

ORIGINAL ARTICLE

Severe food insecurity and mental health among women living in extreme poverty in Ceara, Brazil

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Abstract

Background: the prevalence of moderate or severe food insecurity (FI) in the world will reach 2.4 billion people in 2020. Common Mental Disorders (CMDs) affect one in five people, reaching all social classes.

Objective: to examine the associations between CMDs and FI in the most vulnerable population, mothers of young children.

Methods: population-based cross-sectional observational study, interviewing 484 families with children under six years of age, beneficiaries of the cash transfer program Cartão Mais Infância Ceará (CMIC), in 24 municipalities of Ceara. Poisson regression models were used, adjusted for the sampling effect.

Results: 86% of the families were in a situation of FI, with 36% expressing a severe FI, a condition compatible with hunger. In relation to CMDs, it was observed that the prevalence of severe FI increased significantly, affecting 53% of mothers with CMDs against 31% of those without the disorder ($p < 0.001$). Regression analysis showed that CMDs remained the risk factor most associated with severe FI, with mothers with CMDs having a 64% higher adjusted risk compared to other mothers ($p = 0.002$). In the final model, the condition of not having treated water at home was associated with a 55% higher adjusted risk of severe FI ($p = 0.011$), and two factors were close to statistical significance, namely: not feeling safe at home (possibility of domestic violence) and growing edible plants at home, with adjusted measures of 48% risk and 13% protection, respectively.

Conclusion: 13% of this population live with very high rates of severe FI, compatible with hunger, concomitant with CMDs. As aggravating factors of severe FI and CMDs, public social support programs are necessary to have a real positive impact on the quality of life of this population.

Keywords: food security, child, mental health, nutrition, program evaluation

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Authors summary

Why was this study done?

The study was carried out to provide public management in the State of Ceará with data related to the profile of families benefiting from the “Cartão Mais Infância Ceará” income transfer program. Additionally, it evaluated the relationships between Common Mental Disorder (CMD) and food insecurity in the period after physical distancing, in families with children in early childhood.

What did the researchers do and find?

The researchers carried out a cross-sectional study in 24 towns in Ceará, with highly vulnerable families, beneficiaries of the Cartão Mais Infância Ceará. A scale for detecting food insecurity (EBIA) was applied, as well as the school to screen for common mental disorders in the population (SRQ-20). A 73% higher risk of severe food insecurity was found in women who had CMD, compared to those who did not have CMD.

What do these findings mean?

The findings show that the State of Ceará is working in families with extreme social and economic vulnerability, supporting them with an additional income transfer. It concludes that public policies must be directed towards programs that guarantee food and nutritional security for vulnerable families, in addition to increasing mental health care for mothers of children in early childhood.

INTRODUCTION

The global prevalence of moderate to severe food insecurity (FI) is estimated at 30%, affecting 2.4 billion people in 2020, according to the FAO 2021 report¹. Latin America experienced the largest increase in moderate and severe FI during the COVID-19 pandemic, outpacing all other continents¹. In the United States and Europe, FI increased for the first time since data collection began in 2014². In Brazil, with the introduction of the Brazilian Food Insecurity Scale (BFIS) in 2004, FI has been measured periodically at the national level through three editions, most recently in 2013³. Estimates for the year 2018 indicate an increasing prevalence of FI in Brazil, reaching 36.7%, with 4.6% classified as severe, consistent with conditions of hunger. Notably, there are significant disparities within the country, with the Northeast region showing a prevalence of 49.7%, significantly higher than the national average⁴.

Populations living in a state of chronic food insecurity tend to exhibit recurrent symptoms of emotional disturbance. The magnitude of this problem becomes more pronounced when families have young children in early childhood (ages 0–6), leading to internal conflicts within households and affecting the mental health patterns of all family members.

Common Mental Disorders (CMDs), which include depression, anxiety, and psychosomatic disorders, have a high prevalence across all populations and social classes worldwide and contribute significantly to the burden of disease in low- and middle-income countries^{5,6}.

The links between CMDs and poverty^{7–11}, CMDs and food insecurity^{8,10–13}, and CMDs and violence, especially domestic violence, have been well documented¹⁴, including in Brazil^{7,15}.

