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# Cash transfer in Brazil and nutritional outcomes: a systematic review

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## ABSTRACT

**OBJECTIVE:** To analyze the influence of conditional cash transfer programs on diet and nutrition outcomes among beneficiary families in Brazil.

**METHODS:** A systematic review of literature was carried out with original evaluation studies conducted in Brazil, including all types of clinical trials and observational studies. The search was conducted in PubMed, Scopus, Web of Science and LILACS databases for papers published since 1990. The studies were analyzed according to the program evaluated, participants, study design, location, principal conclusions, confounding factors and methodological limitations. They were classified according to outcomes (nutritional status, dietary intake and food security) and level of evidence for the association with conditional cash transfer programs (adequacy or plausibility).

**RESULTS:** We found 1,412 non-duplicated papers. Fifteen met the eligibility criteria and twelve evaluated the *Bolsa Família* program. Five plausibility studies and two adequacy analyses indicated a positive influence of conditional cash transfer programs on nutritional status of the beneficiary children. The conditional cash transfer programs influence on dietary intake was analyzed in one population-based adequacy study and three cross-sectional plausibility researches in different municipalities. All of them indicated that beneficiaries had higher food intake than non-beneficiaries. The three cross-sectional plausibility analyses suggest a positive influence of conditional cash transfer programs on the food security of the beneficiaries. The main methodological limitations found were using cross-sectional analysis and difficulties in data collection, small sample sizes and limitations of the instruments used.

**CONCLUSIONS:** The few studies found indicated a positive association between Brazilian conditional cash transfer programs and improvements in the recipients' diet and nutrition. Greater efforts to widen and qualify evaluations are needed in order to assess more comprehensively the impact of conditional cash transfer programs in Brazil.

**DESCRIPTORS:** Income. Government Programs. Poverty. Food Consumption. Nutritional Status. Nutritional Epidemiology. Food Security. Review.

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## INTRODUCTION

Conditional cash transfer programs (CCTP) are social protection policies aiming for the social inclusion of families in situations of extreme poverty. Due to the widespread poverty in the world, which has complex and multi-dimensional origins, CCTP have been adopted in countless developing countries over the last two decades.<sup>2,29</sup>

In Brazil, the first CCTP appeared in the 1990s. However, their territorial and numerical expansion occurred mostly from 2001 onwards, with the creation of federal programs such as: *Programa Bolsa Escola* (School Grants Program), *Programa Bolsa Alimentação* (Food Grants Program), *Auxílio Gás* (Gas Subsidies) and *Cartão Alimentação* (Food cards). These programs were even more focused on extreme poverty and many of them had conditionalities, such as having the child vaccinated or having minimum school attendance.<sup>a</sup> In 2003, federal resources became centered on one single program, the *Programa Bolsa Família* (PBF – Family Grant Program) which, by the end of 2012, had aided 13.9 million families.<sup>b</sup> The requirement to meet health care conditions, involving monitoring children's growth and development and vaccinations and pregnant women going to antenatal and postnatal appointments, was expanded from 10.0% of households benefitting from the PBF, in 2005, to around 70.0% in 2011.<sup>c</sup>

CCTP have made a positive contribution, especially in tackling social inequalities. Between 2001 and 2005, social inequality in Brazil was reduced by around 20.0% in the whole country and by almost 50.0% in the Northeast, where the coverage of such programs is highest.<sup>6,d</sup> Although there are still few results on the impact of CCTP on the health of the recipients, there is evidence that social inequalities have decreased and purchasing power of the households increased, leading to decreasing levels of malnutrition and infant mortality.<sup>13,33</sup> Between 2004 and 2009, it was verified that the PBF had contributed to reducing infant mortality in Brazilian municipalities.<sup>22</sup>

In Brazil, there is consensus on the need to maintain and improve conditional cash transfers. The presence of the CCTP, together with policies to strengthen the Brazilian Unified Health System (SUS) and programs

focusing on education and social security, enable the cycle of poverty, generation after generation, to be broken and, therefore, result in improved health condition and quality of life for the population.<sup>2,e</sup>

Evaluations of the impact of the CCTP on the diet and nutrition up until now have different results. There is only one literature review on the impact of the PBF on food security and nutrition, although this was not systematic and did not analyze the level of evidence of the results obtained.<sup>1</sup>

The aim of this study was to analyze the influence of conditional cash transfer programs on diet and nutrition outcomes among the recipient families.

