

## ORIGINAL ARTICLE



## Prevalence and factors associated with adverse early childhood experiences: a population-based study in Ceará, Brazil

### Prevalência e fatores associados a experiências adversas na primeira infância: um estudo de base populacional no Ceará, Brasil

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## ABSTRACT

**Objective:** To estimate the prevalence of adverse childhood experiences and identify associated factors. **Methods:** A population-based cross-sectional study comprised data from a sample of 3,200 households with 3,566 children under 6 years of age, representative of the state of Ceará, Brazil. A multistage sampling approach was used, with stratification among the state capital, Fortaleza, and the 28 countryside municipalities, in which 160 census tracts were randomly selected, each one with a cluster of 20 households. The outcome variable was structured based on adverse childhood experiences as suggested by the Center for Disease Control and Prevention, according to the number of situations to which the child was exposed: 0–2, 3–5, and 6–9. Ordinal logistic regression multivariate model was applied to assess associations. **Results:** Among the 3,566 children studied, 89.7% (95%CI 88.7–90.7) were exposed to at least one adverse experience, of which the most prevalent were neglect, and emotional/physical abuse. The main factors associated were maternal advanced age and smoking, paternal absence, low education level of the head of the family, food insecurity and lack of a social support network. **Conclusion:** The study found a high occurrence of adverse early childhood experiences, particularly among preschool children born to mothers of older age, solo, who smoke and in a situation of social and economic vulnerability, including food insecurity, who should be target of control and prevention measures.

**Keywords:** Adverse childhood experiences. Socioeconomic factors. Prevalence. Brazil.

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## INTRODUCTION

Adverse childhood experiences (ACEs) are potentially traumatic events that occur in childhood and can directly influence child development. About 1 billion children and adolescents worldwide are estimated to be exposed to violent behavior, which may be associated with up to 45.0% of childhood disorders and up to 32.0% of those that appear later<sup>1</sup>. In a survey of more than 26,000 adults conducted by the Centers for Disease Control and Prevention (CDC) in the USA, it was observed that 59.4% of the sample had contact with at least one ACE<sup>2</sup>. A meta-analysis study shows a 12.7% prevalence of childhood sexual abuse in the world<sup>3</sup>. The highest prevalence and intensity of ACEs are associated with negative outcomes such as mental health problems, chronic diseases, infectious diseases, and risk behaviors such as smoking and alcoholism<sup>4,5</sup>.

Previous studies in Brazil, especially in the South and Southeast states, reveal the occurrence of at least one ACE, range from 53.6 to 85%<sup>6-8</sup>. In the Southern states study, it was reported a 7% of physical abuse, 1.4% of sexual abuse and 20% of emotional neglect<sup>8</sup>.

These experiences result in delays in child development, biological and psychosocial impairment in adult life, with a higher prevalence of chronic diseases, cancer, cardiovascular diseases, sexually transmitted diseases, health risk behaviors, sedentary and inappropriate lifestyle habits, psychological distress, self-perception of health and low quality of life, disruptive behaviors and increased risk of early mortality<sup>1,9,10</sup>.

They are public health problems and are divided into three major categories: types of abuse (physical, sexual, and mental), family dysfunction, and physical or emotional neglect<sup>4</sup>. The prevalence of ACEs varies according to the location (influence of cultural beliefs and values, race and sociodemographic characteristics), the collection instrument (type, quantity and format of the questions) used, and the evaluated sample (specificities of each group, selection of sample and type of collection)<sup>3</sup>.

Although many studies worldwide have estimated the prevalence, very few studies are focused on identifying risk or protective factors associated with ACEs. Thus, the present study aims to both estimate the prevalence and identify factors associated with adverse early childhood experiences.

## METHODS

We analyzed data from the Maternal and Child Health Survey Study in Ceará (*Pesquisa de Saúde Materno-Infantil no Ceará* [PESMIC]), and full details of the methods can be found in another reference<sup>11</sup>. The PSMIC is a population-based cross-sectional study on the health and nutritional status of preschool children up to 72 months of age living in the state of Ceará, in Northeastern Brazil. Ceará is one of the poorest states in Brazil, with a population of

approximately 6 million inhabitants living in a semiarid climate, representing about 65.0% of state's total population<sup>12</sup>. Fortaleza (2.3 million inhabitants) is the capital and urban commercial center of Ceará. In the state's rural areas, subsistence farming is dominant.

PESMIC surveys were conducted in 1987, 1990, 1994, 2001, 2007, and 2017 using the same methodology. For this analysis, we used data from the sixth 2017 survey carried out from August to November 2017. The study's total sample consisted of 3,200 households with children up to 72 months old. A multistage sampling approach was used to select these households with state representativeness. Firstly, there was a stratification among Fortaleza and the 28 municipalities of the interior, with strata samples proportional to their population size. Thus, the capital city sample comprised 30.0% of the study's total sample size (960 households). Secondly, systematic sampling was used to select the countryside municipalities, proportionally to their population size. Finally, a cluster sampling approach was used to select the households to be visited. In this process, in each countryside municipality, four census tracts of the Brazilian Institute of Geography and Statistics (IBGE) were randomly selected, while in Fortaleza were 48. By the end, there were a total of 160 clusters of 20 households, totaling the sample size of 3,200 households. Once a census tract was selected and its corresponding map obtained, the location of the cluster of 20 houses to be visited was determined. The starting point of the cluster (the first home to be visited) was randomly selected utilizing ArcGIS® (GIS Inc). Households were visited consecutively in a counterclockwise direction. All children from 0 to 72 months old and women from 10 to 49 years old living in the homes were included. Absent families with children under 6 years old were revisited up to three times within a day in an attempt to obtain data. In each household, information about all children were obtained through the mother or primary caregiver report, and child anthropometric measurements were taken by trained staff.

