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1

Association between cash transfer programs and oral health - a scoping review

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ABSTRACT

Objectives. The aims of this scoping review are to assess the literature investigating the association between cash transfer programs and oral health; and to identify the theoretical frameworks applied to guide this literature.

Methods. A search strategy to identify studies published until December 2020 was applied to a range of databases. Observational and interventional studies that had cash transfer programs as exposure/intervention and oral health as outcome were considered. Dental health services utilization, as well as access to dental health services, were considered secondary outcomes. Cash transfer programs were considered programs based on conditional or unconditional cash transfer carried out as part of national social protection schemes, and interventional studies on the impact of cash transfer on oral health were also considered eligible. Data charting was performed in two steps and a narrative synthesis was conducted.

Results. Of 6344 articles identified, 4 articles were included. These articles investigated 3 different conditional cash transfer programs, Universal Child Allowance (Argentina), *Bolsa Família* (Brazil) and Family Rewards (USA). Inconsistencies were identified in findings on the effect of conditional cash transfer programs on the prevalence of dental caries and these differences may be due to the comparison group selected for each study. Concerning dental visits, the results point in different directions, which makes these findings still inconclusive. No explicit theoretical framework was reported in the articles to guide the expected association.

Conclusion. Although cash transfers play an important role in improving certain health outcomes, there is limited evidence to suggest an association between cash transfers and oral health.

Keywords: cash transfer, public assistance, government program, income redistribution, oral health, dental visits.

INTRODUCTION

Poverty and health inequalities are unfair¹ but present in many nations worldwide. They are also huge obstacles to economic growth and health improvements. While being wealthier is crucial to being healthier², several contextual and individual factors may change this relationship such as public policy, social engagement and education³. Since 2015, every country in the world has at least one social safety net program to support the poor and vulnerable⁴. National social protection schemes aim at improving living conditions and providing a way out of poverty.

Despite considering Universal Basic Income for everyone, no country seems to have implemented it and the common programs include direct cash transfer, microcredit and user fee removal. Those targeted programs have been shown to impact breastfeeding-related outcomes, such as colostrum receipt and average duration of exclusive breastfeeding⁵, in addition to encouraging the use of antenatal care and impacting the maternal diet⁶. While the provision of services by the government is a common indirect way of cash transfer, several countries have implemented direct cash transfer programs, that consist of direct payments made by the government to eligible groups of people, to support health and well-being, such as Child Support Grant, in South Africa⁷, *Janani Suraksha Yojana*, in India⁸, and Family Rewards, in United States of America⁹. In Latin America, the first structured conditional cash transfer program, which differs from unconditional programs in that it grants payment if the beneficiary meets specified criteria, like school attendance or receipt of vaccines, was the Mexican *Oportunidades* (previously *Progres*a) in 1997^{10,11}. Together with Brazil's *Bolsa Família* program

and Colombia's *Más Familias en Acción* program, they are the three well-established cash transfer programs in the region¹².

There is ample evidence that economic situation is related to health in observational studies and the curvilinear relation between income and health¹³ is also described in oral health^{14,15}. According to the diminishing return effect, the gains in health for every dollar is stronger for those in lower income bracket than at the higher income¹⁶. Nevertheless, it is still unclear how cash transfer programs can impact the health of individuals. To enhance people's health, income redistribution should be accompanied by policy that tackles underlying root causes that leads to social inequalities. Further studies are needed to understand which sort of cash transfer programs work best in which population context, and for which health outcomes¹⁷.

Unconditional cash transfer interventions can improve the purchasing power of families, and there is evidence that these interventions improve food security¹⁸. Cash transfer programs may modify the accessibility to a diverse and nutritious diet which is a mechanism that can improve linear growth and contribute to the reduction of stunting¹⁹. Concerning oral health, the effect of these interventions is not yet clear, and much less clear is the understanding of the causal pathways that link cash transfer to oral health outcomes. Broader theoretical frameworks focusing on the mechanisms or pathways through which income support programs are expected to improve health can be applied to cash transfers programs and oral health, as long as they consider differences, such as whether it is a direct or indirect, focused or universal, or conditional or unconditional program. Specifically related to oral health, it is a critical issue

which oral disease is impacted, what is its latency time and the consequences of the accumulation of exposure.

So far, studies indicate that people enrolled in cash transfer programs have poor oral health due to lifelong poverty, but it is unclear whether the programs have any beneficial effect on oral health. Importantly, understanding the theoretical explanations that underpin such associations are critical because the root causes require upstream structural interventions²⁰. Assessing the available literature that links cash transfer programs and oral health, this review aims to investigate what is known from the existing literature and which theoretical frameworks have guided the existing literature on cash transfer programs in oral health research.

METHODS

Study design and Eligibility criteria

This is a scoping review to map, examine and identify the available literature on cash transfer programs and oral health. This study also aims to identify which theoretical frameworks have guided the existing literature on cash transfer programs in oral health research. The PRISMA checklist for scoping reviews was followed to guide article reporting (Appendix 1).

Observational and interventional studies that had cash transfer programs as exposure/intervention and oral health as outcome (clinically assessed or self-reported) were considered eligible for inclusion. Dental health services utilization, as well as access to dental health services, were considered eligible as secondary outcomes. Cash transfer programs were considered programs based on conditional or unconditional cash transfer carried out as part of national social

protection schemes through direct cash transfers or through vouchers (food, school supplies, etc.). Interventions implemented with the aim of assessing the impact of cash transfer on oral health were also considered eligible for inclusion.