This paper examines the interrelationships among these four elements – CMDs, FI, violence, and poverty – specifically among the most vulnerable population, mothers of young children. The rationale for conducting this study stemmed from the lack of data on the most vulnerable population in the state of Ceará, located in northeastern Brazil. While it is known that this population has a family income below the poverty line, little was known about their mental health status, experiences of hunger and exposure to violence. The study focused on a group of families that are among the poorest in the state, beneficiaries of

the federal income transfer program (Bolsa Família). In addition, these families also participate in the Cartão Mais Infância Ceará (CMIC) program, a supplementary income initiative of the state government for those who, despite the support provided by Bolsa Família, remain in conditions of extreme vulnerability.

Therefore, as a contribution to the monitoring of public policies implemented in the State of Ceará, this study aims to examine the associations between CMDs and FI in families receiving assistance from a supplementary income transfer program.

METHODS

Study design

This is a cross-sectional, population-based, observational study conducted in 24 municipalities in the state of Ceará, located in the northeastern region of Brazil. The study included interviews with mothers of children aged 0–6 years, receiving support from both the Bolsa Família Program (BFP) and an additional income transfer program implemented by the state government of Ceará in 2017. These families live in conditions of extreme social vulnerability, low income, and substandard housing, receiving an additional monthly income of R\$100.00 on top of the benefits provided by the BFP.

Study location

The study was conducted in the state of Ceará, characterized as one of the poorest states in the country. It has a semi-arid climate that covers 95% of its territory and a population of approximately nine million people, with a Human Development Index (HDI) of 0.734. Commerce and industry, especially tourism, drive the state’s economy, which is concentrated in the capital, Fortaleza, with a population of 2.3 million, and in the coastal region. In the rural areas of the state, the economy is largely based on subsistence agriculture. Government benefits such as pensions and subsidies have become relatively stable sources of income for rural families and contribute significantly to the functioning of the regional economy.

The 24 municipalities in Ceará selected for the study included the following regions:

- a) Metropolitan region: Fortaleza, Aquiraz, Eusébio, São Gonçalo do Amarante;

- b) Northern region: Aracati, Chaval, Camocim, Granja, Iruaçu, Sobral, Salitre, Tianguá, Trairi, Viçosa do Ceará;
- c) Central region: Ararendá, Crateús, Itaira, Jaguaruana, Mauriti, Paramoti, Quixadá;
- d) Southern region: Juazeiro do Norte, Crato, Barbalha.

These municipalities were selected on the basis of the following criteria:

- a) Number of Cartão Mais Infância beneficiaries;
- b) Infrastructure and housing conditions;
- c) Local capacities in education, social welfare, and health care;
- d) Municipalities with childcare coverage above the national average of 30%;
- e) Municipalities that provide Convivência e Fortalecimento de Vínculos services for children aged 0-6;
- f) Diversity in population size;
- g) Regional distribution and urban-rural typology.

The criteria for selecting families to benefit from the CMIC are as follows:

- a) Families registered in CadÚnico (Single Social Registry);
- b) Families with children in early childhood;
- c) Families living below the poverty line:
 - Per capita income up to R\$ 89.00;
 - Lack of bathroom or dwelling made of wooden planks;
 - No piped water supply;
 - Beneficiaries of Cartão Mais Infância.

Population and sample

As of October 2019, there were approximately 16,544 families participating in the CMIC program in the 24 municipalities studied. These families were in both urban (headquarters) and rural (districts) areas.

A sample of 484 families was selected from the database of the CMIC system, which is owned by the Division of Social Protection (DSP) of the State of Ceará. Information was collected on all mothers or closest caregivers and children under the age of six in families receiving CMIC.

Exclusion criteria

Mothers with any physical or mental illness that could significantly affect their ability to respond to the questionnaire were excluded from the study.

Data collection instrument

The questionnaire was developed in two stages:

- a) Through the Intersectoral Advisory Committee for Child Development Policies in Ceará, represented by 10 state departments: Education, Health, Institute of Economic Research and Strategy of Ceará (IPECE), Sports, Culture, Agrarian Development, Social Protection, Justice, Women and Human Rights and Planning, Management, Environment and City. During the committee meetings,

technicians discussed which indicators would be necessary to evaluate the situation of the families in this period from November to December 2021 (shortly after the COVID-19 pandemic), proposing and formulating questions and indicators. The choice of the indicators was also aimed at providing answers to the public administration, to plan actions more targeted to the situations experienced by these families, with the support of the CMIC;

- b) Data collection related to the project objectives through the application of scales validated in Brazil, namely:

- Depression Scale (SRQ-20): Maternal depressive symptoms were assessed using the Self-Reporting Questionnaire (SRQ-20), a 20-item self-report screening tool developed by the World Health Organization (WHO) to detect psychological distress. The SRQ-20 has been validated for use in the Brazilian population, with a cut-off score of eight or higher indicating positive morbidity, achieving a sensitivity of 83% and a specificity of 80%¹⁶.

