

# SOCIO-BEHAVIORAL DETERMINANTS AND THE VULNERABILITY OF CHILDREN DURING EARLY CHILDHOOD EDUCATION TO PEDICULOSIS\*

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**ABSTRACT:** Schools have a high rate of head lice infestations. The aim of this study was to characterize the socio-behavioral determinants and the vulnerability of early childhood education students to infestations by *Pediculus humanus capitis* in the city of Aracaju, Sergipe state. The exploratory field study was conducted from June to August 2014, in the micro region of the Augusto Franco neighborhood, in the family domain (households) and school (Municipal Early Childhood Education Center). Data analysis used descriptive statistics, Pearson's Chi-square test and Odds Ratio. Approximately 64% (30/47) of respondents receive up to 1 minimum wage and have their own residence, the number of children was between 2 and 3 per interviewee. 30% had lice, of these, 40% were treated with medication and 13.3% used manual removal. Issues such as lice infestation should be considered in the context of the situation with dialogue and a participatory methodology in the family and school context.

**DESCRIPTORS:** Early childhood education; *Pediculus humanus capitis*; Health promotion.

## DETERMINANTES SOCIOCOMPORTAMENTAIS E VULNERABILIDADE DE CRIANÇAS DA EDUCAÇÃO INFANTIL À PEDICULOSE

**RESUMO:** O espaço escolar é associado à alta infestação pelo piolho de cabeça. Este trabalho objetivou caracterizar os determinantes sociocomportamentais e a vulnerabilidade de pré-escolares à infestação por *Pediculus humanus capitis* no município de Aracaju, estado de Sergipe. A pesquisa de campo exploratória foi realizada de junho a agosto de 2014, na microrregião do bairro Augusto Franco, no domínio familiar (unidades domésticas) e escolar (Escola Municipal de Ensino Infantil). A análise dos dados utilizou a estatística descritiva, teste Qui-quadrado de Pearson e Odds Ratio. Aproximadamente de 64% (30/47) dos entrevistados recebem até 1 salário mínimo e possuem residência própria, a quantidade de filhos foi entre 2 e 3 crianças. 30% tiveram piolho, destas, 40% realizaram tratamento medicamentoso e 13,3% catação manual. Questões como a pediculose devem ser consideradas no contexto da situação, com metodologia participativa e dialógica no contexto familiar e escolar.

**DESCRIPTORES:** Educação infantil; *Pediculus humanus capitis*; Promoção da saúde.

## DETERMINANTES SOCIOCOMPORTAMENTALES Y VULNERABILIDAD DE NIÑOS DE LA EDUCACIÓN INICIAL A LA PEDICULOSIS

**RESUMO:** El espacio escolar está asociado a alta infestación por el piojo de cabeza. Este trabajo tuvo la finalidad de caracterizar los determinantes sociocomportamentales y la vulnerabilidad de preescolares a la infestación por *Pediculus humanus capitis* en el municipio de Aracaju, estado de Sergipe. La investigación de campo exploratoria fue realizada de junio a agosto de 2014, en la microrregión del barrio Augusto Franco, en el dominio familiar (unidades domésticas) y escolar (Escuela Municipal de Enseñanza Inicial). El análisis de los datos utilizó la estadística descriptiva, test Chi-cuadrado de Pearson y OddsRatio. Aproximadamente 64% (30/47) de los entrevistados ganan hasta 1 salario mínimo y poseen vivienda propia; la cantidad de hijos está entre 2 y 3 niños. Aproximadamente 30% tuvieron piojo, de estas, 40% realizaron tratamiento medicamentoso y 13,3% quitaron manualmente. Cuestiones como la pediculosis deben ser consideradas en el contexto de la situación, con metodología participativa y dialógica en el contexto familiar y escolar.

**DESCRIPTORES:** Educación inicial; *Pediculus humanus capitis*; Promoción de la salud.

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## INTRODUCTION

Health promotion, in the context of individual and collective health, involves a joint strategy between knowledge and practice and one that analyzes the social, economic, cultural, political and environmental determinants involved<sup>(1)</sup>. Ectoparasitic infections have been responsible for human mortality in past centuries, linked mainly to environmental determinants.