Information sources and Search strategy

PubMed, Embase, Web of Science, Scopus, Latin American and Caribbean Literature on Health Sciences (LILACS, acronym in Portuguese), World Health Organization Institutional Repository for Information Sharing (WHO IRIS), Spanish Bibliographic Index in Health Sciences (IBECS, acronym in spanish), Brazilian Bibliography of Dentistry (BBO, acronym in Portuguese), Database in nursing - Brazilian bibliography (BDENF, acronym in Portuguese) databases were searched. The search strategy was designed based on an adaptation of the PICO/PECO strategy (patient, intervention/exposure, comparison and outcome, respectively), considering the previously mentioned exposures and outcomes.

Search strategy was build up through combinations of controlled vocabulary (MeSH Terms in the case of PubMed and EMTREE in the case of Embase) and free text words. The names of specific cash transfer programs were used to increase the sensibility of the search strategy. Firstly, a spreadsheet was created with all countries in decreasing order of population size. Then, those that concentrated 80% of the world's population in the year 2017 were investigated for cash programs in government reports or official news. Of the programs found, those that returned results in a search in PubMed database were incorporated into the final search strategy. The PubMed search (Appendix 2) was adapted to all other databases.

In addition to the main searches performed, inspection in the reference lists of included papers and manual searches using simplifications of the search strategy were performed in order to return the widest range of results of interest. Searches strategy were carried out in December 2020. There were no limits on the date of publication, nor on the language. When necessary, an online translator was used to provide support.

Data charting and Synthesis of results

All papers retrieved were screened independently by two reviewers (BCC and JBH) to select those potentially eligible for the study. In cases of disagreement, titles and abstracts were read by a third reviewer (RKC). Selected articles were assessed for eligibility by two experts (BCC and AG) and articles that met all inclusion criteria were selected.

Data charting was performed in two steps. At first, a standardized spreadsheet was used to synthesize data from the included studies, such as study design, intervention/exposure characteristics, sample age, measurement outcomes and main findings. A second stage of data charting was a detailed reading of the introduction and discussion of the four articles included, searching for excerpts that mentioned the mechanisms involved in the relationship, and which frameworks constitute the field of possibilities in this relationship between income transfer and oral health. This process was carried out by one of the authors (BCC) and revised by all authors in order to maintain the reliability. Narrative synthesis was conducted to synthesise and present the information collated during data charting. Quality assessments was not performed as a scoping review is not intended to summarise causal effect of an exposure on an outcome after considering methodological rigour of included studies²¹.

RESULTS

From a total of 6344 articles retrieved from all databases, 3837 were assessed for eligibility by reading titles and abstracts after removing duplicates. After that, 13 articles were selected for full-text reading; and 4 articles were included in the final qualitative analysis. Reasons for exclusion after full-text reading are listed in the Figure 1. Of the 4 studies included, two were carried out in Brazil^{22,23}, one in Argentina²⁴ and one in the United States of America (USA)⁹. Detailed descriptive information related to the studies is shown in the Table 1.

The four articles assessed 3 different cash transfer programs, Universal Child Allowance (Argentina), *Bolsa Família* (Brazil) and Family Rewards (USA). All programs could coexist with other government social support actions, such as in the form of supplemental nutrition or housing assistance⁹. Besides, the North American study obtained private funding. All three programs are conditional, which means that beneficiary families must comply with certain conditionalities. Both the Brazilian and Argentinean programs required up-to-date vaccination schedules. In addition, the Brazilian cash transfer program required information on school attendance and growth monitoring. While the Argentinian cash transfer program required registration of children up to six years old in a government healthcare plan called SUMAR program. Family Rewards, which was the first conditional cash transfer program in the USA, had its goals organized into a large set of 22 potential rewards divided into two domains: education and health and parental employment. Approximately 98% of families received cash incentives in the education and health domains, while 53.2% earned a reward in the parental employment domain.

Two of the four articles specifically assessed the effect of being a beneficiary of the conditional cash transfer programs on oral health^{22,23}, while the other two included "indirect health-related outcomes" to explore potential health effects that were not part of the conditionalities, including oral health outcomes. According to Calvasina *et al.*²³, one of two groups to evaluate the effects of the *Bolsa Família* program on children's oral health, beneficiary families received approximately BRL85 per month (approximately US\$22 according to the dollar exchange rate in the year of publication of the article). In the North American program, households earned on average US\$8,674 over the three years of the program, which is approximately US\$240 per month. The Argentine program paid AR\$1,246 (US\$72) per child per month in August of 2017. Part of the money was only transferred to families after proof of compliance with the conditionalities required by each program. In none of the programs were limits or conditions imposed on how families could spend the money.

All studies were carried out with samples of families from urban populations. Only one study presented findings in adults⁹, all others focus their findings on child-related outcomes. The studies' results are substantially divergent regarding the prevalence of caries and attendance at dental appointments in the beneficiary families. One study found a higher prevalence of caries, greater disease severity and a lower probability of using the dental health service in beneficiary children and non-beneficiary children studying in a public school compared to children from private schools²². Another study, on the contrary, showed that having some income (BRL85-170) or receiving the cash from *Bolsa Família* program for at least two years reduce the chance of dental caries when compared to having no income and not receiving the benefit,

respectively²³. The differences found may be due to the comparison group selected for each study.

Regarding dental visits, in addition to the lower probability of using the dental health services²², the Argentinian study found no change in the rate of dental visits when comparing beneficiaries with a group synthetically created through propensity score²⁴. Meanwhile, the North American study found a higher probability of dental check-up attendance for both children and their parents in families benefiting from the programs compared to a control group of homogeneous characteristics⁹. The three results point in different directions, which makes these findings still inconclusive. Further descriptions of the main findings of the studies can be found in table 1.