- Food Insecurity Scale (EBIA in Portuguese): Food insecurity was assessed using the EBIA, which consists of questions related to the last 90 days of the surveyed family. Each positively answered question adds one point to this measure, resulting in a total scale score for the household. The total score is used to classify families into categories such as food secure, mildly food insecure, moderately food insecure, and severely food insecure³.

In addition to these scales, a sociodemographic and epidemiologic questionnaire was included, as well as questions on maternal, postpartum, and child health, and an assessment of screen use during childhood.

Data collection

Data collection took place from November to December 2021 in the homes of the families. The mother/legal guardian responsible for the child benefiting from the Cartão Mais Infância was interviewed by field researchers who were properly trained. Three interview attempts were made in the selected house; if the responsible person could not be located, the house was replaced by another within the same municipality.

For the data collection, a system was developed that worked both online and offline. In the offline mode, the field researchers would submit the data when they had access to the Internet. The field researchers were undergraduate students from universities located in the territories where the research was conducted. They received training from the research team on every aspect of the questionnaire and the data collection instrument.

Statistical analysis

The data collected from the questionnaire were analyzed based on groups of indicators: social and economic profile of families, housing conditions, social assistance, health, education, violence, mental health, child development, child care, food insecurity, work, and income.

Categorical quantitative results were presented as percentages and counts, while numerical results were presented as measures of central tendency. Kolmogorov-

Smirnov normality tests were performed for numerical variables. Chi-square test was used for categorical variables to assess associations. Poisson regression models for non-repeated measures, adjusted for sampling effect using robust errors, were used for multi-variable analyses according to the theoretical model developed. P-values below 0.05 were considered significant. Data from the survey were tabulated and analyzed using STATA, version 13SE.

Ethical aspects

The project was submitted for evaluation to the Ethics and Research Committee (ERC), respecting the ethical-legal guidelines contained in Resolution No. 466/12 of the National Health Council/Brazilian Ministry of Health. All mothers/caregivers who were interviewed received the Informed Consent Form (ICF). The risks were minimal and referred to any situation in which the interviewee may have become sensitive or emotional, but the team assured total confidentiality of the answers and was trained to conduct the interview in a clear and efficient manner. The research project linked to the Federal University of Ceará was approved under opinion N^o. 4565697/2021.

RESULTS

A total of 484 women beneficiaries of the Cartão Mais Infância program were interviewed, belonging to families living in a state of extreme vulnerability in the state of Ceará.

The profile of these women shows that more than 50% became pregnant during adolescence, 90% identified themselves as black or of mixed race, and more than half had only a primary education. In terms of mental health, one in four women showed suggestive signs of depression,

and about 11% had experienced physical aggression from an intimate partner. As a result, 9% said they feared domestic violence and did not feel safe at home. Only 14% were in paid employment, while 30% were not living with the biological father of their children under the age of six. While 56% reported having access to the Internet, only 46% had access to piped water, and more than half used firewood or charcoal for cooking (table 1).

Of the population assessed, only 14% of women belong to families that are food secure. The majority report some degree of food insecurity, with 36% reporting severe food insecurity, a condition compatible with starvation (table 2).

When maternal mental health, represented in this study by the presence of CMDs, is taken into account, the prevalence of severe food insecurity increases significantly, affecting 53% of mothers with CMDs compared to 31% of those without ($p < 0.001$).

The presence of maternal CMDs increased the risk of severe food insecurity in the family by 73% ($p < 0.001$). Another mental health-related factor significantly associated with severe food insecurity was domestic violence, represented by feelings of insecurity at home and experiencing verbal aggression. These factors increased the risk of severe food insecurity by 67% and 71%, respectively, compared to those without these problems (table 3). In terms of social adversities, not having the biological father of their children under six at home significantly increased the risk of severe food insecurity by 37% ($p = 0.043$). Maternal perception of a decrease in food availability within the family due to the COVID-19 pandemic was another strongly correlated factor, with a 4.4 times higher odds of severe food insecurity among mothers who reported this perception ($p < 0.001$).