The outcome variable was structured based on the situations of adverse experiences conceived by the Centers for Disease Control and Prevention (CDC), presented according to nine groups, as follows:

1. Emotional abuse (verbal threats);
2. Physical abuse against child (physical aggression);
3. Child emotional neglect (child who do not live with the father, unwanted and unplanned pregnancy and non-acceptance);
4. Physical neglect with the children (physical integrity put at risk);
5. Domestic violence (peer violence, feeling of unsafety at home, and physical/verbal aggression);
6. Alcohol and drug abuse in the family;
7. Presence of maternal common mental disorder (CMD) (eight or more positive answers to the Self-Reporting Questionnaire [SRQ-20]);

8. Divorce or dispute over custody of the child, and
9. Family member arrested or who has died<sup>13,14</sup>. In Table 1, the CDC classification is related to the study variables applied. As a whole, the variable ACE was composed of 32 variables, grouped into nine categories, based on the CDC's 10 categories of ACE, with the exception of the 'sexual abuse', which was not investigated in the present study<sup>4</sup>. In Supplementary Table 1, there is a table with the description of the 32 variables mentioned above. The final outcome variable was constructed with three categories based on the sum of ACEs: 0 to 2, 3 to 5, and 6 or more.

The SRQ-20 was used for assessing maternal CMD. This questionnaire has been validated in several countries, including Brazil<sup>15</sup>. Each SRQ-20 affirmative answer scores a value of 1 to compose the final score by summing all 20 questions. The scores obtained are related to the probability

of the presence of nonpsychotic disorder, ranging from 0 (no probability) to 20 (extreme probability). Cases with scores equal to or greater than eight were considered positive<sup>16</sup>. Intimate partner violence was assessed using the Hurt, Insulted, Threaten, Scream (HITS) questionnaire<sup>17</sup>. Adverse experiences were self-reported by the participants' mothers.

The independent variables were divided into two assessment groups, as follows:

1. Maternal factors i.e., education, age at childbirth, marital status, current inadequate conditions (smoking, obesity, and increased abdominal circumference) and risk behaviors during pregnancy (smoking and drinking), and
2. Socio-economic factors determined by poverty (lower social classes) through the Brazilian Association of Companies and Research (ABEP) classification, inadequate sanitary conditions (with/without flushing toilet), low

**Table 1. Crude and adjusted\* odds ratio of adverse childhood experiences score according to maternal characteristics. Ceará, Brazil, 2017.**

| Variables                      | Number | ACEs scores |      |     | OR (95%CI)     | p-value | AOR (95%)        | Adjusted p-value |
|--------------------------------|--------|-------------|------|-----|----------------|---------|------------------|------------------|
|                                |        | 0-2         | 3-5  | 6-9 |                |         |                  |                  |
|                                |        | %           | %    | %   |                |         |                  |                  |
| Maternal age group (years)     |        |             |      |     |                |         |                  |                  |
| 15 to 19                       | 313    | 55.3        | 40.3 | 4.5 | 0.67 (0.5-0.9) | 0.034   | 0.54 (0.38-0.78) | 0.001            |
| 20 to 29                       | 1,657  | 53.3        | 39.9 | 4.3 | 0.72 (0.5-0.9) |         | 0.76 (0.57-1.01) |                  |
| 30 to 39                       | 1,230  | 55.1        | 40.3 | 4.6 | 0.68 (0.5-0.8) |         | 0.82 (0.62-1.09) |                  |
| 40 to 49                       | 283    | 44.9        | 49.8 | 5.3 | 1              |         | 1                |                  |
| Marital status                 |        |             |      |     |                |         |                  |                  |
| Without partner                | 964    | 29          | 60.2 | 11  | 4.30 (3.6-5.0) | <0.001  | 4.37 (3.65-5.25) | <0.001           |
| With partner                   | 2,529  | 62.8        | 35.1 | 2.1 | 1              |         | 1                |                  |
| Maternal education (years)     |        |             |      |     |                |         |                  |                  |
| None                           | 33     | 42.4        | 48.5 | 9.1 | 2.46 (1.5-5.3) | <0.001  | 1.07 (0.45-2.51) | 0.351            |
| Up to four                     | 268    | 43.7        | 50.7 | 5.5 | 2.18 (1.5-3.0) |         | 1.27 (0.85-1.92) |                  |
| Five to eight                  | 1,075  | 48.9        | 45.1 | 6   | 1.8 (1.4-2.3)  |         | 1.31 (0.95-1.82) |                  |
| Up to 11                       | 1,733  | 56.1        | 40.1 | 3.8 | 1.3 (1.0-1.7)  |         | 1.11 (0.83-1.49) |                  |
| More than 11                   | 319    | 63          | 34.8 | 2.2 | 1              |         | 1                |                  |
| Bad habits                     |        |             |      |     |                |         |                  |                  |
| Yes                            | 2,846  | 53.4        | 42.4 | 4.2 | 1.0 (0.8-1.2)  | 0.635   | 1.00 (0.45-2.22) | 0.985            |
| No                             | 720    | 52.8        | 41.9 | 5.3 | 1              |         | 1                |                  |
| Smoking mother                 |        |             |      |     |                |         |                  |                  |
| Yes                            | 178    | 35.4        | 53.9 | 11  | 1.4 (0.9-2.2)  | <0.001  | 1.71 (1.23-2.39) | 0.002            |
| No                             | 3,039  | 55.8        | 40.6 | 3.6 | 1              |         | 1                |                  |
| Smoked during pregnancy        |        |             |      |     |                |         |                  |                  |
| Yes                            | 79     | 29.1        | 55.7 | 15  | 1.5 (0.9-2.4)  | <0.001  | 1.21 (0.51-2.88) | 0.124            |
| No                             | 3318   | 54.4        | 41.6 | 4   | 1              |         | 1                |                  |
| Drank alcohol during pregnancy |        |             |      |     |                |         |                  |                  |
| Yes                            | 48     | 27.1        | 52.1 | 21  | 1.9 (1.3-2.8)  | <0.001  | 2.46 (1.04-5.84) | 0.221            |
| No                             | 3,313  | 54.5        | 41.5 | 4   | 1              |         | 1                |                  |

