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Socioeconomic inequalities and child mental health

ABSTRACT

OBJECTIVE: To analyze the association between sociodemographic determinants and the development of social competence and behavior problems in children.

METHODS: Cross-sectional study performed with 479 school children aged between six and 13 years, enrolled in the first grade of public elementary schools of the city of São Gonçalo, Southeastern Brazil, in 2005. Socioeconomic variables, family structure, parents' level of education, child ethnicity, and social competence and behavior problems were analyzed. Prevalence ratios with respective 95% confidence intervals were calculated. Data shown were expanded to the population of students of the school network investigated.

RESULTS: Children who were below the poverty line, who had black skin color, whose parents had low level of education, and lived with single-parent families or comprised by stepmother/stepfather showed lower social competence and more behavior problems. The higher the risk factors, the higher the prevalence of children with low social competence and behavior problems.

CONCLUSIONS: The association between sociodemographic determinants and higher prevalence of behavior problems and lower social competence in children requires that preventive and care actions should be prioritized by public policies, reducing severe social and emotional difficulties in children, which may continue into adulthood.

DESCRIPTORS: Child. Mental Health. Child Behavior. Child Behavior Disorders. Epidemiology. Socioeconomic Factors. Health Inequalities. Cross-Sectional Studies.

INTRODUCTION

The impact of life styles and conditions on the health of populations is very discussed nowadays. Social determinants in health have been at the center of this debate.[2,17] They are characterized by social, political, economic and cultural factors that affect beliefs, behavior and biology. In addition, they cause health problems[8,a] and are present even before one's birth. Low family socioeconomic level and low parents' level of education are examples of social determinants that negatively influence child health.

In the United States, it is estimated that one in every five children has already experienced poverty, which is usually associated with low maternal age at the child's birth, low maternal level of education, and maternal marital status (single or divorced).[7] In developing countries such as Brazil, these estimates would be even higher and the relationships and specificities with poverty even more complex, due to factors such as greater vulnerability of the health care network in these countries.

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As childhood is a time of vulnerability and dependence, social determinants play a key role. However, little is known about its impact on child health. Malnourishment, severe perinatal problems and low birth weight are the more recurrent issues.[a]

In this sense, the World Health Organization (WHO) has created a specific commission to assess the importance of social determinants in the first years of life. The mechanisms that cause child health inequality, defined as inequalities among population groups, are dealt with. These inequalities, in addition to being systematic and relevant, are also avoidable, unjust and unnecessary. This involves a complex and intertwined set of factors responsible for child growth and development which includes the prenatal, perinatal, pre-school age and school age periods, in addition to the dependence on family, school, community and socio-political context attributes in which the child and its family live.[31]

In terms of child mental problems, it is estimated that between 10% and 20% of children worldwide suffer from some psychiatric disorder, thus ranking it among the five main causes of disease in children aged more than five years.[4,19] Despite knowledge about child psychopathology rates, etiology and treatment having substantially advanced worldwide in the last years, Brazil still lacks studies.[3] Among the most studied mental health problems are the emotional (depression and anxiety, for example) and behavior problems (aggressiveness, for example) and the attention difficulties.[4,6,21]

These mental health problems are closely associated with one's ability to deal with and respond to the outer world demand and one's social competence. During childhood, the relationship with friends at school and the academic performance are more relevant expressions of child social competence. Development of social abilities is crucial, especially during the pre-school and school periods, when the child begins to build its social network and spends more time out of home. Social competence helps to establish stable and positive relationships with others, in addition to its being a predictor of current and future child adjustment and absence of psychopathologies.[18]

Children who come from families with low socioeconomic level, including in previous generations, tend to begin their life with a "low health platform". This social and multidimensional phenomenon varies according to political, economic, social and cultural systems. Although several assessment measures exist, it is difficult to measure such phenomenon, especially because human development is used as source of correlation.[12,23] This restricts the benefits of social and economic advances and results in greater health problems throughout life,[20] including problems associated with behavior and social competence acquisition. Qualified stimulation of and care for the social environment where the child lives, both in the family and in other social groups, significantly affect its development.[24]