Table 1: Key characteristics of women beneficiaries of the Cartão Mais Infância Ceará program living in extreme poverty. Ceará, 2021

Characteristics	N	%	95% CI
Age when getting pregnant			
<20 years	279	58.0	54 – 62
20 years or more	202	42.0	38 – 47
Skin color			
White	48	9.9	5 – 14
Brown	383	79.1	74 – 81
Black	53	11.0	6 – 15
Marital status			
Single	152	31.4	27 – 36
Married / in a civil union	332	68.6	64 – 73
Education			
Elementary	241	56.1	51 – 61
High School/Higher	189	43.9	39 – 46
Common mental disorder			
Present	123	25.4	22 – 29
Absent	361	74.6	71 – 78

Continuation - Table 1: Key characteristics of women beneficiaries of the Cartão Mais Infância Ceará program living in extreme poverty. Ceará, 2021

Characteristics	N	%	95% CI
Feel safe at home			
No	42	8.7	8 – 9
Yes	442	91.3	89 – 94
Physical aggression			
Yes	55	11.4	7 – 12
No	429	88.6	87 – 93
Paternal presence			
No	143	29.6	26 – 34
Yes	341	70.4	66 – 74
Maternal work			
No	417	86.2	83 – 89
Yes	67	13.8	11 – 17
Internet availability			
No	213	44.0	39 – 48
Yes	271	56.0	52 – 60
Water quality			
Untreated	148	30.6	27 – 35
Boiled/filtered	126	26.0	22 – 30
Tap/purchased	210	43.4	39 – 48
Cooking fuels			
Firewood	159	32.9	29 – 37
Butane gas	222	45.9	42 – 50
Coal	103	21.3	18 – 25
Edible plants			
Yes	237	49.0	45 – 53
No	247	51.0	47 – 56
Raising animals for consumption			
Yes	219	45.3	41 – 50
No	265	54.7	50 – 59
Impact of COVID-19 on food availability			
Decreased food	386	79.8	76 – 83
Increased food	29	6.0	4 – 8
No impact	69	14.3	11 – 18

Table 2: Food insecurity in families living in extreme poverty, according to maternal mental health. Ceará, Brazil, 2021

Common mental disorder	Food insecurity				Total
	Severe	Moderate	Low	Secure	
	N (%)				
Presence	65 (52.8)	31 (25.2)	19 (15.5)	8 (6.5)	123 (25.4)
Absence	110 (30.5)	109 (30.2)	82 (22.7)	60 (16.6)	361 (74.6)
Total	175 (36.2)	140 (28.9)	101 (20.9)	68 (14.1)	484 (100.0)

Table 3: Factors associated with severe food insecurity in families living in extreme poverty, according to maternal mental health and adverse social conditions. Ceará, 2021

Factors	Severe food insecurity				
	Yes	No	PR ¹	95% CI ²	P value
	N (%)				
Mental health factors - Common mental disorder					
Present	65 (52.9)	58 (47.2)	1.73	1.28 - 2.36	<0.001
Absent	110 (30.5)	251 (69.5)	1		
Feel safe at home					
No	24 (57.1)	18 (42.9)	1.67	1.09 - 2.57	0.019
Yes	151 (34.2)	291 (65.8)	1		
Verbal aggression					
Yes	20 (58.8)	14 (41.2)	1.71	1.07 - 2.72	0.024
No	155 (34.4)	295 (65.6)	1		
Physical aggression					
Yes	26 (47.3)	29 (52.7)	1.36	0.90 - 2.06	0.147
No	149 (34.7)	280 (65.3)	1		
Family conflicts					
Yes	14 (38.9)	22 (61.1)	1.10	0.63 - 1.89	0.743
No	154 (35.5)	280 (64.5)	1		
Conflicts in the community					
Yes	22 (50.0)	22 (50.0)	1.44	0.92 - 2.25	0.110
No	145 (34.7)	273 (65.3)	1		
Social adversities					
Paternal presence					
No	64 (44.8)	79 (55.2)	1.37	1.01 - 1.87	0.043
Yes	111 (32.6)	230 (67.5)	1		
Maternal work					
No	28 (41.8)	39 (58.2)	1.19	0.89 - 1.78	0.409
Yes	147 (35.3)	270 (64.8)	1		
Unemployment					
Yes	25 (44.6)	31 (55.4)	1.27	0.83 - 1.95	0.263
No	150 (35.1)	278 (65.0)	1		
Food intake during COVID-19					
Decreased	150 (38.9)	236 (61.1)	4.4	1.97 - 10.1	<0.001
Increased	19 (65.5)	10 (34.5)	7.5	3.01 - 18.9	<0.001
No impact	6 (8.7)	63 (91.3)	1		

