



EFFECTIVENESS OF BEHAVIOUR CHANGE COMMUNICATION
INTERVENTIONS IN IMPROVING THE DELIVERY OF HEALTH
MESSAGES FOR ANTE-NATAL CARE IN LIMITED LITERACY
SETTINGS: AN EVIDENCE SUMMARY

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EXECUTIVE SUMMARY

This evidence summary summarises systematic review-level evidence evaluating the effectiveness of Behavioural Change Communication (BCC) interventions for improving antenatal care (ANC) indicators, specific to low and middle-income country (LMIC) settings.

This evidence summary finds that increasing community participation, raising awareness about local populations' health care rights and delivering interventions in home and/or community settings are effective ways to increase ANC coverage and uptake. At the delivery level, mobile health (mHealth) is a promising intervention.

ABOUT THIS SUMMARY

The evidence summary is funded by the South Asia Research Hub, Research and Evidence Division of the Department for International Development, UK. This is designed to provide an overview of the key evidence discussed in systematic reviews, to assist policy-makers and researchers in assessing the evidence of BCC interventions in delivering health messages on ANC for improving maternal health outcomes. It is not designed to provide advice on which interventions are more or less appropriate in particular contexts but to summarise what is known in response to the following questions:

- What are the different types and mediums of BCC interventions aimed at improving ANC coverage and uptake of ANC services in low literacy settings?
- Which are the most effective BCC interventions to improve ANC coverage and uptake of ANC services?
- What is the effectiveness of theory based BCC as compared to non-theory based BCC?

SUMMARY

The findings of this evidence summary are derived from 19 systematic reviews that investigated effectiveness of BCC interventions on antenatal care coverage and uptake of services.

ANTENATAL COVERAGE

The evidence from systematic reviews suggests that increasing pregnant women's visits to healthcare facilities for antenatal health check-ups, are more likely to occur when communication about improving ANC or birth preparedness is delivered through home visits and at community level. Community participation and mobilization are integral parts of effective BCC programs. Reminding

women about their scheduled visit to the health facility by sending them text messages through mobile phones is effective in improving ANC service coverage.

UPTAKE OF ANTENATAL CARE SERVICES

Systematic reviews also provided evidence on the impact of BCC on uptake of ANC service components. For example, when women are specifically educated and counselled about their diet in pregnancy and are provided with micronutrient supplements, it helps them to improve their dietary intake and uptake of folic acid. For increasing the uptake of Human Immunodeficiency Virus (HIV) testing during pregnancy, provider initiated testing and counselling is effective in achieving universal HIV testing. Ensuring the community is aware about their entitlement to health services and rights is also effective in increasing uptake of services.

OTHER INDICATORS OF KNOWLEDGE AND BEHAVIOUR CHANGE

Use of structured tools (decision aids) are also helpful in making women aware of the importance of screening for Down's syndrome and reducing decisional conflict regarding that screening. However, there is insufficient evidence to determine whether health communication interventions delivered during the antenatal period are effective in helping women to reduce alcohol consumption or smoking cessation during pregnancy.

METHODS

In this review we sought to investigate what different BCC approaches have been used to motivate women to seek care during pregnancy and which of these approaches are found to be effective in the research. To achieve this, we searched for peer-reviewed English language systematic reviews that studied the effectiveness of BCC to improve women's access to health facilities and uptake of services during pregnancy.

Searching of 33 databases and websites, completed in October 2015, and application of eligibility criteria led to the inclusion of 41 systematic reviews. Of the 41 systematic reviews, 19 relevant ones were used for synthesising the effect of any type of BCC intervention seeking to improve ANC coverage and uptake of services. Interventions could target women, family and associated lay health carers (e.g. traditional birth attendants, community health workers, social workers, health volunteers) set in LMICs or high-income countries (HICs) conducted in low literacy settings or low socio-economic conditions. We used EPPI-Reviewer software to store data and record screening and data extraction decisions. Screening of title, abstract and full text was conducted independently by

four reviewers. Data extraction and methodological quality was assessed independently by two investigators. In case of any discrepancy, the consensus or opinion of senior investigators was considered. The quality of included reviews was assessed using the Revised Assessment of Multiple Systematic Reviews (R-AMSTAR) instrument.

We summarised and thematically categorised systematic review level data for each BCC intervention and its effectiveness. Evidence tables were devised to provide an overview of each BCC intervention, country of included primary studies, statements about effectiveness and methodological quality and relevance.

SUMMARY MAP OF EVIDENCE

The summary map of evidence is presented according to the evidence summary questions posed:

Research Question 1: What are the different types and mediums of BCC interventions aimed at improving ANC coverage and uptake of ANC services in low literacy settings?

Different approaches or mediums of BCC intervention are identified which were used to improve ANC coverage and uptake of ANC services; such as: home visits; counselling; group meetings or education; group discussion; played audiotaped presentations; played video; displayed posters or leaflets or manuals; street theatres; sending text messages; phone calls, media campaign on television or radio; advertisement in daily newspapers and local publicity efforts; and provided visual, verbal or computer feedback.

Apart from the medium of BCC intervention, we also categorised the intervention based on content, provider, target population, place of delivery and setting, which are as follows:

Content: BCC interventions included information pertaining to a wide range of issues such as: education on birth and neonatal care preparedness; spreading awareness on danger signs; spreading awareness on entitled health services; providing some aids which might help pregnant women take the decisions related to maternal and child health; sending reminders about scheduled antenatal visits and immunization; providing health education; motivation and advice on healthy behaviour; counselling before undertaking screening for HIV; spreading awareness on prenatal screening of toxoplasmosis or Down's syndrome; spreading awareness or motivating on altering habits for smoking/alcohol cessation; promotion of nongovernmental-organization (NGO) clinic for facility based ANC and nutrition education and counselling.

Provider: The interventions were provided by different providers such as: community health worker; community based/youth/local non-governmental organisations; trained volunteers; TBA or midwife; health professionals or other public health workers; counsellor and female facilitator.

Target population: The interventions were aimed at the target population, such as pregnant women either alone or with their partners, all women, adolescents, men, health workers, peer facilitators, local leaders etc.

Place of intervention: The interventions were either home based, community based, or health facility based.

Settings: The evidence belonged to different settings such as LMICs, HICs, urban or rural areas, conflict affected areas, resource limited settings etc.

Research Question 2: Which are the most effective BCC interventions to improve ANC coverage, uptake of ANC services and Antiretroviral (ARV) treatment uptake for HIV positive pregnant women?

Effectiveness of BCC intervention as per the outcome of our interest is as follows, also summarised in Table i. below;

1. ANC coverage:

The majority of systematic reviews focused on community level interventions (George Asha et al., 2015; Gogia & Sachdev, 2010; Lathrop, 2013; Webb & Olude, 2012). There is evidence to support that:

- 1-2 home visits, combined with community participation and mobilisation, are effective in improving antenatal care coverage. This systematic review scored moderate on methodological quality (Gogia and Sachdev, 2010).
- Evidence from moderate methodological quality systematic review (SR) suggests that community based interventions to promote awareness of entitled health services and rights are effective (George et al., 2015).
- Group prenatal care interventions produce comparable if not improved outcomes as compared to traditional prenatal care. This evidence is from low methodological quality SR (Lathrop, 2013).
- There is inconclusive, low level evidence, coming from moderate methodological quality SR, on effect of Nutrition Education and Counselling (NEC) on ANC Coverage. NEC compared to usual care shows positive effect. However, compared to NEC alone, NEC combined with

identifying women with healthy practices as community health volunteers yields better results (Webb and Olude, 2012).

- Health interventions in the form of reminders through text messages are effective in improving antenatal care coverage. However, information on contextual factors such as literacy level, mobile penetration, and access to health facilities was lacking in the moderate methodological systematic review (Watterson et al., 2015).

2. Uptake of ANC services

- Improving uptake of tetanus toxoid (TT) immunization following strategies worked. (Two SRs: one high (Lassi & Bhutta, 2015) and one moderate quality (Gogia Sachdev, 2010)).
 - home visits during pregnancy
 - community level meetings
 - participatory approaches, involving family members through community support, advocacy groups, community education and mobilization strategies)
 - provision of care through trained CHWs via home visitation
 - strengthened referrals for sick mothers and newborns
- To improve uptake of iron and folic acid (IFA), evidence from high (Lassi and Bhutta, 2015) and moderate (Stockley et al., 2008; Webb and Olude, 2012) methodological SRs suggests the following strategies worked:
 - Printed materials (less effectiveness in low socio-economic groups)
 - Counselling
 - Reminder calls
 - Use of multimedia
 - Free supplements to vulnerable women and community-based integrated campaigns
 - Community mobilization through participatory women's approach, group meetings, women volunteers from the community trained as facilitators
 - NEC was inconclusive, however, focused NEC, instead of combining it with other health messages, is effective and the effect was stronger when there was access to supplements.
 - It is important to keep in mind that when these interventions are stopped the effects are not sustained. Also, when they are not targeted at vulnerable groups, the differential in awareness/use is exacerbated.

- To increase uptake of HIV testing during pregnancy, the following BCC strategies worked (one moderate quality) (Hensen et al., 2012):
 - Provider-Initiated Testing and Counselling (PITC) within ANC
 - Counselling
- To increase uptake of prenatal screening for Down's syndrome (one high quality SR (Vlemmix et al., 2013))

Decision aids in the form of structured counselling, booklets with worksheets and interactive computer programs found that presenting the information in such formats helped reduce indecision and had a slight improvement in uptake. These studies are from high-income countries (HIC), and highlight the need for this research to be implemented in LMICs.

Awareness and acceptability are important determinants of uptake of antenatal services. Therefore, we have also considered indicators for knowledge and behavioural change in a separate subsection under uptake of ANC services which are as follows.

Indicators for knowledge and behaviour change

- To improve knowledge and changing dietary practices:
 - Nutrition education counselling appears to be effective in improving knowledge and changing dietary practices. However, these conclusions are based on two moderate quality SRs (Webb & Olude, 2012; Nielsen et al., 2006).
- To improve birth preparedness:
 - Couples counselling does not appear to be effective in increasing knowledge about birth preparedness and the danger signs of pregnancy. Male accompaniment alone may not significantly impact outcomes and more efforts are needed to expand the implementation and evaluation rigor of male involvement strategies **for improving** maternal and newborn health (one low quality SR (Higgs et al., 2014)).
 - There is limited, inconclusive evidence regarding effectiveness of training community health workers (moderate quality SR (Aguiar & Jennings, 2015)) and group prenatal care on improving knowledge about danger signs and maternal health behaviour (low quality SR (Lathrop, 2013)).
- To improve knowledge of prenatal screening and reduce decisional conflict:

- Decision aids (DA) in the form of tools such as audiotape-booklet, information pamphlet, routine consultation structured by decision analysis tool, audio-CD, worksheet and booklet, computer-based aid and decision aid booklet were effective in improving knowledge of prenatal screening for Down's syndrome and reducing decisional conflict. DAs in the form of counselling had little effect on improving knowledge. However, the evidence on decision aids largely comes from HICs. The applicability of DAs in LMICs needs to be evaluated. (Low quality (Birch, 2015), moderate quality (Dugas et al., 2012) and high quality (Vlemmix et al., 2013)).
- To achieve alcohol abstinence during pregnancy:
 - There is limited evidence from LMICs on the impact of BCC interventions on alcohol abstinence during pregnancy. The evidence from HICs on this remains inconclusive. Studies from HICs that assess the impact of interventions ranging from a single or multi-sessions of brief psycho-educational interventions (lasting from 10 minutes to one hour), motivational interviewing, midwife-delivered counselling, ultrasound feedback, financial incentives and a nine-step cognitive behavioural self-help manual to reduce alcohol consumption during pregnancy show inconsistent findings (moderate quality SR (Gilinsky et al., 2011)).
- To achieve smoking cessation during pregnancy:
 - There is limited evidence from LMICs on impact of BCC interventions on smoking cessation/quitting during pregnancy. Evidence from HICs on effect of interventions such as providing counselling or resources to pregnant women, motivational counselling along with self-help material, telephonic counselling, use of video and booklets, biofeedback based interventions is inconclusive (two high quality SRs (Hemsing et al., 2012; Nabhan Ashraf & Aflaifel, 2015)).
- Other behavioural changes:
 - Prenatal education classes significantly improved women's behaviour about avoidance of risk factors for toxoplasmosis (moderate quality SR (Di et al., 2015)). But printed material and audiotape did not significantly impact the behaviours (high quality SR (George Asha et al., 2015)). However, there is a need for more evidence.

There was inconsistency on the effect of NEC on different outcomes, which is summarised below.

- *ANC Coverage:* There is inconclusive, low level evidence, coming from moderate methodological quality SRs, on effect of NEC on ANC coverage. NEC compared to usual care shows positive effect. However, compared to NEC alone, NEC combined with identifying women with healthy practices (positive deviances) as community health volunteers yields better results (Webb and Olude, 2012).
- *To improve uptake of IFA:* Moderate quality (Webb and Olude, 2012) methodological SR suggests that NEC was inconclusive, however, focused NEC, instead of combining it with other health messages, is effective and the effect was stronger when there was access to supplements.
- *To improve knowledge and changing dietary practices:* NEC appears to be effective. However, these conclusions are based on two moderate quality SRs (Webb & Olude, 2012; Nielsen et al., 2006).

3. ARV uptake: While there were a few primary studies in the systematic reviews that addressed the issues of ARV uptake, none of the SRs focused on effectiveness of specific BCC intervention on ARV uptake during pregnancy.

Table i. Summary of the BCC Interventions which were found to be effective

Description of intervention						
ANC coverage						
BCC package	Objective	BCC tools	Provider	Target population	Frequency/ Duration	Considerations
Home visits with community engagement (Moderate quality SR (Gogia & Sachdev, 2010))	Birth preparedness and neonatal care	Education, Group meetings/ folk songs/group education	Lady Community health worker (CHW)	Pregnant women, men, community & local leaders	1-2 home visits during pregnancy	Gender of CHW; Extensive training of CHW; Cost-effectiveness should be assessed; Implemented for home based neonatal care
Community participation and mobilization (Moderate quality SR (George et	Awareness about rights and entitled health services	Discussion, participatory meetings, community based monitoring,	Community Based Organisations; local volunteers; youth committees	Community	Several meetings [for 3-15 months]	Challenges power; Conflict or backlash with health system. Presence of strong and motivated community based organization could be important

Description of intervention						
al., 2015))						
mHealth (Moderate quality SR (Watterson Jessica et al., 2015))	Increase ANC attendance	Text or voice message reminders and educational messages	CHW Health Facility	Pregnant women CHW	Varied [daily to twice a month]	Mobile penetration and connectivity; literacy; Skills for using mobile; More personalized narrative voice messages could have better up- take; Effectiveness of the intervention in large programmatic setting is needed.
Uptake of ANC services						
BCC package	ANC service(s)	BCC tools	Provider	Target population	Frequency/ Duration	Considerations
Home visits with community engagement (Two moderate quality SR (Gogia Sachdev, 2010;	Uptake of TT immunization Uptake of iron and folic acid	Education, Group meetings/ folk songs/group education	Lady Community health worker (CHW)	Pregnant women, men, community & local leaders	1-2 home visits during pregnancy;	Evidence from LMIC Gender of CHW Extensive training of CHW Cost-effectiveness should be assessed

Description of intervention						
Stockley et al. 2008) & 1 high quality (Lassi & Bhutta, 2015))						
Nutrition Education Counselling (Two moderate quality SR (Webb & Olude, 2012); (Nielsen et al., 2006))	Uptake of iron and folic acid Improved nutrition knowledge and dietary change	Individual or group education during prenatal care	Not mentioned; possibly CHW	Pregnant women	Not known;	Only knowledge is not enough for behaviour change; Food insecurity should be considered Targeted NEC with supplements work better. Repeated efforts are probably needed
Provider initiated testing and counselling	Uptake of HIV testing	Individual counselling group education information	Nurse counselor	Pregnant women	Not known	Limited information on women's perception and acceptability. Issues about consent, confidentiality, availability of test kits and other HIV services needs consideration

Description of intervention						
(PITC) (Moderate quality SR (Hensen et al., 2012))		provided at clinics through leaflets/skits/pos ters				

Research Question 3: What is the effectiveness of theory based BCC as compared to non-theory based BCC?

There is a lack of review-level evidence on the effectiveness of theory based BCC interventions compared to non-theory based BCC interventions; with only, one systematic review describing a theory-informed BCC programme (with making comparisons), there is a clear gap in the review-level evidence base to answer this question.

OUTLINE OF EVIDENCE

- There is evidence that home visits, along with community participation and mobilization, are effective in improving antenatal care coverage as well as uptake of antenatal services.
- mHealth interventions, in the form of reminders and text messages, are effective in improving antenatal care coverage.
- Adoption of PITC within ANC increases uptake of HIV testing among pregnant women and thus, is likely to facilitate access to HIV prevention and treatment interventions.
- Couples counselling has no effect in improving knowledge about birth preparedness and knowledge of danger signs during pregnancy.
- The evidence, especially from LMICs, largely shows that nutrition education and counselling, along with food/micronutrient supplementation, was effective in improving dietary intake and uptake of folic acid.
- Decision aids are effective in improving knowledge of prenatal screening for Down's syndrome and reducing decisional conflict. However, the evidence largely comes from HICs and may not be relevant to LMICs.
- Methodological quality scores of the systematic review ranged from 19 to 40 in a scale range of 11-44. Of the 41 systematic reviews, five were of low quality, eight high and 28 of moderate quality. This grouping (high, moderate and low) of the systematic reviews according to the methodological quality, are not directed towards the effectiveness of the BCC interventions. However, it conveys robustness of systematic review in its methodology.

RESEARCH GAPS

- Most systematic reviews combined diverse BCC interventions and co-interventions while assessing a particular outcome, making it difficult to understand which component of the intervention worked. For example, community mobilization and participation interventions included group meetings, training of local women volunteers, involvement of local leaders

and health authorities, use of score card/report card, use of posters, street theatre. Thus there is a need to understand effectiveness of specific components/tools of BCC interventions.

- There was lack of systematic reviews assessing the effectiveness of theory based BCC interventions. This indicates lack of primary studies on effectiveness of theory based BCC interventions and there is need for primary research to ascertain the role of theories in designing the BCC interventions.
- Information on contextual factors was insufficiently reported in majority of SRs. Contextual information from primary studies should be reported in the systematic reviews of BCC intervention effectiveness.
- Evidence from HICs has not sufficiently been tested in LMICs, therefore it is challenging to contextualise it to LMICs.

1. BACKGROUND

1.1. CONTEXT OF THE REVIEW

Maternal and child health (MCH) outcomes have remained low in low- and middle-income countries (LMICs) (UNICEF, 2008). High Maternal Mortality Ratio (MMR) reflects the overall effectiveness of health systems. About 95 per cent of the world's maternal deaths occur in Africa and Asia (UNICEF, 2008). Also, many indicators used to measure improvement in maternal health [Millennium Development Goal (MDG)-5] (UN, 2015) and reduce child mortality (MDG-4), are either off track or slow in progress. Improvement in reducing MMR has been nearly non-existent in countries of sub-Saharan Africa (UNICEF, 2008).

Receiving appropriate antenatal care (ANC) is considered a foundation of MCH. Many important MCH issues such as educating women regarding antenatal care, screening for high risk pregnancy, interventions to prevent mother to child transmission of HIV, importance of skilled attendance at birth, exclusive breastfeeding for six months, appropriate contraceptive methods for child spacing, and post-natal care (PNC) for mothers and babies can be addressed during this period. The World Health Organization (WHO) has recommended standards of care during pregnancy and the post-natal period. It promotes a model package of ANC that implements evidence-based interventions through goal-oriented clinic visits. However, achieving adequate ANC coverage, as well as uptake of services, remains a challenge in most LMICs resulting in high maternal, perinatal and neonatal mortality (WHO, 2011).

The coverage of ANC (at least four visits during pregnancy), one of the indicators of maternal health, is 56% in the South Asian region, with specifically lower coverage (than average) in Bangladesh (25%), Pakistan (37%) and Nepal (50%) (WHO, 2015). Likewise, in the year 2013 in the South Asian Region, only 13.8% of HIV infected pregnant women received antiretroviral (ARV) prophylaxis to prevent mother to child transmission (PMTCT) of HIV and 17.6% of treatment eligible women received ARV therapy (WHO, 2015).

Retaining HIV infected women in care and providing a complete cascade of services to HIV infected women has been recognized as one of the important challenges in providing PMTCT services in low- and middle-income countries (Panditrao, Darak, Jori, Kulkarni, & Kulkarni, 2015; Panditrao, Darak, Kulkarni, Kulkarni, & Parchure, 2011).

1.2. DESCRIPTION OF THE INTERVENTION

One of the most cost-effective ways of targeting the issues of MCH is through Behaviour Change Communication (BCC) (UNICEF, 2008). It is a method to encourage positive health outcomes by making planned and strategic usage of communication. BCC is defined as “a research-based consultative process of addressing knowledge, attitudes and practices through identifying, analysing and segmenting audiences and participants in programmes by providing them with relevant information and motivation through well-defined strategies, using an audience-appropriate mix of interpersonal, group and mass-media channels, including participatory methods” (UNICEF, 2005).

BCC in public health includes interventions that focus on communicating health messages to individuals, households or communities through various mediums and in ways that can tangibly impact health behaviour. It can be targeted at different levels of communities such as local, regional, and national levels, through wide varieties of mechanisms delivered by different modes of channels and forms (Riboli-Sasco et al., 2015). BCC can be used for community mobilization, health education and different public outreach programs (Riboli-Sasco et al., 2015). It can take various forms such as Inter Personal Communication (IPC) through one-to-one counselling or group discussions; mass media communication including print media such as newspapers, posters, flyers, leaflets, booklets etc.; electronic media including radio, television and online/digital platforms; and mid-media or edutainment such as songs, folk dances, street shows, dramas, and the multifarious use of the fine and performing arts (Riboli-Sasco et al., 2015).

Another predominant channel for BCC in contemporary human society is via the digital or electronic mode such as mobile phones (mHealth), internet, social media, blogs, chat rooms (eHealth), video games, health applications (Everett et al., 2011; Free et al., 2010; Leslie et al., 2013; Riboli-Sasco et al., 2015), computer-mediated delivery of individual healthcare advice (e.g. online physicians), face-to-face educational session (Bailey et al., 2010) etc. These newer technologies such as internet and mobile phones can be effectively used for BCC. Lack of accessibility to internet (due to various barriers) restricts the reach and impact of health communication in LMICs, but it is evident that the usage of mobile phones is increasing in these countries. It is anticipated that mobile phones would provide favourable opportunities to deliver health messages to a widespread audience (Riboli-Sasco et al., 2015). However, its effectiveness may vary across various socio-cultural contexts. Research on effectiveness of BCC suggests that interventions that are contextualized in the local socio-cultural context and that are based on behaviour change theory are more likely to be successful (Wang, Moss, & Hiller, 2006).

1.3. RATIONALE

Using some form of BCC strategy is very common in almost all public health intervention. There are also specific programs initiated by national, bilateral and multilateral agencies to promote BCC strategies, for example, the Pakistan Initiative for Mothers and Newborns (PAIMAN) in Pakistan (USAID, 2010) or Sumata initiative in Nepal (USAID, 2004). The research to evaluate different BCC strategies and systematically synthesize the results of the research conducted on specific issues also seems to be available. The available literature suggests that uptake of maternal health care is greatly influenced by various contextual factors (Say & Raine, 2007). Even though a wide variety of BCC interventions are available, with their effectiveness addressed in different systematic reviews, the effectiveness is still disputed in limited literacy settings, especially in LMICs. This merits a review of the evidence specific to LMICs and if possible at a country level.

Evidence-based practice (EBP) is the meticulous and judicious use of existing best evidence in concurrence with clinical expertise and patient values to guide health care verdicts (Hughes, 2008). A systematic review attempts to assemble all empirical evidence that constrain into pre-specified eligibility criteria in order to answer a specific research question and are designed to minimize the bias for providing more consistent outcomes from which the interpretations are drawn and decisions are made (Higgins & Green, 2011).

The roles of appropriate and adequate ANC care in improving maternal outcomes are directly linked with the child health outcomes. This overview focused on preparing a summary of the evidence regarding the effectiveness of BCC interventions for improving ANC indicators. We made efforts to find out which BCC interventions work and which do not work in a given context; specifically making an attempt to examine the effectiveness of theory based BCC interventions compared to non-theory based. As there is abundant literature on the effectiveness of proficiently using technologies such as mobile phones text messages, use of internet and social network sites for BCC, specific efforts were made to summarize the evidence on the role of communication technologies in improving the MCH indicators.

1.4. RESEARCH QUESTIONS

We aimed to answer the following research questions through summarising existing systematic reviews:

- What are the different types and mediums of BCC interventions aimed at improving ANC coverage and uptake of ANC services in low literacy settings?

- Which are the most effective BCC interventions to improve ANC coverage (at least one visit) and uptake of ANC services?
- What is the effectiveness of theory based BCC as compared to non-theory based BCC?

2. METHODS

2.1. USER INVOLVEMENT: APPROACH AND RATIONALE

Involvement of end users in the evidence summary helps to ensure that reviews deal with topics and outcomes relevant to a particular population. In order to ensure the pertinence and scope of the evidence summary, we have established a multidisciplinary review team and advisory group.

Advisory members were involved in developing and finalizing the protocol. Their feedback and comments were valuable. We engaged them to review the different stages of the project and received their valuable comments on search terms, screening, data extraction tool, synthesis and final report writing.

The background of the advisory members is attached in Appendix 2 (Section 2.1.). Additionally, the flow chart of the process of the project and the details of project meetings detailed in sections 2.2 and 2.3 portrays the involvement of the different experts and the co-ordination of the multidisciplinary review team throughout the project.

2.2 DEFINING RELEVANT REVIEWS: INCLUSION CRITERIA

Language: We restricted to systematic reviews published in English language.

Types of Studies: We included all systematic reviews that synthesized the effect of BCC intervention to improve ANC coverage and uptake of services. Systematic reviews were included irrespective of the study designs of the primary studies they considered. In this evidence synthesis, we defined systematic reviews as those reviews which have searched at least two bibliographic databases and have explicitly stated their inclusion and exclusion criteria. However, we included only such systematic reviews which had first-hand data on outcomes of our interest.

Types of Population: We included systematic reviews of BCC interventions targeted at women, family members, lay carers such as traditional birth attendants, skilled attendants at birth, midwives, members of village health committees, community health workers, social workers and health volunteers. There was no restriction on type of settings from where the participants were recruited (population-based or facility-based) but we gave more emphasis to LMICs, although we included systematic reviews which also considered high income countries. LMICs are defined as per the World Bank data (WorldBank, 2015). Including evidence from LMICs, rather than only evidence addressing limited literacy settings, helped us to identify many important systematic reviews which otherwise

we would have missed. Our experience with a preliminary scoping search also revealed that “limited literacy setting” terminology has not been used very often in studies. We excluded systematic reviews in which BCC interventions targeted only health professionals.

Types of Intervention: We included systematic reviews that synthesized any type of BCC interventions (single or a combination of BCC interventions) which were designed for improvement of ANC coverage and uptake of services. Interventions may range from interpersonal communication to community-oriented communications such as mass media campaign, mid media and combination. There was no restriction on type of media through which the communication is established and who delivers the intervention. Newer tools and technologies such as mobile health (mHealth), electronic-health (eHealth), text messages, social media, and helplines were also included. Those interventions which were targeted only on training of health professionals were excluded.

Types of Comparison: We included all systematic reviews irrespective of **whether** they included studies with comparison groups or not.

Types of Outcome: ANC indicators are very potent measures to determine the positive impact of interventions aimed at improving MCH. However, receiving the attention of decision-makers and leadership in governance, academia and civil society on such issues, particularly for populations in limited literacy settings, has always been a challenge. Therefore, the knowledge translation and dissemination of this summary of evidence regarding the effectiveness of BCC interventions for improving ANC indicators [specifically ANC coverage, uptake of ANC services and ARV prophylaxis among HIV infected pregnant women to prevent HIV transmission and ARV therapy for (pregnant) women who are treatment-eligible] will be a significant aspect of the activities under the overall effort. As antenatal care coverage does not capture all components of ANC, along with ANC coverage, uptake of **antenatal** services and knowledge and behaviour change indicators were also considered separately. Awareness and acceptability are important determinants of uptake of antenatal services. Disseminating knowledge about antenatal care and bringing about behavioural and social change will ultimately influence maternal and child health. In this context, provision of information and counselling is an important and integral component of antenatal care. Therefore, we have also considered indicators for knowledge and behavioural change in a separate subsection under uptake of ANC services (under section 3.8, pg53).

Providing anti-retroviral (ARV) prophylaxis among HIV positive pregnant women to prevent HIV transmission to the baby and providing ARV therapy for pregnant women who are eligible for

treatment is also a very important component of **antenatal** services. As it was specific to HIV, it was considered separately as ARV uptake.

Therefore, we included the systematic reviews which have focused on at least one of the following outcomes.

a. ANC coverage (antenatal check-up at least once during pregnancy)

b. Uptake of ANC services which includes but is not limited to

- Knowledge and attitude regarding screening for high risk pregnancy.
- Uptake of screening for high risk pregnancy.
- Uptake of iron and folic acid.
- Uptake of tetanus toxoid immunization.
- Improvement in dietary practices.

c. Uptake of ARV prophylaxis among HIV positive pregnant women to prevent HIV transmission and ARV therapy for pregnant women who are eligible for treatment.

Inclusion and exclusion criteria have been listed in table 1 below.

2.3. IDENTIFYING REVIEWS: SEARCH STRATEGY

ELECTRONIC DATABASES:

During a protocol workshop, the project team, consultant and advisors had an extensive debate on databases to be searched and potential keywords to be used for this evidence summary. We circulated these documents to the core team as well as other members to obtain additional inputs. Based on this obtained final set of keywords, we developed a search strategy and searched all electronic databases. Search strategies and table on citation yield from the databases have been attached in Appendix 3, sections 3.1 and 3.2 respectively. Initial search strategy was developed for Ovid Medline and then tailored to other databases.

Time frame: We searched databases from their inception till October 2015. We considered systematic reviews whether or not they had been peer reviewed.

SEARCHING OTHER RESOURCES:

We anticipated that most of the relevant systematic reviews would appear in electronic databases. We also searched key systematic review websites such as Campbell Collaboration, EPPI-Centre, 3ie, Joanna Briggs Institute database of systematic reviews (Section 3.2 in Appendix 3). References of the included reviews were searched for relevant systematic reviews. Due to time restraint, we excluded conference proceedings.

Table 1: Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Type of study	<ul style="list-style-type: none"> • Systematic review of any study design • Systematic review should have searched at least two databases 	<ul style="list-style-type: none"> • Primary studies (observational or experimental) • Systematic reviews if searched only one database • Systematic reviews if not explicitly stated inclusion and exclusion criteria • Conference proceedings
Language	<ul style="list-style-type: none"> • English language 	
Population	<ul style="list-style-type: none"> • Women, family members, lay carers such as traditional birth attendants, skilled attendants at birth, midwives, members of village health committees, community health workers, social workers, health volunteers. 	<ul style="list-style-type: none"> • Health professionals alone
Intervention	<ul style="list-style-type: none"> • Any one or combination of behaviour change communication interventions. • Interventions may range from interpersonal communication to community oriented communications such as mass media campaign, mid media and combination. 	

	<ul style="list-style-type: none"> • There was no restriction on type of media through which the communication is established and who delivers the intervention. 	
Comparison	<ul style="list-style-type: none"> • No restriction 	
Outcome	<p>a. ANC coverage</p> <p>b. Uptake of ANC services which includes but not limited to</p> <ul style="list-style-type: none"> • Knowledge and attitude regarding screening for high risk pregnancy. • Uptake of screening for high risk pregnancy. • Uptake of iron and folic acid. • Uptake of tetanus toxoid immunization. • Improvement in dietary practices. <p>c. Uptake of ARV prophylaxis among HIV positive pregnant women to prevent HIV transmission and ARV therapy for pregnant women who are eligible for treatment.</p>	<p>a. Systematic reviews which don't include at least one outcome of our interest.</p>

2.4. SCREENING REVIEWS: APPLYING INCLUSION AND EXCLUSION CRITERIA

The team members were trained in EPPI-Reviewer 4 software (EPPI-Centre at the Social Science Research Unit of the UCL Institute of Education, 2010). All citations obtained during search were exported to EPPI-Reviewer 4 software and duplications were removed. The obtained final list of citations was considered for screening.

A three stage screening process was adopted to select systematic reviews. The first stage involved screening of all titles for their eligibility to be included, which was done by a single investigator. During this screening, all titles which seemed to be eligible were included for next step screening. Also, whenever in doubt, we included the articles for further screening. We were more inclusive in

title screening. In the second stage the abstracts of the included titles were obtained and screened for eligibility. Abstracts that seemed to be eligible and/or doubtful were moved to the third stage of screening. Unlike primary studies, mostly, the titles and abstracts of systematic reviews do not provide the detailed information on the outcomes, hence we were more liberal at these stage and included such systematic reviews for full text screening. Also, those abstracts which were not available were included for full text screening.

Finally, the full texts of the included abstracts in the second stage were retrieved and screened. In the second and third stage, screening was carried out by two investigators independently and the third investigator, usually senior investigator was involved in case of a discrepancy to arrive at a decision. A flow diagram of screening process was prepared in order to keep track of the search process.

2.5. DATA EXTRACTION

The data extraction was carried out independently by two investigators with a predesigned data extraction tool. The data extraction tool containing details of authors, year of publication, relevant information related to research questions, PICOS (population, intervention, comparison, and outcome and study design), etc. was developed and tested for its suitability and usability. The opinion of advisory group members was sought to finalize the data extraction tool. Contextual information was also extracted. The data extraction tool has been attached as Appendix 3 (Section 3.7).

