SHORT REPORT

Excessive infant crying: definitions determine risk groups

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We assessed risk groups for excessive infant crying using 10 published definitions, in 3179 children aged 1–6 months (response: 96.5%). Risk groups regarding parental employment, living area, lifestyle, and obstetric history varied by definition. This may explain the existence of conflicting evidence on the occurrence and cause of excessive crying.

Excessive crying of young infants is a common and often serious problem for parents.¹ As such, it may affect parental feelings negatively and may cause the infant to be regarded as vulnerable or difficult.¹ Despite its potentially substantial negative health consequences, no consensus has been reached on the definition of excessive crying, often called “infantile colic”.^{1,2} We have previously shown that different definitions of excessive crying include very dissimilar groups of infants.² We subsequently hypothesised that this may explain some of the conflicting results regarding the occurrence of and risk groups for excessive crying. The aim of this study was to examine the impact of the use of different definitions of excessive infant crying on the identification of risk groups.

METHODS

Child health doctors and nurses interviewed the parents of a national community based sample of 3345 infants, stratified by age (1, 3, and 6 months), on infant crying and background characteristics, in 1997 and 1998 (response: 96.5%). Data on infant crying concerned both parent reported duration of

infant crying and the parents' experience of it. Details have been reported elsewhere.^{2,3} We assessed the association of four risk indicators with 10 previously published definitions of excessive crying (see table 1).^{4–11}

Risk indicators were selected to represent various potential risk groups: indicators of socioeconomic position (employment), living circumstances (urbanisation), obstetric history (hospitalisation after birth), and parental lifestyle (maternal smoking). Employment concerned the summed number of hours worked per week by both parents, in the period just before pregnancy leave. Urbanisation concerned the number of living addresses in a square kilometre around the living address of the family. Maternal smoking applied to the moment of the interview (that is, the period after pregnancy). Analyses were limited to the 3179 infants on whom complete data were available.

We repeated all analyses with restriction to infants aged 1 and 3 months because persistent excessive crying beyond 4 months of age may constitute a different clinical entity.^{1,12}

RESULTS

Prevalence rates varied by definition, as has been shown previously.² Risk groups varied similarly (see table 1). For instance, risks for crying a lot (definition J) were associated with employment and urbanisation, whereas risks for crying over three hours/day on more than three days of the preceding week (definition D) were associated with infantile hospitalisation and maternal smoking. Relative risks varied most for unemployment and least for maternal smoking. Thirteen of the 40 computed odds ratios (ORs) reached formal statistical significance, especially regarding maternal smoking (6 out of 10).

Table 1 Prevalence rates of excessive crying, odds ratios (OR), and 95% confidence intervals (CI) regarding employment status, urbanisation, infantile hospitalisation after delivery, and maternal smoking, after adjustment for infant age

