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The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

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Key words: Antenatal care, maternal health, neonatal health, conditional cash transfers, financial incentives

Abstract

Objective

Antenatal care (ANC) is crucial to protecting the health of pregnant women and their unborn children, however the uptake of ANC amongst pregnant women in low- and middle-income countries (LMICs) is sub-optimal. One popular strategy to increase the uptake of health services, including ANC visits, are conditional cash transfer (CCT) programmes. CCT programmes require beneficiaries to comply with certain conditionalities in order to receive a financial sum.

Methods

A systematic review was carried out to determine whether CCT programmes have a positive impact on ANC uptake in LMIC populations. Electronic databases CENTRAL, MEDLINE, Embase, Maternity and Infant Care and Global Health were searched on 21 January 2022. Reference checking and grey literature searches were also applied. Eligible study designs were randomized controlled trials, controlled before-after studies and interrupted time series analysis.

Results

Our search strategy identified 1534 articles, and of these, 308 articles were reviewed in full. A total of 18 publications, detailing 13 separate CCT programs, were included in the analysis. Eight studies reported statistically non-significant results on all reported outcomes. Seven studies demonstrated statistically significant positive effects ranging from 5.5% to 45% increase in ANC service uptake. A further three studies reported small but statistically significant impact of CCT on the use of ANC services in both positive (2.5% increase) and negative (3.7% decrease) directions. Sub-analysis of results disaggregated by socioeconomic status (SES) indicated that ANC attendance may be more markedly improved by CCT programs in low SES populations, however results were inconclusive.

Conclusion

Our evidence synthesis presented here demonstrated a highly heterogeneous evidence base pertaining to the impact of CCTs on ANC attendance. More high-powered studies are required to elucidate the true impact of CCT programmes on ANC uptake, with particular focus on the barriers and enablers of such programs in achieving intended outcomes.

Panel: Research in Context

Evidence before this study While the use of conditional cash transfers (CCTs) is increasing in global development to use financial levers to incentivise certain populations towards healthy behaviours, the evidence base on whether such programs are effective in increasing antenatal care (ANC) uptake remains unclear. In this study, we searched 5 databases (CENTRAL, MEDLINE, Embase, Maternity and Infant Care, and Global Health) using a sensitive and comprehensive search strategy that combined permutations of combinations of 'conditional cash transfers' + 'antenatal care' + 'low and middle income country (LMIC)'. A total of 1534 studies were identified, and 18 studies were included in our analysis. These studies ranged from low to high quality and presented a range of heterogeneous results with only 7 studies reporting a clear, statistically significant positive impact of CCTs on ANC attendance, a further 8 reporting non-significant impact of CCT on ANC uptake, and a final 3 studies reporting small (<4% difference) statistically significant impact in both positive and negative directions.

Added value of this study This study represents the most comprehensive systematic review and evidence synthesis of published evidence on the impact of CCT programmes on ANC uptake in LMIC populations to date.

Implications of all the available evidence Our findings highlight the inconclusive evidence base regarding whether or not CCT programs are effective in increasing ANC uptake in LMIC populations. This indicates a need for more comprehensive high-powered studies to be undertaken in order to elucidate the key drivers, barriers, and enablers that are required for CCT programs to achieve intended impact on ANC attendance.

Reduction in maternal mortality is a global commitment outlined by the United Nations in the 2030 Sustainable Development Goals (SDG 3.1)[1]. Despite widespread recognition of the importance of antenatal care (ANC) in reducing maternal mortality[2] and enhancing maternal and neonatal health outcomes[3], ANC service uptake remains low in many low and middle-income countries (LMICs)[4]. The World Health Organisation recommends that women attend at least eight ANC visits[5] during their pregnancy. A substantial proportion of women living in LMICs do not meet this recommendation, and ANC attendance appears to be highly correlated with socioeconomic status and poverty, reinforcing the notion that the social determinants of health are a strong driving force in influencing health status well-before one is even born[6].

Numerous reviews have been published that report the effects of demand-side interventions on health service uptake, including ANC attendance[7-8-9-10]. Cash transfer programmes are one such intervention, and can be an attractive policy lever for increasing positive health-seeking behaviours in certain populations. Cash transfer programmes can be conditional or unconditional. Conditional cash transfer (CCT) programmes require beneficiaries to comply with certain conditionalities (e.g. regular health check-ups), while unconditional cash transfer programmes do not set such requirements and are less commonly employed[11]. Substantial resources have been allocated to cash transfer programmes in recent years, with an estimated 718 million people receiving assistance through cash transfer programmes in 2014 alone[12].

CCTs may be a viable policy strategy to increase ANC uptake amongst pregnant women in LMICs. Evidence from several studies on the effectiveness of CCT programs to increase health-seeking behaviours have shown promising positive results[11-13]. However, a recent systematic review drew attention to the heterogenous impacts of cash transfer programmes across a range of health behaviours and outcomes, highlighting the need for further research into the key contexts in which such programs may lead to success, and the barriers, enablers, and opportunities for such programs to thrive[14].

Given the well-established correlation between ANC uptake and improved maternal and neonatal health[2], and the low reported rates of ANC attendance across numerous LMIC settings[4], there is an urgent need for governments and multilateral agencies to invest in cost-effective interventions to increase ANC uptake. There is insufficient high-quality consistent evidence to elucidate whether CCTs are one such potentially viable intervention. This review aims to address this important knowledge gap and has two primary objectives: to assess the effectiveness of CCT programmes in improving ANC uptake; and to investigate the impact of poverty in relation to programme success.

Methods

Study design

A systematic review was undertaken, adhering to the guidelines from the Cochrane Handbook for Systematic Reviews of Interventions[15].

Eligibility criteria

Eligibility of each article was assessed according to the inclusion and exclusion criteria presented in table 1.

Table 1: Overview of inclusion and exclusion criteria

Inclusion	Exclusion
Pregnant women and girls	Non-pregnant women and girls

CCT programmes	Other programmes including unconditional cash transfer programmes and voucher schemes
ANC services	Other services not belonging to ANC
Study designs including randomized controlled trials, controlled before-after studies and interrupted time series analysis	Other study designs
Relevant information available	Lacking essential information

Participants

Pregnant women and girls residing in LMICs, defined as per World Bank definition, are eligible. Studies focusing on facilities or geographical areas that include service utilization data were included. All types of health care providers were eligible for inclusion.

Intervention

Studies on CCT programmes were considered for inclusion if these constituted direct monetary transfers for the purpose of increasing health service uptake. Studies on unconditional cash transfers and non-cash transfers (e.g. vouchers) were excluded. Interventions encompassing multiple components (with conditional cash transfers amongst them) were included, where it was possible to disaggregate cash transfer impacts from other intervention impacts.

Comparator

This review compares pregnant women and girls who took part in CCT programmes against those who did not.

Outcome

The sole outcome of this review is ANC service uptake. ANC utilization was measured by health facility utilisation data, health service provision data, and quantitative survey data.

Time period

We searched for evidence from database inception to 21 January 2022.

Study type

Study designs aligning with the Cochrane Effective Practice and Organisation of Care (EPOC) group criteria were included in this review[16]. These encompass:

- Randomized controlled trials (individual or cluster);
- Controlled before-after studies, with data for the period before and after the intervention;
- Interrupted time series analysis, with a clear time indication for the intervention and at least three data points before the intervention, and three data points after the intervention.

Systematic reviews were excluded during the screening process, but their reference lists were checked to possibly identify relevant literature[15].

Data availability

In line with the EPOC criteria, studies with incomplete or opaque data were not incorporated in the final selection[16]. A good example are studies with missing control variables. Authors were contacted for further inquiry as well. Studies with self-reported data are considered, contrary to the EPOC

criteria, as filtering out articles reporting on survey-related data obtained by interviewing people would result in little evidence.

Identification of studies

A search was performed on 21 January 2022 using a sensitive search strategy (see appendix A) in the following electronic databases: CENTRAL[17], MEDLINE[18], Embase[19], Maternity and Infant Care[20] and Global Health[21]. The search results were uploaded to Covidence[22], an online tool to support the selection process. Duplicates were automatically removed by the software and manually checked. Title and abstract screening was undertaken by a single reviewer (WJ) for all records, and a random sample of 20% of identified studies was reviewed by a second reviewer (LD) for quality assurance. Full-text review was undertaken by a single reviewer (WJ) and all records for which there was uncertainty were reviewed by a second author (LD) for final decision regarding inclusion/exclusion[15].

Reference searching of included studies and follow-up with authors was carried out by a single reviewer (WJ) to ensure that all relevant articles and data were identified[15]. Grey literature was also searched by the primary reviewer[15]. The organisations identified for the grey literature search were identified by both reviewers and are listed in appendix B.

Data extraction

A standardized Microsoft Excel form was used to assist with qualitative data extraction[15]. The obtained information from the various studies contains:

- Study type (individually or cluster randomised controlled trial, controlled before-after studies and interrupted time series analysis);
- Study duration;
- Study setting;
- Characteristics of participants;
- Characteristics of the intervention (transfer amounts and conditionalities);
- Main outcome measures and results.

After extraction, the data was cross-checked against the original studies to avoid human error[23]. Authors were contacted in case of data ambiguity[15].

Inflation adjustment

Cash transfers were adjusted for inflation by presenting their value for the year 2022. This to allow comparability across CCT programmes[24].

Data analysis

The information extracted from the included studies was analysed by using descriptive thematic analysis[15]. The analysis included overall effects demonstrated by the studies with further sub-analysis on poverty dynamics.

Risk of bias

The ROB-2 tool recommended by The Cochrane Collaboration was used to assess the risk of bias for the included randomized controlled trials. The tool describes five domains clarifying the risk of bias by trial.. The ROBINS-I tool was used to assess the risk of bias for the included controlled before-after studies and research applying interrupted time series analysis. This tool utilises domains and signalling questions that are tailored to non-randomized study designs[15].

Patient and public involvement

Patient and public involvement is not applicable as this article is a systematic review of existing evidence. The research question development was informed by the global debate on the effectiveness of conditional cash transfer programmes.

Results

Search results

The database search yielded 2803 records. A total of 1534 records remained for title and abstract screening after duplicate studies were removed. These included three duplicates which were removed by Covidence software but added again to the title and abstract screening pool as abstracts were different. Out of the 1534 records, 308 were shortlisted for full-text review against the eligibility criteria.

Figure 1 presents an overview of the number of research articles by stage.

Eighteen studies were included, of which two were identified through other methods. Triyana 2016 was identified by contacting the author after requesting for more information on an excluded study[26]. Barber & Gertler 2010 was included after a reference check of one of the included studies[27].

Included studies

Of the eighteen included studies, two were interrupted time series analysis, ten were controlled before-after studies and the remaining six were randomized controlled trials. Barber & Gertler 2010 was the final study out of three reporting against the same randomized controlled trial of the Oportunidades programme[27]. The article was selected as it was the most recent publication and covered all the necessary information as per EPOC requirements[16]. Another author published two articles[28-29] on the same randomized controlled trial. The first publication was selected for inclusion[29].

The studies in table 2 are included in this review.

Table 2: Included studies

#	Author(s)	Year	Article	Programme & Study Participants	Location & Study Duration
Individually Randomized Controlled Trials					
1	Grepin, Habyarimana & Jack[30]	2019	Cash on delivery: Results of a randomized experiment to promote maternal health care in Kenya	M-Kadi Poor pregnant women without formal education (469 participated in the CCT arm at end-line, out of 1,401 total. 481 participated in the CCT arm at baseline, out of 1,514 total)	Kenya (Vihiga county) February 2013 to March 2014
Cluster Randomized Controlled Trials					
2	Barber & Gertler[27]	2010	Empowering women: how Mexico's conditional cash transfer programme raised prenatal care quality and birth weight	Oportunidades Pregnant women (666 treatment and 174 control)	Mexico 1997 to 2003
3	Kandpal et al.[31]	2016	A conditional cash transfer program in the Philippines reduces severe stunting	Pantawid Pamilya Households below poverty line and with children below age 15 or a pregnant woman (462 treatment and 704 control)	Philippines (4 provinces) October to November 2011
4	Okeke & Abubaker[29]	2020	Healthcare at the beginning of life and child survival: evidence from a cash transfer experiment in Nigeria	Conditional Cash Transfer Programme Expectant women (5,852 treatment and 5,000 control)	Nigeria (5 states) March 2017 to August 2018
5	Triyana[26]	2016	Do Health Care Providers Respond to Demand-Side Incentives? Evidence from Indonesia	Program Keluarga Harapan Pregnant and lactating women (8,303)	Indonesia (6 provinces) 2007 to 2009

6	Vanhuyse et al.[32]	2022	Effectiveness of conditional cash transfers (Afya credits incentive) to retain women in the continuum of care during pregnancy, birth and the postnatal period in Kenya: a cluster-randomised trial	Afya Credits Incentive Pregnant women (2,522 treatment and 2949 control)	Kenya (Siaya county) 2017 to 2019
Controlled Before-After Studies (all apply difference-in-differences, amongst other methods)					
7	Kusama et al.[33]	2016	Can cash transfers improve determinants of maternal mortality? Evidence from the household and community programs in Indonesia	Program Keluarga Harapan Pregnant and lactating women (8,476)	Indonesia (6 provinces) 2007 to 2009
8	De Brauw & Peterman[34]	2020	Can conditional cash transfers improve maternal health care? Evidence from El Salvador's Comunidades Solidarias Rurales program	Comunidades Solidarias Rurales Pregnant women (270)	El Salvador January to November 2008
9	Díaz & Saldarriaga[35]	2019	Encouraging use of prenatal care through conditional cash transfers: Evidence from JUNTOS in Peru	JUNTOS Pregnant women (9,865)	Peru 2000 - 2011
10	Edmond et al.[36]	2019	Conditional cash transfers to improve use of health facilities by mothers and newborns in conflict affected countries, a prospective population based intervention study from Afghanistan	CCT Programme Women aged 16 years and above delivering in a health facility (treatment: 1,199 baseline, 1,254 end-line and control: 1,242 baseline, 1,237 end-line)	Afghanistan (3 provinces) November 2016 to December 2017
11	Chakrabarti, Pan & Singh[37]	2021	Maternal and Child Health Benefits of the Mamata Conditional Cash Transfer Program in Odisha, India	Mamata Scheme Pregnant and lactating women aged 19 and above. (11,036 treatment; 163,539 control1 and 34,320 control2)	India (Odisha state) 1998 - 2016
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Financial incentives in health: New evidence from India's Janani Suraksha Yojana	Safe Motherhood Programme Currently married women (340,323)	India 2001 - 2008
13	Aizawa[39]	2020	Does the expanded eligibility of conditional cash transfers enhance healthcare use among socio-economically disadvantaged mothers in India?	Safe Motherhood Programme Women aged 15-49 years (45,436 treatment and 28,688 control)	India 2005 - 2016
14	Joshi & Sivaram[40]	2014	Does it pay to deliver? An evaluation of India's safe motherhood program.	Safe Motherhood Programme Currently married women (425,708 total, over two survey rounds)	India 2002 - 2008
15	Lim et al.[41]	2010	India's Janani Suraksha Yojana, a conditional cash transfer programme to increase births in health facilities: an impact evaluation	Safe Motherhood Programme Women (not clear, but mentioning 182,869 households for latest survey round used in study)	India 2002 - 2008
16	Debnath[42]	2020	Improving maternal health using incentives for mothers and health care workers: evidence from India.	Safe Motherhood Programme Women reporting at least one pregnancy since January 2004 (208,816)	India 2002 - 2008
Interrupted Time Series Analysis					
17	Powell-Jackson et al.[43]	2009	The impact of Nepal's national incentive programme to promote safe delivery in the district of Makwanpur	Nepal's Safe Delivery Incentive Programme Women delivering in health facility with less than 3 children or obstetric complication (7,613 before programme, 7,186 after)	Nepal (Makwanpur district) 2001 - 2007
18	Okoli et al.[44]	2014	Conditional cash transfer schemes in Nigeria: Potential gains for maternal and child health service uptake in a national pilot programme	SURE-P/MCH Pregnant women (20,133)	Nigeria (9 states) January 2012 to March 2014

Included conditional cash transfer programmes

The selected studies cover thirteen CCT programmes presented in table 3.

Table 3: Conditional cash transfer programmes covered by the included studies

#	Programme, Location & Income	Monetary benefits as reported in studies	Monetary benefits per pregnancy	Conditionality	Co-interventions	Timespan	CCT beneficiaries
A	Program Keluarga Harapan[26-33] Indonesia (6 provinces) Lower-middle income economy[45]	Between 60 and 220 USD per year depending on household characteristics.	Cash per pregnancy: 45 to 165 USD 2022 adjusted cash per pregnancy: 52.5 to 191.5 USD	Maternal health and education services including 4 ANC visits, delivery assistance and 2 PNC visits.	Supply-side improvements	2007 - present	Pregnant and lactating women from poor households. (no info on scope, but covering 5 provinces)
B	M-Kadi[30] Kenya (Vihiga county) Lower-middle income economy[45]	3 USD per ANC or PNC visit (maximum 4 ANC and 3 PNC visits) and 6 USD per delivery Maximum total per pregnancy: 27 USD	Cash per pregnancy: 27 USD 2022 adjusted cash per pregnancy: 29.5 USD	Maternal health services including ANC, PNC and facility-based delivery	No significant co-interventions (but presence of a nationwide free-care policy and other research arms including voucher and UCT)	2013 - end unknown (but ended according to author)	Pregnant women (481 beneficiaries in 2013)
C	Oportunidades[27] (previously called PROGRESA) Mexico Upper-middle income economy[45]	15 USD per household per month (health transfer)	Cash per pregnancy: 135 USD 2022 adjusted cash per pregnancy: 172.5 USD	Health and education services. Regular clinic consultations, health education sessions, at least 5 ANC visits for pregnant women, and 2 PNC visits	Education programme Max. 90 USD per household per month (primary education transfer) or maximum 160 USD per household per month (secondary education transfer). Education transfer is paid by child, and varies by school grade and gender.	1997 - present	Low-income households including pregnant women in poor communities (5 million households as of 2004)
D	Comunidades Solidarias Rurales[34] El Salvador Lower-middle income economy[45]	15 USD per month for households eligible for the health *or* education benefit. 20 USD per month for households eligible for health and education benefits.	Cash per pregnancy: 135 to 180 USD 2022 adjusted cash per pregnancy: 145.5 to 194USD	ANC visits (+ vaccination and health check-up of woman's children)	Community awareness sessions	2005 - present	Households in poor municipalities with a pregnant member and children below age 16 (75,000 households in 2013)
E	JUNTOS[35] Peru Upper-middle income economy[45]	70 USD each two months, transferred to the female head of household.	Cash per pregnancy: 315 USD 2022 adjusted cash per pregnancy: 343.5 USD	6 ANC visits and PNC (+ health check-up and school attendance of woman's children)	No significant co-interventions	2005 - present	Poor households with children or pregnant women (1,300 municipalities by 2016)
F	Safe Motherhood Programme (Janani Suraksha Yojana)[38-39-40-41-42] India Lower-middle income economy[45]	Low performing states: ▪ 19 USD rural beneficiaries ▪ 13.5 USD urban beneficiaries High performing states: ▪ 9.5 USD rural beneficiaries ▪ 8 USD urban beneficiaries	Cash per pregnancy: 8 to 19 USD 2022 adjusted cash per pregnancy: 8.5 to 20.5 USD	Facility-based delivery	Incentives to CHWs CHWs receive 3 USD (2021) for each facility-based delivery (across all states)	2005 - present	Women delivering in a health facility in low performing states, and those 19 years and above and living below poverty line or part of deprivileged social group in high performing states (10.4 million beneficiaries in 2015)

G	SURE-P/MCH[44] Nigeria (9 states) Lower-middle income economy[45]	6 USD for the first ANC visit, 2 USD per additional ANC visit (up to four), 12 USD per delivery and 6 USD for PNC visit	Cash per pregnancy: 30 USD 2022 adjusted cash per pregnancy: 35.5 USD	ANC, facility-based delivery, PNC including vaccinations.	Supply-side intervention	2012 - 2014	Pregnant women (20,133 beneficiaries as of 2014)
H	Safe Delivery Incentive Programme[43] Nepal (Makwanpur district) Lower-middle income economy[45]	16 USD per facility-based delivery if no more than two children or an obstetric complication	Cash per pregnancy: 16 USD 2022 adjusted cash per pregnancy: 21 USD	Facility-based delivery	Incentives to healthcare providers Healthcare provider receives 6.5 USD (2021) per assisted delivery	2005 - present	Women delivering in health facility with less than 3 children or obstetric complication (no info on scope but national programme)
I	Mamata Scheme[37] India (Odisha state) Lower-middle income economy[45]	70 USD per pregnancy	Cash per pregnancy: 70 USD 2022 adjusted cash per pregnancy: 70 USD	Maternal and child services including ANC	Incentives to CHWs CHWs receive 2.5 USD (2021) per beneficiary supported.	2011 - present	Pregnant and lactating women aged 19 and above. (no info on scope but state-wide programme)
J	Conditional Cash Transfer Programme[36] (no specific name) Afghanistan (3 provinces) Low-income economy[45]	15 USD for each facility-based delivery	Cash per pregnancy: 15 USD 2022 adjusted cash per pregnancy: 16.5 USD	Facility-based delivery	Incentive to CHWs, CHW training and IEC program. Also supply-side improvements CHWs receive 5.5 USD (2021) for each facility-based delivery	December 2016 – December 2017	Women aged 16 years and above delivering in a health facility (2,453 beneficiaries in 2016)
K	Pantawid Pamilya[31] Philippines (4 provinces) Lower-middle income economy[45]	11 to 32 USD every two months (mix of health and education grants which depend on household characteristics)	Cash per pregnancy: 49.5 to 144 USD 2022 adjusted cash per pregnancy: 57.5 to 167.5 USD	ANC, facility-based delivery, PNC, attending family development session (+ child education and health)	Family development sessions	2008 - present	Households below poverty line and with children below age 15 or a pregnant woman (4.45 million households as of December 2014)
L	Conditional Cash Transfer Programme[29] (no specific name) Nigeria (5 states) Lower-middle income economy[45]	14 USD per pregnancy	Cash per pregnancy: 14 USD 2022 adjusted cash per pregnancy: 15 USD	At least 3 ANC visits, facility-based delivery, and 1 PNC visit	No significant co-interventions	2017 - present	Households with expectant women (180 primary health service areas across five states)
M	Afya Credits Incentive[32] Kenya (Siaya county) Lower-middle income economy[45]	31.5 USD per scheduled health visit	Cash per pregnancy: 31.5 USD 2022 adjusted cash per pregnancy: 31.5 USD	ANC, facility-based delivery, PNC and childhood immunisation	No significant co-interventions	2014 - 2020	Pregnant women (5,471 beneficiaries as of 2019)

Monetary benefits are extracted as reported in the studies. For studies reporting against the same conditional cash transfer programme, the monetary benefits were taken from the most recent study. Income categories are obtained from the World Bank. The US Inflation Calculator[24] has been used to determine the 2022 USD values. USD stands for United States dollar, CHW for community health worker, PNC for postnatal care and IEC for information, education and communication.

Risk of bias in the included studies

Randomized controlled trials

Amongst the six included randomized controlled trials, only Vanhuyse et al.[32] stated if the reported result was in line with a predetermined set of outcome indicators. Okeke and Abubaker[29], Grepin et al.[30], and Vanhuyse et al.[32], were rated as having a high risk of bias on randomization, as each study failed to conceal the allocation sequence until study participants were enrolled and assigned to the conditional cash transfer or control group (see appendix C for comprehensive risk of bias assessment of each study).

Controlled before-after studies and interrupted time series analysis

Of the twelve included non-randomized studies, Joshi & Sivaram[40] and Okoli et al.[44] indicated that reported results were in line with a research protocol. Almost all studies reported difficulties regarding accurate measurement of outcomes as participants were aware of the cash transfers provided to them. Factors lowering this risk were poorly documented in the studies. Edmond et al.[36] and Okoli et al.[44] were rated as having a serious risk of bias related to confounding (see appendix C).

Effect estimates

The reported effect estimates of CCT programmes on ANC service uptake are presented in table 4.

Table 4: Treatment effects of included studies

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome Description	Treatment Effect	Statistical Information	Data source
Individually Randomized Controlled Trials							
1	Grepin, Habyarimana & Jack[30]	2019	M-Kadi (Kenya) 29.5 USD per pregnancy	Four or more ANC visits	0.045 RC (6.9% increase)	Control: 0.65 **SE: 0.068** **P-value > 0.1**	Registers & Survey (conducted by programme)
Cluster Randomized Controlled Trials							
2	Barber & Gertler[27]	2010	Oportunidades (Mexico) 172.5 USD per pregnancy	Any prenatal care	0.034 RC (3.6% increase)	Control: 0.943 **SE: 0.236**	Survey (ENCEL survey, socio-economic survey and fertility survey)
				Obtained five prenatal care visits	0.015 RC (2% increase)	Control: 0.742 **SE: 0.130**	
				Number of prenatal visits	-0.0348 RC (0.5% decrease)	Control: 6.40 **SE: 0.037**	
3	Kandpal et al.[31]	2016	Pantawid Pamilya (Philippines) 57.5 to 167.5 USD per pregnancy	Four or more ANC visits	7.648 RC (13.9% increase)	Control: 54.911 **95% CI: -3.148; 18.443** **P-value > 0.1**	Survey (specific impact evaluation, Family Income and Expenditure Survey and National DHS)
				Number of times ANC was received	0.596 RC (14.4% increase)	Control: 4.147 **95% CI: -0.088; 1.280** **P-value: 0.09**	
4	Okeke & Abubaker[29]	2020	CCT programme (Nigeria) 15 USD per pregnancy	Number of prenatal visits attended	0.471 RC (19.8% increase)	Control: 2.378 SE: 0.0655 P-value < 0.01	Survey (conducted by programme)
5	Triyana[26]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Prenatal visits	0.084 RC (1.2% increase)	Control: 7.00 **SE: 0.317** **P-value > 0.1**	Survey (conducted by National Planning Agency and World Bank)
6	Vanhuyse et al.[32]	2022	Afya Credits Incentive (Kenya) 31.5 USD per pregnancy Nurses receive 5 USD for each women enrolled in the CCT programme	Antenatal care appointments attended	1.90 OR (odds of ANC being 1.9 times higher than control group)	Control: NA P-value < 0.001 95% CI: 1.36; 2.66	Survey (conducted by programme) Electronic Card Reading System

Controlled Before-After Studies (all applied difference-in-differences methodology)							
7	Kusuma et al.[33]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Four or more prenatal visits	0.039 RC (5.6% increase)	Control: 0.70 **SE: 0.023** **P-value < 0.1**	Survey (conducted by National Planning Agency and World Bank)
8	De Brauw & Peterman[34]	2020	Comunidades Solidarias Rurales (El Salvador) 145.5 to 194 USD per pregnancy	Five or more prenatal visits	-0.102 RC (13.7% decrease)	Control: 0.744 **SE: 0.073** **P-value: 0.206**	Survey (conducted by IFPRI and FUSADES)
9	Díaz & Saldarriaga[35]	2019	JUNTOS (Peru) 343.5 USD per pregnancy	Number of prenatal appointments	0.328 RC (4.7% increase)	Control: 7.009 SE: 0.148 P-value < 0.05	Survey (Peruvian DHS)
				One or more ANC visit(s)	0.028 RC (2.9% increase)	Control: 0.955 SE: 0.011 P-value < 0.05	
				Four or more ANC visits	0.048 RC (5.5% increase)	Control: 0.876 SE: 0.017 P-value < 0.01	
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	45.0% AMD (45.0% higher than control group)	Control: NA 95% CI: 18%; 72% P-value: 0.004	Survey HMIS
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	1.51 OR (odds of ANC being 1.51 times higher than control group)	Control: NA 95% CI: 1.15; 1.99	Survey (NFHS second, third and fourth wave)
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.010 RC (2.2% increase)	Control: 0.45 **SE: 0.0073** **P-value > 0.1**	Survey (DLHS-II and DLHS III)
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.0962 RC (22.9% increase)	Control: 0.42 SE: 0.0113 P-value < 0.01	Survey (NFHS third and fourth wave)
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	-0.004 RC (1.3% decrease)	Control: 0.298 **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
15	Lim et al.[41]	2010	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	10.7% (increase among treatment group, using 'exact matching')	Control: NA 95% CI: 9.1%; 12.3%	Survey (DLHS-II and DLHS-III)
					11.1% (increase among treatment group, using 'with versus without')	Control: NA 95% CI: 10.1%; 12.1%	
					10.9% (increase among treatment group, using 'difference-in-differences')	Control: NA 95% CI: 4.6%; 17.2%	
16	Debnath[42]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Any prenatal care	0.022 RC (2.4% increase)	Control: 0.908 95% CI: 0.013; 0.032 SE: 0.005 P-value < 0.01	Survey (DLHS-II and DLHS-III)
Interrupted Time Series Analysis							

17	Powell-Jackson et al.[43]	2009	Safe Delivery Incentive Programme (Nepal) 201 USD per pregnancy Healthcare provider receives 6.5 USD per assisted delivery	Number of ANC visits	0.031 RC (2.5% increase) *using quartic time function	Control: 1.235 T-statistic: 0.38	Community surveillance system dataset
					-0.046 RC (3.7% decrease) *using quadratic time function	Control: 1.235 T-statistic: -0.75	
18	Okoli et al.[44]	2014	SURE-P/MCH (Nigeria) 35.5 USD per pregnancy	Four or more ANC visits	15.1152 RC (Increase of 15.1 visits per 100,000 population)	Control: NA T-statistic: 4.13 P-value: 0.001 95% CI: 7.38; 22.85	Programme Monitoring data (from facility logbooks)
				Number of first ANC visits	-8.3150 RC (Decrease of 8.3 visits per 100,000 population)	Control: NA **T-statistic: -1.29** **P-value: 0.213** **95% CI: -21.87; 5.24**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Eight studies presented statistically non-significant results on all reported outcomes. Seven studies reported a statistically significant increase of over 5% in ANC service uptake. Three studies reported limited or negative effects.