2.6. QUALITY ASSURANCE PROCESS

A two level quality assurance process was conducted for this overview. At the first level, the core team was divided into two sub-teams led by principle investigator and co-investigator and independently did an evaluation of each major activity of the overview, namely search strategy, database finalisations, keywords, data extraction sheet, structure of possible summary tables and summarization process. Once the team reached a consensus, feedback of the advisory group and the EPPI-Centre team was taken to have a final draft. This was the second level in the quality assurance. The protocol for the evidence summary was subjected to peer-review by the EPPI-Centre and advice was taken from advisory group members. Abstract and full text screening was completed independently by two overview investigators. We also pilot tested the data extraction form.

2.7. METHODOLOGICAL QUALITY OF THE INCLUDED SYSTEMATIC REVIEWS

The quality of included reviews was assessed using the Revised Assessment of Multiple Systematic Reviews (R-AMSTAR) instrument independently by two overview investigators (Kung et al., 2010; Shea et al., 2007). Disagreements were resolved by discussion or the opinion of a third overview investigator was considered. Risks of bias (ROB) of primary studies are reported as given by authors of systematic reviews.

2.8. METHODS FOR SYNTHESIS

Towards the end of data extraction, the project team had a meeting to brainstorm on the process of analysis, structure and categorization of tables. The analysis and reporting strategy were finalised during this debate.

We prepared a table on characteristics of included reviews, table on types of BCC interventions and its detail, table on effectiveness of the outcome and a country-specific table. Based on the availability of data, we attempted to make appropriate categorizations of results in terms of region (rural/urban), population (based on the subgroup of population defined in the population), types and methods of interventions and outcomes. We intended to synthesize evidence and contextualize it to South Asia, Bangladesh and Nepal. In this review the South Asian region is understood as comprising of India, Pakistan, Afghanistan, Bangladesh, Nepal and Myanmar.

The findings are presented as a narrative synthesis. We summarized the results based on the type of BCC, medium of BCC, outcome, quality of evidence etc. However, if authors of the systematic reviews have conducted meta-analysis we have reported the same with interpretations. It might have been reported as standardised mean difference, relative risk or odds ratio¹.

We also sorted the interventions as per the South Asian countries. There is a summary of findings table, of included systematic reviews, will be a useful tool for policymakers and development partners. A discussion meeting was conducted with the review team to finalise the summarization strategy.

¹ “The odds ratio (OR) can be defined as the ratio of the odds of the outcome in the intervention group to the odds of the outcome in the control group. Risk ratio or relative risk (RR) is a ratio of two risks”. The 95% confidence interval of an estimate (such as, of OR or RR) point towards the precision of the estimate. It is less precise if we get wider confidence interval. If the confidence interval for OR or RR includes one, then statistical significant difference between the groups which are compared cannot be established; however when it does not include one, then there is a significant difference between occurrence of outcomes in the groups (Akobeng, 2005). OR or RR is used when data is categorical while standardized mean difference (SMD) is used when data is continuous. “The SMD is the difference in mean effects in the experimental and control groups divided by the pooled standard deviation of participants’ outcomes” (Higgins and Green, 2011). If the 95% confidence interval of SMD includes zero then the difference is not statistically significant (Faraone, 2008).

As this is an evidence summary, we mainly focused on summarizing and thematically categorizing the intervention and its effectiveness.

2.9. ADVOCACY, PUBLIC ENGAGEMENT AND DISSEMINATION TO FACILITATE AND MOBILISE ACTION BASED ON THE EVIDENCE SUMMARY

The project team had developed a specific communication and advocacy strategy detailing key activities and timelines. We conducted these activities during the project period. This is suggested keeping in mind the fact that such activities may be most impactful only after the final evidence summary and final and coherent messages based on strong research evidence are available. The post-project advocacy would also be critical because advocacy-related change and reform is a time-consuming and laborious process that is often influenced by several extraneous factors. We also had an intensive workshop (in Pune) with key stakeholders to discuss about the findings of the evidence summary and contextualisation.

During the project period advocacy activity which we included was internal project discussions with key collaborators (The EPPI-Centre, DFID). This activity was done for finalisation of the major objectives of the advocacy for the findings of the evidence summary; and developing Contextualisation Framework for the South Asian countries under the study.

3. RESULTS

3.1. SEARCHING AND SCREENING PROCESS

The search was conducted in 33 databases and websites (Appendix 3, Section 3.2). Initial citation yielded 3534 hits up to October 2015. After removing duplicates, 3069 unique citations were left for title screening. These titles were divided among four overview investigators (SP, RP, TD, and HN) and screened separately by them. All the relevant and doubtful titles (923) were included for further screening. At the next level of screening, overview investigators formed two groups (two investigators in each group) and screened the abstracts independently. All the relevant and doubtful abstracts were included for full texts screening, which led to inclusion of 379 abstracts. The same groups further screened the full texts of the selected systematic reviews independently. We followed two stages for full texts screening. At the first stage we did not filter for the outcomes and also included all doubtful systematic reviews. **In the next stage** a meeting **was conducted** with the team and an intense discussion **was done** until consensus was reached. Senior researchers also took part in the meetings and discussions. Finally, we included 41 systematic reviews for evidence synthesis. The screening process is depicted in the figure 1 below.

3.2. REASON FOR EXCLUSION

The systematic reviews which were not relevant for the overviews were excluded. The reasons are listed in Table C in Appendix 3 (Section 3.3).

OVERLAP OF INFORMATION:

Systematic reviews excluded due to overlap of information: During the protocol workshop we decided that we would include the most comprehensive systematic reviews in case of identifying multiple systematic reviews which looked into the same intervention and outcome, having considered the same individual primary studies. We classified these systematic reviews as having an overlap of information. We could identify four such systematic reviews, which we initially included. However we excluded them after discussion with the team as the information that they provided has been investigated by other systematic reviews. The reasons and the discussion points have been documented. Individual studies of Tamrat 2012 (Tamrat & Kachnowski, 2012), which had two primary studies and Kawekungwal 2010 and Lund 2010, which had ANC coverage as an outcome, have been covered under Watterson 2015 (Watterson Jessica, Walsh, & Madeka, 2015), therefore the review by Tamrat 2012 (Tamrat & Kachnowski, 2012) was excluded. Similarly, individual studies

of Manant 2011 (Manant & Dodgson, 2011) have been covered under Lathrop 2013 (Lathrop, 2013) and the individual study of Gilmore 2013 (Gilmore & McAuliffe, 2013) has been covered by Lee 2009, hence these were excluded. Primary studies (Chang 1999, Handmaker 1999, O'Connor 2007, Reynolds 1995) of Stade 2009 (Stade et al., 2009) have been covered in Gilinsky 2011 (Gilinsky, Swanson, & Power, 2011) under alcohol abstinence hence excluded. Apart from these outcomes, these systematic reviews did not consider the outcome of our interest.

Overlap of information within included systematic reviews: Individual studies (Kaewkungwal 2010) from Higgs 2014 (Higgs et al., 2014) and Poorman 2015 (Poorman, Gazmararian, Parker, Yang, & Elon, 2015) are covered in Watterson 2015 (Watterson Jessica et al., 2015), so these two systematic reviews have not been considered under ANC coverage outcome. Individual studies of Lee 2009 (Lee et al., 2009) (Manandhar 2004, Baqui 2008) have been covered by Lassi 2015 [community] (Z. Lassi & Bhutta, 2015) under uptake of services outcome (TT immunization, Iron and Folate) hence it was not considered for that particular outcome. Individual studies of Nabhan 2015 (Nabhan Ashraf & Aflaifel, 2015) (Reading 1982) have been covered under Gilinsky 2011 (Gilinsky et al., 2011), cessation of alcohol consumption.

3.3. CHARACTERISTICS OF THE INCLUDED SYSTEMATIC REVIEWS

We included 41 systematic reviews which have described the effect of BCC on key outcomes of our interest. Eleven systematic reviews were published in 2015, followed by 2014 and 2012. The oldest systematic review was published in 2004. See figure 2 below (pg. 33). For other characteristics details refer to table D in Appendix 3 (Section 3.4).

This evidence summary was intended to include reviews which included studies from LMICs, however we also included reviews which included studies from HICs considering that they were conducted in low literacy settings or low socio-economic conditions.

Figure 1: Screening process

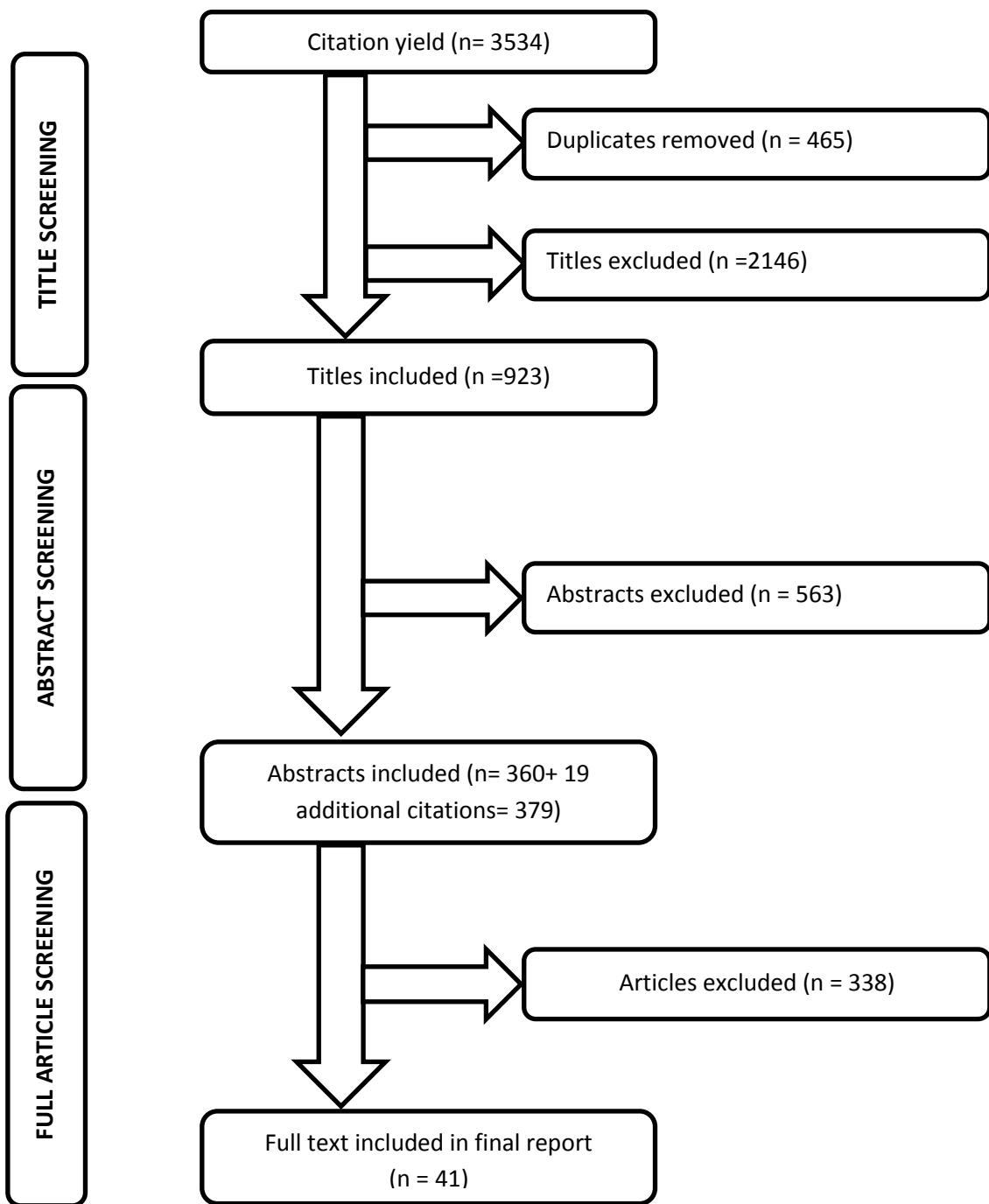
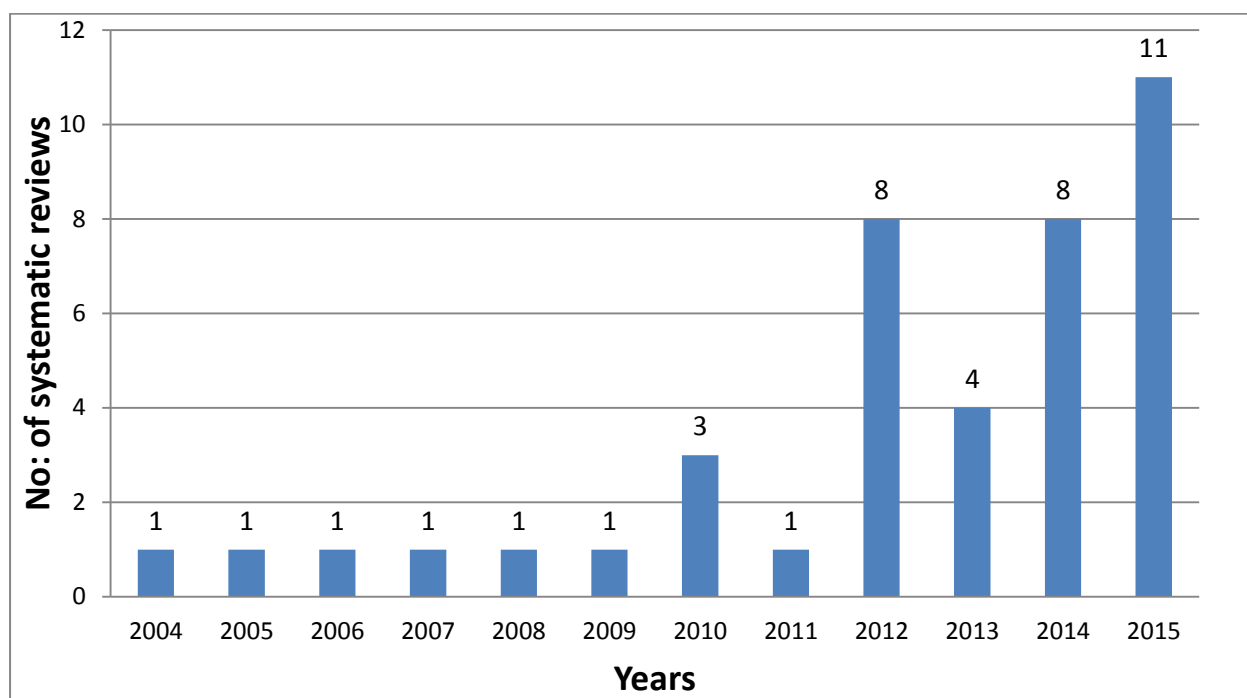


Figure 2: Year wise distribution of the systematic review publications



3.4. REGION

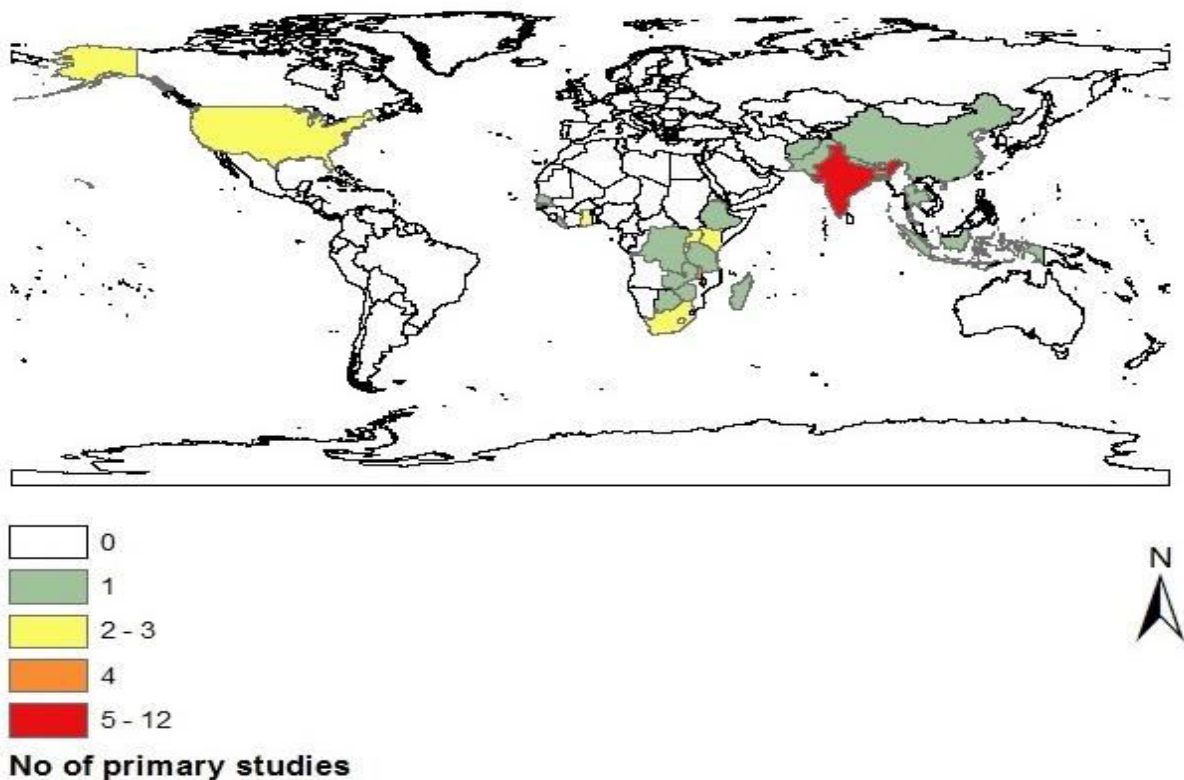
Some systematic reviews restricted their inclusion only to LMICs (Govindasamy et al., 2014; Kennedy et al., 2013; Mangham-Jefferies et al., 2014; Sherr & Croome, 2012; Soubeiga et al., 2014; Velez et al., 2014) or exclusively sub-Saharan Africa (Nutman, McKee, & Khoshnood, 2013; Obasola, Mabawonku, & Lagunju, 2015), while others had no such criterion. Only one primary study of included systematic review (Birch, 2015) reported that the participants belong to low literacy settings. We tried to locate the country of origin of the included primary studies within systematic reviews wherever possible and listed them as per outcomes of our interest. Most of the systematic reviews reported the country where the study was conducted, for others we identified through tracking the reference of the primary studies and for some others we were unable to find the information (Dean et al., 2014; Nielsen et al., 2006; Rumbold & Cunningham, 2008; Stade et al., 2009; Velez et al., 2014; Vlemmix et al., 2013; Webb & Olude, 2012). Under ANC coverage, included primary studies were from Asia, Africa and American regions with most studies coming from India. Under uptake of services primary studies were from all over the globe, although the majority were from US followed by UK, both being high income countries; and under ARV uptake all the studies were from African countries. The details are depicted in Figures 3 to 5 below.

Note: Individual studies of Rumbold 2008 (Rumbold & Cunningham, 2008) have not been reported. Individual studies of Dean 2014, Stade 2009, Girard 2012, Velez 2014 (Dean et al., 2014; Stade et al.,

2009; Velez et al., 2014; Webb & Olude, 2012) and some studies of Vlemmix 2013, Nielsen 2006 (Nielsen et al., 2006; Vlemmix et al., 2013) were not reported. Apart from these studies, below mentioned figures 3, 4 (pg. 36) and 5 (pg. 37) include all the systematic reviews (low, moderate and high relevant).

Figure 3: Distribution of Primary studies for ANC coverage (n=54)

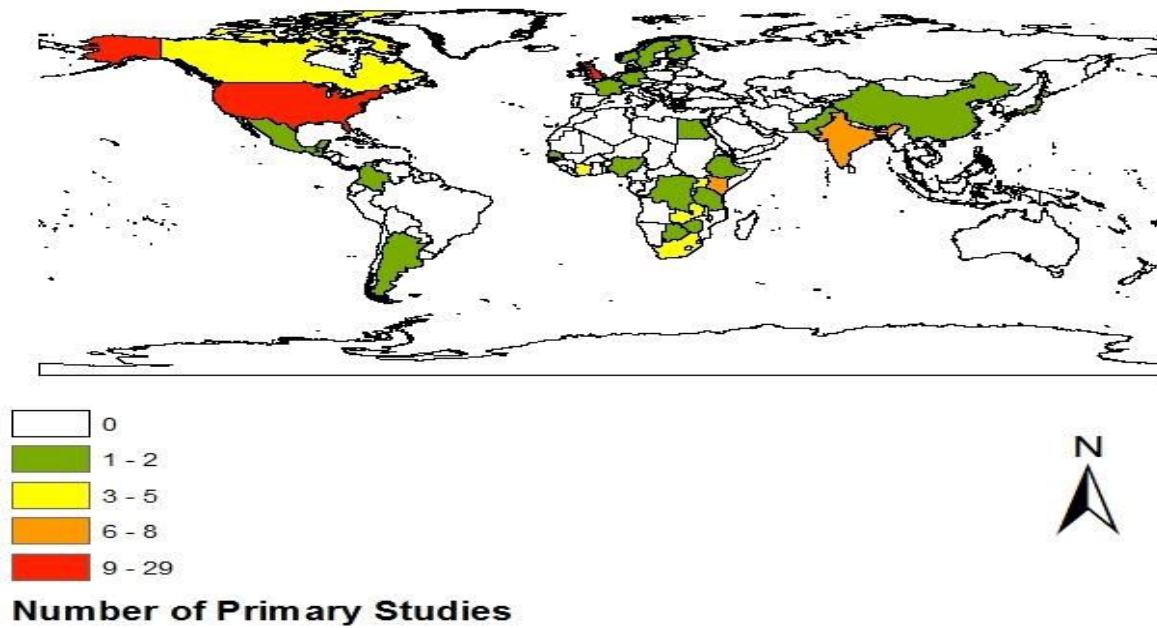
Distribution of primary studies for ANC coverage



The information on this map was derived from digital databases on Global Administrative Areas. Care was taken in the creation of this map. Review team cannot accept any responsibility for errors, omissions, or positional accuracy. However, notification of any errors would be appreciated.

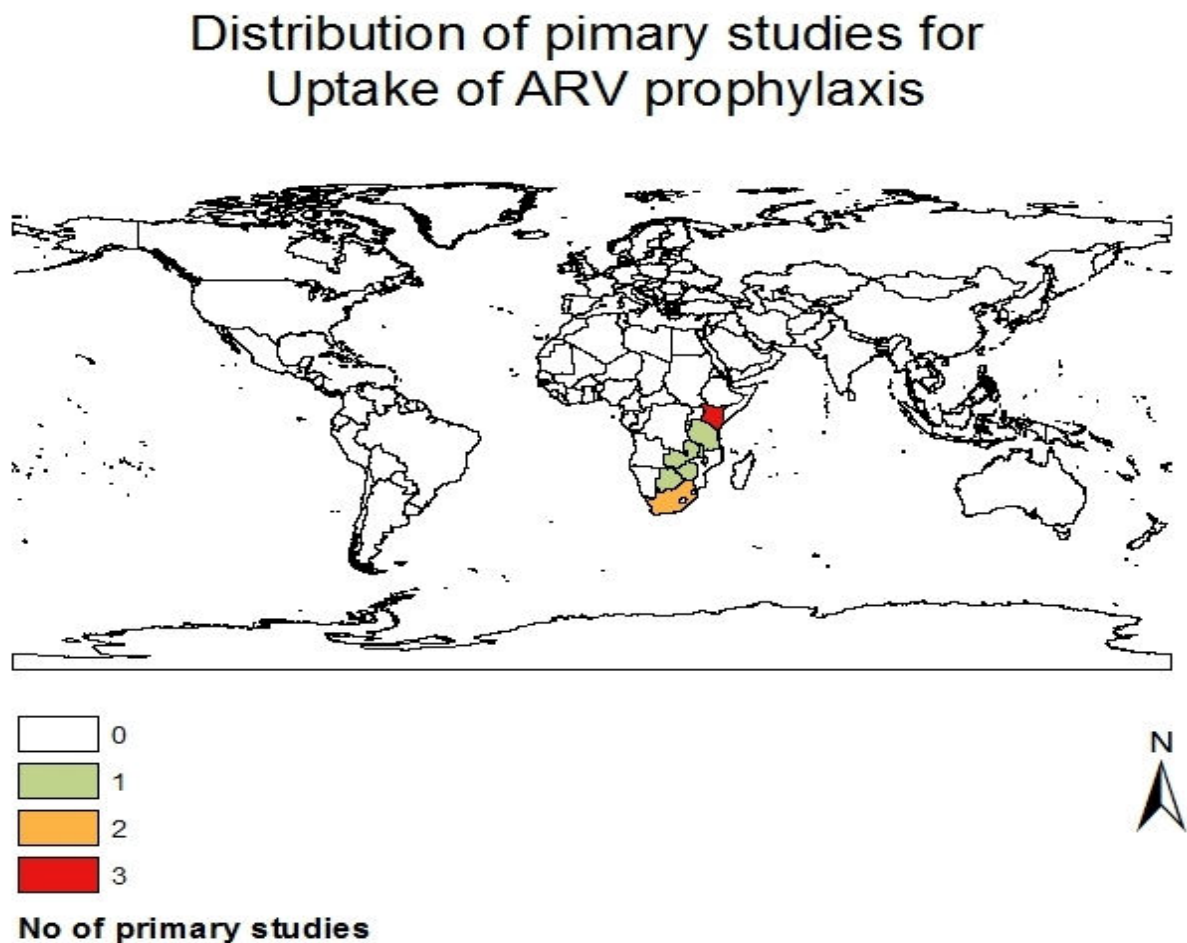
Figure 4: Distribution of Primary studies for Uptake of Services (n=130)

Distribution of Primary Studies for Uptake of ANC services



The information on this map was derived from digital databases on Global Administrative Areas. Care was taken in the creation of this map. Review team cannot accept any responsibility for errors, omissions, or positional accuracy. However, notification of any errors would be appreciated.

Figure 5: Distribution of Primary studies for Uptake of ARV prophylaxis (n=10)

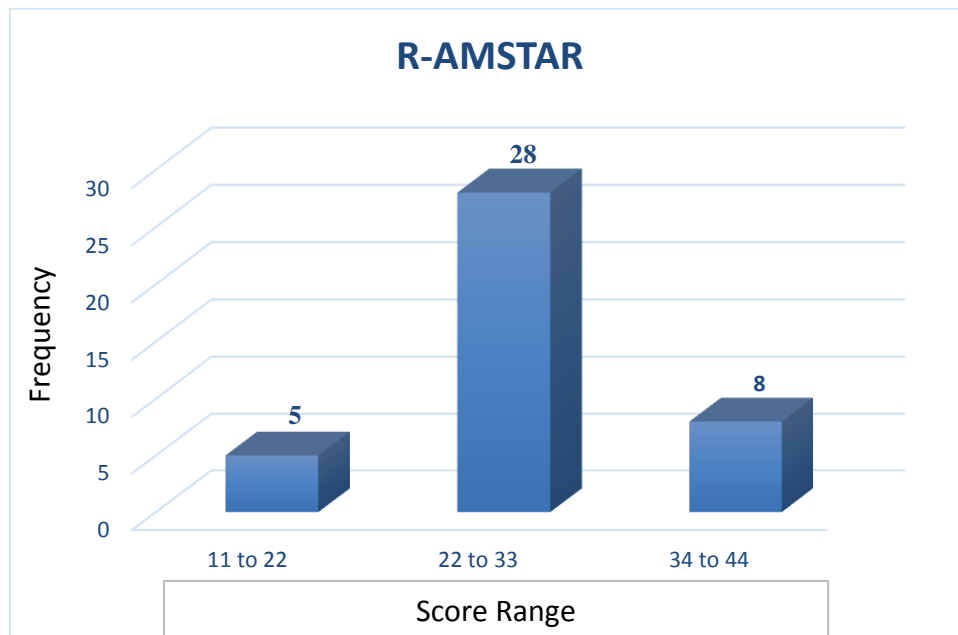


The information on this map was derived from digital databases on Global Administrative Areas. Care was taken in the creation of this map. Review team cannot accept any responsibility for errors, omissions, or positional accuracy. However, notification of any errors would be appreciated.

3.5. METHODOLOGICAL QUALITY OF THE INCLUDED SYSTEMATIC REVIEWS

Methodological quality of the included systematic reviews varied widely. R-AMSTAR score ranged from 19 (Bhutta et al., 2005) to 40 (Nabhan Ashraf & Aflaifel, 2015; Vlemmix et al., 2013). Systematic reviews which scored 11 to 22 were categorized as low, those which scored 23-33 moderate and those which scored 34 to 44 of high quality. Of the 41 systematic reviews, eight were of high quality (Dawn et al., 2014; George Asha, Branchini, & Portela, 2015; Hemsing et al., 2012; Z. Lassi & Bhutta, 2015; Nabhan Ashraf & Aflaifel, 2015; Oteng-Ntim et al., 2012; Pottie et al., 2014; Vlemmix et al., 2013), five were of low quality (Bhutta et al., 2005; Birch, 2015; Higgs et al., 2014; Lathrop, 2013; Victora et al., 2012) and the remaining 28 were of moderate quality. (Depicted in Figure 6 below and other details in Appendix 3 (Section 3.5)).

Figure 6: Methodological quality of the systematic reviews



3.6. RELEVANCE OF THE SYSTEMATIC REVIEWS

Systematic reviews were heterogeneous and most of them did not directly intend to measure the effectiveness of BCC, although they provided the information of the intervention of our interest, but had scarce material in terms of intervention details and effectiveness of it on outcomes of our interest. The team had a consensus not to exclude the systematic reviews which did not provide evidence on effectiveness, as by doing so we could have missed some important information. Hence we decided to include but categorize them in terms of their relevance to this overview into high, moderate and low relevance of interest according to their objectives: whether the systematic review intended to measure the effectiveness of the BCC intervention or not; whether authors have summarized or concluded the effectiveness of the intervention as per outcome of our interest irrespective of how the analysis was carried out. Of the 41 systematic reviews, 22 were categorized as low relevant systematic reviews and we did not include these systematic reviews while summarizing the outcome effectiveness. Below, table 2 lists the systematic reviews under these categories.

Table 2: Categorization of the systematic reviews as per relevance in each outcome

Outcome		High relevance	Moderate relevance	Low relevance
Antenatal care attendance		Gogia & Sachdev, 2010 George Asha et al., 2015 Watterson Jessica et al., 2015	Webb & Olude, 2012 Lathrop, 2013	Mangham-Jefferies et al., 2014 Lassi et al., 2015 (Impact) Sibley, Sipe, & Koblinsky, 2004 Lee et al., 2009 Obasola et al., 2015 Nutman et al., 2013 Rumbold & Cunningham, 2008 Victora et al., 2012 Govindasamy et al., 2014
Uptake of antenatal services	Uptake of tetanus toxoid immunization	Gogia & Sachdev, 2010 Lassi & Bhutta, 2015 (community)	-	Mangham-Jefferies et al., 2014 Nutman et al., 2013
	Uptake of HIV testing during pregnancy	Hensen et al., 2012 Brusamento et al., 2012	-	Mangham-Jefferies et al., 2014 Kennedy et al., 2013 Vélez et al., 2014

Outcome		High relevance	Moderate relevance	Low relevance
				Sherr & Croome, 2012
	Uptake of iron and folic acid	Lassi & Bhutta, 2015 (community)	Webb & Olude, 2012 Stockley et al., 2008	
	Uptake of Prenatal screening other than HIV - (Syphilis, Down's syndrome)	-	Vlemmix et al., 2013	Mangham-Jefferies et al., 2014 Nutman et al., 2013 Dawn et al., 2014 Say, Robson, & Thomson, 2011
	Nutrition knowledge and dietary change	Nielsen et al., 2006	Webb & Olude, 2012	Obasola et al., 2015 Nutman et al., 2013 O'Brien, McCarthy, Gibney, & McAuliffe, 2014 Oteng-Ntim et al., 2012
	Knowledge of danger signs and birth preparedness	-	Aguiar & Jennings, 2015 Higgs et al., 2014	Soubeiga et al., 2014 Poorman et al., 2015

Outcome		High relevance	Moderate relevance	Low relevance
	Knowledge of prenatal screening	-	Birch, 2015 Dugas et al., 2012 Vlemmix et al., 2013 Di et al., 2015 Lathrop et al (2013) (Lathrop, 2013)	Dawn et al., 2014
	Decision making for prenatal screening	-	Dugas et al., 2012 Vlemmix et al., 2013	-
	Alcohol consumption	Gilinsky et al., 2011		Dean et al., 2014
	Smoking cessation		Nabhan & Aflaifel, 2015 Hemsing et al., 2012	Bhutta et al., 2005 Poorman et al., 2015 Dean et al., 2014
	Change in Other behaviours (in terms of reduced work load during	George Asha et al., 2015	-	-

Outcome		High relevance	Moderate relevance	Low relevance
	pregnancy)			
ARV uptake		-	-	Govindasamy et al., 2014 Kennedy et al., 2013 Lassi et al., 2015 Pottie et al., 2014 Burton, Darbes Lynae, & Operario, 2010 Sherr & Croome, 2012
TT uptake: Tetanus toxoid uptake, HIV: Human Immunodeficiency Virus, Iron FA: Iron Folic Acid, BPCR: Birth Preparedness and Complication Readiness				

3.7. INTERVENTION DETAILS

Appendix 3, Section 3.6 describes the intervention targeted for different outcomes, in terms of details of the content of the intervention, who provided it, what was the medium, place where the intervention was delivered, on whom it was targeted and settings and other details of the participants. We have also reported number of primary studies which reported the information in the particular systematic review (Appendix 3, Section 3.6). Description of the BCC intervention is as follows.

a. What was the content of the intervention?