## METHODS

A systematic revision of the literature was performed, centered on the guiding question: "Are conditional cash transfer programs in Brazil capable of affecting the diet and nutrition of the recipient families?". The presentation of the review was based on the directives of the PRISMA protocol for systematic reviews and meta-analyses.<sup>7</sup>

Concerning the inclusion criteria, we looked for original studies, performed in Brazil and published in journals indexed in the selected databases, containing at least one outcome related to diet and nutrition, such as dietary intake, food and nutritional security and/or nutritional status of the beneficiary population. Clinical (random or otherwise) or observational (cross-sectional, longitudinal, with and without control group) studies, published after 1990 in Portuguese, Spanish or English were included. It was decided not to include documents from official evaluations of the CCTP.

The search strategy adopted was to consult the Web of Science, Scopus, PubMed and Lilacs databases.

The following search limits were considered: studies involving humans, published in Portuguese, English or Spanish and dated between January 1990 and July 15, 2013. Two sets of search term intersections were combined: cash transfer [cash transfer, cash transfer program, conditional cash transfer, *Bolsa Família*,

<sup>a</sup> Ministério do Desenvolvimento Social e Combate à Fome. Evolução dos recursos dos programas de transferência de renda. *Cad SUAS*. 2008;3(3). Available from: <http://www.mds.gov.br/assistenciasocial/secretaria-nacional-de-assistencia-social-snas/cadernos/cadernos-suas-evolucao-dos-recursos-dos-programas-de-transferencia-de-renda>

<sup>b</sup> Ministério do Desenvolvimento Social e Combate à Fome, Secretaria de Avaliação e Gestão da Informação. Relatórios de Informações Sociais. Brasília (DF); s.d. [cited 2013 Jan 26]. Available from: <http://aplicacoes.mds.gov.br/sagi/Rlv3/geral/>

<sup>c</sup> Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica, Coordenação Geral de Alimentação e Nutrição. Acompanhamento das condicionalidades da saúde do Programa Bolsa Família (1ª vigência de 2011). Brasília (DF); 2011. (Nota Técnica 2011). [cited 2012 Sep 12]. Available from: [http://189.28.128.100/nutricao/docs/geral/nt2011\\_vigencia1.pdf](http://189.28.128.100/nutricao/docs/geral/nt2011_vigencia1.pdf)

<sup>d</sup> Barros RP, Carvalho M, Franco S, Mendonça R. A queda recente da desigualdade de renda no Brasil. In: Barros RP, Foguel MN, Ulysses G, organizadores. Desigualdade de renda no Brasil: uma análise da queda recente. Brasília (DF): IPEA; 2007. v.1, cap 2, p. 107-27.

<sup>e</sup> Barreto ML, Teixeira MG, Morais Neto OL, Duarte EC. Considerações finais: programas de transferência de renda e o Sistema Único de Saúde: potencializando o impacto das ações. In: Ministério da Saúde, Secretaria de Vigilância em Saúde. Saúde Brasil 2010: uma análise da situação de saúde e de evidências selecionadas de impacto de ações de vigilância em saúde. Brasília (DF); 2011. p. 367-72.

*Bolsa Alimentação*, Nutrition Programs, public policy, poverty, government program, public assistance, income] and diet and nutrition [food, diet, food consumption, food habits, food security, nutritional status, anthropometry, anthropometry measurements, nutritional assessment].

In the search of the PubMed, Web of Science and Scopus databases, the term Brazil was included. The inclusion of this term in LILACS would limited the search, as studies performed in Brazilian municipalities are common in this database and are published in national journals, without mentioning the name of the country.

Each term was individually crossed with the others, guaranteeing the inclusion of all articles related to the topic. The reference lists of the articles were also researched, with the aim of identifying more original studies that had not been found in the search. However, this complementary strategy did not turn up any more results. The articles were selected and organized with EndNoteWeb (version 3.4) software.

First, two of the authors assessed the titles and abstracts of the papers, rejecting those which did not meet the inclusion criteria. To resolve any doubts, the complete text was consulted to confirm the eligibility of the study. If the two evaluators did not agree, another author examined the article. All of the studies were

independently judged by the authors, according to the above mentioned criteria.

The papers were systematically reviewed, grouped according to outcome category (food consumption, food and nutritional security and nutritional status). The studies were evaluated according to the CTTP studied, the participants (study population, sample size, control group), study design, time and place conducted, outcome, key conclusions and adjusted for confounding factors, as well as the methodological limitations mentioned by the authors. In addition, the theoretical framework to evaluate programs and health care policies was used to judge the level of evidence provided by the studies and to classify them. They were classified as accuracy, plausibility or probability studies, with the latter two categories considered to have historical, internal or external control.<sup>5</sup>

Given the heterogeneity of the study designs, outcomes and analyses, a narrative analysis was performed according to the outcome category. For outcomes related to nutritional status, studies which assessed anthropometric data of children and adults were selected; for outcomes concerning food consumption, studies which evaluated food intake, perception of food intake or frequency of food intake were selected. Finally, relating to nutritional security, studies that applied the Brazilian Food Security Scale to evaluate the access to foodstuffs were selected.