A meta-analysis was not performed due to the heterogeneity of the selected studies. There are notable differences regarding the interventions, including the cash amounts and conditionalities. There is also variation in study settings, study population, study methodologies, and data reported[15].

Poverty dynamics

Out of the eighteen included studies in this review, four controlled before-after studies contained in-depth poverty-related information[36-37-39-40]. Studies were included if treatment effects could be retrieved for groups with different socio-economic status. Studies used different definitions for poverty, thereby impeding potential comparisons across settings. The treatment effects by population group are displayed in table 5.

Table 5: Poverty-related treatment effects from included studies containing information on poverty

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome description	Population Group	Treatment Effect	Statistical Information	Data Source
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	Poorest quintile	43.2% AMD (43.2% higher than control group)	Control: NA **95% CI: -17%; 103%** **P-value: 0.145**	Survey HMIS
					Second poorest quintile	55.4% AMD (55.4% higher than control group)	Control: NA 95% CI: 10%; 100% P-value: 0.021	
					Third poorest quintile	58.0% AMD (58.0% higher than control group)	Control: NA 95% CI: 23%; 94% P-value: 0.004	
					Second wealthiest quintile	29.0% AMD (29.0% higher than control group)	Control: NA **95% CI: -8%; 66%** **P-value: 0.112**	
					Wealthiest quintile	28.8% AMD (28.8% higher than control group)	Control: NA **95% CI: -4%; 61%** **P-value: 0.077**	
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	Poorest two quintiles	1.82 OR (odds of ANC being 1.82 times higher than control group)	Control: NA 95% CI: 1.30; 2.56	Survey (NFHS second, third and fourth wave)
					Wealthiest three	1.19 OR (odds of ANC being	Control: NA **95% CI: 0.95; 1.49**	

					quintiles	1.19 times higher than control group)		
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poor (or women with a below-the-poverty card and experienced up to a second live birth or women belonging to a scheduled caste/tribe and experienced up to a second live birth)	0.0997 RC (23.7% increase) Note this coefficient is a combination of two coefficients: 0.0767[1] and 0.0230[2] which come with different SE and P values.	Control : 0.42 SE[1] : 0.0252 **SE[2] : 0.0273** P-value[1] < 0.01 **P-value[2] > 0.1**	Survey (NFHS third and fourth wave)
					Non-poor	0.0767 RC (18.3% increase)	Control: 0.42 SE: 0.0252 P-value < 0.01	
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poorest quintile	0.005 RC (0.74% increase)	Control: 0.680 **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
					All quintiles	-0.004 RC (1.3% decrease)	Control: 0.298 **SE: 0.010** **P-value > 0.1**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Of the four studies that reported on treatment effect disaggregated by socio-economic status (SES), two studies[36-37] reported significantly higher ANC attendance in lower SES groups compared to control populations than did higher SES groups. The remaining two studies[39-40] did not report statistically significant results in relation to this outcome.

Discussion

There is a pressing need across LMICs to increase the proportion of women who attend ANC, as recommended by the World Health Organisation, in order to reduce maternal mortality and poor neonatal health outcomes. CCT programmes are a potentially promising policy lever to increase uptake of ANC across LMIC contexts, however current evidence for the impact of CCTs on ANC is unclear. In this review, we have built on the evidence generated by previous published reviews[7-8-9-10] of demand-side interventions on ANC uptake, to elucidate the specific impact of CCTs on this outcome of interest. Our findings are generally consistent with the existing evidence base that indicates that some CCT programmes have a modest positive impact on ANC attendance, but that other programmes fail to generate such impact, indicating high context-specificity of such programmes in relation to ANC service uptake.

Of the eighteen studies reviewed covering thirteen CCT programs, eight studies presented statistically non-significant results on all reported treatment effects, three studies demonstrated statistically significant limited or negative effects on the utilization of ANC services and seven studies demonstrated a statistically significant increase in ANC service uptake ranging from 5.5% to 45%. The studies that did report statistically significant improvement in ANC uptake as a result of CCT programmes were delivered in Peru[35], Nigeria[29], Afghanistan[36], India[37-39-41] and Kenya[32], where programme settings and modalities vary greatly. The studies that reported small or negative impacts of CCTs on ANC uptake were delivered in India[42], Nepal[43] and Nigeria[44]. The fact that both positive and negative associations between CCTs and ANC uptake were reported in programmes implemented in India and Nigeria, coupled with the general heterogeneity of programme impact across the studies reviewed, indicates that programme design and implementation context might be vital factors in determining programme success.

The amount of money transferred has been postulated to play a key role in incentivizing behaviour, and may be an important factor in whether or not the CCT programmes included in this review observed a positive impact[46]. The study of the 'Mamata' scheme in India[37] reported a notable positive impact, which could relate to the relatively high transfer amounts (70 USD per pregnancy) provided to women. This positive relationship between transfer amount and positive trends in ANC uptake is also supported by findings from the 'JUNTOS' programme in Peru[35], which similarly transferred a relatively high monetary amount (343.5 USD per pregnancy) compared to other studies and reported a statistically significant positive programme impact. However, in this review we also identified programmes in which CCT using relatively low transfer amounts also reported positive impacts of CCT on ANC uptake. The CCT programmes best illustrating the complex relationship between financial allocation and programme success are those implemented in Nigeria in which the CCT programme[29] reported better results than the SURE-P/MCH programme[44] despite it being implemented in the same country with a transfer amount that is more than double of the CCT programme[29].

Previous studies have established that conditionalities are crucial for impact across a range of health-seeing behaviours[47] and could play a key role in increasing ANC service uptake. The 'Mamata' scheme in India[37] required incremental ANC attendance, while the Safe Motherhood Programme in India[39-41-42] focused on an endpoint of facility-based deliveries, with the former generating more impact overall. The Afya Credits Incentive in Kenya[32], the CCT programme in Nigeria[29] and the 'JUNTOS' programme in Peru[35], which reported positive impacts, similarly allocated financial payments to ANC attendance conditionality. However, this conditionality of ANC attendance was not uniformly associated with increased ANC uptake across all studies reviewed, for example the SURE-P/MCH programme in Nigeria[44] reported negative programme impact despite ANC conditionality.

The differences in treatment effects amongst studies scrutinizing the same CCT programme warrant further scrutiny. Three included studies[39-41-42] reported statistically significant results on the Safe Motherhood Programme in India using different data to analyse programme impact. Reported increase in ANC uptake as a result of the same CCT programme ranged from 2.4%[42] to 22.9%[39]. Aizawa (2020)[39] demonstrated the strongest association between CCT and ANC uptake and used data from the National Family Health Survey conducted in 2006 and 2016 comparing from numerous Indian States. Lim et al. (2010)[41] presented a lower positive association (11.1%) and used data from the District-level Household Survey from 2004 and 2009. Debnath (2021)[42] reported the smallest impact, and utilised the same survey data as Lim et al.[41], but opted for a restricted sample excluding numerous districts in India. Such heterogeneity indicates the complexity of policy evaluation as different results are reported on the same CCT programme.

We found inconclusive results regarding the relationship between poverty and CCT programme impact. The four studies[36-37-39-40] that reported comparisons between socio-economic groups and the impact of CCT on ANC uptake lacked statistical power to formulate robust conclusions due to low powered sample sizes. Hence, we failed to determine if the level of poverty amongst people receiving CCTs was an important factor for determining impact on ANC service uptake.

One limitation of the evidence incorporated in this review is the use of survey data by the majority of included studies, opening the potential for data bias. The included studies varied in quality, ranging from suboptimal study designs to high levels of bias. Three included randomized controlled trials reported high risk of bias on the randomization process[29-30-32] and two non-randomized studies presented a serious risk of bias on confounding[36-44]. The heterogeneity of study design, population, and implementation process amongst the eighteen studies hindered us to perform a meta-analysis to generate overall treatment effects of CCTs on ANC. A number of studies did not clearly present the

information required for the summary tables. Together, these factors may contribute to the inconclusiveness of results reported in this review.

Given the high heterogeneity identified in this review in relation to CCT impact on ANC uptake across LMICs, there is substantial scope for future research to explore the most important determinants for CCT programme success, failure, and inconclusiveness. Complex process evaluations should be employed alongside the implementation of CCT programmes to elucidate the contextual factors that contribute to programme success, including population characteristics, geographic and environmental factors, conditionalities, co-interventions, baseline ANC service uptake, and financial allocations attached to demand-side interventions. Study design is an additional important consideration for future CCT programs, whereby more high-powered randomised controlled trials are required to strengthen the evidence base for whether such programs are truly impactful from a health perspective.

Conclusion

This systematic review investigated the relationship between CCT programmes and ANC service uptake. These programmes are an alluring instrument for policy makers in LMICs to expand ANC coverage. Our review demonstrated divergent effects of conditional cash transfers amongst the included studies, indicating high context-specificity for these programmes to achieve the desired impact of increased ANC service uptake. The global health community, most notably multilateral organisations and donor community, have invested substantially in CCTs during the past few decades. This review highlights that further high-quality high-powered evidence is required in order to elucidate the true impact of CCT programmes on ANC uptake, with special focus on process evaluation of the barriers, enablers, and opportunities for programmatic success.

Ethics approval statement

This study is a systematic review of already published literature.

Contribution statement

Ward Jacobs: project administration, research protocol, conceptualisation, title and abstract screening, data extraction, data analysis and synthesis, methodology, grey literature search, background reading, risk of bias assessment, drafting the first manuscript, editing, and overall review.

Laura E Downey: research protocol, title and abstract screening, editing of the draft manuscript, overall review, provision of guidance and direction.

Competing interests

No competing interests to declare.

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Data sharing statement

This study is a systematic review. All included studies can be retrieved through the reference list. More information regarding the review process including title and abstract screening can be obtained by contacting the corresponding author.

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Figure

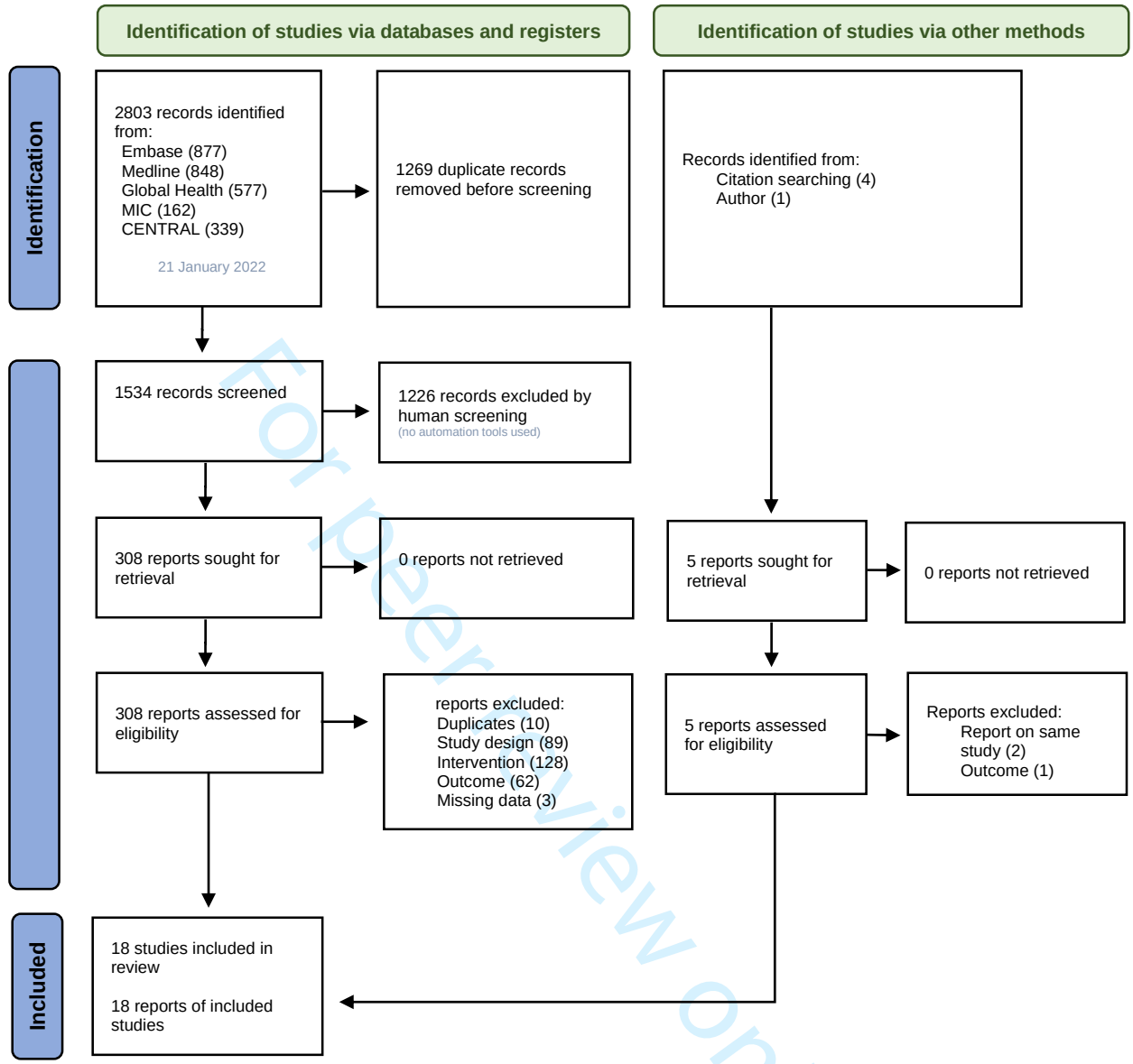

Figure 1: Overview of the study selection process[25]

Appendix

Appendix A: Search strategy

Database	CENTRAL
Results	339
Date	21 January 2022

#1 Cash near/2 transfer* 380

#2 Cash near/2 payment* 60

#3 Voucher* 853

#4 Cash near/2 assistance 19

#5 Financ* NEXT incentiv* 1276

#6 Mone* NEXT incentiv* 510

#7 Cash NEXT incentiv* 134

#8 Mone* NEXT transfer* 17

#9 Cash NEXT based NEXT intervention* 4

#10 "Social insurance" 289

#11 "Community-based insurance" 5

#12 MeSH descriptor: [Social Security] explode all trees 46

#13 MeSH descriptor: [Community-Based Health Insurance] this term only 2

#14 Antenat* 5571

#15 Ante NEXT nat* 94

#16 ANC 2376

#17 Perinat* 10524

#18 Peri NEXT nat* 33

#19 Prenat* 7888

#20 Pre NEXT nat* 130

#21 Matern* 29044

#22 "Primary care" 23761

#23 Primary NEXT health* 8949

#24 Pregna* 74636

#25 Antepartum 771

#26 "Ante partum" 39

#27 MeSH descriptor: [Perinatal Care] this term only 181

#28 MeSH descriptor: [Prenatal Care] this term only 1620

#29 MeSH descriptor: [Maternal-Child Health Services] this term only 47

#30 MeSH descriptor: [Pregnancy] this term only 23343

#31 Developing NEXT countr* 4925

#32 Low NEXT income NEXT countr* 1396

#33 Middle NEXT income NEXT countr* 2995

#34 LMIC 327

#35 MeSH descriptor: [Developing Countries] this term only 907

#36 "Eastern Europe" or "Pacific Islands" or "Indian Ocean Islands" or "West Indies" or Caribbean or "Atlantic Islands" or Africa or "South America" or "Latin America" or "Central America" or Asia 21994

#37	Afghanistan or Albania or Algeria or "American Samoa" or Angola or Argentina or "Argentine Republic" or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or "Cabo Verde" or "Cape Verde" or Cambodia or Cameroon or "Central African Republic" or Chad or China or Colombia or Comoro* or Comores or Congo or "Costa Rica" or "Ivory Coast" or "Cote d'Ivoire" or Cuba or Djibouti or Dominica or "Dominican Republic" or Ecuador or Egypt or "El Salvador" or "Equatorial Guinea" or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or "Guinea-Bissau" or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or "Lao PDR" or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or "Marshall Islands" or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or "Papua New Guinea" or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or "Sao Tome" or Principe or Senegal or Serbia or "Sierra Leone" or "Solomon Islands" or Somalia or "South Africa" or "South Sudan" or "Sri Lanka" or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or "West Bank" or Gaza or Yemen or Zambia or Zimbabwe	240376
#38	MeSH descriptor: [Afghanistan] this term only	51
#39	MeSH descriptor: [Albania] this term only	5
#40	MeSH descriptor: [Algeria] this term only	13
#41	MeSH descriptor: [American Samoa] this term only	6
#42	MeSH descriptor: [Angola] this term only	12
#43	MeSH descriptor: [Argentina] this term only	201
#44	MeSH descriptor: [Armenia] this term only	8
#45	MeSH descriptor: [Azerbaijan] this term only	7
#46	MeSH descriptor: [Bangladesh] this term only	704
#47	MeSH descriptor: [Republic of Belarus] this term only	29
#48	MeSH descriptor: [Belize] this term only	10
#49	MeSH descriptor: [Benin] this term only	51
#50	MeSH descriptor: [Bhutan] this term only	2
#51	MeSH descriptor: [Bolivia] this term only	37
#52	MeSH descriptor: [Bosnia and Herzegovina] this term only	15
#53	MeSH descriptor: [Botswana] this term only	66
#54	MeSH descriptor: [Brazil] this term only	1671
#55	MeSH descriptor: [Bulgaria] this term only	37
#56	MeSH descriptor: [Burkina Faso] this term only	194
#57	MeSH descriptor: [Burundi] this term only	18
#58	MeSH descriptor: [Cabo Verde] this term only	0
#59	MeSH descriptor: [Cambodia] this term only	123
#60	MeSH descriptor: [Cameroon] this term only	106
#61	MeSH descriptor: [Central African Republic] this term only	12
#62	MeSH descriptor: [Chad] this term only	5
#63	MeSH descriptor: [China] this term only	4671
#64	MeSH descriptor: [Colombia] this term only	174
#65	MeSH descriptor: [Comoros] this term only	1
#66	MeSH descriptor: [Congo] this term only	15
#67	MeSH descriptor: [Democratic Republic of the Congo] this term only	107
#68	MeSH descriptor: [Costa Rica] this term only	42
#69	MeSH descriptor: [Cote d'Ivoire] this term only	102
#70	MeSH descriptor: [Cuba] this term only	60
#71	MeSH descriptor: [Djibouti] this term only	2
#72	MeSH descriptor: [Dominica] this term only	0
#73	MeSH descriptor: [Dominican Republic] this term only	38
#74	MeSH descriptor: [Ecuador] this term only	77
#75	MeSH descriptor: [Egypt] this term only	453

#76	MeSH descriptor: [El Salvador] this term only	8
#77	MeSH descriptor: [Equatorial Guinea] this term only	5
#78	MeSH descriptor: [Eritrea] this term only	1
#79	MeSH descriptor: [Eswatini] this term only	22
#80	MeSH descriptor: [Ethiopia] this term only	261
#81	MeSH descriptor: [Fiji] this term only	14
#82	MeSH descriptor: [Gabon] this term only	49
#83	MeSH descriptor: [Gambia] this term only	243
#84	MeSH descriptor: [Georgia (Republic)] this term only	18
#85	MeSH descriptor: [Ghana] this term only	334
#86	MeSH descriptor: [Grenada] this term only	1
#87	MeSH descriptor: [Guatemala] this term only	135
#88	MeSH descriptor: [Guinea] this term only	8
#89	MeSH descriptor: [Guinea-Bissau] this term only	101
#90	MeSH descriptor: [Guyana] this term only	3
#91	MeSH descriptor: [Haiti] this term only	65
#92	MeSH descriptor: [Honduras] this term only	40
#93	MeSH descriptor: [India] this term only	2343
#94	MeSH descriptor: [Indonesia] this term only	371
#95	MeSH descriptor: [Iran] this term only	1632
#96	MeSH descriptor: [Iraq] this term only	54
#97	MeSH descriptor: [Jamaica] this term only	67
#98	MeSH descriptor: [Jordan] this term only	93
#99	MeSH descriptor: [Kazakhstan] this term only	16
#100	MeSH descriptor: [Kenya] this term only	825
#101	MeSH descriptor: [Micronesia] this term only	10
#102	MeSH descriptor: [Democratic People's Republic of Korea] this term only	4
#103	MeSH descriptor: [Kosovo] this term only	3
#104	MeSH descriptor: [Kyrgyzstan] this term only	6
#105	MeSH descriptor: [Laos] this term only	39
#106	MeSH descriptor: [Lebanon] this term only	74
#107	MeSH descriptor: [Lesotho] this term only	14
#108	MeSH descriptor: [Liberia] this term only	24
#109	MeSH descriptor: [Libya] this term only	6
#110	MeSH descriptor: [Madagascar] this term only	39
#111	MeSH descriptor: [Malawi] this term only	424
#112	MeSH descriptor: [Malaysia] this term only	316
#113	MeSH descriptor: [Mali] this term only	113
#114	MeSH descriptor: [Mauritania] this term only	4
#115	MeSH descriptor: [Mauritius] this term only	3
#116	MeSH descriptor: [Mexico] this term only	669
#117	MeSH descriptor: [Moldova] this term only	6
#118	MeSH descriptor: [Mongolia] this term only	22
#119	MeSH descriptor: [Montenegro] this term only	2

#120	MeSH descriptor: [Morocco] this term only	37
#121	MeSH descriptor: [Mozambique] this term only	94
#122	MeSH descriptor: [Myanmar] this term only	78
#123	MeSH descriptor: [Namibia] this term only	13
#124	MeSH descriptor: [Nepal] this term only	327
#125	MeSH descriptor: [Nicaragua] this term only	31
#126	MeSH descriptor: [Niger] this term only	61
#127	MeSH descriptor: [Nigeria] this term only	665
#128	MeSH descriptor: [Republic of North Macedonia] this term only	11
#129	MeSH descriptor: [Pakistan] this term only	517
#130	MeSH descriptor: [Panama] this term only	22
#131	MeSH descriptor: [Papua New Guinea] this term only	66
#132	MeSH descriptor: [Paraguay] this term only	5
#133	MeSH descriptor: [Peru] this term only	215
#134	MeSH descriptor: [Philippines] this term only	186
#135	MeSH descriptor: [Romania] this term only	111
#136	MeSH descriptor: [Russia] this term only	325
#137	MeSH descriptor: [Rwanda] this term only	85
#138	MeSH descriptor: [Samoa] this term only	2
#139	MeSH descriptor: [Sao Tome and Principe] this term only	0
#140	MeSH descriptor: [Senegal] this term only	101
#141	MeSH descriptor: [Serbia] this term only	51
#142	MeSH descriptor: [Sierra Leone] this term only	41
#143	MeSH descriptor: [Melanesia] this term only	5
#144	MeSH descriptor: [Somalia] this term only	22
#145	MeSH descriptor: [South Africa] this term only	1216
#146	MeSH descriptor: [South Sudan] this term only	1
#147	MeSH descriptor: [Sri Lanka] this term only	123
#148	MeSH descriptor: [Saint Lucia] this term only	0
#149	MeSH descriptor: [Saint Vincent and the Grenadines] this term only	0
#150	MeSH descriptor: [Sudan] this term only	85
#151	MeSH descriptor: [Suriname] this term only	17
#152	MeSH descriptor: [Syria] this term only	40
#153	MeSH descriptor: [Tajikistan] this term only	3
#154	MeSH descriptor: [Tanzania] this term only	632
#155	MeSH descriptor: [Thailand] this term only	1133
#156	MeSH descriptor: [Timor-Leste] this term only	4
#157	MeSH descriptor: [Togo] this term only	15
#158	MeSH descriptor: [Tonga] this term only	1
#159	MeSH descriptor: [Tunisia] this term only	63
#160	MeSH descriptor: [Turkey] this term only	914
#161	MeSH descriptor: [Turkmenistan] this term only	1
#162	MeSH descriptor: [Uganda] this term only	789
#163	MeSH descriptor: [Ukraine] this term only	51

#164 MeSH descriptor: [Uzbekistan] this term only 11

#165 MeSH descriptor: [Vanuatu] this term only 3

#166 MeSH descriptor: [Vietnam] this term only 364

#167 MeSH descriptor: [Yemen] this term only 6

#168 MeSH descriptor: [Zambia] this term only 311

#169 MeSH descriptor: [Zimbabwe] this term only 231

#170 MeSH descriptor: [Europe, Eastern] this term only 17

#171 MeSH descriptor: [Pacific Islands] this term only 17

#172 MeSH descriptor: [Indian Ocean Islands] this term only 6

#173 MeSH descriptor: [Caribbean Region] this term only 19

#174 MeSH descriptor: [Atlantic Islands] this term only 2

#175 MeSH descriptor: [Africa] this term only 203

#176 MeSH descriptor: [South America] this term only 89

#177 MeSH descriptor: [Central America] this term only 9

#178 MeSH descriptor: [Latin America] this term only 128

#179 MeSH descriptor: [Asia] this term only 308

#180 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 3214

#181 #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 116971

#182 #31 #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70 OR #71 OR #72 OR #73 OR #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 OR #82 OR #83 OR #84 OR #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116 OR #117 OR #118 OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR #126 OR #127 OR #128 OR #129 OR #130 OR #131 OR #132 OR #133 OR #134 OR #135 OR #136 OR #137 OR #138 OR #139 OR #140 OR #141 OR #142 OR #143 OR #144 OR #145 OR #146 OR #147 OR #148 OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 OR #155 OR #156 OR #157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163 OR #164 OR #165 OR #166 OR #167 OR #168 OR #169 OR #170 OR #171 OR #172 OR #173 OR #174 OR #175 OR #176 OR #177 OR #178 OR #179 247425

#183 #180 AND #181 AND #182 in Cochrane Reviews, Trials, Clinical Answers, Editorials, Special Collections 353

Note: removed 14 clinical answers, editorials and special collections before screening, so the total became 339.