BCC intervention was based on:

- i. Education on birth and neonatal care preparedness or spreading awareness on danger signs (Lathrop, 2013; Higgs et al., 2014; Lee et al., 2009; Lassi and Bhutta, 2015; Soubeiga et al., 2014; Gogia and Sachdev 2010; Aguiar and Jennings, 2015).
- ii. Spreading awareness on entitled health services or providing some aids which might help pregnant women take the decisions related to maternal and child health (Birch, 2015; Vlemmix et al., 2013; George et al., 2015; Dawn et al., 2014; O'Brien et al., 2014; Oteng-Ntim et al., 2012).
- iii. Sending reminders about scheduled antenatal visits and immunization (Watterson et al., 2015; Higgs et al., 2014; Obasola et al., 2015; Stockley et al., 2008).
- iv. Providing health education or motivation or advice on healthy behaviour (Watterson et al., 2015; Lathrop, 2013; Higgs et al., 2014; Lee et al., 2009; Lassi and Bhutta, 2015; Kennedy et al., 2013; Nutman et al., 2013; Obasola et al., 2015; Rumbold and Cunningham, 2008; Lassi et al., 2015; Brusamento et al., 2012; Stockley et al., 2008).
- v. Providing counselling to the participants before undertaking screening for HIV (Govindasamy et al., 2014; Kennedy et al., 2013; Mangham-Jefferies et al., 2014; Sherr and Croome, 2012; Velez et al., 2014; Nutman et al., 2013; Lassi et al., 2015; Hensen et al., 2012; Brusamento et al., 2012; Pottie et al., 2014; Burton et al., 2010).
- vi. Spreading awareness on prenatal screening of toxoplasmosis or Down's syndrome (Vlemmix et al., 2013; Dugas et al., 2012; Di Mario et al., 2015).
- vii. Spreading health awareness or motivating or counselling on altering habits for smoking/ alcohol cessation (Gilinsky et al., 2011; Nabhan and Aflaifel, 2015; Hemsing et al., 2012; Bhutta et al., 2005).

- viii. Promotion of NGO clinic for facility based ANC (Mangham-Jefferies et al., 2014).
- ix. Nutrition education and counselling (Nutman et al., 2013; Nielsen et al., 2006; Webb and Olude, 2012; Victora et al., 2012).
- x. Mobilizing the community (Lee et al., 2009; Lassi and Bhutta, 2015; Stockley et al., 2008).

b. Who provided the intervention?

Interventions were provided by various personnel; we listed them as follows:

- i. Community health worker (CHW), which includes anganwadi workers, auxiliary midwife, village health workers or other health workers (Watterson et al., 2015; Lee et al., 2009; Lassi and Bhutta, 2015; Rumbold and Cunningham, 2008; Gogia and Sachdev, 2010; Lassi et al., 2015; Hensen et al., 2012; Hemsing et al., 2012).
- ii. Community based/youth/local government organisations (Higgs et al., 2014; Sherr and Croome, 2012; Gogia and Sachdev, 2010; George et al. 2015).
- iii. Trained volunteers (Gilinsky et al., 2011; Lassi and Bhutta, 2015; Webb and Olude, 2012; Gogia and Sachdev, 2010; O'Brien et al., 2014).
- iv. TBA or midwife (Gilinsky et al., 2011; Lassi and Bhutta, 2015; Kennedy et al., 2013; Mangham-Jefferies et al., 201).
- v. Health professionals or other public health agencies (Gilinsky et al., 2011; Higgs et al., 2014; Birch, 2015; Brusamento et al., 2012; Stockley et al., 2008; Oteng-Ntim et al., 2012; Di Mario et al., 2015; Hemsing et al., 2012; Bhutta et al., 2005).
- vi. Counsellor (Gilinsky et al., 2011; Lasi and Bhutta, 2015; Kennedy et al., 2013; Hensen et al., 2012; Hemsing et al., 2012).
- vii. Female facilitator (Lassi and Bhutta, 2015; Lassi et al., 2015).

c. How (medium) the intervention was delivered?

BCC intervention had wide varieties of medium; we categorized them as follows (we maintained the words as provided by the authors of the included systematic reviews):

- i. Home visits (Lee et al., 2009; Lassi and Bhutta, 2015; Soubeiga et al., 2014; Nielsen et al., 2006; Rumbold and Cunningham, 2008; Webb and Olude, 2012; Gogia and Sachdev, 2010; George et al., 2015; Lassi et al., 2015).

- ii. Counselling (Gilinsky et al., 2011; Govindsamy et al., 2014; Kennedy et al., 2013; Velez et al., 2013; Nutman et al., 2013; Birch, 2015; Nielsen et al., 2006; Rumbold and Cunningham, 2008; Vlemmix et al., 2013; Webb and Olude, 2012; George et al., 2015; Hensen et al., 2012; Brusamento et al., 2012; Stockley et al., 2008; Dawn et al., 2014; Oteng-Ntim et al., 2012; Duga et al., 2012; Hemsing et al., 2012; Bhutta et al., 2005; Pottie et al., 2014);
- iii. Group meetings or education (Lathrop, 2013; Lee et al., 2009; Lassi and Bhutta, 2015; Kennedy et al., 2013; Soubeiga et al; 2014; Nielsen et al., 2006; Webb and Olude, 2012; George et al., 2015; Lassi et al., 2015; Sibley et al., 2004; Dugas et al., 2012; Di Mario et al., 2015) or focused group discussion (Lee et al., 2009; Lassi and Bhutta, 2015; Mangam-Jefferies et al., 2014; Nielsen et al., 2006; Hensen et al., 2012);
- iv. Played audiotaped presentations (Higgs et al., 2014; Lassi and Bhutta, 2015; Nielsen et al., 2006; Vlemmix et al., 2013; Dawn et al., 2014; Dugas et al., 2012; Di Mario et al., 2015);
- v. Played video (Dawn et al., 2014; O'Brien et al., 2014, Hemsing et al., 2012);
- vi. Displayed posters or provided the leaflets or manuals to read (Gilinsky et al., 2011, Lassi and Bhutta, 2015; Govindasamy et al., 2014; Kennedy et al., 2013; Mangham-Jeffries et al., 2014; Sherr and Croome, 2015; Neilson et al., 2006; Vlemmix et al., 2013; George et al., 2015; Hensen et al., 2012; Stockley et al., 2008; Dugas et al., 2012; Di Mario et al., 2015; Hemsing et al., 2012; Bhutta 2005);
- vii. Street theatres (Obasola et al., 2015; George et al., 2015; Hnesen et al., 2012);
- viii. Sending text messages (Mangham-Jeffries et al., 2014; Higgs et al., 2014; Poorman et al., 2015; Obasola et al., 2015)
- ix. Phone calls (Stockley et al., 2008; Hemsing et al 2012);
- x. Media campaign on Television (Mangham-Jeffries et al., 2014; Stockley et al., 2008; Down et al., 2014) or Radio (Higgs et al., 2014; Mangham-Jeffries et al., 2014; Stockley et al., 2008);
- xi. Advertisement in daily newspapers and local publicity efforts (Mangham-Jeffries et al., 2014; Stockley et al., 2008) and
- xii. Provided visual or verbal feedback (Nabhan and Aflaifel, 2015; Neilsen et al., 2006; Hemsing et al., 2012) or computerized biofeedback (Nabhan and Aflaifel 2015; Birch, 2015; Vlemmix et al., 2013; Dugas et al., 2012; Hemsing et al., 2012)

d. Place where the intervention was delivered?

BCC intervention was carried out at following places;

- i. Home based (Lee et al., 2009; Lassi and Bhutta, 2015; Soubeiga et al., 2014; Rumbold and Cunningham, 2008; Gogia and Sachdev, 2010; George et al., 2015; Lassi et al., 2015);
- ii. Community based (Lee et al., 2009; Lassi and Bhutta, 2015; Mangham- Jeffries et al., 2014; Rumbold and Cunningham, 2008; George et al., 2015; Lassi et al., 2015; Sibley and Kobilinsky, 2004);
- iii. Institution based such as health facility or educational facilities (Wattersson et al, 2015; Higgs et al., 2014; Poorman et al., 2015; Lassi and Bhutta, 2015; Govindasamy et al., 2014; Kennedy et al., 2013; Sherr and Croome, 2012; Velez et al., 2014; Birch, 2015; Webb and Olude, 2012; George et al., 2015; Hensen et al., 2012; Brusamento et al., 2012; Stockley et al., 2008; Oteng-Ntim et al., 2012; Di Mario et al., 2015);
- iv. National level (Mangham-Jeffries et al., 2014, Stockley et al., 2008; Hemsing et al., 2012)

While other systematic reviews did not provide the information on place of delivery of the intervention.

e. On whom the intervention was targeted?

BCC intervention was targeted on

- i. Pregnant women (Watterson et al. 2015; Lathrop, 2013; Gilinsky et al., 2011; Poorman et al., 2015; Nabhan and Aflaifel, 2015; Govindasamy et al., 2014; Kennedy et al., 2013; Soubeiga et al., 2014; Obasola et al., 2015; Birch, 2015; Nielsen et al., 2006; Rumbold and Cunningham, 2008; Vlemmix et al., 2013; Webb and Olude, 2012; Gogia and Sachdev, 2010; Lassi et al., 2015; Sibley et al., 2004; O'Brien et al., 2014; Oteng-Ntim et al., 2012; Dugas et al., 2012; Di Mario et al., 2015; Hemsing et al., 2012; Bhutta et al., 2005);
- ii. Pregnant women and her partner/husband (Gilinsky et al., 2011; Higgs et al., 2014; Poorman et al., 2015; Lassi and Bhutta, 2015; Kennedy et al., 2013; Sherr and Croome, 2012; Nutman et al., 2013; Obasola et al., 2015; Brusamento et al., 2012; Aguiar and Jennings, 2015; Hemsing et al., 2012; Burton et al., 2010);
- iii. Women (Higgs et al., 2014; Lassi and Bhutta, 2015; Govindasamy et al., 2014; Kennedy et al., 2013; Mangham-Jefferies et al., 2014; Lassi et al., 2015; George et al., 2015);
- iv. Adolescents (Neilsen et al., 2006; Webb and Olude, 2012);

- v. Men (Soubeiga et al., 2014; Nutman et al., 2013; Hemsing et al., 2012);
- vi. Community (Lee et al., 2009; Lassi and Bhutta, 2015; Mangham-Jeffries et al., 2014; George et al., 2015; Lassi et al., 2015);
- vii. Health worker/staff (Wattersson et al., 2015; Nutman et al., 2013; Obasola et al., 2015; George et al., 2015; Sibley et al., 2004; Stockley et al., 2008);
- viii. Peer facilitator (Lassi and Bhutta, 2015), and
- ix. Local elected members (George et al., 2015).

f. Setting and other details of the participants

We incorporated setting related information under this section as well as other details of participants. These were as follows; i. LMICs or exclusively sub-Saharan Africa, ii. Resource limited setting with poor access to health facility, iii. Low literacy setting, iv. Conflict affected areas, v. Rural areas; vi. Urban areas; vii. High income countries or high income countries with low socio-economic group and viii. Participant details: Hispanic women or Australian indigenous women, obese women, people at high risk of HIV exposures.

3.8. EFFECTIVENESS OF BCC INTERVENTION ON OUTCOMES

The following tables summarize the effectiveness of different interventions on outcomes related to antenatal care coverage (Table 3, pg. 61) and uptake of antenatal services (Table 4, pg.64), which also includes knowledge and behavioural changes during pregnancy (Table 5, pg. 71). We considered only high and moderate relevance (n=19) systematic reviews for this analysis.

a. Antenatal coverage

There were five systematic reviews (SRs) (George et al., 2015; Gogia & Sachdev, 2010; Lathrop, 2013; Wattersson et al., 2015; Webb & Olude, 2012) reporting the impact of BCC on the ANC coverage outcome. The definition of ANC coverage varied across the studies included in these five SRs; with only a few studies defining it by number of antenatal visits. All SRs were from LMICs except one, which was from North America (Lathrop, 2013), where the targeted population was from a low income group (Table 3, pg. 61).

In a SR from South Asia (India, Bangladesh, Pakistan), which included four studies, the BCC intervention was in the form of 1-2 **home visits** during pregnancy by community health workers along with community meetings (Gogia & Sachdev, 2010). The meta-analysis showed that there was

a higher chance of having more than one ANC visit (pooled RR: 1.33; CI 95%: 1.20–1.47) in the intervention group compared to no home based intervention group. The specific BCC component of the interventions was not described or separately assessed in the SR. This SR had a moderate methodological quality.

Nutrition Education Counselling (NEC) was examined in one moderate quality SR (Webb & Olude, 2012). The findings were based on two low quality studies (one from India and one from Senegal) focusing on pregnant women (Webb & Olude, 2012). The NEC interventions were delivered through facility based individual counselling, home visits, and group meetings by community health volunteers. The narrative synthesis of this review showed inconsistent results. The study from India (Garg A & Kashyap S, 2006) showed positive effect on ANC coverage in the NEC group compared to the control group where NEC was not given. Another study from Senegal (Ndiaye M, Siekmans K, Haddad S, Receveur O, 2009) used positive deviance approach compared to an ongoing integrated nutrition and health program intervention which included NEC². Such positive deviant women were identified and selected as community health volunteers to educate pregnant women in their own communities. It was concluded that combining NEC with positive deviance approach would have a greater impact on coverage of ANC services compared to only NEC. The effect size of the individual study was not provided in the SR.

One of the SRs from North America (three studies from United States (US)), where the samples included were from low income groups, examined the **Centering Pregnancy Program**, a group prenatal care programme that facilitates discussion, education and allows participants to teach one another (Lathrop, 2013). From narrative synthesis of data from included studies, the author concluded that the group prenatal care appears to produce comparable, if not improved, pregnancy outcomes when compared to traditional prenatal care. The quality of included studies was not assessed and this SR scored low on R-AMSTAR.

Another moderate quality SR, which included studies from South Asia (three studies from India) and Africa (one study from Uganda), showed an improvement in antenatal care attendance with **community based interventions** to promote awareness of entitled health services and rights (George et al., 2015). This was done through a range of activities such as community/health facility meetings, home visits, use of score/report cards, posters, street theatres etc. Outcomes measured differed (number of ANC visits, early antenatal registration) in each study.

² Here positive deviance refers to the finding that in many poor communities, there are some individuals who apply beneficial practices to achieve better health than their neighbours, despite the fact that they are equally impoverished. These behaviours are usually affordable, acceptable, and sustainable by the wider community.

Only one SR assessed the impact of **mHealth interventions** in African and Asian settings (Watterson et al., 2015). It included two RCTs and five observational studies. Text messages in the form of reminders or educational messages were sent to pregnant women during pregnancy. The frequency of messages varied across studies. The RCTs and one of the observational studies showed improved antenatal attendance. The remaining observational studies had outcomes based on self-reported behavioural changes from health workers and patients, providing largely positive evidence on effectiveness. This SR was judged to have a moderate quality.

Summary of BCC Interventions for improving antenatal coverage

To summarize, the majority of systematic reviews focused on community level interventions (George Asha et al., 2015; Gogia & Sachdev, 2010; Lathrop, 2013; Webb & Olude, 2012). There is evidence to support that:

- **1-2 home visits combined with community participation and mobilisation is effective in improving antenatal care coverage. This systematic review scored moderate on methodological quality (Gogia and Sachdev, 2010).**
- **Evidence from moderate methodological quality SR suggests that community based interventions to promote awareness of entitled health services and rights are effective (George et al., 2015).**
- **Group prenatal care interventions produce comparable if not improved outcomes as compared to traditional prenatal care. This evidence is from a low methodological quality SR (Lathrop, 2013).**
- **There is inconclusive, low level evidence, coming from a moderate methodological quality SR, on effect of Nutrition Education and Counselling on ANC Coverage. NEC compared to usual care shows positive effect. However, compared to NEC alone, NEC combined with identifying women with healthy practices as community health volunteers yields better results (Webb and Olude, 2012).**
- **mHealth interventions in the form of reminders through text messages are effective in improving antenatal care coverage. However, information on contextual factors such as literacy level, mobile penetration, and access to health facilities was lacking in the moderate methodological systematic review (Watterson et al., 2015).**

b. Uptake of ANC Services and Indicators for knowledge and behavioural change

Uptake of ANC Services

A total of seven SRs focused on uptake of antenatal services including a) tetanus immunization (Gogia & Sachdev, 2010; Z. Lassi & Bhutta, 2015), b) iron and folic acid (IFA) (Z. Lassi & Bhutta, 2015; Stockley et al.; Webb & Olude, 2012) and c) prenatal testing for HIV and other tests (Hensen et al., 2012; Brusamento et al., 2012; Vlemmix et al., 2013) (Table 4, pg.64).

a) Uptake of tetanus toxoid immunization

Two SRs assessed the impact of **community interventions** on uptake of tetanus toxoid (TT) immunization during pregnancy in LMICs (Gogia & Sachdev, 2010; Z. Lassi & Bhutta, 2015). BCC interventions such as home visits during pregnancy and community level meetings were examined in one of the SRs that included four studies (Gogia & Sachdev, 2010). The meta-analysis showed that interventions, such as home visits during pregnancy and community level meetings, have a positive impact compared to no home-based intervention. The pooled analysis showed that an intervention group was more likely of completing two doses of TT immunization during pregnancy compared to a control group (pooled RR 1.11; 95% CI: 1.04–1.18) (Gogia & Sachdev, 2010). This SR scored moderately on the R-AMSTAR.

The other SR included seven RCTS from South Asia (Bangladesh, Pakistan, and India) and Africa (Zambia) (Z. Lassi & Bhutta, 2015). The majority of these studies examined the BCC **interventions designed using participatory approach and community mobilisation**. The pooled analysis in this SR showed a significant impact on tetanus immunization during pregnancy (pooled RR 1.05; 95% CI 1.02 to 1.09) compared to non-participatory approach or usual standard of care. The authors of the SR concluded that BCC interventions which involved family members through community support, advocacy groups, community mobilisation and education strategies, provision of care through trained CHWs via home visitation, and strengthened referrals for sick mothers and newborns were successful. The methodological quality of this SR was high.

b) Uptake of iron and folic acid (IFA)

Uptake of iron and folic acid was assessed in three SRs (Z. Lassi & Bhutta, 2015; Stockley et al.; Webb & Olude, 2012).

One SR included the BCC interventions that varied greatly, ranging from **printed material, counselling, reminder calls to a use of multimedia** (TV, audio, magazines etc.) (Stockley et al.). The SR included trials with and without control groups. The SR also included few studies where national

campaigns were carried out as an intervention. Ascertainment of outcome varied across the studies. Many of the studies were from high income countries (North America, Australia, and Europe). The quality of the included studies was not assessed but the overall quality of the SR was moderate. In all, the results of these studies were positive. However, the effect was not sustained after the cessation of intervention. It was observed that the interventions do not target vulnerable groups, differentials in awareness/use exacerbated, highlighting the need for targeting interventions at vulnerable groups. Printed resources were less effective for low socio-economic groups. The authors also concluded that providing free supplements to vulnerable women and community-based integrated campaigns could be a promising approach.

A high quality SR included the studies that assessed the impact of **community level interventions** such as community mobilization through participatory women's approach (local female facilitator), group meetings, women volunteers from a village trained as Information and Education for Empowerment and Change facilitators. The findings from the pooled analysis of included studies showed the positive impact of the interventions on uptake of iron and folic acid (average RR 1.47; 95% CI 0.99 to 2.17) (Z. Lassi & Bhutta, 2015).

The third SR reported mixed results from the **nutrition education and counselling programmes**. The details about content, frequency and duration of NEC were not provided (Webb & Olude, 2012). The included studies are moderate to low quality and SR was of moderate quality. Two studies from US observed no significant effects of NEC on uptake of IFA and/or micronutrient supply. However, studies from India and Nepal each found positive impacts of NEC on IFA compliance. There were two studies, one from Senegal and one from Egypt, with positive deviance approach, which refers to the principle that, even in the presence of significant constraints, some individuals, households, or organizations have found ways to overcome these constraints to produce positive outcomes. Positive deviance approach identifies these stakeholders as community volunteers to promote healthy practices. The Senegal study reported improved IFA compliance with positive deviance approach compared to an ongoing integrated nutrition and health program intervention, which included NEC. The study in Egypt reported significantly higher compliance in the NEC intervention with positive deviance approach compared with the control group where only standard of care (ANC) was provided. Excluding studies from US, all the studies provided IFA free of cost or at subsidized rate. The authors concluded that inconsistent findings and methodological limitations hinder the evidence base for confidently assessing whether there is an effect of NEC on IFA and/or micronutrients compliance. However, the findings from the SR suggest that the effect of NEC was

stronger when access to supplements was assured suggesting that improved supply and accessibility are critical for compliance.

c) Uptake of HIV and other testing during pregnancy

There was a total of three SRs which looked at uptake of HIV testing and other testing during pregnancy.

One SR, in which the majority of included studies were from Africa, evaluated impact of **Provider Initiated Testing and Counselling (PITC)** on HIV testing uptake (Hensen et al., 2012). The studies mainly compared different approaches of testing such as PITC vs. Voluntary Counselling and Testing (VCT), opt out vs. opt in HIV testing. The review suggested that adoption of PITC within ANC increases uptake of HIV testing among pregnant women and thus, is likely to facilitate access to prevention and treatment interventions. The narrative synthesis revealed improved uptake of HIV testing with PITC and had scored moderately on R-AMSTAR. BCC in the form of counselling/health education is an integral part of all of these testing approaches. It is therefore difficult to comment on contribution of BCC on the outcomes achieved.

One moderate quality SR concluded that **BCC aimed at involvement of male partners reduced uptake of HIV counselling and testing** (Brusamento et al., 2012). Only one study was included in this SR. In this study, only invitation letters were given for male partner during first ANC visit. The partner was asked to accompany the woman to the clinic for discussing health issues related to the pregnancy and the health of the baby. The women did not receive counselling and testing during that first visit and were asked to come back even if the partner refused to accompany her. Fewer women returned for second ANC visits resulting in lower uptake of HIV testing.

One SR from HICs (UK, Canada, Japan, Australia, US) examined the uptake of prenatal screening for Down's syndrome (Vlemmix et al., 2013). The studies assessed the use of **Decision Aids (DA) in the form of structured counselling, booklet with worksheet, interactive computer programme**. The included studies were of moderate quality but the SR was conducted with high methodological quality. The pooled analysis of five RCTs showed no significant difference for preference for prenatal testing for Down's syndrome (RR 1.04, 95% CI, 0.95–1.14) between DA group and usual care group which included usual counselling, standard information leaflets, etc. However, presenting the information in a DA decreased the rate of women who were still undecided after receiving an intervention (RR 0.44, 95% CI 0.26–0.73) and the actual uptake (actual number of women who underwent prenatal screening) was slightly higher among women informed with a DA (RR 1.15, 95% CI 1.04–1.24). These studies were from HICs.

Summary of BCC interventions for the uptake of AN services and behavioural change

To summarize,

- **To improve uptake of TT immunization following strategies worked. (Two SRs: one high (Lassi & Bhutta, 2015) and one moderate quality (Gogia Sachdev, 2010)).**
 - **home visits during pregnancy,**
 - **community level meetings,**
 - **participatory approaches, involving family members through community support, advocacy groups, community education and mobilization strategies)**
 - **provision of care through trained CHWs via home visitation**
 - **strengthened referrals for sick mothers and newborns**

- **To improve uptake of IFA evidence from high (Lassi and Bhutta, 2015) and moderate (Stockley et al., 2008; Webb and Olude, 2012) methodological SR suggests following;**
 - **Printed materials (less effectiveness in low socio-economic groups)**
 - **Counselling**
 - **Reminder calls**
 - **Use of multimedia**
 - **Free supplements to vulnerable women and community-based integrated campaigns**
 - **Community mobilization through participatory women's approach, group meetings, women volunteers from the community trained as facilitators**
 - **NEC was inconclusive, however, focused NEC, instead of combining it with other health messages, is effective and the effect was stronger when there was access to supplements**
 - **It is important to keep in mind that when these interventions are stopped the effects are not sustained. Also, when they are not targeted at vulnerable groups, the differential in awareness/use is exacerbated.**

- **To increase uptake of HIV testing during pregnancy following BCC strategies worked (one moderate quality) (Hensen et al., 2012)):**
 - **PITC within ANC**
 - **Counselling**

- **To increase uptake of prenatal screening for Down's syndrome (One high quality SR (Vlemmix**

et al., 2013)):

- **Decision aids in the form of structured counselling, booklets with worksheets, interactive computer programs found that presenting the information in such formats helped reduce indecision and had a slight improvement in uptake. These studies are from HIC, and highlight the need for this research to be implemented in LMICs.**

Indicators for knowledge and behavioural change

A total of eleven SRs focused on outcomes related to knowledge and behaviour change: a) Nutrition knowledge and dietary change (Nielsen et al., 2006; Webb & Olude, 2012), b) knowledge of danger signs and birth preparedness (Aguar & Jennings, 2015; Higgs et al., 2014), c) knowledge of prenatal screening for Down's syndrome (Birch, 2015; Dugas et al., 2012; Vlemmix et al., 2013) and decision making for prenatal screening (Dugas et al., 2012; Vlemmix et al., 2013), d) alcohol consumption (Nabhan Ashraf & Aflaifel, 2015; Stade et al., 2009), e) smoking (Hemsing et al., 2012; Nabhan Ashraf & Aflaifel, 2015) and f) other behavioural changes in terms of reduced workload during pregnancy and preparing for birth (George Asha et al., 2015). The majority of this evidence comes from HICs and quality varied from low to high (Table 5, pg.71).

a) Nutrition knowledge and dietary change

There were two SRs which looked at change in nutrition knowledge and dietary practices.

One of the SRs examined the effect of NEC on dietary practices such as changes in quantity and types of food consumed or macro and micro nutrient intake (Webb & Olude, 2012). The intervention showed improved knowledge and positively impacted dietary change. However, this evidence was based on narrative synthesis of twenty moderate to low quality studies and the SR scored moderate on R-AMSTAR. Studies from both HICs and LMICs (US, Europe, Africa, and Asia) were included. The details of NEC in terms of its content, frequency and setting through which it was delivered were not provided in the review. In five studies nutrition support was also provided to pregnant women but effects of NEC in the presence/absence of nutrition support was not explored. Overall, authors have concluded that NEC that is targeted at maternal diet and supplement intakes during pregnancy, even when provided for a brief period of time, can improve multiple maternal and neonatal health indicators. However, these findings are grounded in a relatively weak evidence base that is largely characterized by quasi experimental studies or RCTs with design or analysis limitations.

The other SR examined the effectiveness of NEC intervention through different activities such as health education classes, home visits, group interactions, peer educators, use of questionnaires,

feedback, multimedia, nutritional prescriptions on nutrition knowledge in pregnant adolescents and adults (Nielsen et al., 2006). Four studies from HICs (North America) were included. The quality of these studies was not assessed but SR had moderate quality. The settings through which interventions were delivered were not specified. Four included studies noted improvement in nutrition knowledge, however effect size of individual studies was not provided. The outcome indicator examined was pre/post-intervention nutrition knowledge score. As the NEC was delivered using a range of approaches as mentioned above, it is difficult to comment on which approach was more effective. Eleven included studies from this SR also assessed change in dietary practices seen with these interventions. Outcome indicators seen were change in energy protein intake, dietary intake evaluated with Nutrition Adequacy Ratio, self-reported dietary behaviours, dietary intake measured by three day food records, dietary assessment via 24 hour recall, food frequency questionnaire and pre/post exposure dietary intake assessed by three 24 hour recall. Improvement in dietary intake and quality was noted. Ascertainment of the outcome varied across studies.

b) Knowledge of danger signs and birth preparedness

There were two SRs which looked for knowledge of danger signs and birth preparedness.

One SR from LMICs (South Africa, Nepal, India) examined the impact of couples counselling on birth preparedness and knowledge of danger signs (Aguiar & Jennings, 2015). Narrative synthesis of this moderate quality SR based on four high to moderate quality studies (three RCTs and one pre-post) indicated that inviting men to attend ANC showed positive but insignificant results in improving women and men's knowledge of danger signs during pregnancy. The authors concluded that the current literature suggests accompaniment alone may not significantly impact outcomes and more efforts are needed to expand the implementation and evaluation rigor of male involvement strategies to improve maternal and newborn health.

Another SR (Higgs et al., 2014) narratively summarising investigating this outcome was based on only one study (survey) from Guatemala where methodological quality of study was not mentioned, and overall this SR scored low on R-AMSTAR. Interventions such as training of health workers, women's group sessions, and provision of messages through multimedia (radio) were provided. Three different surveys across three years (1997, 1998, and 1999) were conducted to assess whether there was a difference in the percentage of women who heard of danger signs during pregnancy before and after intervention. Women who were surveyed post intervention, were three to five times more likely to have heard about danger signs in pregnancy than those surveyed earlier.

A low quality SR examined the effectiveness of group prenatal care on maternal knowledge and health behaviour in pregnancy (Lathrop, 2013). The results were inconclusive as two studies reported greater pregnancy/prenatal care knowledge among women in group care. One study found no significant difference and one study found lower rates of health promoting behaviours among women in group care.

c) Knowledge and decision making for prenatal screening

There were three SRs which looked at knowledge of prenatal screening and decision making for prenatal screening outcomes (Birch, 2015; Dugas et al., 2012; Vlemmix et al., 2013).

In one low quality SR, DA in the form of an interactive educational e-tool was used for pre-test genetic/genomic e-counselling (Birch, 2015). Evidence was based on two studies from US and quality of studies was not assessed. The studies showed increased knowledge with intervention.

A moderate quality SR from HICs (Australia, Canada, and Europe) also examined the effectiveness of DAs on knowledge of prenatal screening of Down's syndrome (Dugas et al., 2012). DAs were in the form of any combination of tools such as audiotape-booklet, information pamphlet, routine consultation structured by decision analysis tool, audio-CD, worksheet and booklet, computer based aid, decision aid booklet. Most of the tools separately showed significant increase in knowledge, except for the Decision Tree and Individual Counselling (not evaluated). There was great variability of topics and questionnaires used to assess the knowledge of each included study so meta-analysis was not possible. As discussed in this SR, although DA appears to be effective in research settings, more evidence is needed to identify effective strategies for their implementation into diverse clinical obstetric environments.

One SR also looked at the outcome of decisional conflict, defined as a state of uncertainty about the preferred course of action for prenatal screening (Dugas et al., 2012). The findings from the meta-analysis showed that the Decisional Conflict Score (DCS) in the intervention group was lower compared to the control group, suggesting favourable outcomes. (Std. mean difference in DCS score for feelings of certainty: -0.16 [-0.32, -0.00], $p=0.05$) and feeling informed -0.19 [-0.45, -0.07], $p=0.16$). The desired reduction of decisional conflict (uncertainty) occurred only for computer-based information and decision analysis tools. Decision Tree and Group Counselling did not present evidence of any significant reduction in decisional conflict.

The third SR which was of high quality examined the impact of DAs along with standard care compared to only standard care on decisional making for prenatal screening for Down's syndrome and other decisions in pregnancy (Vlemmix et al., 2013). This SR was also from HICs (Canada,

Australia, and North America). The result of pooled analysis of three RCTs showed fewer women were undecided for undergoing prenatal screening for Down's syndrome (RR: 0.42, 95% CI 0.24–0.74), pooled analysis of two RCTs showed fewer women regretted their decision (RR: 0.58, 95% CI 0.35–0.97) and pooled analysis of three RCTs showed a greater proportion of women felt that they had enough information to make their decision (RR 2.88, 95% CI 2.02–4.10) when they were informed with DA compared to standard methods like information leaflet, usual counselling or usual care. Only one study related to prenatal screening contributed to meta-analysis. This study had insignificant difference in two arms of RCT. The authors of the SR also reported publication bias. It looked at the decisional conflict for prenatal screening and other decisions in pregnancy where the meta-analysis of four RCTs showed that there was a significant difference in Decisional Conflict Score (DCS) at first follow up, in favour of DA (weighted mean difference (WMD): -3.66 (95% CI : -6.65 to -0.68). However, the type of control intervention did make a difference to decisional conflict with a stronger effect evident when the comparison group was usual care (WMD: -5.75, 95% CI 7.75 to -3.75), but no difference was observed when comparing the DA with information leaflets. Subgroup analysis yielded similar results regardless of the type of DA (booklet, computer program or counselling) or quality of the decision-support technique.

The same review (Vlemmix et al., 2013) also looked at knowledge level. However, only one study was related to knowledge of prenatal screening for Down's syndrome. The other three studies focused on knowledge related to other obstetric conditions (such as pain relief during labour, breech presentation, etc.). The meta-analysis of four RCTs showed the increased knowledge (weighted mean difference: was 11.06%; 95% CI 4.85-17.27) in favour of the DA group rather than standard of care group. It showed a positive effect on knowledge in nearly all types of DA. There was little effect in knowledge scores when the DA was in the form of counselling. The SR authors also noted that applicability of the DA in LMIC/ resource-constrained settings is limited when considering some issues such as resistance from health care providers and the procedure was time consuming.

d) Abstinence or reduction in alcohol consumption

A moderate quality SR from HICs (US, UK, Europe) observed effectiveness of a wide range of interventions, ranging from a single or multi-sessions of brief psycho-educational interventions (lasting from 10 minutes to one hour), motivational interviewing, midwife delivered counselling, ultrasound feedback, financial incentives and a nine-step cognitive behavioural self-help manual on reducing alcohol consumption in women during pregnancy (Gilinsky et al., 2011). Of eight studies, only two studies reported significant positive outcomes. Setting an abstinence goal and partner participation were the factors which improved outcomes. Two high to moderate quality RCTs

showed insignificant results. However, the authors note that these studies were conducted among relatively affluent women and many had already abstained from drinking alcohol upon enrolment in the trial. Overall, there is inconclusive evidence to determine whether above mentioned interventions delivered during the antenatal period are effective in helping women to reduce alcohol consumption during pregnancy. Financial incentives were provided in four of the included studies, but only one study reported positive outcome. None of the included studies belonged to LMIC settings.

e) Smoking cessation during pregnancy

Two high quality SRs examined the impact of BCC interventions on smoking cessation during pregnancy (Hemsing et al., 2012; Nabhan Ashraf & Aflaifel, 2015). In one SR that was based on only one study. This study compared high feedback intervention, i.e. women could see the monitor and were given standardised visual and verbal feedback of the ultrasonography report with low feedback where women were told that there are no complications and no visual or verbal feedback of the ultrasonography report was given (Nabhan Ashraf & Aflaifel, 2015). The study showed that women were more likely to stop smoking with high feedback intervention (RR 2.93, 95% confidence interval (CI) 1.25 to 6.86) compared to a low feedback group.