¹Prevalence ratio (PR); ² 95% confidence interval.

Table 4: Factors associated with severe food insecurity in families living in extreme poverty, according to maternal and household characteristics. Ceará, 2021

Factors	Severe food insecurity				
	Yes	No	PR ¹	95% CI ²	P value
	N (%)				
Maternal characteristics: Age when getting pregnant					
<20 years	112 (40.1)	167 (59.9)	1.29	0.94 - 1.75	0.109
20 years or more	63 (31.2)	139 (68.8)	1		
Skin color					
White	16 (33.3)	32 (66.7)	1		
Brown	138 (36.0)	245 (64.0)	1.08	0.64 - 1.81	0.768
Black	21 (39.6)	32 (60.4)	1.19	0.62 - 2.28	0.602
Marital status					
Single	64 (42.1)	88 (57.9)	1.26	0.93 - 1.71	0.142
Married / in a civil union	111 (33.4)	221 (66.6)	1		
Education					
Elementary	101 (41.9)	140 (58.1)	1.41	1.02 - 1.96	0.037
High school/Higher	56 (29.3)	133 (70.4)	1		
Household characteristics:					
Number of members					
1 to 3	82 (36.7)	141 (65.2)	1		
4 to 5	42 (35.6)	76 (64.4)	0.97	0.67 - 1.40	0.864
6 or more	51 (35.7)	92 (64.3)	0.97	0.68 - 1.38	0.864
Paternal education					
Elementary	57 (30.2)	132 (69.8)	1		
High school/Higher	40 (33.1)	81 (66.9)	1.10	0.73 - 1.64	0.656
Do not know	59 (49.2)	61 (50.8)	1.63	1.13 - 2.34	0.008
Internet availability					
No	88 (41.3)	125 (58.7)	1.29	0.96 - 1.73	0.095
Yes	87 (32.1)	184 (67.9)	1		
Water quality					
Untreated	70 (47.3)	78 (52.7)	1.55	1.11 - 2.18	0.011
Boiled/filtered	41 (32.5)	85 (67.5)	1.07	0.72 - 1.58	0.743
Tap/purchased	64 (30.5)	146 (69.5)	1		
Cooking fuel					
Firewood	70 (44.0)	89 (56.0)	1		
Butane gas	25 (24.3)	78 (75.7)	0.67	0.43 - 1.06	0.085
Coal	80 (36.0)	142 (64.0)	1.22	0.88 - 1.68	0.221
Edible plants					
Yes	72 (30.4)	165 (69.6)	0.85	0.73 - 0.99	0.039
No	103 (41.7)	144 (58.3)	1		
Raising animals for consumption					
Yes	72 (32.9)	162 (61.1)	0.91	0.79 - 1.07	0.276
No	103 (38.9)	147 (67.1)	1		

¹ Prevalence ratio (PR); ² 95% confidence interval.

Other mother and family characteristics associated with severe food insecurity are shown in Table 4. Having only an elementary school education increased the likelihood of a mother coming from a family with severe food insecurity by 41% compared to mothers with higher levels of education ($p = 0.037$). Lack of access to treated

drinking water also increased the odds of severe food insecurity by 55% ($p = 0.011$). Household cultivation of edible plants was observed as a protective factor against severe food insecurity, reducing the likelihood of the family experiencing the most severe form of food insecurity by 15% ($p = 0.039$).