Among these infections, pediculosis, caused by the *Pediculus humanus capitis*, parasites people, especially the children aged between 3 and 13 years<sup>(2)</sup>. In general, the rate of prevalence of lice among school age children can be more than 50%, regardless of social class<sup>(3)</sup>.

Schools are associated with the high possibility of and vulnerability of children to head lice, due to social contact and collective activities. Infestation by head lice in children results in low productivity in daily educational activities, since it causes absenteeism, discrimination, poor concentration and discomfort caused by the continued itching, besides affecting sleep patterns and self-esteem<sup>(4)</sup>.

The school community, which includes students, parents and teachers, need proper knowledge to control and prevent head lice in schools, and to implement actions to solve the situation of children with lice<sup>(4)</sup>. The development of updated activities and training for educators is necessary, including the promotion of child health with the adequate management of injuries of this phase of human growth<sup>(5)</sup>. However, the lack of communication between teachers and parents and/ guardians is one of the main obstacles for the eradication of pediculosis in schools, in addition to lack of appropriate practices and inadequate coping<sup>(6)</sup>.

Health policies recognize the school as an ideal space for promoting health practices, disease prevention and health education. In Brazil, the School Health Program (PSE, or *Programa de Saúde na Escola* in Portuguese), established in 2007, resulted in coordinated efforts between Schools and Primary Health Care (PHC), through the Family Health Strategy (FHS). The objective of PSE is to contribute to the strengthening of actions in the context of comprehensive development and to provide the school community with the opportunity to participate in programs and projects that link health and education. This would help reduce the vulnerabilities that compromise the full development of children, adolescents and youth in public school education<sup>(7)</sup>. Due to

heterogeneous health problems experienced by the school community, intersectoral and interdisciplinary activities, with the participation of each class, is key to tackling most common childhood diseases, including pediculosis.

Considering that a school environment maybe vulnerable to infection, the following hypothesis was elaborated: Does the school/home environment and behavioral factors influence the infestation of head lice? Based on this premise, this study aimed to characterize the socio-behavioral determinants and the vulnerability of early childhood education students to infestations by *Pediculus humanus capitis* in the city of Aracaju, Sergipe State.

## METHODOLOGY

The nature of this study was exploratory research. It was also descriptive, developed in observation units (home and school), located in the city of Aracaju, Sergipe, with children under the age of four and five years old enrolled in grades IV and V of a Municipal School of Early Childhood Education (EMEI, or *Escola Municipal de Educação Infantil* in Portuguese) in 2014. The choice of this school was due to its inclusion in the Health Program in Schools. According to data provided by the EMEI in the academic year of 2014, there were 57 students enrolled in these grades.

Data collection occurred from June to August 2014, respecting the inclusion criteria: Parents/legal guardians of the school children of grades IV and V who were regularly enrolled in school agreed to participate and signed the Free and Informed Consent Forms (FICF). Exclusion criteria were: Parents/legal guardians whose children/dependents were absent from school activities due to illness, and those in temporary custody situation who were not found in the data collection or during the school period.

The study population comprised 47 parents or legal guardians of children in early childhood education. Ten students were excluded, six of whom were in temporary foster homes under ownership and custody of the child protection agency; a student moved from the State without informing the school; two students were traveling during the data collection period and one mother refused to participate.

The methodological phase of data collection consisted of interviews with a specific script, carried out during daily domestic and field unit visits for the purpose of describing and

characterizing the domestic environment of the students. The instrument was structured on family characteristics, with nine questions aimed at the socio-demographic and the economic identity of the students. There were thirteen issues related to gender, ethnicity, age, time they remained in school, hygiene habits and lice occurrence. The data were categorized<sup>(8)</sup> as: age of the informants and race/ethnicity. The behavioral factors identified were related to the hygiene habits of children, related to the number of baths taken a day and whether personal care was performed by the child him/herself.

Data were submitted to descriptive statistics, Pearson's Chi-square test and Odds Ratio (OR) with a confidence interval equal to or less than 5%, using the Statistical Package for Social Sciences (SPSS) version 18.0. Categorical variables were described through absolute and relative frequency, while numeric variables were described as mean and standard deviation (SD).

The research proposal was approved by the Research Ethics Committee of University Tiradentes, under record CAAE22751713.1.0000. All interviews were recorded to ensure their reliability and later transcribed, preserving the meaning given by the speaker, forms of language and content.