\*Adjusted for: increased waist circumference maternal body mass index and inappropriate behaviors in addition to the variables in the table. ACEs: adverse childhood experiences; OR: odds ratio; 95%CI: confidence interval 95%; AOR: adjusted odds ratio.

*per capita* income (less than \$21.13 USD), recent job loss in the family, deficient social support network, number of children in the household, head of the family schooling, and food insecurity assessed by the Brazilian Scale of Food Insecurity (EBIA).

All study data were double-entered using Epi Info 2000 and tested for concordance, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 (IBM Inc).

In the initial analysis, bivariate analysis was carried out to identify maternal and socio-economic factors associated with ACEs. After that, a multivariate analysis was performed selecting the variables significantly associated with the outcome at the  $p < 0.05$  level. The ordinal logistic regression model was used in a backwards approach, considering the groups of maternal/family and socio-economic factors, based on the CDC model for regression analysis of toxic stress<sup>13</sup>, as shown in Supplementary Figure 1.

Written informed consent was obtained from participating women. Written consent for children was given by mothers, and consent for adolescent minors was obtained

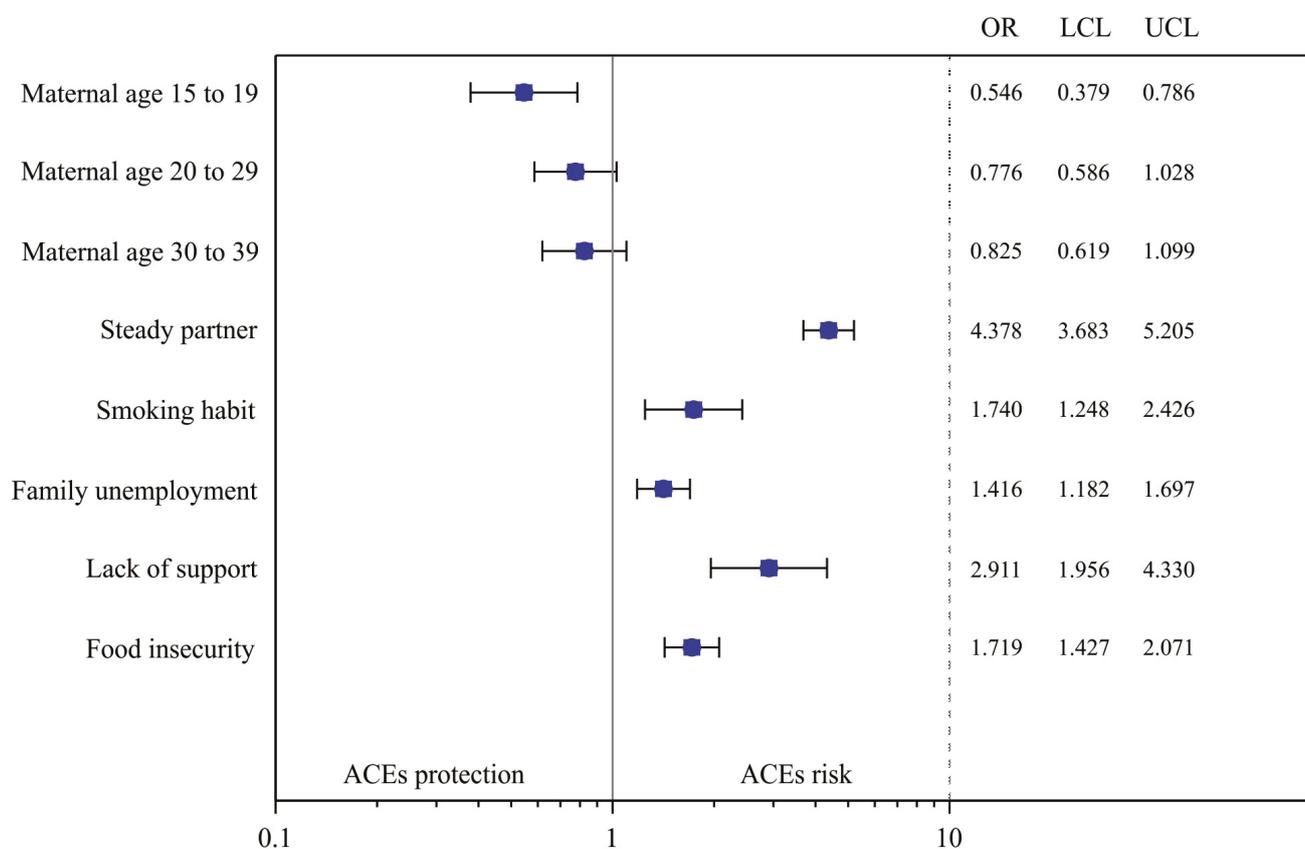
from their parents or legal guardians. The PESMIC survey was approved by the Research Ethics Committee in Brazil under opinion number 2.255.063.