In an ecological perspective, longitudinal study with children followed from birth to the age of four years, Sameroff (1998)[26] concluded that multiple risk factors affect the child's emotional development. The worst diagnosis was associated with characteristics of children who: had parents with professional occupations of lower social status; had mothers with low level of education; belonged to minority groups and large and single-parent families; had a history of several stressful events; had mothers with a mental disease; had a history of anxiety and poor mother-child interaction in the first years; and had parents who were very strict. As regards social status, Sameroff (1998)[26] reported that children from poorer families had worse emotional development at four years of age. The relationship between multiple risk factors and emotional health has a cumulative effect, by combining the risk factors previously mentioned. Thus, to exclusively investigate unique child or family characteristics hardly explains the child's behavioral development. Greater differences appear when comparisons are made between groups of children with many and few risk factors, in the varied environmental contexts where they live. This difference, even though it can be noticed in all social strata, is more concentrated in poor families.

The present study aimed to analyze the association between social determinants and the development of behavior problems and social competence in children.

METHODS

A cross-sectional study was performed with first grade students enrolled in the morning shift in a public elementary school, in the city of São Gonçalo, Southeastern Brazil, in 2005. The majority of the population of São Gonçalo lives in precarious conditions. In 2004, the city ranked 62nd in the Child Development Index (CDI), among the 92 cities of the state of Rio de Janeiro, and 1,479th when compared with all Brazilian cities.[b]

The sample was comprised by 479 children aged between six and 13 years, of which 52% were males, 95% belonged to the poorer social classes C, D, and E (*Associação Brasileira de Estudos Populacionais* –

[a] Maggi S, Irwin LG, Siddigi A, Poureslami I, Hertzman E, Hertzman C. Knowledge network for early child development analytic and strategic review paper: international perspectives on early child development [internet]. Vancouver: The University of British Columbia, 2005 [cited 2009 Jun 5]. Available from: http://www.who.int/social_determinants/resources/ecd.pdf

[b] Fundo das Nações Unidas para a Infância. Situação da infância brasileira 2006: IDI por municípios [cited 2008 Oct 10]. Available from: http://www.unicef.org/brazil/pt/cadernobrasil2008.pdf

Brazilian Association of Population Studies),[a] 91.4% were aged between six and nine years, and 54.4% were of mixed ethnicity.

Conglomerate sampling design was used, with three stages of selection: schools, first grade classes, and students. In the first stage, 25 schools were sampled using selection proportional to size, and considering the number of students of each school as auxiliary variable to select classes. Next, a simple random sample of ten students was selected for each of the two classes sampled from the 25 schools, totaling 500 students sampled from a universe of 6,589 first grade students enrolled in elementary school, as reported by the Department of Education for the year. A total of 21 children were excluded from the analysis, because their Intelligence Quotient (IQ) was equal to or lower than 69 (measured by the reduced version of the Wechsler Intelligence Scale for Children – WISC III – vocabulary and cubes).[30] This exclusion from the analysis was made as it was not possible to assess behavior problems in children with greater cognitive difficulties, with the instrument used in this study, described as follows. Minimum sample size was determined using a 50% $\prod$ proportion to be estimated, with a 98% confidence interval and 5% relative error.

In the analysis, data were expanded to the population of students of the city's public school network. To achieve this, the weight of each student selected for this study was calculated, according to placement in each one of the sampling units (school, class and students). Thus, all information about students was considered, according to the sample weight calculated, considering all selection stages. The total number of children used in the analysis was 6,392.

The adults responsible for the children selected answered a structured questionnaire, which included the following: family socioeconomic profile and presence of child behavior and social competence problems. The mother was the main informant (83.7%). In addition to errors frequently found on roll-calls (with names of children who had never been in classes or who had changed classes/schools), the absence of responsible adults on the day booked for the interview (after three booking attempts) led to a replacement of about 35% of the children initially sampled. In these cases, children were replaced by the subsequent, randomly selected child until ten students per class were totaled. These replacements were considered not to cause bias, observing the similarity between the educational profile of mothers/responsible adults interviewed and that of women living in the city. Moreover, according to what was expected, the average income of families studied was below (R$ 611.00 or US$ 222.20) that of the city as a whole (R$ 852.00 or US$ 309.80).