Database	Embase (Ovid)
Results	877
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (950)

2 (Cash adj3 payment*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (247)

3 Voucher*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2737)

4 (Cash adj3 assistance).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (157)

5 cash incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (253)

6 Financ* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (6406)

7 Mone* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (1939)

8 Mone* transfer*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (74)

9 Cash based intervention*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (9)

10 exp social insurance/ (3663)

11 social insurance.mp. (5288)

12 Community-based insurance.mp. (30)

13 antenat*.mp. (61671)

14 ante nat*.mp. (1122)

15 ANC.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (11049)

16 perinat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (163446)

17 peri nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (452)

18 exp prenatal care/ (168798)

19 perinatal period/ (38633)

20 perinatal care/ (15070)

21 maternal care/ (19994)

22 prenat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (281205)

23 pre nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2425)

24 matern*.mp. (484686)

25 pregna*.mp. (1170254)

26 exp pregnancy/ (849842)

27 exp primary health care/ (187395)

28 primary health*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (93820)

29 primary care.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (178603)

30 antepartum.mp. (10163)

31 ante partum.mp. (746)

32 developing country/ (99758)

33 developing countr*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (148948)

34 low income countr*.mp. (17463)

35 low income country/ (9603)

36 middle income countr*.mp. (34073)

37 middle income country/ (13913)

38 LMIC.mp. (4053)

39 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (413531)

40 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or

Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2279243)

41 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (17516)

42 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 (1819447)

43 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 (2551327)

44 41 and 42 and 43 (877)

Database	Global Health (Ovid)
Results	577
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (785)

2 (Cash adj3 payment*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (75)

3 Cash incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (113)

4 Voucher*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1080)

5 (Cash adj3 assistance).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (59)

6 Financ* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1252)

7 Mone* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (242)

8 Mone* transfer*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20)

9 Cash based intervention*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (12)

10 Social insurance.mp. (521)

11 social insurance/ (120)

12 community-based insurance.mp. (13)

13 antenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (18571)

14 ante nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (342)

15 ANC.mp. (2742)

16 Perinat*.mp. (16727)

17 peri nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (63)

18 prenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26852)

19 pre nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (484)

20 prenatal care/ (3765)

21 matern*.mp. (89713)

22 maternity services/ (4857)

23 primary care.mp. (21106)

24 primary health*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26124)

25 primary health care/ (18029)

26 pregna*.mp. (131634)

27 pregnancy/ (102766)

28 antepartum.mp. (1020)

29 ante partum.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (79)

30 prenatal screening/ (2123)

31 developing countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (987316)

32 developing countries/ (978914)

33 low income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (5257)

34 middle income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20934)

35 LMIC.mp. (1225)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (1164860)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1047629)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (3924)

39 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (212249)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1275836)

41 38 and 39 and 40 (577)

Database	Medline (Ovid)
Results	848
Date	21 January 2022

1 (cash adj3 transfer*).mp. (924)

2 (cash adj3 payment*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (198)

3 cash incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (235)

4 voucher*.mp. (2543)

5 (cash adj3 assistance).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (151)

6 financ* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (5230)

7 mone* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1394)

8 mone* transfer*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (67)

9 cash based intervention*.mp. (9)

10 Social insurance.mp. (2123)

11 exp Social security/ (8397)

12 Community-based insurance.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (25)

13 community-based health insurance/ (43)

14 antenat*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (42675)

15 ante nat*.mp. (647)

16 ANC.mp. (5759)

17 perinat*.mp. (87644)

18 Perinatal Care/ (5133)

19 peri nat*.mp. (238)

20 prenat*.mp. (191959)

21 Prenatal Care/ (30659)

22 matern*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (369304)

23 primary care.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (131882)

24 primary health*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (109340)

25 maternal-child health services/ (937)

26 pre nat*.mp. (1644)

27 Pregnancy/ (933890)

28 pregna*.mp. (1073445)

29 antepartum.mp. (6290)

30 ante partum.mp. (479)

31 Developing Countries/ (78551)

32 developing countr*.mp. (135974)

33 low income countr*.mp. (8349)

34 middle income countr*.mp. (26526)

35 LMIC.mp. (3103)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (325525)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cabo Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1794374)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 (20308)

39 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (1433855)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1993866)

41 38 and 39 and 40 (848)

Database	Maternity & Infant Care Database (Ovid)
Results	162
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, heading word, title] (88)

2 (cash adj3 payment*).mp. [mp=abstract, heading word, title] (6)

3 cash incentiv*.mp. [mp=abstract, heading word, title] (30)

4 voucher*.mp. [mp=abstract, heading word, title] (143)

5 (cash adj3 assistance).mp. [mp=abstract, heading word, title] (11)

6 financ* incentiv*.mp. [mp=abstract, heading word, title] (144)

7 mone* incentiv*.mp. [mp=abstract, heading word, title] (17)

8 mone* transfer*.mp. [mp=abstract, heading word, title] (1)

9 cash based intervention*.mp. [mp=abstract, heading word, title] (2)

10 Social insurance.mp. (20)

11 community-based insurance.mp. [mp=abstract, heading word, title] (0)

12 antenat*.mp. [mp=abstract, heading word, title] (24559)

13 ante nat*.mp. [mp=abstract, heading word, title] (181)

14 ANC.mp. [mp=abstract, heading word, title] (995)

15 Perinat*.mp. [mp=abstract, heading word, title] (27487)

16 Peri nat*.mp. [mp=abstract, heading word, title] (23)

17 Prenat*.mp. [mp=abstract, heading word, title] (25290)

18 Pre nat*.mp. [mp=abstract, heading word, title] (148)

19 Matern*.mp. [mp=abstract, heading word, title] (88912)

20 Primary care.mp. [mp=abstract, heading word, title] (2502)

21 Primary health*.mp. [mp=abstract, heading word, title] (1471)

22 pregna*.mp. [mp=abstract, heading word, title] (127997)

23 antepartum.mp. [mp=abstract, heading word, title] (2784)

24 ante partum.mp. [mp=abstract, heading word, title] (69)

25 developing countr*.mp. [mp=abstract, heading word, title] (13467)

26 low income countr*.mp. [mp=abstract, heading word, title] (679)

27 middle income countr*.mp. [mp=abstract, heading word, title] (1438)

28 LMIC.mp. [mp=abstract, heading word, title] (105)

29 (Eastern Europe or Pacific Islands or Indian Ocean Islands or West Indies or Caribbean or Atlantic Islands or Africa or South America or Latin America or Central America or Asia).mp. (13162)

30 (Afghanistan or Albania or Algeria or American Samoa or Angola or Argentina or Argentine Republic or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or Cabo Verde or Cape Verde or Cambodia or Cameroon or Central African Republic or Chad or China or Colombia or Comoro* or Comores or Congo or Costa Rica or Ivory Coast or Cote d'Ivoire or Cuba or Djibouti or Dominica or Dominican Republic or Ecuador or Egypt or El Salvador or Equatorial Guinea or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or Guinea-Bissau or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or Lao PDR or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or Marshall Islands or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or Papua New Guinea or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or Sao Tome or Principe or Senegal or Serbia or Sierra Leone or Solomon Islands or Somalia or South Africa or South Sudan or Sri Lanka or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or West Bank or Gaza or Yemen or Zambia or Zimbabwe).mp. [mp=abstract, heading word, title] (27340)

31 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (420)

32 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 (181387)

33 25 or 26 or 27 or 28 or 29 or 30 (34577)

34 31 and 32 and 33 (162)

Appendix B: Grey literature

The websites of the following organisations were screened.

- Online sources from expert organizations including:
  - WHO
    - https://www.who.int/publications

- https://apps.who.int/iris
- https://kohahq.searo.who.int
- https://www.globalindexmedicus.net

- UNICEF
  - https://www.unicef-irc.org
  - https://www.unicef.org/research-and-reports
- UNFPA
  - https://www.unfpa.org/publications
- World Bank
  - https://www.worldbank.org/en/research
- USAID
  - https://www.usaid.gov/site-search
- Management Sciences for Health
  - https://www.msh.org/resources
- Oxford Policy Management
  - https://www.opml.co.uk/publications
- Save the Children
  - https://www.savethechildren.net/research-reports
  - https://www.savethechildren.org/us/about-us/resource-library
- Oxfam
  - https://www.oxfam.org/en/research
- EQUINET
  - https://www.equinetafrica.org/par/sections/participatory-action-research-publications-journal-papers-and-reports
- IntraHealth
  - https://www.intrahealth.org/resources
- ICRIER
  - https://icrier.org/publications
- Inter-American Development Bank
  - https://publications.iadb.org/en
- Asian Development Bank
  - https://www.adb.org/search

- University sources including:
  - Erasmus University International Institute of Social Studies
    - https://repub.eur.nl/org/9739
  - University of Southampton
    - https://www.southampton.ac.uk/research.page
  - International Centre for Diarrhoeal Disease Research and the Centre for Health and Population Research
    - http://lis.icddrb.org:8380/liberty/libraryHome.do
  - Boston University Institute for Economic Development
    - https://www.bu.edu/econ/research/
  - University of Sussex Institute of Development Studies
    - https://www.sussex.ac.uk/research/explore-our-research
  - London School of Hygiene and Tropical Medicine
    - https://researchonline.lshtm.ac.uk
  - Institute of Policy Analysis and Research

- https://www.ippr.org/research
- http://www.ipar-rwanda.org/what-we-do/research-policy-analysis/publications/

- University of Cape Town Development Policy Research Unit
  - http://www.dpru.uct.ac.za/
- The Transfer Project
  - https://transfer.cpc.unc.edu/publications

Appendix C: Risk of bias by study

Randomized controlled trials

Domain	Signalling Question	Grepin, Habyarimana & Jack[30]	Barber & Gertler[27]	Kandpal et al.[31]	Okeke & Abubakar[29]	Triyana[26]	Vanhuyse et al.[32]
		2019	2010	2016	2020	2016	2022
Randomization Process	1.1 Was the allocation sequence random?	Yes	Yes	Yes	Yes	Yes	Yes
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions	No	Yes	Yes	No	Yes	No
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	No	No	No	No	No	No
	Risk of bias judgement	**High risk**	**Low risk**	**Low risk**	**High risk**	**Low risk**	**High risk**
Deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Yes	Yes	Yes	Yes	Yes	Yes
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	No info	No info	No info	No info	No info	Yes
	2.3. If Y/PY/NI to 2.1 or 2.2: Were there deviations from the intended intervention that arose because of the trial context?	No	No	No	No	No	Yes
	2.4 If Y/PY to 2.3: Were these deviations likely to have affected the outcome?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Possibly No
	2.5. If Y/PY/NI to 2.4: Were these deviations from intended intervention balanced between groups?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.6 Was an appropriate analysis used to estimate the effect of assignment to intervention?	Yes	Yes	Yes	Yes	Yes	Yes
	2.7 If N/PN/NI to 2.6: Was there potential for a substantial impact (on the result) of the failure to analyse participants in the group to which they were randomized?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Moderate risk**
Missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 If N/PN/NI to 3.1: Is there evidence that the result was not biased by missing outcome data?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	No	No	No	No	No	No
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No

	4.3 If N/PN/NI to 4.1 and 4.2: Were outcome assessors aware of the intervention received by study participants?	No	No	No	No	No	No
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	No info	No info	No info	No info	No info	Yes
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.2. ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.3 ... multiple eligible analyses of the data?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No
	Risk of bias judgement	**No info**	**No info**	**No info**	**No info**	**No info**	**Low risk**

Controlled before-after studies and interrupted time series analysis

Domain	Signalling Question	Kusuma et al.[33]	De Brauw & Peterman[34]	Diaz & Saldarriaga[35]	Edmond et al. [36]	Chakrabarti et al.[37]	Powell-Jackson et al.[38]	Aizawa[39]	Joshi & Sivaram[40]	Lim et al.[41]	Debnath[42]	Powell-Jackson et al.[43]	Okoli et al.[44]
		2016	2020	2019	2019	2021	2015	2020	2014	2010	2020	2009	2014
Bias due to Confounding	1.1 Is there potential for confounding of the effect of intervention in this study?	No	Possibly Yes	Possibly No	Yes	Possibly Yes	Yes	Possibly No	Possibly No	Yes	Possibly No	Possibly Yes	Yes
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.2. Was the analysis based on splitting participants' follow up time according to intervention received?	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.3. Were intervention discontinuations or switches	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No

	likely to be related to factors that are prognostic for the outcome?												
	Questions relating to baseline confounding only: 1.4. Did the authors use an appropriate analysis method that controlled for all the important confounding domains?	Not applicable	No info	Not applicable	No	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.5. If Y/PY to 1.4: Were confounding domains that were controlled for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.6. Did the authors control for any post-intervention variables that could have been affected by the intervention?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	Questions relating to baseline and time-varying confounding 1.7. Did the authors use an appropriate analysis method that adjusted for all the important confounding domains and for time varying confounding?	Not applicable	No info	Not applicable	Not applicable	Possibly Yes	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Questions relating to baseline and time-varying confounding: 1.8. If Y/PY to 1.7: Were confounding domains that were adjusted for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Possibly No	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Risk of Bias	**Low risk**	**No info**	**Low risk**	**Serious risk**	**Moderate risk**	**Moderate risk**	**Low risk**	**Low risk**	**Moderate risk**	**Low risk**	**No info**	**Serious risk**
Bias in selection of participants	2.1. Was selection of participants into the study (or into the analysis) based on participant characteristics observed after	No	No	No	No	No	No	No	No	No	No	No	No

into the study	the start of intervention? If N/PN to 2.1: go to 2.4												
	2.2. If Y/PY to 2.1: Were the postintervention variables that influenced selection likely to be associated with intervention?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.3 If Y/PY to 2.2: Were the postintervention variables that influenced selection likely to be influenced by the outcome or a cause of the outcome?.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.4. Do start of follow-up and start of intervention coincide for most participants?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	2.5. If Y/PY to 2.2 and 2.3, or N/PN to 2.4: Were adjustment techniques used that are likely to correct for the presence of selection biases?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias in classification of interventions	3.1 Were intervention groups clearly defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 Was the information used to define intervention groups recorded at the start of the intervention?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.3 Could classification of intervention status have been affected by knowledge of the outcome or risk of the outcome?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Deviations from intended interventions	4.1. Were there deviations from the intended intervention beyond what would be expected in usual practice?	Yes	Possibly No	Possibly No	Possibly No	No	No	No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	4.2. If Y/PY to 4.1: Were these deviations from intended intervention unbalanced between groups and likely to have affected the outcome?	No	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**

Bias due to missing data	5.1 Were outcome data available for all, or nearly all, participants?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes
	5.2 Were participants excluded due to missing data on intervention status?	No info	No	Yes	No	No info	Yes	No info	Yes	No info	No info	No info	No info
	5.3 Were participants excluded due to missing data on other variables needed for the analysis?	No info	Yes	Yes	Yes	No info	No	No info	Yes	No info	No info	No info	No info
	5.4 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Are the proportion of participants and reasons for missing data similar across interventions?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	5.5 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Is there evidence that results were robust to the presence of missing data?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Low risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias in Measurement of Outcomes	6.1 Could the outcome measure have been influenced by knowledge of the intervention received?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	6.2 Were outcome assessors aware of the intervention received by study participants?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No	No
	6.3 Were the methods of outcome assessment comparable across intervention groups?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes	Possibly Yes
	6.4 Were any systematic errors in measurement of the outcome related to intervention received?	No info	No info	No	No info	No info	No info	No info	No info	No info	No info	No info	No info
	Risk of Bias	**Moderate risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**
Bias in selection of the reported result	Is the reported effect estimate likely to be selected, on the basis of the results, from... 7.1. ... multiple outcome measurements within the outcome domain?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.2 ... multiple analyses of the intervention outcome relationship	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.3 ... different subgroups?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No

	Risk of Bias	No info	No info	No info	No info	No info	No info	No info	Low risk	No info	No info	No info	Low risk

PRISMA checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page (first page)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	See appendix E
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Background section, page 2, last paragraph
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Background section, page 2, last paragraph
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Eligibility criteria section, page 2-3 Data analysis section, page 4
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Search results section, page 5, figure 1.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	See appendix B
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Search results section, page 5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Data extraction section, page 4

Section and Topic	Item #	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Eligibility criteria section, page 2-3
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Eligibility criteria section, page 2-3
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Risk of bias section, page 4
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Effect estimates section, page 9-10
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Data analysis section, page 4 Eligibility criteria section, page 2-3
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Eligibility criteria section (data availability), page 3-4
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Data extraction section, page 4
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Data analysis section, page 4
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Data analysis section, page 4
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Risk of bias section, page 4 Data extraction section, page 4
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Risk of bias section, page 4
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Risk of bias section, page 4
RESULTS			

Section and Topic	Item #	Checklist item	Location where item is reported
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Search results section, page 5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Search results section, page 5
Study characteristics	17	Cite each included study and present its characteristics.	Included studies section, page 5-6
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Risk of bias in the included studies section, page 9
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Effect estimates section, page 9-11
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Effect estimates section, page 9-11 Risk of bias in the included studies section, page 9
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Effect estimates section, page 9-11
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Effect estimates section, page 9-11
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Risk of bias in the included studies section, page 9
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Risk of bias in the included studies section, page 9
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Risk of bias in the included studies section, page 9
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion section, page 13, second paragraph
	23b	Discuss any limitations of the evidence included in the review.	Discussion, page 14,

Section and Topic	Item #	Checklist item	Location where item is reported
			third paragraph
	23c	Discuss any limitations of the review processes used.	Discussion, page 14, third paragraph
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion, page 14, fourth paragraph
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Upon request from the authors
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Not applicable
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	No funding
Competing interests	26	Declare any competing interests of review authors.	No competing interests
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Upon request from authors

PRISMA checklist [abstract]

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	No
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes

Section and Topic	Item #	Checklist item	Reported (Yes/No)
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	No
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	No
Registration	12	Provide the register name and registration number.	No

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The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

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The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

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Running title: The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

Key words: Antenatal care, maternal health, neonatal health, conditional cash transfers, financial incentives

Abstract

Objective

Antenatal care (ANC) is crucial to protecting the health of pregnant women and their unborn children, however the uptake of ANC amongst pregnant women in low- and middle-income countries (LMICs) is sub-optimal. One popular strategy to increase the uptake of health services, including ANC visits, are conditional cash transfer (CCT) programmes. CCT programmes require beneficiaries to comply with certain conditionalities in order to receive a financial sum. A systematic review was carried out to determine whether CCT programmes have a positive impact on ANC uptake in LMIC populations.

Methods

Electronic databases CENTRAL, MEDLINE, Embase, Maternity and Infant Care and Global Health were searched from database inception to 21 January 2022. Reference checking and grey literature searches were also applied. Eligible study designs were randomized controlled trials, controlled before-after studies and interrupted time series analysis. Risk of bias assessments were undertaken for each study by applying the ROB-2 and ROBINS-I tools.

Results

Out of 1534 identified articles, 18 publications were included for analysis. Eight studies reported statistically non-significant results on all reported outcomes. Seven studies demonstrated statistically significant positive effects ranging from 5.5% to 45% increase in ANC service uptake. A further three studies reported small but statistically significant impact of CCT on the use of ANC services in both positive (2.5% increase) and negative (3.7% decrease) directions. Sub-analysis of results disaggregated by socioeconomic status (SES) indicated that ANC attendance may be more markedly improved by CCT programs in low SES populations, however results were inconclusive.

Conclusion

Our evidence synthesis presented here demonstrated a highly heterogeneous evidence base pertaining to the impact of CCTs on ANC attendance. More high-powered studies are required to elucidate the true impact of CCT programmes on ANC uptake, with particular focus on the barriers and enablers of such programs in achieving intended outcomes.

Strengths and limitations of this study

- This is the most comprehensive systematic review and synthesis of published evidence on the impact of CCT programmes on ANC uptake in LMIC populations to date
- Evidence from 18 studies was analysed, which indicated a high level of heterogeneity and program/context specificity in whether CCT programmes increased ANC service uptake
- Heterogeneity in study design and implementation prevented a meta-analysis from being conducted to generate macro-impact statistics

Reduction in maternal mortality is a global commitment outlined by the United Nations in the 2030 Sustainable Development Goals (SDG 3.1)[1]. Despite widespread recognition of the importance of antenatal care (ANC) in reducing maternal mortality[2] and enhancing maternal and neonatal health outcomes[3], ANC service uptake remains low in many low and middle-income countries (LMICs)[4]. The World Health Organisation recommends that women attend at least eight ANC visits[5] during their pregnancy. A substantial proportion of women living in LMICs do not meet this recommendation, and ANC attendance appears to be highly correlated with socioeconomic status and poverty, reinforcing the notion that the social determinants of health are a strong driving force in influencing health status well-before one is even born[6].

Numerous reviews have been published that report the effects of demand-side interventions on health service uptake, including ANC attendance[7-8-9-10]. Cash transfer programmes are one such intervention, and can be an attractive policy lever for increasing positive health-seeking behaviours in certain populations. Cash transfer programmes can be conditional or unconditional. Conditional cash transfer (CCT) programmes require beneficiaries to comply with certain conditionalities (e.g. regular health check-ups), while unconditional cash transfer programmes do not set such requirements[11]. Substantial resources have been allocated to cash transfer programmes in recent years, with an estimated 718 million people receiving assistance through cash transfer programmes in 2014 alone[12].

CCTs may be a viable policy strategy to increase ANC uptake amongst pregnant women in LMICs. Evidence from several studies on the effectiveness of CCT programs to increase health-seeking behaviours have shown promising positive results[11-13]. However, a recent systematic review drew attention to the heterogenous impacts of cash transfer programmes across a range of health behaviours and outcomes, highlighting the need for further research into the key contexts in which such programs may lead to success, and the barriers, enablers, and opportunities for such programs to thrive[14].

Given the well-established correlation between ANC uptake and improved maternal and neonatal health[2], and the low reported rates of ANC attendance across numerous LMIC settings[4], there is an urgent need for bilateral and multilateral agencies and governments to invest in cost-effective interventions to increase ANC uptake. There is insufficient high-quality consistent evidence to elucidate whether CCTs are one such potentially viable intervention. This review aims to address this important knowledge gap and has two primary objectives: to assess the effectiveness of CCT programmes in improving ANC uptake; and to investigate the impact of poverty in relation to ANC attendance.

Methods

Study design

A systematic review was undertaken, adhering to the guidelines from the Cochrane Handbook for Systematic Reviews of Interventions[15].

Eligibility criteria

Eligibility of each article was assessed according to the inclusion and exclusion criteria presented in table 1.

Table 1: Overview of inclusion and exclusion criteria

Inclusion	Exclusion
Pregnant women and girls	Non-pregnant women and girls

CCT programmes	Other programmes including unconditional cash transfer programmes and voucher schemes
ANC services	Other services not belonging to ANC
Study designs including randomized controlled trials, controlled before-after studies and interrupted time series analysis	Other study designs
Relevant information available	Lacking essential information

Participants

Pregnant women and girls residing in LMICs, defined as per World Bank definition, are eligible. Studies focusing on facilities or geographical areas that include service utilization data were included. All types of health care providers were eligible for inclusion.

Intervention

Studies on CCT programmes were considered for inclusion if these constituted direct monetary transfers for the purpose of increasing health service uptake. Studies on unconditional cash transfers and non-cash transfers (e.g. vouchers) were excluded. Interventions encompassing multiple components (with conditional cash transfers amongst them) were included, where it was possible to disaggregate cash transfer impacts from other intervention impacts.

Comparator

This review compares pregnant women and girls who took part in CCT programmes against those who did not.

Outcome

The sole outcome of this review is ANC service uptake. ANC utilization was measured by health facility utilisation data, health service provision data, and quantitative survey data.

Time period

We searched for evidence from database inception to 21 January 2022.

Study type

Study designs aligning with the Cochrane Effective Practice and Organisation of Care (EPOC) group criteria were included in this review[16]. These encompass:

- Randomized controlled trials (individual or cluster);
- Controlled before-after studies, with data for the period before and after the intervention;
- Interrupted time series analysis, with a clear time indication for the intervention and at least three data points before the intervention, and three data points after the intervention.

Systematic reviews were excluded during the screening process, but their reference lists were checked to possibly identify relevant literature[15].

Data availability

In line with the EPOC criteria, studies with incomplete or opaque data were not incorporated in the final selection[16]. A good example are studies with missing control variables. Authors were contacted for further inquiry as well. Studies with self-reported data are considered, contrary to the EPOC

criteria, as filtering out articles reporting on survey-related data obtained by interviewing people would result in little evidence.

Identification of studies

A search was performed on 21 January 2022 using a sensitive search strategy (see appendix A) in the following electronic databases: CENTRAL[17], MEDLINE[18], Embase[19], Maternity and Infant Care[20] and Global Health[21]. The search results were uploaded to Covidence[22], an online tool to support the selection process. Duplicates were automatically removed by the software and manually checked. Title and abstract screening was undertaken by a single reviewer (WJ) for all records, and a random sample of 20% of identified studies was reviewed by a second reviewer (LD) for quality assurance. Full-text review was undertaken by a single reviewer (WJ) and all records for which there was uncertainty were reviewed by a second author (LD) for final decision regarding inclusion/exclusion[15].

Reference searching of included studies and follow-up with authors was carried out by a single reviewer (WJ) to ensure that all relevant articles and data were identified[15]. Grey literature was also searched by the primary reviewer[15]. The organisations identified for the grey literature search were identified by both reviewers and are listed in appendix B.

Data extraction

A standardized Microsoft Excel form was used to assist with qualitative data extraction[15]. The obtained information from the various studies contains:

- Study type (individually or cluster randomised controlled trial, controlled before-after studies and interrupted time series analysis);
- Study duration;
- Study setting;
- Characteristics of participants;
- Characteristics of the intervention (transfer amounts and conditionalities);
- Main outcome measures and results.

After extraction, the data was cross-checked against the original studies to avoid human error[23]. Authors were contacted in case of data ambiguity[15].

Inflation adjustment

Cash transfers were adjusted for inflation by presenting their value for the year 2022. This to allow comparability across CCT programmes[24].

Data analysis

The information extracted from the included studies was analysed by using descriptive thematic analysis[15]. The analysis included overall effects demonstrated by the studies with further sub-analysis on poverty dynamics.

Risk of bias

The ROB-2 tool recommended by The Cochrane Collaboration was used to assess the risk of bias for the included randomized controlled trials. The tool describes five domains clarifying the risk of bias by trial. These domains include the randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome and the selection of the reported result. The ROBINS-I tool was used to assess the risk of bias for the included controlled before-after studies and research applying interrupted time series analysis. This tool utilises domains and signalling questions

that are tailored to non-randomized study designs, which encompass bias related to confounding, bias due to selection of study participants, bias in classification of interventions, deviations from intended interventions, bias due to missing data, bias in measurement of outcomes and bias in selection of the reported result[15].

Patient and public involvement

Patient and public involvement is not applicable as this article is a systematic review of existing evidence. The research question development was informed by the global debate on the effectiveness of conditional cash transfer programmes.

Results

Search results

The PRISMA guidelines for conducting and reporting systematic reviews were followed[25]. The PRISMA flow diagram is presented in Figure 1.

The database search yielded 2803 records. A total of 1534 records remained for title and abstract screening after duplicate studies were removed. These included three duplicates which were removed by Covidence software but added again to the title and abstract screening pool as abstracts were different. Out of the 1534 records, 308 were shortlisted for full-text review against the eligibility criteria.

Eighteen studies were included, of which two were identified through other methods. Triyana 2016 was identified by contacting the author after requesting for more information on an excluded study[26]. Barber & Gertler 2010 was included after a reference check of one of the included studies[27].

Included studies

Of the eighteen included studies, two were interrupted time series analysis, ten were controlled before-after studies and the remaining six were randomized controlled trials. Barber & Gertler 2010 was the final study out of three reporting against the same randomized controlled trial of the Oportunidades programme[27]. The article was selected as it was the most recent publication and covered all the necessary information as per EPOC requirements[16]. Another author published two articles[28-29] on the same randomized controlled trial. The first publication was selected for inclusion[29].

The studies in table 2 are included in this review.

Table 2: Included studies

#	Author(s)	Year	Programme & Study Participants	Location & Study Duration
Individually Randomized Controlled Trials				
1	Grepin, Habyarimana & Jack[30]	2019	M-Kadi Poor pregnant women without formal education (469 participated in the CCT arm at end-line, out of 1,401 total. 481 participated in the CCT arm at baseline, out of 1,514 total)	Kenya (Vihiga county) February 2013 to March 2014
Cluster Randomized Controlled Trials				
2	Barber & Gertler[27]	2010	Oportunidades Pregnant women (666 treatment and 174 control)	Mexico 1997 to 2003
3	Kandpal et al.[31]	2016	Pantawid Pamilya Households below poverty line and with children below age 15 or a pregnant woman (462 treatment and 704 control)	Philippines (4 provinces) October to November 2011

4	Okeke & Abubaker[29]	2020	Conditional Cash Transfer Programme Expectant women (5,852 treatment and 5,000 control)	Nigeria (5 states) March 2017 to August 2018
5	Triyana[26]	2016	Program Keluarga Harapan Pregnant and lactating women (8,303)	Indonesia (6 provinces) 2007 to 2009
6	Vanhuyse et al.[32]	2022	Afya Credits Incentive Pregnant women (2,522 treatment and 2949 control)	Kenya (Siaya county) 2017 to 2019
Controlled Before-After Studies (all apply difference-in-differences, amongst other methods)				
7	Kusama et al.[33]	2016	Program Keluarga Harapan Pregnant and lactating women (8,476)	Indonesia (6 provinces) 2007 to 2009
8	De Brauw & Peterman[34]	2020	Comunidades Solidarias Rurales Pregnant women (270)	El Salvador January to November 2008
9	Díaz & Saldarriaga[35]	2019	JUNTOS Pregnant women (9,865)	Peru 2000 - 2011
10	Edmond et al.[36]	2019	CCT Programme Women aged 16 years and above delivering in a health facility (treatment: 1,199 baseline, 1,254 end-line and control: 1,242 baseline, 1,237 end-line)	Afghanistan (3 provinces) November 2016 to December 2017
11	Chakrabarti, Pan & Singh[37]	2021	Mamata Scheme Pregnant and lactating women aged 19 and above. (11,036 treatment; 163,539 control1 and 34,320 control2)	India (Odisha state) 1998 - 2016
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Safe Motherhood Programme Currently married women (340,323)	India 2001 - 2008
13	Aizawa[39]	2020	Safe Motherhood Programme Women aged 15-49 years (45,436 treatment and 28,688 control)	India 2005 - 2016
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme Currently married women (425,708 total, over two survey rounds)	India 2002 - 2008
15	Lim et al.[41]	2010	Safe Motherhood Programme Women (not clear, but mentioning 182,869 households for latest survey round used in study)	India 2002 - 2008
16	Debnath[42]	2020	Safe Motherhood Programme Women reporting at least one pregnancy since January 2004 (208,816)	India 2002 - 2008
Interrupted Time Series Analysis				
17	Powell-Jackson et al.[43]	2009	Nepal's Safe Delivery Incentive Programme Women delivering in health facility with less than 3 children or obstetric complication (7,613 before programme, 7,186 after)	Nepal (Makwanpur district) 2001 - 2007
18	Okoli et al.[44]	2014	SURE-P/MCH Pregnant women (20,133)	Nigeria (9 states) January 2012 to March 2014

Included conditional cash transfer programmes

The selected studies cover thirteen CCT programmes presented in table 3. See appendix C for more information on the monetary benefits.