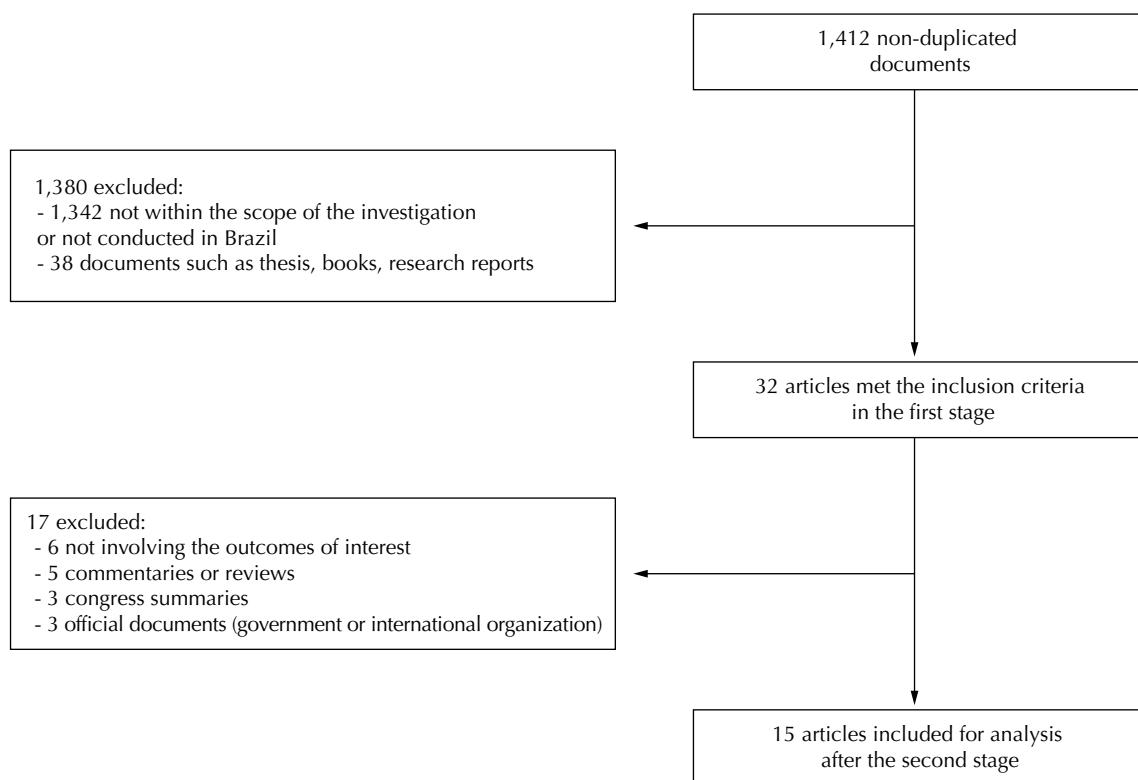


Figure. Process of selecting the studies.

## RESULTS

The search identified 1,412 non-duplicated documents, of which 1,397 did not meet the eligibility criteria, resulting in 15 articles for analysis. The complete selection process can be found in the Figure.

Nine studies that evaluated the influence of CCTP on nutritional status were selected. The methodology, principal results and methodological limitations of these studies were described, according to the level of evidence obtained (Table 1). All of the studies' samples were on a municipal, state or regional level, of which four used a control group and adjusted for external factors and only one was population based. Two of the studies were longitudinal analyses and the others were cross-sectional.

Only one of the studies assessed the *Programa Bolsa Alimentação* (PBA).<sup>14</sup> This study had two stages: a cross-sectional stage and a retrospective cohort. Both stages took place in four municipalities in the Northeast, where the program had been established for less than six months. It was the only study which obtained plausibility evidence with internal control, as the recipient households were compared with others which were eligible to receive the benefit, but had been excluded because of administrative errors in the registration. Anthropometric measurements of the intervention and control groups were taken (individually matched), and up to ten reported weight measurements were recorded from the Child Health Card for a longitudinal sub-analysis (retrospective cohort). It concluded that children included in the PBA had lower initial z-scores and gained less weight (31 g less) compared with children who did not benefit from the first six months of the program.

Plausibility studies with external control, in which the recipients were compared with non-recipients with similar socioeconomic characteristics, predominated in the PBF impact evaluations on nutritional status. One of the studies was originated from surveys that took place during vaccination campaigns in socially vulnerable areas of the country, with around 15 thousand children.<sup>17</sup> In that study, belonging to the PBF increased by 26.0% the chance of the children to have a z-score appropriate for height/age and weight/age, after controlling for external factors. Similarly, another study, carried out in seven rural communities in the North of the country, found an increase of 0.25 in the mean z-score for height/age in children receiving the PBF, after adjusting for socioeconomic factors.<sup>20</sup> This study compared the nutritional status evolution over a five-year period (before and after the establishment of the program) in a sample of around 204 individuals under 18 years old.