To characterize the sociodemographic profile, the following variables were analyzed: child sex, age, ethnicity, and family structure (characterized by those who live with the child). Only the result of higher level of education of one of the parents was analyzed, grouped from illiterate and completed elementary school level to not completed elementary school level. Monthly family income (informed in R$/*reais*) was used to calculate the poverty line. Families with monthly family income of up to R$ 207.00, equivalent to US$ 75.27/month or US$ 2.51/day for family consumption, corresponded to the lowest social class E. Above this line, monthly income varied between R$ 207.00 (US$ 75.27) and R$ 5,554.00 (US$ 2,019.64), corresponding to social classes A2, B, C, and D. These cut-off points were defined by the economic classification criterion that assesses family consumption, estimated by the educational level of parents or responsible adults and material goods accumulated at home, and created by the *Associação Brasileira de Estudos Populacionais*.[a]

To measure social competence and behavior problems, the Child Behavior Checklist (CBCL), created by Achenbach (2001), was used.[1]

The CBCL section that measures social competence includes 20 items and is comprised by three sub-scales, answered by responsible adults, concerning children at the same age: a) activities performed: amount and quality of child participation in sports, hobbies, activities, games, tasks and chores; b) social functioning: integration and participation in social groups, through the number of organizations it participates in; participation in organizations; number and frequency of contact with friends; behavior towards others (siblings, parents, schoolmates) and when alone; c) school functioning: child school performance in portuguese, geography, mathematics, history, sciences; participation in special class; school failure and other school-related problems. Total social competence was assessed by the sum of scores obtained in all three sub-scales. Thus, the number of children on the tables that show social competence results was reduced throughout the article.

Behavior problems were also measured with the CBCL, which identifies several behavioral syndromes based on 118 items: a) internalizing syndromes (anxiety/depression, withdrawal/depression and somatic complaints); b) externalizing syndromes (violation of rules and aggressiveness); c) attention problems; d) thought problems (obsessions and hearing voices, for example); e) social problems (loneliness and feeling of persecution, for example). Response options vary as follows:

[a] Associação Brasileira de Estudos Populacionais. Critério de classificação econômica Brasil [internet]. São Paulo; 2003 [cited 2009 Jul 06]. Available from: www.abep.org/codigosguias/ABEP_CCEB_2003.pdf

false; rarely true/sometimes true; often/very often true. Only the total score of behavior problems was analyzed, grouping all five sub-scales previously described.[1]

The scale of social competence and that of total behavior problems enable the distinction of cases as clinical, borderline or normal, based on T scores. For the lowest social competence (borderline and clinical children), international data indicate a T score lower than or equal to 40; for behavior problems, above or equal to 65.[1] These cut-off points were adopted and, as a result, clinical and borderline cases were grouped.

The CBCL version used was validated for Brazil by Bordin et al[5] (1995).

Frequencies and intersections between sociodemographic variables and the "social competence" and "total behavior problems" outcomes were used in the exploratory analysis. Independent chi-square test was used to analyze statistically significant association at the 5% level.

In the bivariate analyses, the prevalence ratio (PR) of each adjusted variable was separately assessed from each of the remaining variables, using Poisson models with robust variance. Due to the differences between crude and adjusted prevalence ratios being minimal (with maximum variation below 8%, data not shown), the four variables with significant crude prevalence ratios were considered, when a cumulative index of inequalities was created.

This cumulative index of social inequalities was comprised by the sum of scores obtained in the variables: poverty line, family structure, level of education and ethnicity. Calculation of this index was made as follows:

- score 1 for child below poverty line; score 0 for those above this limit;
- score 1 for at least one of the parents with level of education between illiterate and not completed elementary school; score 0 for completed elementary school level or higher;
- score 1 for family structure distinct from those with both parents; score 0 for child who lives together with father and mother;
- score 1 for mixed child and 2 for black child; score 0 for white child.

Cumulative index of inequalities varied from zero to five points. Higher scores indicate greater vulnerability to sources of inequality.

