Preconception health care interventions: A scoping review

Natalie Hemsing *, Lorraine Greaves, Nancy Poole

Centre of Excellence for Women’s Health, 4500 Oak Street, Box 48, Vancouver, BC V6H 3N1, Canada

A R T I C L E   I N F O
Article history:
Received 20 March 2017
Revised 16 August 2017
Accepted 17 August 2017

Keywords:
Preconception health
Interconception health
Scoping review

A B S T R A C T
Pregnancy is often framed as a “window of opportunity” for intervening on a variety of health practices such as alcohol and tobacco use. However, there is evidence that interventions focusing solely on the time of pregnancy can be too narrow and potentially stigmatizing. Indeed, health risks observed in the preconception period often continue during pregnancy. Using a scoping review methodology, this study consolidates knowledge and information related to current preconception and interconception health care interventions published in the academic literature. We identified a total of 29 intervention evaluations, and summarized these narratively. Findings suggest that there has been some progress in intervening on preconception health, with the majority of interventions offering assessment or screening followed by brief intervention or counselling. Overall, these interventions demonstrated improvements in at least some of the outcomes measured. However, further preconception care research and intervention design is needed. In particular, the integration of gender transformative principles into preconception care is needed, along with further intervention design for partners/men, and more investigation on how best to deliver preconception care.

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I n t r o d u c t i o n

Calls have been made for preconception care in which women and men are regularly counseled on sexual and reproductive health and planning during the reproductive years, and in which women’s health is valued along with a focus on fetal health outcomes [1]. In the provision of prenatal care, women’s health has often been underemphasized by health care professionals [2] and health interventions aimed at improving reproductive care implemented exclusively during pregnancy are often too narrow in scope. Among women who become pregnant, health risks experienced in the preconception period often continue during pregnancy, such as the use of alcohol, tobacco and other substances, nutritional deficiencies, and chronic health issues. In addition, the increasing prevalence of obesity and chronic conditions demand attention in the context of preconception care [3]. All of these health issues and risk factors are associated with negative health outcomes for the woman, her pregnancy and the fetus [4–6]. For example, maternal obesity and maternal diabetes are both associated with an increased risk of: gestational diabetes, pre-eclampsia, risk of obstetric interventions, and having a baby with congenital anomalies [3,7]. Tobacco, alcohol and illicit substance use during pregnancy can result in obstetric complications, preterm birth and low birth-weight [8], and alcohol consumption during the periconception period is associated with Fetal Alcohol Spectrum Disorder (FASD) and birth defects [9]. Further, almost half of pregnancies are unplanned, and behaviours such as smoking and substance use are potentially stigmatizing and hence, not consistently disclosed [10]. Preconception care provides an opportunity to intervene with women and their partners early, and address such health risks that are of benefit to all women and men regardless of intention or desire to conceive. Preconception care is useful to improve both sperm and partner health which are also associated with pregnancy and birth outcomes [11]. Such care need not be pronatalist [12].

Current approaches to preconception care differ between countries. A systematic review of preconception policies, guidelines, services and recommendations in 6 European countries including: Belgium, Denmark, Italy, the Netherlands, Sweden and the United Kingdom (UK) [13] revealed that all countries had recommendations for women with chronic conditions, but recommendations for women and men in general were inconsistent, suggesting the need for the development of standard European guidelines. In Canada, the Public Health Agency of Canada included one chapter dedicated to preconception health in the report- Family-Centred Maternity and Newborn Care: National Guidelines in 2000, and updated this in 2016 [14]. However there is no evidence if and how the recommendations have been implemented [15].
In contrast, the USA has had a national strategic plan and guidelines on preconception health, released in 2006 [16]. With leadership and funding from the Centre for Disease Control (CDC), a public–private partnership called the Preconception Health and Health Care (PCHHC) Initiative, made up of federal agencies and private sector organizations was developed to support implementation of the recommendations outlined in the report [17]. There have been many achievements, including: the development of strategic plans, national summit meetings, increased federal funding for preconception health programs, the development of the PCHHC resource centre and the publication of multiple reports and articles [18]. Yet, despite clear progress achieved by the PCHHC initiative, there is evidence that further work is required, particularly in designing, implementing and evaluating preconception health approaches. Floyd et al. [19] note the need for: studies evaluating holistic preconception care and counseling, further research to address health disparities in preconception health and birth outcomes, and ongoing evaluation and monitoring of the PCHHC initiative [19].

Multiple systematic reviews have examined preconception care interventions and reported improvements in maternal and child outcomes [20,21], although some reported that effects were minimal or non-significant [22,23]. However, these reviews differ in research question and types of studies included, are narrow in scope, and tend to report a lack of methodologically robust evidence. In response, we conducted a scoping review of preconception care interventions to identify the breadth of current preconception health care interventions, and further understand how preconception health care can be improved. The purpose of this scoping review is to map current evidence on preconception health care interventions, and identify gaps and future research priorities. The research question is: What is the extent and nature of the published academic literature on preconception health interventions, including: how preconception health is being addressed (the type and format of interventions being used, which dimensions of preconception health are being addressed, and how are these dimensions of preconception health impacted), who interventions are aimed at, and in what settings?