Other SRs observed the impact of BCC interventions, such as providing counselling or resources to pregnant women and/or their partners to assist them in quitting smoking, motivational counselling along with self-help material, telephonic counselling, use of video and booklets, biofeedback based intervention. which demonstrated the effect of smoking on foetal heart rate, press advertisement and publicity campaigns on smoking cessation during pregnancy (Hemsing et al., 2012). This SR was from HICs (Europe, Australia, and North America) where women or their partner or both received the BCC intervention. Evidence was based on narrative synthesis of moderate quality studies. There was no significant change observed between the intervention and control groups, except one study from the Netherlands which found a significant difference between the intervention (a video, a booklet and 10 minutes counselling session with midwife during two visits) and control groups (usual care) on attempts to quit smoking or smoking cessation during pregnancy. But it showed no impact on partner smoking rates in response to a partner booklet handed to them by their pregnant partner. The study could not comment on partner support in terms of quitting or cessation of smoking by the partner, as only a few partners (48.5%) reported reading the partner booklet.

f) Other behavioural changes

There were two SRs which looked at other behavioural changes like decreasing workload during pregnancy or avoidance of risk factors for toxoplasmosis infection during pregnancy.

There was one high quality SR which observed the impact of group meetings, home visits, awareness campaigns about rights (posters, street theatre, etc.) on behavioural changes in terms of reduced work load during pregnancy and preparing for birth and awareness of health (George et al., 2015). Narrative synthesis based on a single study of weak quality showed behaviour changes such as decreased workloads during pregnancy (such as carrying heavy water, agriculture work, washing clothes) and increase in birth preparedness plans.

One of the moderate quality SRs looked at effectiveness of education classes, printed material and audiotape on knowledge and behaviour about avoidance of risk factors for toxoplasmosis infection during pregnancy (Di Mario et al., 2015). Knowledge and behaviour change including consumption of undercooked meat of any type, hand washing after contact with transmission factors (soil, raw meat, and unwashed vegetables), pet hygiene behaviour of cat owners, food hygiene behaviours, and personal hygiene behaviours were measured through specific questionnaires. It was observed that education classes significantly improved the behaviours but printed material and audiotape did not significantly impact the behaviours. The authors concluded that prenatal education could have a positive effect in terms of improving women's behaviour and reducing sero-conversion during pregnancy but strong evidence is still lacking.

Summary of BCC interventions for the Indicators for knowledge and behavioural change

To summarize,

- To improve knowledge and changing dietary practices - Nutrition education counselling appears to be effective in improving knowledge and changing dietary practices. However these conclusions are based on two moderate quality SRs (Webb & Olude, 2012; Nielsen et al., 2006).
- To improve birth preparedness –
 - Couples counselling does not appear to be effective in increasing knowledge about birth preparedness and danger signs of pregnancy. Male accompaniment alone may not significantly impact outcomes and more efforts are needed to expand the implementation and evaluation rigor of male involvement strategies, to improve maternal and newborn health (one low quality SR (Higgs et al., 2014)).
 - There is limited, inconclusive evidence regarding effectiveness of training community health workers (Moderate quality SR (Aguar & Jennings, 2015)) and

group prenatal care on improving knowledge about danger signs and maternal health behavior (low quality SR (Lathrop, 2013)).

- To improve knowledge of prenatal screening and reduce decisional conflict: Decision aids (DA) in the form of tools such as audiotape-booklet, information pamphlet, routine consultation structured by decision analysis tool, audio-CD, worksheet and booklet, computer-based aid, & decision aid booklet were effective in improving knowledge of prenatal screening for Down's syndrome and reducing decisional conflict. DA in the form of counselling had little effect on improving knowledge. However, the evidence on decision aids largely comes from HICs. Applicability of DA in LMICs needs to be evaluated. (Low quality (Birch, 2015), moderate quality (Dugas et al., 2012) and high quality (Vlemmix et al., 2013)).
- To achieve alcohol abstinence during pregnancy: There is limited evidence from LMICs on impact of BCC interventions on alcohol abstinence during pregnancy. The evidence from HICs on this remains inconclusive. Studies from HICs that assess impact of interventions ranging from a single or multi-sessions of brief psycho-educational interventions (lasting from 10 minutes to one hour), motivational interviewing, midwife delivered counselling, ultrasound feedback, financial incentives and a nine-step cognitive behavioural self-help manual to reduce alcohol consumption during pregnancy show inconsistent findings (Moderate quality SR (Gilinsky et al., 2011)).
- To achieve smoking cessation during pregnancy: There is limited evidence from LMICs on impact of BCC interventions on smoking cessation/quitting during pregnancy. Evidence from HICs on effect of interventions such as providing counselling or resources to pregnant women, motivational counselling along with self-help material, telephonic counselling, use of video and booklets, biofeedback based interventions is inconclusive. (Two high quality SRs ((Hemsing et al., 2012; Nabhan Ashraf & Aflaifel, 2015).)
- Other behavioural changes: Prenatal education classes significantly improved women's behaviour about avoidance of risk factors for toxoplasmosis (Moderate quality SR (Di Mario et al., 2015)). But printed material and audiotape did not significantly impact the behaviours (High quality SR (George et al., 2015)). However, there is a need for more evidence.

c. Uptake of ARV prophylaxis

None of the SRs focused on effectiveness of specific BCC intervention on ARV uptake during pregnancy.

Table 3: Effectiveness of BCC on ANC coverage

SR ID (RAMSTAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
(Gogia & Sachdev, 2010) (Moderate)	2 cRCT, 1 NRCT, 1 Quasi RCT	Community based	Home visits along with community level meetings: 1-2 home visits during pregnancy. Co-intervention – None	Pregnant women	LMIC : South Asia	ANC attendance (> 1 AN visit) improved. Pooled RR: 1.33; 95% CI: 1.20–1.47 p<0.0001.	Meta- analysis	Yes
(Webb & Olude, 2012) (Moderate)	2 quasi experimental	Facility / Community based	Nutrition Education Counselling. Co-intervention - Nutritional support in one of the studies	Not specified	LMIC: Africa, India	Inconsistent findings	Narrative synthesis	Inconclusive

SR ID (RAMSTAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
(Lathrop, 2013) (Low)	1 RCT, 1 Observational 1 Qualitative and quantitative design	Unclear	Group prenatal care: Facilitating discussion and education, participants to teach one another (Centering Pregnancy program) Co-intervention - Antenatal check up by the women themselves	Pregnant women	HIC: N. America	Increased ANC visits	Narrative synthesis	Yes

SR ID (RAMSTAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
(George Asha et al., 2015) (High)	2 RCTs 1 participatory action research, 1 pre-post	Community based	Promotion of awareness of rights through range of activities such as - group meetings, community/health facility meeting, home visits. Use of score card/report card. Involvement of local leaders and health authorities. Use of posters, street theatre. Co-intervention – None	Community	LMIC: South Asia, Africa	Improved ANC attendance (> 1, >3 AN visits, early AN registration). Positive effect seen in 3 studies (1:strong, 2:weak quality)	Narrative synthesis	Yes
(Watterson Jessica et al., 2015) (Moderate)	2 RCT, 5 Observational	mHealth	Text messages: Reminders and educational messages. Frequency of messages varied across studies. Co-intervention – None	Pregnant women / community, Health workers	LMIC: Africa and Asia	Improved ANC attendance.	Narrative synthesis	Yes

Table 4: Effectiveness of BCC on Uptake of ANC Services

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
2.1. Uptake of TT <i>immunization</i>								
(Gogia Sachdev, 2010) (Moderate)	2 cRCT, 1 NRCT, 1 Quasi RCT	Community based	Home visits along with community level meetings : 1-2 home visits during pregnancy Co-intervention – None	Pregnant women	LMIC: South Asia	Improved immunization with 2 doses of TT. Pooled: RR: 1.11 CI 95%: 1.04–1.18, p=0.001.	Meta- analysis	Yes

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
[community] (Lassi & Bhutta, 2015) (High)	7 RCT	Community based	Community mobilization through participatory women's approach (local female facilitator), group meetings, home visits, women volunteers from village trained as Information and Education for Empowerment and Change facilitators, training of TBA. Co-intervention- Strengthening of health services	Community , TBAs, peer facilitators	LMIC: South Asia, Africa	Significant impact observed on TT immunization (pooled RR 1.05; 95% CI 1.02 to 1.09). Interventions involving family members, community mobilization, provision of care through CHWs and strengthened referrals were most successful.	Meta-analysis	Yes

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
<i>Outcome 2.2 Uptake of iron and folic acid</i>								
(Stockley et al., 2008) (Moderate)	4 controlled trials, 3 trials without control group, 4 integrated campaign	Facility based / Community based	Printed education material, counselling, reminder calls, multimedia (TV, audio, magazines etc.). Co-intervention - Food/micro-nutrient supplements provided in 3 studies	women and community	HIC: N. America, Australia, Europe	Increase folic acid use. Printed resources less effective for low socio- economic groups. Exacerbated differential in awareness/use, if vulnerable groups are not targeted.	Narrative synthesis	Yes

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
[community] Lassi & Bhutta, 2015) (High)	6 RCT	Community based	Community mobilization through participatory women's approach (local female facilitator), group meetings, home visits, women volunteers from village trained as Information and Education for Empowerment and Change facilitators, training of TBA Co-intervention- Strengthening of health services	Community , TBAs, peer facilitators	LMIC: South Asia, Africa	Possible effect on iron/folate supplementation in women during pregnancy (average RR 1.47; 95% CI 0.99 to 2.17).	Meta-analysis	Yes

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
(Webb & Olude, 2012) (Moderate)	2 RCTs, 4 Quasi experime ntal	Unclear	Nutrition education and counselling. Co-intervention – Free micronutrient supplements in 3 studies	Not specified but mostly pregnant women	LMIC/HIC: South Asia, N. America, Africa, Eastern Mediterranean	Inconsistent findings. Effect was stronger when access to supplements was assured.	Narrative synthesis.	Inconclusi ve
<i>Outcome 2.3 Uptake of HIV and other testing during pregnancy</i>								
(Hensen et al., 2012) (Moderate)	1 RCT, 5 pre/post, 4 Time series.	Facility based	Provider initiated testing and counselling Co-intervention – None	Pregnant women	LMIC, HMIC :Africa, Europe and N. America	Improved HIV testing uptake seen with PITC	Narrative synthesis	Yes

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
(Brusamento et al., 2012) (Moderate)	1 RCT	Facility based	Invitation letter to male partner (during first AN visit), followed by VCTC to the couple/woman (during follow-up visit) Co-intervention – None	Pregnant women and male partner	LMIC: Africa	Reduced uptake of HIV counselling and testing in intervention arm. Significantly lower proportion of women came back for second ANC visit. Uptake of NVP was same in both arms	Narrative synthesis	Inconclusive due to limited evidence

SR ID (RAMS TAR score)	No. of studies	Intervention : Setting	Intervention : Description	Population	Region	Summary Result	Type of synthesis	Whether effective
Vlemmix (2013) (High)	6 RCT	Facility based	Decision aids using any / combination of following tools: printed material, interactive computer program, counselling. Co-intervention – None	Pregnant women	HIC: N. America, Asia, Europe, Canada, Australia	No difference in preference for testing (RR 1.04, 95% CI, 0.95–1.14). Decreased the rate of women who were still undecided (RR 0.44, 95% CI 0.26–0.73). Uptake of prenatal screening was slightly higher (RR 1.15, 95% CI 1.04–1.24).	Meta-analysis	Yes

Table 5: Effectiveness of BCC on Indicators for knowledge and behavioral change

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
<i>Outcome 3.1 Nutrition knowledge and dietary change</i>								
(Webb & Olude, 2012) (Moderate)	12 QE, 8 RCTs	Unclear	Nutrition education and counselling. Co-intervention - Nutrition support in 5 studies	NM	NM	Improved dietary intake.	Narrative synthesis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Nielsen et al., 2006) (Moderate)	3 NRCT, 1 RCT	Unclear	Nutrition education and counselling through different activities such as health education classes, home visits, group interactions, peer educators. Use of questionnaires, feedback, multimedia, nutritional prescriptions Co-intervention – None	Adolescents	HIC: N. America	Improved nutrition related knowledge	Narrative synthesis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
Nielson 2006 (Moderate)	5 NRCT, 3 RCT, 1 QE RCT, 1 qualitati ve	Unclear	Nutrition education and counselling through different activities such as health education classes, home visits, group interactions, peer educators. Use of questionnaires, feedback, multimedia, nutritional prescriptions Co-intervention - Food supplementation, transport in a few studies	Adolescen t	HIC: N. America, Scotland, Canada	Increased dietary intake and quality	Narrative synthesis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
<i>Outcome 3.2 Knowledge of danger signs and birth preparedness</i>								
(Aguiar & Jennings, 2015) (Moderate)	3 RCT, 1 pre- post	Facility based	Counselling to woman along with male partner Co-intervention – None	Pregnant women with male partner	LMIC: South Asia, Africa	Overall studies show positive but insignificant outcomes.	Narrative synthesis	No
(Higgs et al., 2014) (Low)	1 survey	Facility based, and mass media	Training of health workers, women's group sessions, provision of messages through multi-media (radio) Co-intervention – None	women	LMIC: Central America	Improved knowledge of danger signs post intervention	Narrative synthesis	Limited due to limited evidence

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Lathrop, 2013) (Low)	1RCT,1 QRCT, 1 pre- post, 1 cross- sectiona l	Unclear	Group prenatal care: Facilitating discussion and education, participants to teach one another (Centering Pregnancy program) Co-intervention - Antenatal check up by the women themselves	Pregnant women	HIC: N. America	Maternal knowledge and self-esteem would ideally be increased by group care but the results are inconclusive	Narrative synthesis	Inconclus ive
<i>Outcome 3.3 Knowledge and decision making for prenatal screening</i>								
(Birch, 2015) (Low)	1 NRCT, 2 RCT	Facility based	E- tool: Interactive educational tool Co-intervention - None	Pregnant women	HIC: N America	Increased knowledge.	Narrative synthesis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Dugas et al., 2012) (Moderate)	7 RCT	Facility based	Decision aid using any / combination of following tools- audiotape-booklet decision aid, information pamphlet, routine consultation structured by decision analysis tool, audio-CD, worksheet and Booklet, Computer based aid, decision aid booklet Co-intervention – None	Pregnant women	HIC: Australia, Canada, Europe	Most tools separately showed significant increase in knowledge, except for the Decision Tree and Individual Counselling (not evaluated)	Narrative synthesis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Dugas et al., 2012) (Moderate)	6 RCT	Facility based	Decision aid using any / combination of following tools - audiotape-booklet decision aid, information pamphlet, routine consultation structured by decision analysis tool, audio-CD, worksheet and Booklet, Computer based aid, decision aid booklet Co-intervention – None	Pregnant women	HIC: Australia, Canada, Europe	DCS for feelings of certainty and feeling informed was -0.16 [-0.32, -0.00], p=0.05) and -0.19 [-0.45, -0.07], p=0.16). The desired reduction of decisional conflict occurred only for Computer-based information and decision analysis tools.	Meta-analysis	Yes (only for Computer-based information and decision analysis tools.)

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Vlemmix et al., 2013) (High)	4 RCT, 1 not mention ed	Facility based	Decision aid using any / combination of following tools - information leaflets, structured counselling, booklet, computerized information Co-intervention - None	Pregnant women 79	HIC: Europe, Australia	The WMD was 11.06% (95% CI 4.85–17.27) in favour of the DA group. (Only 1 study was related to prenatal screening and had insignificant difference in two arms.) Positive effect on knowledge regardless of most types of DA. Little effect in knowledge scores when the DA in the form of counselling.	Meta- analysis	Inconclus ive due to limited evidence

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Vlemmix et al., 2013) (High)	4 RCT, 1 cluster RCT, 1 design not specifie d	Facility based	Decision aid using any / combination of following tools - booklet, audio- guide, interactive computer program, structured counselling. Only 2 studies focused on prenatal screening decisions. Co-intervention - None	Pregnant women	HIC: Europe, Canada, Australia, N America, Central Asia	WMD of DCS was - 3.66 (95% CI: -6.65 to -0.68) in favour of decision aid. Similar results regardless of the type or quality of the decision- support technique.	Meta- analysis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Vlemmix et al., 2013) (High)	6 RCT	Facility based	Decision aid using any / combination of following tools - booklet with worksheet, audio CD, interactive comp program Co-intervention – None	Pregnant women 81	HIC: Canada, Australia, N America	DAs reduce decisional regret (RR : 0.58, 95% CI 0.35–0.97, Pooled analysis of 2 RCT), reduce the proportion of women who are undecided (RR : 0.42, 95% CI 0.24–0.74, Pooled analysis of 3 RCT). A greater proportion of women felt that they had enough information to make their decision (RR 2.88, 95% CI 2.02–4.10, Pooled analysis of 3 RCT)	Meta-analysis	Yes

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
Outcome 3.4 Alcohol consumption								
(Gilinsky et al., 2011) (Moderate)	6 RCTs, 2 Non RCTs	Facility based	Single or multi-session brief psycho-educational interventions ranging from 10 minutes to 1 hour, motivational interviewing, Midwife delivered counselling, ultrasound feedback, nine-step cognitive behavioural self- help manual Co-intervention- Financial incentives to both groups in 4 studies	Pregnant women	HIC (US, UK, Europe)	Out of 8 studies only 2 (of poor quality) reported significant positive outcomes. Insufficient evidence	Narrative synthesis	Inconclus ive

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
Outcome 3.5 Smoking cessation								
(Nabhan Ashraf & Aflaifel, 2015) (High)	1 RCT	Facility based	high-feedback of sonography report (women could see the monitor and were given standardized visual and verbal feedback as to foetal size, shape and movement) Co-intervention – None	Pregnant women	HIC: Europe	Women were more likely to stop smoking with high feedback intervention	Narrative synthesis	Can't be commented

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Hemsing et al., 2012) (High)	3 RCT, 3 pre- post	Facility based / community level	Motivational counselling along with self-help material, telephonic counselling, Use of video and booklets, Biofeedback based intervention which demonstrated the effect of smoking on foetal heart rate, press advertisement, publicity campaigns Co-intervention – None	Women and partner	HIC: Europe, Australia, N. America	No significant change observed between intervention and control groups	Narrative synthesis	No

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
Outcome 3.6 Other behavioural changes								
(George Asha et al., 2015) (High)	1 pre- post	Community level	Group meetings, home visits, awareness campaigns about rights (posters, street theatre, etc. Co-intervention - Community support for pregnant women through local government and youth committees, health officials	Communi ty	LMIC: South Asia	Decreased workloads during pregnancy (such as carrying heavy water, agriculture work, washing clothes), and Increase in birth preparedness plans	Narrative synthesis	Can't be comment ed

SR ID (RAMS TAR)	No. of studies	Intervention :Setting	Intervention : Description	Populatio n	Region	Summary Result	Type of synthesis	Whether effective
(Di Mario, et al., 2015) (Moderate)	2 RCT	Facility based	Education classes, printed material, audiotape Co-intervention – None	Pregnant women	HIC: N. America, Canada	Education classes significantly improved the behaviours. Printed material and audiotape did not significantly impact the behaviours.	Narrative synthesis	Yes (only for prenatal education)

3.9. THEORY BASED BCC INTERVENTION

Only one systematic review mentioned that some primary studies included in the review used theories to base their BCC interventions (Dugas et al., 2012). The researchers stated that both interventions, “Paper-based information” (pamphlets, leaflets) and the computer-based information tools were based on cognitive theory or Information Integration. The theory described how an individual assimilates evidence from a number of sources to make a consolidated judgment on the different possibilities and arrive on a decision. Likewise, the “Decision Analysis Tool (DAT)”, which can be paper-based or computer-based, provides a structured guidance of the health care option and a visual illustration of the risks, assistances and consequences of each choice. This tool is constructed largely on the Expected Utility Theory and the Ottawa Health Decision Framework. However, the researchers were unable to do any analysis to understand the role of theories in effectiveness of BCC.

For this evidence summary, we did not find any systematic reviews that compared theory-based interventions with non-theory based intervention. Therefore, **we cannot conclude on the role of theories in determining the effectiveness of BCC.** Nonetheless, it appears that researchers are not using BCC theories in their research or at least not publishing about it in the papers. This needs to be explored further.

4. DISCUSSION AND CONCLUSIONS

DISCUSSION

This evidence summary aimed to bring together the evidence on types and effectiveness of BCC interventions for improving ANC coverage, uptake of ANC services and uptake of ARV prophylaxis (in HIV positive pregnant women), specific to low and middle-income settings. We identified 41 systematic reviews but because of paucity of information on effectiveness of the BCC intervention, we restricted the narrative synthesis to nineteen of them.

Various types of BCC interventions were identified, and we categorised them in terms of what content they included (such as education on birth preparedness, spreading awareness on entitled health services, reminders of scheduled ANC visits, counselling etc.); who was the provider (such as CHWs, TBAs, volunteers, counsellors etc.); what medium was used (such as home visits, counselling, group meetings, audiovisual aids, printing materials etc.); **what** was the target population (pregnant women alone or with partners, community in general); place and setting where the intervention was provided (home, community or institution). Included systematic reviews were of varied methodological quality; five were of low quality, 28 moderate and eight good quality which were based on R-AMSTAR scoring.

Overall, it appears that BCC interventions, such as one to two home visits, combined with community participation and mobilisation are effective in improving antenatal care coverage. This evidence is from a single moderate quality SR (Gogia and Sachdev, 2010). Community-based interventions to promote awareness of entitled health services and rights are effective. This evidence is from a single moderate quality SR (George et al., 2015). This finding may be related to the 'collectivist culture' prevalent in most LMICs and particularly in South Asia, where decision making (including the decision to visit health facilities/take treatment) takes place at the level of the family. For women, their family members, particularly their partners and mothers-in law, play an important role in decision making about the care during pregnancy. Home visits and community participations provide an opportunity to include these important actors and hence are likely to be more acceptable and effective.

mHealth interventions, in the form of reminders and text messages, are effective in improving antenatal care coverage. The evidence is from a moderate methodological quality SR (Watterson et al., 2015). With rapidly increasing access to mobile phone, mHealth could be a promising cost-effective intervention to increase ANC coverage. However, due to lack of large-scale studies and

program evaluation the operational issues with implementation of mHealth interventions are not known and cannot be commented on.

Community interventions involving home visits and a participatory approach were effective in improving uptake of tetanus toxoid immunization among the pregnant women. This evidence is from two SRs, one having moderate and one good methodological quality (Gogia and Sachdev, 2010; Lassi and Bhutta, 2015).

Adoption of PITC within ANC increases uptake of HIV testing among pregnant women and thus, is likely to facilitate access to prevention and treatment interventions. PITC was compared to client-initiated testing and a counselling approach. Evidence from moderate methodological single SR (Hensen et al., 2012). From the existing systematic reviews, the exact component of the BCC was not clear and hence the evidence is at the level of the strategy and not at the level of specific BCC component of this strategy.

The effect of NEC for different outcomes is summarized below:

ANC Coverage: There is inconclusive, low level evidence, coming from a moderate methodological quality SR, on the effect of NEC on ANC coverage. NEC compared to usual care shows positive effect. However, compared to NEC alone, NEC, combined with identifying women with healthy practices (positive deviances) as community health volunteers, yields better results (Webb and Olude, 2012).

To improve uptake of IFA: A moderate (Webb and Olude, 2012) methodological SR suggests that NEC was inconclusive, however, focused NEC instead of combining it with other health messages is effective and the effect was stronger when there was access to supplements.

To improve knowledge and changing dietary practices: NEC appears to be effective. However these conclusions are based on two moderate quality SR (Webb & Olude, 2012; Nielsen et al., 2006).

Decision aids are effective in improving knowledge of prenatal screening for Down's syndrome and reducing decisional conflict. However, the evidence largely comes from HICs and the methodological quality of the SR was good (Vlemmix et al., 2013).

None of the systematic reviews focused on effectiveness of specific BCC intervention on ARV uptake during pregnancy and none of the reviews compared theory based intervention with non-theory based intervention. Couples counselling has no appreciable effect in improving knowledge about birth preparedness and knowledge of danger signs during pregnancy. However, this evidence compares from very limited primary studies and cannot be applied to overall usefulness of couples counselling for involving men in ANC.

Most systematic reviews combined diverse BCC interventions and co-interventions while assessing a particular outcome, making it difficult to understand which component of the intervention worked. For example, community mobilization and participation interventions included group meetings, training of local women volunteers, involvement of local leaders and health authorities, use of score card/report card, use of posters and street theatre. There is a need to understand effectiveness of specific components/tools of BCC interventions.

There was also scarce information on frequency and duration of the BCC component of the package. Components of some of the BCC interventions were insufficiently described, for example in home visits.

Information on contextual factors was insufficient in majority of systematic reviews. Contextual information from primary studies should be reported in the systematic reviews of BCC intervention effectiveness.

For this evidence summary, though the focus was on LMICs, we also included reviews which included studies from high income countries (HICs), considering that they were conducted in low literacy settings or low socio-economic conditions. An extensive search was carried out to identify relevant systematic reviews, however, due to time constraints we had to limit our search to English language. Of the 41 included systematic reviews, only 19 had information on effectiveness of the BCC intervention and only eight had good methodological quality.

CONCLUSIONS

This evidence summary is focused on preparing a summary of systematic review-level evidence evaluating the effectiveness of BCC interventions for improving ANC indicators, specific to low and middle-income country (LMIC) settings. This evidence summary finds that increasing community participation, raising awareness about local populations' health care rights and delivering interventions in home and/or community settings are effective ways to increase antenatal care (ANC) coverage and uptake. At the delivery level, mobile health (mHealth) is a promising intervention. PITC increases uptake of HIV testing among pregnant women and thus, is likely to facilitate access to prevention and treatment interventions. The evidence, especially from LMICs, largely shows that nutrition education and counselling, along with food/micronutrient supplementation, was effective in improving dietary intake and uptake of folic acid. Decision aids are effective in improving knowledge of prenatal screening for Down's syndrome and reducing decisional conflict.

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6. APPENDIX

APPENDIX 1: AUTHORSHIP OF THIS REPORT

Details of Advisory Group membership

1. Dr. Pavitra Mohan, MBBS, MD, MPH, Director, Health Services, Aajeevika Bureau, Udaipur, India.
2. Dr. B. Unnikrishnan, MBBS, MD, Associate Dean & Professor of Community Medicine, Kasturba Medical College, Mangalore, India.

Details of Review Group membership

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Conflicts of interest

None declared.

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2.1. C.V. of the Advisory Group members

A. Dr. B. Unnikrishnan, (MBBS, MD) is currently working as Associate Dean & Professor of Community Medicine at Kasturba Medical College (MAHE), Mangalore, India. He is a member of MAHE Ethics Committee. He has published more than 150 articles including two systematic reviews in peer-reviewed indexed journals. He had a Department for International Development (DFID), UK Fellowship in 2009 at South Asian Cochrane Center, CMC, Vellore, India, for developing systematic reviews.

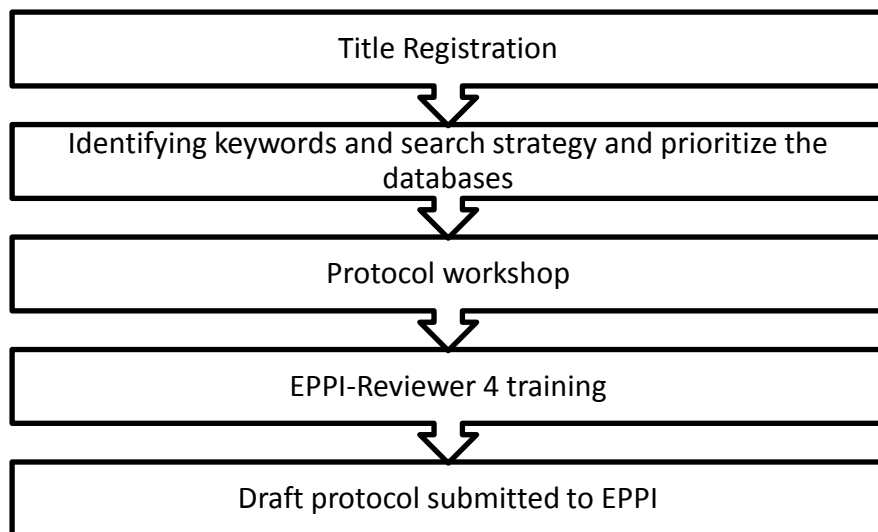
He worked extensively in the area of maternal & child health at the community level and was an advisor for the Indian Institute of Public Health and Karolinska University, Sweden collaborative research project on “Evidence for Policy & Implementation – Intensifying efforts to achieving health related Millennium Development Goals related to Maternal and Child Health in 4 countries” and was Co-PI on 2 ICMR project on Maternal and Child Health, conducting many non-funded research projects on MCH related to Antenatal Care, Delivery of MCH services and Immunization.

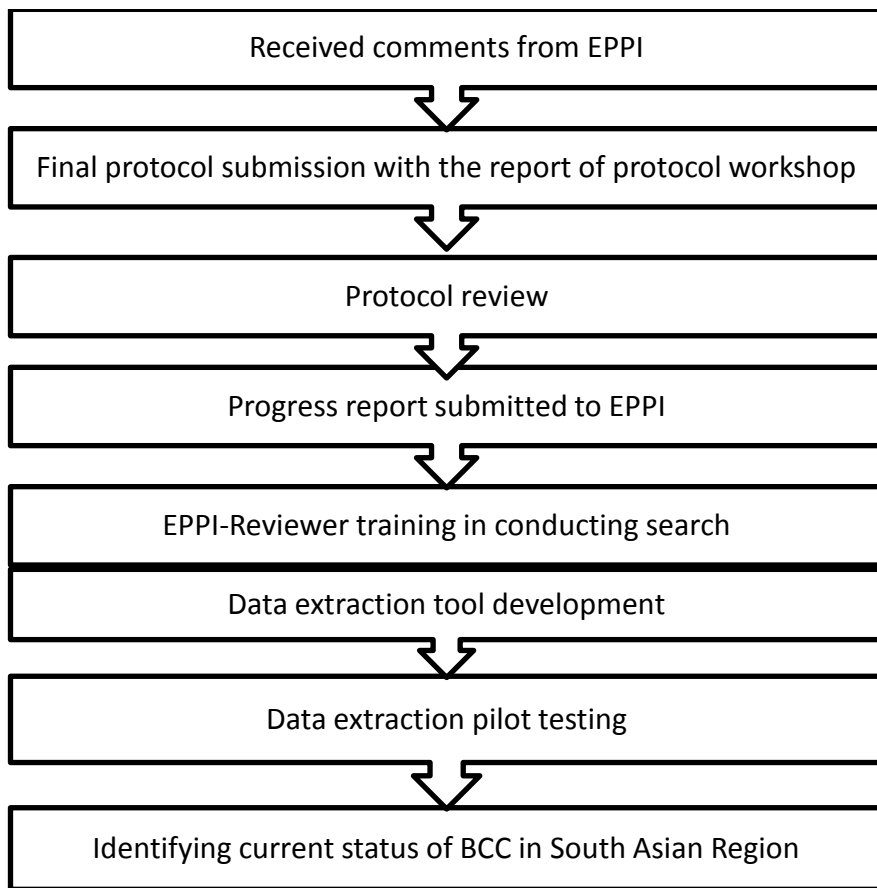
He is a member of the Standing Expert Peer Committee (SEPC) for Public Health Research Initiative (PHRI) Research grant, under the Dept. of Science & Technology, Govt. of India and PI for many research projects funded by ICMR, MOHFW, Govt. of Karnataka, University of Alabama, University of Arizona, and NIH, USA.

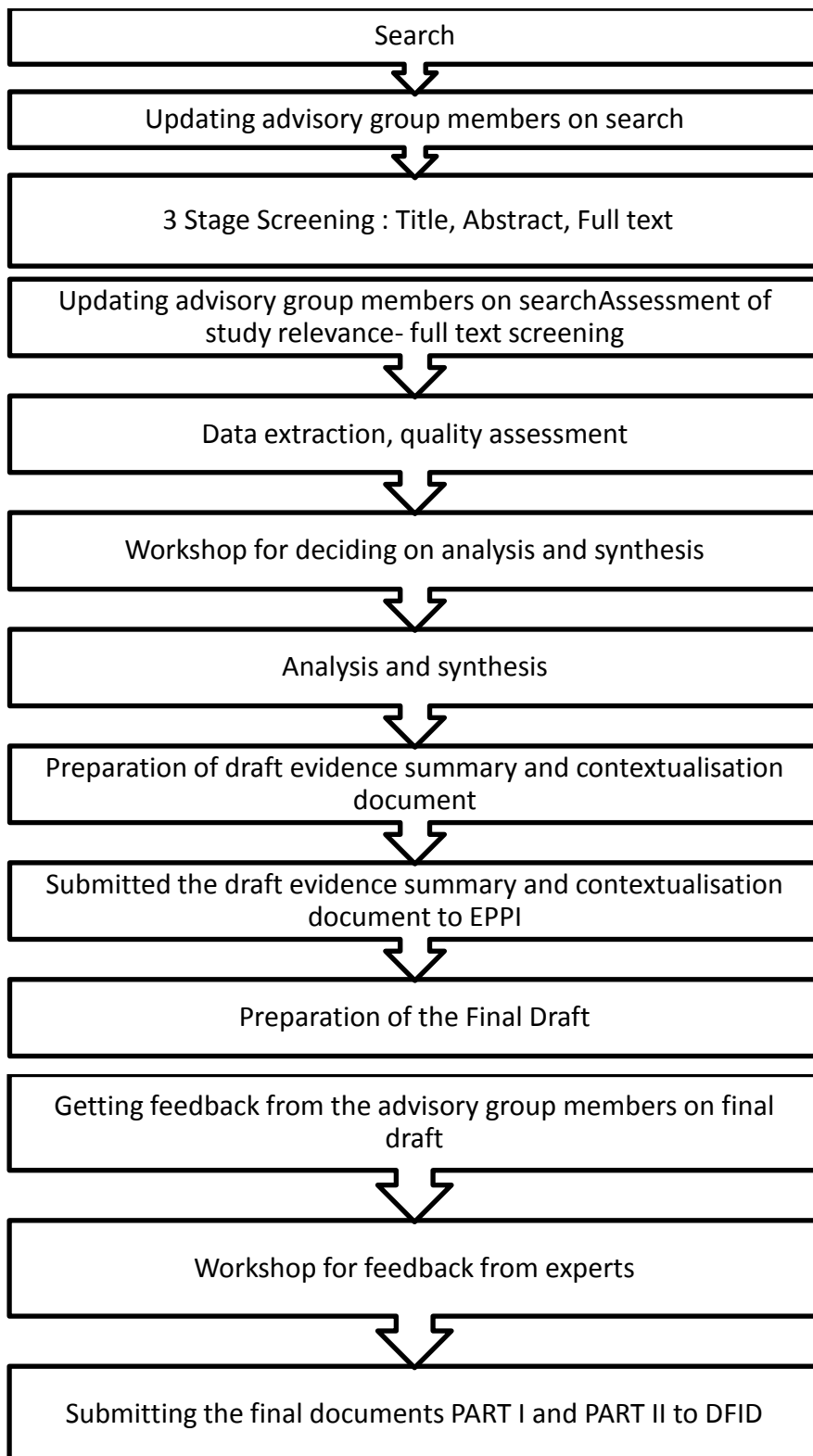
He is Internal Mentor & Supervisor for the ASCEND Research network (Asian Collaboration for Excellence in Non-Communicable Disease), a US NIH Millennium Promise Award to support the development of an Asian Non-Communicable disease (NCD) Research Network over five years (2010 – 2014). He was an external expert for ICMR extramural research projects Health Systems Research.