## RESULTS

This study was conducted with 47 parents or guardians of the students through interviews that occurred during household visits, with notes of the particularities of the home environment taken in a field diary. Specific information was collected that distinguished the surveyed households according to family and school characteristics.

Table 1 shows that mothers' were the main respondent population (66%), with similar percentage regarding marital status: single (34%) and married (36.2%). The occupation of the informant was, in about half of the individuals interviewed, unpaid domestic work.

The socioeconomic data, as shown in Table 2, revealed that about 64% of the interviewees receive up to one minimum wage and have their own homes. The number of children per interviewee was between 2 and 3 children.

Among children enrolled in the EMEI under study, equality between the sexes of students, standard age of four years old (57.5%) and brown ethnic profile (63.8%) were identified. The vast

majority of these children remain up to four hours per day in the school (93.6%) (Table 3).

Table 4 shows the clinical profile of preschool children, in which it is observed that for most, there were no reports of skin problems (93.6%), approximately 30% of children reported having previous cases of lice (*Pediculus humanus capitis*), and 25.5% have reoccurring cases of lice. Among the latter, 40% were treated with medication and 13.3% had the lice removed manually. Additionally, the report highlighted the use of alcohol as a therapeutic strategy (7%). With regard to hygiene, 44.6% of preschool children perform bodily care by themselves, with an average of 2.62 baths/day (SD  $\pm$  0.8).

In the connection between lice infestation with the sociodemographic and behavioral variables, it was found that, regarding the female sex, the result was significant ( $p = 0.023$ ) and the chances of infestation risks by *Pediculus humanus capitis* is approximately 4.5 times higher in girls (OR = 4.48,  $p = 0.047$ ). On the other hand, the analysis of school children whose family income is at or below the minimum wage (OR = 0.72;  $p = 0.85$ ) together with the time spent in school (OR = 1.4;  $p = 0.73$ ) was significant regarding the risk of head lice infestation (Table 5).

## DISCUSSION

Health promotion within schools arises from a comprehensive and multidisciplinary vision of the child and that which considers individuals in their family, community, social and environmental context. Within the family context of the Sergipe children evaluated in this study, the family income, occupation of parents and the number of people living in the same dwelling do not emerge as causative agents associated with *Pediculus humanus capitis* infestation. Other epidemiological studies undertaken with students from various regions of the world<sup>(9-11)</sup> did not correlate sociodemographic characteristics of parents to child pediculosis. This reinforces the hypothesis that lice infestation is not limited to lower social strata.

Studies investigating other disadvantaged groups in the slums of large cities and in rural communities in northeastern Brazil, however, confirmed that these groups are affected by at least one parasitic skin disease, most commonly louse<sup>(12)</sup>. Its high prevalence relates to the low availability of water and irregularities in hygiene practices, a situation which improved in the first half of the twentieth century, due to



Table 1 - Distribution of sociodemographic data of the households interviewed, Aracaju, Sergipe, Brazil

Variables	Absolute frequency N=47	Relative frequency FR=100%
Family role of the informant		
Father	7	14.9
Mother	31	66
Others	9	19.1
Age of the informant		
up to 19 years old	1	2.1
20 to 24 years old	9	19.1
20 to 29 years old	12	25.5
30 to 34 years old	12	25.5
More than 34 years old	13	27.7
Sex		
Female	39	83
Male	8	17
Marital Status		
Single	16	34
Married	17	36.2
Stable union	3	6.5
Partnership	9	19.1
Divorced	1	2.1
Not informed	1	2.1
Occupation of the informant		
Unpaid housework	23	48.9
Manicurist	4	8.5
Self-employed	3	6.5
Housekeeper	2	4.3
Waitress	2	4.3
Kitchen assistant	2	4.3
Financial assistant	2	4.3
Horseman	1	2.1
Baker	1	2.1
Student	1	2.1
Painter	1	2.1
Supervisor	1	2.1
Attendant	1	2.1
Vendor	1	2.1
Travel agent	1	2.1
Not informed	1	2.1

the improvement in both situations<sup>(13)</sup>. Social indicators of the Brazilian Institute of Geography and Statistics (IBGE) show that 93% of Brazilian children between 0 and 14 years of age reside in private households with inadequate sanitation<sup>(14)</sup>, and without a general sewage system or septic tank.