In four plausibility studies with external control it was found that the PBF had no effect on the nutritional status of children receiving it. Two of them<sup>15,16</sup> used different analytical approaches in a cross-sectional study of a sample of 446 children in a municipality in the Southeast. However, none of the approaches found an association between belonging to the PBF and nutritional status (continuous z-score for weight/age and height/age or categorized as malnourished or otherwise), even after adjusting for external factors. The others were cross-sectional and took place in a city in the Northeast with a sample of 164 children<sup>25</sup> and in the Southeast with a sample of 115 children.<sup>18</sup> Neither found statistically significant differences between mean z-scores for weight/height, weight/age and height/age or in the prevalence of being small for age or overweight for PBF recipients and non-recipients, without adjusting for other factors.

The accuracy studies, which only evaluated the recipients without using a control group, highlighted the need to implement diet and nutrition campaigns aimed at PBF recipients. In a cross-sectional population based study in a municipality in the South of the country, the prevalence of overweight in the adult population was higher than 50.0% and the increased risk for cardiovascular disease was around 30.0%.<sup>10</sup> The study that assessed regional disparities in the state of Sergipe, using data of the SISVAN/DATASUS,<sup>f</sup> from 2008 to 2010, concluded that there was a higher prevalence of overweight or obesity in children receiving the PBF<sup>28</sup> in the regions with lower human development Indices.

The five studies that assessed the relationship between CCTP and food consumption are shown in Table 2. All of them were cross-sectional studies and only one used a national representative sample, although no comparison with a control group was made.

The three plausibility studies identified had external control groups and evaluated diet diversity of CCTP beneficiaries.<sup>18,19,25</sup> The first concluded that there had been an increase in amount of protein intake (around 10 g) and that protein intake was appropriate among the recipients of the program, without adjusting for other factors.<sup>19</sup> The second study<sup>25</sup> found an association between being included in the PBF and increased consumption of processed foodstuffs with high concentration of added sugar (the chance of consumption was 3.1 times higher for recipients). In Belo Horizonte, MG, Southeastern Brazil, it was noted that meals were skipped more often and there was greater consumption of cheese, milk, fast-food and sweets in school break times among children receiving the PBF.<sup>18</sup>

<sup>f</sup>Sistema de Vigilância Alimentar e Nutricional. Departamento de Informática do SUS – SISVAN/DATASUS. Available from: [http://tabnet.datasus.gov.br/cgi-win/SISVAN/CNV/notas\\_sisvan.html](http://tabnet.datasus.gov.br/cgi-win/SISVAN/CNV/notas_sisvan.html)

**Table 1.** Description of the studies evaluating the influence of conditional cash transfer programs in Brazil on the nutritional status of the recipients.

Authors/ Program	Participants	Study design	Local and data	Outcome	Main conclusions	Methodological limitations
Morris et al <sup>14</sup> PBA	1,347 children under 7 included in the PBA and 483 excluded due to administrative errors (measurements taken); 472 children receiving and 158 excluded under 3 years old (reported measurements)	Cross-sectional study and retrospective cohort study	4 municipalities in the Northeast 2002	Z-scores for weight/age, difference in weight gain 6 months after starting to receive PBA	Children included had lower z-score for weight/age than those excluded. Each additional month in the PBA (total of 6 months) was associated with 31 g less weight gain after adjusting for socioeconomic characteristics.	Possible bias from the receipt of another benefit (School Grant) by the beneficiaries of the PBA. Lack of a measure of weight and height prior to the start of the program. Sample of only four municipalities in the Northeast.
Paes-Sousa et al <sup>17</sup> PBF	22,375 children under 5 years old from areas with low socioeconomic levels (included and not included in the PBF)	4 cross-sectional studies	419 municipalities in Brazil (4 Chamadas Nutricionais) 2005/2006	Z score for weight/age and height/age	Children included in the PBF showed 26% greater chance of having appropriate height/age and weight/age. Greater effect among children older than 35 months, after adjusting for socioeconomic characteristics.	Cross-sectional study has inherent limitations. Unable to determine the time of exposure to the program or the possible biases related to participation in programs other than the PBF. Some variables not assessed could explain residual confounding such as family income, food consumption and nutritional status before entry into the program.
Piperata et al <sup>20</sup> PBF	469 individuals in 2002 429 individuals in 2009 Sub-sample of 204 individuals (longitudinal)	2 cross-sectional and one longitudinal study	7 rural communities in 2 municipalities in Pará 2002 and 2009	Z score for weight/age and height/age in individuals aged under 18	Significant positive effect of PBF on the difference in height/age between the two studies for both sexes and for males, after adjusting for socioeconomic characteristics.	The doubt remained as to whether the effect came from the cash transfer itself or from another aspect of the PBF, such as the conditionalities. Small sample size.
Oliveira et al <sup>15</sup> PBF	443 children aged from 6 to 84 months (262 included and 184 not included), with per capita income < R\$ 120.00	Cross-sectional study	One municipality in the Southeast 2007	Malnutrition (z-score for weight/age and height/age < -2)	There were no statistically significant differences between the prevalence of malnutrition among the groups for any anthropometric index, after adjusting for socioeconomic characteristics.	Inclusion of siblings of children selected to compose the study.