Table 5: Final multivariate analysis model using poisson regression of factors associated with severe food insecurity in women living in extreme poverty. Ceará, Brazil, 2021

Factors	PR ¹ (95%CI ²)	P value	Adjusted PR ³ (95%CI)	P value
Common mental disorder				
Present	1.73 (1.28 - 2.36)	<0.001	1.64 (1.20 - 2.24)	0.002
Absent	1		1	
Feel safe at home				
No	1.67 (1.09 - 2.57)	0.019	1.48 (0.96 - 2.29)	0.076
Yes	1		1	
Water quality				
Untreated	1.55 (1.11 - 2.18)	0.011	1.55 (1.10 - 2.17)	0.011
Boiled/Filtered	1.07 (0.72 - 1.58)	0.743		

¹ Prevalence ratio (PR); ² 95% confidence interval; ³ Prevalence ratio adjusted for the following factors, in addition to those shown in the final model: verbal aggression, paternal presence and maternal education.

An adjusted analysis was conducted using Poisson regression, and the following factors remained significantly associated with severe FI in the final model: maternal CMDs and quality of water consumed (table 5). Maternal CMDs emerged as the risk factor most strongly associated with severe FI, with mothers with this mental disorder having a 64% higher adjusted risk compared to mothers without this condition ($p=0.002$). Conversely, the absence of a treated water supply in the home was associated with a 55% higher adjusted risk of severe FI ($p=0.011$). Factors such as feeling safe at home and growing edible plants showed only marginally significant associations, with adjusted measures of 48% risk and 13% protection, respectively.

DISCUSSION

The research conducted among families receiving support from a supplementary income transfer program in the state of Ceará revealed that 86% of the families were in a situation of food insecurity, with 36% of them experiencing severe FI. Another aspect that highlights the complexity of the patterns of these low-income families is the impact that starvation can have on the mental health of mothers of young children. The presence of maternal CMDs increased the risk of severe FI in the family by 73% ($p<0.001$).

In the sample, the prevalence of maternal CMDs was identified at 25%. When considering the association between severe FI and maternal CMDs, a notably higher CMD prevalence of 53% was observed. This figure was approximately eight times higher than that among mothers in food-secure situations, where CMD prevalence stood at 6.5%. However, it's important to acknowledge a significant limitation of this study, which is its cross-sectional nature. This limitation stems from the challenge of disentangling

cause and effect in the interaction between severe FI and CMDs, primarily due to the phenomenon of reverse causality.

An important aspect relevant to public health is the scarcity of studies specifically addressing the situation of severe food insecurity and adverse mental health in a population below the poverty line in middle-income countries such as Brazil, especially in one of the Brazilian states characterized by a population in need of targeted public policies to combat starvation.

Studies on food insecurity in high-income countries such as Canada and Australia suggest that different forms of food insecurity affect only 15% and 20% of the population, respectively, with the majority of families falling into milder forms of FI^{10,13}. Even when vulnerable populations such as people living with HIV are taken into account, the overall prevalence of severe FI is only 39%¹². Such high levels of severe FI as found in this study have only been found in Bangladesh, where 58% had moderate to severe FI⁸. The 36% rate of severe FI found in this research is the highest, exceeding the 55% rate for all degrees of FI in mothers with children under six years old in the state of Ceará¹¹, and the 36.7% rate for Brazil as a whole in 2018⁴.

In terms of maternal mental health, this is an issue of great concern in developed countries. For example, Canada reported an 18% prevalence of CMDs in its adult population¹⁰. In middle- and low-income countries such as Bangladesh, one of the highest prevalence rates of CMDs in the world was reported at 46%⁸. The situation found among women living in extreme poverty in Ceará was similarly alarming, reaching 25% of mothers surveyed. This rate was higher than that of the general population of women of reproductive age in Ceará (18%)¹¹. Domestic violence has also been well documented in Brazil, with studies conducted in Salvador, BA, indicating prevalence

rates of 10% for lower levels of physical violence and 5% for more severe forms⁷. This study reported even higher rates, with 9% of mothers reporting feelings of insecurity at home and 11% reporting physical aggression.