Regarding mechanisms and frameworks, sentences such as, "the convergence of psychosocial, infectious, and stress-related biological processes appears to be implicated in the production of greater cariogenic bacterial growth, increased physical vulnerability of the developing dentition, and poor oral health care behaviours, and hence dental caries."²³, and "through its health-related incentives, it encouraged participating families to increase their use of preventive care services. The expectation was that such increases would translate into better health outcomes."⁹ have been identified in the articles included in the review, however, beyond that, there is no explicit theoretical framework either articulated or tested for the expected association.

DISCUSSION

The present review mapped and examined in depth four articles with cross-sectional data on income transfer and its association with oral health. The

results are divergent and, therefore, inconclusive, and do not allow any assertive conclusion about the association. Furthermore, any theoretical framework was not found to support the association, nor does it allow the understanding of causal pathways.

The strengths of this scoping review include a comprehensive search strategy, to our knowledge the first in the area, which signals what is important to be taken forward for future research based on the knowledge available to date. Our findings are limited by the small number of studies available, their heterogeneity, the absence of an assessment of the quality of the literature included and due to the difficulty of generalizing the findings, which is a result of the great difference between the programs and the countries where they are implemented.

The small number of studies and the varied results found by included articles means that important gaps remain unaddressed for understanding the role of cash transfers in oral health outcomes. It appears that some studies refute the proposed hypotheses because they have methodological issues and not because being a beneficiary of the programs modify the chance or risk of oral health-related outcomes. For example, sub-populations who receive cash transfers are likely to be different to those who are ineligible to receive cash transfers, and these factors can be associated with their oral health outcomes. Thus, confounding can bias the effect of cash transfers on oral health. Furthermore, the values may not reach the minimum income necessary for a healthy life, taking into account the amount of money needed to pay for certain health determinants, such as food, housing and physical activity^{15,25}. Finally, cash transfers are likely to be mediators for the relationship between poverty and oral

health. As the exposure of poverty lacks a reference group in these studies, the research question regarding how much of the negative effect of poverty on poor oral health is mitigated through cash transfer remains largely unanswered. Although we do not have information about the dental health system available to beneficiaries in each study, it was likely that structural factors remained the same in those studies, that is people living in the same neighbourhoods, with the same sanitary conditions, accessing the same schools and healthcare centers. Any possible health effect of an increase in income is limited by the absence of other social policies and programs, such as primary health care, public education and social security²⁶.

Despite being underfunded, poorly managed and often criticized by sectors of the population and politicians, cash transfer programs have been shown to be able to change the health and illness conditions of thousands of people, such as improving infant growth and contributing to the reduction of malnutrition in young children. This effect is possibly due to the increase in food diversity and reduced incidence of diarrhoea¹⁹. The *Bolsa Família* Program has improved the utilization of health services, especially for services related to health conditionalities. Further health improvements may depend on the quality of health services provided, the scope of services linked to health conditionalities, and coordination with other social safety net programs²⁷. One argument for the absence of conditionalities in programs in regions such as Sub-Saharan Africa is precisely the underdeveloped supply side in terms of education and health, which would not be able to cope with the increased demand resulting from the implementation of the conditionality itself²⁸.

Important points for future research in this field are the selection of an adequate experimental design capable of measuring and evaluating intermediate and final results, ensuring adequate selection of participants to prevent the risk of selection bias, longitudinal follow-ups to avoid the risk of reverse causality, and follow-up for a sufficient time considering characteristics of each disease and latency period. Besides, conceptual frameworks are important tools at different stages of the study and should be articulated and tested to better understand how cash transfers may improve oral health. Such frameworks, when developed in the initial planning stage, helps in the social and biological understanding of the disease and influences aspects of the study design²⁹, also minimizing the risks associated with residual confounding. Faced with such an incipient literature in the field, adapting models can be a useful strategy³⁰, as well as a focus on the maternal and child population, which already presents consistent results in the literature in the area of general health.

Conclusion

Although cash transfers play an important role in certain health outcomes, the association between cash transfers and oral health remains unclear. The field needs studies with an adequate design, solid theoretical basis and it may also benefit from causal analytical models.

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DISCLOSURE STATEMENT

The authors have no conflicts of interest to declare.

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Figure 1. Flowchart of studies selection.