Table 3: Conditional cash transfer programmes covered by the included studies

#	Programme, Location & Income	Monetary benefits as reported in studies	Monetary benefits per pregnancy	Conditionality	Co-interventions	Timespan	CCT beneficiaries
A	Program Keluarga Harapan[26-33] Indonesia (6 provinces) +[45]	Between 60 and 220 USD per year depending on household characteristics.	2022 adjusted cash per pregnancy: 52.5 to 191.5 USD	Maternal health and education services including 4 ANC visits, delivery assistance and 2 PNC visits.	Supply-side improvements	2007 - present	Pregnant and lactating women from poor households. (no info on scope, but covering 5 provinces)
B	M-Kadi[30] Kenya (Vihiga county) +[45]	3 USD per ANC or PNC visit (maximum 4 ANC and 3 PNC visits) and 6 USD per delivery Maximum total per pregnancy: 27 USD	2022 adjusted cash per pregnancy: 29.5 USD	Maternal health services including ANC, PNC and facility-based delivery	No significant co-interventions (but presence of a nationwide free-care policy and other research arms including voucher and UCT)	2013 - end unknown (but ended according to author)	Pregnant women (481 beneficiaries in 2013)
C	Oportunidades[27] (previously called PROGRESA) Mexico -[45]	15 USD per household per month (health transfer)	2022 adjusted cash per pregnancy: 172.5 USD	Health and education services. Regular clinic consultations, health education sessions, at least 5 ANC visits for pregnant women, and 2 PNC visits	Education programme Max. 90 USD per household per month (primary education transfer) or maximum 160 USD per household per month (secondary education transfer). Education transfer is paid by child, and varies by school grade and gender.	1997 - present	Low-income households including pregnant women in poor communities (5 million households as of 2004)
D	Comunidades Solidarias Rurales[34] El Salvador +[45]	15 USD per month for households eligible for the health *or* education benefit. 20 USD per month for households eligible for health and education benefits.	2022 adjusted cash per pregnancy: 145.5 to 194USD	ANC visits (+ vaccination and health check-up of woman's children)	Community awareness sessions	2005 - present	Households in poor municipalities with a pregnant member and children below age 16 (75,000 households in 2013)
E	JUNTOS[35] Peru -[45]	70 USD each two months, transferred to the female head of household.	2022 adjusted cash per pregnancy: 343.5 USD	6 ANC visits and PNC (+ health check-up and school attendance of woman's children)	No significant co-interventions	2005 - present	Poor households with children or pregnant women (1,300 municipalities by 2016)
F	Safe Motherhood Programme (Janani Suraksha Yojana)[38-39-40-41-42] India +[45]	Low performing states: ▪ 19 USD rural beneficiaries ▪ 13.5 USD urban beneficiaries High performing states: ▪ 9.5 USD rural beneficiaries ▪ 8 USD urban beneficiaries	2022 adjusted cash per pregnancy: 8.5 to 20.5 USD	Facility-based delivery	Incentives to CHWs CHWs receive 3 USD (2021) for each facility-based delivery (across all states)	2005 - present	Women delivering in a health facility in low performing states, and those 19 years and above and living below poverty line or part of deprivileged social group in high performing states (10.4 million beneficiaries in 2015)
G	SURE-P/MCH[44] Nigeria (9 states) +[45]	6 USD for the first ANC visit, 2 USD per additional ANC visit (up to four), 12 USD per delivery and 6 USD for PNC visit	2022 adjusted cash per pregnancy: 35.5 USD	ANC, facility-based delivery, PNC including vaccinations.	Supply-side intervention	2012 - 2014	Pregnant women (20,133 beneficiaries as of 2014)
H	Safe Delivery Incentive Programme[43] Nepal (Makwanpur district) +[45]	16 USD per facility-based delivery if no more than two children or an obstetric complication	2022 adjusted cash per pregnancy: 21 USD	Facility-based delivery	Incentives to healthcare providers Healthcare provider receives 6.5 USD (2021) per assisted delivery	2005 - present	Women delivering in health facility with less than 3 children or obstetric complication (no info on scope but national programme)

I	Mamata Scheme[37] India (Odisha state) +[45]	70 USD per pregnancy	2022 adjusted cash per pregnancy: 70 USD	Maternal and child services including ANC	Incentives to CHWs CHWs receive 2.5 USD (2021) per beneficiary supported.	2011 - present	Pregnant and lactating women aged 19 and above. (no info on scope but state-wide programme)
J	Conditional Cash Transfer Programme[36] (no specific name) Afghanistan (3 provinces) *[45]	15 USD for each facility-based delivery	2022 adjusted cash per pregnancy: 16.5 USD	Facility-based delivery	Incentive to CHWs, CHW training and IEC program. Also supply-side improvements CHWs receive 5.5 USD (2021) for each facility-based delivery	December 2016 – December 2017	Women aged 16 years and above delivering in a health facility (2,453 beneficiaries in 2016)
K	Pantawid Pamilya[31] Philippines (4 provinces) +[45]	11 to 32 USD every two months (mix of health and education grants which depend on household characteristics)	2022 adjusted cash per pregnancy: 57.5 to 167.5 USD	ANC, facility-based delivery, PNC, attending family development session (+ child education and health)	Family development sessions	2008 - present	Households below poverty line and with children below age 15 or a pregnant woman (4.45 million households as of December 2014)
L	Conditional Cash Transfer Programme[29] (no specific name) Nigeria (5 states) +[45]	14 USD per pregnancy	2022 adjusted cash per pregnancy: 15 USD	At least 3 ANC visits, facility-based delivery, and 1 PNC visit	No significant co-interventions	2017 - present	Households with expectant women (180 primary health service areas across five states)
M	Afya Credits Incentive[32] Kenya (Siaya county) +[45]	31.5 USD per scheduled health visit	2022 adjusted cash per pregnancy: 31.5 USD	ANC, facility-based delivery, PNC and childhood immunisation	No significant co-interventions	2014 - 2020	Pregnant women (5,471 beneficiaries as of 2019)

Monetary benefits are extracted as reported in the studies. For studies reporting against the same conditional cash transfer programme, the monetary benefits were taken from the most recent study. Income categories are obtained from the World Bank. The US Inflation Calculator[24] has been used to determine the 2022 USD values. USD stands for United States dollar, CHW for community health worker, PNC for postnatal care and IEC for information, education and communication. Symbols have been used to indicate country income level. Low income economy with an asterisk (*), lower-middle income economy with a plus (+), and upper-middle income economy with a minus (-).

Risk of bias in the included studies

Randomized controlled trials

Amongst the six included randomized controlled trials, only Vanhuyse et al.[32] stated if the reported result was in line with a predetermined set of outcome indicators. Okeke and Abubaker[29], Grepin et al.[30], and Vanhuyse et al.[32], were rated as having a high risk of bias on randomization, as each study failed to conceal the allocation sequence until study participants were enrolled and assigned to the conditional cash transfer or control group (see appendix C for comprehensive risk of bias assessment of each study).

Controlled before-after studies and interrupted time series analysis

Of the twelve included non-randomized studies, Joshi & Sivaram[40] and Okoli et al.[44] indicated that reported results were in line with a research protocol. Almost all studies reported difficulties regarding accurate measurement of outcomes as participants were aware of the cash transfers provided to them. Factors lowering this risk were poorly documented in the studies. Edmond et al.[36] and Okoli et al.[44] were rated as having a serious risk of bias related to confounding (see appendix D).

Effect estimates

The reported effect estimates of CCT programmes on ANC service uptake are presented in table 4.

Table 4: Treatment effects of included studies

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome Description	Treatment Effect	Statistical Information	Data source
Individually Randomized Controlled Trials							
1	Grepin, Habyarimana & Jack[30]	2019	M-Kadi (Kenya) 29.5 USD per pregnancy	Four or more ANC visits	0.045 RC (6.9% increase)	Control: 0.65 95% CI: NA **SE: 0.068** **P-value > 0.1**	Registers & Survey (conducted by programme)
Cluster Randomized Controlled Trials							
2	Barber & Gertler[27]	2010	Oportunidades (Mexico) 172.5 USD per pregnancy	Any prenatal care	0.034 RC (3.6% increase)	Control: 0.943 95% CI: NA **SE: 0.236**	Survey (ENCEL survey, socio-economic survey and fertility survey)
				Obtained five prenatal care visits	0.015 RC (2% increase)	Control: 0.742 95% CI: NA **SE: 0.130**	
				Number of prenatal visits	-0.0348 RC (0.5% decrease)	Control: 6.40 95% CI: NA **SE: 0.037**	
3	Kandpal et al.[31]	2016	Pantawid Pamilya (Philippines) 57.5 to 167.5 USD per pregnancy	Four or more ANC visits	7.648 RC (13.9% increase)	Control: 54.911 **95% CI: -3.148; 18.443** **P-value > 0.1**	Survey (specific impact evaluation, Family Income and Expenditure Survey and National DHS)
				Number of times ANC was received	0.596 RC (14.4% increase)	Control: 4.147 **95% CI: -0.088; 1.280** **P-value: 0.09**	
4	Okeke & Abubaker[29]	2020	CCT programme (Nigeria) 15 USD per pregnancy	Number of prenatal visits attended	0.471 RC (19.8% increase)	Control: 2.378 95% CI: NA SE: 0.0655 P-value < 0.01	Survey (conducted by programme)
5	Triyana[26]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Prenatal visits	0.084 RC (1.2% increase)	Control: 7.00 95% CI: NA **SE: 0.317** **P-value > 0.1**	Survey (conducted by National Planning Agency and World Bank)
6	Vanhuyse et al.[32]	2022	Afya Credits Incentive (Kenya) 31.5 USD per pregnancy Nurses receive 5 USD for each women enrolled in the CCT programme	Antenatal care appointments attended	1.90 OR (odds of ANC being 1.9 times higher than control group)	Control: NA 95% CI: 1.36; 2.66 P-value < 0.001	Survey (conducted by programme) Electronic Card Reading System
Controlled Before-After Studies (all applied difference-in-differences methodology)							
7	Kusuma et al.[33]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Four or more prenatal visits	0.039 RC (5.6% increase)	Control: 0.70 95% CI: NA **SE: 0.023** **P-value < 0.1**	Survey (conducted by National Planning Agency and World Bank)
8	De Brauw & Peterman[34]	2020	Comunidades Solidarias Rurales (El Salvador) 145.5 to 194 USD per pregnancy	Five or more prenatal visits	-0.102 RC (13.7% decrease)	Control: 0.744 95% CI: NA **SE: 0.073** **P-value: 0.206**	Survey (conducted by IFPRI and FUSADES)
9	Díaz & Saldarriaga[35]	2019	JUNTOS (Peru) 343.5 USD per pregnancy	Number of prenatal appointments	0.328 RC (4.7% increase)	Control: 7.009 95% CI: NA SE: 0.148 P-value < 0.05	Survey (Peruvian DHS)
				One or more ANC visit(s)	0.028 RC (2.9% increase)	Control: 0.955 95% CI: NA SE: 0.011 P-value < 0.05	
				Four or more ANC visits	0.048 RC (5.5% increase)	Control: 0.876 95% CI: NA	

						SE: 0.017 P-value < 0.01	
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	45.0% AMD (45.0% higher than control group)	Control: NA 95% CI: 18%; 72% P-value: 0.004	Survey HMIS
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	1.51 OR (odds of ANC being 1.51 times higher than control group)	Control: NA 95% CI: 1.15; 1.99	Survey (NFHS second, third and fourth wave)
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.010 RC (2.2% increase)	Control: 0.45 95% CI: NA **SE: 0.0073** **P-value > 0.1**	Survey (DLHS-II and DLHS III)
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.0962 RC (22.9% increase)	Control: 0.42 95% CI: NA SE: 0.0113 P-value < 0.01	Survey (NFHS third and fourth wave)
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	-0.004 RC (1.3% decrease)	Control: 0.298 95% CI: NA **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
15	Lim et al.[41]	2010	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	10.7% (increase among treatment group, using 'exact matching')	Control: NA 95% CI: 9.1%; 12.3%	Survey (DLHS-II and DLHS-III)
					11.1% (increase among treatment group, using 'with versus without')	Control: NA 95% CI: 10.1%; 12.1%	
					10.9% (increase among treatment group, using 'difference-in-differences')	Control: NA 95% CI: 4.6%; 17.2%	
16	Debnath[42]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Any prenatal care	0.022 RC (2.4% increase)	Control: 0.908 95% CI: 0.013; 0.032 SE: 0.005 P-value < 0.01	Survey (DLHS-II and DLHS-III)
Interrupted Time Series Analysis							
17	Powell-Jackson et al.[43]	2009	Safe Delivery Incentive Programme (Nepal) 201 USD per pregnancy Healthcare provider receives 6.5 USD per assisted delivery	Number of ANC visits	0.031 RC (2.5% increase) *using quartic time function	Control: 1.235 T-statistic: 0.38 95% CI: NA	Community surveillance system dataset
					-0.046 RC (3.7% decrease) *using quadratic time function	Control: 1.235 T-statistic: -0.75 95% CI: NA	
18	Okoli et al.[44]	2014	SURE-P/MCH (Nigeria) 35.5 USD per pregnancy	Four or more ANC visits	15.1152 RC (Increase of 15.1 visits per 100,000 population)	Control: NA T-statistic: 4.13 P-value: 0.001 95% CI: 7.38; 22.85	Programme Monitoring data (from facility logbooks)
				Number of first ANC visits	-8.3150 RC (Decrease of 8.3 visits per 100,000 population)	Control: NA **T-statistic: -1.29** **P-value: 0.213** **95% CI: -21.87; 5.24**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Eight studies presented statistically non-significant results on all reported outcomes. Seven studies reported a statistically significant increase of over 5% in ANC service uptake. Three studies reported limited or negative effects.

A meta-analysis was not performed due to the heterogeneity of the selected studies. There are notable differences regarding the interventions, including the cash amounts and conditionalities. There is also variation in study settings, study population, study methodologies, and data reported[15].

Poverty dynamics

Out of the eighteen included studies in this review, four controlled before-after studies contained in-depth poverty-related information[36-37-39-40]. Studies were included if treatment effects could be retrieved for groups with different socio-economic status. Studies used different definitions for poverty, thereby impeding potential comparisons across settings. The treatment effects by population group are displayed in table 5.

Table 5: Poverty-related treatment effects from included studies containing information on poverty

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome description	Population Group	Treatment Effect	Statistical Information	Data Source
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	Poorest quintile	43.2% AMD (43.2% higher than control group)	Control: NA **95% CI: -17%; 103%** **P-value: 0.145**	Survey HMIS
					Second poorest quintile	55.4% AMD (55.4% higher than control group)	Control: NA 95% CI: 10%; 100% P-value: 0.021	
					Third poorest quintile	58.0% AMD (58.0% higher than control group)	Control: NA 95% CI: 23%; 94% P-value: 0.004	
					Second wealthiest quintile	29.0% AMD (29.0% higher than control group)	Control: NA **95% CI: -8%; 66%** **P-value: 0.112**	
					Wealthiest quintile	28.8% AMD (28.8% higher than control group)	Control: NA **95% CI: -4%; 61%** **P-value: 0.077**	
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	Poorest two quintiles	1.82 OR (odds of ANC being 1.82 times higher than control group)	Control: NA 95% CI: 1.30; 2.56	Survey (NFHS second, third and fourth wave)
					Wealthiest three quintiles	1.19 OR (odds of ANC being 1.19 times higher than control group)	Control: NA **95% CI: 0.95; 1.49**	
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poor (or women with a below-the-poverty card and experienced up to a second live birth or women belonging to a scheduled caste/tribe and experienced up to a second live birth)	0.0997 RC (23.7% increase) Note this coefficient is a combination of two coefficients: 0.0767[1] and 0.0230[2] which come with different SE and P values.	Control : 0.42 SE[1] : 0.0252 **SE[2] : 0.0273** P-value[1] < 0.01 **P-value[2] > 0.1**	Survey (NFHS third and fourth wave)
					Non-poor	0.0767 RC (18.3% increase)	Control: 0.42 SE: 0.0252 P-value < 0.01	
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poorest quintile	0.005 RC (0.74% increase)	Control: 0.680 **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
					All quintiles	-0.004 RC (1.3% decrease)	Control: 0.298 **SE: 0.010** **P-value > 0.1**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Of the four studies that reported on treatment effect disaggregated by socio-economic status (SES), two studies[36-37] reported significantly higher ANC attendance in lower SES groups compared to control populations than did higher SES groups. The remaining two studies[39-40] did not report statistically significant results in relation to this outcome.

Discussion

There is a pressing need across LMICs to increase the proportion of women who attend ANC, as recommended by the World Health Organisation, in order to reduce maternal mortality and poor neonatal health outcomes[2-5]. CCT programmes are a potentially promising policy lever to increase uptake of ANC across LMIC contexts, however current evidence for the impact of CCTs on ANC is unclear. In this review, we have built on the evidence generated by previous published reviews[7-8-9-10] of demand-side interventions on ANC uptake, to elucidate the specific impact of CCTs on this outcome of interest. Our findings are generally consistent with the existing evidence base that indicates that some CCT programmes have a modest positive impact on ANC attendance, but that other programmes fail to generate such impact, indicating high context-specificity of such programmes in relation to ANC service uptake.

Of the eighteen studies reviewed covering thirteen CCT programs, eight studies[26-27-30-31-33-34-38-40] presented statistically non-significant results on all reported treatment effects, three studies[42-43-44] demonstrated statistically significant limited or negative effects on the utilization of ANC services and seven studies[29-32-35-36-37-39-41] demonstrated a statistically significant increase in ANC service uptake ranging from 5.5% to 45%. The studies that did report statistically significant improvement in ANC uptake as a result of CCT programmes were delivered in Peru[35], Nigeria[29], Afghanistan[36], India[37-39-41] and Kenya[32], where programme settings and modalities vary greatly. The studies that reported small or negative impacts of CCTs on ANC uptake were delivered in India[42], Nepal[43] and Nigeria[44]. The fact that both positive and negative associations between CCTs and ANC uptake were reported in programmes implemented in India and Nigeria, coupled with the general heterogeneity of programme impact across the studies reviewed, indicates that programme design and implementation context might be vital factors in determining programme success.

The amount of money transferred has been postulated to play a key role in incentivizing behaviour, and may be an important factor in whether or not the CCT programmes included in this review observed a positive impact[46]. The study of the 'Mamata' scheme in India[37] reported a notable positive impact, which could relate to the relatively high transfer amounts (70 USD per pregnancy) provided to women. This positive relationship between transfer amount and positive trends in ANC uptake is also supported by findings from the 'JUNTOS' programme in Peru[35], which similarly transferred a relatively high monetary amount (343.5 USD per pregnancy) compared to other studies and reported a statistically significant positive programme impact. However, in this review we also identified programmes in which CCT using relatively low transfer amounts also reported positive impacts of CCT on ANC uptake. The CCT programmes best illustrating the complex relationship between financial allocation and programme success are those implemented in Nigeria in which the CCT programme[29] reported better results than the SURE-P/MCH programme[44] despite it being implemented in the same country with a transfer amount that is more than double of the CCT programme[29].

Previous studies have established that conditionalities are crucial for impact across a range of health-seeing behaviours[47] and could play a key role in increasing ANC service uptake. The 'Mamata' scheme

in India[37] required incremental ANC attendance, while the Safe Motherhood Programme in India[39-41-42] focused on an endpoint of facility-based deliveries, with the former generating more impact overall. The Afya Credits Incentive in Kenya[32], the CCT programme in Nigeria[29] and the 'JUNTOS' programme in Peru[35], which reported positive impacts, similarly allocated financial payments to ANC attendance conditionality. However, this conditionality of ANC attendance was not uniformly associated with increased ANC uptake across all studies reviewed, for example the SURE-P/MCH programme in Nigeria[44] reported negative programme impact despite ANC conditionality.

The differences in treatment effects amongst studies examining the same CCT programme warrant further scrutiny. Three included studies[39-41-42] reported statistically significant results on the Safe Motherhood Programme in India using different data to analyse programme impact. Reported increase in ANC uptake as a result of the same CCT programme ranged from 2.4%[42] to 22.9%[39]. Aizawa (2020)[39] demonstrated the strongest association between CCT and ANC uptake and used data from the National Family Health Survey conducted in 2006 and 2016 comparing from numerous Indian States. Lim et al. (2010)[41] presented a lower positive association (11.1%) and used data from the District-level Household Survey from 2004 and 2009. Debnath (2021)[42] reported the smallest impact, and utilised the same survey data as Lim et al.[41], but opted for a restricted sample excluding numerous districts in India. Such heterogeneity indicates the complexity of policy evaluation as different results are reported on the same CCT programme.

We found inconclusive results regarding the relationship between poverty and CCT programme impact. The four studies[36-37-39-40] that reported comparisons between socio-economic groups and the impact of CCT on ANC uptake lacked statistical power to formulate robust conclusions due to low powered sample sizes. Hence, we failed to determine if the level of poverty amongst people receiving CCTs was an important factor for determining impact on ANC service uptake.

One limitation of the evidence incorporated in this review is the use of survey data by the majority of included studies, opening the potential for data bias. We also note the developments in data capture infrastructure, such as smartphones and tablets, that coincide with the decade covered by the included studies, and the potential impact that this had on later studies in terms of enhanced ability to accurately capture data. The included studies varied in quality, ranging from suboptimal study designs to high levels of bias. Three included randomized controlled trials reported high risk of bias on the randomization process[29-30-32] and two non-randomized studies presented a serious risk of bias on confounding[36-44]. The heterogeneity of study design, population, and implementation process amongst the eighteen studies hindered us to perform a meta-analysis to generate overall treatment effects of CCTs on ANC. A number of studies did not clearly present the information required for the summary tables. For example, less than half of all studies reported the actual number of ANC visits attended by programme participant populations, rendering it impossible to compare ANC attendance against the WHO-recommended[5] number of visits for the majority of included studies. Together, these factors may contribute to the inconclusiveness of results reported in this review.

Given the high heterogeneity identified in this review in relation to CCT impact on ANC uptake across LMICs, there is substantial scope for future research to explore the most important determinants for CCT programme success, failure, and inconclusiveness. Complex process evaluations should be employed alongside the implementation of CCT programmes to elucidate the contextual factors that contribute to programme success, including population characteristics, geographic and environmental factors, conditionalities, co-interventions, baseline ANC service uptake, and financial allocations attached to demand-side interventions. Study design is an additional important consideration for future CCT programs, whereby more high-powered randomised controlled trials are required to

strengthen the evidence base for whether such programs are truly impactful from a health perspective.

Conclusion

This systematic review investigated the relationship between CCT programmes and ANC service uptake. These programmes are an alluring instrument for policy makers in LMICs to expand ANC coverage. Our review demonstrated divergent effects of conditional cash transfers amongst the included studies, indicating high context-specificity for these programmes to achieve the desired impact of increased ANC service uptake. The global health community, most notably multilateral organisations and donor community, have invested substantially in CCTs during the past few decades. This review highlights that further high-quality high-powered evidence is required in order to elucidate the true impact of CCT programmes on ANC uptake, with special focus on process evaluation of the barriers, enablers, and opportunities for programmatic success.

Ethics approval statement

This study is a systematic review of already published literature.

Contribution statement

Ward Jacobs: project administration, research protocol, conceptualisation, title and abstract screening, data extraction, data analysis and synthesis, methodology, grey literature search, background reading, risk of bias assessment, drafting the first manuscript, editing, and overall review.

Laura E Downey: research protocol, title and abstract screening, editing of the draft manuscript, overall review, provision of guidance and direction.

Competing interests

No competing interests to declare.

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Data sharing statement

This study is a systematic review. All included studies can be retrieved through the reference list. More information regarding the review process including title and abstract screening can be obtained by contacting the corresponding author.

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Figure

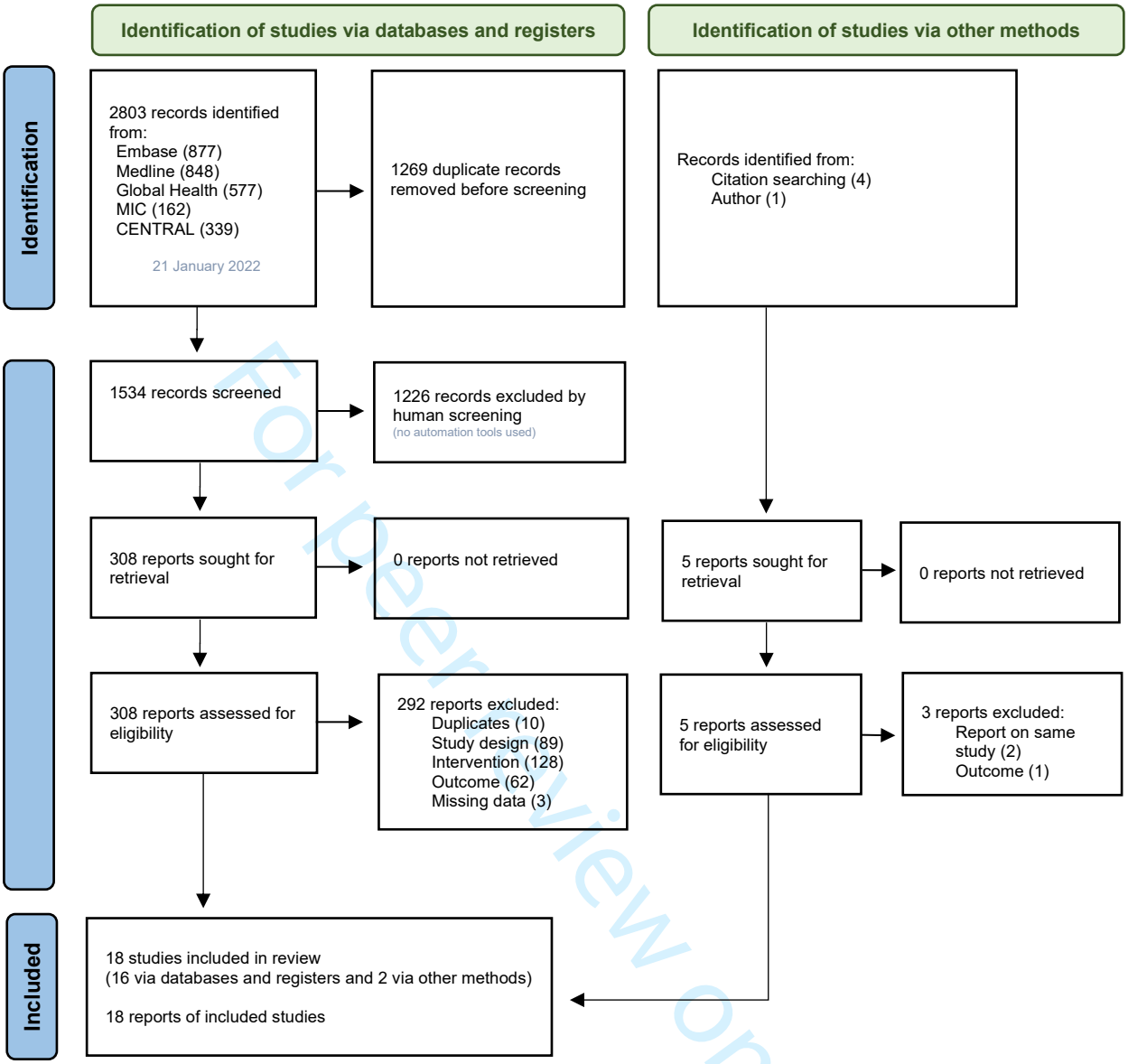

Figure 1: Overview of the study selection process[25]

Appendix

Appendix A: Search strategy

Database	CENTRAL
Results	339
Date	21 January 2022

#1 Cash near/2 transfer* 380

#2 Cash near/2 payment* 60

#3 Voucher* 853

#4 Cash near/2 assistance 19

#5 Financ* NEXT incentiv* 1276

#6 Mone* NEXT incentiv* 510

#7 Cash NEXT incentiv* 134

#8 Mone* NEXT transfer* 17

#9 Cash NEXT based NEXT intervention* 4

#10 "Social insurance" 289

#11 "Community-based insurance" 5

#12 MeSH descriptor: [Social Security] explode all trees 46

#13 MeSH descriptor: [Community-Based Health Insurance] this term only 2

#14 Antenat* 5571

#15 Ante NEXT nat* 94

#16 ANC 2376

#17 Perinat* 10524

#18 Peri NEXT nat* 33

#19 Prenat* 7888

#20 Pre NEXT nat* 130

#21 Matern* 29044

#22 "Primary care" 23761

#23 Primary NEXT health* 8949

#24 Pregna* 74636

#25 Antepartum 771

#26 "Ante partum" 39

#27 MeSH descriptor: [Perinatal Care] this term only 181

#28 MeSH descriptor: [Prenatal Care] this term only 1620

#29 MeSH descriptor: [Maternal-Child Health Services] this term only 47

#30 MeSH descriptor: [Pregnancy] this term only 23343

#31 Developing NEXT countr* 4925

#32 Low NEXT income NEXT countr* 1396

#33 Middle NEXT income NEXT countr* 2995

#34 LMIC 327

#35 MeSH descriptor: [Developing Countries] this term only 907

#36 "Eastern Europe" or "Pacific Islands" or "Indian Ocean Islands" or "West Indies" or Caribbean or "Atlantic Islands" or Africa or "South America" or "Latin America" or "Central America" or Asia 21994