Lastly, Poisson models with robust variance were performed for each outcome, considering this new index, and exclusively controlled by the sample's small demographic unbalance concerning sex and age, and by the relevance of these issues in theory. Prevalence ratios and their respective 95% confidence intervals were calculated.

In all tests, a 5% significance level was used. All analyses employed the sample weight in the sample expansion. SPSS software, version 16.0, was used in the analyses.

The study was approved by the *Comitê de Ética em Pesquisa da Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz* (Oswaldo Cruz Foundation National School of Public Health Ethics Committee). Parents or responsible adults and school management signed an informed consent form.

RESULTS

Table 1 shows the sample's socioeconomic characteristics. In the population, it was observed that 15.6% of families lived with an income below the poverty line, and parents' low level of education (76.1% with up to completed elementary school level) and black or mixed children (67.1%) predominated. Families in which both parents of the child lived together corresponded to more than half of the total number (53.4%).

Child social competence was informed by 80.5% of responsible adults, while emotional and behavior problems were mentioned by 16.8%.

Male students showed lower social competence (PR= 1.19; 95% CI: 1.06;1.33) and more behavior problems (PR= 1.39; 95% CI: 1.24;1.56). As regards age group, younger children, aged between six and nine years, showed lower social competence (PR= 1.86; 95% CI: 1.38;2.51), but lower presence of behavior problems (PR= 0.57; 95% CI: 0.49;0.66).

Table 2 shows the results of multivariate analyses of associations between socioeconomic variables and outcome variables. There was little variation in crude PRs and those adjusted for sex and age, for both outcomes.

Children below the poverty line and black children showed lower social competence and behavior problems.

Among mixed children, only social competence was found to be lower (adjusted PR = 1.17) and the same occurred among illiterate parents or those who had not completed elementary school (adjusted PR = 1.25). Family structure without both parents together was associated with higher frequency of behavior problems (adjusted PR = 1.13).

Cumulative index of social inequalities showed that only 10.5% of children did not have any of the social and economic disadvantage items: they lived in a

Table 1. Socioeconomic and outcome characteristics of the population of students. Municipality of São Gonçalo, Southeastern Brazil, 2005.

Socioeconomic variable	n	%
Sex		
Male	3,254	50.9
Female	3,138	49.1
Age (years)		
6-9	5,842	91.4
10-14	550	8.6
Poverty line		
Below	997	15.6
Above	5,395	84.4
Ethnicity		
White	2,068	32.9
Black	773	12.3
Mixed	3,445	54.8
Parents'/responsible adult's level of education		
Illiterate/ not completed elementary school	3,231	51.3
Completed elementary school/not completed high-school	1,562	24.8
Completed high-school/Higher education	1,505	23.9
Family structure		
Parents living together	3,392	53.4
Parents not living together	2,960	46.6
Outcome variable		
Social competence		
Yes	4,222	80.5
No	1,023	19.5
Behavior problems		
No	5,318	83.2
Yes	1,074	16.8

family with income above the poverty line, had at least one parent with completed elementary school level or higher, lived with both parents, and were white. Distribution of the population with risk indicators corresponded to: 1= 28.0%; 2= 32.2%; 3= 21.2%; 4= 7.2%; 5=0.9%.

Table 3 shows the influence of the cumulative index of inequalities on low social competence and behavior problems. In terms of social competence, 14.1% of children did not have any risk indicators and, at the other end, 50% of children had all risk attributes and were 4.5 times more likely to show low competence when compared to those without risk indicators.

On the other hand, behavior problems were less frequent among children with one or two risk indicators (when compared to those without any risk attribute). Among children with four or five vulnerability indicators, there was greater occurrence of behavior problems (PR = 1.82 and 2.20, respectively).

DISCUSSION

Results from the present study confirm previous findings.[20,25] To live in very poor socioeconomic conditions, to be black, to have parents with low level of education, and to live in single-parent families or including the presence of a stepfather or stepmother (or including other people) are factors that are independently associated with low social competence and behavior problems in children.