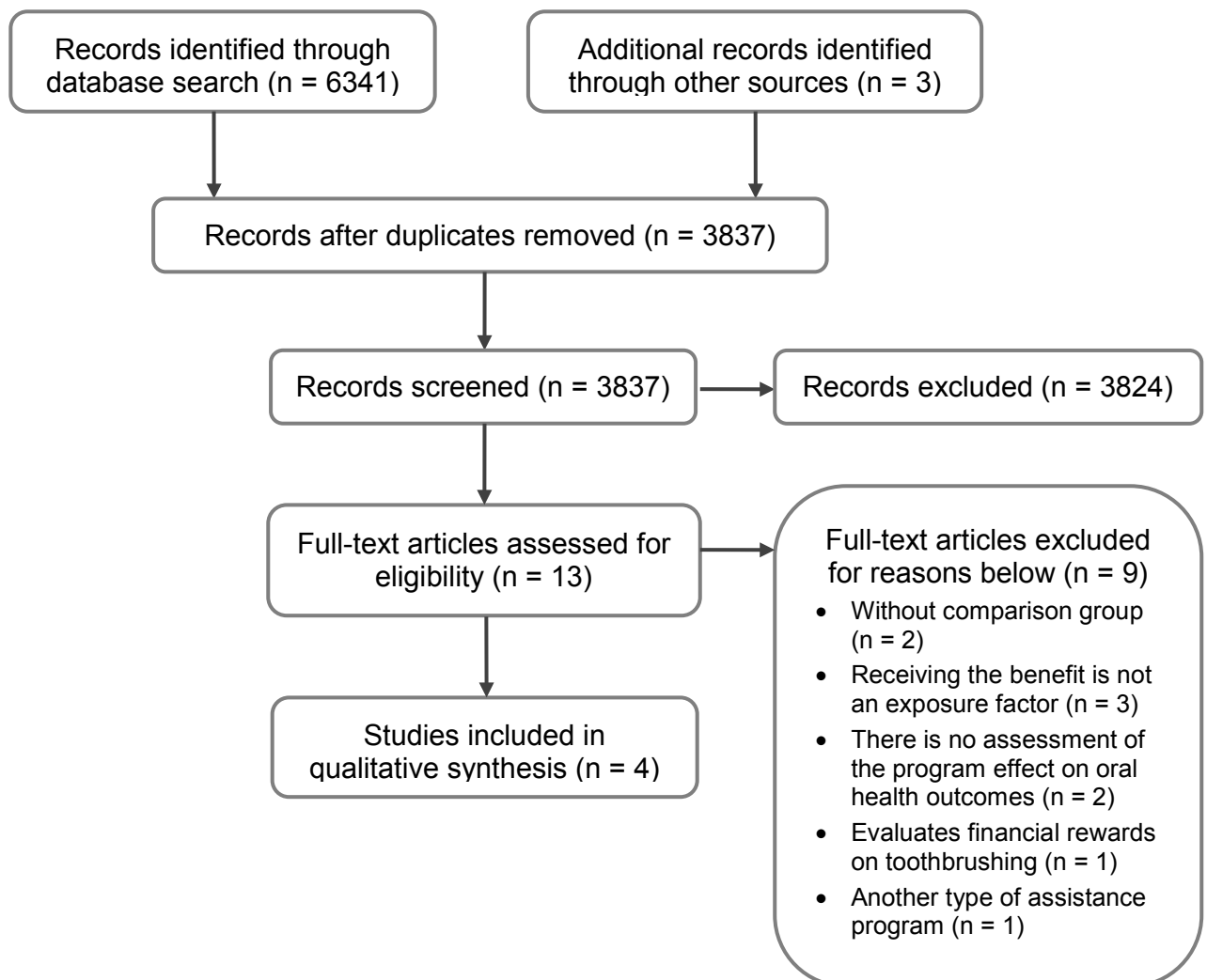


Table 1. Detailed description of studies included in the review.

First author, year, country	Study design	Program characteristics	Inclusion criteria to be eligible for the scheme	Inclusion criteria to be eligible for the study	Sample age	Comparison characteristics	Oral health-related outcomes	Main findings
Calvasina P; 2018; Brazil	Cross-sectional	*	*	Caregivers with 5-years-old children who were registered in the CADUNICO and were receiving BF benefit and caregivers registered in the CADUNICO but who have not received the BF benefit.	5-years-old children.	*	Clinical evaluation, oral health behaviours (e.g., tooth brushing habits) and access to dental care.	Compared with those who have never received BF, there was significantly less chance of having tooth decay for those who received the benefit for at least two years in three of four models tested. Having some income (BRL85-170) significantly reduced the chance of having caries compared to having no income. Children from poor families (per capita income BRL0–170) who received BF for up to two years were less likely to have dental caries than children from families with a per capita income of more than BRL170 monthly not receiving the benefit [OR = 0.05; 95% CI 0.01–0.28].
Courtin E; 2018; USA	Randomized controlled trial	Family Rewards was designed to complement existing government programs. Payments were made conditional on meeting a	Combination of low family income, the grade the child would enter in 2007 (fourth, seventh or ninth grade), home location (in six community districts in the Bronx,	Same eligibility criteria for inclusion in the scheme.	Children in 4 th , 7 th or 9 th grade.	To control group were not offered incentives.	Dental visits.	Parents' results: at 18 months, parents in the intervention group were more likely to have had at least two dental visits than parents in the control group, a difference of 11.6 percentage points (57.5% vs. 69.1%). At forty-two months, the difference between the groups

larger number of specific targets (22 potential rewards). Participating families were eligible to receive cash transfers every two months over the three-year period (from 2007 to 2010).

Brooklyn, and Manhattan), and citizenship status (US citizens or legal residents).

persisted (13.0 percentage points).

Children results: children in the intervention group were more likely to have had at least two dental check-ups in the past year compared to those in the control group (a difference of 11.8 percentage points). This effect persisted at forty-two months (a difference of 14.6 percentage points).

Oliveira
LJC;
2013;
Brazil

Cross-
sectional

Bolsa Família program is a Brazilian government program enacted in 2003 that directly transfers income to households living in poverty and extreme poverty. Receiving this benefit is linked to the authorities and to the household undertaking to fulfil certain conditions, increasing health care, education and social assistance.

Households living in poverty and extreme poverty.

Children enrolled in schools in the urban zone of Pelotas, southern Brazil, in 2010.

Children between 8 and 12-years-old.

*

Clinical evaluation and use of dental services.

Caries' prevalence was 2x higher in beneficiary children compared to those in private schools. Children in public schools not receiving the benefit had a higher prevalence of caries compared to those receiving the benefit. Children receiving the benefit had more severe forms of the disease than those in private schools and those in public schools not receiving the benefit. The presence of children who had never visited a dentist was more than 6x higher among children receiving the benefit compared to those in private schools.