## RESULTS

From the proposed sample size of 3,200 households, 3,180 were visited, and data were obtained from 3,566 children below 72 months of age and their respective mothers. In 20 (0.6%) eligible selected households there was a refusal of participation. Among the nine categories of the ACEs analyzed, the most prevalent were physical (57.2%) and emotional (55.1%) child abuse, intimate partner violence (33.8%), emotional neglect (29.3%), prison or death of a household member (28.4%) and maternal CMD (20.9%) (Supplementary Table 2).

The main maternal and household characteristics of the sample are presented in Table 1. Almost half of the mothers were in their 20's, and one quarter lived without a partner. More than half belonged to the poorer socio-economic classes D/E, one out of four families had someone who lost

### Factors associated with adverse childhood experiences odds ratio and 95%CI



OR: odds ratio; 95%CI: confidence interval 95%; LCL: lower control limit; UCL: upper control limit; ACEs: adverse childhood experiences.

**Figure 1. Forest plot of factors associated (p-values lower than 0.05) with adverse childhood experiences after adjustment to all remnant variables of previous steps.**

his/her job, and one quarter presented severe or moderate food insecurity. Smoking and alcohol drinking habits were reported by 6% of the mothers (Supplementary Table 3).

The outcome variable that ranged from 0 to 9 was summarized into three categories according to the number of child exposures to ACEs: 0–2, 3–5, and 6–9 (Supplementary Table 4). While there was no statistical difference in the level of exposure to ACEs between male and female children ( $p=0.284$ ), in relation to age, children two years old or above presented a prevalence of high exposure to ACEs (6–9) three times higher than children below two years of age ( $p<0.001$ ).

Children of younger mothers tended to show a lower ACE score compared to children of older mothers (Table 1). Among teenage mothers, the chance of a higher ACE score was 46% lower as compared to mothers aged 40–49 years (AOR: 0.54; 95%CI 0.5–0.7). The chance of having a higher ACE score among children who do not live with a father was 4.4 times greater than among those who have a father figure present at home (AOR: 4.37; 95%CI 3.6–5.2). Children of smoking mothers were 71% more likely to have higher ACE scores than children of non-smoking mothers (AOR: 1.71; 95%CI 1.2–2.3). Maternal education and alcoholism were not associated with ACEs in the adjusted analysis.

**Table 2. Crude and adjusted\* odds ratio of adverse childhood experiences score according to socio-economic characteristics. Ceará, Brazil, 2017.**

