Results of a Dutch national and subsequent international expert meeting on interconception care

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The Journal of Maternal-Fetal & Neonatal Medicine 2019

ABSTRACT

Introduction: The potential value of preconception care and interconception care is increasingly acknowledged, but delivery is generally uncommon. Reaching women for interconception care is potentially easier than for preconception care, however the concept is still unfamiliar. Expert consensus could facilitate guidelines, policies and subsequent implementation. A national and subsequent international expert meeting were organized to discuss the term, definition, content, relevant target groups, and ways to reach target groups for interconception care.

Methods: We performed a literature study to develop propositions for discussion in a national expert meeting in the Netherlands in October 2015. The outcomes of this meeting were discussed during an international congress on preconception care in Sweden in February 2016. Both meetings were recorded, transcribed and subsequently reviewed by participants.

Results: The experts argued that the term, definition, and content for interconception care should be in line with preconception care. They discussed that the target group for interconception care should be 'all women who have been pregnant and could be pregnant in the future and their (possible) partners'. In addition, they opted that any healthcare provider having contact with the target group should reach out and make every encounter a potential opportunity to promote interconception care.

Discussion: Expert discussions led to a description of the term, definition, content, and relevant target groups for interconception care. Opportunities to reach the target group were identified, but should be further developed and evaluated in policies and guidelines to determine the optimal way to deliver interconception care.

INTRODUCTION

In order to prevent adverse birth outcomes, the importance of preconception health and preconception care (PCC) has been recognized [1]. This applies to care before first pregnancies as well as to care before subsequent pregnancies, the latter often referred to as interconception care (ICC). However, more effort is needed to integrate PCC and ICC in current practice [2]. Compared to PCC, ICC could take advantage of available routine postnatal care, yet a complicating factor is that ICC is a rather unfamiliar concept, literature is scarce and different terms and definitions are used [3]. Clarity, for instance in guidelines, has been described as a determinant for implementation of new concepts in healthcare [4]. As such, achieving consensus on ICC could facilitate multidisciplinary guidelines and policies on ICC, which are currently not in place in many European countries [5]. Consensus meetings have been organized on PCC previously [6-8], however to our knowledge, this has not been done for ICC. We therefore organized a national and subsequent international expert meeting to discuss different aspects of ICC.

MATERIALS AND METHODS

We used a similar approach for organizing and reporting on the ICC expert meetings, as was previously used for an expert meeting on PCC [6]. Firstly, we carried out a comprehensive literature search [see addendum for more details] to develop propositions as a starting point for discussion in the national expert meeting. We formulated propositions for consensus on five items related to ICC: the term ICC, the definition of ICC, the content of ICC, relevant target groups for ICC and ways to reach the target groups. In addition, studies that specifically reported on the impact of ICC interventions were summarized by describing participants, the intervention, and key findings [Addendum]. Also, three papers that provided an overview of ICC and together covered many of the topics described in the other papers [2, 3, 9], were sent in advance to the participants of the national expert meeting.

Secondly, during the national ICC expert meeting that we organized in the Netherlands in October 2015, the propositions based on the literature study were presented and discussed with nineteen participants. The results of this national meeting were subsequently discussed in an international meeting, which was organized during the Third European Congress on Preconception health and care (ECPHC) in Sweden in February 2016 and was joined by about 40 participants from seven countries. Different disciplines were involved in the meetings [see addendum for more details on the meetings]. Both meetings were chaired by members of the project team and were audio recorded. We produced transcripts and summarized the outcomes of the meetings that were reviewed by the participants of the national meeting and by country representatives of the international meeting.

The results will be presented per discussed ICC item in a fixed format: a summary of the *literature*; the *proposition* given as input for the national meeting; the *discussion outcomes* of the expert meetings; and lastly, a *summary of the expert's discussions* that had led to the outcome, including identified knowledge gaps.