Walsh M; 2020; Argentina	Quasi-experimental	Universal Child Allowance is an Argentina's CCT program enacted in November 2009 that conditions payment to parents on the fulfilment of health and education conditions for children.	A child is eligible if neither parent is formally employed (unemployed, employed in the informal economy, self-employed, or must be lower than the minimum wage). Family must have been Argentine residents for at least three years.	Children who meet the eligibility program's requirements.	Children between 3 and 17-years-old.	Through propensity score matching, a control group and treatment group were created synthetically by matching based on baseline sociodemographic characteristics.	Dental visits.	The AUH did not affect the rate of dental visits among programme-recipient children.
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AUH = Universal Child Allowance; BF = *Bolsa Família* program; CCT = conditional cash transfer; CADUNICO = Brazilian national unified social system registry; OR = odds ratio; * = Unreported.

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ABSTRACT

Objectives. The aims of this scoping review are to assess the literature investigating the association between cash transfer programs and oral health; and to identify the theoretical frameworks applied to guide this literature.

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INTRODUCTION

Poverty and health inequalities are unfair¹ but present in many nations worldwide. They are also huge obstacles to economic growth and health improvements. While being wealthier is crucial to being healthier², several contextual and individual factors may change this relationship such as public policy, social engagement and education³. Since 2015, every country in the world has at least one social safety net program to support the poor and vulnerable⁴. National social protection schemes aim at improving living conditions and providing a way out of poverty.

Despite considering Universal Basic Income for everyone, no country seems to have implemented it and the common programs include direct cash transfer, microcredit and user fee removal. Those targeted programs have been shown to impact breastfeeding-related outcomes, such as colostrum receipt and average duration of exclusive breastfeeding⁵, in addition to encouraging the use of antenatal care and impacting the maternal diet⁶. While the provision of services by the government is a common indirect way of cash transfer, several countries have implemented direct cash transfer programs, that consist of direct payments made by the government to eligible groups of people, to support health and well-being, such as Child Support Grant, in South Africa⁷, *Janani Suraksha Yojana*, in India⁸, and Family Rewards, in United States of America⁹. In Latin America, the first structured conditional cash transfer program, which differs from unconditional programs in that it grants payment if the beneficiary meets specified criteria, like school attendance or receipt of vaccines, was the Mexican *Oportunidades* (previously *Progres*a) in 1997^{10,11}. Together with Brazil's *Bolsa Família* program

and Colombia's *Más Familias en Acción* program, they are the three well-established cash transfer programs in the region¹².

There is ample evidence that economic situation is related to health in observational studies and the curvilinear relation between income and health¹³ is also described in oral health^{14,15}. According to the diminishing return effect, the gains in health for every dollar is stronger for those in lower income bracket than at the higher income¹⁶. Nevertheless, it is still unclear how cash transfer programs can impact the health of individuals. To enhance people's health, income redistribution should be accompanied by policy that tackles underlying root causes that leads to social inequalities. Further studies are needed to understand which sort of cash transfer programs work best in which population context, and for which health outcomes¹⁷.

Unconditional cash transfer interventions can improve the purchasing power of families, and there is evidence that these interventions improve food security¹⁸. Cash transfer programs may modify the accessibility to a diverse and nutritious diet which is a mechanism that can improve linear growth and contribute to the reduction of stunting¹⁹. Concerning oral health, the effect of these interventions is not yet clear, and much less clear is the understanding of the causal pathways that link cash transfer to oral health outcomes. Broader theoretical frameworks focusing on the mechanisms or pathways through which income support programs are expected to improve health can be applied to cash transfers programs and oral health, as long as they consider differences, such as whether it is a direct or indirect, focused or universal, or conditional or unconditional program. Specifically related to oral health, it is a critical issue

which oral disease is impacted, what is its latency time and the consequences of the accumulation of exposure.

So far, studies indicate that people enrolled in cash transfer programs have poor oral health due to lifelong poverty, but it is unclear whether the programs have any beneficial effect on oral health. Importantly, understanding the theoretical explanations that underpin such associations are critical because the root causes require upstream structural interventions²⁰. Assessing the available literature that links cash transfer programs and oral health, this review aims to investigate what is known from the existing literature and which theoretical frameworks have guided the existing literature on cash transfer programs in oral health research.

METHODS

Study design and Eligibility criteria

This is a scoping review to map, examine and identify the available literature on cash transfer programs and oral health. This study also aims to identify which theoretical frameworks have guided the existing literature on cash transfer programs in oral health research. The PRISMA checklist for scoping reviews was followed to guide article reporting (Appendix 1).

Observational and interventional studies that had cash transfer programs as exposure/intervention and oral health as outcome (clinically assessed or self-reported) were considered eligible for inclusion. Dental health services utilization, as well as access to dental health services, were considered eligible as secondary outcomes. Cash transfer programs were considered programs based on conditional or unconditional cash transfer carried out as part of national social

protection schemes through direct cash transfers or through vouchers (food, school supplies, etc.). Interventions implemented with the aim of assessing the impact of cash transfer on oral health were also considered eligible for inclusion.

Information sources and Search strategy

PubMed, Embase, Web of Science, Scopus, Latin American and Caribbean Literature on Health Sciences (LILACS, acronym in Portuguese), World Health Organization Institutional Repository for Information Sharing (WHO IRIS), Spanish Bibliographic Index in Health Sciences (IBECS, acronym in spanish), Brazilian Bibliography of Dentistry (BBO, acronym in Portuguese), Database in nursing - Brazilian bibliography (BDENF, acronym in Portuguese) databases were searched. The search strategy was designed based on an adaptation of the PICO/PECO strategy (patient, intervention/exposure, comparison and outcome, respectively), considering the previously mentioned exposures and outcomes.