#37	Afghanistan or Albania or Algeria or "American Samoa" or Angola or Argentina or "Argentine Republic" or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or "Cabo Verde" or "Cape Verde" or Cambodia or Cameroon or "Central African Republic" or Chad or China or Colombia or Comoro* or Comores or Congo or "Costa Rica" or "Ivory Coast" or "Cote d'Ivoire" or Cuba or Djibouti or Dominica or "Dominican Republic" or Ecuador or Egypt or "El Salvador" or "Equatorial Guinea" or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or "Guinea-Bissau" or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or "Lao PDR" or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or "Marshall Islands" or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or "Papua New Guinea" or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or "Sao Tome" or Principe or Senegal or Serbia or "Sierra Leone" or "Solomon Islands" or Somalia or "South Africa" or "South Sudan" or "Sri Lanka" or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or "West Bank" or Gaza or Yemen or Zambia or Zimbabwe	240376
#38	MeSH descriptor: [Afghanistan] this term only	51
#39	MeSH descriptor: [Albania] this term only	5
#40	MeSH descriptor: [Algeria] this term only	13
#41	MeSH descriptor: [American Samoa] this term only	6
#42	MeSH descriptor: [Angola] this term only	12
#43	MeSH descriptor: [Argentina] this term only	201
#44	MeSH descriptor: [Armenia] this term only	8
#45	MeSH descriptor: [Azerbaijan] this term only	7
#46	MeSH descriptor: [Bangladesh] this term only	704
#47	MeSH descriptor: [Republic of Belarus] this term only	29
#48	MeSH descriptor: [Belize] this term only	10
#49	MeSH descriptor: [Benin] this term only	51
#50	MeSH descriptor: [Bhutan] this term only	2
#51	MeSH descriptor: [Bolivia] this term only	37
#52	MeSH descriptor: [Bosnia and Herzegovina] this term only	15
#53	MeSH descriptor: [Botswana] this term only	66
#54	MeSH descriptor: [Brazil] this term only	1671
#55	MeSH descriptor: [Bulgaria] this term only	37
#56	MeSH descriptor: [Burkina Faso] this term only	194
#57	MeSH descriptor: [Burundi] this term only	18
#58	MeSH descriptor: [Cabo Verde] this term only	0
#59	MeSH descriptor: [Cambodia] this term only	123
#60	MeSH descriptor: [Cameroon] this term only	106
#61	MeSH descriptor: [Central African Republic] this term only	12
#62	MeSH descriptor: [Chad] this term only	5
#63	MeSH descriptor: [China] this term only	4671
#64	MeSH descriptor: [Colombia] this term only	174
#65	MeSH descriptor: [Comoros] this term only	1
#66	MeSH descriptor: [Congo] this term only	15
#67	MeSH descriptor: [Democratic Republic of the Congo] this term only	107
#68	MeSH descriptor: [Costa Rica] this term only	42
#69	MeSH descriptor: [Cote d'Ivoire] this term only	102
#70	MeSH descriptor: [Cuba] this term only	60
#71	MeSH descriptor: [Djibouti] this term only	2
#72	MeSH descriptor: [Dominica] this term only	0
#73	MeSH descriptor: [Dominican Republic] this term only	38
#74	MeSH descriptor: [Ecuador] this term only	77
#75	MeSH descriptor: [Egypt] this term only	453

#76	MeSH descriptor: [El Salvador] this term only	8
#77	MeSH descriptor: [Equatorial Guinea] this term only	5
#78	MeSH descriptor: [Eritrea] this term only	1
#79	MeSH descriptor: [Eswatini] this term only	22
#80	MeSH descriptor: [Ethiopia] this term only	261
#81	MeSH descriptor: [Fiji] this term only	14
#82	MeSH descriptor: [Gabon] this term only	49
#83	MeSH descriptor: [Gambia] this term only	243
#84	MeSH descriptor: [Georgia (Republic)] this term only	18
#85	MeSH descriptor: [Ghana] this term only	334
#86	MeSH descriptor: [Grenada] this term only	1
#87	MeSH descriptor: [Guatemala] this term only	135
#88	MeSH descriptor: [Guinea] this term only	8
#89	MeSH descriptor: [Guinea-Bissau] this term only	101
#90	MeSH descriptor: [Guyana] this term only	3
#91	MeSH descriptor: [Haiti] this term only	65
#92	MeSH descriptor: [Honduras] this term only	40
#93	MeSH descriptor: [India] this term only	2343
#94	MeSH descriptor: [Indonesia] this term only	371
#95	MeSH descriptor: [Iran] this term only	1632
#96	MeSH descriptor: [Iraq] this term only	54
#97	MeSH descriptor: [Jamaica] this term only	67
#98	MeSH descriptor: [Jordan] this term only	93
#99	MeSH descriptor: [Kazakhstan] this term only	16
#100	MeSH descriptor: [Kenya] this term only	825
#101	MeSH descriptor: [Micronesia] this term only	10
#102	MeSH descriptor: [Democratic People's Republic of Korea] this term only	4
#103	MeSH descriptor: [Kosovo] this term only	3
#104	MeSH descriptor: [Kyrgyzstan] this term only	6
#105	MeSH descriptor: [Laos] this term only	39
#106	MeSH descriptor: [Lebanon] this term only	74
#107	MeSH descriptor: [Lesotho] this term only	14
#108	MeSH descriptor: [Liberia] this term only	24
#109	MeSH descriptor: [Libya] this term only	6
#110	MeSH descriptor: [Madagascar] this term only	39
#111	MeSH descriptor: [Malawi] this term only	424
#112	MeSH descriptor: [Malaysia] this term only	316
#113	MeSH descriptor: [Mali] this term only	113
#114	MeSH descriptor: [Mauritania] this term only	4
#115	MeSH descriptor: [Mauritius] this term only	3
#116	MeSH descriptor: [Mexico] this term only	669
#117	MeSH descriptor: [Moldova] this term only	6
#118	MeSH descriptor: [Mongolia] this term only	22
#119	MeSH descriptor: [Montenegro] this term only	2

#120	MeSH descriptor: [Morocco] this term only	37
#121	MeSH descriptor: [Mozambique] this term only	94
#122	MeSH descriptor: [Myanmar] this term only	78
#123	MeSH descriptor: [Namibia] this term only	13
#124	MeSH descriptor: [Nepal] this term only	327
#125	MeSH descriptor: [Nicaragua] this term only	31
#126	MeSH descriptor: [Niger] this term only	61
#127	MeSH descriptor: [Nigeria] this term only	665
#128	MeSH descriptor: [Republic of North Macedonia] this term only	11
#129	MeSH descriptor: [Pakistan] this term only	517
#130	MeSH descriptor: [Panama] this term only	22
#131	MeSH descriptor: [Papua New Guinea] this term only	66
#132	MeSH descriptor: [Paraguay] this term only	5
#133	MeSH descriptor: [Peru] this term only	215
#134	MeSH descriptor: [Philippines] this term only	186
#135	MeSH descriptor: [Romania] this term only	111
#136	MeSH descriptor: [Russia] this term only	325
#137	MeSH descriptor: [Rwanda] this term only	85
#138	MeSH descriptor: [Samoa] this term only	2
#139	MeSH descriptor: [Sao Tome and Principe] this term only	0
#140	MeSH descriptor: [Senegal] this term only	101
#141	MeSH descriptor: [Serbia] this term only	51
#142	MeSH descriptor: [Sierra Leone] this term only	41
#143	MeSH descriptor: [Melanesia] this term only	5
#144	MeSH descriptor: [Somalia] this term only	22
#145	MeSH descriptor: [South Africa] this term only	1216
#146	MeSH descriptor: [South Sudan] this term only	1
#147	MeSH descriptor: [Sri Lanka] this term only	123
#148	MeSH descriptor: [Saint Lucia] this term only	0
#149	MeSH descriptor: [Saint Vincent and the Grenadines] this term only	0
#150	MeSH descriptor: [Sudan] this term only	85
#151	MeSH descriptor: [Suriname] this term only	17
#152	MeSH descriptor: [Syria] this term only	40
#153	MeSH descriptor: [Tajikistan] this term only	3
#154	MeSH descriptor: [Tanzania] this term only	632
#155	MeSH descriptor: [Thailand] this term only	1133
#156	MeSH descriptor: [Timor-Leste] this term only	4
#157	MeSH descriptor: [Togo] this term only	15
#158	MeSH descriptor: [Tonga] this term only	1
#159	MeSH descriptor: [Tunisia] this term only	63
#160	MeSH descriptor: [Turkey] this term only	914
#161	MeSH descriptor: [Turkmenistan] this term only	1
#162	MeSH descriptor: [Uganda] this term only	789
#163	MeSH descriptor: [Ukraine] this term only	51

#164 MeSH descriptor: [Uzbekistan] this term only 11

#165 MeSH descriptor: [Vanuatu] this term only 3

#166 MeSH descriptor: [Vietnam] this term only 364

#167 MeSH descriptor: [Yemen] this term only 6

#168 MeSH descriptor: [Zambia] this term only 311

#169 MeSH descriptor: [Zimbabwe] this term only 231

#170 MeSH descriptor: [Europe, Eastern] this term only 17

#171 MeSH descriptor: [Pacific Islands] this term only 17

#172 MeSH descriptor: [Indian Ocean Islands] this term only 6

#173 MeSH descriptor: [Caribbean Region] this term only 19

#174 MeSH descriptor: [Atlantic Islands] this term only 2

#175 MeSH descriptor: [Africa] this term only 203

#176 MeSH descriptor: [South America] this term only 89

#177 MeSH descriptor: [Central America] this term only 9

#178 MeSH descriptor: [Latin America] this term only 128

#179 MeSH descriptor: [Asia] this term only 308

#180 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 3214

#181 #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 116971

#182 #31 #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70 OR #71 OR #72 OR #73 OR #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 OR #82 OR #83 OR #84 OR #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116 OR #117 OR #118 OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR #126 OR #127 OR #128 OR #129 OR #130 OR #131 OR #132 OR #133 OR #134 OR #135 OR #136 OR #137 OR #138 OR #139 OR #140 OR #141 OR #142 OR #143 OR #144 OR #145 OR #146 OR #147 OR #148 OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 OR #155 OR #156 OR #157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163 OR #164 OR #165 OR #166 OR #167 OR #168 OR #169 OR #170 OR #171 OR #172 OR #173 OR #174 OR #175 OR #176 OR #177 OR #178 OR #179 247425

#183 #180 AND #181 AND #182 in Cochrane Reviews, Trials, Clinical Answers, Editorials, Special Collections 353

Note: removed 14 clinical answers, editorials and special collections before screening, so the total became 339.

Database	Embase (Ovid)
Results	877
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (950)

2 (Cash adj3 payment*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (247)

3 Voucher*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2737)

4 (Cash adj3 assistance).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (157)

5 cash incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (253)

6 Financ* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (6406)

7 Mone* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (1939)

8 Mone* transfer*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (74)

9 Cash based intervention*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (9)

10 exp social insurance/ (3663)

11 social insurance.mp. (5288)

12 Community-based insurance.mp. (30)

13 antenat*.mp. (61671)

14 ante nat*.mp. (1122)

15 ANC.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (11049)

16 perinat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (163446)

17 peri nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (452)

18 exp prenatal care/ (168798)

19 perinatal period/ (38633)

20 perinatal care/ (15070)

21 maternal care/ (19994)

22 prenat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (281205)

23 pre nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2425)

24 matern*.mp. (484686)

25 pregna*.mp. (1170254)

26 exp pregnancy/ (849842)

27 exp primary health care/ (187395)

28 primary health*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (93820)

29 primary care.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (178603)

30 antepartum.mp. (10163)

31 ante partum.mp. (746)

32 developing country/ (99758)

33 developing countr*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (148948)

34 low income countr*.mp. (17463)

35 low income country/ (9603)

36 middle income countr*.mp. (34073)

37 middle income country/ (13913)

38 LMIC.mp. (4053)

39 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (413531)

40 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or

Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2279243)

41 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (17516)

42 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 (1819447)

43 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 (2551327)

44 41 and 42 and 43 (877)

Database	Global Health (Ovid)
Results	577
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (785)

2 (Cash adj3 payment*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (75)

3 Cash incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (113)

4 Voucher*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1080)

5 (Cash adj3 assistance).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (59)

6 Financ* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1252)

7 Mone* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (242)

8 Mone* transfer*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20)

9 Cash based intervention*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (12)

10 Social insurance.mp. (521)

11 social insurance/ (120)

12 community-based insurance.mp. (13)

13 antenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (18571)

14 ante nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (342)

15 ANC.mp. (2742)

16 Perinat*.mp. (16727)

17 peri nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (63)

18 prenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26852)

19 pre nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (484)

20 prenatal care/ (3765)

21 matern*.mp. (89713)

22 maternity services/ (4857)

23 primary care.mp. (21106)

24 primary health*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26124)

25 primary health care/ (18029)

26 pregna*.mp. (131634)

27 pregnancy/ (102766)

28 antepartum.mp. (1020)

29 ante partum.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (79)

30 prenatal screening/ (2123)

31 developing countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (987316)

32 developing countries/ (978914)

33 low income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (5257)

34 middle income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20934)

35 LMIC.mp. (1225)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (1164860)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1047629)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (3924)

39 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (212249)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1275836)

41 38 and 39 and 40 (577)

Database	Medline (Ovid)
Results	848
Date	21 January 2022

1 (cash adj3 transfer*).mp. (924)

2 (cash adj3 payment*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (198)

3 cash incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (235)

4 voucher*.mp. (2543)

5 (cash adj3 assistance).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (151)

6 financ* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (5230)

7 mone* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1394)

8 mone* transfer*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (67)

9 cash based intervention*.mp. (9)

10 Social insurance.mp. (2123)

11 exp Social security/ (8397)

12 Community-based insurance.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (25)

13 community-based health insurance/ (43)

14 antenat*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (42675)

15 ante nat*.mp. (647)

16 ANC.mp. (5759)

17 perinat*.mp. (87644)

18 Perinatal Care/ (5133)

19 peri nat*.mp. (238)

20 prenat*.mp. (191959)

21 Prenatal Care/ (30659)

22 matern*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (369304)

23 primary care.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (131882)

24 primary health*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (109340)

25 maternal-child health services/ (937)

26 pre nat*.mp. (1644)

27 Pregnancy/ (933890)

28 pregna*.mp. (1073445)

29 antepartum.mp. (6290)

30 ante partum.mp. (479)

31 Developing Countries/ (78551)

32 developing countr*.mp. (135974)

33 low income countr*.mp. (8349)

34 middle income countr*.mp. (26526)

35 LMIC.mp. (3103)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (325525)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cabo Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1794374)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 (20308)

39 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (1433855)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1993866)

41 38 and 39 and 40 (848)

Database	Maternity & Infant Care Database (Ovid)
Results	162
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, heading word, title] (88)

2 (cash adj3 payment*).mp. [mp=abstract, heading word, title] (6)

3 cash incentiv*.mp. [mp=abstract, heading word, title] (30)

4 voucher*.mp. [mp=abstract, heading word, title] (143)

5 (cash adj3 assistance).mp. [mp=abstract, heading word, title] (11)

6 financ* incentiv*.mp. [mp=abstract, heading word, title] (144)

7 mone* incentiv*.mp. [mp=abstract, heading word, title] (17)

8 mone* transfer*.mp. [mp=abstract, heading word, title] (1)

9 cash based intervention*.mp. [mp=abstract, heading word, title] (2)

10 Social insurance.mp. (20)

11 community-based insurance.mp. [mp=abstract, heading word, title] (0)

12 antenat*.mp. [mp=abstract, heading word, title] (24559)

13 ante nat*.mp. [mp=abstract, heading word, title] (181)

14 ANC.mp. [mp=abstract, heading word, title] (995)

15 Perinat*.mp. [mp=abstract, heading word, title] (27487)

16 Peri nat*.mp. [mp=abstract, heading word, title] (23)

17 Prenat*.mp. [mp=abstract, heading word, title] (25290)

18 Pre nat*.mp. [mp=abstract, heading word, title] (148)

19 Matern*.mp. [mp=abstract, heading word, title] (88912)

20 Primary care.mp. [mp=abstract, heading word, title] (2502)

21 Primary health*.mp. [mp=abstract, heading word, title] (1471)

22 pregna*.mp. [mp=abstract, heading word, title] (127997)

23 antepartum.mp. [mp=abstract, heading word, title] (2784)

24 ante partum.mp. [mp=abstract, heading word, title] (69)

25 developing countr*.mp. [mp=abstract, heading word, title] (13467)

26 low income countr*.mp. [mp=abstract, heading word, title] (679)

27 middle income countr*.mp. [mp=abstract, heading word, title] (1438)

28 LMIC.mp. [mp=abstract, heading word, title] (105)

29 (Eastern Europe or Pacific Islands or Indian Ocean Islands or West Indies or Caribbean or Atlantic Islands or Africa or South America or Latin America or Central America or Asia).mp. (13162)

30 (Afghanistan or Albania or Algeria or American Samoa or Angola or Argentina or Argentine Republic or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or Cabo Verde or Cape Verde or Cambodia or Cameroon or Central African Republic or Chad or China or Colombia or Comoro* or Comores or Congo or Costa Rica or Ivory Coast or Cote d'Ivoire or Cuba or Djibouti or Dominica or Dominican Republic or Ecuador or Egypt or El Salvador or Equatorial Guinea or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or Guinea-Bissau or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or Lao PDR or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or Marshall Islands or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or Papua New Guinea or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or Sao Tome or Principe or Senegal or Serbia or Sierra Leone or Solomon Islands or Somalia or South Africa or South Sudan or Sri Lanka or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or West Bank or Gaza or Yemen or Zambia or Zimbabwe).mp. [mp=abstract, heading word, title] (27340)

31 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (420)

32 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 (181387)

33 25 or 26 or 27 or 28 or 29 or 30 (34577)

34 31 and 32 and 33 (162)

Appendix B: Grey literature

The websites of the following organisations were screened.

- Online sources from expert organizations including:
  - WHO
    - https://www.who.int/publications

- https://apps.who.int/iris
- https://kohahq.searo.who.int
- https://www.globalindexmedicus.net

- UNICEF
  - https://www.unicef-irc.org
  - https://www.unicef.org/research-and-reports
- UNFPA
  - https://www.unfpa.org/publications
- World Bank
  - https://www.worldbank.org/en/research
- USAID
  - https://www.usaid.gov/site-search
- Management Sciences for Health
  - https://www.msh.org/resources
- Oxford Policy Management
  - https://www.opml.co.uk/publications
- Save the Children
  - https://www.savethechildren.net/research-reports
  - https://www.savethechildren.org/us/about-us/resource-library
- Oxfam
  - https://www.oxfam.org/en/research
- EQUINET
  - https://www.equinetafrica.org/par/sections/participatory-action-research-publications-journal-papers-and-reports
- IntraHealth
  - https://www.intrahealth.org/resources
- ICRIER
  - https://icrier.org/publications
- Inter-American Development Bank
  - https://publications.iadb.org/en
- Asian Development Bank
  - https://www.adb.org/search

- University sources including:
  - Erasmus University International Institute of Social Studies
    - https://repub.eur.nl/org/9739
  - University of Southampton
    - https://www.southampton.ac.uk/research.page
  - International Centre for Diarrhoeal Disease Research and the Centre for Health and Population Research
    - http://lis.icddrb.org:8380/liberty/libraryHome.do
  - Boston University Institute for Economic Development
    - https://www.bu.edu/econ/research/
  - University of Sussex Institute of Development Studies
    - https://www.sussex.ac.uk/research/explore-our-research
  - London School of Hygiene and Tropical Medicine
    - https://researchonline.lshtm.ac.uk
  - Institute of Policy Analysis and Research

- https://www.ippr.org/research
- http://www.ipar-rwanda.org/what-we-do/research-policy-analysis/publications/

- University of Cape Town Development Policy Research Unit
  - http://www.dpru.uct.ac.za/
- The Transfer Project
  - https://transfer.cpc.unc.edu/publications

Appendix C: Cash transfers by programme

#	Programme	Monetary benefits as reported in studies		2022 adjusted monetary benefits per pregnancy
		Description	Per pregnancy	
A	Program Keluarga Harapan[26-33] Indonesia (6 provinces)	Between 60 and 220 USD per year depending on household characteristics.	45 to 165 USD	52.5 to 191.5 USD
B	M-Kadi[30] Kenya (Vihiga county)	3 USD per ANC or PNC visit (maximum 4 ANC and 3 PNC visits) and 6 USD per delivery Maximum total per pregnancy: 27 USD	27 USD	29.5 USD
C	Oportunidades[27] (previously called PROGRESA) Mexico	15 USD per household per month (health transfer)	135 USD	172.5 USD
D	Comunidades Solidarias Rurales[34] El Salvador	15 USD per month for households eligible for the health *or* education benefit. 20 USD per month for households eligible for health and education benefits.	135 to 180 USD	145.5 to 194USD
E	JUNTOS[35] Peru	70 USD each two months, transferred to the female head of household.	315 USD	343.5 USD
F	Safe Motherhood Programme (Janani Suraksha Yojana)[38-39-40-41-42] India	Low performing states: ▪ 19 USD rural beneficiaries ▪ 13.5 USD urban beneficiaries High performing states: ▪ 9.5 USD rural beneficiaries ▪ 8 USD urban beneficiaries	8 to 19 USD	8.5 to 20.5 USD
G	SURE-P/MCH[44] Nigeria (9 states)	6 USD for the first ANC visit, 2 USD per additional ANC visit (up to four), 12 USD per delivery and 6 USD for PNC visit	30 USD	35.5 USD
H	Safe Delivery Incentive Programme[43] Nepal (Makwanpur district)	16 USD per facility-based delivery if no more than two children or an obstetric complication	16 USD	21 USD

I	Mamata Scheme[37] India (Odisha state)	70 USD per pregnancy	70 USD	70 USD
J	Conditional Cash Transfer Programme[36] (no specific name) Afghanistan (3 provinces)	15 USD for each facility-based delivery	15 USD	16.5 USD
K	Pantawid Pamilya[31] Philippines (4 provinces)	11 to 32 USD every two months (mix of health and education grants which depend on household characteristics)	49.5 to 144 USD	57.5 to 167.5 USD
L	Conditional Cash Transfer Programme[29] (no specific name) Nigeria (5 states)	14 USD per pregnancy	14 USD	15 USD
M	Afya Credits Incentive[32] Kenya (Siaya county)	31.5 USD per scheduled health visit	31.5 USD	31.5 USD

Appendix D: Risk of bias by study

Randomized controlled trials

Domain	Signalling Question	Grepin, Habyarimana & Jack[30]	Barber & Gertler[27]	Kandpal et al.[31]	Okeke & Abubakar[29]	Triyana[26]	Vanhuyse et al.[32]
		2019	2010	2016	2020	2016	2022
Randomization Process	1.1 Was the allocation sequence random?	Yes	Yes	Yes	Yes	Yes	Yes
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions	No	Yes	Yes	No	Yes	No
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	No	No	No	No	No	No
	Risk of bias judgement	**High risk**	**Low risk**	**Low risk**	**High risk**	**Low risk**	**High risk**

Deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Yes	Yes	Yes	Yes	Yes	Yes
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	No info	No info	No info	No info	No info	Yes
	2.3. If Y/PY/NI to 2.1 or 2.2: Were there deviations from the intended intervention that arose because of the trial context?	No	No	No	No	No	Yes
	2.4 If Y/PY to 2.3: Were these deviations likely to have affected the outcome?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Possibly No
	2.5. If Y/PY/NI to 2.4: Were these deviations from intended intervention balanced between groups?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.6 Was an appropriate analysis used to estimate the effect of assignment to intervention?	Yes	Yes	Yes	Yes	Yes	Yes
	2.7 If N/PN/NI to 2.6: Was there potential for a substantial impact (on the result) of the failure to analyse participants in the group to which they were randomized?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Moderate risk**
Missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 If N/PN/NI to 3.1: Is there evidence that the result was not biased by missing outcome data?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	No	No	No	No	No	No
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	4.3 If N/PN/NI to 4.1 and 4.2: Were outcome assessors aware of the intervention received by study participants?	No	No	No	No	No	No
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	No info	No info	No info	No info	No info	Yes
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.2. ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No

	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.3 ... multiple eligible analyses of the data?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No
	Risk of bias judgement	No info	No info	No info	No info	No info	**Low risk**

Controlled before-after studies and interrupted time series analysis

Domain	Signalling Question	Kusuma et al.[33]	De Brauw & Peterman[34]	Diaz & Saldarriaga[35]	Edmond et al. [36]	Chakrabarti et al.[37]	Powell-Jackson et al.[38]	Aizawa[39]	Joshi & Sivaram[40]	Lim et al.[41]	Debnath[42]	Powell-Jackson et al.[43]	Okoli et al.[44]
		2016	2020	2019	2019	2021	2015	2020	2014	2010	2020	2009	2014
Bias due to Confounding	1.1 Is there potential for confounding of the effect of intervention in this study?	No	Possibly Yes	Possibly No	Yes	Possibly Yes	Yes	Possibly No	Possibly No	Yes	Possibly No	Possibly Yes	Yes
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.2. Was the analysis based on splitting participants' follow up time according to intervention received?	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.3. Were intervention discontinuations or switches likely to be related to factors that are prognostic for the outcome?	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.4. Did the authors use an appropriate analysis method that controlled for all the important confounding domains?	Not applicable	No info	Not applicable	No	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.5. If Y/PY to 1.4: Were confounding domains that were controlled for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No

	Questions relating to baseline confounding only: 1.6. Did the authors control for any post-intervention variables that could have been affected by the intervention?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	Questions relating to baseline and time-varying confounding 1.7. Did the authors use an appropriate analysis method that adjusted for all the important confounding domains and for time varying confounding?	Not applicable	No info	Not applicable	Not applicable	Possibly Yes	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Questions relating to baseline and time-varying confounding: 1.8. If Y/PY to 1.7: Were confounding domains that were adjusted for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Possibly No	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Risk of Bias	**Low risk**	**No info**	**Low risk**	**Serious risk**	**Moderate risk**	**Moderate risk**	**Low risk**	**Low risk**	**Moderate risk**	**Low risk**	**No info**	**Serious risk**
Bias in selection of participants into the study	2.1. Was selection of participants into the study (or into the analysis) based on participant characteristics observed after the start of intervention? If N/PN to 2.1: go to 2.4	No	No	No	No	No	No	No	No	No	No	No	No
	2.2. If Y/PY to 2.1: Were the postintervention variables that influenced selection likely to be associated with intervention?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.3 If Y/PY to 2.2: Were the postintervention variables that influenced selection likely to be influenced by the outcome or a cause of the outcome?.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.4. Do start of follow-up and start of intervention coincide for most participants?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	2.5. If Y/PY to 2.2 and 2.3, or N/PN to 2.4: Were adjustment techniques used that are likely to correct for the presence of selection biases?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias in classification of interventions	3.1 Were intervention groups clearly defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 Was the information used to define intervention groups recorded at the start of the intervention?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.3 Could classification of intervention status have been affected by knowledge of the outcome or risk of the outcome?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Deviations from intended interventions	4.1. Were there deviations from the intended intervention beyond what would be expected in usual practice?	Yes	Possibly No	Possibly No	Possibly No	No	No	No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	4.2. If Y/PY to 4.1: Were these deviations from intended intervention unbalanced between groups and likely to have affected the outcome?	No	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias due to missing data	5.1 Were outcome data available for all, or nearly all, participants?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes
	5.2 Were participants excluded due to missing data on intervention status?	No info	No	Yes	No	No info	Yes	No info	Yes	No info	No info	No info	No info
	5.3 Were participants excluded due to missing data on other variables needed for the analysis?	No info	Yes	Yes	Yes	No info	No	No info	Yes	No info	No info	No info	No info
	5.4 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Are the proportion of participants and reasons for missing data similar across interventions?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	5.5 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Is there evidence that results were robust to the presence of missing data?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Low risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**

Bias in Measurement of Outcomes	6.1 Could the outcome measure have been influenced by knowledge of the intervention received?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	6.2 Were outcome assessors aware of the intervention received by study participants?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No	No
	6.3 Were the methods of outcome assessment comparable across intervention groups?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes	Possibly Yes
	6.4 Were any systematic errors in measurement of the outcome related to intervention received?	No info	No info	No	No info	No info	No info	No info	No info	No info	No info	No info	No info
	Risk of Bias	**Moderate risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**
Bias in selection of the reported result	Is the reported effect estimate likely to be selected, on the basis of the results, from... 7.1. ... multiple outcome measurements within the outcome domain?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.2 ... multiple analyses of the intervention outcome relationship	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.3 ... different subgroups?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	Risk of Bias	**No info**	**No info**	**No info**	**No info**	**No info**	**No info**	**No info**	**Low risk**	**No info**	**No info**	**No info**	**Low risk**

PRISMA checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page (first page)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	See appendix E
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Background section, page 2, last paragraph
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Background section, page 2, last paragraph
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Eligibility criteria section, page 2-3 Data analysis section, page 4
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Search results section, page 5, figure 1.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	See appendix B
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Search results section, page 5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Data extraction section, page 4

Section and Topic	Item #	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Eligibility criteria section, page 2-3
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Eligibility criteria section, page 2-3
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Risk of bias section, page 4
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Effect estimates section, page 9-10
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Data analysis section, page 4 Eligibility criteria section, page 2-3
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Eligibility criteria section (data availability), page 3-4
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Data extraction section, page 4
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Data analysis section, page 4
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Data analysis section, page 4
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Risk of bias section, page 4 Data extraction section, page 4
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Risk of bias section, page 4
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Risk of bias section, page 4
RESULTS			

Section and Topic	Item #	Checklist item	Location where item is reported
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Search results section, page 5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Search results section, page 5
Study characteristics	17	Cite each included study and present its characteristics.	Included studies section, page 5-6
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Risk of bias in the included studies section, page 9
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Effect estimates section, page 9-11
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Effect estimates section, page 9-11 Risk of bias in the included studies section, page 9
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Effect estimates section, page 9-11
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Effect estimates section, page 9-11
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Risk of bias in the included studies section, page 9
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Risk of bias in the included studies section, page 9
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Risk of bias in the included studies section, page 9
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion section, page 13, second paragraph
	23b	Discuss any limitations of the evidence included in the review.	Discussion, page 14,

Section and Topic	Item #	Checklist item	Location where item is reported
			third paragraph
	23c	Discuss any limitations of the review processes used.	Discussion, page 14, third paragraph
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion, page 14, fourth paragraph
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Upon request from the authors
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Not applicable
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	No funding
Competing interests	26	Declare any competing interests of review authors.	No competing interests
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Upon request from authors

PRISMA checklist [abstract]

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	No
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes

Section and Topic	Item #	Checklist item	Reported (Yes/No)
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	No
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	No
Registration	12	Provide the register name and registration number.	No

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The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

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The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

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Running title: The impact of conditional cash transfer programmes on antenatal care service uptake in low- and middle-income countries: a systematic review

Key words: Antenatal care, maternal health, neonatal health, conditional cash transfers, financial incentives

Abstract

Objective

Antenatal care (ANC) is crucial to protecting the health of pregnant women and their unborn children, however the uptake of ANC amongst pregnant women in low- and middle-income countries (LMICs) is sub-optimal. One popular strategy to increase the uptake of health services, including ANC visits, are conditional cash transfer (CCT) programmes. CCT programmes require beneficiaries to comply with certain conditionalities in order to receive a financial sum. A systematic review was carried out to determine whether CCT programmes have a positive impact on ANC uptake in LMIC populations.

