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SHORT COMMUNICATIONS

Social inequalities in maternal opinion of child development in southern Brazil

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Abstract

Aims and methods: Concurrent validity of maternal opinion of child development was estimated in a cross-sectional, population-based survey of 6–59-mo children ($n = 3025$), using a standard measure devised from the Denver Developmental Screening Test. *Results:* Sensitivity, specificity and negative predictive value increased with maternal education and family income. Positive predictive value was higher in low-income families and children with impairments, low birthweight and long hospital stays.

Conclusion: Children at social and clinical risk should be assessed more carefully, even if maternal report is normal or advanced.

Key Words: *Child development, developmental assessment, social inequalities*

Parental opinion is considered a valuable tool for developmental assessment. The probability of a mother correctly reporting the child's development (predictive value) depends on the prevalence of developmental delay and on her ability to identify delay (sensitivity), or normal or advanced development (specificity). In developed countries, sensitivity ranges from 70% to 95% [1–5] and specificity from 68% to 100% [2,4,6]. Socio-economic conditions may affect maternal assessment, but various studies have not found this association [1–5,7]. A limitation of most studies [1–3,5] for addressing social inequalities in maternal opinion is that they are mostly restricted to well-educated mothers of clients attending services for developmental disabilities.

This population-based study is unique in investigating differences between mothers in the validity of their opinion of child development as a pre-screening in a developing country, particularly the differences related to inequalities in maternal education and family income. It uses data from 3025 6–59-mo-old children in a cross-sectional survey of growth and development of under-fives in the Brazilian city of Porto Alegre in 1990, based on census tracts of the city, dwellings and children sampled at random. Ethical approval was obtained from the Health Department of the City Hall and informed consent from the parents (97.4% participation rate). Health professionals trained for this fieldwork applied the Denver Developmental Screening Test [8] according to the test manual and administered an oral questionnaire to the mother. She was asked to compare the child's actions with other children of similar age and report whether her child was advanced, delayed or comparable. All Denver test items were standardized for the study population by logistic regression of success on log chronological age

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Table I. Prevalence of scores suspect of developmental delay and validity of maternal opinion of child developmental status relative to the test score.

	Score indicative of delay (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Maternal education[a]					
⩽4 y	6.9	32.7	91.4	21.9	94.9
5–8 y	3.3	62.9	93.2	24.2	98.7
⩾9 y	0.9	72.7	94.0	9.6	99.7
	$p<0.001$	$p=0.002$	$p=0.043$	$p=0.033$	$p<0.001$
Income per capita[a]					
<0.5 national wage	8.5	39.6	90.9	28.8	94.2
0.5–1.0 national wage	3.1	43.5	92.4	15.4	98.1
>1.0 national wage	1.3	69.6	94.2	14.1	99.6
	$p<0.001$	$p=0.026$	$p=0.006$	$p=0.037$	$p<0.001$
Birthweight					
<2500 g	7.2	58.8	92.7	38.4	96.6
⩾2500 g	2.6	47.9	93.1	15.9	98.5
	$p<0.001$	$p=0.418$	$p=0.816$	$p=0.050$	$p=0.045$
Gestational age					
<37 wk	6.8	77.8	87.1	30.4	98.2
⩾37 wk	2.9	45.8	93.4	17.1	98.3
	$p<0.011$	$p=0.068$	$p=0.007$	$p=0.116$	$P=0.925$
Hospitalization (first 2 y)[a]					
Not reported	1.8	51.2	93.8	13.3	99.0
<3 wk	4.1	50.0	93.0	23.3	97.8
⩾3 wk	17.3	44.8	81.4	35.1	86.8
	$p<0.001$	$p=0.865$	$p<0.001$	$p=0.001$	$p<0.001$
Impairments					
Not reported	2.4	44.8	93.6	14.5	98.6
One or more	13.6	57.1	86.5	40.0	92.8
	$p<0.001$	$p=0.271$	$p<0.001$	$p<0.001$	$p<0.001$
Total	3.1 ($n=3025$)	48.4 ($n=94$)	93.1 ($n=2931$)	18.6 ($n=248$)	98.2 ($n=2777$)