| Variables                              | Number | ACEs scores |      |      | OR (95%CI)     | p-value | AOR (95%)        | Adjusted p-value |
|--|--------|-------------|------|------|----------------|---------|------------------|------------------|
|  |        | 0–2         | 3–5  | 6–9  |                |         |                  |                  |
|  |        | %           | %    | %    |                |         |                  |                  |
| Socioeconomic classes (ABEP)           |        |             |      |      |                |         |                  |                  |
| A/B1/B2                                | 183    | 65.6        | 31.1 | 3.3  | 0.52 (0.4–0.7) | <0.001  | 0.79 (0.51–1.24) | 0.479            |
| C1/C2                                  | 1,368  | 56.2        | 40.6 | 3.2  | 0.77 (0.6–0.8) |         | 1.02 (0.84–1.25) |                  |
| D/E                                    | 2,015  | 50.1        | 44.6 | 5.3  | 1              |         | 1                |                  |
| Restroom                               |        |             |      |      |                |         |                  |                  |
| Flush toilet                           | 2,729  | 55.2        | 41   | 3.8  | 0.70 (0.6–0.8) | <0.001  | 0.87 (0.71–1.07) | 0.201            |
| No flush toilet                        | 837    | 47          | 46.7 | 6.3  | 1              |         | 1                |                  |
| Water used for drinking                |        |             |      |      |                |         |                  |                  |
| Mineral water                          | 1,832  | 55.1        | 40.9 | 3.9  | 0.85 (0.7–0.9) | 0.023   | 0.99 (0.84–1.18) | 0.978            |
| Tap water/fountain/others              | 1,734  | 51.3        | 43.8 | 4.9  | 1              |         | 1                |                  |
| Per capita income (USD)                |        |             |      |      |                |         |                  |                  |
| <21.13                                 | 607    | 47.6        | 47.4 | 4.9  | 1.73 (1.3–2.2) | <0.001  | 1.11 (0.84–1.47) | 0.961            |
| 18.46–34.59                            | 527    | 53.3        | 41.9 | 4.7  | 1.40 (1.1–1.8) |         | 1.06 (0.80–1.39) |                  |
| 34.60–49.23                            | 578    | 54.6        | 42.7 | 2.7  | 1.30 (1.1–1.6) |         | 1.05 (0.80–1.36) |                  |
| 49.23–69.04                            | 506    | 58.3        | 36.6 | 5.1  | 1.11 (0.9–1.5) |         | 1.07 (0.82–1.39) |                  |
| 69.04>                                 | 553    | 61.5        | 35.3 | 3.3  | 1              |         | 1                |                  |
| Someone lost their job                 |        |             |      |      |                |         |                  |                  |
| Yes                                    | 897    | 44.8        | 48.3 | 6.9  | 1.61 (1.4–1.9) | <0.001  | 1.31 (1.08–1.59) | 0.006            |
| No                                     | 2,669  | 56.1        | 40.4 | 3.6  | 1              |         | 1                |                  |
| Support from family/friends            |        |             |      |      |                |         |                  |                  |
| No                                     | 141    | 22.7        | 62.4 | 14.9 | 4.13 (2.8–6.0) | <0.001  | 2.77 (1.78–4.29) | <0.001           |
| Yes                                    | 3,425  | 54.5        | 41.5 | 4.0  | 1              |         | 1                |                  |
| Education of the family's head (years) |        |             |      |      |                |         |                  |                  |
| None                                   | 251    | 45.8        | 44.6 | 9.6  | 1.89 (1.2–2.8) | <0.001  | 1.62 (0.97–2.73) | 0.005            |
| Up to four                             | 649    | 48.8        | 47   | 4.2  | 1.52 (1.0–2.1) |         | 1.30 (0.85–1.97) |                  |
| Five to eight                          | 1,107  | 51.1        | 43.6 | 5.2  | 1.42 (1.0–1.9) |         | 1.07 (0.72–1.60) |                  |
| Up to 11                               | 1,357  | 57.5        | 39.6 | 2.9  | 1.10 (0.8–1.5) |         | 0.90 (0.61–1.32) |                  |
| More than 11                           | 202    | 59.9        | 36.1 | 4.0  | 1              |         | 1                |                  |
| Food insecurity                        |        |             |      |      |                |         |                  |                  |
| Severe/moderate                        | 894    | 40.2        | 51.9 | 7.9  | 2.08 (1.7–2.5) | <0.001  | 1.77 (1.45–2.16) | <0.001           |
| Mild/food security                     | 2,672  | 57.6        | 39.1 | 3.2  | 1              |         | 1                |                  |

ACEs: adverse childhood experiences; OR: odds ratio; 95%CI: confidence interval 95%; AOR: adjusted odds ratio; ABEP: Brazilian Association of Companies and Research.

\*Adjusted for: number of children up to 6 years old living in the same household in addition to variables in the table.

Families with at least one member who lost his/her job had 40% more chance of their children presenting ACEs, as compared to families that did not (AOR: 1.40; 95%CI 1.1–1.6). The same is true for families whose mothers reported the lack of social support from friends and/or family members, with a 2.8 more chance of a higher score of ACEs, as compared to mothers who did not report (AOR: 2.77; CI95% 1.8–4.3). The level of education of the household's head was also an important factor associated with ACEs, with the presence of a risk gradient that increased with reduced educational attainment (Table 2). The chance of achieving ACEs higher score was 62% more likely for those with no formal education, than those with university level (AOR: 1.62; CI95% 1.0–2.7). Moderate to severe food insecure households also showed 77% more chance of scoring higher on ACEs, as compared to food secure or mildly insecure households (AOR: 1.77; CI95% 1.4–2.1). Social classes, family income, and availability of water and sanitation were not associated with ACEs in the adjusted analysis.

In the final regression model shown in Figure 1, younger mothers were less likely to provide an environment with the presence of ACE in childhood. Meanwhile, factors like the absence of a partner, lack of social support network, mother's smoking habit, food insecurity, and unemployment increased the chance of child exposure to ACEs.

## DISCUSSION

Our results show that adverse experiences with the highest prevalence were neglect and emotional/physical abuse, affecting more than half of the children, followed by events that make the home environment unwelcoming, such as intimate partner violence, the arrest or death of a family member, and maternal depression, affecting 20.0 to 30.0% of the families. The main factor associated with ACEs found in the present study were mother's older age and smoking habit, paternal absence, low education of the head of the family, food insecurity, and lack of social support network.