Methods

Electronic databases CENTRAL, MEDLINE, Embase, Maternity and Infant Care and Global Health were searched from database inception to 21 January 2022. Reference checking and grey literature searches were also applied. Eligible study designs were randomized controlled trials, controlled before-after studies and interrupted time series analysis. Risk of bias assessments were undertaken for each study by applying the ROB-2 and ROBINS-I tools.

Results

Out of 1534 identified articles, 18 publications were included for analysis. Eight studies reported statistically non-significant results on all reported outcomes. Seven studies demonstrated statistically significant positive effects ranging from 5.5% to 45% increase in ANC service uptake. A further three studies reported small but statistically significant impact of CCT on the use of ANC services in both positive (2.5% increase) and negative (3.7% decrease) directions. Sub-analysis of results disaggregated by socioeconomic status (SES) indicated that ANC attendance may be more markedly improved by CCT programs in low SES populations, however results were inconclusive.

Conclusion

Our evidence synthesis presented here demonstrated a highly heterogeneous evidence base pertaining to the impact of CCTs on ANC attendance. More high-powered studies are required to elucidate the true impact of CCT programmes on ANC uptake, with particular focus on the barriers and enablers of such programs in achieving intended outcomes.

Strengths and limitations of this study

- To the best of our knowledge, this is the most comprehensive systematic review and synthesis of published evidence on the impact of CCT programmes on ANC uptake in LMIC populations to date
- Evidence from 18 studies conducted in Africa, Asia, Central and South America was included in this study, representing a diverse sample of LMIC populations
- Heterogeneity in study design and implementation prevented a meta-analysis from being conducted to generate macro-impact statistics
- The descriptive nature of this study precludes conclusions regarding the causality between CCT program implementation and ANC attendance

Reduction in maternal mortality is a global commitment outlined by the United Nations in the 2030 Sustainable Development Goals (SDG 3.1)[1]. Despite widespread recognition of the importance of antenatal care (ANC) in reducing maternal mortality[2] and enhancing maternal and neonatal health outcomes[3], ANC service uptake remains low in many low and middle-income countries (LMICs)[4]. The World Health Organisation recommends that women attend at least eight ANC visits[5] during their pregnancy. A substantial proportion of women living in LMICs do not meet this recommendation, and ANC attendance appears to be highly correlated with socioeconomic status and poverty, reinforcing the notion that the social determinants of health are a strong driving force in influencing health status well-before one is even born[6].

Numerous reviews have been published that report the effects of demand-side interventions on health service uptake, including ANC attendance[7-8-9-10]. Cash transfer programmes are one such intervention, and can be an attractive policy lever for increasing positive health-seeking behaviours in certain populations. Cash transfer programmes can be conditional or unconditional. Conditional cash transfer (CCT) programmes require beneficiaries to comply with certain conditionalities (e.g. regular health check-ups), while unconditional cash transfer programmes do not set such requirements[11]. Substantial resources have been allocated to cash transfer programmes in recent years, with an estimated 718 million people receiving assistance through cash transfer programmes in 2014 alone[12].

CCTs may be a viable policy strategy to increase ANC uptake amongst pregnant women in LMICs. Evidence from several studies on the effectiveness of CCT programs to increase health-seeking behaviours have shown promising positive results[11-13]. However, a recent systematic review drew attention to the heterogenous impacts of cash transfer programmes across a range of health behaviours and outcomes, highlighting the need for further research into the key contexts in which such programs may lead to success, and the barriers, enablers, and opportunities for such programs to thrive[14].

Given the well-established correlation between ANC uptake and improved maternal and neonatal health[2], and the low reported rates of ANC attendance across numerous LMIC settings[4], there is an urgent need for bilateral and multilateral agencies and governments to invest in cost-effective interventions to increase ANC uptake. There is insufficient high-quality consistent evidence to elucidate whether CCTs are one such potentially viable intervention. This review aims to address this important knowledge gap and has two primary objectives: to assess the effectiveness of CCT programmes in improving ANC uptake; and to investigate the impact of poverty in relation to ANC attendance.

Methods

Study design

A systematic review was undertaken, adhering to the guidelines from the Cochrane Handbook for Systematic Reviews of Interventions[15].

Eligibility criteria

Eligibility of each article was assessed according to the inclusion and exclusion criteria presented in table 1.

Table 1: Overview of inclusion and exclusion criteria

Inclusion	Exclusion
Pregnant women and girls	Non-pregnant women and girls

CCT programmes	Other programmes including unconditional cash transfer programmes and voucher schemes
ANC services	Other services not belonging to ANC
Study designs including randomized controlled trials, controlled before-after studies and interrupted time series analysis	Other study designs
Relevant information available	Lacking essential information

Participants

Pregnant women and girls residing in LMICs, defined as per World Bank definition, are eligible. Studies focusing on facilities or geographical areas that include service utilization data were included. All types of health care providers were eligible for inclusion.

Intervention

Studies on CCT programmes were considered for inclusion if these constituted direct monetary transfers for the purpose of increasing health service uptake. Studies on unconditional cash transfers and non-cash transfers (e.g. vouchers) were excluded. Interventions encompassing multiple components (with conditional cash transfers amongst them) were included, where it was possible to disaggregate cash transfer impacts from other intervention impacts.

Comparator

This review compares pregnant women and girls who took part in CCT programmes against those who did not.

Outcome

The sole outcome of this review is ANC service uptake. ANC utilization was measured by health facility utilisation data, health service provision data, and quantitative survey data.

Time period

We searched for evidence from database inception to 21 January 2022.

Study type

Study designs aligning with the Cochrane Effective Practice and Organisation of Care (EPOC) group criteria were included in this review[16]. These encompass:

- Randomized controlled trials (individual or cluster);
- Controlled before-after studies, with data for the period before and after the intervention;
- Interrupted time series analysis, with a clear time indication for the intervention and at least three data points before the intervention, and three data points after the intervention.

Systematic reviews were excluded during the screening process, but their reference lists were checked to possibly identify relevant literature[15].

Data availability

In line with the EPOC criteria, studies with incomplete or opaque data were not incorporated in the final selection[16]. A good example are studies with missing control variables. Authors were contacted for further inquiry as well. Studies with self-reported data are considered, contrary to the EPOC

criteria, as filtering out articles reporting on survey-related data obtained by interviewing people would result in little evidence.

Identification of studies

A search was performed on 21 January 2022 using a sensitive search strategy (see appendix A) in the following electronic databases: CENTRAL[17], MEDLINE[18], Embase[19], Maternity and Infant Care[20] and Global Health[21]. The search results were uploaded to Covidence[22], an online tool to support the selection process. Duplicates were automatically removed by the software and manually checked. Title and abstract screening was undertaken by a single reviewer (WJ) for all records, and a random sample of 20% of identified studies was reviewed by a second reviewer (LD) for quality assurance. Full-text review was undertaken by a single reviewer (WJ) and all records for which there was uncertainty were reviewed by a second author (LD) for final decision regarding inclusion/exclusion[15].

Reference searching of included studies and follow-up with authors was carried out by a single reviewer (WJ) to ensure that all relevant articles and data were identified[15]. Grey literature was also searched by the primary reviewer[15]. The organisations identified for the grey literature search were identified by both reviewers and are listed in appendix B.

Data extraction

A standardized Microsoft Excel form was used to assist with qualitative data extraction[15]. The obtained information from the various studies contains:

- Study type (individually or cluster randomised controlled trial, controlled before-after studies and interrupted time series analysis);
- Study duration;
- Study setting;
- Characteristics of participants;
- Characteristics of the intervention (transfer amounts and conditionalities);
- Main outcome measures and results.

After extraction, the data was cross-checked against the original studies to avoid human error[23]. Authors were contacted in case of data ambiguity[15].

Inflation adjustment

Cash transfers were adjusted for inflation by presenting their value for the year 2022. This to allow comparability across CCT programmes[24].

Data analysis

The information extracted from the included studies was analysed by using descriptive thematic analysis[15]. The analysis included overall effects demonstrated by the studies with further sub-analysis on poverty dynamics.

Risk of bias

The ROB-2 tool recommended by The Cochrane Collaboration was used to assess the risk of bias for the included randomized controlled trials. The tool describes five domains clarifying the risk of bias by trial. These domains include the randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome and the selection of the reported result. The ROBINS-I tool was used to assess the risk of bias for the included controlled before-after studies and research applying interrupted time series analysis. This tool utilises domains and signalling questions

that are tailored to non-randomized study designs, which encompass bias related to confounding, bias due to selection of study participants, bias in classification of interventions, deviations from intended interventions, bias due to missing data, bias in measurement of outcomes and bias in selection of the reported result[15].

Patient and public involvement

Patient and public involvement is not applicable as this article is a systematic review of existing evidence. The research question development was informed by the global debate on the effectiveness of conditional cash transfer programmes.

Results

Search results

The PRISMA guidelines for conducting and reporting systematic reviews were followed[25]. The PRISMA flow diagram is presented in Figure 1.

The database search yielded 2803 records. A total of 1534 records remained for title and abstract screening after duplicate studies were removed. These included three duplicates which were removed by Covidence software but added again to the title and abstract screening pool as abstracts were different. Out of the 1534 records, 308 were shortlisted for full-text review against the eligibility criteria.

Eighteen studies were included, of which two were identified through other methods. Triyana 2016 was identified by contacting the author after requesting for more information on an excluded study[26]. Barber & Gertler 2010 was included after a reference check of one of the included studies[27].

Included studies

Of the eighteen included studies, two were interrupted time series analysis, ten were controlled before-after studies and the remaining six were randomized controlled trials. Barber & Gertler 2010 was the final study out of three reporting against the same randomized controlled trial of the Oportunidades programme[27]. The article was selected as it was the most recent publication and covered all the necessary information as per EPOC requirements[16]. Another author published two articles[28-29] on the same randomized controlled trial. The first publication was selected for inclusion[29].

The studies in table 2 are included in this review.

Table 2: Included studies

#	Author(s)	Year	Programme & Study Participants	Location & Study Duration
Individually Randomized Controlled Trials				
1	Grepin, Habyarimana & Jack[30]	2019	M-Kadi Poor pregnant women without formal education (469 participated in the CCT arm at end-line, out of 1,401 total. 481 participated in the CCT arm at baseline, out of 1,514 total)	Kenya (Vihiga county) February 2013 to March 2014
Cluster Randomized Controlled Trials				
2	Barber & Gertler[27]	2010	Oportunidades Pregnant women (666 treatment and 174 control)	Mexico 1997 to 2003
3	Kandpal et al.[31]	2016	Pantawid Pamilya Households below poverty line and with children below age 15 or a pregnant woman (462 treatment and 704 control)	Philippines (4 provinces) October to November 2011

4	Okeke & Abubaker[29]	2020	Conditional Cash Transfer Programme Expectant women (5,852 treatment and 5,000 control)	Nigeria (5 states) March 2017 to August 2018
5	Triyana[26]	2016	Program Keluarga Harapan Pregnant and lactating women (8,303)	Indonesia (6 provinces) 2007 to 2009
6	Vanhuyse et al.[32]	2022	Afya Credits Incentive Pregnant women (2,522 treatment and 2949 control)	Kenya (Siaya county) 2017 to 2019
Controlled Before-After Studies (all apply difference-in-differences, amongst other methods)				
7	Kusama et al.[33]	2016	Program Keluarga Harapan Pregnant and lactating women (8,476)	Indonesia (6 provinces) 2007 to 2009
8	De Brauw & Peterman[34]	2020	Comunidades Solidarias Rurales Pregnant women (270)	El Salvador January to November 2008
9	Díaz & Saldarriaga[35]	2019	JUNTOS Pregnant women (9,865)	Peru 2000 - 2011
10	Edmond et al.[36]	2019	CCT Programme Women aged 16 years and above delivering in a health facility (treatment: 1,199 baseline, 1,254 end-line and control: 1,242 baseline, 1,237 end-line)	Afghanistan (3 provinces) November 2016 to December 2017
11	Chakrabarti, Pan & Singh[37]	2021	Mamata Scheme Pregnant and lactating women aged 19 and above. (11,036 treatment; 163,539 control1 and 34,320 control2)	India (Odisha state) 1998 - 2016
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Safe Motherhood Programme Currently married women (340,323)	India 2001 - 2008
13	Aizawa[39]	2020	Safe Motherhood Programme Women aged 15-49 years (45,436 treatment and 28,688 control)	India 2005 - 2016
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme Currently married women (425,708 total, over two survey rounds)	India 2002 - 2008
15	Lim et al.[41]	2010	Safe Motherhood Programme Women (not clear, but mentioning 182,869 households for latest survey round used in study)	India 2002 - 2008
16	Debnath[42]	2020	Safe Motherhood Programme Women reporting at least one pregnancy since January 2004 (208,816)	India 2002 - 2008
Interrupted Time Series Analysis				
17	Powell-Jackson et al.[43]	2009	Nepal's Safe Delivery Incentive Programme Women delivering in health facility with less than 3 children or obstetric complication (7,613 before programme, 7,186 after)	Nepal (Makwanpur district) 2001 - 2007
18	Okoli et al.[44]	2014	SURE-P/MCH Pregnant women (20,133)	Nigeria (9 states) January 2012 to March 2014

Included conditional cash transfer programmes

The selected studies cover thirteen CCT programmes presented in table 3. See appendix C for more information on the monetary benefits.

Table 3: Conditional cash transfer programmes covered by the included studies

#	Programme, Location & Income	Monetary benefits as reported in studies	2022 adjusted monetary	Conditionality	Co-interventions	Timespan	CCT beneficiaries

			benefits per pregnancy				
A	Program Keluarga Harapan[26-33] Indonesia (6 provinces) +[45]	Between 60 and 220 USD per year depending on household characteristics.	52.5 to 191.5 USD	Maternal health and education services including 4 ANC visits, delivery assistance and 2 PNC visits.	Supply-side improvements	2007 - present	Pregnant and lactating women from poor households. (no info on scope, but covering 5 provinces)
B	M-Kadi[30] Kenya (Vihiga county) +[45]	3 USD per ANC or PNC visit (maximum 4 ANC and 3 PNC visits) and 6 USD per delivery Maximum total per pregnancy: 27 USD	29.5 USD	Maternal health services including ANC, PNC and facility-based delivery	No significant co-interventions (but presence of a nationwide free-care policy and other research arms including voucher and UCT)	2013 - end unknown (but ended according to author)	Pregnant women (481 beneficiaries in 2013)
C	Oportunidades[27] (previously called PROGRESA) Mexico -[45]	15 USD per household per month (health transfer)	172.5 USD	Health and education services. Regular clinic consultations, health education sessions, at least 5 ANC visits for pregnant women, and 2 PNC visits	Education programme Max. 90 USD per household per month (primary education transfer) or maximum 160 USD per household per month (secondary education transfer). Education transfer is paid by child, and varies by school grade and gender.	1997 - present	Low-income households including pregnant women in poor communities (5 million households as of 2004)
D	Comunidades Solidarias Rurales[34] El Salvador +[45]	15 USD per month for households eligible for the health *or* education benefit. 20 USD per month for households eligible for health and education benefits.	145.5 to 194USD	ANC visits (+ vaccination and health check-up of woman's children)	Community awareness sessions	2005 - present	Households in poor municipalities with a pregnant member and children below age 16 (75,000 households in 2013)
E	JUNTOS[35] Peru -[45]	70 USD each two months, transferred to the female head of household.	343.5 USD	6 ANC visits and PNC (+ health check-up and school attendance of woman's children)	No significant co-interventions	2005 - present	Poor households with children or pregnant women (1,300 municipalities by 2016)
F	Safe Motherhood Programme (Janani Suraksha Yojana)[38-39-40-41-42] India +[45]	Low performing states: ▪ 19 USD rural beneficiaries ▪ 13.5 USD urban beneficiaries High performing states: ▪ 9.5 USD rural beneficiaries ▪ 8 USD urban beneficiaries	8.5 to 20.5 USD	Facility-based delivery	Incentives to CHWs CHWs receive 3 USD (2021) for each facility-based delivery (across all states)	2005 - present	Women delivering in a health facility in low performing states, and those 19 years and above and living below poverty line or part of deprivileged social group in high performing states (10.4 million beneficiaries in 2015)
G	SURE-P/MCH[44] Nigeria (9 states) +[45]	6 USD for the first ANC visit, 2 USD per additional ANC visit (up to four), 12 USD per delivery and 6 USD for PNC visit	35.5 USD	ANC, facility-based delivery, PNC including vaccinations.	Supply-side intervention	2012 - 2014	Pregnant women (20,133 beneficiaries as of 2014)
H	Safe Delivery Incentive Programme[43] Nepal (Makwanpur district) +[45]	16 USD per facility-based delivery if no more than two children or an obstetric complication	21 USD	Facility-based delivery	Incentives to healthcare providers Healthcare provider receives 6.5 USD (2021) per assisted delivery	2005 - present	Women delivering in health facility with less than 3 children or obstetric complication (no info on scope but national programme)
I	Mamata Scheme[37] India	70 USD per pregnancy	70 USD	Maternal and child services including ANC	Incentives to CHWs	2011 - present	Pregnant and lactating women

	(Odisha state) +[45]				CHWs receive 2.5 USD (2021) per beneficiary supported.		aged 19 and above. (no info on scope but state-wide programme)
J	Conditional Cash Transfer Programme[36] (no specific name) Afghanistan (3 provinces) *[45]	15 USD for each facility-based delivery	16.5 USD	Facility-based delivery	Incentive to CHWs, CHW training and IEC program. Also supply-side improvements CHWs receive 5.5 USD (2021) for each facility-based delivery	December 2016 – December 2017	Women aged 16 years and above delivering in a health facility (2,453 beneficiaries in 2016)
K	Pantawid Pamilya[31] Philippines (4 provinces) +[45]	11 to 32 USD every two months (mix of health and education grants which depend on household characteristics)	57.5 to 167.5 USD	ANC, facility-based delivery, PNC, attending family development session (+ child education and health)	Family development sessions	2008 - present	Households below poverty line and with children below age 15 or a pregnant woman (4.45 million households as of December 2014)
L	Conditional Cash Transfer Programme[29] (no specific name) Nigeria (5 states) +[45]	14 USD per pregnancy	15 USD	At least 3 ANC visits, facility-based delivery, and 1 PNC visit	No significant co-interventions	2017 - present	Households with expectant women (180 primary health service areas across five states)
M	Afya Credits Incentive[32] Kenya (Siaya county) +[45]	31.5 USD per scheduled health visit	31.5 USD	ANC, facility-based delivery, PNC and childhood immunisation	No significant co-interventions	2014 - 2020	Pregnant women (5,471 beneficiaries as of 2019)

Monetary benefits are extracted as reported in the studies. For studies reporting against the same conditional cash transfer programme, the monetary benefits were taken from the most recent study. Income categories are obtained from the World Bank. The US Inflation Calculator[24] has been used to determine the 2022 USD values. USD stands for United States dollar, CHW for community health worker, PNC for postnatal care and IEC for information, education and communication. Symbols have been used to indicate country income level. Low income economy with an asterisk (*), lower-middle income economy with a plus (+), and upper-middle income economy with a minus (-).

Risk of bias in the included studies

Randomized controlled trials

Amongst the six included randomized controlled trials, only Vanhuyse et al.[32] stated if the reported result was in line with a predetermined set of outcome indicators. Okeke and Abubaker[29], Grepin et al.[30], and Vanhuyse et al.[32], were rated as having a high risk of bias on randomization, as each study failed to conceal the allocation sequence until study participants were enrolled and assigned to the conditional cash transfer or control group (see appendix C for comprehensive risk of bias assessment of each study).

Controlled before-after studies and interrupted time series analysis

Of the twelve included non-randomized studies, Joshi & Sivaram[40] and Okoli et al.[44] indicated that reported results were in line with a research protocol. Almost all studies reported difficulties regarding accurate measurement of outcomes as participants were aware of the cash transfers provided to them. Factors lowering this risk were poorly documented in the studies. Edmond et al.[36] and Okoli et al.[44] were rated as having a serious risk of bias related to confounding (see appendix D).

Effect estimates

The reported effect estimates of CCT programmes on ANC service uptake are presented in table 4.

Table 4: Treatment effects of included studies

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome Description	Treatment Effect	Statistical Information	Data source
Individually Randomized Controlled Trials							
1	Grepin, Habyarimana & Jack[30]	2019	M-Kadi (Kenya) 29.5 USD per pregnancy	Four or more ANC visits	0.045 RC (6.9% increase)	Control: 0.65 95% CI: NA **SE: 0.068** **P-value > 0.1**	Registers & Survey (conducted by programme)
Cluster Randomized Controlled Trials							
2	Barber & Gertler[27]	2010	Oportunidades (Mexico) 172.5 USD per pregnancy	Any prenatal care	0.034 RC (3.6% increase)	Control: 0.943 95% CI: NA **SE: 0.236**	Survey (ENCEL survey, socio-economic survey and fertility survey)
				Obtained five prenatal care visits	0.015 RC (2% increase)	Control: 0.742 95% CI: NA **SE: 0.130**	
				Number of prenatal visits	-0.0348 RC (0.5% decrease)	Control: 6.40 95% CI: NA **SE: 0.037**	
3	Kandpal et al.[31]	2016	Pantawid Pamilya (Philippines) 57.5 to 167.5 USD per pregnancy	Four or more ANC visits	7.648 RC (13.9% increase)	Control: 54.911 **95% CI: -3.148; 18.443** **P-value > 0.1**	Survey (specific impact evaluation, Family Income and Expenditure Survey and National DHS)
				Number of times ANC was received	0.596 RC (14.4% increase)	Control: 4.147 **95% CI: -0.088; 1.280** **P-value: 0.09**	
4	Okeke & Abubaker[29]	2020	CCT programme (Nigeria) 15 USD per pregnancy	Number of prenatal visits attended	0.471 RC (19.8% increase)	Control: 2.378 95% CI: NA SE: 0.0655 P-value < 0.01	Survey (conducted by programme)
5	Triyana[26]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Prenatal visits	0.084 RC (1.2% increase)	Control: 7.00 95% CI: NA **SE: 0.317** **P-value > 0.1**	Survey (conducted by National Planning Agency and World Bank)
6	Vanhuyse et al.[32]	2022	Afya Credits Incentive (Kenya) 31.5 USD per pregnancy Nurses receive 5 USD for each women enrolled in the CCT programme	Antenatal care appointments attended	1.90 OR (odds of ANC being 1.9 times higher than control group)	Control: NA 95% CI: 1.36; 2.66 P-value < 0.001	Survey (conducted by programme) Electronic Card Reading System
Controlled Before-After Studies (all applied difference-in-differences methodology)							
7	Kusuma et al.[33]	2016	Program Keluarga Harapan (Indonesia) 52.5 to 191.5 USD per pregnancy	Four or more prenatal visits	0.039 RC (5.6% increase)	Control: 0.70 95% CI: NA **SE: 0.023** **P-value < 0.1**	Survey (conducted by National Planning Agency and World Bank)
8	De Brauw & Peterman[34]	2020	Comunidades Solidarias Rurales (El Salvador) 145.5 to 194 USD per pregnancy	Five or more prenatal visits	-0.102 RC (13.7% decrease)	Control: 0.744 95% CI: NA **SE: 0.073** **P-value: 0.206**	Survey (conducted by IFPRI and FUSADES)
9	Díaz & Saldarriaga[35]	2019	JUNTOS (Peru) 343.5 USD per pregnancy	Number of prenatal appointments	0.328 RC (4.7% increase)	Control: 7.009 95% CI: NA SE: 0.148 P-value < 0.05	Survey (Peruvian DHS)
				One or more ANC visit(s)	0.028 RC (2.9% increase)	Control: 0.955 95% CI: NA SE: 0.011 P-value < 0.05	
				Four or more ANC visits	0.048 RC (5.5% increase)	Control: 0.876 95% CI: NA	

						SE: 0.017 P-value < 0.01	
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	45.0% AMD (45.0% higher than control group)	Control: NA 95% CI: 18%; 72% P-value: 0.004	Survey HMIS
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	1.51 OR (odds of ANC being 1.51 times higher than control group)	Control: NA 95% CI: 1.15; 1.99	Survey (NFHS second, third and fourth wave)
12	Powell-Jackson, Mazumdar & Mills[38]	2015	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.010 RC (2.2% increase)	Control: 0.45 95% CI: NA **SE: 0.0073** **P-value > 0.1**	Survey (DLHS-II and DLHS III)
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	0.0962 RC (22.9% increase)	Control: 0.42 95% CI: NA SE: 0.0113 P-value < 0.01	Survey (NFHS third and fourth wave)
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	-0.004 RC (1.3% decrease)	Control: 0.298 95% CI: NA **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
15	Lim et al.[41]	2010	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	10.7% (increase among treatment group, using 'exact matching')	Control: NA 95% CI: 9.1%; 12.3%	Survey (DLHS-II and DLHS-III)
					11.1% (increase among treatment group, using 'with versus without')	Control: NA 95% CI: 10.1%; 12.1%	
					10.9% (increase among treatment group, using 'difference-in-differences')	Control: NA 95% CI: 4.6%; 17.2%	
16	Debnath[42]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Any prenatal care	0.022 RC (2.4% increase)	Control: 0.908 95% CI: 0.013; 0.032 SE: 0.005 P-value < 0.01	Survey (DLHS-II and DLHS-III)
Interrupted Time Series Analysis							
17	Powell-Jackson et al.[43]	2009	Safe Delivery Incentive Programme (Nepal) 201 USD per pregnancy Healthcare provider receives 6.5 USD per assisted delivery	Number of ANC visits	0.031 RC (2.5% increase) *using quartic time function	Control: 1.235 T-statistic: 0.38 95% CI: NA	Community surveillance system dataset
					-0.046 RC (3.7% decrease) *using quadratic time function	Control: 1.235 T-statistic: -0.75 95% CI: NA	
18	Okoli et al.[44]	2014	SURE-P/MCH (Nigeria) 35.5 USD per pregnancy	Four or more ANC visits	15.1152 RC (Increase of 15.1 visits per 100,000 population)	Control: NA T-statistic: 4.13 P-value: 0.001 95% CI: 7.38; 22.85	Programme Monitoring data (from facility logbooks)
				Number of first ANC visits	-8.3150 RC (Decrease of 8.3 visits per 100,000 population)	Control: NA **T-statistic: -1.29** **P-value: 0.213** **95% CI: -21.87; 5.24**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Eight studies presented statistically non-significant results on all reported outcomes. Seven studies reported a statistically significant increase of over 5% in ANC service uptake. Three studies reported limited or negative effects.

