: 6.5(0.4) v 4.9(0.4)g/l, $p=0.01$; kcal 94.0(3.9) v 78.0(3.9)kcal/l, $p=0.01$). After adjusting for milk fat (or energy), time spent crying was no longer significantly different between UK and Malaysian infants.

Infant behaviour at 6 weeks and infant feeding at 6 months (UK, Russia, China)

We found no relationships between infant behaviour at 6 weeks and how infants were fed at 6 months.

Conclusions

Significant differences in infant behaviour were seen at 6 weeks between the four countries studied; notably infants from countries where traditional confinement is often practised (Malaysia and China) were reported to spend longer periods either 'awake and content' or 'asleep', suggesting that parenting practices may influence infant behaviour. We found no consistent associations between infant behaviour or milk composition at 6 weeks and infant feeding at 6 months, but this requires further investigation in a larger sample.

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