RESULTS

ICC Term

Literature

Our starting point was the term interconception care, which was already described as interconceptional care in the late 1970s [10, 11]. However, three different terms seem to be used interchangeably with ICC on a regular basis: preconception, interpregnancy, and internatal care [2, 3]. Based on the meaning of terms, these terms could differ in the period of care they enclose (figure 1).

Proposition

The four different terms (figure 1) were introduced.

Expert discussion outcome

ICC should be referred to as 'PCC between pregnancies' (figure 1). This PCC can then be part of internatal care, which is the whole package of healthcare from birth until the next birth.

Figure 1. Different terms used in the context of Interconception care

Term	Period	Before conception	Conception	Pregnancy	End of pregnancy / childbirth	Before conception	Conception	Pregnancy	End of pregnancy / Childbirth
Preconception care (PCC)	before a pregnancy								
Interpregnancy care	from the end of one pregnancy to the conception of the next pregnancy								
Internatal care	from the birth of one child to the birth of the next child								
Interconception care (ICC)	from the conception of one pregnancy to the conception of the next pregnancy								
Discussion outcome					ICC = PCC between pregnancies				

Summary of the experts' discussions

The Dutch experts did not want to introduce another term for something that is actually the same as PCC. They argued that using just one term, PCC, would help in conveying the message of PCC. Furthermore, ICC can be a confusing term with regard to the period it covers, since it suggests care starting from conception onwards. Despite the period not being completely adequate, the experts preferred the term ICC when comparing it to the terms internatal and interpregnancy care. During the international meeting two other terms were also mentioned: 'prepregnancy care' and 'periconception care'. However, from a policymaker perspective, the helpfulness of using the same term was stressed again and it was argued that the WHO also uses the term PCC and the term ICC. From a public health point of view, using the term ICC instead of PCC can sometimes have an advantage, because ICC offers the opportunity to target a specific group of women (women who have been pregnant). The result of the expert meetings was to use the term 'PCC between pregnancies'. This is in line with the description of the WHO and the description used before by Lu et al in the context of internatal care.[3, 7] Dutch experts thought that 'internatal care' fits the whole package of care to both women and children between births.

ICC Definition

Literature

Our literature search showed various descriptions for ICC. ICC is said to be in essence PCC for a subsequent pregnancy [3]. ICC has also been referred to as the identification and reduction of risks that affect the health of the woman and any future pregnancy, with additional intensive interventions in the interconception period for women who have had a prior adverse pregnancy outcome, such as fetal loss, preterm birth, low birth weight, congenital or genetic diseases and medical comorbidities [2, 12]. The interconception period is generally interpreted as the interpregnancy period or as a bridge from the postpartum period to either a subsequent pregnancy or the decision not to conceive again [8, 13, 14].

For PCC, more comprehensive definitions have already been formed. The Dutch expert meeting on PCC in 2012 adapted the definition of the Centers for Disease Control and Prevention (CDC) and the March of Dimes from 2005 to the following definition: 'A set of interventions and/or programs that aims to identify and enable informed decision-making to modify biomedical, behavioral, and (psycho) social risks to parental health and the health of their future child, through counselling, prevention and management, emphasizing those factors that must be acted on before conception and in early pregnancy, to have maximal impact and/or choice$_1$' [6, 8]. This definition included a footnote: $_1$ *Preconception care may be a good opportunity to reduce perinatal mortality and morbidity*

Propositions

Two propositions were formed based on the PCC definition from 2012: 1) an adjusted version of the PCC definition including the aspects 'risk factors from prior pregnancies' and the period 'between two pregnancies'; 2) ICC described as a subtype of PCC.

Expert discussion outcome

The former definition of PCC was adjusted on several points (in bold), resulting in the following definition for ICC: Interconception care is preconception care* between pregnancies.