Continue

Continuation	Study description	Study design	Setting	Measure	Results	Limitations
Oliveira et al <sup>16</sup> PBF	443 children aged from 6 to 84 months registered to receive the PBF (184 not included and 262 included)	Cross-sectional study	One municipality in the Southeast 2007	Z-score for weight/age and height/age and BMI/age	There were no statistically significant differences between the nutritional status of children included in the PBF and the length of time receiving the benefit, without adjusting for other factors.  There were no statistically significant differences between the nutritional status of children and being included in the PBF, without adjusting for other factors.	The prevalence rates cannot be extrapolated for all Brazilians. Cross-sectional analysis means it cannot be guaranteed that the results represent the effect of the program or whether they already existed before the PBF started.  No limitations indicated.
Saldiva et al <sup>25</sup> PBF	411 families and 164 children under 5 (included and not included in the PBF)	Cross-sectional study	One municipality in the Northeast 2005	Z-score for weight/height, weight/age and height/age	3.0% of stunted in children not in the de PBF and 0% in children included in the de PBF (p = 0.28).  Increased risk of overweight or obesity of 27.6% in those not included and 16.2% in those included in the PBF (p = 0.16).	Not possible to evaluate association between doing physical exercise and nutritional status.  Minimum sample size not calculated. Small sample size. Study carried out in one municipal school in Belo Horizonte.
Paula et al <sup>18</sup> PBF	115 children aged from 6 to 10 years old	Cross-sectional study	1 municipal school of a municipality in the Southeast 2009	Stunted (height/age index) and BMI/age		
Studies of accuracy						
Lima et al <sup>9</sup> PBF	747 adults included in the PBF	Population based cross-sectional study	One municipality in the South 2006/2007	Excess weight (BMI > 25 kg/m <sup>2</sup> ) risk of CVD (waist circumference).	Prevalence of 29.0% overweight and 27.1% obesity. Higher chance of being overweight in men, being over 40 and being single. 46.2% of adults at increased risk of CVD.	No limitations indicated.
Silva <sup>28</sup> PBF	79,795 children aged 5 to 10 years old, receiving the PBF (DATASUS/ SISVAN records).	3 cross-sectional studies	State of Sergipe 2008 to 2010	Prevalence of overweight and obesity by sex, year of study and each health region.	Prevalence of overweight in girls went from 12.2% in 2008 to 13.2% in 2010 and obesity from 11.0% to 11.9%. In males, prevalence of overweight went from 12.4% to 13.2% and obesity from 11.0% to 15.1%. Higher prevalence in regions with lower HDI.	Use of secondary data meant not controlling for possible data input and recording errors, as well as possible underreporting.

PBA: Food grant program; PBF: Family grant program; CVD: Cardiovascular disease; HDI: Human Development Index.

**Table 2.** Description of studies evaluating the influence of conditional cash transfer programs in Brazil on recipients' food consumption.