Definition and source publication	Rate (%)	Parents unemployed or working <16 h/wk (n=98; 3.1%)		Moderately highly urbanised (>1000 addresses/km ²) (n=1463; 46.0%)		Hospitalisation of infant after delivery (n=463; 14.6%)		Mother smokes cigarettes (n=693; 21.8%)	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
A: Crying >3 h/day on >3 day/wk, >3 wk ⁴	1.5	2.99	1.04 to 8.57	1.51	0.83 to 2.73	0.61	0.22 to 1.71	1.35	0.69 to 2.64
B: Crying >3 h/day on >3 day/wk, ≥3 wk ⁵	2.1	2.60	1.01 to 6.70	1.20	0.73 to 1.98	0.96	0.45 to 2.05	1.80	1.05 to 3.09
C: Crying >3 h/day on >3 day/wk, ≥2 wk ⁶	3.1	1.72	0.67 to 4.39	0.98	0.65 to 1.50	1.24	0.69 to 2.23	1.95	1.24 to 3.05
D: Crying >3 h/day on >3 day/wk, 1 wk ⁴	4.7	1.32	0.56 to 3.11	0.81	0.57 to 1.14	1.56*	1.00 to 2.43	1.68	1.15 to 2.45
E: Crying >3 h/day on ≥3 day/wk, 1 wk ⁷	6.4	1.07	0.48 to 2.38	0.93	0.69 to 1.24	1.27	0.85 to 1.91	1.46	1.04 to 2.03
F: Average crying ≥4 h/day, 1 wk ⁸	3.9	1.04	0.37 to 2.90	1.01	0.70 to 1.46	0.95	0.55 to 1.66	1.53*	1.01 to 2.31
G: Average crying ≥3 h/day, 1 wk ⁸	6.2	1.39	0.66 to 2.95	1.05	0.78 to 1.42	1.56	1.05 to 2.31	1.32	0.93 to 1.87
H: Inconsolable crying ⁹	6.6	1.64†	0.84 to 3.22	0.89	0.67 to 1.18	1.13	0.76 to 1.68	1.52	1.11 to 2.09
I: Problematic crying ¹⁰	8.4	1.69	0.92 to 3.11	1.32*	1.02 to 1.71	1.16	0.81 to 1.67	1.21	0.90 to 1.64
J: Cries a lot ¹¹	11.9	2.09*	1.26 to 3.45	1.38	1.11 to 1.72	1.31	0.97 to 1.76	1.14	0.87 to 1.48
Lowest risk estimate		1.04		0.81		0.61		1.14	
Highest risk estimate		2.99		1.51		1.56		1.95	
Ratio of highest v lowest estimate		2.9		1.9		2.6		1.7	

Statistically significant ORs are indicated by bold.

*OR is no more statistically significant if the analyses are restricted to infants aged 1 and 3 months.

†OR becomes statistically significant if the analyses are restricted to infants aged 1 and 3 months.

Restriction to infants aged 1 and 3 months yielded very similar results: mean ORs were 1.3% higher (not shown), and 10 of the 40 ORs remained statistically significant with these smaller numbers (see table 1).

CONCLUSION AND DISCUSSION

Our study shows that the identification of risk groups for excessive infant crying depends on the definition that is used, even if these definitions are closely related.

The variations in risks that we found were relatively largest for unemployment. As this is the least prevalent risk factor, its large variation can easily be explained by chance. However, this explanation is unlikely for the other risk indicators. Secondly, our results may be criticised because of multiple comparisons. Only because of chance variation, 5% of the odds ratios that we computed (2 of 40), would reach statistical significance ($p < 0.05$). However, we found a much higher number of statistically significant differences, implying that multiple comparisons offer no (satisfactory) explanation.

Though all definitions have been operationalised on the basis of parental report, they vary regarding their degree of subjectivity. For instance, asking for the mean daily duration of infant crying in the preceding week will probably yield more objective data than asking whether a parent thinks that an infant cries a lot. Despite this variation, the number of statistically significant associations with risk indicators is remarkably similar across definitions: either 1 or 2. This also shows that lower prevalence rates do not result in more statistically significant associations. Neither do they always yield higher ORs: correlation coefficients between ORs and prevalence rates are negative for employment and smoking (-0.29 and -0.69 , respectively), implying a mostly higher OR if the prevalence is lower, but they are positive for urbanisation (0.11) and hospitalisation (0.49).

The use of different definitions may explain the conflicting results of previous studies regarding the occurrence of excessive crying and risk groups, for instance regarding socioeconomic class and regarding type of feeding (breast or formula).¹³ The fact that different definitions mostly include different infants,² thus really affects findings on risk groups,¹³ and potentially also on treatment effectiveness.¹⁴

Regarding our results, it is interesting that only maternal smoking is a risk factor for excessive crying on the basis of the majority of the definitions. Of the four risk indicators studied, this is the most likely immediate risk factor.³ If maternal smoking indeed causes excessive crying, it may explain between 2.1% (definition J) and 17.2% (definition C) of its occurrence, depending on the definition. Further study is needed on whether the use of varying definitions similarly affects results regarding other potentially aetiological factors for excessive infant crying and why the different definitions

recruit different risk groups. For the time being, clinicians should realise that risk groups for excessive infant crying depend on the way in which this crying is defined, and that maternal smoking is associated with most definitions.

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