Family and individual stress, resulting from living in families with major social, economic, educational and demographic disadvantages, tends to influence the context of life, causing problems in children.[22] Certain adverse social circumstances, for example, can reduce the mother's availability to provide support to her child, which may cause the occurrence, maintenance or aggravation of problems in children.[6] On the other hand, parents with a high level of education tend to recognize their children's needs more easily and promote social competence, in addition to being more prepared to deal with challenges, having more interaction with the social network, and offering more support.[28] The same occurs in relation to life with single-parent families and/or those including a stepfather and stepmother, where harm caused by these family arrangements is more justified by the direct and indirect effect of a more exclusive life with the mother in family functioning and child care.[14] Taylor & Wang (2000)[28] point to the economic and emotional disadvantage of living without the father figure at home, which overloads the mother in the multiple functions of child education and emotional support and may thus increase the risk of school and externalizing problems in children.[11]

In terms of the social determination of sex and age, an investigation conducted by the WHO in children from 25 countries emphasizes that the social context, life styles and types of behavior change dramatically throughout life or even during childhood, with significant distinctions between boys and girls. This is reflected in behavioral variations, problems presented and social perspectives experienced by children.[9] In the study of adult population health, the emphasis has been directed towards child early life and socialization, in which the concepts of latency, accumulation and process are highlighted, agreeing with the results observed during childhood.[27]

Temperament, socialization and biological influences explain the relationship between behavior problems and males and also between these problems and the

Table 2. Crude and adjusted ratios of socioeconomic variables, according to low social competence and presence of behavior problems. Municipality of São Gonçalo, Southeastern Brazil, 2005.

Variable	Low social competence[a]				Presence of behavior problems			
	n	%	PR_{crude} (95% CI)	$PR_{adjusted}$[b] (95% CI)	n	%	PR_{crude} (95% CI)	$PR_{adjusted}$[b] (95% CI)
Poverty line			n=5,104				n=6,265	
Below	785	28.4	1.65 (1.45;1.88)	1.65 (1.45;1.88)	968	21.7	1.40 (1.23;1.61)	1.39 (1.22;1.59)
Above	4,319	17.2	1	1	5,245	15.5	1	-
Ethnicity			n=5,078				n=6,161	
Black	656	24.1	1.45 (1.22;1.73)	1.49 (1.25;1.78)	760	31.1	2.42 (2.07;2.82)	2.32 (1.99;2.70)
Mixed	2,775	19.3	1.16 (1.02;1.32)	1.17 (1.03;1.34)	3,377	14.7	1.14 (0.99;1.31)	1.13 (0.98;1.30)
White	1,647	16.6	1	1	2,024	12.9	1	1
Parents'/responsible adult's level of education			n=5,078				n=6,174	
Illiterate/ not completed elementary school	2,434	20.9	1.22 (1.09;1.36)	1.25 (1.11;1.39)	3,164	17.4	1.13 (1.01;1.27)	1.08 (0.96;1.21)
At least completed elementary school	2,644	17.3	1	1	3,010	15.3	1	1
Family structure			n=5,104				n=6,226	
Parents living together	2,252	18.6	1.02 (0.91;1.14)	1.04 (0.92;1.16)	2,905	18.0	1.21 (1.08;1.35)	1.13 (1.01;1.27)
Parents not living together	2,852	18.3	1	1	3,321	15.0	1	1

[a] Considering presence of social competence as the basis
[b] Adjusted for sex/age in the Poisson model

pre-puberty period. In a study with 480 mothers from a city of the state of São Paulo, Bordin et al (2009)[6] found that, among low-income families, girls were two times more likely to have emotional problems than boys; however, among average-income families, boys and girls had a similar risk. These data emphasize the different impact of child problems according to sex, based on a broader perspective which takes the family's socioeconomic context into consideration.

Moreover, the tendency of lower social competence in younger children is justified, due to this age group's typically low social and cognitive development, yet in full progress, differently from pre-puberty children.