B. Dr. Pavitra Mohan, MBBS, MD, MPH is the founder of Basic Health Care Services (not for profit organization), which promotes models of high quality, low cost primary care health services in underserved areas. He is the Director of Health Services, Aajeevika Bureau in setting up models of primary healthcare for migrant communities, since 2013; a faculty in Paediatrics, Udaipur Medical College; coordinated research and child health programs at ARTH; and has led child health systems at the UNICEF India Country Office. He has a degree in MBBS, a residency program in Paediatrics, a MD from the University of Delhi and Masters in Public Health from University of North Carolina at Chapel Hill.

2.2. Process of the project.







2.3. Project Meetings

Date	Meeting	Agenda for the meeting
19/10/2015	Protocol Workshop	- To develop the protocol
20/10/2015	Protocol Workshop	- To finalise the protocol
21/10/2015	Training session from EPPI	- Training on EPPI-Reviewer 4 software
04/11/2015	Training session from EPPI	- Training on conducting search in EPPI-Reviewer 4 software.
18/11/2015	Skype Meeting	<ul style="list-style-type: none"> - Search strategy and result - EPPI-Reviewer account extension - Comments on protocol by advisory members - Data extraction sheet - Screening - Current status of BCC in South Asian Countries - Writing: Background and Methodology - Immediate deadlines
26/11/2015	Meeting	<ul style="list-style-type: none"> - Updating on search - Updating on Screening - Updating to advisory members
02/12/2015	Skype meeting	- Discussing on the comments from EPPI-Centre on BCC protocol within team members
03/12/2015	Skype meeting	- Discussing on the comments from EPPI-Centre on BCC protocol with EPPI-Centre
04/12/2015	Skype meeting	- Discussing on work distribution and updates
11/12/2015	Skype meeting	- Updating within team members
22/12/2015	Telephone Meeting	- Updating within the team members
28/12/2015	Skype meeting	<ul style="list-style-type: none"> - Comments from DFID on BCC protocol - Updates on abstract screening

		<ul style="list-style-type: none"> - Next activity: Full-text screening and full text retrievals - Deadlines
02/01/2016	Skype meeting	<ul style="list-style-type: none"> - Discussion on inclusion and exclusion criteria - Discussion on full text coding - Discussion on full text inaccessible
21/01/2016	Skype meeting	<ul style="list-style-type: none"> - Update on the project - Resolving the doubts on full text screening - Discussion on the list of papers in which the outcomes are different than the ones which are of our interest. These systematic reviews have made the included full text comparatively large. - Decision on the citations which are not accessible - Discussion on the data extraction sheet (Timeline, developing the codes in EPPI-Reviewer 4 and the process) - Overall timeline (need to ask DFID and EPPI-Centre to extend it)
02/02/2016	Meeting with EPPI/PwC	<ul style="list-style-type: none"> - Update on the project (BCC) - The timeline (BCC)
05/02/2016	Skype meeting	<ul style="list-style-type: none"> - Discussion on data extraction - Update on the project
01/03/2016	Skype meeting	<ul style="list-style-type: none"> - Update on the project - Doubts on data extraction
12/05/2016	Skype meeting	<ul style="list-style-type: none"> - Update on the project - Discussion on contextualization - Discussion on comments on draft document of the project
13/05/2016	Skype meeting	<ul style="list-style-type: none"> - Update on the project - Discussion on draft document of the main draft and

		contextualization with EPPI-Centre and PwC members
17/05/2016	Discussion with Dr. Nair	- Updating on the project and for further guidance on some aspects
31/05/2016	Skype meeting	- Discussion on preparing final draft document
21/06/2016	Skype meeting	- Update on the project - Discussion on comments from advisory members and comments from Dr Sandy Oliver - Workshop plan

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3.7.	Data extraction sheet for the included systematic reviews

3.1. Search Strategy

1. PUBMED
<p><u>mother* OR maternal OR “maternal health” OR pregnant women OR lay carer* OR family care provider* OR “Gestational care giver*” OR “community health worker*” OR health promotion group OR traditional birth attendants)OR midwives OR village health worker*OR health volunteer OR health work force OR “HIV positive pregnant women” OR “maternal or newborn health” OR maternal welfare OR women’s group OR safe motherhood OR “maternal and child health”</u></p>

AND

Intervention OR promotion or initiative* OR “behavior?r adj change” OR “health adj education” OR strategies OR “behaviour change communication” OR “behavior?r change intervention”

television OR radio OR community radio OR narratives OR mHealth OR ehealth OR text messages OR edutainment OR mid media OR mass media OR street play OR community mobilization OR mobile health OR health literacy OR sbcc or motivational interviews OR folk dances OR traditional media OR posters or pamphlets OR leaflets OR “information education communication” OR IEC or knowledge attitude and practice OR communication channels OR care group OR community outreach OR intra partum care strategy Or primary health care OR referral level facilities OR task shifting OR skill mix change OR delivery platform OR care management OR health intervention OR health education OR nutrition policy OR health planning OR information services OR birth spacing OR participatory learning OR home visit OR inter personal communication OR “social and behavior*r change communication” OR SBCC OR audio messages OR video messages OR books OR helpline or pictures OR animation videos OR diet advise

AND

high risk pregnancy OR “antenatal care coverage” OR antenatal care coverage[TIAB] OR EMTCT OR PMTCT OR anemia OR malaria OR antenatal screening OR “ANC package” OR ANC package OR trimester care OR iron supplement OR IFS OR health outcome OR tetanus OR “care seeking behavior*r OR birth preparedness package OR birth preparedness OR maternal care package OR perinatal outcome OR ARV OR “antiretroviral prophylaxis” OR “antepartum care” OR HIV OR AIDS OR “national family health survey” OR blood test* OR antenatal services OR pregnancy screening or antenatal checkup OR atenatal services OR antenatal care[tw] OR perinatal care[TIAB]. OR gestational care[TW] OR prenatal care[tw] OR prenatal CARE

2. OVID MEDLINE

1. exp MetaAnalysis/
2. meta analy\$.tw.
3. metanaly\$.tw.
4. metaanaly\$.tw.
5. metaanalysis.pt.

6. (systematic adj (review\$ or overview\$1)).tw.
7. exp review/
8. 1 or 2 or 3 or 4 or 5 or 6 or 7
9. (((((intervention or promotion or initiative\$ or behavio?r) adj change) or health) adj education) or strategies or "behavio?r change communication" or "behavio?r change intervention").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
10. (mother\$ or maternal or "maternal health" or "pregnant women" or "lay carer\$" or "family care provider\$" or "gestational care giver\$" or "community health worker\$s" or "health promotion group" or "traditional birth attendants" or midwives or "village health worker\$" or "health volunteers" or "health work force").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
11. (audio messages or video messages or books or helpline or pictures or animation videos or (diet adj advise)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
12. (television or radio or "community radio").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
13. (narratives or mhealth or ehealth).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
14. (text messages or midmedia or mass media campaign).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
15. (street play or community mobilization).mp. [mp=title, abstract, original title, name of substance word, subject

- heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
16. (mobile health or health literacy).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
17. (sbcc or motivational interviews or folk dances or traditional media).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
18. (posters or pamphlets or leaflets or information education communication or IEC).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
19. ((knowledge attitude and practice) or communication channels or care group).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
20. (community outreach or intra partum care strategy or primary health care).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
21. (referral level facilities or task shifting or skill mix change or delivery platform or care management).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
22. (inter personal communication or (social and behaviour change communication)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]

23. (nutrition policy or health planning or information services or birth spacing or participatory learning or home visit).mp.
 [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]

24. 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23

25. 9 and 24

26. 8 and 10 and 25

27. ("antenatal care" or "antenatal care strategy" or "prenatal care" or "perinatal care" or "maternal care" or "maternal health" or "maternal and child health").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]

28. 26 and 27

29. 10 and 27

30. 8 and 25 and 29

31. 8 and 9 and 29

32. 9 or 24

33. 8 and 29 and 32

3. COCHRANE

No.		No. of hits
A.	<i>{with Sexually Transmitted Infections Group, Public Health Group, Fertility Regulation Group, Developmental, Psychosocial and Learning Problems Group, Depression, Anxiety and Neurosis Group, HIV/AIDS Group, Menstrual Disorders and Subfertility Group, Hypertension Group, Methodology Review Group, Neonatal Group, Effective Practice and Organisation of Care Group or</i>	

	Consumers and Communication Group in Review Groups, with Pregnancy and Childbirth Group, , Menstrual Disorders and Subfertility Group, Hypertension Group, Methodology Review Group or Neonatal Group in Review Groups}	
1.	(mother* or maternal or maternal health or pregnant women or lay carer* or family care provider* or Gestational care giver* or community health worker* or health promotion group or traditional birth attendants or midwives or village health worker* or health volunteers or health work force or HIV positive pregnant women or maternal or newborn health or maternal welfare or women's group or safe motherhood or maternal and child health)	
2.	(television or radio or community radio or narratives or m-health or e-health or text messages or edutainment or mid media or mass media or street play or community mobilization or mobile health or health literacy or sbcc or motivational interviews or folk dances or traditional media or posters or pamphlets or leaflets or information education communication or IEC or knowledge attitude and practice or communication channels or care group or community outreach or intra partum are strategy or primary health care or referral level facilities or task shifting or skill mix change or delivery platform or care management or health intervention or health education or nutrition policy or health planning or information services or birth spacing or participatory learning or home visit or inter personal communication or "social behavior next change communication" or SBCC or or audio messages or video intervention or promotion or initiative* or behavio?r next change or health next education or behavio?r next change communication or strategies or behavio?r change intervention messages or books or helpline or pictures or animation videos and diet next advise	
3.	high risk pregnancy or antenatal care coverage or EMTCT or PMTCT or anemia or malaria or antenatal screening or ANC package or trimester care or iron supplement or IFS or health outcome or tetanus or care seeking behavio?r or birth preparedness package or maternal care package or perinatal outcome or ARV or (antiretroviral prophylaxis) or antepartum care or HIV or AIDS or national family health survey or blood test* or antenatal services or pregnancy screening or antenatal checkup or diet next advise or antenatal services or antenatal care or perinatal care or gestational care or prenatal care	
4.	1 AND 2 AND 3	747

B.	<i>(with Pregnancy and Childbirth Group, Public Health Group, Depression, Anxiety and Neurosis Group, Menstrual Disorders and Subfertility Group, Infectious Diseases Group, Hypertension Group, Methodology Review Group, Neonatal Group, Effective Practice and Organisation of Care Group or Drugs and Alcohol Group in Review Groups)</i>	
1.	MeSH descriptor: [Maternal Health Services] explode all trees AND MeSH descriptor: [Education, Nonprofessional] explode all trees	
2.	[Maternal Health Services] explode all trees AND MeSH descriptor: [Patient Education as Topic] explode all trees	
3.	1 and 2	7
	Total hits: A (4.) + B (3.)	754
4. EMBASE		
<p>((('mother'/exp or 'maternal welfare'/exp or 'maternal care'/exp or 'pregnant woman'/exp or 'nursing home personnel'/exp or 'childbirth educator'/exp or 'health auxiliary'/exp or 'health care personnel'/exp) and (((('behavior change'/exp or 'behavior change' or 'health promotion'/exp or 'health promotion') or 'behaviour change communication') or ('television'/exp or 'television') or ('telecommunication'/exp or 'telehealth'/exp or 'health literacy'/exp or 'mass medium'/exp or 'visiting nursing service'/exp or 'dancing'/exp or 'medical information'/exp or 'interpersonal communication'/exp or 'facilitated communication'/exp or 'book'/exp or 'health care policy'/exp)) and ('maternal care'/exp or 'prenatal care'/exp)) and ('systematic reviews'/exp or 'systematic reviews')</p>		
5. EMERALDINSIGHT		
<p>("antenatal care" or "prenatal care" or "maternal health" or "pregnancy screening" or "pregnant women") and ("behaviour change communication" or communication or counselling or "mass media" or "social media" or training) and "systematic review"</p>		
6. EBSCO “communication and mass media complete”		
<p>("antenatal care" or "prenatal care" or "maternal health" or "pregnancy screening" or "pregnant women") and ("behaviour change communication" or communication or counselling or "mass media" or "social media" or training) and "systematic review"</p>		
7. PROSPERO		
Used keywords antenatal care coverage, antenatal care ,anc,prenatal care,perinatal care,maternal health,maternal welfare,pregnancy screening,pregnant		

women,uptake,hiv positive pregnant women,maternal newborn health,behavior change,behaviour change,systematic review,meta analysis

8. CINAHL

(mother or maternal or "maternal health" or "pregnant women" or lay carer or "family care provider" or "Gestational care giver or "community health worker" or health promotion group or "village health workers" or

Health volunteer or healthworkforce or HIV positive pregnant women traditional Birthattendants or midwives or pregnant women or maternal and newborn health or maternal welfare women group or safemotherhood or(maternal and child health))

AND

interventionOR promotion or initiative* OR "behavio?radj change" OR "health adj education" OR strategies OR "behaviour change communication" OR "behavio#r change" AND

systematic review or systematic-review or Meta-Analysis or meta analy? ormetanaly? ormetaanaly? ormeta analysis or meta-analysisn or systematic N(review? or overview) or evidence based or evidence-based or systematic evidence synthesis or narrative synthesis or rct or randomised controlled trial?

9. PSYCINFO

1.Any Field: "prenatal care" *OR Any Field:* "antenatal care" *OR Any Field:* "ANC coverage" *OR Any Field:* "perinatal care" *OR Any Field:* "pregnancy screening" *OR Any Field:* "uptake of services" *AND Any Field:* "awareness programme" *OR Any Field:* behaviour NEAR change *OR Any Field:* "behaviour change communication" *OR Any Field:* "mass media campaign" *OR Any Field:* "community outreach" *OR Any Field:* counselling *AND Any Field:* "family care provider" *OR Any Field:* "maternal and child health" *OR Any Field:* "health promotion groups" *OR Any Field:* "community health worker*" *OR Any Field:* "nonprofessionals" *OR Any Field:* "traditional birth attendants" *OR Any Field:* midwives *OR Index Terms:* "social workers" *AND Index Terms:* "voluntary health workers" *AND Any Field:* "lay carer" *AND Methodology:* Systematic Review *AND Population Group:* Human *AND Methodology:* Systematic Review.

2. Index Terms: "prenatal care" *OR Index Terms:* "antenatal care" *OR Index Terms:* "ANC COVERAGE" *OR Index Terms:* "PREGNANCY CARE" *OR Index Terms:* "GESTATIONAL CARE" *AND Methodology:* Systematic Review *AND Methodology:* Systematic Review *AND Population Group:* Human

10. WEB OF SCIENCE

TOPIC: (“high risk pregnancy” or “antenatal care coverage” or “antenatal care coverage”. or EMTCT or PMTCT or anemia or malaria or antenatal screening or ANC package or “trimester care” or “iron supplement” or IFS or “health outcome” or tetanus or “care seeking behavior” or “birth preparedness package” or “maternal care package” or “perinatal outcome” or ARV or “antiretroviral prophylaxis” or “antepartum care” or HIV or AIDS or “national family health survey” or blood test* or antenatal services or pregnancy screening or antenatal checkup or “diet NEXT advise”)

Timespan=All years

Search language=Auto

AND

TOPIC: (television OR radio OR “community radio” OR narratives OR mHealth OR ehealth OR “text messages” OR edutainment OR midmedia OR mass media OR “street play” OR “community mobilization” OR “mobile health” OR “health literacy” OR sbcc or “motivational interviews” OR folk dances OR “traditional media” OR posters OR pamphlets OR leaflets OR “information education communication” OR IEC or “knowledge attitude practice” OR “communication channels” OR care group OR “community outreach” OR “intrapartum care strategy” Or “primary health care” OR “referral level facilities” OR “task shifting” OR “skill mix change” OR “delivery platform” OR “care management” OR “health intervention” OR “health education” OR” nutrition policy” OR “health planning” OR “information services” OR birth spacing OR “participatory learning” OR “home visit” OR “interpersonal communication” OR “social and behavior?r change communication” OR SBCC OR audio messages OR video messages OR books OR helpline or pictures OR “animation videos” OR “diet advise”)

Timespan=All years

Search language=Auto

AND

TOPIC: (mother* OR maternal OR “maternal health” OR pregnant women OR lay carer* OR family care provider* OR “Gestational care giver*” OR “community health worker*” OR “health promotion group” OR traditional birth attendants OR midwives OR “village health worker*” OR health volunteer OR “health work force” OR “HIV positive pregnant women” OR “maternal or newborn health” OR maternal welfare OR women’s group OR “safe

motherhood" OR "maternal and child health")

Timespan=All years

Search language=Auto

11. SPRINGER

("antenatal care" or "prenatal care" or "maternal health" or "pregnancy screening" or "pregnant women") and ("behaviour change communication" or communication or counselling or "mass media" or "social media" or training) and "systematic review"

12. SCOPUS

((television OR radio OR [community radio]

OR narratives OR [m health] OR [e health] OR [text messages] OR edutainment OR [mass media] OR [street play] OR [community mobilization] OR [mobile health] OR health literacy OR [motivational interviews] OR folk dances OR [traditional media or posters] OR [health intervention] OR [health education] OR [nutrition policy] OR [health planning] OR [information services] OR [birth spacing] OR [participatory learning] OR [home visit] OR [inter personal communication] OR [behav* pre change communication] OR [audio messages] OR [video messages] OR books OR helpline OR pictures OR [animation videos] OR [diet pre advise])) AND ((ALL (maternal OR [maternal health] OR [pregnant women] OR [lay carer*] OR [family care provider*] OR [gestational care giver*] OR [community health worker*] OR [health promotion group] OR [traditional birth attendants] OR midwives OR [village health worker*])) OR (ALL ([health volunteers] OR [health work force] OR [HIV positive pregnant women] OR maternal welfare OR [women's group] OR [safe motherhood] OR [maternal and child health])))) AND (((ALL ([care seeking behavio?r] OR [birth preparedness package] OR [maternal care package] OR [perinatal outcome] OR arv OR [antiretroviral prophylaxis] OR [antepartum care] OR hiv OR aids)) OR (ALL (anemia OR malaria OR [antenatal screening] OR [ANC package] OR [trimester care] OR [iron supplement] OR ifs OR [health outcome] OR tetanus OR [high risk pregnancy] OR [antenatal care coverage] OR [antenatal care] OR emtct OR pmtct)

#18) AND (LIMIT-TO (DOCTYPE , "re"))

13. RESEARCHGATE

<p><u>("antenatal care" or "prenatal care" or "maternal health" or "pregnancy screening" or "pregnant women") and ("behaviour change communication" or communication or counselling or "mass media" or "social media" or training) and "systematic review"</u></p>
<p>14. JOANNABRIGS</p>
<p><u>("antenatal care" OR "prenatal care" OR "maternal health" OR "pregnancy screening" OR "pregnant women") AND ("behaviour change communication" OR communication OR counselling OR "mass media" OR "social media" OR training) NOT breast feeding</u></p>
<p>15. DOPHER</p>
<p><u>>("antenatal care" OR "prenatal care" OR "maternal health" OR "pregnancy screening" OR "pregnant women")AND ("behaviour change communication" OR communication OR counselling OR "mass media" OR "social media" OR training)</AND"systematic review"</u></p>
<p>16. WHO REPRODUCTIVE DATABASE</p>
<p><u>"SYSTEMATIC REVIEW" AND "PRENATAL CARE" OR "MATERNAL HEALTH" OR "ANTENATAL CARE" OR "PERINATAL CARE"</u></p>
<p>17. WHO</p>
<p>Used keywords antenatal care coverage, antenatal care ,anc,prenatal care,perinatal care,maternal health,maternal welfare,pregnancy screening,pregnant women,uptake,hiv positive pregnant women,maternal newborn health,behaviour change communication,behaviour change,behavior change,systematic review,meta analysis</p>
<p>18. JOLIS</p>
<p><u>Searched with keywords ---- antenatal care coverage, antenatal care ,anc,prenatal care,perinatal care,maternal health,maternal welfare,pregnancy screening,pregnant women,uptake,hiv positive pregnant women,maternal newborn health,behaviour change communication,behaviour change,behavior change,systematic review,meta analysis</u></p>

3.2. List of databases and hits

Databases	No. of hits
Online Databases	
PubMed	439
OVID MEDLINE	346
Cochrane library	754
EMBASE	52
EMERALD	49
EBSCO	46
EPISTAMONIKAS	14
SAGE Online	46
PROSPERO	37
CINAHL	79
PSYCINFO	239
Web OF Science	358
SCIENCE DIRECT	281
SPRINGER LINK	60
SCOPES	282
Research Gates	60
Systematic Review Databases	
The Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports	13
Campbell Collaboration	13
3IE	40
DoPHER (EPPI)	11
Environment Evidence Library	0
EVIDENCE AID	2
Health System Evidence	19
WHO Reproductive Health Library	8
Regional Database	
INDMED	0
Libraries And Organisations	
Research For Development	2

JSTOR digital library	170
World Health Organization	20
JOLIS	8
POPLINE	72
USAID	1
Grey Literature	
Agency for healthcare research and quality (www.ahrq.gov)	13
Kaiser Family Foundation (www.kff.org)	0
Total no. of databases: 33	Total no of hits: 3534

3.3. Reasons for exclusion

Reason	Number of citations
Reasons for exclusion of abstracts (n= 563)	
Duplicate systematic review	20
Publication being a protocol	16
Non English systematic review	4
Old version of systematic review	11
Not a systematic review	249
Population not relevant	6
Intervention not relevant	220
Outcome not relevant	37
Reasons for exclusion of full texts (n= 338)	
Duplicate systematic review	7
Publication being a protocol	23
Non English systematic review	4
Old version of systematic review	6
Not a systematic review	100
Population not relevant	11
Intervention not relevant	68
Outcome not relevant	114
Overlap of information	4
Non-accessible	1

3.4. Characteristics of the systematic reviews

Author ID	Aguiar (2015)
Title	Impact of male partner antenatal accompaniment on perinatal health outcomes in developing countries: a systematic literature review
Objective	To synthesize the current literature pertaining to the effect of male antenatal accompaniment on non-HIV perinatal health outcomes in developing countries.
Search period	Jan 2003 to Dec 2013
Participants	Target population: Male partners and pregnant women Number of included participants; n= >442 Gender: Both gender Age group: one study (Chattopadhyay 2012) mentioned the age range: 15-49 years Ethnicity: not specified
Intervention	Health service or education program during the pregnancy period.
Comparison	NM
Outcome	Evaluated the relationship between male partner antenatal accompaniment and at least one non-HIV perinatal outcome measured during pregnancy up to 30 days postpartum.
No of studies included with study design	7 studies: 2 cross sectional national survey, 1 retrospective cohort study, 1 cluster randomized controlled trial, 2 prospective randomized controlled trial, 1 pre/post intervention trial.
Other inclusion criteria	Geographic location: LMIC/ Developing countries
Methodological quality	11 items checklist: 3 studies rated as having strong methodological rigor, 3 articles moderate methodological rigor and one with poor methodological rigor.
Author ID	Bhutta (2005)
Title	Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence
Objective	The objectives of this review of community-based antenatal, intrapartum and postnatal intervention trials in developing countries were to (1) identify key behaviors and interventions for which the weight of evidence is sufficient to recommend their inclusion in community-based neonatal care

	programs and (2) identify key gaps in knowledge and priority areas for future research and program learning.
Search period	NM
Participants	<p>Target population: Pregnant women, mothers, newborn infants</p> <p>Number of included participants: Range of n= 39- 43559</p> <p>Gender: Both gender</p> <p>Age group: Age not reported</p> <p>Ethnicity: NM</p>
Intervention	<p>Community based interventions during antenatal, intrapartum and postnatal periods. The following categorization of interventions was made: Maternal Interventions 1. Maternal schooling/health education 2. Antenatal care packages 3. Protein supplementation 4. Balanced protein-energy supplementation 5. Iron supplementation 6. Folate supplementation 7. Iodine supplementation 8. Antenatal vitamin A supplementation 9. Zinc supplementation 10. Multiple micronutrient supplementation 11. Malaria chemoprophylaxis or intermittent presumptive treatment (IPT) 12. Malaria protection using insecticide-treated bed nets (ITNs) 13. Deworming 14. Syphilis screening and treatment 15. Antibiotics for asymptomatic bacteria 16. Antibiotics for bacterial vaginosis 17. Antibiotics for preterm labor 18. Antibiotics for preterm premature rupture of membranes (PPROM) 19. Tetanus toxoid (TT) immunization and clean delivery 20. Maternal pneumococcal immunization 21. Promotion of smoking cessation during pregnancy Composite Interventions In addition to the specific community-based interventions noted above, some studies evaluated packages of maternal interventions in community settings: 22. Maternal care packages Intrapartum Interventions Maternal vaginal and newborn skin antisepsis Postnatal Interventions 1. Newborn resuscitation 2. Delayed umbilical cord clamping 3. Umbilical cord antisepsis 4. Hypothermia prevention and management 5. Hypoglycemia prevention and management 6. Breastfeeding 7. Prevention and treatment of ophthalmia neonatorum 8. Vitamin K prophylaxis 9. Hepatitis B vaccination 10. Neonatal vitamin A supplementation 11. Kangaroo mother care (KMC) 12. Topical emollient therapy 13. Hyperbilirubinemia screening 14. Traditional birth attendant (TBA)/CHW training 15. Pneumonia case management Composite</p>

	Interventions which was part of community interventions focusing on the aforementioned specific areas, some studies evaluated packages of postnatal interventions or the functioning of hospitals in the community and interventions performed within them, including use of alternative methods of care to compensate for meagre resources and facilities: 1. Neonatal care packages 2. Care in peripheral health facilities The scientific evidence available from individual interventions or combinations thereof was reviewed, and information from programs and effectiveness trials that used packages of interventions was specifically solicited and analyzed.
Comparison	Not specified
Outcome	Perinatal and neonatal health status outcomes.
No of studies with study design	186 studies, RCTs, QT,PCS, RPCT, RCS, CCS
Other criteria	Geographic location: Developing countries Exclusion Criteria: Some interventions were excluded from this review because other investigators were evaluating the evidence base for their impact. Interventions excluded included the following: 1. Roles of skilled birth attendants 2. Family planning and birth spacing 3. Safe motherhood strategies such as prevention and treatment for pre-eclampsia, pregnancy-induced hypertension, and antepartum hemorrhage; newer strategies for prevention of preterm labor (e.g., magnesium, calcium, fish oil); emergency obstetric care; emergency transport services; communications strategies; community waiting homes; and use of fetal partograph 4. HIV prevention and mother-to-child transmission reduction strategies. 5. Maternal tuberculosis treatment
Methodological quality	Not mentioned
Author ID	Birch (2015)
Title	Interactive e-counselling for genetics pre-test decisions: where are we now?
Objective	The purpose of this review is to summarize the published literature about interactive e-learning and decisional support tools that have been used or could be used for pre-test genetic/genomic e-counselling.
Search period	Jan 1994 - Mar 2014
Participants	Target population: Users were broadly defined as patients or research study

	<p>participants, including healthy members of the public.</p> <p>Number of included participants: Ranged from 44- 526</p> <p>Gender: Both gender</p> <p>Age not reported</p> <p>Ethnicity: The majority of studies stated that their participants tended to be young to middle-aged Caucasian adults</p>
Intervention	E-Tool: The tool had to be interactive and either online or on CD-ROM as described by the authors. An interactive tool is defined as one whereby deliberate or non-deliberate action by the user influences the output or decision pathway.
Comparison	<p>Comparison</p> <p>Not mentioned in priori criteria. But under the results author has mentioned comparison for each study.</p>
Outcome	Outcomes are not specifically mentioned. Author has mentioned that articles were assessed for mechanism of interactivity, e-learning, and decision support components as stated by authors.
No of studies with study design	15 studies : 9 RCT, 4 descriptive study, 1 usability study
Other inclusion criteria	Scholarly literature with all of the following three components: (i) a genetic element, (ii) a computerized and interactive element, and (iii) an element that could be used for patient education. Language: English, French.
Methodological quality	Not mentioned
Author ID	Brusamento (2012)
Title	Male involvement for increasing the effectiveness of prevention of mother-to-child HIV transmission (PMTCT) programs
Objective	To evaluate the impact of interventions which aim to enhance male involvement to increase women's uptake of PMTCT interventions in developing countries
Search period	Since 2000
Participants	<p>Target population: Pregnant women and the male partners</p> <p>Number of included participants: 1521 women, 760 in the intervention group and 761 in the control group. 254 male partners in the intervention group participated.</p>

	<p>Gender: Both gender</p> <p>Age not reported</p> <p>Ethnicity: not specified</p>
Intervention	<p>We considered interventions aiming to improve all degrees of male partner involvement: from the participation in HIV counselling and testing to more constructive engagement of men to support their women and families through the pregnancy, delivery, and postpartum follow up and care. Eligible interventions included counselling programmes, health worker training, male peer groups, information campaigns, strategies at the community level, and changes in service delivery at health facilities to improve male participation.</p>
Comparison	<p>The comparison was the absence of any specific intervention aimed at male partners; the usual practice of the PMTCT programme.</p>
Outcome	<p>Primary outcomes 1. HIV incidence among infants. 2. Proportion of pregnant women who accept HIV testing at ANC. 3. Proportion of HIV positive pregnant women who receive ARV prophylaxis or treatment at ANC. 4. Proportion of mothers who adhere to a selected infant feeding option, either exclusive breastfeeding for 6 months or infant formula. 5. Proportion of HIV-exposed infants born who are tested for HIV Proportion of women at ANC identified as living with HIV who are enrolled in HIV care and treatment services. 6. Proportion of infants diagnosed with HIV who are enrolled in HIV care and treatment services. 7. Proportion of identified male partners of pregnant women living with HIV who are enrolled in HIV care and treatment services. Secondary outcomes 1. Proportion of hospital deliveries among women living with HIV. 2. Proportion of infants born alive to women living with HIV who receive ARV prophylaxis Proportion of male partner of pregnant women who receive HIV counselling. 3. Proportion of male partners of pregnant women who receive HIV testing. 4. Proportion of women living with HIV who disclose their HIV status to their male partners. 5. Impact of male participation on the health service settings. 6. Attitude of health workers to male participation. 7. Male perspective and experience with ANC services</p>
No of studies with study design	<p>1 RCT</p>