A meta-analysis was not performed due to the heterogeneity of the selected studies. There are notable differences regarding the interventions, including the cash amounts and conditionalities. There is also variation in study settings, study population, study methodologies, and data reported[15].

Poverty dynamics

Out of the eighteen included studies in this review, four controlled before-after studies contained in-depth poverty-related information[36-37-39-40]. Studies were included if treatment effects could be retrieved for groups with different socio-economic status. Studies used different definitions for poverty, thereby impeding potential comparisons across settings. The treatment effects by population group are displayed in table 5.

Table 5: Poverty-related treatment effects from included studies containing information on poverty

#	Author(s)	Year	Programme & Benefits (adjusted for inflation, showing 2021 value)	Outcome description	Population Group	Treatment Effect	Statistical Information	Data Source
10	Edmond et al.[36]	2019	CCT programme (Afghanistan) 16.5 USD per pregnancy Community health workers receive 5.5 USD for each facility-based delivery	One or more ANC visit(s)	Poorest quintile	43.2% AMD (43.2% higher than control group)	Control: NA **95% CI: -17%; 103%** **P-value: 0.145**	Survey HMIS
					Second poorest quintile	55.4% AMD (55.4% higher than control group)	Control: NA 95% CI: 10%; 100% P-value: 0.021	
					Third poorest quintile	58.0% AMD (58.0% higher than control group)	Control: NA 95% CI: 23%; 94% P-value: 0.004	
					Second wealthiest quintile	29.0% AMD (29.0% higher than control group)	Control: NA **95% CI: -8%; 66%** **P-value: 0.112**	
					Wealthiest quintile	28.8% AMD (28.8% higher than control group)	Control: NA **95% CI: -4%; 61%** **P-value: 0.077**	
11	Chakrabarti et al.[37]	2021	Mamata Scheme (India) 70 USD per pregnancy Community health workers receive 2.5 USD per programme beneficiary	Four or more ANC visits	Poorest two quintiles	1.82 OR (odds of ANC being 1.82 times higher than control group)	Control: NA 95% CI: 1.30; 2.56	Survey (NFHS second, third and fourth wave)
					Wealthiest three quintiles	1.19 OR (odds of ANC being 1.19 times higher than control group)	Control: NA **95% CI: 0.95; 1.49**	
13	Aizawa[39]	2020	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poor (or women with a below-the-poverty card and experienced up to a second live birth or women belonging to a scheduled caste/tribe and experienced up to a second live birth)	0.0997 RC (23.7% increase) Note this coefficient is a combination of two coefficients: 0.0767[1] and 0.0230[2] which come with different SE and P values.	Control : 0.42 SE[1] : 0.0252 **SE[2] : 0.0273** P-value[1] < 0.01 **P-value[2] > 0.1**	Survey (NFHS third and fourth wave)
					Non-poor	0.0767 RC (18.3% increase)	Control: 0.42 SE: 0.0252 P-value < 0.01	
14	Joshi & Sivaram[40]	2014	Safe Motherhood Programme (India) 8.5 to 20.5 USD per pregnancy Community health workers receive 3 USD for each facility-based delivery	Three or more ANC visits	Poorest quintile	0.005 RC (0.74% increase)	Control: 0.680 **SE: 0.010** **P-value > 0.1**	Survey (DLHS-II and DLHS-III)
					All quintiles	-0.004 RC (1.3% decrease)	Control: 0.298 **SE: 0.010** **P-value > 0.1**	

Treatment effects include regression coefficients (RC), odds ratios (OR), adjusted mean difference (AMD) or other types described in full. SE stands for standard error, CI for confidence interval and NA for not available. Information presented in bold is not statistically significant according to conventional levels. Financial benefits are maximum amounts and can vary amongst beneficiaries depending on compliance with conditions. Amounts per pregnancy presented in 2022 values using US Inflation Calculator[24]. USD stands for United States dollar.

Of the four studies that reported on treatment effect disaggregated by socio-economic status (SES), two studies[36-37] reported significantly higher ANC attendance in lower SES groups compared to control populations than did higher SES groups. The remaining two studies[39-40] did not report statistically significant results in relation to this outcome.

Discussion

There is a pressing need across LMICs to increase the proportion of women who attend ANC, as recommended by the World Health Organisation, in order to reduce maternal mortality and poor neonatal health outcomes[2-5]. CCT programmes are a potentially promising policy lever to increase uptake of ANC across LMIC contexts, however current evidence for the impact of CCTs on ANC is unclear. In this review, we have built on the evidence generated by previous published reviews[7-8-9-10] of demand-side interventions on ANC uptake, to elucidate the specific impact of CCTs on this outcome of interest. Our findings are generally consistent with the existing evidence base that indicates that some CCT programmes have a modest positive impact on ANC attendance, but that other programmes fail to generate such impact, indicating high context-specificity of such programmes in relation to ANC service uptake.

Of the eighteen studies reviewed covering thirteen CCT programs, eight studies[26-27-30-31-33-34-38-40] presented statistically non-significant results on all reported treatment effects, three studies[42-43-44] demonstrated statistically significant limited or negative effects on the utilization of ANC services and seven studies[29-32-35-36-37-39-41] demonstrated a statistically significant increase in ANC service uptake ranging from 5.5% to 45%. The studies that did report statistically significant improvement in ANC uptake as a result of CCT programmes were delivered in Peru[35], Nigeria[29], Afghanistan[36], India[37-39-41] and Kenya[32], where programme settings and modalities vary greatly. The studies that reported small or negative impacts of CCTs on ANC uptake were delivered in India[42], Nepal[43] and Nigeria[44]. The fact that both positive and negative associations between CCTs and ANC uptake were reported in programmes implemented in India and Nigeria, coupled with the general heterogeneity of programme impact across the studies reviewed, indicates that programme design and implementation context might be vital factors in determining programme success.

The amount of money transferred has been postulated to play a key role in incentivizing behaviour, and may be an important factor in whether or not the CCT programmes included in this review observed a positive impact[46]. The study of the 'Mamata' scheme in India[37] reported a notable positive impact, which could relate to the relatively high transfer amounts (70 USD per pregnancy) provided to women. This positive relationship between transfer amount and positive trends in ANC uptake is also supported by findings from the 'JUNTOS' programme in Peru[35], which similarly transferred a relatively high monetary amount (343.5 USD per pregnancy) compared to other studies and reported a statistically significant positive programme impact. However, in this review we also identified programmes in which CCT using relatively low transfer amounts also reported positive impacts of CCT on ANC uptake. The CCT programmes best illustrating the complex relationship between financial allocation and programme success are those implemented in Nigeria in which the CCT programme[29] reported better results than the SURE-P/MCH programme[44] despite it being implemented in the same country with a transfer amount that is more than double of the CCT programme[29].

Previous studies have established that conditionalities are crucial for impact across a range of health-seeing behaviours[47] and could play a key role in increasing ANC service uptake. The 'Mamata' scheme

in India[37] required incremental ANC attendance, while the Safe Motherhood Programme in India[39-41-42] focused on an endpoint of facility-based deliveries, with the former generating more impact overall. The Afya Credits Incentive in Kenya[32], the CCT programme in Nigeria[29] and the 'JUNTOS' programme in Peru[35], which reported positive impacts, similarly allocated financial payments to ANC attendance conditionality. However, this conditionality of ANC attendance was not uniformly associated with increased ANC uptake across all studies reviewed, for example the SURE-P/MCH programme in Nigeria[44] reported negative programme impact despite ANC conditionality.

The differences in treatment effects amongst studies examining the same CCT programme warrant further scrutiny. Three included studies[39-41-42] reported statistically significant results on the Safe Motherhood Programme in India using different data to analyse programme impact. Reported increase in ANC uptake as a result of the same CCT programme ranged from 2.4%[42] to 22.9%[39]. Aizawa (2020)[39] demonstrated the strongest association between CCT and ANC uptake and used data from the National Family Health Survey conducted in 2006 and 2016 comparing from numerous Indian States. Lim et al. (2010)[41] presented a lower positive association (11.1%) and used data from the District-level Household Survey from 2004 and 2009. Debnath (2021)[42] reported the smallest impact, and utilised the same survey data as Lim et al.[41], but opted for a restricted sample excluding numerous districts in India. Such heterogeneity indicates the complexity of policy evaluation as different results are reported on the same CCT programme.

We found inconclusive results regarding the relationship between poverty and CCT programme impact. The four studies[36-37-39-40] that reported comparisons between socio-economic groups and the impact of CCT on ANC uptake lacked statistical power to formulate robust conclusions due to low powered sample sizes. Hence, we failed to determine if the level of poverty amongst people receiving CCTs was an important factor for determining impact on ANC service uptake.

One limitation of the evidence incorporated in this review is the use of survey data by the majority of included studies, opening the potential for data bias. We also note the developments in data capture infrastructure, such as smartphones and tablets, that coincide with the decade covered by the included studies, and the potential impact that this had on later studies in terms of enhanced ability to accurately capture data. The included studies varied in quality, ranging from suboptimal study designs to high levels of bias. Three included randomized controlled trials reported high risk of bias on the randomization process[29-30-32] and two non-randomized studies presented a serious risk of bias on confounding[36-44]. The heterogeneity of study design, population, and implementation process amongst the eighteen studies hindered us to perform a meta-analysis to generate overall treatment effects of CCTs on ANC. A number of studies did not clearly present the information required for the summary tables. For example, less than half of all studies reported the actual number of ANC visits attended by programme participant populations, rendering it impossible to compare ANC attendance against the WHO-recommended[5] number of visits for the majority of included studies. Together, these factors may contribute to the inconclusiveness of results reported in this review.

Given the high heterogeneity identified in this review in relation to CCT impact on ANC uptake across LMICs, there is substantial scope for future research to explore the most important determinants for CCT programme success, failure, and inconclusiveness. Complex process evaluations should be employed alongside the implementation of CCT programmes to elucidate the contextual factors that contribute to programme success, including population characteristics, geographic and environmental factors, conditionalities, co-interventions, baseline ANC service uptake, and financial allocations attached to demand-side interventions. Study design is an additional important consideration for future CCT programs, whereby more high-powered randomised controlled trials are required to

strengthen the evidence base for whether such programs are truly impactful from a health perspective.

Conclusion

This systematic review investigated the relationship between CCT programmes and ANC service uptake. These programmes are an alluring instrument for policy makers in LMICs to expand ANC coverage. Our review demonstrated divergent effects of conditional cash transfers amongst the included studies, indicating high context-specificity for these programmes to achieve the desired impact of increased ANC service uptake. The global health community, most notably multilateral organisations and donor community, have invested substantially in CCTs during the past few decades. This review highlights that further high-quality high-powered evidence is required in order to elucidate the true impact of CCT programmes on ANC uptake, with special focus on process evaluation of the barriers, enablers, and opportunities for programmatic success.

Ethics approval statement

This study is a systematic review of already published literature.

Contribution statement

Ward Jacobs: project administration, research protocol, conceptualisation, title and abstract screening, data extraction, data analysis and synthesis, methodology, grey literature search, background reading, risk of bias assessment, drafting the first manuscript, editing, and overall review.

Laura E Downey: research protocol, title and abstract screening, editing of the draft manuscript, overall review, provision of guidance and direction.

Competing interests

No competing interests to declare.

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Data sharing statement

This study is a systematic review. All included studies can be retrieved through the reference list. More information regarding the review process including title and abstract screening can be obtained by contacting the corresponding author.

Figure Legend

Figure 1: Overview of the study selection process

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Figure

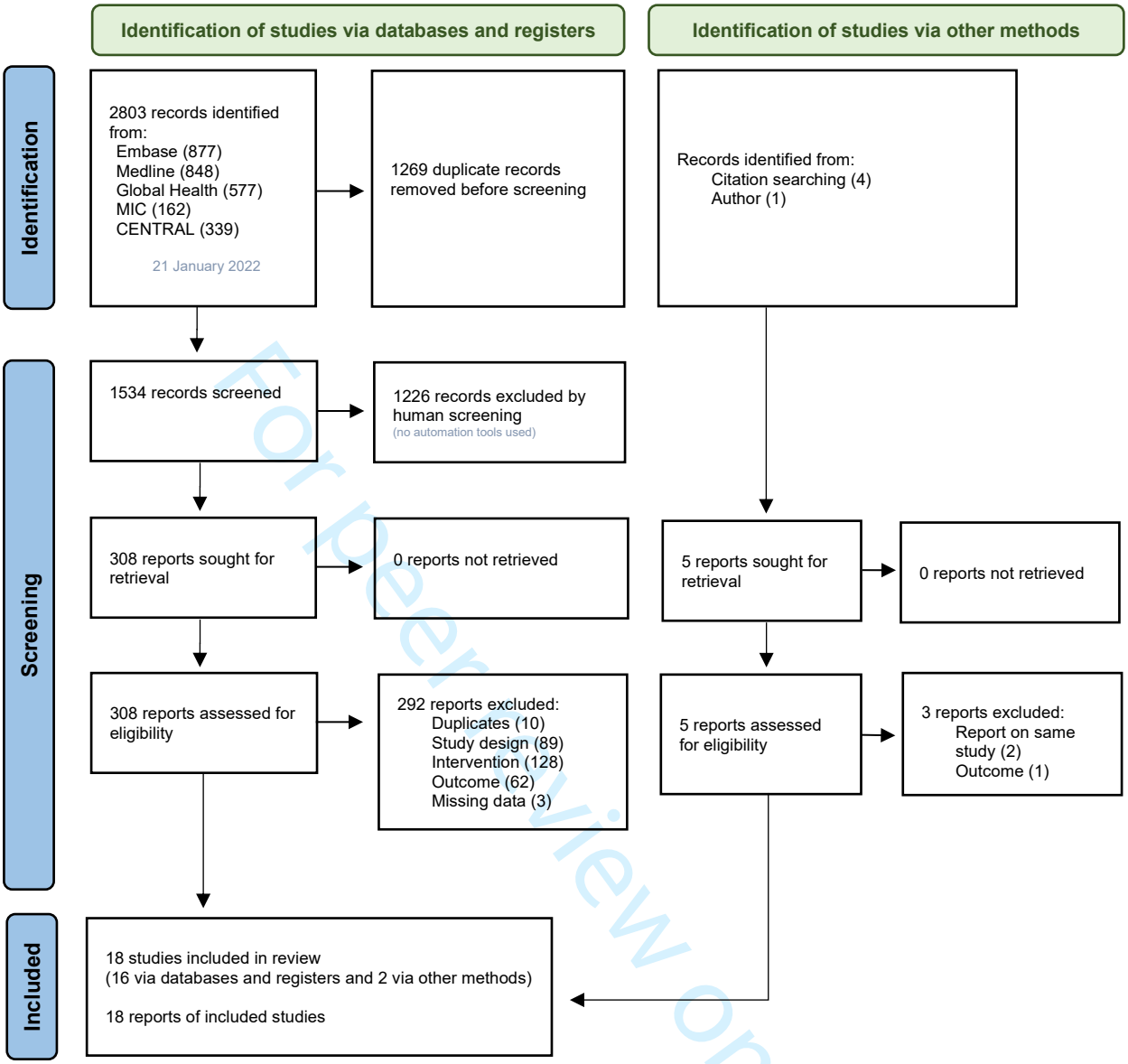

Figure 1: Overview of the study selection process[25]

Appendix

Appendix A: Search strategy

Database	CENTRAL
Results	339
Date	21 January 2022

#1 Cash near/2 transfer* 380

#2 Cash near/2 payment* 60

#3 Voucher* 853

#4 Cash near/2 assistance 19

#5 Financ* NEXT incentiv* 1276

#6 Mone* NEXT incentiv* 510

#7 Cash NEXT incentiv* 134

#8 Mone* NEXT transfer* 17

#9 Cash NEXT based NEXT intervention* 4

#10 "Social insurance" 289

#11 "Community-based insurance" 5

#12 MeSH descriptor: [Social Security] explode all trees 46

#13 MeSH descriptor: [Community-Based Health Insurance] this term only 2

#14 Antenat* 5571

#15 Ante NEXT nat* 94

#16 ANC 2376

#17 Perinat* 10524

#18 Peri NEXT nat* 33

#19 Prenat* 7888

#20 Pre NEXT nat* 130

#21 Matern* 29044

#22 "Primary care" 23761

#23 Primary NEXT health* 8949

#24 Pregna* 74636

#25 Antepartum 771

#26 "Ante partum" 39

#27 MeSH descriptor: [Perinatal Care] this term only 181

#28 MeSH descriptor: [Prenatal Care] this term only 1620

#29 MeSH descriptor: [Maternal-Child Health Services] this term only 47

#30 MeSH descriptor: [Pregnancy] this term only 23343

#31 Developing NEXT countr* 4925

#32 Low NEXT income NEXT countr* 1396

#33 Middle NEXT income NEXT countr* 2995

#34 LMIC 327

#35 MeSH descriptor: [Developing Countries] this term only 907

#36 "Eastern Europe" or "Pacific Islands" or "Indian Ocean Islands" or "West Indies" or Caribbean or "Atlantic Islands" or Africa or "South America" or "Latin America" or "Central America" or Asia 21994

#37	Afghanistan or Albania or Algeria or "American Samoa" or Angola or Argentina or "Argentine Republic" or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or "Cabo Verde" or "Cape Verde" or Cambodia or Cameroon or "Central African Republic" or Chad or China or Colombia or Comoro* or Comores or Congo or "Costa Rica" or "Ivory Coast" or "Cote d'Ivoire" or Cuba or Djibouti or Dominica or "Dominican Republic" or Ecuador or Egypt or "El Salvador" or "Equatorial Guinea" or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or "Guinea-Bissau" or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or "Lao PDR" or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or "Marshall Islands" or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or "Papua New Guinea" or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or "Sao Tome" or Principe or Senegal or Serbia or "Sierra Leone" or "Solomon Islands" or Somalia or "South Africa" or "South Sudan" or "Sri Lanka" or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or "West Bank" or Gaza or Yemen or Zambia or Zimbabwe	240376
#38	MeSH descriptor: [Afghanistan] this term only	51
#39	MeSH descriptor: [Albania] this term only	5
#40	MeSH descriptor: [Algeria] this term only	13
#41	MeSH descriptor: [American Samoa] this term only	6
#42	MeSH descriptor: [Angola] this term only	12
#43	MeSH descriptor: [Argentina] this term only	201
#44	MeSH descriptor: [Armenia] this term only	8
#45	MeSH descriptor: [Azerbaijan] this term only	7
#46	MeSH descriptor: [Bangladesh] this term only	704
#47	MeSH descriptor: [Republic of Belarus] this term only	29
#48	MeSH descriptor: [Belize] this term only	10
#49	MeSH descriptor: [Benin] this term only	51
#50	MeSH descriptor: [Bhutan] this term only	2
#51	MeSH descriptor: [Bolivia] this term only	37
#52	MeSH descriptor: [Bosnia and Herzegovina] this term only	15
#53	MeSH descriptor: [Botswana] this term only	66
#54	MeSH descriptor: [Brazil] this term only	1671
#55	MeSH descriptor: [Bulgaria] this term only	37
#56	MeSH descriptor: [Burkina Faso] this term only	194
#57	MeSH descriptor: [Burundi] this term only	18
#58	MeSH descriptor: [Cabo Verde] this term only	0
#59	MeSH descriptor: [Cambodia] this term only	123
#60	MeSH descriptor: [Cameroon] this term only	106
#61	MeSH descriptor: [Central African Republic] this term only	12
#62	MeSH descriptor: [Chad] this term only	5
#63	MeSH descriptor: [China] this term only	4671
#64	MeSH descriptor: [Colombia] this term only	174
#65	MeSH descriptor: [Comoros] this term only	1
#66	MeSH descriptor: [Congo] this term only	15
#67	MeSH descriptor: [Democratic Republic of the Congo] this term only	107
#68	MeSH descriptor: [Costa Rica] this term only	42
#69	MeSH descriptor: [Cote d'Ivoire] this term only	102
#70	MeSH descriptor: [Cuba] this term only	60
#71	MeSH descriptor: [Djibouti] this term only	2
#72	MeSH descriptor: [Dominica] this term only	0
#73	MeSH descriptor: [Dominican Republic] this term only	38
#74	MeSH descriptor: [Ecuador] this term only	77
#75	MeSH descriptor: [Egypt] this term only	453

#76	MeSH descriptor: [El Salvador] this term only	8
#77	MeSH descriptor: [Equatorial Guinea] this term only	5
#78	MeSH descriptor: [Eritrea] this term only	1
#79	MeSH descriptor: [Eswatini] this term only	22
#80	MeSH descriptor: [Ethiopia] this term only	261
#81	MeSH descriptor: [Fiji] this term only	14
#82	MeSH descriptor: [Gabon] this term only	49
#83	MeSH descriptor: [Gambia] this term only	243
#84	MeSH descriptor: [Georgia (Republic)] this term only	18
#85	MeSH descriptor: [Ghana] this term only	334
#86	MeSH descriptor: [Grenada] this term only	1
#87	MeSH descriptor: [Guatemala] this term only	135
#88	MeSH descriptor: [Guinea] this term only	8
#89	MeSH descriptor: [Guinea-Bissau] this term only	101
#90	MeSH descriptor: [Guyana] this term only	3
#91	MeSH descriptor: [Haiti] this term only	65
#92	MeSH descriptor: [Honduras] this term only	40
#93	MeSH descriptor: [India] this term only	2343
#94	MeSH descriptor: [Indonesia] this term only	371
#95	MeSH descriptor: [Iran] this term only	1632
#96	MeSH descriptor: [Iraq] this term only	54
#97	MeSH descriptor: [Jamaica] this term only	67
#98	MeSH descriptor: [Jordan] this term only	93
#99	MeSH descriptor: [Kazakhstan] this term only	16
#100	MeSH descriptor: [Kenya] this term only	825
#101	MeSH descriptor: [Micronesia] this term only	10
#102	MeSH descriptor: [Democratic People's Republic of Korea] this term only	4
#103	MeSH descriptor: [Kosovo] this term only	3
#104	MeSH descriptor: [Kyrgyzstan] this term only	6
#105	MeSH descriptor: [Laos] this term only	39
#106	MeSH descriptor: [Lebanon] this term only	74
#107	MeSH descriptor: [Lesotho] this term only	14
#108	MeSH descriptor: [Liberia] this term only	24
#109	MeSH descriptor: [Libya] this term only	6
#110	MeSH descriptor: [Madagascar] this term only	39
#111	MeSH descriptor: [Malawi] this term only	424
#112	MeSH descriptor: [Malaysia] this term only	316
#113	MeSH descriptor: [Mali] this term only	113
#114	MeSH descriptor: [Mauritania] this term only	4
#115	MeSH descriptor: [Mauritius] this term only	3
#116	MeSH descriptor: [Mexico] this term only	669
#117	MeSH descriptor: [Moldova] this term only	6
#118	MeSH descriptor: [Mongolia] this term only	22
#119	MeSH descriptor: [Montenegro] this term only	2

#120	MeSH descriptor: [Morocco] this term only	37
#121	MeSH descriptor: [Mozambique] this term only	94
#122	MeSH descriptor: [Myanmar] this term only	78
#123	MeSH descriptor: [Namibia] this term only	13
#124	MeSH descriptor: [Nepal] this term only	327
#125	MeSH descriptor: [Nicaragua] this term only	31
#126	MeSH descriptor: [Niger] this term only	61
#127	MeSH descriptor: [Nigeria] this term only	665
#128	MeSH descriptor: [Republic of North Macedonia] this term only	11
#129	MeSH descriptor: [Pakistan] this term only	517
#130	MeSH descriptor: [Panama] this term only	22
#131	MeSH descriptor: [Papua New Guinea] this term only	66
#132	MeSH descriptor: [Paraguay] this term only	5
#133	MeSH descriptor: [Peru] this term only	215
#134	MeSH descriptor: [Philippines] this term only	186
#135	MeSH descriptor: [Romania] this term only	111
#136	MeSH descriptor: [Russia] this term only	325
#137	MeSH descriptor: [Rwanda] this term only	85
#138	MeSH descriptor: [Samoa] this term only	2
#139	MeSH descriptor: [Sao Tome and Principe] this term only	0
#140	MeSH descriptor: [Senegal] this term only	101
#141	MeSH descriptor: [Serbia] this term only	51
#142	MeSH descriptor: [Sierra Leone] this term only	41
#143	MeSH descriptor: [Melanesia] this term only	5
#144	MeSH descriptor: [Somalia] this term only	22
#145	MeSH descriptor: [South Africa] this term only	1216
#146	MeSH descriptor: [South Sudan] this term only	1
#147	MeSH descriptor: [Sri Lanka] this term only	123
#148	MeSH descriptor: [Saint Lucia] this term only	0
#149	MeSH descriptor: [Saint Vincent and the Grenadines] this term only	0
#150	MeSH descriptor: [Sudan] this term only	85
#151	MeSH descriptor: [Suriname] this term only	17
#152	MeSH descriptor: [Syria] this term only	40
#153	MeSH descriptor: [Tajikistan] this term only	3
#154	MeSH descriptor: [Tanzania] this term only	632
#155	MeSH descriptor: [Thailand] this term only	1133
#156	MeSH descriptor: [Timor-Leste] this term only	4
#157	MeSH descriptor: [Togo] this term only	15
#158	MeSH descriptor: [Tonga] this term only	1
#159	MeSH descriptor: [Tunisia] this term only	63
#160	MeSH descriptor: [Turkey] this term only	914
#161	MeSH descriptor: [Turkmenistan] this term only	1
#162	MeSH descriptor: [Uganda] this term only	789
#163	MeSH descriptor: [Ukraine] this term only	51

#164 MeSH descriptor: [Uzbekistan] this term only 11

#165 MeSH descriptor: [Vanuatu] this term only 3

#166 MeSH descriptor: [Vietnam] this term only 364

#167 MeSH descriptor: [Yemen] this term only 6

#168 MeSH descriptor: [Zambia] this term only 311

#169 MeSH descriptor: [Zimbabwe] this term only 231

#170 MeSH descriptor: [Europe, Eastern] this term only 17

#171 MeSH descriptor: [Pacific Islands] this term only 17

#172 MeSH descriptor: [Indian Ocean Islands] this term only 6

#173 MeSH descriptor: [Caribbean Region] this term only 19

#174 MeSH descriptor: [Atlantic Islands] this term only 2

#175 MeSH descriptor: [Africa] this term only 203

#176 MeSH descriptor: [South America] this term only 89

#177 MeSH descriptor: [Central America] this term only 9

#178 MeSH descriptor: [Latin America] this term only 128

#179 MeSH descriptor: [Asia] this term only 308

#180 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 3214

#181 #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 116971

#182 #31 #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70 OR #71 OR #72 OR #73 OR #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 OR #82 OR #83 OR #84 OR #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116 OR #117 OR #118 OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR #126 OR #127 OR #128 OR #129 OR #130 OR #131 OR #132 OR #133 OR #134 OR #135 OR #136 OR #137 OR #138 OR #139 OR #140 OR #141 OR #142 OR #143 OR #144 OR #145 OR #146 OR #147 OR #148 OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 OR #155 OR #156 OR #157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163 OR #164 OR #165 OR #166 OR #167 OR #168 OR #169 OR #170 OR #171 OR #172 OR #173 OR #174 OR #175 OR #176 OR #177 OR #178 OR #179 247425

#183 #180 AND #181 AND #182 in Cochrane Reviews, Trials, Clinical Answers, Editorials, Special Collections 353

Note: removed 14 clinical answers, editorials and special collections before screening, so the total became 339.