*A set of interventions and/or programs that aims to identify and enable informed decision-making **to optimize** biomedical, behavioral, and (psycho) social **factors** that can influence parental health **(including fertility potential)** and the health of their future child, through counselling, prevention and management, emphasizing those factors that must be acted on before conception and **continued** in early pregnancy, to have maximal impact and **enable informed choices**$_1$.
$_1$ *Preconception care may be a good opportunity to reduce perinatal and maternal mortality and morbidity*

Summary of the experts' discussions

In line with the discussion on the term, the Dutch experts agreed to define ICC as a subtype of PCC. They preferred to keep the definition of PCC and thereby not focusing on risk factors from prior pregnancies in particular, as all the components of PCC stay relevant for ICC. In addition, they argued that a focus on health promotion instead of risk factors would facilitate implementation of PCC by policymakers, professionals and researchers. At the international meeting, a discussion arose on the words 'in early pregnancy' being part of the definition, because this might diminish the importance of the preconception period. In the end, participants agreed that PCC interventions have to continue into early pregnancy, because women do not yet receive regular antenatal care. During the international expert meeting the suggestion was made to add fertility potential to the definition, because it reflects the positive effects of PCC on the health of gametes. Someone argued that this was already included in 'parental health', but other experts argued to explicitly mention it and hence to create a stronger link between PCC and fertility care.

ICC Content

Literature

Evidence for risk factors to be taken up in PCC was provided by a review of Jack et al. from 2008 and an update of this review by Temel et al. in 2012, who also performed a systematic search to assess the effectiveness of preconceptional lifestyle interventions [6, 15, 16]. This evidence is likely to be applicable to ICC as well, as often no distinction has been made between PCC and ICC. Few studies have specifically assessed the effectiveness of an ICC intervention on improved pregnancy outcomes or proxy outcomes such as behavior change (see addendum table) [17]. Only two studies have shown a positive impact; suggesting improved folic acid use and suggesting increased pregnancy intervals and less adverse outcomes in a high-risk population [18, 19].

Many ICC programs have been described without reporting on effectiveness or only providing feasibility and process evaluations [20-28].

The content of the reported ICC interventions is often widespread including social and medical services. In addition to the general content recommended for PCC [6], certain items have gained special attention for ICC based on risk factors in the period between pregnancies and the associations with pregnancy outcomes. Firstly, family planning should support effective use of contraception to avoid unintended pregnancies and short pregnancy intervals [2, 3, 29]. Since, these situations are associated with increased risk of adverse outcomes [3, 9, 30-35]. Secondly, previous pregnancy outcomes should be considered 'to reduce risks that may affect the woman's health and any future birth she may have' [2]. This includes outcomes such as preeclampsia and hypertensive disorders [36, 37], gestational diabetes [38-41], recurrent miscarriages [42], preterm birth [43-45], a small-for-gestational-age baby [46], perinatal loss [13, 47-49], and adolescent pregnancy [34, 50]. Thirdly, optimizing health status in the interconception period related to weight [51-58], HIV [59, 60], and chronic conditions [14, 61] has been recommended. Lastly, psychosocial and behavioral components of ICC have been mentioned, such as paying attention to stress, depression, family violence and substance abuse [2, 3, 9]. On the same note, parenting support and breastfeeding promotion have been suggested [3].

Proposition

Our proposition was to include the same content for ICC as was reached in the consensus for PCC previously [6]. In addition, special attention should be given to risk groups and to the following items that are specifically relevant in ICC: outcomes of prior pregnancies, the interpregnancy interval, contraception, breastfeeding, physical recovery and mental health after pregnancy.

Expert discussion outcome

'Continuing preconception care as delivered before a first pregnancy, as well as paying attention to outcomes of prior pregnancies and future pregnancy planning.'

Summary of the experts' discussions

When the content of ICC was discussed during the Dutch meeting, the importance of both emphasizing the general PCC message, as well as leaving out the focus on risk groups was expressed. The international experts agreed that the content of ICC is the same as the content of PCC, but mentioned that it should in practice also be a continuation of received PCC before the first pregnancy. In addition, it was deemed relevant to raise awareness on timely health seeking in case of secondary infertility, and combine this with other aspects of reproductive health such as contraception and birth spacing in the term 'future pregnancy planning'. Lastly, in the international discussion topics such as future health, male health and domestic violence were identified as important, but considered covered by the general PCC content.