[a] p-value: χ^2 for linear trend.
PPV and NPV: positive and negative predictive value.

corrected for gestational age at birth. The child's ability age was estimated as the age at which the child's profile of successes and failures in the test is most likely in the population by maximum likelihood. The score of child developmental status was the natural logarithm of the ability age divided by the chronological age. The antilogarithm of the score measures delay or advance in ability as a proportion of chronological age (e.g., a score of -0.15 indicates ability age approximately 15% less than the age, and 0.12 indicates ability age 12% higher). Sensitivity, specificity, positive and negative predictive values of maternal opinion of developmental status were estimated relative to suspected development delay indicated by a score below -0.296 (-2 SD below zero). Evaluations based on a screening test cannot confirm or exclude developmental disabilities. Further research should assess the validity of maternal opinion and test score with other measures. However, the results of this study are potentially useful for detecting developmental delay in primary care.

Inequalities in education were large, with 41.5% of the mothers having more than primary school education (which corresponds to 8 y), whilst 23.6% had 4 or less years of schooling. Family income *per capita* was above poverty levels for 56.5% (defined as one minimum wage for southern Brazil) and was less than half for 18.5%. About 8.1% of the children had low birthweight, 4.4% were born at less than 37 wk of gestational age, 6.8% had impairments reported, 21.8% were hospitalized during the first 2 y of life, with 5.6% spending 3 wk or more in hospital, and 8.2% of the mothers reported developmental delay in the child.

Table I shows the prevalence of test scores indicative of delay and the validity measures of maternal opinion. Although there are no comparative data from Brazil, the 3.1% with scores indicative of delay was similar to the prevalence of delay for American children of similar age [9]. The sensitivity of maternal assessment of child development was below 40% for mothers with little education or low income. It increased with socioeconomic level, being about 70% for the wealthier and better educated. Similar sensitivity has been found in developed countries, where most mothers had completed secondary education [1–3,5]. Specificity was 94% for the wealthier and better educated, and slightly lower for the poorer and least educated. Premature birth, impairments and long hospitalization also

decreased the specificity. Sensitivity and specificity are independent of prevalence and reflect discriminating capability, which appears to be greater among better-educated and wealthier mothers. The large differences in sensitivity may be partially explained by expectations of child development related to values and rearing practices varying among social groups. Furthermore, the prevalence of scores indicative of delay was higher for socio-economically deprived children, making their mothers more likely to assess development using children with lower scores as a reference, which resulted in a lower sensitivity. Positive predictive value (probability of correctly reporting delay) is dependent on the size of the prevalence; the average positive predictive value was only 19% due to the low (3%) prevalence of scores suspect of delay. The greater prevalence among children of low-income families, little maternal education and biological risk may explain the higher positive predictive value (30–40%) here. In contrast, the negative predictive value (probability of reported normality being correct) was above 99.5% for the wealthier and better educated. However, among the most deprived mothers, about 5% of the children reported as presenting normal or advanced development had a score indicative of delay (positive predictive value about 95%). This is due to the lower sensitivity of the assessment made by deprived mothers and the higher prevalence of delay among their children. Low birthweight, impairments and long hospital stays decreased negative predictive value with a misclassification of 3%, 7% and 13%, respectively, due to the higher prevalence of delay. Thus, children at social or clinical risk should be assessed more carefully, even if the maternal report is normal or advanced.

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Age- and sex-specific body composition of Chinese children

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Abstract

We examined age- and sex-specific body compositions of Chinese children by the bioelectrical impedance method. The subjects were a total of 587 children aged 6–14 y who had normal relative weight. In all ages, boys had larger fat-free mass and lower percent body fat (%BF) than girls did. Even in the subjects with BMI <20 kg/m^2, more than one quarter of them had high %BF.

Conclusion: Chinese children may have higher %BF than that predicted by BMI.

Key Words: *Chinese children, bioelectrical impedance, body composition, percent body fat, fat-free mass*

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