Authors/ Program	Participants	Study design	Time and place	Outcome	Main conclusions	Methodological limitations
Piperata et al <sup>19</sup> PBF	30 women in 2002 and 52 women in 2009 and a subsample of 20 women (longitudinal)	2 cross-sectional studies and a longitudinal study	7 rural communities in 2 municipalities in Pará 2002 and 2009	Quantity of calories, protein (g), carbohydrates (g) and lipids (g) and adequacy of protein consumption.	Higher protein intake and adequate protein consumption among PBF recipients, without adjusting for other factors.	Time required to collect data on food intake and dispersion of households in the region limited sample size. Data did not reflect food consumption patterns of communities in other places and with other economic subsistence strategies.
Saldiva et al <sup>25</sup> PBF	411 families and 164 children under 5 (included in PBF or otherwise)	cross-sectional study	1 municipality in the Northeast 2005	Frequency of consumption of 23 foodstuffs and classification of high or low intake for fruit, vegetables, beans, meat and soft drinks, candies and other sweets.	Positive and statistically significant association between consumption of soft drinks, candies and other sweets and receiving PBF, after adjusting for socioeconomic variables.	No limitations indicated.
Paula et al <sup>18</sup> PBF	115 children aged 6 to 10 years old	cross-sectional study	1 municipal school and 1 municipality in the Southeast 2009	Qualitative questionnaire on one day's consumption (preferences and eating habits and children's satisfaction with fruit, soft drinks, rice and beans and vegetables)	80.0% of the children receiving the PBF had five meals a day, compared with 52.1% non-PBF (p = 0.01). Significant differences were identified (p < 0.05) with regards intake of different foods, as morning and afternoon snacks between PBF and non-PBF children.	Only one day's food intake was evaluated, does not show habitual intake. Not possible to evaluate association between doing physical activity and nutritional status. Minimum sample size not calculated, resulting in a small sample.
Study of accuracy						
Lignani et al <sup>8</sup> PBF	Those responsible for the benefit (women in 93.6% of cases) in 5,000 Brazilian residences.	Population based cross-sectional study	Brazil 2007	Recipients' perceptions of changes in their food intake for 16 food groups.	Families reported higher intake of all food groups. The length of time they had received the PBF had no effect on the changes in the diet. Higher intake of all food groups the greater the financial dependence on the PBF.	No limitations indicated.
Lima et al <sup>9</sup> PBF	747 PBF recipients aged 19 and over, (91.4% of interviewees were women)	Population based cross-sectional study	1 municipality in the South 2006/2007	Diet Quality Index (DQI)	According to the DQI, 52.9% were classified as having an inadequate diet, 45.8% with a diet in need of change and 1.3% with an adequate diet. Median consumption of meat and beans was high (> 8 points), although two thirds of the population did not eat fruit every day, 46.0% did not eat vegetables and 43.9% did not consume milk or dairy products.	Using a 24hr recall to evaluate diet quality. Cross-sectional design, meant that consumption before receiving the benefit could not be assessed.

PBF: Family grant program.

One of the accuracy studies assessed the perceptions of PBF recipients regarding their food intake in a representative sample of beneficiary households. After entering the program, the households reported higher intake of all food groups, although no association was found with the period that the benefit was received. Also, the higher the value of the benefit, the higher the intake of all foodgroups.<sup>8</sup> The second study<sup>9</sup> assessed the diets of 747 PBF recipients in a municipality in the South using the Dietary Quality Index (DQI). It was concluded that the majority of recipients' diets were not adequate. Although the median consumption of beans and meat was high, around 45.0% of the beneficiaries did not consume vegetables, milk and other dairy products.<sup>9</sup>

Another three evaluations of the impact of CCTP on nutritional security of the recipients were identified. All of them were cross-sectional plausibility studies with external control (Table 3). On two of the studies, it was observed that the households in worse situations of nutritional security were selected to receive the benefits.<sup>27,30</sup>

In a study of a representative sample in Brazil, it was found that there was a significant increase of 8.0% in the chance of having nutritional security in households which benefitted from the programs existing in 2004 (Food Cards, Continued Benefit, Program for the Eradication of Child Labor and Food Grants), for each R\$ 10.00 increase in the value of the benefit, after selecting low income households and adjusting for sociodemographic variables.<sup>27</sup> The study performed in the Northeast found that, there was a decrease of 4.8% in the prevalence of severe food insecurity, adjusted for income, among beneficiary households, when compared with non-beneficiaries.<sup>30</sup> The third study evaluated food insecurity in 172 households, from a primary health care unit in the Southeast.<sup>3</sup> It was verified that 12% of the interviewees were in severe food insecurity, although it was not reported the proportions of recipients and non-recipients of the PBF or the municipal CCTP "Full Basket, Happy Family".

The majority of methodological limitations highlighted in all of the studies were related to the cross-sectional design of data collection, which meant they were

**Table 3.** Description of studies evaluating the influence of conditional cash transfer programs in Brazil on the recipients' food and nutrition security.