ICC Target Group

Literature

ICC has been advised for everyone, but specifically for high-risk mothers, for whom it would be particularly beneficial [2, 3]. DeCesare et al. refer to the 'every woman, every time' slogan and include in ICC women actively trying get pregnant, women unsure of pregnancy plans, and women who are preventing pregnancy [9]. Instead of just women, Moore et al. refer to the couple [13]. Previous ICC interventions have often focused on specific risk groups (Addendum table), such as women with previous adverse outcomes, lower socio-economic status, minority background, or risk behavior, and adolescents, aiming to reduce disparities. Medical and behavioral risks (e.g. no folic acid supplementation) seem as relevant, if not more, in the interconception period as in the preconception period based on their prevalence [62-69].

Proposition

'All fertile women who have ever been pregnant, with a focus on high-risk groups.'

Expert discussion outcome

'All women who have been pregnant and could be pregnant in the future and their (possible) partners.'

Summary of the experts' discussions

The Dutch experts thought that ICC should be offered to a broad target group and that it is unnecessary to say that you pay extra attention to high-risk groups. Both the Dutch and international experts agreed that 'partners' had to be added to the target group. In addition, the proposed formulation of 'fertile women' was adjusted in an effort to include women with fertility problems in the target group as well.

Reaching ICC Target Groups

Literature

Reaching parents before the (next) conception is essential for effective ICC. Women who have been pregnant can often be identified within the medical system. As such, Shannon et al. describe ICC as risk identification during a woman's hospital visit for labor and delivery [12]. A frequently suggested way to reach parents for ICC is at postpartum visits [2, 3, 9]. However, use of postpartum care can be dependable on sociodemographic characteristics and perceived need [70, 71]. The optimal frequency, timing, duration and intensity for postpartum visits is unknown [72]. In the Netherlands, a single visit around six weeks postpartum is recommended, but Lu et al. have recommended expanding the number of visits to apply ICC [3]. The role of maternity care providers in postpartum care and ICC has been described [11, 73, 74], but also other healthcare

providers have been suggested to take part in ICC such a pediatric care providers [19, 23, 75, 76], internists [61], sexually transmitted disease clinics [77], general practitioners and genetic counsellors [78]. Actually, every office visit is an opportunity for ICC [9]. Also, group sessions such as Centering-Parenting[79] and home visits can be used for ICC. On a general note, ICC should be part of a life course approach [78, 80-82].

Proposition

We proposed three fixed moments: six weeks postpartum by a midwife, gynecologist or pediatrician; six months and twelve months postpartum by a preventive child healthcare physician (well-baby clinics).

Expert discussion outcome

The target group should be reached at different moments and as often as possible, for instance during postpartum visits by midwives, gynecologists or pediatricians, during regular check-up or vaccination moments by preventive child healthcare physicians or nurses, and during consultations with other healthcare professionals (e.g. general practitioners, nutritionists, and professionals at abortion and fertility clinics).

Summary of the experts' discussions

The Dutch experts discussed the difference between ICC and an ICC consultation; ICC can be integrated in regular care and (if necessary) result in a separate ICC consultation. This distinction might facilitate implementation of ICC. It gives the opportunity to involve many healthcare professionals in the delivery of ICC, who can offer a form of ICC and refer patients for a separate ICC consultation. All healthcare professionals should continuously be aware of the opportunity to offer PCC and ICC. In addition, other options to involve healthcare professionals and the target group were mentioned, such as via social media, medical curricula, municipal public health policies and integrating ICC in CenteringParenting. The international experts discussed a few other opportunities: ICC provided by abortion services and fertility clinics, and by occupational physicians. A discussion arose about women who might be missed when they have a miscarriage at home and do not visit a healthcare provider. Yet, experts suggested that PCC opportunities should be in place to reach these women. Unfortunately, both expert meetings did not achieve consensus on an elaborate plan to reach the target group.