Other inclusion criteria	Geographic location: Developing countries We excluded studies focusing only on pregnant women, on interventions targeting all community members or only adult male relatives of pregnant women other than their male partners
Methodological quality	Cochrane ROB Random sequence generation (selection bias): Not Randomized Allocation concealment (selection bias: High risk. Blinding of participants and personnel (performance bias): Low risk. Blinding of outcome assessment (detection bias): Unclear risk. Incomplete outcome data (attrition bias): Low risk. Selective reporting (reporting bias): Unclear. Other bias: Unclear risk
Author ID	Burton (2010)
Title	Couples-focused behavioral interventions for prevention of HIV: systematic review of the state of evidence
Objective	The aims of this paper were to (a) describe and synthesize findings from identified studies, and (b) conduct a critical analysis of the state of this research.
Search period	1980- April 2007.
Participants	Target population: Self- identified couple. Couple was defined here as a dyad (two-person pair) involved in an intimate sexual relationship; length of relationship and depth of emotional commitment was unspecified in our search, and was left to be determined by primary study investigators. Number of included participants: Ranged from 86 indexed couples to 586 index couples. Gender: Both gender Age group: Ranged from 14 to 25 Ethnicity: NM
Intervention	Intervention: couple focused interventions.
Comparison	Any comparison.
Outcome	Outcome Reduced biological indication of HIV or STI infection to reduced sexual risk behavior in the intervention versus control group. We included studies measuring any biological outcomes (e.g. HIV incidence, STI incidence, pregnancy) or behavioral outcomes (e.g. unprotected vaginal, oral, or anal sex, sharing of needles) as relevant markers of HIV risk. Studies that did not

	report either a biological or a behavioral outcome were excluded.
No of studies with study design	6 studies, 3 RCTs and QRCT
Other inclusion criteria	Geographic location: Not specified
Methodological quality	We assessed the following aspects of study quality: 1. Study design (RCT, quasi-RCT, quasi-experimental study). 2. Method of allocating participants to trial arms. 3. Concealment of allocation sequence from trial staff and from personnel who recruit participants into the trial (for RCTs). 4. Blinding of participants, program staff, and outcome assessors (we do not expect most studies in this field to blind participants and/or facilitators, as preliminary research suggests that these interventions often involve time and personal contact). 5. Baseline differences between trial arms, methods of controlling for differences in analyses. 6. Attrition: percentage dropout at each follow-up, differential attrition between trial arms, and differences between dropouts and participants who are retained. 7. Method of outcome assessment (e.g., ACASI, biomarkers, self-report). 8. Analytic procedures: Intention to treat, complete case, per-protocol, or treatment on the treated.
Author ID	Dean (2014)
Title	Preconception care: closing the gap in the continuum of care to accelerate improvements in maternal, newborn and child health
Objective	Our objectives were to collate the data on risk factors in the preconception period and their impact on MNCH outcomes; identify research gaps; and recommend strategies for implementation.
Search period	Not mentioned
Participants	Target population: While the focus remains on women, it is recognized that care provided before and between pregnancies should be inclusive to adolescent boys and men, since their involvement is critical to planned and healthy pregnancies. Number of included participants: not mentioned Gender: Both gender Age not reported Ethnicity: not mentioned
Intervention	Preconception care and counseling. Preconception care be defined as “any

	intervention provided to women and couples of childbearing age, regardless of pregnancy status or desire, before pregnancy, to improve health outcomes for women, newborns and children”.
Comparison	Not specified
Outcome	Maternal and child health outcomes
No of studies with study design	19 RCTs
Other inclusion criteria	Geographic location: Not specified Preconception care must address the underlying and intermediate determinants of maternal and child health outcomes, such as the overall socioeconomic context and community structures and institutions, as well as the immediate biomedical and lifestyle risk factors.
Author ID	Di Mario (2015)
Title	Prenatal education for congenital toxoplasmosis
Objective	The primary objectives of this review were to assess the efficacy of prenatal education to reduce the rate of: 1. new cases of congenital toxoplasmosis; 2. toxoplasmosis seroconversion during pregnancy. Secondary objectives were to assess the efficacy of prenatal education to increase the rate of: 1. pregnant women’s knowledge of risk factors for acquiring toxoplasmosis infection; 2. pregnant women’s awareness of the importance of avoiding toxoplasmosis infection during pregnancy; 3. pregnant women’s behavior with respect to avoidance of risk factors for toxoplasmosis infection during pregnancy.
Search period	Last search: 31 May 2015
Participants	Target population: Women of reproductive age, irrespective of their pregnant status were included. Number of included participants: n=5455 Gender: Women Age not reported
Intervention	Intervention: Prenatal education on toxoplasmosis infection during pregnancy.
Comparison	Not specified
Outcome	1. Rate of congenital toxoplasmosis, defined by persistence of specific IgG antibodies beyond 11 months of age (Lebech 1996). 2. Rate of toxoplasmosis

	seroconversion in pregnant women, defined by: Primary Outcome i) an increase in specific IgG from paired sera in pregnant woman previously seronegative; ii) a rising IgG titre, low IgG avidity, IgA antibodies, or a combination of these in pregnant women who were IgG and IgM positive at their first prenatal test (Gilbert 2002). Secondary outcomes 1. Pregnant women's knowledge of risk factors for acquiring toxoplasmosis infection as objectively measured (quantitative score) through specific questionnaire. 2. Pregnant women's awareness of the importance of avoiding toxoplasmosis infection during pregnancy as objectively measured (quantitative score) through specific questionnaire. 3. Pregnant women's behavior with respect to the avoidance of risk factors for toxoplasmosis infection during pregnancy as objectively measured (quantitative score) through specific questionnaire.
No of studies with study design	2 cluster randomized trial
Other inclusion criteria	Geographic location: Not specified No other criteria mentioned
Methodological quality	Cochrane ROB
Author ID	Dugas (2012)
Title	Decision aid tools to support women's decision making in pregnancy and birth: a systematic review and meta-analysis
Objective	The objective of this study was to conduct a systematic review and meta-analysis to evaluate the effectiveness of different decision aid tools on knowledge, anxiety, decisional conflict, final choice and final outcome, in the specific context of pregnancy and birth.
Search period	1 Jan 1994 to 31 Dec 2009
Participants	Target population: Pregnant women Number of included participants; n= 4100 Gender: Women Age group stated Ethnicity: Not specified
Intervention	Interventions aimed at evaluating different obstetric decision aid tools added to usual or routine care.
Comparison	Routine care/usual care alone

Outcome	Improvement of knowledge, reduction of anxiety and the decisional conflict, effect of the tool on final choice or outcome.
No of studies with study design	10 RCTs
Other inclusion criteria	Geographic location: Not specified Exclusion criteria: studies in which participants were not making an active treatment or screening decision, did not meet the minimal inclusion criteria.
Methodological quality	Jaddad's scale; Songs tools for quality assessment; the guide of Giacomini and Cook(2000)
Author ID	George (2015)
Title	Do interventions that promote awareness of rights increase use of maternity care services? A systematic review
Objective	To systematically assessed the evidence available on interventions that promote awareness of rights to increase use of maternity care services.
Search period	2000-2014
Participants	Target Population: community and the outcome is measured in pregnant women or women in labor Number of included participants: Pandey 2007: 105 village clusters across 21 districts, Intervention with 22,495 households in 55 village clusters across 11 districts. Bjorkman 2009: 9 districts-Study included, 50 communities - Intervention with approximately 55,000 households in 25 communities. Ganju 2014: 1 district, Intervention with 10,374 people in 12 villages. Sinha 2008: Intervention with approximately 40,000 people in 37 villages and poor area of headquarter village in 1 district Gender: Both gender Age not reported
Intervention	Interventions aimed to improve awareness of rights among women, men, community members or health workers and program administrators.
Comparison	Such awareness was not promoted
Outcome	Birth with a skilled attendant or in a facility, use of antenatal care, use of postnatal care for the infant and mothers, as well as satisfaction with the birth experience
No of studies with study design	2 cluster RCTs, 1 participatory action research and 1 pre and post design.

Other inclusion criteria	Geographic location: LMICs
Methodological quality	Effective Public Health Practice Project quality assessment tool. 1 RCT (Pandey 2007) strong quality, 1 RCT (Bjorkman 2009) moderate quality, other 2 studies (Ganju 2014 & Sinha 2008) weak quality.
Author ID	Gilinsky (2011)
Title	Interventions delivered during antenatal care to reduce alcohol consumption during pregnancy: a systematic review
Objective	Alcohol-reduction interventions delivered to pregnant women during antenatal care to determine whether these resulted in reduced alcohol consumption or abstinence from alcohol during pregnancy
Search period	Varied between databases, inclusive of 1980 to October 2008
Participants	Target population: pregnant women attending for antenatal care who were drinking any amount of alcohol during pregnancy (including dependent drinkers) or were abstinent from alcohol. Number of included participants: n= 42 to 2100 Gender: Women Age group: Mean age Ranged from 22.4-31.4 years. One study (Watterson and Murray-Lyon (1990) did not report on the information.
Intervention	All types of interventions delivered during antenatal care were considered. They included a range of health promotion and psychosocial interventions (e.g. brief interventions, MI, health education, social support, etc.). Interventions in all delivery modes were considered (e.g. face-to-face, telephone, self-help).
Comparison	Not specified
Outcome	Primary outcome of interest was short- and long-term maternal alcohol consumption during pregnancy. Secondary outcomes included neonatal outcomes (e.g. birth weight, birth defects associated with prenatal exposure to alcohol).
No of studies with study design	8 RCTs and NRCTs
Other inclusion criteria	Geographic location: Not specified in the inclusion criteria. But the included studies were from UK, US and Norway. Unpublished studies (e.g. conference proceedings and doctoral theses) were

	excluded, as were studies that were not published in English. Studies including women who used illicit drugs were also excluded (unless alcohol outcomes were reported separately). Studies that did not include an identifiable alcohol consumption measure during pregnancy and studies in which the findings were not considered potentially transferable to UK populations (e.g. non-western and developing countries) were excluded.
Methodological quality	Modified version of the SIGN (2008) methodology checklist for RCTs to assess internal validity. The following information was extracted from each trial: methods for assigning participants to groups (e.g. random or non-random allocation) and how the randomisation sequence was generated (e.g. computer generated), methods for concealment of allocation (refers to the process used to ensure that researchers are unaware which group participants are being allocated to at the time of study entry), whether outcome assessors were blinded to treatment allocation, and whether there were significant differences between the intervention and control groups at the start of the trial. The integrity of the intervention (e.g. whether either the intervention and control group had potentially received unintended interventions) was also noted as were the methods by which relevant outcomes were measured, and the extent to which these were standardised, valid and reliable. Finally, the percentage of participants who were lost to follow-up and whether an intention to treat analysis was considered. Each item was graded as either: well-covered, adequately addressed, poorly addressed, not addressed (e.g. was not described in the study report) or not applicable.
Author ID	Gogia (2010)
Title	Home visits by community health workers to prevent neonatal deaths in developing countries: a systematic review
Objective	To determine whether home visits for neonatal care by community health workers can reduce infant and neonatal deaths and stillbirths in resource-limited settings with poor access to health facility-based care.
Search period	Last date of search: 5 Oct 2008
Participants	Target population: neonates, caregiver, mother, pregnant women. Number of included participants: not mentioned. Gender: Not specified

Intervention	Home-based experimental interventions by community health workers in the neonatal period ((i) the promotion of optimal neonatal care practices, such as exclusive breastfeeding, keeping the baby warm and clean umbilical cord care; (ii) caregiver education to improve caregiver recognition of life-threatening neonatal problems and appropriate health care seeking behaviour; (iii) the identification of signs of severe neonatal illness and referral to a health facility; or (iv) home-based management of neonatal conditions). Additional home-based interventions by community health workers during pregnancy or delivery ((i) promotion of antenatal care; (ii) health mother regarding desirable practices during pregnancy; (iii) promotion of delivery in a hospital or at home by a skilled birth attendant; and (iv) education about safe and/or clean delivery practices.
Comparison	Did not receive any home-based intervention by community health workers during the neonatal period.
Outcome	Primary outcome: all-cause neonatal mortality rate, defined as the number of deaths from any cause in infants up to the age of 28 completed days (or 1 month) divided by the number of live births in the study population. Secondary outcomes: (i) all-cause infant mortality rate, defined as the number of deaths from any cause during the first year of life divided by the number of live births in the study population; (ii) cause-specific neonatal mortality: deaths due to sepsis, tetanus, asphyxia or prematurity (as defined by authors, irrespective of single- or multiple-cause assignment); (iii) stillbirth rate; and (iv) care practices during pregnancy and delivery and in the postnatal period in trials providing data on neonatal mortality. Such practices included the following: > 1 antenatal care visit; 2 doses of maternal tetanus toxoid injection; money saving for childbirth; skilled care at birth; clean umbilical cord care; breastfeeding initiation within 1 hour of birth; bathing of the neonate no less than 24 hours after birth; and skin-to-skin care after birth.
No of studies with Study design	Number of studies with study design: 5 studies, 2 cluster RCT, 3 Non-randomised controlled trial.
Other inclusion criteria	Geographic location: resource-limited settings with poor access to health-facility-based care.

	Trials evaluating interventions for the home-based follow up of infants born and initially cared for in a hospital were excluded, as were single-intervention trials.
Methodological quality	Assessed on the basis of the methods used for sampling and for allocation into intervention and control groups. Randomisation was classified as: (a) adequate, (b) unclear, (c) inadequate and (d) not used; allocation concealment as: (a) adequate, (b) unclear, (c) inadequate and (d) not used.
Author ID	Govindasamy (2014)
Title	Interventions to improve or facilitate linkage to or retention in pre-ART (HIV) care and initiation of ART in low and middle-income settings: a systematic review
Objective	The aim of this review is to assess the effect of interventions to improve or facilitate linkage to or retention in pre-ART care and initiation of ART in low- and middle-income settings.
Search period	1st Jan 2004- 10th Feb 2013
Participants	Target population: HIV-positive patients in low- and middle-income countries (as defined by the World Bank) at any point before initiating treatment. Number of included participants: 14 patients; Patients co-infected with tuberculosis (TB) : n= 1 Children: n=1 Adolescents: n= 1 Inpatients: n= 1 Injecting drug users: n=1 Pregnant women: n= 9 Gender: Both gender Age not reported Ethnicity: not mentioned
Intervention	Any intervention aimed at improving linkage or retention in pre-ART care or initiation of ART.
Comparison	Not mentioned
Outcome	Primary outcomes: Proportion of HIV-positive patients: -Retained in pre-ART care -Linked to care -Initiated on ART as defined by study author -Time to linkage or initiation of ART. Secondary outcomes: Patient satisfaction with care, as defined by the study authors. Cost to the provider. Cost to the patient and family.
No of studies with study design	10 Before and after study, 6 Observational study with control group, 2 Cluster randomized trial, 3 Individual randomized controlled trial total: 21

	studies, 3 conference abstracts. Total 24 studies.
Other inclusion criteria	Geographic location: LMICs
Methodological quality	EPOC : Randomized controlled study and non- randomized controlled study New Castle Ottawa Scale: Observational study 2 studies with low risk; 8 studies with unclear risk and 4 studies with high risk.
Author ID	Hemsing (2012)
Title	Partner support for smoking cessation during pregnancy: a systematic review
Objective	Review of interventions to enhance partner support for pregnant/postpartum women's smoking reduction or cessation and cessation treatments for the partners themselves.
Search period	From 1950 to May 2009
Participants	Target population: Pregnant woman or her partner or both Number of included participants: Not specified Ethnicity: Not specified
Intervention	Interventions included providing counselling or resources to pregnant women and/or their partners to assist them in quitting smoking, a mass media campaign on smoking during pregnancy, biofeedback interventions, and providing information booklets aimed at facilitating partner support.
Comparison	Not specified
Outcome	1) Interventions to assist the partners of women who are pregnant, planning a pregnancy or who have recently given birth support the woman in her attempts to quit smoking. Expected outcomes: Increased partner support provided to the pregnant woman to encourage her to quit or reduce smoking. Reduction in smoking prevalence among pregnant women and their partners. Increase in the number of partners reducing or quitting smoking. Positive changes in the partner's knowledge and attitudes regarding smoking before, during and after the pregnancy. 2) Interventions to help the partners themselves to reduce or quit smoking. Expected outcomes: Reduction in the smoking prevalence of the partners of women who are pregnant or have an infant under the age of 12 months. Increase in the number of partners who stop smoking. Positive changes in their

	smoking-related knowledge, attitudes and behaviour.
No of studies with study design	Total 9 studies. Five studies employed RCT (of which one study was a clustered RCT), two studies used a pre–posttest design, and one study each used a two-group pre – posttest and a single group prepost test design.
Other inclusion criteria	Geographic location: Not specified but the reviewed studies were conducted in seven countries, with two (28.5%) from the United Kingdom, two (28.5%) from Australia, and one each from Netherlands, Sweden, the USA, and Norway. They included studies published in English language.
Methodological quality	Subsequent to determining the research design of each study (using the NICE algorithm), their methodologies were then examined for rigor and quality based on the critical appraisal checklists provided in Methods for the Development of NICE Public Health Guidance (Second Edition; NICE, 2009). The quality of each study included in the review was assessed by identifying the type of study (i.e., quantitative [experimental], quantitative [observational], economic etc.) and examining the internal (i.e., assessing if sources of bias have been minimized) and external (i.e., identifying if findings can be generalizable) validity of each study.
Author ID	Hensen (2012)
Title	Universal voluntary HIV testing in antenatal care settings: a review of the contribution of provider-initiated testing and counselling
Objective	The aim of this systematic review was to determine the extent to which the adoption of guidelines for a PITC-related model in ANC contributes to achieving the goal of universal voluntary testing of pregnant women and increases the coverage of PMTCT, treatment and care services. We also aimed to assess whether PITC adheres to the standards inherent to good conduct of HIV testing, namely that it provides pre-test information and post-test counselling.
Search period	Search was conducted in Dec 2010
Participants	Target population: pregnant women Number of included participants: n varied from 1456- 54429 Gender: Women Age not reported Ethnicity: Not mentioned

Intervention	Provider initiated testing and counselling (PITC)
Comparison	Not specified
Outcome	Uptake of HIV testing
No of studies with study design	10 studies: 1 RCT, 9 Non randomized trial (4 B/A, 1 RBA, 4 Time series)
Other inclusion criteria	Geographic location: Not specified Settings: ANC Settings Exclusion: Studies conducted at population level as they provide limited information of changes within individual facilities, thus imposing greater challenges in inferring causation.
Methodological quality	EPHPP
Author ID	Higgs (2014)
Title	Understanding the role of mHealth and other media interventions for behavior change to enhance child survival and development in low- and middle-income countries: an evidence review
Objective	The evidence review included areas such as use of mHealth for compliance with antiretroviral treatment in adults with HIV, which has both direct implications (e.g., perinatal transmission of HIV and transmission via breast feeding) and indirect implications (e.g., therapeutic compliance) for child survival. We present these results in detail to ensure (a) visibility on the adequacy of Study design for intended area of evidence generation and (b) reporting of critical context (e.g., rural vs. urban) and implementation elements that may be helpful when considering adaptation or adoption. We also provide insight into the challenges to conducting high-quality research on the effectiveness of technology platforms and gaps that these types of interventions can fill to improve child survival.
Search period	Initial literature review was conducted on Jan 2013. They have not mentioned the search period of second literature review.
Participants	Target population: health workers, family, children, mother, pregnant women, neonates. Number of included participants: varies from 29-7890. Some of the primary studies haven't mentioned the sample size. Gender: Both gender

	Age group: children less than 5 years, adolescent girls. Haven't mentioned the age group for other population Ethnicity: Not specified
Intervention	mHealth, Social media and trans media.
Comparison	Not specified
Outcome	Health related outcome
No of studies with study design	26 studies. 6 rct, 1 cluster rct, 5 survey/intervention, 1 systematic QRCT, 2 systematic reviews. Remaining studies have not mentioned the study design.
Other inclusion criteria	Geographic location: LMICs
Methodological quality	Not mentioned
Author ID	Kennedy (2013)
Title	Provider-initiated HIV testing and counseling in low- and middle-income countries: a systematic review
Objective	Systematic review of the literature on the effect of PITC (Provider Initiated HIV Testing and Counselling) on behavioral, psychological, social, care or biological outcomes in low- and middle-income countries.
Search period	January 1, 1990 to July 16, 2010
Participants	Target population: individuals who received PITC, participants attending ANC, family planning or postpartum/child health care; TB clinics; STD clinics; methadone maintenance clinic Number of included participants: Not reported Gender: Women (10 studies) and Men (1 study); 5 studies (% of female ranged from 22.9-51.4%) Age group: 4 studies reported range: 18-70 years 4 studies reported median: which ranged from 22.5-29 y 5 studies reported mean: 25.6-35.2y; Age is not reported in 6 studies Ethnicity: Not reported
Intervention	Evaluate a PITC intervention. Definition of PITC aligned with the 2007 WHO guidelines. Specifically, individuals, couples, or groups had to receive pre- and post-test counseling about HIV and an HIV test. However, pre-test counseling could be minimal, particularly in opt-out settings. These individuals, couples, or groups then had to learn, or have the opportunity to

	<p>learn, their HIV infection status. HIV testing had to be initiated by a provider using either an opt-in or opt-out approach. Further, HIV testing had to be conducted in a health care setting where individuals were seeking health care services other than HIV testing. While we followed the WHO PITC definition created in 2007, we did not limit our review to studies conducted after this time or to studies that explicitly said they had provided PITC. Instead, we included all studies evaluating interventions that met the definition above to broadly consider all evidence on this approach to HIV testing, regardless of the terminology used to describe it. Provider-initiated HIV testing and counseling (PITC) refers to HIV testing and counselling, which is routinely recommended by health care providers to persons attending health care facilities as a standard component of medical care.</p>
Comparison	<p>Control group that did not receive any type of intervention, a comparison group that received another form of HIV testing (such as VCT), or a separate intervention on a different topic</p> <p>Outcome</p> <p>Any other criteria</p> <p>Was the geographic location specified?</p>
Outcome	<p>Behavioral, psychological, social, care or biological outcome other than uptake of HIV testing. Studies measuring HIV testing uptake as the only outcome were not included. However, if studies measured HIV testing uptake in addition to other behavioral, psychological, social, or biological outcomes, HIV testing uptake was recorded</p>
No of studies with study design	<p>19 studies; Time series: 6 studies; Serial cross sectional studies: 7 studies; NRCT: 2 studies; RCT: 2 studies; Prospective cohort: 1 study; before and after: 1 study.</p>
Other inclusion criteria	<p>Geographic location: Conducted in a low, lower-middle, or upper-middle income country, according to the World Bank country classification scheme. The studies should be published in a peer-reviewed journal.</p>
Methodological quality	<p>Study quality (rigor) was assessed using an 8-Item assessment tool developed for other HIV behavioral intervention systematic reviews by The Evidence Project.</p>
Author ID	Lassi (2015) (C)
Title	Community-based intervention packages for reducing maternal and

	neonatal morbidity and mortality and improving neonatal outcomes
Objective	To assess the effectiveness of community-based intervention packages in reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes
Search period	Last search May 25, 2014
Participants	<p>Target population: Women of reproductive age, particularly pregnant women at any period of gestation.</p> <p>Number of included participants: Not reported</p> <p>Gender: Women</p> <p>Age group: reproductive age group</p> <p>Ethnicity: not reported</p>
Intervention	<p>Intervention packages that included additional training of outreach workers (residents from the community who are trained and supervised to deliver maternal and newborn care interventions to her target population) namely, lady health workers/visitors, community midwives, community/village health workers, facilitators or TBAs in maternal care during pregnancy, delivery and in the postpartum period; and routine newborn care. Additional training was defined as training other than the usual training that health workers received from their governmental or non-governmental organisation (NGO) and could include a combination of training in providing basic antenatal, natal and postnatal care; preventive essential newborn care, breastfeeding counselling; management and referral of sick newborns; skills development in behaviour change communication; and community mobilisation strategies to promote birth and newborn care preparedness. The training sessions included lectures, supervised hands-on training in a healthcare facility and/or within the community.</p>
Comparison	Women received their usual maternal and newborn care services from local government and non-government facilities
Outcome	<p>Primary: Maternal and neonatal mortality. Secondary: Perinatal mortality, still births, Complications of pregnancy, referral to health facility for any complication, Iron/folate supplementation, Tetanus toxoid immunisation, Use of clean delivery kits, Institutional delivery/delivery at a health facility, Birth attended by a health provider, Initiation of breastfeeding within one hour of birth, Wrapping babies within 30 minutes, Delayed bathing for six</p>

	hours, Clean cord care, Exclusive breastfeeding at six months of age, Health care seeking for maternal and/or neonatal morbidities, Infant's weight for age and height for age Z scores at six months of age.
No of studies with study design	26 studies. Twenty-four of those are cluster-randomised controlled trials, one study (Bang 1999) is a controlled clinical trial which uses a cluster design and one trial Syed 2006) is a quasi-randomised cluster trial. Results from two intervention arms (two subsets) of Baqui - Sylhet 2008, Kumar 2008 and Midhet 2001.
Other inclusion criteria	Geographic location: Not specified
Methodological quality	Cochrane ROB
Author ID	Lassi (2015) (I)
Title	Impact of service provision platforms on maternal and newborn health in conflict areas and their acceptability in Pakistan: a systematic review
Objective	To undertake a systematic review of global and local (Pakistan) information from conflict areas on platforms of health service provision implemented at community and/or facility level to improve MNH within the last ten years (September 2003 to September 2013). Furthermore, to interview the stakeholders from Pakistan to understand the acceptability of effective models of service delivery in conflict areas. Lastly, based on the information from the systematic review and information from stakeholders, the paper proposed key recommendations for improving the coverage of health facilities in those areas.
Search period	September 2003 to September 2013
Participants	Target population: conflict affected population (global and Pakistan) Number of included participants: Not mentioned Gender: Not specified Age not reported Ethnicity: not stated
Intervention	Platforms of health service delivery (services provided to conflict affected population)
Comparison	Not specified. Some of the included studies have mentioned control group.
Outcome	Maternal and neonatal health, morbidity and mortality

No of studies with study design	10 studies; 6 case studies, 2 pre/post surveys, 1 descriptive cross sectional study and 1 with unclear study design.
Other inclusion criteria	Geographic location: conflict areas (special reference Pakistan) Exclusion Criteria: Studies on refugees were excluded
Methodological quality	Not mentioned
Author ID	Lathrop (2013)
Title	A systematic review comparing group prenatal care to traditional prenatal care
Objective	This article explores the use of group visits as an effective alternative to traditional, one-on-one prenatal care. The aim of this systematic review is to answer the question, "How does group prenatal care compare to traditional prenatal care with regard to pregnancy outcomes and patient satisfaction?"
Search period	By December 2011
Participants	Target population: Not mentioned clearly. The included studies focused on pregnant women, adolescent pregnant women. Author mentioned that studies tended to evaluate high risk population (but didn't write high risk for what) four studies focusing on low-income women (Ickovics et al., 2003, 2007, 2011; Klima et al., 2009) Number of included participants: 3038. size ranged from 49 to 1047 Gender: Women Age group: 6 studies reported ages as mentioned below: 14-25 (Ickovics 2011) >18 (Shakespear 2010) 14-38 (Klima 2009) 18-48 (Baldwin 2006) 17 years or younger (Grady 2004) 14-21 (Hoyer 1994) Adolescent (Ford 2002) three studies were conducted on adolescents (Ford et al., 2002; Grady & Bloom, 2004; Hoyer et al., 1994) 5 studies did not report the ages. Ethnicity: not mentioned in the inclusion criteria. But three studies were done on Hispanic women (Robertson et al., 2009; Shakespear et al., 2010; Trudnak, 2011)
Intervention	Group antenatal care verses traditional prenatal care.
Comparison	Mentioned in the objective that comparison is traditional, one to one prenatal care.
Outcome	Pregnancy outcome and patient satisfaction.
No of studies with	Randomized controlled trial 3 studies, the rest all are single as mentioned

study design	below: Retrospective cohort study Pilot program with comparison between intervention (group care) and control groups Cross-sectional, correlational Qualitative and quantitative design Quasi-experimental, prospective comparison pretest/posttest Comparison between three adolescent groups Prospective-matched cohort study Randomized, experimental pretest/posttest design.
Other inclusion criteria	Geographic location: Not specified Exclude the studies if they did not include defined comparison
Methodological quality	Not mentioned
Author ID	Lee (2009)
Title	Linking families and facilities for care at birth: what works to avert intra-partum-related deaths?
Objective	To describe the evidence for interventions to link mothers with skilled care during pregnancy, labor, and birth, and to summarize the implications for programs. Using GRADE present data on effects, when available, on early neonatal mortality rate (ENMR), intra-partum related neonatal mortality rate (IPR-NMR), stillbirth rate (SBR), intra-partum stillbirth rate (IP-SBR), and perinatal mortality rate (PMR). We also present evidence on the effects on intermediate outcomes such as care seeking, skilled birth attendance and facility delivery rates, cost and cost-effectiveness.
Search period	First search conducted in 2002 and updated in May 2009. Studies published since 1960 were included.
Participants	Target population : Community Number of included participants: Not reported Gender: Not specified Age not reported Ethnicity: Not reported
Intervention	Strategies to link families and facilities, including community mobilization, financial incentives, emergency referral and transport systems, prenatal risk screening, and maternity waiting homes
Comparison	Not specified.
Outcome	Early neonatal mortality rate (ENMR), intra-partum related neonatal mortality rate (IPR-NMR), stillbirth rate (SBR), intra-partum stillbirth rate (IP-

	SBR), and perinatal mortality rate (PMR) intermediate outcomes such as care seeking, skilled birth attendance and facility delivery rates, cost and cost-effectiveness.
No of studies with study design	Total included studies varied and info in first series. 52 reviews, 29 RCTs, 470 quasi RCTs
Other inclusion criteria	Geographic location: Not specified
Methodological quality	Methodological quality was not mentioned GRADE was done.
Author ID	Mangham-Jefferies (2015)
Title	Cost-effectiveness of strategies to improve the utilization and provision of maternal and newborn health care in low-income and lower-middle-income countries: a systematic review
Objective	Systematic review of the cost-effectiveness of strategies to improve the demand and supply of maternal and newborn health care in low-income countries (LICs) and lower-middle-income countries (LMICs).
Search period	Published since 1 January 1990 - on 14 September 2012 and last updated on 16 October 2013
Participants	Target population: Directly or indirectly target individuals, community members, frontline workers or other actors or aspects of the health system. No restriction on participants. (Info taken from protocol) Number of included participants: Not mentioned Gender: Not specified Age not reported Ethnicity: Not reported
Intervention	It must report on an innovation that sought to improve the utilization or provision of maternal and newborn health care. An innovation is defined as an approach, activity or set of activities that aims to improve the utilization or provision of health care. Innovations to improve the utilization of health care are approaches and activities that strive to shape demand and influence health practices of individuals or communities. These may provide health information and education, create incentives to obtain care, or reduce financial, geographic, social or cultural barriers to care. Innovations

	to improve the provision of health care are approaches and activities that aim to enhance frontline worker capabilities and performance. These innovations may target the individual worker, the organization or other aspects of the health system. Relevant examples include: training, supervision, job aids, pay-for-performance, and changes to organizational processes, systems or infrastructure. (Info taken from Protocol)
Comparison	No restrictions on the type of comparator, and the study may report on the cost-effectiveness of an innovation compared to current practice or the cost-effectiveness of alternative innovations. (Info taken from protocol)
Outcome	Primary outcomes. The primary outcomes are i) cost per disability-adjusted-life-year (DALY) and ii) cost per life-saved. There are no restrictions for inclusion in the review relating to outcome measures. Secondary outcomes. All reported outcomes are of interest. It is expected that various measures will have been used to report on the cost-effectiveness in relation to health service utilization or health service provision (info from protocol). Their main outcome was cost. Effectiveness data not available for other outcomes but have mentioned about the other outcomes in the table.
No of studies with study design	48 publications (43 individual studies) Seven studies were conducted in the context of cluster randomized trials (including 2 with a factorial design), 3 were pre-post studies with a control, and 16 studies had a pre-post design without a control group. In addition, 7 studies compared intervention and control areas, 2 used prospective cohort data, 4 used economic modelling, and 4 used secondary data to estimate the cost-effectiveness results.
Other inclusion criteria	Geographic location: LICs and LMICs; to be included in the review the study must be set in one or more low-income or lower-middle income countries, as classified by the World Bank in 2012. The following countries are low-income countries (with GDP per capita of <\$1025): Afghanistan; Bangladesh; Benin; Burkina Faso; Burundi; Cambodia; Central African Republic; Chad; Comoros; Democratic Republic of Congo; Eritrea; Ethiopia; The Gambia; Guinea; Guinea-Bissau; Haiti; Kenya; Democratic Republic of Korea; Kyrgyz Republic; Liberia; Madagascar; Malawi; Mali; Mauritania; Mozambique; Myanmar; Nepal; Niger; Rwanda; Sierra Leone; Somalia; Tajikistan; Tanzania; Togo; Uganda; and Zimbabwe. The following countries are lower-middle-income countries (with GDP per capita of \$1026 to \$4035): Albania;

	<p>Armenia; Belize; Bhutan; Bolivia; Cameroon; Cape Verde; Republic of Congo; Cote d'Ivoire; Djibouti; Egypt; El Salvador; Fiji; Georgia; Ghana; Guatemala; Guyana; Honduras; Indonesia; India; Iraq; Kiribati; Kosovo; Lao PDR; Lesotho; Marshall Islands; Micronesia, Fed. Sts.; Moldova; Morocco; Nicaragua; Nigeria; Pakistan; Papua New Guinea; Paraguay; Philippines; Samoa; Sao Tome and Principe; Senegal; Solomon Islands; South Sudan; Sri Lanka; Sudan; Swaziland; Syrian Arab Republic or Syria; Timor-Leste; Tonga; Ukraine; Uzbekistan; Vanuatu; Vietnam; West Bank and Gaza; Yemen & Zambia. (Info from protocol)</p> <p>Exclusion criteria: Studies which did not report on a strategy that sought to influence health practices or enhance front-line worker performance. Did not report on maternal or newborn care. Was not set in a LIC or LMIC, did not report on costs, did not report the effect of the strategy. The studies which were published before 1990, which have a letter or editorial. Studies which did not report a cost-effectiveness measure. Studies which presented secondary rather than primary analysis (in which case the references were checked for additional articles for inclusion).</p>
Methodological quality	Not mentioned; but used consolidated health economic evaluation reporting standards (CHEERS) statement. It is a reporting guideline and not a methodological quality assessment tool.
Author ID	Minnie (2009)
Title	A systematic review of counselling for HIV testing of pregnant women
Objective	To establish research evidence regarding factors influencing counselling for HIV testing during pregnancy.
Search period	Studies published after 1996
Participants	<p>Target population: Not specified</p> <p>Number of included participants: Not specified</p> <p>Gender: Not specified</p> <p>Age not reported</p> <p>Ethnicity: Not specified</p>
Intervention	Not specified
Comparison	Not specified
Outcome	Not specified
No of studies with	5 Systematic Reviews, 4 RCTs, 7 Cohort, 10 observational, 3 economical

study design	evaluations and 4 qualitative studies.
Other inclusion criteria	Geographic location: Not specified but the data extracted was contextualised to South Africa Studies are done from HICs as well as LMICs but data extracted was assessed according to its applicability in the South African context. Studies with contexts very dissimilar to the South African context were excluded.
Methodological quality	The Critical Appraisal Skills Programme (2005) instruments were used for the reviews, randomised controlled trials, cohort studies, economic evaluations and qualitative research studies. Descriptive studies were appraised according to the generic principles of critical appraisal studies as proposed by Melnyk and Fineout-Overholt (2005), as no suitable instruments could be found for these types of studies. These generic principles were appraisal of the validity of the study, the reliability and applicability of the results.
Author ID	Nabhan (2015)
Title	High feedback versus low feedback of prenatal ultrasound for reducing maternal anxiety and improving maternal health behaviour in pregnancy
Objective	To compare high feedback versus low feedback during prenatal ultrasound for reducing maternal anxiety and improving maternal health behaviour.
Search period	Up to 12 May 2015 and MEDLINE (January 1966 to 12 May 2015)
Participants	Target population: Pregnant women undergoing routine ultrasound during pregnancy Number of included participants: 365 women Gender: Women Age not reported Ethnicity: Not specified
Intervention	High feedback during ultrasound during routine antenatal care. High feedback: women can see the monitor screen and receive detailed visual and verbal explanations during prenatal USG.
Comparison	Low feedback during prenatal ultrasound. Low feedback: women cannot see the monitor screen and women are given only a summary statement of the scan
Outcome	Primary outcomes 1. Maternal anxiety measured by State Trait Anxiety Inventory as defined by the investigators of each included study. Secondary outcomes 1. Cessation of alcohol 2. Cessation of smoking 3. Women's views

	of level of feedback
No of studies with study design	RCTs were included
Other inclusion criteria	Geographic location: Not specified
Methodological quality	Cochrane ROB
Author ID	Nielsen (2006)
Title	Interventions to improve diet and weight gain among pregnant adolescents and recommendations for future research
Objective	The purpose of this article is to review the literature evaluating nutrition education interventions targeting pregnant adolescents to determine the extent to which these modern behavior change methodologies have been tested with this vulnerable group, examine the effects of such programs, and propose avenues for future research.
Search period	Since 1980 search date is not given
Participants	Target Population: Pregnant adolescents Gender: Women Age group: adolescent age group Each study has given different upper limit of age from 15 to 20 yrs of age. Ethnicity: Not specified few studies have mentioned ethnicity.
Intervention	Prenatal interventions that included a nutrition education and counseling component.
Comparison	Not specified
Outcome	Not specified
No of studies with Study design	A total of 27 articles were identified that met the inclusion criteria. The interventions are reviewed in two broad categories: controlled trials of prenatal nutrition interventions targeting or including pregnant adolescents; and evaluations of prenatal nutrition programs that included very small or no comparison groups. Study designs: -nonrandomized: 2 -nonrandomized, quasiexperimental -nonrandomized, controlled retrospective data survey -nonrandomized control study -nonrandomized retrospective medical chart review -nonrandomized retrospective medical record review: 2 -matched