Recent studies carried out in the US found ACEs of a similar nature to those of the present study but with lower levels of prevalence, such as emotional abuse (33.5%), intimate partner violence (17.8%), physical abuse (17.5%), mental illness (16.2%) and incarcerated family member (8.1%)<sup>18,19</sup>.

The presence of an ACE is related to the prediction of other types of ACEs. Thus, the cumulative effect of ACEs acts on both behavior and cognition of the individual, resulting in lower academic performance, behavioral problems and long-term consequences on health and social aspects, increasing the chances of having more health problems by up to 22.0%<sup>9,20</sup>.

In the present study, about half of the children were exposed to a considerable number of ACEs (3 or more), with increased prevalence proportional to increased age (children over two years old). In agreement, other studies that followed children also observed a rise in ACEs concomitant

to the aging of children<sup>21</sup>, resulting in older children resorting to more coping strategies with ACEs<sup>22</sup>.

The maternal factors associated with ACEs found in the present study were older age and smoking. Adolescent mothers were associated with a lower exposure of their children to ACEs, with a gradient of greater probability concurrent with increased maternal age. This may be on account of the fact that, considering the local cultural context, family members usually support very young mothers, often the grandmothers, both in economic aspects and in child care. Older mothers, on the other hand, often do not even have the support of the child's own father. A study in the state of Rio de Janeiro showed that in cases where the mother had her child in the limit age groups (below 20 and above 35), physical neglect and abuse were more common<sup>7</sup>. Additionally, another study in a hospital in the state of Amazon, in turn, observed that younger mothers tend to exercise their parenting more continuously, showing greater availability in their daily lives, perhaps due to the inexistence of a formal job<sup>23</sup>.

The absence of a father figure makes the child four times more likely to have high score of ACE, appearing in the present study as the factor most strongly associated with this outcome. It is worth noting that separations of couples usually involve periods of intense and prolonged stress, with emotional and financial repercussions on the family and the child itself. This finding is corroborated by a study that showed a trend towards an increase in the number of ACEs in environments where children did not live with both parents, favoring the experience of emotional neglect and physical abuse, in addition to compromising child development by reducing child protection, family income and emotional security<sup>7</sup>.

Although it showed a low prevalence among the investigated mothers (6%), smoking was presented as a factor associated with the child's exposure to a greater number of ACEs. Smoking has often been associated with maternal depression<sup>24</sup> and the study's findings may be an extension of common maternal mental disorders.

The study identified the low education level of the head of the family as a factor strongly associated with a greater number of ACEs in the child. Families headed by people with little or no education showed an increased chance of 30.0% and 60.0%, respectively, compared to those with a higher education level. It is worth noting that in this study, 26.0% of the families were headed by their mothers. The influence of social class and socio-economic environment on ACEs were also identified in a study in the USA, in which, a sample of white people with high level of education and income showed that about 42.0% of children had no contact with ACEs<sup>18</sup>.

Schooling as a determining factor for the occurrence of ACEs is related to parental care, which, due to poor argumentative ability, has difficulty resolving family conflicts and may even resort to violent acts<sup>7</sup>.

In the present study, food insecurity was also an essential associated factor with an increased number of ACEs, in children from families with moderate or severe food insecurity, presenting a 77.0% greater probability of being exposed to an excessive number of ACEs, in comparison to children from food-secure or mildly insecure households. Also, moderate/severe food insecurity was associated with lower income and social class, children under two years of age at home, and the presence of family dysfunctions. In addition, studies show the influence of food insecurity on children's health, growth and development, with lifelong consequences on cognition, schooling and economic productivity<sup>25</sup>.

Unemployment presented as adversity that significantly favored the child's exposure to a more significant number of ACEs in our study. One in four families reported that at least one of their members lost his/her job in the previous 12 months. Other studies have also found unemployment as a driver of a high number of ACEs in the family. The instability resulting from the loss of a job places the family in a context of greater vulnerability due to the imminence of financial problems, changes in the family routine, the anxiety of the heads of the family, and high exposure to situations of social, emotional and affective instability<sup>26,27</sup>.

About 4% of the mothers reported that they felt a lack of support from other family members and friends. This lack of support was identified as the second factor most strongly associated with adverse experiences, increasing by almost three times the probability of the occurrence of such outcome. Social support is characterized by formal or informal interpersonal relationships that are important for the family to support the child's care. Its importance is recognized in strengthening families in the face of adverse experiences, and in preventing health and mortality problems, including mental suffering<sup>28,29</sup>.

This study has some limitations. First, as much as we have used validated tools, they are not diagnostic of maternal depression (SRQ-20) and intimate partner violence (HITS). Second, the cross-sectional design of the study does not allow to evaluate direct causal relation to the ACEs. Finally, the results obtained are representative of the study population, and may not be generalized in other contexts.

Through the results presented, it is possible to observe that the occurrence of ACEs arises amid the action of unfavorable socio-environmental factors, given the characteristics found of low education, inadequate health behavior (poor diet, smoking, alcoholism), low socio-economic status, insecure environment and absence of family support ranging from the absence of a partner to the lack of a social/family support network. In this way, it is emphasized that in a context in which knowledge about the consequences of ACEs in the short, medium and long term is increasingly consolidated, knowing their associated factors is relevant for the establishment of effective preventive programs and interventional strategies.