Table 2 - Distribution of sociodemographic data of the households' interviewed, Aracaju, Sergipe, Brazil

Variables	Absolute frequency N=47	Relative frequency FR=100%
Family income		
Less than 1/4 of the minimum wage	1	2.1
Between 1/4 and 1/2 of the minimum wage	2	4.3
Between 1/2 and 1 minimum wage	28	59.5
Between than 01 to 02 minimum wages	13	27.7
Greater than 02 minimum wages	3	6.4
Own home		
Yes	29	61.7
No	18	38.3
Number of residents/household		
Up to 03 people	7	15
04 people	16	34
05 people	8	17
06 people	8	17
07 people or more	8	17
Number of residents/household		
1 child	10	21.3
2 children	15	31.9
3 children	11	23.4
4 children	4	8.5
5 or more children	7	14.9
Rating of children's age*		
Infant (0-2 years)	15	11.5
Preschooler (3-6 years)	54	41.5
Student (7-10 years)	19	14.6
Adolescent (11-20 years)	26	20
Youth (21-30 years)	16	12.4
Children's sex *		
Female	63	48.5
Male	59	45.4
Not informed	8	6.1

\*(n=130)

An Argentinian study investigated the relationship between head lice infestation and the socioeconomic conditions in private and public schools<sup>(15)</sup> where the prevalence of head lice was higher, both among girls and boys. In the Latin American environment of our study, we observed a higher prevalence among girls (73.3%), and half bathed themselves. A study performed

Table 3 - Distribution of preschool data according to gender, ethnicity, age, length of time in school

Categories	Absolute frequency N=47	Relative frequency FR=100%
Sex		
Female	24	51
Male	23	49
Age		
4 years old	27	57.5
5 years old	19	40.4
6 years old	1	2.1
Ethnicity		
White	10	21.3
Brown	30	63.8
Black	7	14.9
Time of stay in school		
04:00 min	44	93.6
04h01 to 05h00 min.	3	6.4

only with school girls revealed that the social status and way of life are meaningful and relevant to infestation by *Pediculus humanus capitis*, with negative correlation between the frequency of hair washing and pediculosis<sup>(16)</sup>.

The largest pediculosis rates occur in the months of April and August, coinciding with the beginning or resumption of school activities, which are considered as the main sites of transmission by agglomeration and the peculiar characteristics of the child population<sup>(17-18)</sup>. The parasite passes from one person to another through direct contact and prolonged sharing of utensils (combs, hair brushes, hats, barrettes, bed linen and towels)<sup>(19)</sup>.

The care related to a child's body is the responsibility of the family, while the aims of child development are included in the educational practices of schools. Overlying this shared responsibility, are differing opinions that generate family-school conflicts, for example, on the issue of head lice and their removal<sup>(5)</sup>. The number of young children who perform body care in the family home without adult supervision (Table 4), and the insignificant association between time spent in school and the risk of *Pediculus humanus capitis* infestation is something that is worthy of attention. Thus, it is assumed that many hygienic practices are carried out empirically and may interfere with hygiene.

Several researchers have emphasized that

Table 4 - Clinical and behavioral profile of the preschooler associated with hair lice. Aracaju, Sergipe, Brazil

Categories	Absolute frequency N=47	Relative frequency FR=100%
Previous reports of pediculosis cases		
None (0)	32	68.1
Once	12	25.5
Twice	2	4.3
Does not know	1	2.1
Skin problems		
Pruritus No	45	95.7
Yes	2	4.3
Rashes No	47	100
Yes	-	-
Treatment*		
Medication	6	40
Manual removal	2	13.3
Medication and haircut	3	20
Medication and manual removal	1	6.7
Medicine and fine comb	1	6.7
Alcohol and manual removal	1	6.7
Does not know	1	6.7
Performs body care by themselves		
No	13	27.7
Yes	21	44.6
Sometimes	13	27.7
Number of baths per day		
2 baths per day	16	34
3 baths per day	26	55.3
More than 3 baths per day	5	10.7

\*n=15

using a comb is economical, does not imply risks to children and is five times more efficient than other verification strategies for detecting the presence of lice in school children<sup>(20-22)</sup>. Other researchers also agree that other economical measures for the control of lice are manual removal, frequent hair brushing, and other popular measures to facilitate the removal of this etiological agent<sup>(5, 23)</sup>. However, the use of chemical treatment remains the main method used by the population for the control of pediculosis<sup>(24)</sup>, as evidenced by this study, in which drug therapy was used in 73.4% of cases, with or without manual removal, hair cutting and the use of a fine comb (Table 4).