DISCUSSION

The literature study showed how little uniformity there is in the implementation of ICC and how little literature is available on the evaluation of ICC. The expert meetings offered a unique opportunity to discuss the topic of ICC with experts of different disciplines and different na-

tionalities. Although we have to be careful in stating that we reached consensus on ICC, for instance since more official methods for reaching consensus exist [83], the described results can give the necessary attention to this still uncommon form of care. The summarized expert discussions and the suggested international discussion outcomes on the definition, term, content, target group and ways to reach the target group for ICC will be helpful in bringing the implementation of ICC forward. In addition, the outcomes are graphically summarized in figure 2.

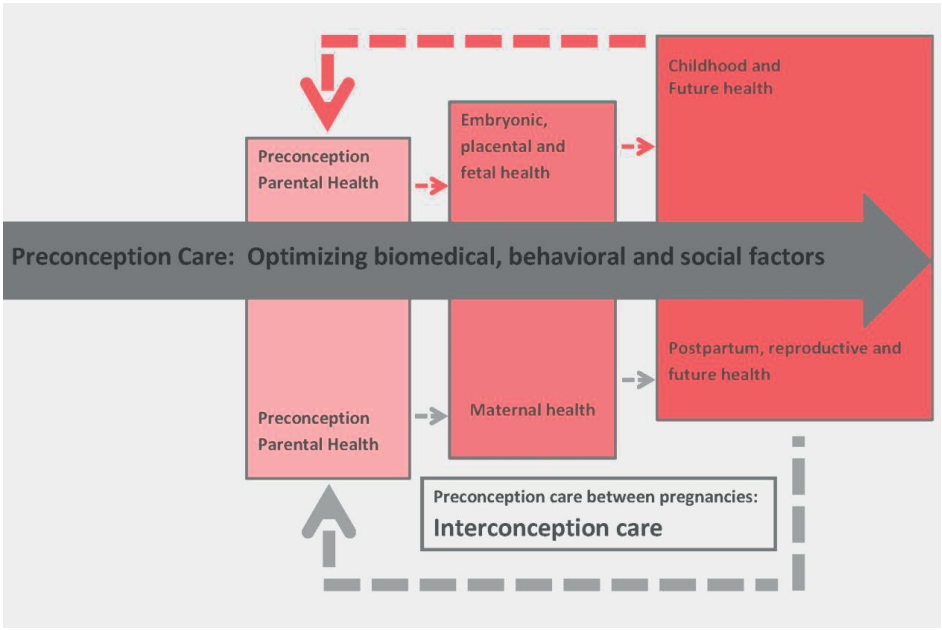

Figure 2. Preconception care and Interconception care impact

The prevailing opinion was to refrain from putting much emphasis on ICC, but focus on PCC. PCC is a more familiar term that is extensive in its definition and content, and includes ICC. Sometimes, referring specifically to ICC can be useful, for example when a specific focus is desired on the target group of women who have been pregnant. Yet, even then ICC should not be explained differently than 'PCC between pregnancies'. This latter description has been used before by Lu et al, but they preferred the term internatal care to ICC in contrast to our experts [3]. Another dominant view at the national expert meeting was to put less emphasis on risks, but put more emphasis on promoting health instead. Moreover, this way a more general approach of reaching the target group could be pursued, including 'all women who have been pregnant and could be pregnant in the future and their (possible) partners' and 'any healthcare provider in contact with the target group'. Verbiest et al. have also advocated the importance of increasing the provision of comprehensive, woman-centered care to promote women's health and wellness in the postpartum and interconception period and recently Barker et al referred to the postpartum or interpartum care opportunities to improve health behavior [84, 85]. A final

recurrent theme at the international meeting was to make a stronger connection between fertility care and PCC and ICC. Both expert meetings did not result in a detailed plan to reach the target group. Many opportunities were identified, but implementation of ICC should be further developed and evaluated in policies and guidelines to formulate the optimal way to deliver ICC.