As regards the correlative tendency of social determinants, parents' low level of education is more common among poorer families, who also experience more frequent mental health problems in children.[10,20] To belong to ethnic groups that are more socially vulnerable combines with other vulnerability factors, such as belonging to groups with low income and level of education, living in places without services and with little public safety and susceptibility to different forms of violence. In addition, mental health problems are more present in groups with these characteristics, which tend to be simultaneously present in the child's life.[3,15]

Table 3. Cumulative index of inequalities, according to low social competence and presence of behavior problems. Municipality of São Gonçalo, Southeastern Brazil, 2005.

Cumulative index of inequalities	Low social competence (n=4,935)			Presence of behavior problems (n=5,979)		
	n	%	PR[a] (95% CI)	n	%	PR[a] (95% CI)
0	563	14.1	1.0	628	18.8	1.0
1	1,489	15.8	1.14 (0.90;1.45)	1,671	11.7	0.61(0.50;0.76)
2	1,483	19.4	1.43 (1.13;1.80)	1,927	12.9	0.67 (0.55;0.81)
3	1,006	23.4	1.74 (1.37;2.20)	1,268	18.6	0.93 (0.76;1.13)
4	340	23.1	1.74 (1.31;2.31)	431	36.4	1.82 (1.48;2.23)
5	54	50.0	4.50 (3.17;6.38)	54	50.0	2.20 (1.61;3.02)

[a] Adjusted for sex and age

In this sense, the cumulative effect of inequalities in mental health is observed by the level of risk associated with low social competence and the presence of behavior problems in children. In terms of behavior problems, the impact seems to be greater when four or more socioeconomic inequalities are present in the child's life. Halpern & Figueiras (2004)[16] corroborate this finding, stating that the cumulative effect of multiple factors is more determinant in emotional and behavior problems than the isolated presence of one of them.

However, when comparing both child problems investigated, the potential risk of inequalities studied to children's low social competence is observed. Considering that the social nature of the social competence construct, in which an individual characteristic is expressed in the context of interactions,[13] children's low social competence in a situation of greater social inequalities partly reveals the unprivileged position occupied by these children in the family, community and school. A child who is considered to have low social competence experiences great difficulties in efficiently interacting with others and with the social environment, enabling harm to be accumulated in its development and future life. Just as socioeconomic conditions are low, maternal depression and experiencing maltreatment are variables that have been found to be associated with lower social competence in children, in addition to mental health problems.[18]

The debate over socioeconomic inequalities and social competence problems or behavior problems in children goes beyond the sum and the establishment of correlations of the hierarchy of family socioeconomic factors, once the complex chain of (individual and social) mediations and the subjective nature of the experience and representation of these factors are sensitive points to understand this process. Thus, it is necessary to analyze the problem from broader perspectives that consider the existing multi-levels of determination and also integrate individual and group, social and biological approaches in a dynamic, historical and ecological viewpoint.[8]

For future investigations, the following should be taken into consideration: length of time of family poverty situation, length of time of child exposure to difficult and precarious life circumstances, childhood stage when inequality was present or is still present, existence of a social support network in which the family is involved, and family health and individual characteristics.

The main challenge the studies on relationships between social determinants and child health have to face is precisely to establish a hierarchy of determinations between more general factors of a social, economic and political nature and the mediations through which these factors affect the health situation of groups and individuals. In this way, it would be possible to identify where and how interventions to reduce health inequalities should be made. Thus, reflection on the impact of the family's/community's social capital on child development should be expanded, becoming aware of the relationships of trust and solidarity between people and groups, which are an important mechanism through which income inequalities have a negative impact on health situation.[8,29] Thus, the third generation of studies on inequalities could be performed, aimed at understanding the mechanisms of production of health inequalities, surpassing the generations of studies that investigated the relationships between poverty and health and health gradations, according to several criteria of socioeconomic stratification.[2]

Restriction of the inequality measurement to four variables, disregarding several other aspects of childhood disease determination, was the main limitation to this study, as exemplified by the study on social capital. Thus, as this issue is new, results shown here may mark the beginning of more in-depth investigations in Brazil.

Finally, public policies on income redistribution and greater access to mental health services aimed at the child population are necessary, so that children will have their rights to birth, growth and development in cohesive families and communities guaranteed and also obtain support to achieve better perspectives in the future.

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