The size of families in the assessed households, comprised of up to four members, with 2 to 3

Table 5 - Association of *Pediculus humanus capitis* infestation with sociodemographic and behavioral variables

Categories	Previous lice infestation		No previous lice infestation		P
	Absolute frequency (N=15)	Relative frequency FR=100%	Absolute frequency (N=15)	Relative frequency	
Family role of the informant					
Mother	11	73.3	20	62.5	0.673
Father/Aunt/Grandparents/Brother	4	26.7	12	37.5	
Occupation of the informant					
Unpaid housework	5	33.3	18	56.3	0.124
Other occupations	10	66.7	14	43.7	
Number of children					
1 to 3 children	10	66.7	26	81.3	0.229
More than three children	5	33.3	6	18.7	
Number of persons residing in the house					
Up to 5 people	9	60	22	68.8	0.527
More than 5 people	6	40	10	31.2	
Family income					
Up to 1 minimum wage	2	13.3	1	3.2	0.219
Greater than or equal to the minimum wage	13	86.7	31	96.8	
Sex of the child					
Female	11	73.3	20	62.5	0,023
Male	4	26.7	12	37.5	
Child's ethnicity					
Brown	13	86.7	17	53.1	0,025
White/Black	2	13.3	15	46.9	
Age of the child					
4 years old	8	53.3	19	59.4	0.689
5 to 6 years old	7	46.7	13	40.6	
Time of stay in school					
Up to 4 hours	14	93.3	30	93.8	0.694
More than 4 hours	1	6.7	2	6.2	
The child performs personal hygiene by themselves					
No	8	53.3	13	40.6	0.323
Yes	2	13.4	11	34.4	
Sometimes	5	33.3	8	25	
Number of times personal hygiene is performed					
Up to 3 times	12	80	30	93.8	0.178
More than 4 times	3	20	2	6.2	

being children (Table 2), is an important socio-economic indicator for resolving the problem of hair pediculosis. Despite the costs of treating pediculosis being low, in homes where there are a greater number of children, costs rise up<sup>(25)</sup>. Individuals who are poorest typically have very bad living conditions, are more vulnerable to developing diseases and probably have less access to health services, and poor health in turn

can lead to lower incomes<sup>(26)</sup>.

Social vulnerabilities escape statistical analysis, and depend on contemporary processes, changes in social relations that may include a diversity of situations and diversity of meaning for different individuals, families and communities<sup>(27)</sup>. In the households visited and investigated, it was not necessarily the mother

who took care of the children. They were under the care of grandparents, aunts or neighbors (37.5%), revealing the composition of families beyond consanguineous family ties. As for the environments of the lower class households, the study noted the presence of a few rooms of a conjugate type, cohabitation of domestic animals with residents, and poor physical infrastructure (cemented floors, laundry areas and shared kitchen). Such features can interfere with living conditions and suggest that the environment of the students' families undertake the physical space, social and interpersonal relations and ties.

Close relationships and established interpersonal bonds offer the greatest chances of risk for child pediculosis in girls of the micro region Augusto Franco. Other risk factors are length of hair, greater physical contact and the sharing of objects such as hair ornaments, combs and brushes which are common behaviors between female individuals. The warm climate highlights the need for greater and more frequent attention to body and hair hygiene.

## CONCLUSION

The results of this study showed that the socio-behavioral determinants of the Sergipe preschool student's vulnerability to hair lice are related to family income of a minimum wage, a greater number of residents in a household, and the number of children, which makes for situations of domestic agglomeration. However, girls have a higher risk of acquiring lice, especially when they have autonomy in their bath and body care.

In schools that promote health, and in spaces that promote the sharing of knowledge between school, family and other socializing agents, issues such as lice should be considered within the context of the situation with dialogue and participatory methodology so that the standard behaviour of the community and family is understood. This is emphasized as a consequence of the findings that, in the specific case of this study, the children's stay at school was not associated with the risk of ectoparasitic infection. The challenge is to empower individuals to manage their lives in a healthy way, even in unfavorable situations.

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