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ADDENDUM

Methods

Literature study

In June 2015, we performed a literature study on ICC in different databases (Embase, Medline, Web-of-science, Scopus, Cinahl, Pubmed, Cochrane and Google Scholar) with combinations of the following keywords in different inflected forms: interconception, interpregnancy, internatal, multipara, multigravida, consecutive, repeat, following, prepregnancy and preconception care.

Due to the broad scope, our literature search followed the methodology of a scoping review. This is a way to develop a picture of the extent of the literature in a certain domain without narrowing down to a focused research question [1].

The initial search identified 498 titles, to which we added 20 more through reference searching. We included papers published from 1995 onwards that were available in full text in the English language, generally based in western countries, not specific to rare conditions and that were relevant to our five ICC items. Three researchers were involved in reviewing the papers and selecting latest reviews when applicable. We included different kinds of papers (e.g. qualitative, quantitative, opinion papers) that provided information on the five predetermined ICC items: the term, the definition, the content, the relevant target groups and ways to reach the target groups. This resulted in a final selection of 81 papers that are referred to in the literature overview in the manuscript.

Expert meetings

In the Netherlands, we organized an afternoon meeting in October 2015 with nineteen participants. Participants were invited based on their expertise and/or their earlier participation in the PCC expert meeting in 2012.

During the Third European Congress on Preconception health and care (ECPHC), which was held in Uppsala in Sweden in February 2016, we organized a second meeting. This meeting, a workshop session, was joined by about 40 participants from seven countries; The United States of America, The United Kingdom, Belgium, Italy, Sweden, Ukraine, and The Netherlands.

Different disciplines were involved in the meetings, being professional caregivers (midwives, general practitioners, gynaecologists, geneticists, paediatricians / neonatologists, a preventive child healthcare physician, a psychologist, and an occupational physician), governmental representatives, representatives of healthcare expertise centres, researchers (e.g. epidemiologists, a medical ethicist, clinical researchers) and research funders.

Table. Studies reporting impact of interconception care interventions (k =8)

Author (year); country	Study design	Intervention / focus	Participants description + N	Key findings / recommendations
Doyle et al (1999)[2]; UK	Intervention (pilot study)	Effectiveness of a 6-month period of nutrition counselling during the interpregnancy interval	Mothers who had a low-birthweight baby (<2,500 g) and planned to have another baby in the future N= 77 (51%); 70 inadequate diet;41 follow up completed	* High prevalence of inadequate nutrition among women who deliver low-birthweight babies in this inner-city community. * Mothers in this population are not receptive to an intervention program designed to improve their nutritional intake, but the trend was towards an improved dietary intake. * Poor awareness of the importance of nutrition in relation to pregnancy outcome
Loomis and Martin (2000)[3]; USA	Intervention	* Case management and home visits from delivery up to 8 or >24 months postpartum * To improve participant's internal resilience, use of medical services and reproductive planning and to reduce or eliminate existing medical, nutritional, psychosocial, and behavioral risks * Through education, counselling, financial support, referral, and follow-up prior to the onset of another pregnancy to improve outcomes of subsequent pregnancies	Women delivering an low-birthweight baby (<2,500 g) or with a congenital anomaly, or after having a perinatal fetal demise + prioritization criteria based on risk factors N=277 (59%); 151 follow up completed	* Because of the relatively small number of program cases, no definitive conclusions are drawn about its effectiveness in preventing recurrent preterm birth and LBW. * The fact that none of 26 infants born to participant women were admitted to the NICU is suggestive of a positive program effect. * Identification of high-risk women at the time of a poor reproductive outcome appeared to be an effective strategy to engage a traditionally hard-to-reach population.
Lumley and Donohue (2006)[4]; Australia	Randomized controlled trial	* After randomization, a home visit by study midwife for everyone to discuss past pregnancy * In intervention arm: pre-pregnancy discussion of social, health or lifestyle problems and preparation for next pregnancy including a reminder card and referral if necessary. * To assess increase in birth weight	Women attending local maternal and child health centers with their first child between May 1982 and July 1991 N =1688 randomized; 392 (intervention arm + 394 control arm) pregnant women	* More adverse outcomes in intervention arm (preterm birth and low birthweight), but no significant differences * Birth weight on average 97g lighter in the intervention group, but may be (partly) explained by more preterm births