Search strategy was build up through combinations of controlled vocabulary (MeSH Terms in the case of PubMed and EMTREE in the case of Embase) and free text words. The names of specific cash transfer programs were used to increase the sensibility of the search strategy. Firstly, a spreadsheet was created with all countries in decreasing order of population size. Then, those that concentrated 80% of the world's population in the year 2017 were investigated for cash programs in government reports or official news. Of the programs found, those that returned results in a search in PubMed database were incorporated into the final search strategy. The PubMed search (Appendix 2) was adapted to all other databases.

In addition to the main searches performed, inspection in the reference lists of included papers and manual searches using simplifications of the search strategy were performed in order to return the widest range of results of interest. Searches strategy were carried out in December 2020. There were no limits on the date of publication, nor on the language. When necessary, an online translator was used to provide support.

Data charting and Synthesis of results

All papers retrieved were screened independently by two reviewers (BCC and JBH) to select those potentially eligible for the study. In cases of disagreement, titles and abstracts were read by a third reviewer (RKC). Selected articles were assessed for eligibility by two experts (BCC and AG) and articles that met all inclusion criteria were selected.

Data charting was performed in two steps. At first, a standardized spreadsheet was used to synthesize data from the included studies, such as study design, intervention/exposure characteristics, sample age, measurement outcomes and main findings. A second stage of data charting was a detailed reading of the introduction and discussion of the four articles included, searching for excerpts that mentioned the mechanisms involved in the relationship, and which frameworks constitute the field of possibilities in this relationship between income transfer and oral health. This process was carried out by one of the authors (BCC) and revised by all authors in order to maintain the reliability. Narrative synthesis was conducted to synthesise and present the information collated during data charting. Quality assessments was not performed as a scoping review is not intended to summarise causal effect of an exposure on an outcome after considering methodological rigour of included studies²¹.

RESULTS

From a total of 6344 articles retrieved from all databases, 3837 were assessed for eligibility by reading titles and abstracts after removing duplicates. After that, 13 articles were selected for full-text reading; and 4 articles were included in the final qualitative analysis. Reasons for exclusion after full-text reading are listed in the Figure 1. Of the 4 studies included, two were carried out in Brazil^{22,23}, one in Argentina²⁴ and one in the United States of America (USA)⁹. Detailed descriptive information related to the studies is shown in the Table 1.

The four articles assessed 3 different cash transfer programs, Universal Child Allowance (Argentina), *Bolsa Família* (Brazil) and Family Rewards (USA). All programs could coexist with other government social support actions, such as in the form of supplemental nutrition or housing assistance⁹. Besides, the North American study obtained private funding. All three programs are conditional, which means that beneficiary families must comply with certain conditionalities. Both the Brazilian and Argentinean programs required up-to-date vaccination schedules. In addition, the Brazilian cash transfer program required information on school attendance and growth monitoring. While the Argentinian cash transfer program required registration of children up to six years old in a government healthcare plan called SUMAR program. Family Rewards, which was the first conditional cash transfer program in the USA, had its goals organized into a large set of 22 potential rewards divided into two domains: education and health and parental employment. Approximately 98% of families received cash incentives in the education and health domains, while 53.2% earned a reward in the parental employment domain.

Two of the four articles specifically assessed the effect of being a beneficiary of the conditional cash transfer programs on oral health^{22,23}, while the other two included "indirect health-related outcomes" to explore potential health effects that were not part of the conditionalities, including oral health outcomes. According to Calvasina *et al.*²³, one of two groups to evaluate the effects of the *Bolsa Família* program on children's oral health, beneficiary families received approximately BRL85 per month (approximately US\$22 according to the dollar exchange rate in the year of publication of the article). In the North American program, households earned on average US\$8,674 over the three years of the program, which is approximately US\$240 per month. The Argentine program paid AR\$1,246 (US\$72) per child per month in August of 2017. Part of the money was only transferred to families after proof of compliance with the conditionalities required by each program. In none of the programs were limits or conditions imposed on how families could spend the money.

All studies were carried out with samples of families from urban populations. Only one study presented findings in adults⁹, all others focus their findings on child-related outcomes. The studies' results are substantially divergent regarding the prevalence of caries and attendance at dental appointments in the beneficiary families. One study found a higher prevalence of caries, greater disease severity and a lower probability of using the dental health service in beneficiary children and non-beneficiary children studying in a public school compared to children from private schools²². Another study, on the contrary, showed that having some income (BRL85-170) or receiving the cash from *Bolsa Família* program for at least two years reduce the chance of dental caries when compared to having no income and not receiving the benefit,

respectively²³. The differences found may be due to the comparison group selected for each study.

Regarding dental visits, in addition to the lower probability of using the dental health services²², the Argentinian study found no change in the rate of dental visits when comparing beneficiaries with a group synthetically created through propensity score²⁴. Meanwhile, the North American study found a higher probability of dental check-up attendance for both children and their parents in families benefiting from the programs compared to a control group of homogeneous characteristics⁹. The three results point in different directions, which makes these findings still inconclusive. Further descriptions of the main findings of the studies can be found in table 1.

Regarding mechanisms and frameworks, sentences such as, "the convergence of psychosocial, infectious, and stress-related biological processes appears to be implicated in the production of greater cariogenic bacterial growth, increased physical vulnerability of the developing dentition, and poor oral health care behaviours, and hence dental caries."²³, and "through its health-related incentives, it encouraged participating families to increase their use of preventive care services. The expectation was that such increases would translate into better health outcomes."⁹ have been identified in the articles included in the review, however, beyond that, there is no explicit theoretical framework either articulated or tested for the expected association.