	<p>case-control study: 2 -nonrandomized retrospective review of outcomes of contemporary groups of teens: 2 -cross-sectional comparison -examination of program effect -randomized controlled trial: 3 -large population-based database analysis -randomized, controlled formative evaluation of feasibility and effect of prenatal nutrition education pilot -nonrandomized descriptive comparison of different intervention: 2 -nonrandomized pre/posttest - qualitative research - evaluation of nutrition intake of teens attending specialized PNC without effect assessment - small randomized control pilot with volunteer subjects - quasi-experimental randomized control trial with convenience sample - comparison of intervention outcomes with local and national datasets .</p>
Other inclusion criteria	<p>Geographic location: High income countries; Out of total 27 studies 25 were from US, 1 from Canada and one from Aberdeen, Scotland. Most of the studies are from low socio-economic status</p>
Methodological quality	<p>Not mentioned</p>
Author ID	<p>Nutman (2013)</p>
Title	<p>Externalities of prevention of mother-to-child transmission programs: a systematic review</p>
Objective	<p>This review seeks to describe and quantify the effect of PMTCT programs in sub-Saharan Africa beyond transmission prevention and assess the current understanding about such programs as they relate to broader health outcomes. In addition, it identifies gaps in data that might affect decisions of policymakers and funders.</p>
Search period	<p>1st Jan 2000 to 15th Mar 2011</p>
Participants	<p>Target population: Not specifically mentioned in inclusion criteria; most of the studies target population is women (HIV+ or -) attending ANC/ health centers</p> <p>Number of included participants: Not mentioned</p> <p>Gender: Both gender</p> <p>Mostly women, but only one study where men were included. In few studies women and children attending primary health center and ANC/PCH staff were also included.</p> <p>Age not reported</p>

	Ethnicity: Not mentioned
Intervention	PMTCT service delivery including implementation of PMTCT and efforts to enhance or intensify pre-existing PMTCT programs.
Comparison	The results presented were from pre- and post-assessments of interventions directly related to PMTCT service delivery or compared persons or communities exposed and unexposed to such interventions. It is unclear from details of studies that if any comparison was done. Outcome Any other criteria Was the geographic location specified? Sub-Saharan Africa
Outcome	These outcomes included: attendance at antenatal clinics, presence of a skilled attendant at birth, emergency obstetric care, postpartum care for mother and child, antenatal tetanus toxoid immunization, iron and folic acid supplementation and detection of anemia, testing and treatment of sexually transmitted infections testing and treatment of other non- opportunistic infections (such as syphilis and malaria), family planning, and early childhood immunization. Ten of these outcomes were pre-specified and one (the inclusion of non-opportunistic infections into testing and treatment) was added after the initial screening process.
No of studies with study design	10 Pre/Post, 4 time series, 1 cross sectional retrospective with time series, 3 quasi-experimental, 1 longitudinal, 1 case-control.
Other inclusion criteria	Geographic location: LMICs Not specifically mentioned about LMICs but all the studies are from sub-Saharan Africa The studies should report at least one quantitative outcome related to maternal or child health
Methodological quality	Study rigor was evaluated on a ten-point scale adapted from a systematic review that used a nine point scale to evaluate the rigor of articles discussing the integration of HIV/AIDS interventions and family planning services [39 Spaulding AB, 2009]
Author ID	Obasola (2015)
Title	A Review of eHealth Interventions for maternal and child health in sub-

	Sahara Africa
Objective	To review eHealth interventions for maternal and child health (MCH) and to explore their influence on MCH practices in sub-Saharan Africa.
Search period	2002 to 2013
Participants	Target population: pregnant women and children under the age of 5 yrs. were considered; In few studies target population were men, HCW, volunteers, TBAs, health facilities, CHWs, etc. Number of included participants: Not reported. Gender: Both gender Age not reported Ethnicity: Not specified
Intervention	Information and communication technology interventions for delivering MCH information and services.
Comparison	Not mentioned
Outcome	Not specified.
No of studies with Study design	8 reports, 5 quantitative and 5 qualitative studies. Target population Pregnant women and children under the age of 5 yrs. In few studies target population were men, HCW, volunteers, TBAs, health facilities, CHWs, etc.
Other inclusion criteria	Geographic location: Sub-Saharan Africa Studies done in sub-Saharan Africa between 2002 to 2013
Methodological quality	Not mentioned
Author ID	O'Brien (2014)
Title	Technology-supported dietary and lifestyle interventions in healthy pregnant women: a systematic review
Objective	The aim of the current review is to systematically review the literature examining technology-supported lifestyle interventions among healthy pregnant women, and to determine the potential impact that such interventions could have on modern antenatal care.
Search period	Not specified
Participants	It is not specifically mentioned in methods section but in the title targeted population is healthy pregnant women. The term 'healthy' pregnant women refers to women who have not been diagnosed with gestational diabetes

	<p>mellitus (GDM) or any other common medical condition associated with pregnancy, and encapsulates all BMI categories.</p> <p>Number of included participants: The pooled RCTs included a total of 4500 participants and the pooled non-RCTs included 15 328 participants.</p> <p>Gender: Women</p> <p>Age not reported</p> <p>Ethnicity: Not mentioned</p>
Intervention	Technology-supported lifestyle interventions which are defined as dietary, exercise or health behavioural interventions that incorporate significant contributions from telephone, video, internet or mobile application (app) technologies.
Comparison	Not specifically mentioned in methods. But there was intervention group vs control group with standard care.
Outcome	The primary outcomes were fasting maternal glucose during pregnancy, incidence of GDM diagnosis and maternal GWG. Secondary outcomes included were intervention uptake and acceptance, and dietary or physical activity modification.
No of studies with Study design	The pooled RCTs included a total of 4500 participants and the pooled non-RCTs included 15 328 participants.
Other inclusion criteria	Geographic location: High income countries; All studies from developed countries. 4 from United States, 2 from Netherlands and 1 from Australia. Only English language articles were included.
Methodological quality	Not mentioned
Author ID	Oteng-Ntim (2012)
Title	Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcome: systematic review and meta-analysis
Objective	To determine the efficacy of antenatal dietary, activity, behaviour or lifestyle interventions in overweight and obese pregnant women to improve maternal and perinatal outcomes.
Search period	No restriction on publication date of the study, all studies published prior to Jan 2012
Participants	Target Population: obese and overweight pregnant women Number of included participants: The pooled RCTs included a total of 1,228

	<p>participants and the pooled non-RCTs included 1,534 participants</p> <p>Gender: Women</p> <p>Age not reported</p> <p>Ethnicity: Participants were predominantly white except in the studies by Asbee et al., Gray-Donald et al., and Hui et al. In the Asbee et al. study, the majority were described as being of Hispanic ethnicity.</p>
Intervention	Antenatal dietary and lifestyle interventions which included individual or group counselling, dietary and physical activity guidance.
Comparison	Not specified in inclusion criteria
Outcome	Quantitative maternal and fetal health outcomes. Such as maternal clinical outcomes of weight gain, gestational diabetes and Caesarean section and infant outcomes, such as large for gestational age and macrosomia.
No of studies with study design	Total 19 trials were included, out of which 13 were RCTs and 6 non-RCTs
Other inclusion criteria	Geographic location: High income countries; All 19 trials were performed in developed countries: five in the US, three in Canada, three in Australia, two in Finland and one in Denmark, Netherlands, Sweden, Spain, Brazil and Belgium.
Methodological quality	<p>Cochrane ROB</p> <p>The quality of studies was assessed based on how the studies had minimised bias and error in their methods. The studies were categorised according to criteria based on PRISMA guidelines and the Cochrane Library.</p>
Author ID	Poorman (2015)
Title	Use of text messaging for maternal and infant health: a systematic review of the literature
Objective	The goal of this review article is to identify studies of interventions relevant to the use of text messaging related to maternal health and infant care.
Search period	The primary search was conducted by the lead author in June, 2012. All articles published before 2012 were eligible for inclusion.
Participants	<p>Target population: Studies had to include reproductive age women (12–50 years) or infants up to 2 years of age; and be available in English.</p> <p>Number of participants ranged from: 19 to 22,658 n= 92,551</p> <p>Gender: Both gender</p> <p>Age not reported</p>

	Ethnicity: Not mentioned
Intervention	Interventions in the preconception, prenatal, or postpartum period endorsed by at least one of the following organizations: The American College of Obstetrics and Gynecology, the American Pediatrics Association, or the United States Preventive Services Task Force. Interventions that utilized other communication methods were included only if text messaging was the primary mode of communication.
Comparison	Not mentioned
Outcome	For the preconception period, studies focused on family planning, the treatment and prevention of sexually transmitted diseases, and vitamin adherence. In the pregnancy category, studies addressed increased access to and utilization of outpatient care, smoking cessation, substance abuse, and diabetes control. Studies related to postpartum and infant care included those related to weight loss, depression, and vaccine promotion.
No of studies with study design	48 studies
Other inclusion criteria	Geographic location: Not specified Given the lack of studies targeting the specified population, qualitative and pilot studies of text messaging interventions were included if specific to maternal or infant health promotion.
Methodological quality	Not mentioned
Author ID	Pottie (2014)
Title	Effect of rapid HIV testing on HIV incidence and services in populations at high risk for HIV exposure: an equity-focused systematic review
Objective	To assess the effects of rapid voluntary counselling and testing (VCT) for HIV on HIV incidence and uptake of HIV/AIDS services in people at high risk for HIV exposure.
Search period	From 1 January 2001 to 5 June 2014.
Participants	Target population: marginalised populations at high risk for HIV exposure Number of included participants: Not reported Gender: Both gender Age not reported Ethnicity: Not specified

Intervention	Rapid VCT with three main components: (1) facilitated voluntary enrolment; (2) use of a rapid-testing approach (providing results within 24 h) and (3) outreach counselling, delivery of results and treatment options. Use of the rapid test alone was not sufficient to be considered a rapid VCT.
Comparison	'Conventional approaches', which could include one or more of the above elements, but not all three. 'Conventional approaches' refers to HIV testing in health facilities using traditional laboratory testing approaches where the client has to wait for more than 24 h before results are received.
Outcome	Uptake of HIV testing, receipt of HIV tests, repeat HIV testing or retesting, HIV incidence and HIV-related stigma
No of studies with Study design	Total 13 studies were included. 8 RCTs and 5 prospective controlled observational studies.
Other inclusion criteria	Geographic location: Not specified
Methodological quality	Cochrane ROB And GRADE criteria. PRISMA Equity reporting guidelines were used Observational studies, were appraised using the Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomised studies and report the individual study cohort star template
Author ID	Rumbold (2008)
Title	A review of the impact of antenatal care for Australian Indigenous women and attempts to strengthen these services
Objective	To review evaluations of changes to services or changes in the delivery of antenatal care for Australian Indigenous women and the impact on utilization and quality of care, birth outcomes and maternal views about care.
Search period	Up to Feb 2006
Participants	Target population: Pregnant Australian Indigenous women Number of included participants: not mentioned Gender: Women Age not reported Ethnicity: Australian Indigenous women
Intervention	Either an antenatal care program or an explicit change in the provision of maternity services specifically developed to address the health needs of

	pregnant Australian Indigenous women
Comparison	Not specifically mentioned Outcome. Any other criteria Was the geographic location specified? Australia
Outcome	Measures of care utilization (for example gestational age at first antenatal visit, number of antenatal visits, antenatal hospitalisation, and other measured indicators of use of care) and any of the following health outcomes: perinatal mortality, maternal mortality, pre-eclampsia, anaemia (antenatal or postpartum), treated urinary tract infection including pyelonephritis (requiring antibiotic treatment or hospital admission), preterm birth (< 37 weeks' gestation), low birth weight (birth weight less than 10th percentile, or birth weight < 2,500 g), birth weight (mean or median) and measures of maternal alcohol, tobacco and other drug use in pregnancy. Other outcomes of interest included measures of quality of care: care consistent with antenatal clinical practice guidelines; models or programs that included interventions where there is good evidence of benefit; adherence to treatment interventions; women's views about care and satisfaction with care; and measures of cost and cost-effectiveness.
No of studies with study design	Programs
Other inclusion criteria	Geographic location: High income countries; Australian Indigenous women Studies were excluded if they were: not specifically about antenatal care, for example family planning, sexual health, breast feeding or infant care interventions; commentary or discussion about the need for better service provision; reports of descriptive epidemiology about patterns of care utilization or disparities in birth outcomes; descriptions of Indigenous cultural practices surrounding pregnancy and giving birth; or changes in service provision or interventions that were not specifically for Australian Indigenous women. Where care programs were identified for Indigenous women, studies were excluded if there was no formal evaluation undertaken or reported.
Methodological	Not mentioned

quality	
Author ID	Say (2011)
Title	Helping pregnant women make better decisions: a systematic review of the benefits of patient decision aids in obstetrics
Objective	To identify and critically appraise all randomised controlled trials evaluating patient decision aids in obstetrics and to evaluate their effects on decision-making processes and a range of clinical and psychosocial outcomes.
Search period	Inception of databases to May 2011
Participants	Target population: women facing any treatment decision in pregnancy Number of included participants: not mentioned Gender: Women Age not reported
Intervention	Patient decision aids. Studies evaluating health education material that did not address women's values and preferences were excluded.
Comparison	Not specified but reported in selected studies
Outcome	All reported outcomes
No of studies with study design	11 RCT
Other inclusion criteria	Geographic location: Not specified
Methodological quality	Jaddad's scale
Author ID	Sherr (2012)
Title	Involving fathers in prevention of mother to child transmission initiatives - what the evidence suggests
Objective	A systematic review was carried out to explore interventions in prevention of vertical transmission initiatives or general pregnancy programs aimed at male involvement around HIV prevention, management or care. The aim of the review was to identify any interventions (programs, community or healthcare based) with a paternal component and to summarize the knowledge base on the efficacy of such interventions.
Search period	Search was done in Dec 2011. Exact search period was not mentioned
Participants	Target population: all those in pregnancy care or identified through pregnancy where the issue of HIV infection, HIV testing or HIV prevention

	<p>interventions were reported</p> <p>Number of included participants: not mentioned</p> <p>Gender: Both gender</p> <p>Age not reported</p> <p>Ethnicity: not reported</p>
Intervention	Not specified but papers were first selected based on relevance to the topic if they related to any HIV and pregnancy/reproduction or fertility situation and included male involvement or male measures.
Comparison	Not mentioned
Outcome	Not specified but papers were first selected based on relevance to the topic if they related to any HIV and pregnancy/reproduction or fertility situation and included male involvement or male measures
No of studies with study design	13 studies; study designs not mentioned
Other inclusion criteria	<p>Geographic location: Not specified</p> <p>Exclusion criteria: Types of articles excluded were reviews, book chapters, dissertations, letters or editorial opinions. Excluded target populations were non-HIV (including those in high risk groups for HIV). Study types excluded were case report, studies without intervention or comparison/control groups or descriptive qualitative studies, which were retained for examination in terms of core concepts to inform the discussion but not included in the data extraction. Non-English articles were also excluded.</p>
Methodological quality	Not mentioned
Author ID	Sibley (2004)
Title	Does traditional birth attendant training increase use of antenatal care? A review of the evidence
Objective	To critically examine evidence concerning the effectiveness of TBA training in relation to use of ANC. Our purpose is to further the understanding of the potential of TBA training as a behavior change strategy to increase women's use of ANC services provided by skilled health professionals
Search period	1970-1999 first search, updated for period of July 1999 to December 2002.
Participants	Target population: TBAs or mothers and neonates, whose care was provided by trained TBAs or who were living in areas where more than 50% of births

	<p>were attended by trained TBAs</p> <p>Number of included participants: Provided in specific included studies</p> <p>Gender: Not specified</p> <p>Age not reported</p> <p>Ethnicity: Not reported</p>
Intervention	TBA training
Comparison	Not mentioned in the inclusion criteria
Outcome	Knowledge, attitude, behavior, or maternal and peri-neonatal health outcomes
No of studies with study design	15 quasi experimental studies
Other inclusion criteria	<p>Geographic location: Not specified</p> <p>Data were sufficient to calculate an effect size. Studies published in English.</p>
Methodological quality	Table 1 of the systematic review as described by Loevinsohn 1990. The overall quality of the studies included in this review was variable, making it impossible to attribute causality to the observed outcomes in relation to TBA training.
Author ID	Soubeiga (2014)
Title	Birth Preparedness and Complication Readiness (BPCR) interventions to reduce maternal and neonatal mortality in developing countries: systematic review and meta-analysis
Objective	The primary aim of this review was to evaluate the impact BPCR interventions in reducing maternal and neonatal mortality in developing country settings. We also examined the impact of BPCR interventions on process outcomes such use of skilled services, and hygienic practices in the home.
Search period	December 17th 2012, updated December 5th 2013.
Participants	<p>Target population: pregnant women who received BPCR interventions and lived in developing countries as classified by the World Bank; studies included husbands, persons close to the women, other women of reproductive age in the community, or community leaders</p> <p>Number of included participants: n= 307018</p> <p>Gender: Women</p> <p>Age not reported</p>

Intervention	These were intervention packages that included any component of the Birth Preparedness and Complication Readiness (BPCR) concept, individually or in combination. Interventions could take place in antenatal, intra-partum, postpartum and neonatal care periods; and at different levels of care (provider, facility, home, community). Specific approaches assessed included counselling of women in prenatal clinics, home visit strategies; and community mobilisation activities.
Comparison	Women who received no experimental BPCR intervention defined by studied trial.
Outcome	Primary outcomes are maternal mortality and neonatal mortality. Secondary outcomes are institutional delivery, home delivery with skilled birth attendant, use of skilled care for neonatal illness, use of postpartum care, clean cutting of the umbilical cord, initiation of breastfeeding within the first hour of birth, knowledge of maternal and neonatal danger signs, and birth preparedness and complication readiness behaviours.
No of studies with study design	14 RCT
Other inclusion criteria	Geographic location: Developing countries
Methodological quality	Methodological quality based on the recommendations of the Cochrane Collaboration and the McMaster Quality Assessment Tool for Quantitative Studies
Author ID	Stockley (2008)
Title	Use of folic acid supplements, particularly by low-income and young women: a series of systematic reviews to inform public health policy in the UK
Objective	To provide a basis for making recommendations on the potential to improve use of folic acid supplements in the UK, particularly among low-income and young women. Information of folic acid supplement use in relation to decreasing the risk of neural tube defects for example to assess the level of use or knowledge or attitudes; to carry out and evaluate an intervention to increase uptake.
Search period	1989 to May 2006 (as provided in abstract)
Participants	Target population: healthy, free-living women of childbearing age Excluded - Other groups, including pregnant women – unless the study is retrospective

	<p>with the pre conceptual period included. Unhealthy population receiving drug or medical intervention. Women, or close relatives of women, with preexisting conditions, or previously affected births, or at risk of carrying a genetic disorder</p> <p>Gender: Both gender</p> <p>Age not reported</p> <p>Ethnicity: not mentioned</p>
Intervention	Not specified. But as mentioned in purpose - Information of folic acid supplement use in relation to decreasing the risk of neural tube defects
Comparison	Not specified
Outcome	Uptake of folic acid
No of studies with study design	9 studies SR, trails (with or without control groups), program evaluations, cost-effectiveness analysis, Cross-sectional surveys, prospective cohorts Qualitative studies Expert reports/Consultations, case series.
Other inclusion criteria	<p>Geographic location: High income countries; Europe, the US, Canada, Australia and New Zealand</p> <p>Inclusion criteria - European languages, Dates since 1998 Published and 'grey' literature from scientific and reputable sources.</p>
Methodological quality	Not mentioned
Author ID	Vélez (2014)
Title	The role of health systems and policy in producing behavior and social change to enhance child survival and development in low-and middle-income countries: an examination of the evidence
Objective	Identify effective, proven interventions that could contribute to the goal of reducing child mortality and ensuring healthy child survival and development. One of those dimensions is the subject of this article - social and behavior changes that are facilitated by interventions targeting health systems and health policies.
Search period	Published on or after Jan 1, 1990
Participants	<p>Target population: not specifically mentioned; appears to range from child, mother, caregivers, health provider, community level etc. (as mentioned in Figure 3 of the systematic review)</p> <p>Number of included participants: not mentioned</p>

	<p>Gender: Not specified</p> <p>Age not reported</p> <p>Ethnicity: not reported</p>
Intervention	Social or behavior change intervention
Comparison	Not specifically mentioned
Outcome	Measurement of at least one of the following: (a) health outcome related to maternal health or child health and development; (b) a behavioral outcome that contributes to improved child survival, including behaviors relevant to maternal health, female or adolescent reproductive health, provider behavior (includes teachers or other individuals who have the potential to influence maternal=child health behaviors or outcomes such as spouses, mother-in-laws), and community-level behaviors; or (c) child development outcome for children under 5 years of age.
No of studies with study design	Details not provided
Other inclusion criteria	<p>Geographic location: LMICs</p> <p>Exclusion criteria: Where possible, the following exclusion criteria were applied to the database searches; Documents not published in English, Spanish, or Portuguese. Documents published before January 1, 1990. Documents not detailing an intervention that includes a measurement of at least one child or maternal health outcome, behavioral outcome, or child development outcome. Documents focusing only on knowledge and attitudes without any identifiable changes in behavior, developmental, or health outcomes. Research carried out in high-income countries. Magazine or newspaper articles; letters to the editor; obituaries; commentaries and recommendations that are not based on thorough literature reviews; book reviews; job postings and historical accounts</p>
Methodological quality	The quality review instruments were derived from previous evidence summits (Higgs et al., 2012; Higgs et al., 2014). The quality review was designed to accommodate review articles, reports of qualitative work, and reports of quantitative research, using survey logic to direct respondents to questions appropriate for the document type. The question set was revised to a set of 20 questions
Author ID	Victoria (2012)

Title	Scaling up maternal nutrition programs to improve birth outcomes: a review of implementation issues
Objective	In this paper we build upon the findings on efficacy through a review of large-scale maternal nutrition programs that combine one or more interventions implemented at the national or at the very least at the provincial or state level. We review the main barriers and enabling factors affecting such programs, and pay particular attention to those with documented evidence of success or failure.
Search period	Not mentioned
Participants	Target population: Not mentioned in the inclusion criteria; but programs were for pregnant women and children Number of included participants: not mentioned Gender: Not specified Age not reported Ethnicity: not specified
Intervention	Each type of program covered by this paper: food fortification—salt iodization; food fortification—flour fortification with iron and foliate; micronutrient supplementation (iron, multiple micronutrients); integrated programs, including food supplementation and/or nutrition education and counseling; and conditional cash transfers (as a platform for delivering the above interventions).
Comparison	Not mentioned
Outcome	Attained coverage and/or impact. The criteria for identifying a program as successful were expanded from those proposed by Mason et al. » Targeting: program is adequately targeted at a subpopulation that can benefit from it; » Coverage: a high proportion of the target population is reached; » Equity: coverage is equitable, that is, no subgroup of the target population is left behind; » Resource intensity: there is a sufficient amount of available resources per participant; » Technology: there is an appropriate and innovative (if applicable) use of technology; » Sustainability: program is sustained over a period of several years; » Impact: there is a measurable impact on health and/ or nutrition (this is a desirable criterion, but it is recognized that few programs undergo rigorous impact evaluations).
No of studies with	Not mentioned

study design	
Other inclusion criteria	Geographic location: LMICs; Sub-Saharan Africa and South Asia with emphasis on three countries or regions—India, Northern Nigeria, and Ethiopia Lessons learned from major programs in other low- and middle-income countries (e.g. Latin America, North Africa and the Middle East, and East Asia) are also reviewed when relevant.
Methodological quality	Not mentioned
Author ID	Vlemmix (2013)
Title	Decision aids to improve informed decision-making in pregnancy care: a systematic review
Objective	To conduct a systematic review of randomised trials to summarise the available decision support techniques, and to assess their quality and their effectiveness for pregnancy care.
Search period	Up to March 2011
Participants	Target population: pregnant women, who were facing the relevant pregnancy care decision in their current pregnancy. Number of included participants: not specified 10 studies included Gender: Women Age not reported Ethnicity: not reported
Intervention	Decision Aids (DAs) - defined as interventions that provide unbiased and nondirective information to help pregnant women make choices based on personal values. They should contain information on all treatment options (including expectant management), and outcomes relevant to a person's health status. Furthermore, implicit methods to clarify values should also be presented.
Comparison	We included randomised controlled trials that compared pregnancy care DAs with no intervention, usual care, alternative interventions, or a combination of these. Any other criteria Was the geographic location specified? no

Outcome	Decisional conflict score (DCS), knowledge and anxiety. Defined as Decisional conflict refers to uncertainty in chosen option and the score ascertains whether individuals had clarity of values and felt informed and supported in their decision making. Knowledge is assessed using specific questions concerning the topic of the DA and usually consists of several true/false or multiple choice questions. Anxiety is often examined in these studies to confirm that DAs do not increase anxiety by providing too much detailed information. Anxiety was usually measured using the State- Trait Anxiety Scale. Secondary outcomes assessed were effectiveness of DA (proportion of individuals undecided, accuracy of risk perception of treatment options, enough information to make decision, involvement in decision making, regret of choice and satisfaction with choice); acceptability of DA (readability of DA and usefulness of information to make choice); decision behaviour outcomes (outcome of decision, uptake of intervention, and adherence to chosen option); health outcomes (neonatal and maternal morbidity and mortality, Apgar score, gestational age at delivery, and depression and self-esteem); and health care system outcomes (cost-effectiveness of the DA, length of stay in hospital and length of consultation).
No of studies with study design	10 studies included; details not given.
Other inclusion criteria	Geographic location: Not specified Exclusion Criteria: We excluded studies where the interventions did not meet the criteria of a DA or where the DA was not available and the article did not provide enough information to determine whether the intervention met the minimum criteria to qualify as a patient DA, according to the International Patient Decision Aid Standards (IPDAS) criteria
Methodological quality	Cochrane ROB GRADE scale - to assess quality of evidence International Patient Decision Aid Standards ((IPDAS) to asses quality of decision aid, categorized them as low/high quality aids using arbitrary cut-off value of 60% of total IPDAS score
Author ID	Watterson (2015)
Title	Using mHealth to improve usage of antenatal care, postnatal care, and immunization: a systematic review of the literature

Objective	To determine the effectiveness of mHealth tools to increase the coverage and use of antenatal care, postnatal care and childhood immunizations through behavioural change in low and middle income countries.
Search period	Jan 1, 2000 to Nov 20, 2014
Participants	Target population: not specified; • Women (pregnant, non- non pregnant, mothers) • Family members • Lay carers • Traditional birth attendants • Skilled attendants at birth • Midwives • Members of village health committees • Community health workers • Social workers • Health volunteers Gender: Both gender Age not reported Ethnicity: Unclear
Intervention	mHealth tools
Comparison	Not mentioned
Outcome	Antenatal care attendance. Childhood immunization rates. Postnatal care attendance.
No of studies with study design	10 studies 2 RCT. 8 Observational studies
Other inclusion criteria	Geographic location: LMICs Studies should be in English language
Methodological quality	Cochrane ROB Newcastle Ottawa Quality Assessment Scale: Observational studies Evaluating potential sources of bias in the selection and comparability of participants, the assessment of outcomes, and the duration and adequacy of the follow up: Non randomized studies
Author ID	Webb (2012)
Title	Nutrition education and counselling provided during pregnancy: effects on maternal, neonatal and child health outcomes
Objective	To see the effect of Nutrition Education Counselling on maternal, neonatal and infant health outcomes including gestational weight gain, maternal anaemia, birthweight, low birthweight and preterm delivery.
Search period	Author did not put a limit on publication date. The last search date was conducted on July 2011.
Participants	Target population: pregnant adults or adolescents and providing

	<p>Number of included participants: Total sample is not specified. For each outcome sample size is given in the table illustrated in the systematic review</p> <p>Gender: Women</p> <p>Age not reported</p> <p>Ethnicity: Not specified</p>
Intervention	The Nutrition Education Counselling intervention focused on improving maternal diet and nutritional status during pregnancy.
Comparison	The comparison group was a concurrent control or comparison group that did not receive NEC. In the event that both groups received NEC, the system of delivery, number of sessions and/or intensity differed.
Outcome	The primary maternal outcomes included gestational weight gain, PIH, haemorrhage, gestational diabetes, anemia and mortality. Neonatal and infant outcomes included birth weight, LBW as defined by study authors, prematurity as defined by study authors, gestational age, intrauterine growth retardation/small-for-gestational age, mortality (stillbirths, perinatal, neonatal and infant mortality), neonatal and infant morbidity and infant growth. Secondary outcomes: behaviours antecedent to the primary outcomes of interest including changes in diet practices, compliance to micronutrient supplementation, including iron-folic acid (IFA) supplements, and uptake of antenatal care.
No of studies with study design	15 RCTs in which 2 were clustered RCTs and 18 Quasi-experimental in which 4 were clustered QE
Other inclusion criteria	Geographic location: Not specified; it is mentioned that out of 34 there were 11 studies from LMICs
Methodological quality	The quality of the evidence was assessed and graded according to the Child Health Epidemiology Reference Group adaptation of the Grading of Recommendations, Assessment, Development and Evaluation technique

3.5.1. Assessing the Methodological Quality of the Systematic Reviews

Note: The numbering used in this table corresponds to the questions mentioned below:

Questions pertaining to Revised Assessment of Multiple Systematic reviews and Meta-analysis.

1. Was an 'a priori' design provided?

- (A) 'a priori' design
- (B) Statement of inclusion criteria

(C) PICO/PIPO research question (population, intervention, comparison, prediction, outcome)

2. Was there duplicate study selection and data extraction?

- (A) There should be at least 2 independent data extractors as stated or implied
- (B) Statement of recognition or awareness of consensus procedure for disagreements
- (C) Disagreements among extractors resolved properly as stated or implied

3. Was a comprehensive literature search performed?

- (A) At least 2 electronic sources should be searched
- (B) The report must include years and databases used (e.g. CENTRAL, MEDLINE, EMBASE)
- (C) Keywords or MESH terms (or both) must be stated AND where feasible the search strategy outline should be provided such that one can trace the filtering process of the included articles
- (D) In addition to the electronic databases (PubMed, MEDLINE, EMBASE), all searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found
- (E) Journals were “hand-searched” or “manual searched” (i.e. identifying highly relevant journals and conducting a manual, page by- page search of their entire contents looking for potentially eligible studies)

4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?