Authors/ Program	Participants	Study design	Time and place	Outcome	Main conclusions	Methodological limitations
Plausibility study with external control						
Segal-Correa et al <sup>27</sup> Set of municipal programs	56,037 Brazilian households with <i>per capita</i> income below R\$ 260.00	Cross- sectional study	Brazil (secondary data from the 2004 PNAD)	Food security or mild and moderate or severe FI (EBIA)	Increasing the value of the cash transfer by R\$ 10.00 increases the family's chance of food security by 8.0%, after adjusting for sociodemographic variables.	Cross-sectional study means no conclusions could be drawn on the effects of the program.
Vianna et al <sup>30</sup> School grant, Gas Tickets, Food grant, Family grant	4,533 families	Population based cross- sectional study	14 municipalities in Paraiba in 2005	Food security, mild and moderate or severe FI (EBIA)	Comparing families with <i>per capita</i> income < R\$25.00, a lower prevalence of severe FI in families registered in the CCTP (reduction of 4.8%), after adjusting for income.	It was not possible to classify the families on more than one minimum wage/ month. These data were not sufficient to evaluate the impact of these programs as there were no parameters for comparing the situation observed.
Dias et al <sup>3</sup> PBF, municipal program Cesta Cheia, Família Feliz – Full basket, happy family	172 families receiving <i>Programas Bolsa Família</i> and <i>Cesta Cheia, Família Feliz</i>	Population based cross- sectional study	1 primary health care unit in a municipality in the Southeast 2009	Food security, mild and moderate or severe FI (EBIA)	28.0% were found to have food security and 12.0% to have severe food insecurity. Increased income lead to significant drops in food insecurity ( $p < 0.01$ ).	Cross-sectional study means causal relationships between the dependent variable (food insecurity) and the independent variables cannot be proved.

CCTP: Conditional Cash Transfer Programs; FI: Food insecurity; EBIA: Brazilian Scale of Food Insecurity; PNAD: National Household Survey; PBF: Family grant program.



unable to confirm the existence of a causal relationship between belonging to a CCTP and the outcome studied. Also, small sample sizes, difficulties in collecting data and limitations of the instrument used were also noted as limiting factors.

## DISCUSSION

This study aimed to systematically review studies evaluating the impact of CCTP on the food intake, nutritional status and food and nutritional security of recipient households in Brazil. Of the studies found, it was noted that the majority of them obtained evidence of plausibility and evaluated the impacts of CCTP on the nutritional status of the recipient households as positive, especially for children. With regard other outcomes, the few evaluations found indicated an association between belonging to a CCTP and increased consumption of different food groups and increased food and nutritional security of the recipients.

On the subject of study design, some carefully selected a control group with similar socioeconomic characteristics to the recipients of the benefit<sup>14,19,20</sup> and others obtained representative population based samples.<sup>8,27,30</sup> However, methodological problems were identified in other studies which compromised the interpretation of results and weakened the evidence obtained, such as selecting the sample by convenience, small sample size<sup>18,19,25</sup> and not adjusting for confounding variables.<sup>9,16</sup>

Evidences obtained in plausibility studies are useful and reliable in evaluating the impact of programs and public policies. Although they do not have the maximum internal validity, due to the lack of sampling randomization, they can provide consistent results on the effect of a specific program, when combined with strategies that strengthen the evidence. Among the most commonly used strategies are adopting similar control groups for characteristics which may affect the result, adjusting for confounding effects and analyzing the dose-response effect. Evidence from accuracy studies can be used as tools to monitor the evolution of specific indicators over time, when accompanied by other studies indicating the isolated influence of the program on these indicators.<sup>31</sup>

It is believed that the probability inference is not needed in evaluating the impact of comprehensive, large-scale CCTP, as can be observed in a controlled and randomized study in Mexico,<sup>23</sup> due to peculiarities on establishing the Mexican cash transfer program. Performing a study of this type in Brazil would not be viable for ethical reasons, as it would not be possible to select the households receiving (or not) the benefit, and because of the difficulty of controlling the entire complex causal pathway between cash transfers and their effect on the recipients diet and nutrition.<sup>31</sup>

When evaluating the diet and nutrition status of vulnerable populations, there is no gold standard indicator, but it is possible to obtain a combination of indicators which assess different aspects such as the health, economy, behavior and perception of the individuals studied. In this revision, we selected three nutritional outcomes which were related to income and the combination of which provided a more complete picture of the impact of the CCTP in the diet and nutrition of the recipients.<sup>12</sup> The quantitative indicators analyzed were anthropometric (especially in children) and food consumption, which measured the appropriateness of the population's energy and nutrient intake and its dietary habits.

According to the World Health Organization, nutritional status evaluation using anthropometric measurements is an ideal indicator for studies aiming to investigate inequalities in health care and economic development<sup>35</sup> and so has been used as a classical measure in evaluation studies of public policies. Nutritional deficiencies in early childhood – strongly associated with conditions of social inequality – can be reversed through overall improvements in living conditions. This phenomenon, known as catch-up, is more successful when the improvements occur in early childhood.<sup>21,35</sup> Measuring individual food consumption enables accurate dietary data to be obtained, although it requires a high level of logistics and training. These data can be used to validate information obtained in family budget surveys, which provide lower cost representative data on acquisition of foodstuffs on a household level.<sup>4</sup> Both consumption and acquisition of foodstuffs indicate how household income is spent on foodstuffs and how the household behaves when receiving cash transfers.