DISCUSSION

The present review mapped and examined in depth four articles with cross-sectional data on income transfer and its association with oral health. The

results are divergent and, therefore, inconclusive, and do not allow any assertive conclusion about the association. Furthermore, any theoretical framework was not found to support the association, nor does it allow the understanding of causal pathways.

The strengths of this scoping review include a comprehensive search strategy, to our knowledge the first in the area, which signals what is important to be taken forward for future research based on the knowledge available to date. Our findings are limited by the small number of studies available, their heterogeneity, the absence of an assessment of the quality of the literature included and due to the difficulty of generalizing the findings, which is a result of the great difference between the programs and the countries where they are implemented.

The small number of studies and the varied results found by included articles means that important gaps remain unaddressed for understanding the role of cash transfers in oral health outcomes. It appears that some studies refute the proposed hypotheses because they have methodological issues and not because being a beneficiary of the programs modify the chance or risk of oral health-related outcomes. For example, sub-populations who receive cash transfers are likely to be different to those who are ineligible to receive cash transfers, and these factors can be associated with their oral health outcomes. Thus, confounding can bias the effect of cash transfers on oral health. Furthermore, the values may not reach the minimum income necessary for a healthy life, taking into account the amount of money needed to pay for certain health determinants, such as food, housing and physical activity^{15,25}. Finally, cash transfers are likely to be mediators for the relationship between poverty and oral

health. As the exposure of poverty lacks a reference group in these studies, the research question regarding how much of the negative effect of poverty on poor oral health is mitigated through cash transfer remains largely unanswered. Although we do not have information about the dental health system available to beneficiaries in each study, it was likely that structural factors remained the same in those studies, that is people living in the same neighbourhoods, with the same sanitary conditions, accessing the same schools and healthcare centers. Any possible health effect of an increase in income is limited by the absence of other social policies and programs, such as primary health care, public education and social security²⁶.

Despite being underfunded, poorly managed and often criticized by sectors of the population and politicians, cash transfer programs have been shown to be able to change the health and illness conditions of thousands of people, such as improving infant growth and contributing to the reduction of malnutrition in young children. This effect is possibly due to the increase in food diversity and reduced incidence of diarrhoea¹⁹. The *Bolsa Família* Program has improved the utilization of health services, especially for services related to health conditionalities. Further health improvements may depend on the quality of health services provided, the scope of services linked to health conditionalities, and coordination with other social safety net programs²⁷. One argument for the absence of conditionalities in programs in regions such as Sub-Saharan Africa is precisely the underdeveloped supply side in terms of education and health, which would not be able to cope with the increased demand resulting from the implementation of the conditionality itself²⁸.

Important points for future research in this field are the selection of an adequate experimental design capable of measuring and evaluating intermediate and final results, ensuring adequate selection of participants to prevent the risk of selection bias, longitudinal follow-ups to avoid the risk of reverse causality, and follow-up for a sufficient time considering characteristics of each disease and latency period. Besides, conceptual frameworks are important tools at different stages of the study and should be articulated and tested to better understand how cash transfers may improve oral health. Such frameworks, when developed in the initial planning stage, helps in the social and biological understanding of the disease and influences aspects of the study design²⁹, also minimizing the risks associated with residual confounding. Faced with such an incipient literature in the field, adapting models can be a useful strategy³⁰, as well as a focus on the maternal and child population, which already presents consistent results in the literature in the area of general health.

Conclusion

Although cash transfers play an important role in certain health outcomes, the association between cash transfers and oral health remains unclear. The field needs studies with an adequate design, solid theoretical basis and it may also benefit from causal analytical models.

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DISCLOSURE STATEMENT

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Figure 1. Flowchart of studies selection.