- (A) The authors should state that they searched for reports regardless of their publication type
- (B) The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language, etc.
- (C) “Non-English papers were translated” or readers sufficiently trained in foreign language
- (D) No language restriction or recognition of non-English articles

5. Was a list of studies (included and excluded) provided?

- (A) Table/list/figure of included studies, a reference list does not suffice
- (B) Table/list/figure of excluded studies, either in the article or in a supplemental source (i.e. online). (Excluded studies refers to those studies seriously considered on the basis of title and/or abstract, but rejected after reading the body of the text)
- (C) Author satisfactorily/ sufficiently stated the reason for exclusion of the seriously considered studies
- (D) Reader was able to retrace the included and the excluded studies anywhere in the article

bibliography, reference or supplemental source

6. Were the characteristics of the included studies provided?

- (A) In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions AND outcomes
- (B) Provide the ranges of relevant characteristics in the studies analysed (e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity or other diseases should be reported)
- (C) The information provided appears to be complete and accurate (i.e. there was a tolerable range of subjectivity here. Is the reader left wondering? If so, state the needed information and the reasoning)

7. Was the scientific quality of the included studies assessed and documented?

- (A) 'A priori' methods of assessment should be provided (e.g. for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant
- (B) The scientific quality of the included studies appeared to be meaningful
- (C) Discussion/ recognition/ awareness of level of evidence
- (D) Quality of evidence should be rated/ranked based on characterized instruments. (Characterized instrument is a created instrument that ranks the level of evidence, e.g. GRADE (Grading of Recommendations Assessment, Development and Evaluation))

8. Was the scientific quality of the included studies used appropriately in formulating conclusions?

- (A) The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review
- (B) The results of the methodological rigor and scientific quality were explicitly stated in formulating recommendations
- (C) To have conclusions integrated/ drives towards a clinical consensus statement
- (D) This clinical consensus statement drives towards revision or confirmation of clinical practice guidelines

9. Were the methods used to combine the findings of studies appropriate?

- (A) Statement of criteria that were used to decide that the studies analysed were similar enough to be pooled?
- (B) For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi² test for homogeneity, I² statistic)

- (C) Is there a recognition of heterogeneity or lack of thereof
- (D) If heterogeneity exists a “random-effects model” should be used or the rationale (i.e. clinical appropriateness) of combining should be taken into consideration (i.e. is it sensible to combine?), or stated explicitly (or both)
- (E) If homogeneity exists, author should state a rationale or a statistical test
- 10. Was the likelihood of publication bias (a.k.a. “file drawer” effect) assessed?**
- (A) Recognition of publication bias or file drawer effect
- (B) An assessment of publication bias should include graphical aids (e.g. funnel plot, other available tests)
- (C) Statistical tests (e.g. Egger regression test)
- 11. Was the conflict of interest stated?**
- (A) Statement of sources of support
- (B) No conflict of interest. This is subjective and may require some deduction or searching
- (C) An awareness/ statement of support or conflict of interest in the primary inclusion studies

R-AMSTAR Question numbers	Systematic review ID													
	Hemsing 2012	Nabhan 2015	Nielsen 2006	Nutman 2013	Obasola 2015	O'Brien 2014	Dawn 2014	Oteng-Ntim 2012	Poorman 2015	Pottie 2014	Webb 2012	Rumbold 2008	Say 2011	Sherr 2012
1 (A)	U	Y	U	Y	U	U	Y	Y	U	Y	U	N	U	Y
1 (B)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1 (C)	Y	Y	Y	U	U	Y	Y	Y	U	Y	Y	Y	Y	Y
Score	3	4	3	3	2	3	4	4	2	4	3	3	3	4
2 (A)	Y	Y	U	U	U	U	Y	Y	U	Y	Y	U	U	N
2 (B)	Y	Y	U	U	U	U	Y	Y	Y	Y	Y	N	U	N
2 (C)	Y	Y	U	U	U	U	Y	Y	U	U	Y	U	U	N
Score	4	4	1	1	1	1	4	4	2	3	4	1	1	1

3 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (B)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U
3 (C)	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (D)	U	Y	U	U	Y	Y	U	U	N	Y	U	Y	Y	U
3 (E)	U	U	U	U	U	Y	U	U	Y	Y	Y	Y	U	U
Score	2	4	3	3	4	4	3	3	4	4	4	4	4	2
4 (A)	U	U	U	U	U	U	U	U	N	Y	U	Y	U	U
4 (B)	Y	Y	U	U	U	U	U	Y	Y	Y	Y	Y	Y	Y
4 (C)	NA	U	U	U	U	N	U	U	N	U	NA	U	NA	NA
4 (D)	N	Y	U	U	U	N	U	Y	N	Y	N	U	N	N
Score	2	3	1	1	1	1	1	3	2	4	2	3	2	2
5 (A)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5 (B)	Y	Y	N	Y	Y	Y	Y	Y	N	Y	U	Y	Y	U
5 (C)	Y	Y	N	Y	Y	U	Y	Y	Y	Y	U	N	Y	N
5 (D)	Y	Y	N	U	Y	Y	Y	Y	U	Y	Y	N	N	N
Score	4	4	1	3	4	3	4	4	2	4	2	2	3	1
6 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
6 (B)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
6 (C)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
Score	4	4	4	4	3	4	4	4	4	4	1	4	2	4
7 (A)	Y	Y	N	Y	U	U	Y	Y	N	Y	Y	N	Y	N
7 (B)	Y	Y	U	Y	U	U	Y	Y	U	Y	Y	NA	Y	U
7 (C)	Y	Y	N	Y	N	U	Y	Y	N	Y	Y	N	N	N
7 (D)	Y	Y	U	U	U	U	Y	U	U	Y	Y	U	U	U
Score	4	4	1	3	1	1	4	3	1	4	4	1	2	1
8 (A)	Y	Y	Y	Y	N	U	Y	Y	N	Y	Y	Y	Y	N
8 (B)	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	U	N
8 (C)	Y	NA	U	NA	U	U	Y	N	NA	Y	N	U	U	Y

8 (D)	Y	NA	U	NA	U	U	Y	N	NA	Y	N	U	U	U
Score	4	4	2	4	1	1	4	2	2	4	2	2	1	1
9 (A)	NA	Y	NA	U	NA	NA	Y	Y	NA	Y	Y	NA	NA	NA
9 (B)	NA	Y	NA	Y	NA	NA	N	N	NA	N	Y	NA	NA	NA
9(C)	NA	Y	NA	U	NA	NA	Y	Y	NA	Y	Y	NA	NA	NA
9 (D)	NA	Y	NA	NA	NA	NA	Y	Y	NA	Y	Y	NA	NA	NA
E)	NA	Y	NA	NA	NA	NA	NA	NA	NA	NA	Y	NA	NA	NA
Score	4	4	4	1	4	4	4	4	4	4	4	4	4	4
10 (A)	U	Y	U	U	U	U	Y	U	Y	U	U	Y	U	U
10 (B)	U	U	U	U	U	U	Y	U	U	U	U	U	U	U
10 (C)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Score	1	2	1	1	1	1	3	1	2	1	1	2	1	1
11 (A)	Y	Y	U	U	Y	Y	Y	Y	U	Y	U	Y	Y	N
11 (B)	Y	Y	U	U	U	Y	N	Y	U	Y	Y	U	Y	Y
11 (C)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Score	3	3	1	1	2	3	2	3	1	3	2	2	3	2
Total Score	35	40	22	25	24	26	37	35	26	39	29	28	26	23
Y: Yes; N: No; U: Unclear; NA: Not applicable														

3.5.2. Assessing the Methodological Quality of the Systematic Review

R	Systematic review ID
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	Vélez 2014	Victoria 2012	Vlemmix 2013	Stockley 2007	Soubeiga 2014	Aguiar 2015	Bhutta 2005	Birch 2015	Brusamento 2011	Burton 2010	Dean 2014	Di Mario 2015	Watterson 2015
1 (A)	Y	U	Y	U	U	U	U	U	Y	U	U	Y	U
1 (B)	Y	U	Y	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
1 (C)	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
Score	4	2	4	1	3	3	3	3	4	3	3	4	3
2 (A)	U	U	Y	N	Y	Y	U	U	Y	Y	Y	U	N
2 (B)	U	U	Y	N	Y	U	U	U	Y	Y	U	U	U
2 (C)	U	U	Y	N	Y	U	U	U	Y	Y	U	U	U
Score	1	1	4	1	4	2	1	1	4	4	2	1	1
3 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (B)	Y	N	Y	Y	Y	U	U	Y	Y	Y	N	Y	Y
3 (C)	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (D)	Y	U	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y
3 (E)	Y	U	U	U	Y	U	U	U	U	U	U	Y	U
Score	4	1	4	4	4	3	3	3	4	4	3	4	4
4 (A)	N	Y	Y	Y	Y	U	Y	U	U	Y	U	Y	N
4 (B)	Y	U	Y	Y	Y	Y	U	Y	Y	Y	U	Y	Y
4 (C)	U	U	Y	Y	U	NA	U	NA	U	N	U	U	NA
4 (D)	N	U	Y	Y	N	N	U	N	Y	N	U	Y	N
Score	1	1	4	4	2	1	1	1	2	2	1	3	2
5 (A)	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
5 (B)	Y	N	Y	N	Y	N	N	N	Y	N	N	Y	N
5 (C)	U	N	Y	U	Y	Y	U	U	Y	Y	U	Y	Y
5 (D)	N	N	N	U	N	N	N	N	Y	N	N	Y	N
Score	2	1	3	1	3	2	1	1	4	2	1	4	2
6 (A)	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
6 (B)	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y

6 (C)	N	N	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y
Score	1	3	4	4	2	4	4	4	4	4	1	4	4
7 (A)	Y	N	Y	N	Y	Y	U	U	Y	Y	Y	Y	Y
7 (B)	Y	N	Y	U	Y	Y	U	U	Y	Y	U	Y	Y
7 (C)	Y	N	Y	N	N	U	U	U	U	U	U	Y	U
7 (D)	Y	U	Y	U	U	U	U	U	U	U	U	Y	U
Score	4	1	4	1	2	2	1	1	2	2	1	4	2
8 (A)	U	Y	Y	N	Y	N	U	U	Y	Y	U	Y	Y
8 (B)	U	Y	Y	N	U	U	U	U	N	U	U	Y	Y
8 (C)	Y	NA	U	Y	Y	NA	U	NA	NA	NA	NA	NA	NA
8 (D)	U	NA	U	U	U	NA	U	NA	NA	NA	NA	NA	NA
Score	1	4	2	1	2	2	1	2	3	3	2	4	4
9 (A)	NA	NA	Y	NA	Y	NA	U	U	U	NA	Y	U	U
9 (B)	NA	NA	Y	NA	Y	NA	U	U	U	NA	Y	U	U
9(C)	NA	NA	Y	NA	Y	NA	U	U	U	NA	Y	U	U
9 (D)	NA	NA	Y	NA	Y	NA	U	U	U	NA	Y	NA	NA
9 (E)	NA	NA	Y	NA	NA	NA	U	U	U	NA	NA	U	U
Score	4	4	4	4	4	4	1	1	1	4	4	1	1
10 (A)	U	Y	Y	U	N	U	U	U	U	U	U	U	U
10 (B)	U	U	Y	U	U	U	U	U	U	U	U	U	U
10 (C)	U	U	Y	U	U	U	U	U	U	U	U	U	U
Score	1	2	4	1	1	1	1	1	1	1	1	1	1
11 (A)	Y	N	Y	Y	N	U	Y	U	Y	Y	Y	Y	U
11 (B)	Y	U	Y	U	Y	Y	N	Y	Y	U	Y	Y	Y
11 (C)	U	U	U	U	U	U	U	U	U	U	U	U	U
Score	3	1	3	2	2	2	2	2	3	2	3	3	2
Total score	26	21	40	24	29	26	19	20	32	31	22	33	26
Y: Yes; N: No; U: Unclear; NA: Not applicable													

3.5.3. Assessing the Methodological Quality of the Systematic Review

R- A	Systematic review ID
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	Dugas 2012	George 2015	Gilinsky 2010	Gogia 2010	Govindasamy 2014	Hensen 2012	Higgs 2014	Kennedy 2013	Lassi 2015 [community]	Lassi 2015 [impact]	Lathrop 2013	Lee 2009	Mangham- Jeffries 2014	Sibley 2004
1 (A)	U	Y	U	U	U	U	U	U	Y	U	U	U	Y	U
1 (B)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1 (C)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Score	3	4	3	3	3	3	3	3	4	3	3	3	4	3
2 (A)	Y	Y	N	Y	N	U	U	Y	Y	Y	N	U	Y	U
2 (B)	Y	Y	U	Y	U	U	U	Y	Y	Y	NA	U	Y	U
2 (C)	Y	Y	U	Y	U	U	U	Y	Y	Y	NA	U	Y	U
Score	4	4	1	4	1	1	1	4	4	4	1	1	4	1
3 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (B)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (C)	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
3 (D)	Y	Y	Y	U	Y	U	Y	Y	U	Y	Y	U	Y	Y
3 (E)	Y	U	U	U	U	U	U	Y	Y	U	U	U	U	Y
Score	4	4	4	2	3	3	4	4	4	4	4	3	4	4
4 (A)	U	Y	N	U	Y	N	Y	N	Y	U	U	U	Y	Y
4 (B)	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	U	U	U	Y
4 (C)	Y	U	NA	U	U	NA	U	Y	U	U	U	U	U	N
4 (D)	N	Y	N	Y	U	N	U	Y	Y	Y	U	U	U	Y
Score	3	4	2	3	3	2	2	4	4	3	1	1	2	4
5 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5 (B)	N	N	N	N	N	N	N	N	Y	N	U	N	N	N
5 (C)	Y	Y	N	Y	Y	Y	U	Y	Y	N	U	N	Y	N
5 (D)	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Score	2	2	1	2	2	2	1	2	4	1	1	1	2	1
6 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6 (B)	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	N

6 (C)	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	Y	N
Score	4	3	4	4	4	4	2	4	3	2	4	2	3	2
7 (A)	Y	Y	Y	Y	Y	Y	U	Y	Y	U	U	U	N	U
7 (B)	Y	Y	Y	U	Y	N	U	U	Y	Y	U	U	N	Y
7 (C)	U	U	U	U	U	U	U	U	U	U	U	Y	U	U
7 (D)	U	U	U	U	U	U	U	U	U	U	U	Y	U	U
Score	2	2	2	1	2	1	1	1	2	1	1	2	1	1
8 (A)	U	Y	Y	U	Y	U	U	Y	Y	Y	U	U	U	Y
8 (B)	N	Y	Y	N	U	U	U	N	Y	Y	U	Y	U	Y
8 (C)	Y	NA	U	NA	NA	NA	NA	Y	Y	NA	Y	Y	NA	NA
8 (D)	NA	NA	U	NA	NA	NA	NA	Y	U	NA	N	Y	NA	NA
Score	2	4	2	2	3	2	2	3	3	4	1	3	2	4
9 (A)	Y	NA	U	Y	U	U	U	NA	Y	NA	U	Y	NA	Y
9 (B)	Y	NA	U	Y	U	U	U	NA	Y	NA	U	Y	NA	U
9(C)	Y	NA	U	Y	U	U	U	NA	Y	NA	U	Y	NA	U
9 (D)	Y	NA	U	Y	U	U	U	NA	Y	NA	U	Y	NA	U
E)	Y	NA	U	NA	U	U	U	NA	Y	NA	U	NA	NA	U
Score	4	4	1	4	1	1	1	4	4	4	1	4	4	1
10 (A)	Y	U	N	Y	U	U	U	U	Y	U	U	U	U	Y
10 (B)	Y	U	N	Y	U	U	U	U	Y	U	U	U	U	Y
10 (C)	U	U	N	Y	U	U	U	U	U	U	U	U	U	U
Score	3	1	1	3	1	1	1	1	3	1	1	1	1	3
11 (A)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11 (B)	U	Y	Y	Y	U	U	Y	U	Y	Y	N	Y	Y	U
11 (C)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Score	2	3	3	3	2	2	3	2	3	3	2	3	3	2
Total Score	33	35	24	31	25	22	21	32	38	30	20	24	30	26
Y: Yes; N: No; U: Unclear; NA: Not applicable														

3.6. Intervention details

Intervention details	Outcomes												
	a. ANC coverage	b. Uptake of services										c. ARV uptake	
		Uptake of TT	Uptake of HIV testing	Uptake of IFA	Uptake of prenatal screening	Nutrition and knowledge	Knowledge of danger signs	Knowledge of prenatal screening	Decision making for prenatal screening	Alcohol reduction	Smoking cessation		Other changes in behavior
A. Content of the intervention													
1. Education on birth and neonatal care preparedness/ danger signs	Gogia (4 studies) Lathrop (3 studies) Lee (1 study)	Gogia (4 studies) Lassi[C] (4 studies)		Lassi [c] (2 studies)			Aguiar (4 studies) Higgs (1 study) Soubeiga (4 studies)						
2. Spreading awareness	Georg				Vlemm	O'Brie						Georg	

about entitled health services or decisional support	e (4 studies)				ix (5 studies)	n (1 study)		Birch (3 studies)				e (1 study)	
3. Reminders (antenatal visit and immunization)	Waterson (6 studies)			Stockely (1 study)			Higgs (1 study)						
4. Health education/advice/motivation	Waterson (5 studies)	Lassi [c] (2 studies)	Brusamento (1 study)	Lassi [c] (2 studies)		Obasola (1 study)	Higgs (1 study)	Lathrop (4 studies)		Dean (1 study)	Poorman (1 study)		Govindasamy (2 studies)
	Lassi		Kenny (4)	Stockely (1)			Poorman (1 study)				Dean (1)		Lassi

	[i] (2 studies) Lee (1 study) Obasola (1 study) Nutman (6 studies) Rumbold (4 studies)		studies)	study)							study)		[i] (4 studies) Kennedy (4 studies)
5. Counselling before screening for HIV	Mangham Jeffries (1 study) Govin	Nutman (3 studies)	Brusamento (1 study) Hensen (10	Nutman (5 studies)									Burton (1 study) Govindasa

	dasamy (1 study)		counseling) Kennedy (5 studies) Velez (1 study) Sherr (13 studies)										my (1 study) Lassi [i] (1 study) Pottier (1 study) Sherr (13 studies) Kennedy (4 studies)
6. Awareness of prenatal screening of diseases								Di Mario	Dugas (6				

								(2 studies) Dugas (6 studies) Vlemmix(5 studies)	studies) Vlemmix (2 studies)				
7. Altering habits (Smoking or alcohol cessation) by motivation/ counselling										Gilinsky (8 studies) Nabhain (1 study) Bhutta (6 studies)	Hemsi ng (6 studies)		

8. Promotion of NGO clinic for facility based ANC	Mangham Jeffries (1 study)												
9. Nutrition, education, counselling	Webb (2 studies) Victoria (3 studies)			Webb (1 study)		Nielson (4 studies) Nielson 2006 (10 studies) Webb (1 study) Nutman (4 studies)							

10. Community mobilization	Lassi [c] (1 Study) Lee (1 study)			Lassi [c] (1 Study) Stockel y (4 studies)									
B. Who provided the intervention													

1. Community health workers (Female community health worker or Anganwadi workers, ANMs, village health workers)/ health workers	Gogia (4 studies) Watterson (3 studies) Lassi [i] (1 study) Lee (1 study) Rumbold (1 study)	Gogia (4 studies) Lassi [c] (3 studies)	Henso n (2 studies)	Lassi [c] (2 studies)							Hemsi ng (1 study)		Lassi [i] (1 study)
2. Community based organization/ local Govt. & youth organizations	Gogia (2 studies)						Higgs(1 study)	Soube iga (2 studies)				Georg e (1 study)	
3. Trained volunteers	Gogia	Lassi					O'Brien			Gilin			Govin

	(2 studies) Webb (1 study)	[c] (1 study)					(1 study)			sky (3 studies)			dasma my (1 study)
4. TBA/midwife	Mangham Jeffries (1 study)	Lassi [c] (1 study)	Kennedy (1 study)							Gilinsky (1 study)			Kennedy (1 study)
5. Health professionals/ public health agencies			Brusamento (1 study)	Stockley (1 study)			Higgs (1 study) Oteng Ntim (1 study)	Di Mario (2 study) Birch (1 study)		Gilinsky (2 studies)	Hemsi ng (1 study)	Bhutta (5 studies)	
6. Counsellor/ nurse counsellor			Henso n (1 study)	Lassi [c] (2 studies)						Gilinsky (1 study)	Hemsi ng (1 study)		Kennedy (2 studies)

				Kennedy (2 studies)							y)			es)
7. Female facilitator	Lassi [i] (1 study)	Lassi [c] (2 studies)												
C. How the intervention was delivered (Medium)														
1. Home visits	Gogia (4 studies) George (1 study) Webb (1 study) Lassi [i] (1 study)	Gogia (4 studies) Lassi [c] (1 study)		Lassi [c] (1 study)		Neilson (1 study)	Soubegha (4 studies)							George (1 study)

	Lee (1 study) Rumbold (6 studies)												
2. Counselling	George (4 studies) Webb (1 study) Govindasamy (1 study) Nutman (1 study) Rumbold (2 studies)		Brusamento (1 study) Henson (3 studies) Kennedy (5 studies) Velez (9 studies)	Stockel y (1 study)	Vlemm ix (2 studies) Nutman (5 studies) Stacey (5 studies)	Neilson (8 studies) Oteng Ntim (2 studies) Nutman (1 study)		Dugas (1 study) Vlemm ix (1 study) Birch (1 study) Stacey (2 studies)	Dugas (1 study) Vlemm ix (2 studies)	Gilinsky (7 studies) Dean (1 study)	Hemsi ng (2 studies) Bhatta (6 studies) Dean (1 study)		Govindasamy (1 study) Kennedy (4 studies) Pottie (1 study)

	studies)												
3. Public meetings/ group meetings/ group interaction/ teaching/ education sessions	George (1 study) Webb (1 study) Lassi [i] (1 study) Sibley (10 studies) Lee (1 study)	Lassi [c] (1 study)		Lassi [c] (1 study)		Neilson (1 study)	Soubeiga (1 study)	Di Mario (1 study) Dugas (1 study) Lathrop (4 studies)	Dugas (1 study)			George (1 study)	Kennedy (1 study) Lassi [i] (1 study)
4. Audiotaped presentation was played		Lassi [c] (1 study)			Stacey (1 study)	Neilson (1 study)	Higgs (1 study)	Di Mario (1 study)	Dugas (2 studies)				

								Dugas (2 studies) Stacey (1 study)	Vlemmix (4 studies)				
5. Video					Stacey (1 study)	O' Brein (1 study)		Stacey (1 study)			Hemsi ng (1 study)		
6. Posters and leaflets or manual	George (1 study) Mangham Jeffries (1 study) Govindasamy (2	Lassi [c] (1 study)	Henison (4 studies) Kennedy (2 studies) Sherr (13 study)	Stockley (4 studies)	Vlemmix (2 studies) Stacey (2 studies)	Neilson (2 study)		Di Mario (1 study) Dugas (4 studies) Vlemmix (1 study)	Dugas (3 studies) Vlemmix (7 studies)	Gilinsky (2 studies)	Hemsi ng (4 studies) Bhutta (3 studies)		Govindasamy (1 study) Kennedy (2 studies) Sherr (13 studie

	studies)							Birch (1 study) Satcey (3 studies)					s)
7. Street theatres	George (1 study)		Henison (1 study)				Obasola (1 study)						
8. Text messages (mobile)	Waterson (7 studies) Obasola (2 studies)						Higgs (1 study) Poorman (1 study)				Poorman (1 study)		
9. Telephone calls				Stockley (1 study)							Hemsi ng (1 study)		

10. Media campaign: TV	Mangham Jeffries (1 study)			Stockley (1 study)		Stacey (1 study)							
11. Media campaign: Radio	Mangham Jeffries (1 study)			Stockley (1 study)			Higgs (1 study)						
12. Ads in daily newspapers, & local publicity efforts	Mangham Jeffries (1 study)			Stockley (1 study)									
13. Visual and verbal feedback						Neilson (2 study)				Gilinsky (1 study)	Hemsi ng (1 study)		
14. Computerized biofeedback					Vlemm ix (1			Dugas (1	Dugas (1		Hemsi ng (2		

					study)			study)	study)		studie s) Nabha n (1 study)		
								Vlem mix (1 study) Birch (3 studie s)	Vlem mix (1 study) Vlem mix (2 studie s)				
15. FGDs	Mang ham Jeffrie s (1 study) Lee (2 studie s)	Lassi [c] (2 studie s)	Henso n (4 studie s)	Lassi [c] (3 studies)		Neilso n (3 studie s)							
D. Place where the intervention was delivered?													
1. Home	Gogia (4 studie s) Georg	Gogia (4 studie s) Lassi[c		Lassi [c] (4 studies)			Soubei ga (4 studies)						

	e (1 study) Lassi [i](1 study) Lee (1 study) Rumbold (4 studies)] (3 studies)											
2. Community	George (4 studies) Mangham Jeffries (1 study) Lassi [i] (2	Lassi[c] (4 studies)		Lassi [c] (2 studies)							Hemsi ng (1 study)		

	studies) Sibley (10 studies) Lee (4 studies) Rumbold (2 studies)												
3. Health facility	George (1 study) Watterson (3 studies) Lathro	Lassi [c] (1 study) Nutman (3 studies)	Brusamento (1 study) Henso (10 studies) Kennedy (1 study)	Lassi [c] (1 study) Stockley (2 studies) Webb (1 study)	Nutman (1 study)	(Nutman (1 study) Oteng Ntim (2 studies)	Higgs (1 study) Poorman (1 study)	Di Mario (1 study) Lathrop (1 study) Birch (2 studies)			Hemsi (4 studies) Nabhan (1 study)	George (1 study)	Govindasamy (1 study) Kennedy (4 studies) Lassi

	p (3 studies) Webb (1 study) Govindasamy (1 study)		dy (5 studies) Velez (9 studies) Sherr (13 studies)	study)				studies)					[i] (1 study) Pottier (1 study) Sherr (13 studies)
4. National level	Mangham Jeffries (1 study)			Stockley (1 study)							Hemsi (1 study)		
5. Institution based (schools, colleges or other educational centers)	Mangham Jeffries (1 study)					Neilson (1 study) Neilson (2 studies)					Hemsi (1 study)		

						s)							
E. Target population													
1. Community people	George (2 studies) Mangham Jeffries (1 study) Lassi [i] (2 studies) Lee (4 studies)	Lassi [c] (2 studies)		Lassi [c] (2 studies)									Lassi [i] (1 study)
2. Health staff/worker or community health worker	George (1 study) Watte	Lassi [c] (3 studies)		Lassi [c] (3 studies)	Nutman (2 studies)	Obasola (1 study) Nutm							

	rson (2 studie s) Sibley (10 studie s)	Nutm an (1 study)		Stockle y (1 study)		an (2 studie s)							
3. Pregnant women	Georg e (2 studie s) Watte rson (6 studie s) Lathro p (studi es) Webb	Nutm an (2 studie s)	Kenne dy (3 studie s) Velez (9 studie s)	Webb (1 study)	Vlemm ix (1 study) Nutma n (5 studies)	Neilso n (10 studie s) Webb (1 study) Nutm an (4 studie s) O,Brie n (1 study)	Soubei ga (4 studies) Poorm an (1 study)	Di Mario (2 studie s) Dugas (7 studie s) Vlem mix (1 study) Lathr op(1	Dugas (6 studie s) Vlem mix (4stud ies)	Gilin sky (7 stud ies)	Hemsi ng (1 study) Nabha n (1 study) Bhutt a (6 studie s)	Georg e (1 study)	Govin dasam y (1 study) Kenne dy (4 studie s)

	(1 study) Govindasamy (1 study) Sibley (10 studies) Obasola (2 studies) Nutman (1 study) Rumbold (6 studies)					Oteng Ntim (2 studies)		study) Birch (2 studies)					
4. Women	Georg	Lassi	Kenne	Lassi			Higgs			Dea	Dean		Govin

	e (1 study)	[c] (4 studies)	dy (1 study)	[c] (4 studies) Stockley (7 studies)			(2 studies)	Birch (1 study)		n (1 study)	(1 study)		dasam y (2 studies) Pottie (1 study)
5. Pregnant women and her partner (couple)		Lassi [c] (1 study) Nutman (1 study)	Brusamento (1 study) Higgs (3 studies) Kennedy (1 study) Sherr (13 studies)			Obasola (1 study)	Aguiar (4 studies)			Gilinsky (1 study)	Hemsi ng (4 studies) Poorman (1 study)		Burton (1 study) Sherr (13 studies)

6. Men	Nutm an (1 study)						Soubei ga (1 study)				Hemsi ng (1 study)		
7. Local elected members	Georg e (1 study)												
8. Adolescents	Webb (1 study)					Neilso n (3+2 studie s)							
9. Peer facilitator		Lassi [c] (1 study)		Lassi [c] (1 study)									
F. Settings and other details of the participants													
1. Resource limited settings with poor access to health facility based care	Gogia (4 studies)	Gogia (4 studie s)											

2. LMICs/ Developing countries	Govindasamy (1 study)		Mangham Jeffries (2 studies) Kennedy (5 studies) Velez (9 studies) Sherr (13 studies)		Mangham Jeffries (4 studies)		Soubeiga (4 studies)						Govindasamy (4 studies) Kennedy (4 studies) Sherr (13 studies)
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3. Rural	George (4 studies) Watterso n (4 studies) Lee (4 studies), Lassi [c] (1 study)		Henso n (9 studie s)		Nutma n (1 study)	Neilso n (1 study) Nutm an (1 study)	Higgs (1 study)				Hemsi ng (1 study)	Georg e (1 study)	
4. Urban	Watterso n (3 studies)		Brusa mento (1 study)		Nutma n (1 study)	Nutm an (1 study)	Higgs (1 study)				Hemsi ng (3 urban) Bhutt a (6 studie s)		
5. Low literacy									Birch 2015 (1 study)				

6. High income countries, low socioeconomic group	Lathrop (2 studies)				Stockley (10 studies)	O'Brien (1 study)		Lathrop (4 studies)					
7. High income									Vlemmix (5 studies)				
8. Hispanic women (Latina)	Lathrop (1 study)												
9. Conflict affected areas	Lassi[i] (2 studies)												Lassi[i] (1 study)
10. Sub-Saharan Africa	Obasola (2 studies) Nutman (12 studies)	Nutman (3 studies)			Nutman (5 studies)	Obasola (1 study) Nutman (4 studies)							

11. Australian Indigenous women	Rumbold (6 studies)												
12. Obese						Oteng Ntim (2 studies)							
13. Patients at high risk of HIV exposure													Pottie (1 study)

3.7. Data extraction sheet for the included systematic reviews

Study ID:	Data extractor ID:	Date form completed:
First author:	Year of study:	Overview authors ID:

3.7.1. Description of the SR

Title:
Funding: Yes / No / Unclear
Potential conflict of interest from funding? Yes / No / Unclear
Country (ies):
Setting (whether limited literacy setting/high or LMICs):
Aim/Objectives:
Inclusion and Exclusion criteria of Systematic review
Study designs:
Participants:
Intervention:
Comparison:
Outcome:

3.7.2. Characteristics of included systematic review

Target population:

No. of included participants:
Gender:
Age group:
Ethnicity:
Geographic location:
No. of studies and study design
Type of synthesis
Tool used for methodological quality:
Other findings/ comment/ limitations of the SR reported by author:

3.7.3. Outcomes specific Information

List the outcomes assessed by systematic review:

- a. ANC Coverage
- b. Uptake of ANC Service
- c. Uptake of ARV

3.7.4. Outcome: _____

Note: Section 3.1 to 3.6 will be repeated for each outcome

Question	
Outcome defined	
No. of studies and study design	
At which level the outcome (individual/ group level) is measured	

3.7.5. Participants

Participants	Information for each group
Participants	Specify the Population (as mentioned in systematic review) included:
No. of participants in the review	
Area covered e.g. households or districts	
Rural or urban	
No. of participants considered for analysis of the review	
Age (provide mean or median or range)	
Gender & Mean (% of women)	
Pregnant and non-pregnant (%)	
Literacy level	High literacy/ low literacy (if mentioned in the review):

3.7.6. Intervention:

Intervention:	
Description of interventions (as defined in the systematic review)	
Co-interventions if any	<i>Any other intervention apart from BCC</i>
Theoretical basis (include key references)	<i>Is theoretical framework for designing the intervention explicitly mentioned?</i>

	<p><i>If yes, whether intervention include single theoretical framework or multiple frameworks are grouped together.</i></p> <p><i>Which theories are used? [include with references]</i></p>
Did the intervention include strategies to address diversity/disadvantage?	<i>If yes, describe:</i>
Level at which intervention delivered	Interpersonal/group/community
Place where intervention delivered	(Setting; Facility/institution; home; community etc.)
Duration of delivery	<p><i>Length (in minutes)=</i></p> <p><i>Frequency (per week) =</i></p> <p><i>Duration (in weeks)=</i></p>
Medium of delivery	
Who provided the intervention?	
Control/comparison	

3.8. Analysis:

Results		
Type of		
Whether meta-analysis performed	Yes <input type="checkbox"/> , No <input type="checkbox"/>	
Describe the analysis if meta-analysis done		
GRADE		
If no meta-analysis, describe the result		

3.7.7. Methodological quality

R O B	Tool used	
	Description	

3.7.8. Conclusion

Effectiveness of BCC if mentioned in the discussion section	
Conclusion of systematic review	
Overview authors conclusion	

LIST OF ABBREVIATIONS

ANC:	Antenatal Care
ARV:	Ante-retroviral
BCC:	Behaviour Change Communication
BPCR:	Birth Preparedness and Complication Readiness
CHW:	Community Health Worker
CI:	Confidence interval
DA:	Decision Aid
DCS:	Decisional Conflict Score
DFID:	Department for International Development
EBP:	Evidence-Based Practice
eHealth:	Electronic Health
EPPI-Centre:	Evidence for Policy and Practice Information and Coordinating Centre
HC3:	Health Communication Capacity Collaboration
HIC:	High-Income countries
HIV:	Human Immunodeficiency Virus
HMIC:	High and Middle Income Countries
HN:	Hanna Nelson
IPC:	Interpersonal Communication
IPDAS:	International Patient Decision Aid Standards
IFA:	Iron Folic Acid
LMICs:	Low-and Middle-Income Countries
MCH:	Maternal and Child Health
MDG:	Millennium Development Goals
mHealth:	Mobile health
MMR:	Maternal Mortality Ratio
NEC:	Nutrition Education and Counselling
NGO:	Non-Government Organisation
NM:	Not mentioned
NRCT:	Non Randomized Controlled Trial
NVP:	Nevirapine
PAIMAN:	The Pakistan Initiative for Mothers and Newborns
PI:	Principal Investigator
PICOS:	Population, Intervention, Comparison, Study design

PITC:	Provider Initiated Testing and Counselling
PMTCT:	Prevention of Mother to Child Transmission of HIV
PNC:	Post-Natal Care
R-AMSTAR:	Revised Assessment of Multiple Systematic Reviews
RCT:	Randomized Controlled Trial
RP:	Ritu Parchure
RR:	Relative Risk
SP:	Shradha Parsekar
SR:	Systematic review
TBA:	Trained Birth Attendant
TD:	Trupti Darak
TT:	Tetanus Toxoid
TV:	Television
UNICEF:	The United Nations Children's Emergency Fund
US:	United States
VCT:	Voluntary Counselling and Testing
WHO:	World Health Organization
WMD:	Weighted Mean Difference