The study's primary objective, currently under consideration, focuses on the association between severe FI and adverse mental health indicators, as reported in previous studies conducted in Ethiopia, Canada, and Australia^{10,12,13,17}. The most intensive association was found in Dhaka, Bangladesh, where the risk of CMDs was 12 times higher in households with severe FI⁸. In situations of armed conflict (Afghanistan) or prolonged drought (India), the odds of CMDs in households with FI ranged from 1.9 to 3.4 times higher than in those without FI⁶. A meta-analysis of 19 studies from 10 countries found a positive association between FI and the risk of depression and stress, with odds ratios of 1.40 (95% CI 1.30 - 1.58) and 1.34 (95% CI 1.24 - 1.44), respectively¹⁸. In this study, severe FI was found to have a significant impact on maternal mental health, with mothers in this food insecure situation having a CMDs prevalence of 53%, about eight times higher than those in food secure situations (6.5%). In the risk analysis, CMDs emerged as the factor most strongly associated with FI, with mothers with this condition having a 75% higher risk of severe FI compared to those without CMDs.

Domestic violence was another maternal mental health factor associated with severe FI. Studies in Rio de Janeiro and Salvador found that violence against women, both psychological and physical, was a significant risk for household food insecurity^{7,15}. In the United States, an experiment identified FI as an important risk indicator for intimate partner violence, particularly among black women¹⁴. In this research, the risk of severe FI was up to 70% higher among mothers who reported feeling unsafe at home and who had experienced verbal and physical aggression than among mothers who hadn't experienced aggression.

Other predictors of severe FI found in this study included the absence of the child's biological father from the household, which increased the risk of severe FI by 37%; low maternal education, which was associated with a 41% higher risk of severe FI among those with only an elementary school education; and lack of treated drinking water, which was associated with a 55% higher risk of severe FI.

Other studies have also found the presence of single-parent families to be associated with FI^{19,20}. Associations have been found between maternal education and moderate and severe FI^{6,20,21}. Studies also suggest that households in rural areas with poorer access to treated water are more vulnerable to food insecurity²².

Growing edible plants was found to be a protective factor against severe FI, shielding 15% of families from adverse food situations. A study of active communities in the United States found that low intake of plant-based foods was associated with food insecurity¹⁹.

It is worth noting that a positive aspect of the research is the fact that it was limited to a more vulnerable population within the State of Ceará, those who depend on income transfer programs. Another distinctive feature was the focus on families experiencing severe food insecurity, essentially those living with hunger. As expected, this population had high rates of severe FI coupled with a high prevalence of CMDs, together affecting 13.4% of mothers of young children living in extreme poverty. Aggravating factors for severe FI and CMDs were identified as domestic violence, paternal absence, and low maternal education.

In conclusion, the participating mothers exhibited a high prevalence of CMDs and demonstrated a profile of considerable vulnerability. Consequently, there is an imperative for providing social and nutritional support, along with regular monitoring of the mental well-being of these women, to enhance the care provided to their children. This underscores the need for targeted public policies that provide social and economic support, including income transfers.

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Resumo

Introdução: a insegurança alimentar tem efeitos importantes e agravantes na saúde humana, especialmente na saúde mental das mães e crianças.

Objetivo: avaliar as inter-relações do Transtorno mental comum (TMC) e Insegurança Alimentar, em famílias assistidas por programa adicional de transferência de renda no Ceará.

Método: estudo transversal foi realizado no Ceará, caracterizado como um dos estados mais pobres do país, em uma amostra de 484 famílias, com crianças menores de seis anos, beneficiárias do Cartão Mais Infância Ceará (CMIC), em 24 municípios. Foram analisados o perfil social e econômico das famílias, moradia, dados sobre a saúde e educação, violência, saúde mental, insegurança alimentar, trabalho e renda. Utilizou-se modelos de Regressão de Poisson, ajustados para o efeito amostral.

Resultados: das 484 famílias, 86% encontravam-se em situação de IA; 36% apresentavam IA Grave. A presença do TMC materno aumentou em 73% o risco de IA Grave na família ($p < 0,001$). A análise de regressão, mostrou que o TMC se manteve como o fator de risco associado à IA Grave, com mães com TMC mostrando um risco ajustado 64% mais elevado, em comparação às outras mães ($p = 0,002$). Não dispor de água tratada no domicílio, apresentou uma medida ajustada de 55% maior risco de IA Grave ($p = 0,011$).

Conclusão: as mães assistidas possuem elevada prevalência de TMC e com perfil de alta vulnerabilidade, sendo necessário suporte social e nutricional, acompanhamento da saúde mental dessas mulheres, para melhor cuidar dos filhos.

Palavras-chave: segurança alimentar, criança, saúde mental, nutrição, avaliação de programas.

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