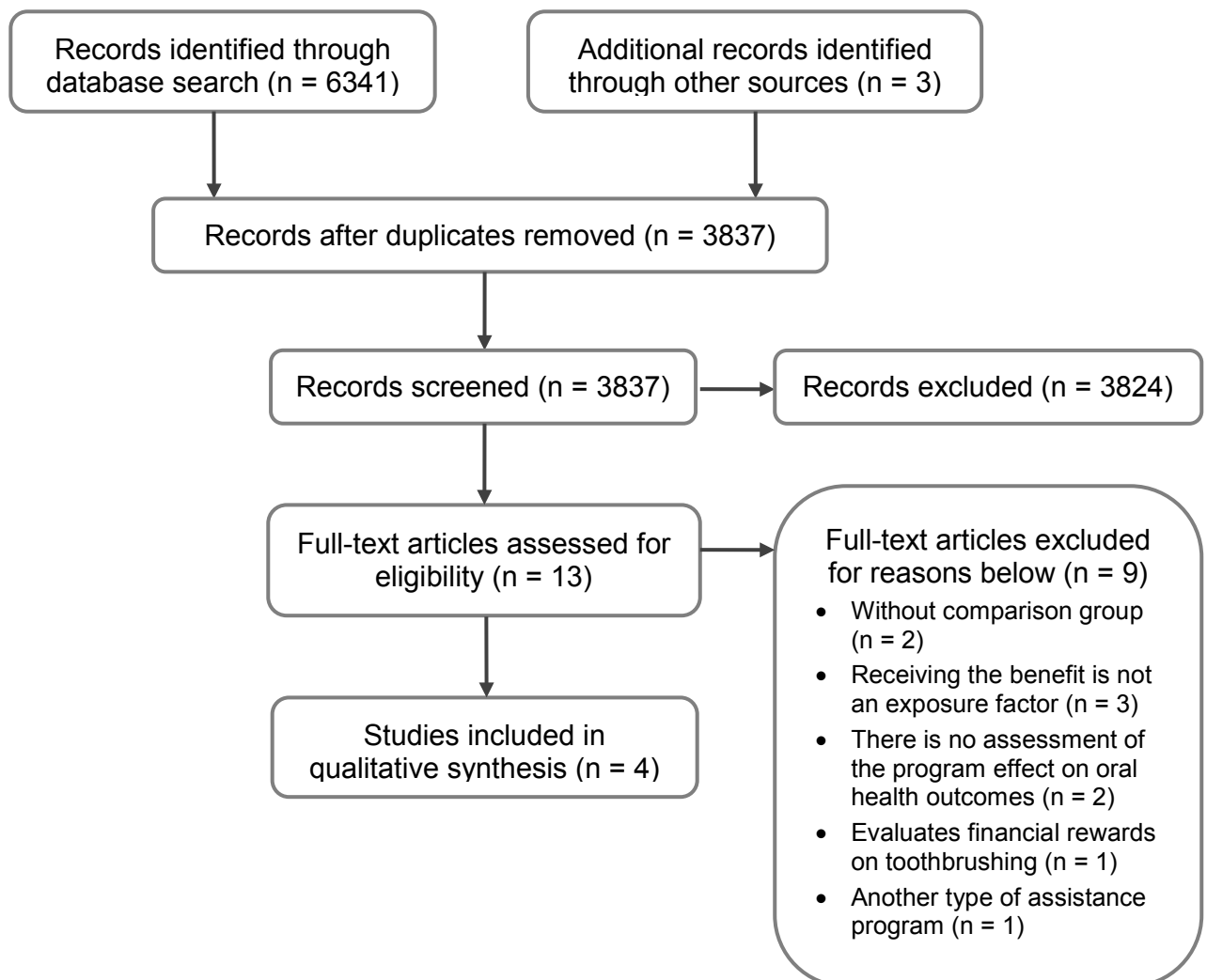


Table 1. Detailed description of studies included in the review.

First author, year, country	Study design	Program characteristics	Inclusion criteria to be eligible for the scheme	Inclusion criteria to be eligible for the study	Sample age	Comparison characteristics	Oral health-related outcomes	Main findings
Calvasina P; 2018; Brazil	Cross-sectional	*	*	Caregivers with 5-years-old children who were registered in the CADUNICO and were receiving BF benefit and caregivers registered in the CADUNICO but who have not received the BF benefit.	5-years-old children.	*	Clinical evaluation, oral health behaviours (e.g., tooth brushing habits) and access to dental care.	Compared with those who have never received BF, there was significantly less chance of having tooth decay for those who received the benefit for at least two years in three of four models tested. Having some income (BRL85-170) significantly reduced the chance of having caries compared to having no income. Children from poor families (per capita income BRL0–170) who received BF for up to two years were less likely to have dental caries than children from families with a per capita income of more than BRL170 monthly not receiving the benefit [OR = 0.05; 95% CI 0.01–0.28].
Courtin E; 2018; USA	Randomized controlled trial	Family Rewards was designed to complement existing government programs. Payments were made conditional on meeting a	Combination of low family income, the grade the child would enter in 2007 (fourth, seventh or ninth grade), home location (in six community districts in the Bronx,	Same eligibility criteria for inclusion in the scheme.	Children in 4 th , 7 th or 9 th grade.	To control group were not offered incentives.	Dental visits.	Parents' results: at 18 months, parents in the intervention group were more likely to have had at least two dental visits than parents in the control group, a difference of 11.6 percentage points (57.5% vs. 69.1%). At forty-two months, the difference between the groups

		larger number of specific targets (22 potential rewards). Participating families were eligible to receive cash transfers every two months over the three-year period (from 2007 to 2010).	Brooklyn, and Manhattan), and citizenship status (US citizens or legal residents).					persisted (13.0 percentage points). Children results: children in the intervention group were more likely to have had at least two dental check-ups in the past year compared to those in the control group (a difference of 11.8 percentage points). This effect persisted at forty-two months (a difference of 14.6 percentage points).
Oliveira LJC; 2013; Brazil	Cross-sectional	Bolsa Família program is a Brazilian government program enacted in 2003 that directly transfers income to households living in poverty and extreme poverty. Receiving this benefit is linked to the authorities and to the household undertaking to fulfil certain conditions, increasing health care, education and social assistance.	Households living in poverty and extreme poverty.	Children enrolled in schools in the urban zone of Pelotas, southern Brazil, in 2010.	Children between 8 and 12-years-old.	*	Clinical evaluation and use of dental services.	Caries' prevalence was 2x higher in beneficiary children compared to those in private schools. Children in public schools not receiving the benefit had a higher prevalence of caries compared to those receiving the benefit. Children receiving the benefit had more severe forms of the disease than those in private schools and those in public schools not receiving the benefit. The presence of children who had never visited a dentist was more than 6x higher among children receiving the benefit compared to those in private schools.

Walsh M; 2020; Argentina	Quasi-experimental	Universal Child Allowance is an Argentina's CCT program enacted in November 2009 that conditions payment to parents on the fulfilment of health and education conditions for children.	A child is eligible if neither parent is formally employed (unemployed, employed in the informal economy, self-employed, or must be lower than the minimum wage). Family must have been Argentine residents for at least three years.	Children who meet the eligibility program's requirements.	Children between 3 and 17-years-old.	Through propensity score matching, a control group and treatment group were created synthetically by matching based on baseline sociodemographic characteristics.	Dental visits.	The AUH did not affect the rate of dental visits among programme-recipient children.
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AUH = Universal Child Allowance; BF = *Bolsa Família* program; CCT = conditional cash transfer; CADUNICO = Brazilian national unified social system registry; OR = odds ratio; * = Unreported.