Table. Studies reporting impact of interconception care interventions (k =8) (*continued*)

Author (year); country	Study design	Intervention / focus	Participants description + N	Key findings / recommendations
Andrews et al. (2006)[5]; USA	Randomized controlled trial	* To estimate if antibiotic administration during the interpregnancy interval in women with a previous preterm birth before 34 weeks' gestational age reduces the rate of preterm birth in the subsequent pregnancy. * Randomization 4 months postpartum to receive oral azithromycin 1 g twice plus metronidazole 750 mg daily for 7 days, or placebos, every 4 months until pregnancy.	Women with a spontaneous preterm birth <34 weeks' gestational age N =241 women randomized; 124 conceived a subsequent pregnancy	* Intermittent treatment with metronidazole plus azithromycin of non-pregnant women with a recent early spontaneous preterm birth does not significantly reduce subsequent preterm birth, and may be associated with a lower delivery gestational age and lower birth weight
Dunlop et al. (2007)[6]; USA	Mixed prospective-retrospective cohort	* Primary healthcare and social support for 24 months following a very-low birth weight delivery to improve subsequent child spacing and pregnancy outcomes	African-Americans of lower socioeconomic status N = 29 prospective cohort (=intervention); 5 pregnant; 2003-2004 N = 58 retrospective cohort (= control); 29 pregnant; 2001-2002	* Control cohort: 2.6 (CI 1,1-5,8) times as many pregnancies within 18 months and 3.5 (CI 1,0-11,7) times as many adverse outcomes (late spontaneous abortion, stillbirth, ectopic or molar pregnancy, or a live born infant weighing <2500 g)
Livingood et al. (2010)[7]; USA	Retrospective quasi-experimental design	* Social determinant intervention, designed to mitigate the impact of social class and stress; building resilience to negative social forces through peer mentor-based case management *A secondary data analysis to assess impact of pre- and inter-conception case management on birth outcomes and related health factors; ICC specific outcome was a minimum of 2 year interval between births (yes/no/not pregnant)	The Magnolia Project intervention group of African- American women from a socioeconomic high-risk area (n=217) and a closely matched comparison group of Medicaid-eligible clients (n=412)	* Chi square analyses of the frequency of successful and failed inter-conception periods (lengths) did not show statistically significant differences between the groups.
Salihu et al. (2011)[8]: USA	Ecological study	* ICC health education for young mothers through monthly home visits or monthly peer support group meetings addressing a range of topics to reduce repeat teen pregnancy * PCC services for teenagers (not further described here)	Mothers <20 years for ICC N=3,155 between 1998-2007 (2000-2007 used for analyses of repeat pregnancies)	* Efforts to prevent repeat teenage pregnancy were not successful; it increased over time in both the target community as well as the comparison communities.

Table. Studies reporting impact of interconception care interventions (k =8) (*continued*)

Author (year); country	Study design	Intervention / focus	Participants description + N	Key findings / recommendations
de Smit et al. (2015)[9]; The Netherlands	Controlled intervention study	* Intervention consisting of tailored provision of information (verbal and in writing) at the six month well-baby visit to promote the preconception use of folic acid supplements in mothers who expected to be pregnant again within 0–12 months	Mothers who visit a well-baby clinic for the 6-month and 11-month check-up of their child N = 198 (68%) intervention group N = 215 (84%) control group	* Folic acid use or usage intention was 65 % in the intervention group versus 42 % in the control group (95 % CI 4, 43 %, P <0·05). *Health education intervention at the 6-month well-baby visit is an effective means to promote the use of FA supplements or the intention to do so

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