Database	Embase (Ovid)
Results	877
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (950)

2 (Cash adj3 payment*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (247)

3 Voucher*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2737)

4 (Cash adj3 assistance).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (157)

5 cash incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (253)

6 Financ* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (6406)

7 Mone* incentiv*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (1939)

8 Mone* transfer*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (74)

9 Cash based intervention*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (9)

10 exp social insurance/ (3663)

11 social insurance.mp. (5288)

12 Community-based insurance.mp. (30)

13 antenat*.mp. (61671)

14 ante nat*.mp. (1122)

15 ANC.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (11049)

16 perinat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (163446)

17 peri nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (452)

18 exp prenatal care/ (168798)

19 perinatal period/ (38633)

20 perinatal care/ (15070)

21 maternal care/ (19994)

22 prenat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (281205)

23 pre nat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2425)

24 matern*.mp. (484686)

25 pregna*.mp. (1170254)

26 exp pregnancy/ (849842)

27 exp primary health care/ (187395)

28 primary health*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (93820)

29 primary care.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (178603)

30 antepartum.mp. (10163)

31 ante partum.mp. (746)

32 developing country/ (99758)

33 developing countr*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (148948)

34 low income countr*.mp. (17463)

35 low income country/ (9603)

36 middle income countr*.mp. (34073)

37 middle income country/ (13913)

38 LMIC.mp. (4053)

39 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (413531)

40 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or

Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (2279243)

41 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (17516)

42 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 (1819447)

43 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 (2551327)

44 41 and 42 and 43 (877)

Database	Global Health (Ovid)
Results	577
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (785)

2 (Cash adj3 payment*).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (75)

3 Cash incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (113)

4 Voucher*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1080)

5 (Cash adj3 assistance).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (59)

6 Financ* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1252)

7 Mone* incentiv*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (242)

8 Mone* transfer*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20)

9 Cash based intervention*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (12)

10 Social insurance.mp. (521)

11 social insurance/ (120)

12 community-based insurance.mp. (13)

13 antenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (18571)

14 ante nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (342)

15 ANC.mp. (2742)

16 Perinat*.mp. (16727)

17 peri nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (63)

18 prenat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26852)

19 pre nat*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (484)

20 prenatal care/ (3765)

21 matern*.mp. (89713)

22 maternity services/ (4857)

23 primary care.mp. (21106)

24 primary health*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (26124)

25 primary health care/ (18029)

26 pregna*.mp. (131634)

27 pregnancy/ (102766)

28 antepartum.mp. (1020)

29 ante partum.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (79)

30 prenatal screening/ (2123)

31 developing countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (987316)

32 developing countries/ (978914)

33 low income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (5257)

34 middle income countr*.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (20934)

35 LMIC.mp. (1225)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (1164860)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cape Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kyrgyzstan.mp. or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes] (1047629)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (3924)

39 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (212249)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1275836)

41 38 and 39 and 40 (577)

Database	Medline (Ovid)
Results	848
Date	21 January 2022

1 (cash adj3 transfer*).mp. (924)

2 (cash adj3 payment*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (198)

3 cash incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (235)

4 voucher*.mp. (2543)

5 (cash adj3 assistance).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (151)

6 financ* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (5230)

7 mone* incentiv*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1394)

8 mone* transfer*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (67)

9 cash based intervention*.mp. (9)

10 Social insurance.mp. (2123)

11 exp Social security/ (8397)

12 Community-based insurance.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (25)

13 community-based health insurance/ (43)

14 antenat*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (42675)

15 ante nat*.mp. (647)

16 ANC.mp. (5759)

17 perinat*.mp. (87644)

18 Perinatal Care/ (5133)

19 peri nat*.mp. (238)

20 prenat*.mp. (191959)

21 Prenatal Care/ (30659)

22 matern*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (369304)

23 primary care.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (131882)

24 primary health*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (109340)

25 maternal-child health services/ (937)

26 pre nat*.mp. (1644)

27 Pregnancy/ (933890)

28 pregna*.mp. (1073445)

29 antepartum.mp. (6290)

30 ante partum.mp. (479)

31 Developing Countries/ (78551)

32 developing countr*.mp. (135974)

33 low income countr*.mp. (8349)

34 middle income countr*.mp. (26526)

35 LMIC.mp. (3103)

36 Eastern Europe.mp. or Eastern Europe/ or Pacific Islands.mp. or Pacific Islands/ or Indian Ocean Islands.mp. or Indian Ocean Islands/ or West Indies.mp. or West Indies/ or Caribbean.mp. or Caribbean/ or Atlantic Islands.mp. or Atlantic Islands/ or Africa.mp. or Africa/ or South America.mp. or South America/ or Latin America.mp. or Latin America/ or Central America.mp. or Central America/ or Asia.mp. or Asia/ (325525)

37 Afghanistan.mp. or Afghanistan/ or Albania.mp. or Albania/ or Algeria.mp. or Algeria/ or American Samoa.mp. or American Samoa/ or Angola.mp. or Angola/ or Argentina.mp. or Argentine Republic.mp. or Argentina/ or Armenia.mp. or Armenia/ or Azerbaijan.mp. or Azerbaijan/ or Bangladesh.mp. or Bangladesh/ or Belarus.mp. or Byelarus.mp. or Belorussia.mp. or Belarus/ or Belize.mp. or Belize/ or Benin.mp. or Benin/ or Bhutan.mp. or Bhutan/ or Bolivia.mp. or Bolivia/ or Bosnia.mp. or Herzegovina.mp. or Hercegovina.mp. or (Bosnia.mp. and Herzegovina/) or Botswana.mp. or Botswana/ or Brazil.mp. or Brazil/ or Bulgaria.mp. or Bulgaria/ or Burkina Faso.mp. or Burkina Faso/ or Burundi.mp. or Burundi/ or Cabo Verde.mp. or Cabo Verde/ or Cape Verde.mp. or Cambodia.mp. or Cambodia/ or Cameroon.mp. or Cameroon/ or Central African Republic.mp. or Central African Republic/ or Chad.mp. or Chad/ or China.mp. or China/ or Colombia.mp. or Colombia/ or Comoro*.mp. or Comores.mp. or Comoros/ or Congo.mp. or Democratic Republic of the Congo/ or Congo/ or Costa Rica.mp. or Costa Rica/ or Ivory Coast.mp. or Cote d'Ivoire.mp. or Cote d'Ivoire/ or Cuba.mp. or Cuba/ or Djibouti.mp. or Djibouti/ or Dominica.mp. or Dominica/ or Dominican Republic.mp. or Dominican Republic/ or Ecuador.mp. or Ecuador/ or Egypt.mp. or Egypt/ or El Salvador.mp. or El Salvador/ or Equatorial Guinea.mp. or Equatorial Guinea/ or Eritrea.mp. or Eritrea/ or Eswatini.mp. or Swaziland.mp. or Eswatini/ or Ethiopia.mp. or Ethiopia/ or Fiji.mp. or Fiji/ or Gabon.mp. or Gabon/ or Gambia.mp. or Gambia/ or Georgia.mp. or Georgia/ or Ghana.mp. or Ghana/ or Grenada.mp. or Grenada/ or Guatemala.mp. or Guatemala/ or Guinea.mp. or Guinea/ or Guinea-Bissau.mp. or Guinea-Bissau/ or Guyana.mp. or Guyana/ or Haiti.mp. or Haiti/ or Honduras.mp. or Honduras/ or India.mp. or India/ or Indonesia.mp. or Indonesia/ or Iran.mp. or Iran/ or Iraq.mp. or Iraq/ or Jamaica.mp. or Jamaica/ or Jordan.mp. or Jordan/ or Kazakhstan.mp. or Kazakhstan/ or Kenya.mp. or Kenya/ or Kiribati.mp. or Kiribati/ or Korea.mp. or "Democratic People's Republic of Korea"/ or Kosovo.mp. or Kosovo/ or Kirghiz*.mp. or Kyrgyz*.mp. or Kyrgyzstan/ or Laos.mp. or Lao PDR.mp. or Laos/ or Lebanon.mp. or Lebanon/ or Lesotho.mp. or Lesotho/ or Liberia.mp. or Liberia/ or Libya.mp. or Libya/ or Madagascar.mp. or Madagascar/ or Malawi.mp. or Malawi/ or Malay*.mp. or Malaysia/ or Maldives.mp. or Maldives/ or Mali.mp. or Mali/ or Marshall Islands.mp. or Marshall Islands/ or Mauritania.mp. or Mauritania/ or Mauritius.mp. or Mauritius/ or Mexico.mp. or Mexico/ or Micronesia.mp. or Micronesia/ or Moldova.mp. or Moldova/ or Mongolia.mp. or Mongolia/ or Montenegro.mp. or Montenegro/ or Morocco.mp. or Morocco/ or Mozambique.mp. or Mozambique/ or Myanmar.mp. or Myanmar/ or Burma.mp. or Namibia.mp. or Namibia/ or Nepal.mp. or Nepal/ or Nicaragua.mp. or Nicaragua/ or Niger.mp. or Niger/ or Nigeria.mp. or Nigeria/ or Macedonia.mp. or Republic of North Macedonia/ or Pakistan.mp. or Pakistan/ or Panama.mp. or Panama/ or Papua New Guinea.mp. or Papua New Guinea/ or Paraguay.mp. or Paraguay/ or Peru.mp. or Peru/ or Philippines.mp. or Phillippines.mp. or Philippines/ or Romania.mp. or Romania/ or Russia.mp. or Russia/ or Rwanda.mp. or Ruanda.mp. or Rwanda/ or Samoa.mp. or Independent State of Samoa/ or Sao Tome.mp. or Principe.mp. or (Sao Tome.mp. and Principe/) or Senegal.mp. or Senegal/ or Serbia.mp. or Serbia/ or Sierra Leone.mp. or Sierra Leone/ or Solomon Islands.mp. or Solomon Islands/ or Somalia.mp. or Somalia/ or South Africa.mp. or South Africa/ or South Sudan.mp. or South Sudan/ or Sri Lanka.mp. or Sri Lanka/ or Lucia.mp. or Saint Lucia/ or Vincent.mp. or Grenadines.mp. or (Saint Vincent.mp. and the Grenadines/) or Sudan.mp. or Sudan/ or Surinam*.mp. or Suriname/ or Syria.mp. or Syria/ or Tajik*.mp. or Tadzhik*.mp. or Tadjik*.mp. or Tajikistan/ or Tanzania.mp. or Tanzania/ or Thailand.mp. or Thailand/ or Timor*.mp. or Timor-Leste/ or Togo.mp. or Togo/ or Tonga.mp. or Tonga/ or Tunisia.mp. or Tunisia/ or Turkey.mp. or Turkey/ or Turkmen*.mp. or Turkmenistan/ or Tuvalu.mp. or Tuvalu/ or Uganda.mp. or Uganda/ or Ukraine.mp. or Ukraine/ or Uzbek*.mp. or Uzbekistan/ or Vanuatu.mp. or Vanuatu/ or Vietnam.mp. or Vietnam/ or Palestine.mp. or West Bank.mp. or Gaza.mp. or Yemen.mp. or Yemen/ or Zambia.mp. or Zambia/ or Zimbabwe.mp. or Zimbabwe/ [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1794374)

38 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 (20308)

39 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (1433855)

40 31 or 32 or 33 or 34 or 35 or 36 or 37 (1993866)

41 38 and 39 and 40 (848)

Database	Maternity & Infant Care Database (Ovid)
Results	162
Date	21 January 2022

1 (Cash adj3 transfer*).mp. [mp=abstract, heading word, title] (88)

2 (cash adj3 payment*).mp. [mp=abstract, heading word, title] (6)

3 cash incentiv*.mp. [mp=abstract, heading word, title] (30)

4 voucher*.mp. [mp=abstract, heading word, title] (143)

5 (cash adj3 assistance).mp. [mp=abstract, heading word, title] (11)

6 financ* incentiv*.mp. [mp=abstract, heading word, title] (144)

7 mone* incentiv*.mp. [mp=abstract, heading word, title] (17)

8 mone* transfer*.mp. [mp=abstract, heading word, title] (1)

9 cash based intervention*.mp. [mp=abstract, heading word, title] (2)

10 Social insurance.mp. (20)

11 community-based insurance.mp. [mp=abstract, heading word, title] (0)

12 antenat*.mp. [mp=abstract, heading word, title] (24559)

13 ante nat*.mp. [mp=abstract, heading word, title] (181)

14 ANC.mp. [mp=abstract, heading word, title] (995)

15 Perinat*.mp. [mp=abstract, heading word, title] (27487)

16 Peri nat*.mp. [mp=abstract, heading word, title] (23)

17 Prenat*.mp. [mp=abstract, heading word, title] (25290)

18 Pre nat*.mp. [mp=abstract, heading word, title] (148)

19 Matern*.mp. [mp=abstract, heading word, title] (88912)

20 Primary care.mp. [mp=abstract, heading word, title] (2502)

21 Primary health*.mp. [mp=abstract, heading word, title] (1471)

22 pregna*.mp. [mp=abstract, heading word, title] (127997)

23 antepartum.mp. [mp=abstract, heading word, title] (2784)

24 ante partum.mp. [mp=abstract, heading word, title] (69)

25 developing countr*.mp. [mp=abstract, heading word, title] (13467)

26 low income countr*.mp. [mp=abstract, heading word, title] (679)

27 middle income countr*.mp. [mp=abstract, heading word, title] (1438)

28 LMIC.mp. [mp=abstract, heading word, title] (105)

29 (Eastern Europe or Pacific Islands or Indian Ocean Islands or West Indies or Caribbean or Atlantic Islands or Africa or South America or Latin America or Central America or Asia).mp. (13162)

30 (Afghanistan or Albania or Algeria or American Samoa or Angola or Argentina or Argentine Republic or Armenia or Azerbaijan or Bangladesh or Belarus or Byelarus or Belorussia or Belize or Benin or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burundi or Cabo Verde or Cape Verde or Cambodia or Cameroon or Central African Republic or Chad or China or Colombia or Comoro* or Comores or Congo or Costa Rica or Ivory Coast or Cote d'Ivoire or Cuba or Djibouti or Dominica or Dominican Republic or Ecuador or Egypt or El Salvador or Equatorial Guinea or Eritrea or Eswatini or Swaziland or Ethiopia or Fiji or Gabon or Gambia or Georgia or Ghana or Grenada or Guatemala or Guinea or Guinea-Bissau or Guyana or Haiti or Honduras or India or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kenya or Kiribati or Korea or Kosovo or Kirghiz* or Kyrgyz* or Laos or Lao PDR or Lebanon or Lesotho or Liberia or Libya or Madagascar or Malawi or Malay* or Maldives or Mali or Marshall Islands or Mauritania or Mauritius or Mexico or Micronesia or Moldova or Mongolia or Montenegro or Morocco or Mozambique or Myanmar or Burma or Namibia or Nepal or Nicaragua or Niger or Nigeria or Macedonia or Pakistan or Panama or Papua New Guinea or Paraguay or Peru or Philippines or Phillippines or Romania or Russia or Rwanda or Ruanda or Samoa or Sao Tome or Principe or Senegal or Serbia or Sierra Leone or Solomon Islands or Somalia or South Africa or South Sudan or Sri Lanka or Lucia or Vincent or Grenadines or Sudan or Surinam* or Syria or Tajik* or Tadjik* or Tadzhik* or Tanzania or Thailand or Timor* or Togo or Tonga or Tunisia or Turkey or Turkmen* or Tuvalu or Uganda or Ukraine or Uzbek* or Vanuatu or Vietnam or Palestine or West Bank or Gaza or Yemen or Zambia or Zimbabwe).mp. [mp=abstract, heading word, title] (27340)

31 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (420)

32 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 (181387)

33 25 or 26 or 27 or 28 or 29 or 30 (34577)

34 31 and 32 and 33 (162)

Appendix B: Grey literature

The websites of the following organisations were screened.

- Online sources from expert organizations including:
  - WHO
    - https://www.who.int/publications

- https://apps.who.int/iris
- https://kohahq.searo.who.int
- https://www.globalindexmedicus.net

- UNICEF
  - https://www.unicef-irc.org
  - https://www.unicef.org/research-and-reports
- UNFPA
  - https://www.unfpa.org/publications
- World Bank
  - https://www.worldbank.org/en/research
- USAID
  - https://www.usaid.gov/site-search
- Management Sciences for Health
  - https://www.msh.org/resources
- Oxford Policy Management
  - https://www.opml.co.uk/publications
- Save the Children
  - https://www.savethechildren.net/research-reports
  - https://www.savethechildren.org/us/about-us/resource-library
- Oxfam
  - https://www.oxfam.org/en/research
- EQUINET
  - https://www.equinetafrica.org/par/sections/participatory-action-research-publications-journal-papers-and-reports
- IntraHealth
  - https://www.intrahealth.org/resources
- ICRIER
  - https://icrier.org/publications
- Inter-American Development Bank
  - https://publications.iadb.org/en
- Asian Development Bank
  - https://www.adb.org/search

- University sources including:
  - Erasmus University International Institute of Social Studies
    - https://repub.eur.nl/org/9739
  - University of Southampton
    - https://www.southampton.ac.uk/research.page
  - International Centre for Diarrhoeal Disease Research and the Centre for Health and Population Research
    - http://lis.icddrb.org:8380/liberty/libraryHome.do
  - Boston University Institute for Economic Development
    - https://www.bu.edu/econ/research/
  - University of Sussex Institute of Development Studies
    - https://www.sussex.ac.uk/research/explore-our-research
  - London School of Hygiene and Tropical Medicine
    - https://researchonline.lshtm.ac.uk
  - Institute of Policy Analysis and Research

- https://www.ippr.org/research
- http://www.ipar-rwanda.org/what-we-do/research-policy-analysis/publications/

- University of Cape Town Development Policy Research Unit
  - http://www.dpru.uct.ac.za/
- The Transfer Project
  - https://transfer.cpc.unc.edu/publications

Appendix C: Cash transfers by programme

#	Programme	Monetary benefits as reported in studies		2022 adjusted monetary benefits per pregnancy
		Description	Per pregnancy	
A	Program Keluarga Harapan[26-33] Indonesia (6 provinces)	Between 60 and 220 USD per year depending on household characteristics.	45 to 165 USD	52.5 to 191.5 USD
B	M-Kadi[30] Kenya (Vihiga county)	3 USD per ANC or PNC visit (maximum 4 ANC and 3 PNC visits) and 6 USD per delivery Maximum total per pregnancy: 27 USD	27 USD	29.5 USD
C	Oportunidades[27] (previously called PROGRESA) Mexico	15 USD per household per month (health transfer)	135 USD	172.5 USD
D	Comunidades Solidarias Rurales[34] El Salvador	15 USD per month for households eligible for the health *or* education benefit. 20 USD per month for households eligible for health and education benefits.	135 to 180 USD	145.5 to 194USD
E	JUNTOS[35] Peru	70 USD each two months, transferred to the female head of household.	315 USD	343.5 USD
F	Safe Motherhood Programme (Janani Suraksha Yojana)[38-39-40-41-42] India	Low performing states: ▪ 19 USD rural beneficiaries ▪ 13.5 USD urban beneficiaries High performing states: ▪ 9.5 USD rural beneficiaries ▪ 8 USD urban beneficiaries	8 to 19 USD	8.5 to 20.5 USD
G	SURE-P/MCH[44] Nigeria (9 states)	6 USD for the first ANC visit, 2 USD per additional ANC visit (up to four), 12 USD per delivery and 6 USD for PNC visit	30 USD	35.5 USD
H	Safe Delivery Incentive Programme[43] Nepal (Makwanpur district)	16 USD per facility-based delivery if no more than two children or an obstetric complication	16 USD	21 USD

I	Mamata Scheme[37] India (Odisha state)	70 USD per pregnancy	70 USD	70 USD
J	Conditional Cash Transfer Programme[36] (no specific name) Afghanistan (3 provinces)	15 USD for each facility-based delivery	15 USD	16.5 USD
K	Pantawid Pamilya[31] Philippines (4 provinces)	11 to 32 USD every two months (mix of health and education grants which depend on household characteristics)	49.5 to 144 USD	57.5 to 167.5 USD
L	Conditional Cash Transfer Programme[29] (no specific name) Nigeria (5 states)	14 USD per pregnancy	14 USD	15 USD
M	Afya Credits Incentive[32] Kenya (Siaya county)	31.5 USD per scheduled health visit	31.5 USD	31.5 USD

Appendix D: Risk of bias by study

Randomized controlled trials

Domain	Signalling Question	Grepin, Habyarimana & Jack[30]	Barber & Gertler[27]	Kandpal et al.[31]	Okeke & Abubakar[29]	Triyana[26]	Vanhuyse et al.[32]
		2019	2010	2016	2020	2016	2022
Randomization Process	1.1 Was the allocation sequence random?	Yes	Yes	Yes	Yes	Yes	Yes
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions	No	Yes	Yes	No	Yes	No
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	No	No	No	No	No	No
	Risk of bias judgement	**High risk**	**Low risk**	**Low risk**	**High risk**	**Low risk**	**High risk**

Deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Yes	Yes	Yes	Yes	Yes	Yes
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	No info	No info	No info	No info	No info	Yes
	2.3. If Y/PY/NI to 2.1 or 2.2: Were there deviations from the intended intervention that arose because of the trial context?	No	No	No	No	No	Yes
	2.4 If Y/PY to 2.3: Were these deviations likely to have affected the outcome?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Possibly No
	2.5. If Y/PY/NI to 2.4: Were these deviations from intended intervention balanced between groups?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.6 Was an appropriate analysis used to estimate the effect of assignment to intervention?	Yes	Yes	Yes	Yes	Yes	Yes
	2.7 If N/PN/NI to 2.6: Was there potential for a substantial impact (on the result) of the failure to analyse participants in the group to which they were randomized?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Moderate risk**
Missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 If N/PN/NI to 3.1: Is there evidence that the result was not biased by missing outcome data?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	No	No	No	No	No	No
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	4.3 If N/PN/NI to 4.1 and 4.2: Were outcome assessors aware of the intervention received by study participants?	No	No	No	No	No	No
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of bias judgement	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	No info	No info	No info	No info	No info	Yes
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.2. ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No

	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.3 ... multiple eligible analyses of the data?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No
	Risk of bias judgement	No info	No info	No info	No info	No info	**Low risk**

Controlled before-after studies and interrupted time series analysis

Domain	Signalling Question	Kusuma et al.[33]	De Brauw & Peterman[34]	Diaz & Saldarriaga[35]	Edmond et al. [36]	Chakrabarti et al.[37]	Powell-Jackson et al.[38]	Aizawa[39]	Joshi & Sivaram[40]	Lim et al.[41]	Debnath[42]	Powell-Jackson et al.[43]	Okoli et al.[44]
		2016	2020	2019	2019	2021	2015	2020	2014	2010	2020	2009	2014
Bias due to Confounding	1.1 Is there potential for confounding of the effect of intervention in this study?	No	Possibly Yes	Possibly No	Yes	Possibly Yes	Yes	Possibly No	Possibly No	Yes	Possibly No	Possibly Yes	Yes
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.2. Was the analysis based on splitting participants' follow up time according to intervention received?	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	If Y/PY to 1.1: determine whether there is a need to assess time-varying confounding: 1.3. Were intervention discontinuations or switches likely to be related to factors that are prognostic for the outcome?	Not applicable	No info	Not applicable	No	Possibly Yes	Possibly Yes	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.4. Did the authors use an appropriate analysis method that controlled for all the important confounding domains?	Not applicable	No info	Not applicable	No	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No
	Questions relating to baseline confounding only: 1.5. If Y/PY to 1.4: Were confounding domains that were controlled for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Yes	Not applicable	No info	Possibly No

	Questions relating to baseline confounding only: 1.6. Did the authors control for any post-intervention variables that could have been affected by the intervention?	Not applicable	No info	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	No	Not applicable	No info	Possibly No
	Questions relating to baseline and time-varying confounding 1.7. Did the authors use an appropriate analysis method that adjusted for all the important confounding domains and for time varying confounding?	Not applicable	No info	Not applicable	Not applicable	Possibly Yes	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Questions relating to baseline and time-varying confounding: 1.8. If Y/PY to 1.7: Were confounding domains that were adjusted for measured validly and reliably by the variables available in this study?	Not applicable	No info	Not applicable	Not applicable	Possibly No	Possibly Yes	Not applicable	Not applicable	Not applicable	Not applicable	No info	Not applicable
	Risk of Bias	**Low risk**	**No info**	**Low risk**	**Serious risk**	**Moderate risk**	**Moderate risk**	**Low risk**	**Low risk**	**Moderate risk**	**Low risk**	**No info**	**Serious risk**
Bias in selection of participants into the study	2.1. Was selection of participants into the study (or into the analysis) based on participant characteristics observed after the start of intervention? If N/PN to 2.1: go to 2.4	No	No	No	No	No	No	No	No	No	No	No	No
	2.2. If Y/PY to 2.1: Were the postintervention variables that influenced selection likely to be associated with intervention?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.3 If Y/PY to 2.2: Were the postintervention variables that influenced selection likely to be influenced by the outcome or a cause of the outcome?.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	2.4. Do start of follow-up and start of intervention coincide for most participants?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	2.5. If Y/PY to 2.2 and 2.3, or N/PN to 2.4: Were adjustment techniques used that are likely to correct for the presence of selection biases?	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias in classification of interventions	3.1 Were intervention groups clearly defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.2 Was the information used to define intervention groups recorded at the start of the intervention?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	3.3 Could classification of intervention status have been affected by knowledge of the outcome or risk of the outcome?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	Risk of Bias	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Deviations from intended interventions	4.1. Were there deviations from the intended intervention beyond what would be expected in usual practice?	Yes	Possibly No	Possibly No	Possibly No	No	No	No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No
	4.2. If Y/PY to 4.1: Were these deviations from intended intervention unbalanced between groups and likely to have affected the outcome?	No	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**
Bias due to missing data	5.1 Were outcome data available for all, or nearly all, participants?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes
	5.2 Were participants excluded due to missing data on intervention status?	No info	No	Yes	No	No info	Yes	No info	Yes	No info	No info	No info	No info
	5.3 Were participants excluded due to missing data on other variables needed for the analysis?	No info	Yes	Yes	Yes	No info	No	No info	Yes	No info	No info	No info	No info
	5.4 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Are the proportion of participants and reasons for missing data similar across interventions?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	5.5 If PN/N to 5.1, or Y/PY to 5.2 or 5.3: Is there evidence that results were robust to the presence of missing data?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable	Not applicable	Not applicable
	Risk of Bias	**Low risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**	**Low risk**

Bias in Measurement of Outcomes	6.1 Could the outcome measure have been influenced by knowledge of the intervention received?	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes	Possibly Yes
	6.2 Were outcome assessors aware of the intervention received by study participants?	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	Possibly No	No	No
	6.3 Were the methods of outcome assessment comparable across intervention groups?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Possibly Yes	Possibly Yes
	6.4 Were any systematic errors in measurement of the outcome related to intervention received?	No info	No info	No	No info	No info	No info	No info	No info	No info	No info	No info	No info
	Risk of Bias	**Moderate risk**	**Moderate risk**	**Low risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**	**Moderate risk**
Bias in selection of the reported result	Is the reported effect estimate likely to be selected, on the basis of the results, from... 7.1. ... multiple outcome measurements within the outcome domain?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.2 ... multiple analyses of the intervention outcome relationship	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	7.3 ... different subgroups?	No info	No info	No info	No info	No info	No info	No info	No	No info	No info	No info	Possibly No
	Risk of Bias	**No info**	**No info**	**No info**	**No info**	**No info**	**No info**	**No info**	**Low risk**	**No info**	**No info**	**No info**	**Low risk**

PRISMA checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title page (first page)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	See appendix E
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Background section, page 2, last paragraph
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Background section, page 2, last paragraph
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Eligibility criteria section, page 2-3 Data analysis section, page 4
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Search results section, page 5, figure 1.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	See appendix B
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Search results section, page 5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Identification of studies section, page 4 Data extraction section, page 4

Section and Topic	Item #	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Eligibility criteria section, page 2-3
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Eligibility criteria section, page 2-3
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Risk of bias section, page 4
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Effect estimates section, page 9-10
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Data analysis section, page 4 Eligibility criteria section, page 2-3
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Eligibility criteria section (data availability), page 3-4
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Data extraction section, page 4
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Data analysis section, page 4
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Data analysis section, page 4
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Risk of bias section, page 4 Data extraction section, page 4
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Risk of bias section, page 4
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Risk of bias section, page 4
RESULTS			

Section and Topic	Item #	Checklist item	Location where item is reported
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Search results section, page 5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Search results section, page 5
Study characteristics	17	Cite each included study and present its characteristics.	Included studies section, page 5-6
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Risk of bias in the included studies section, page 9
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Effect estimates section, page 9-11
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Effect estimates section, page 9-11 Risk of bias in the included studies section, page 9
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Effect estimates section, page 9-11
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Effect estimates section, page 9-11
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Risk of bias in the included studies section, page 9
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Risk of bias in the included studies section, page 9
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Risk of bias in the included studies section, page 9
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion section, page 13, second paragraph
	23b	Discuss any limitations of the evidence included in the review.	Discussion, page 14,

Section and Topic	Item #	Checklist item	Location where item is reported
			third paragraph
	23c	Discuss any limitations of the review processes used.	Discussion, page 14, third paragraph
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion, page 14, fourth paragraph
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Upon request from the authors
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Not applicable
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	No funding
Competing interests	26	Declare any competing interests of review authors.	No competing interests
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Upon request from authors

PRISMA checklist [abstract]

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	No
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes

Section and Topic	Item #	Checklist item	Reported (Yes/No)
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	No
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	No
Registration	12	Provide the register name and registration number.	No