## REFERENCES

1. Thumfart KM, Jawaid A, Bright K, Flachsmann M, Mansuy IM. Epigenetics of childhood trauma: long term sequelae and potential for treatment. *Neurosci Biobehav Rev* 2022; 132: 1049-66. <https://doi.org/10.1016/j.neubiorev.2021.10.042>
2. Centers for Disease Control and Prevention. Adverse childhood experiences reported by adults -- five states, 2009. *MMWR Morb Mortal Wkly Rep* 2010; 59(49): 1609-13. PMID: 21160456
3. Stoltenborgh M, van Ijzendoorn MH, Euser EM, Bakermans-Kranenburg MJ. A global perspective on child sexual abuse: meta-analysis of prevalence around the world. *Child Maltreat* 2011; 16(2): 79-101. <https://doi.org/10.1177/1077559511403920>
4. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse childhood experiences (ACE) study. *Am J Prev Med* 1998; 14(4):245-58. [https://doi.org/10.1016/s0749-3797\(98\)00017-8](https://doi.org/10.1016/s0749-3797(98)00017-8)
5. Leban L, Gibson CL. The role of gender in the relationship between adverse childhood experiences and delinquency and substance use in adolescence. *Journal of Criminal Justice* 2020; 66: 101637. <https://doi.org/10.1016/j.jcrimjus.2019.101637>
6. Coêlho BM, Andrade LH, Borges G, Santana GL, Viana MC, Wang YP. Do childhood adversities predict suicidality? Findings from the general population of the metropolitan area of São Paulo, Brazil. *PLoS One* 2016; 11(5): e0155639. <https://doi.org/10.1371/journal.pone.0155639>
7. Stochero L, Moraes CL, Marques ES, Santos EB, Pacheco DL, Reichenheim ME, et al. Prevalência e coocorrência de experiências adversas na infância: um inquérito de base escolar no município do Rio de Janeiro. *Ciênc Saúde Coletiva* 2021; 26(9): 4115-27. <https://doi.org/10.1590/1413-81232021269.07412020>
8. Soares ALG, Howe LD, Matijasevich A, Wehrmeister FC, Menezes AMB, Gonçalves H. Adverse childhood experiences: prevalence and related factors in adolescents of a Brazilian birth cohort. *Child Abuse Negl* 2016; 51: 21-30. <https://doi.org/10.1016/j.chiabu.2015.11.017>
9. Chartier MJ, Walker JR, Naimark B. Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse Negl* 2010; 34(6): 454-64. <https://doi.org/10.1016/j.chiabu.2009.09.020>
10. Korotana LM, Dobson KS, Pusch D, Josephson T. A review of primary care interventions to improve health outcomes in adult survivors of adverse childhood experiences. *Clin Psychol Rev* 2016; 46: 59-90. <https://doi.org/10.1016/j.cpr.2016.04.007>
11. Correia LL, Rocha HAL, Rocha SGM, Nascimento LS, Silva AC, Campos JS, et al. Methodology of maternal and child health populational surveys: a statewide cross-sectional time series carried out in Ceará, Brazil, from 1987 to