The third outcome used was evaluating the food and nutritional security of the households using the Brazilian Scale of Food Insecurity. This is a scale which has been translated and adapted for the Brazilian population and evaluates the household's perceptions about hunger. It is considered a qualitative indicator of the population's food and nutrition status and a more direct method of evaluating access to an adequate diet. However, this method is still relatively new, which means there are doubts about its ability to assess less severe forms of chronic food insecurity and to be used as a marker of food and nutritional security in evaluating the impact of interventions.<sup>34</sup> Using the scale is a valid strategy of evaluating perceptions of improvements in food security conditions after receiving the benefit. However, it comprises subjective conceptions, making difficult to control for other variables which could alter this relationship, such as the influence of other public policies in other areas, as well as social assistance.

Other studies evaluating the impact of CCTP on food and nutrition related outcomes were found in the reference lists of the selected papers, but were not included

in this review as they were not published in indexed journals. A version of one particular study, cited in in various papers, and presented as a “preliminary and incomplete document” was excluded.<sup>8</sup> An effort was made to locate the final publication; however, no response was obtained from the authors and so it was decided not to include it.

It was also decided not to include official documents evaluating CCTP, as they may only highlight such results as favor the continuance of the programs, which would bias the findings of the review. In fact, it was verified that in the evaluations conducted or commissioned by the Federal Government,<sup>hi</sup> the CCTP were shown to have positive impact on reducing social inequality in terms of food and nutritional insecurity. Moreover, some studies that are included in this review<sup>14,17</sup> used data from research performed by the Federal Government and including official documents would duplicate some results.

The main sources of errors in evaluating the impact of CCTP are the lack of evaluation, the use of inappropriate methods and the lack of evaluating the process and context in which the program operates.<sup>32</sup> By looking at the set of studies on Brazilian CCTP it is possible to identify some of these errors, especially those involving the lack of process evaluation. It was

noted that the CCTP in Brazil were established before planning an evaluation stage. Thus, what was found were merely evaluations using impact indicators, but not evaluating the process (provision, use, coverage). Given the complexity of the influence of CCTP in Brazil, studies on implementation and process evaluations are important in verifying whether the lack of effect is the result of a problem in the program or a problem in the evaluation.<sup>24</sup> Such findings can improve the impact of the programs by indicating what needs to be changed.<sup>5</sup> Of the studies which assessed the implementation of CCTP in Brazil, gaps were identified in the legislation, organization and bureaucratic structure of the municipalities, affecting the performance in the coverage and impact of the PBF<sup>11</sup> and other programs which preceded it.<sup>26</sup>

Overall, the few studies found indicate a positive association between belonging to a CCTP and improvements in the diet and nutrition of the recipient families in Brazil, although there are no standardized indicators or external validity, making it impossible to conduct a robust evaluation of the relationship between CCTP and the outcomes in question. New studies, using standardized evaluation with methodological rigor and indicators defined and measured appropriately, are needed to clarify the impacts of CCTP on the diet and nutrition of recipients, based on high quality evidence.

<sup>8</sup> Olinto P, Flores R, Morris S, Veiga A. The Impact of the Bolsa Alimentação Program on food consumption. Presented at the Annual Meeting of the International Association of Agricultural Economists Durban; 2003 Ago 16-22; Durban, South Africa. Available from: [http://siteresources.worldbank.org/EXTLACREGTOPPOVANA/Resources/OlintoFloresMorrisVeigaimpactofbolsadeali\\_entacaoprogram.pdf](http://siteresources.worldbank.org/EXTLACREGTOPPOVANA/Resources/OlintoFloresMorrisVeigaimpactofbolsadeali_entacaoprogram.pdf)

<sup>h</sup> Santos LMP, Guanais F, Porto DL, Morais Neto OL, Stevens A, Escalante JJC, et al. Peso ao nascer entre crianças de famílias de baixa renda beneficiárias e não beneficiárias do Programa Bolsa Família da Região Nordeste (Brasil): pareamento entre CadÚnico e Sinasc. In: Ministério da Saúde, Secretaria de Vigilância em Saúde. Saúde Brasil 2010: uma análise da situação de saúde e de evidências selecionadas de impacto de ações de vigilância em saúde. Brasília (DF); 2011. cap.13, p.271-93.

<sup>1</sup> Vaitsman J, Paes-Sousa R, organizadores. Avaliação de políticas e programas do MDS: resultados: Bolsa Família e Assistência Social. Brasília (DF): Ministério do Desenvolvimento Social e Combate à Fome, Secretaria de Avaliação e Gestão da Informação; 2007.

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