- 2017, with pooled data analysis for child stunting. *Ann Glob Health* 2019; 85(1): 24. <https://doi.org/10.5334/aogh.2299>
12. Batista MLB, Moura JEA, Alves CLB. Vulnerabilidade socioeconômica no semiárido cearense. *Desenv Reg Debate* 2020; 10: 1001-32. <https://doi.org/10.24302/drd.v10i0.2942>
13. Centers for disease Control and Prevention. Violence Prevention. CDC-Kaiser ACE Study [Internet]. 2021 [cited on Jul 26, 2022]. Available at: <https://www.cdc.gov/violenceprevention/aces/about.html>
14. Starechieski L. Take The ACE quiz-and learn what it does and doesn't mean. NPR Science Desk [Internet]. 2015. [cited on Apr 23, 2022]. Available at: <https://www.npr.org/sections/health-shots/2015/03/02/387007941/take-the-ace-quiz-and-learn-what-it-does-and-doesnt-mean/>
15. Harding TW, Arango MV, Baltazar J, Climent CE, Ibrahim HHA, Ladrado-Ignacio L, et al. Mental disorders in primary health care: a study of their frequency and diagnosis in four developing countries. *Psychol Med* 1980; 10(2): 231-41. <https://doi.org/10.1017/S0033291700043993>
16. Gonçalves DM, Stein AT, Kapczinski F. Avaliação de desempenho do Self-Reporting Questionnaire como instrumento de rastreamento psiquiátrico: um estudo comparativo com o Structured Clinical Interview for DSM-IV-TR. *Cad Saúde Pública* 2008; 24(2): 380-90. <https://doi.org/10.1590/S0102-311X2008000200017>
17. Chen PH, Rovi S, Vega M, Jacobs A, Johnson MS. Screening for domestic violence in a predominantly Hispanic clinical setting. *Fam Pract* 2005; 22(6): 617-23. <https://doi.org/10.1093/fampra/cmi075>
18. Giano Z, Wheeler DL, Hubach RD. The frequencies and disparities of adverse childhood experiences in the U.S. *BMC Public Health* 2020; 20(1): 1327. <https://doi.org/10.1186/s12889-020-09411-z>
19. Boullier M, Blair M. Adverse childhood experiences. *Paediatr Child Health* 2018; 28(3): 132-7. <https://doi.org/10.1016/j.paed.2017.12.008>
20. Bellis MA, Hughes K, Ford K, Rodriguez GR, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *Lancet Public Health* 2019; 4(10): e517-e528. [https://doi.org/10.1016/S2468-2667\(19\)30145-8](https://doi.org/10.1016/S2468-2667(19)30145-8)
21. Lowthian E, Anthony R, Evans A, Daniel R, Long S, Bandyopadhyay A, et al. Adverse childhood experiences and child mental health: an electronic birth cohort study. *BMC Med* 2021; 19(1): 172. <https://doi.org/10.1186/s12916-021-02045-x>
22. Misiak B, Stańczykiewicz B, Pawlak A, Szewczuk-Bogusławska M, Samochowiec J, Samochowiec A, et al. Adverse childhood experiences and low socioeconomic status with respect to allostatic load in adulthood: a systematic review. *Psychoneuroendocrinology* 2022; 136: 105602. <https://doi.org/10.1016/j.psyneuen.2021.105602>
23. Braun SVM, Nascimento RG, Pires SMAM, Cunha KC, Silva SSC. Práticas de cuidado de mães de crianças com paralisia cerebral. *Mudanças* 2021; 29(1): 1-8.
24. Hartmann JM, Mendoza-Sassi RA, Cesar JA. Depressão entre puérperas: prevalência e fatores associados. *Cad Saúde Pública* 2017; 33(9): e00094016. <https://doi.org/10.1590/0102-311x00094016>
25. Chapanski VR, Costa MD, Fraiz GM, Höfelmann DA, Fraiz FC. Insegurança alimentar e fatores sociodemográficos em crianças de São José dos Pinhais, Paraná, 2017: estudo transversal. *Epidemiol Serv Saúde* 2021; 30(4): e2021032. <https://doi.org/10.1590/S1679-49742021000400008>
26. Merrick MT, Ford DC, Ports KA, Guinn AS. Prevalence of adverse childhood experiences from the 2011-2014 behavioral risk factor surveillance system in 23 states. *JAMA Pediatr* 2018; 172(11): 1038-44. <https://doi.org/10.1001/jamapediatrics.2018.2537>
27. Linhares MBM, Enumo SRF. Reflexões baseadas na psicologia sobre efeitos da pandemia COVID-19 no desenvolvimento infantil. *Estud Psicol* 2020; 37: e200089. <https://doi.org/10.1590/1982-0275202037e200089>
28. Mello DF, Pancieri L, Wernet M, Andrade RD, Santos JS, Silva MAI. Vulnerabilidades na infância: experiências maternas no cuidado à saúde da criança. *Rev Eletr Enferm* 2014; 16(1): 52-60. <https://doi.org/10.5216/ree.v16i1.21134>
29. Giordani JP, Lima CP, Trentini CM. Adversidades na infância: associação a fatores protetivos e sintomas internalizantes na adultez. *Estud Pesqui Psicol* 2020; 20(3): 899-918. <https://dx.doi.org/10.12957/epp.2020.54356>

## RESUMO

**Objetivo:** Estimar a prevalência de experiências adversas na infância e identificar fatores associados. **Métodos:** O estudo transversal de base populacional compreendeu os dados de uma amostra de 3.200 domicílios com 3.566 crianças menores de seis anos, representativa do estado do Ceará, Brasil. Foi utilizado um processo de amostragem multiestágio, com estratificação entre a capital do estado, Fortaleza, e os 28 municípios do interior, nos quais foram sorteados 160 setores censitários, cada qual com um conglomerado de 20 domicílios. A variável desfecho foi estruturada com base nas situações de experiências adversas na infância sugeridas pelo grupo *Centers for Disease Control and Prevention*, de acordo com o número de situações a que a criança foi exposta: 0–2, 3–5 e 6–9. O modelo multivariado de regressão logística ordinal foi utilizado para avaliar as associações. **Resultados:** Das 3.566 crianças estudadas, 89,7% (intervalo de confiança — IC95% 88,7–90,7) foram expostas a pelo menos uma experiência adversa, sendo as mais prevalentes negligência e abuso emocional/físico. Os principais fatores associados às experiências adversas na infância foram a idade materna mais elevada e o tabagismo materno, a ausência paterna, a baixa escolaridade do chefe da família, a insegurança alimentar e a falta de rede de apoio social. **Conclusão:** O estudo encontrou alta ocorrência de experiências adversas na primeira infância, principalmente entre crianças nascidas de mães de idade mais elevada e tabagistas, sem a presença paterna, e em situação de vulnerabilidade social e econômica, como a insegurança alimentar, que deve ser alvo prioritário de medidas de prevenção e controle.

**Palavras-chave:** Experiências adversas na infância. Fatores socioeconômicos. Prevalência. Brasil.

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