**Methods**

We followed a scoping review methodology as presented by Arksey and O’Malley [24]. We searched for intervention studies on preconception health published between January 2005 and June 2016 in the following academic databases: Medline full text; CINAHL complete; Studies of Women and Gender Abstracts; Social Services Abstracts; Social Sciences Citation Index; Health and Psychosocial Instruments; The Cochrane Library; and the Native Health Database. We used the following search terms: preconception health, interconception health, family planning, reproductive health; and program, intervention, care, approach, guidelines, assessment, and tool. All peer-reviewed articles published in English which described or evaluated a preconception health intervention were included.

We excluded the broader literature describing the prevalence of preconception health risk factors. Literature reviews, policy papers and commentaries were also excluded, but are used to contextualize the rationale and discussion of findings. We did not exclude studies based on: study design, intervention type, outcomes measured, setting, or population (i.e. women, men and couples of all socio-demographics were included). Interventions delivered during pregnancy were excluded; however, retrospective studies that asked pregnant or postpartum women or their partners about the preconception care they received prior to pregnancy were included.

A total of 1326 search returns were imported into Endnote reference management software. Manual searching of the reference lists of key articles resulted in an additional 23 studies. Titles were read and screened by one researcher, and were organized into two Endnote databases: one with included studies and one with excluded studies. These Endnote databases were then checked by a second researcher to ensure relevant studies were not excluded. Following removal of duplicates and title screening, 235 studies were included. Abstract and full text screening was again conducted by one researcher, and checked by a second researcher, reducing the number of included studies to 57. If there was ambiguity regarding the eligibility of an article for inclusion, the research team discussed the study and made a decision regarding inclusion or exclusion. A total of 29 preconception health intervention studies were identified. A flow diagram detailing the number of studies included and excluded at each stage is provided in Fig. 1.

We then extracted data from the 29 included studies in Microsoft Excel, including information on: location and setting, study design, number of participants and characteristics, the preconception health factors addressed, methodology, the aim of the study, key findings, and study limitations. As is typical in scoping reviews, we did not quality assess included studies [25], but rather focused on identifying the current state and breadth of preconception intervention research, and identifying patterns and gaps to inform the development of recommendations for future research and interventions. The research team met to review, discuss and define the themes of the collected studies. Themes were chosen by grouping similar intervention studies, based on the: risk factors addressed, the population or type of intervention. The data extracted were then narratively summarized within this thematic outline.

**Results**

Studies are summarized within the following categories: interventions addressing multiple risk factors; interventions addressing dual risk factors; technology-assisted interventions; counselling for women/couples with pre-existing health conditions; group health education; community-based social marketing interventions; and interconception interventions. Details on the: study design, country and setting, preconception risk factors addressed, intervention approach, participants and key findings are presented in Table 1.

**Interventions addressing multiple risk factors**

Three interventions addressed multiple preconception health risks through risk assessment followed by advice or motivational interviewing (MI). These were all delivered in clinical settings, primarily in primary care clinics. The interventions ranged in intensity and duration, from brief advice [26] to more lengthy consultations and counseling [27,28].

Two of these studies evaluated behaviour change among women who received preconception care and subsequently conceived; both demonstrated improvements in at least one risk factor. One of these studies, conducted in Australia, evaluated a 45-min risk assessment delivered by a midwife. The advice was based on the US Centre for Disease Control (CDC) categories of preconception health, with tailored follow-up provided by an obstetrician [27]. Evaluation of this intervention revealed that pregnant women who received preconception care prior to conception were more likely to: supplement with folate, be vaccinated, consult with a specialist regarding any pre-existing health condition, report less weight gain prior to conception, and report fewer preterm births and hypertensive disorders. Yet women who received preconcep-
tion care reported no differences in smoking, or alcohol consumption in the preconception period. Similarly, in a study from the Netherlands, women’s risk behaviours were measured following a screening and counseling intervention delivered in a family practice setting [28]. Intervention participants reported significant improvements in folic acid use, reduced alcohol use in the first 3 months of pregnancy, and lower adverse pregnancy outcomes (16% vs 20%) compared to women who received standard care. Finally, one study included African American women of reproductive age, but unlike the previously described studies was not limited to women who later conceived or who were trying to conceive. This study did not measure behaviour change, but reported improvements in women’s knowledge of preconception health risks following a risk assessment and brief intervention [26].

**Dual risk factor interventions**

Five studies evaluated interventions to address both alcohol and contraception use to reduce alcohol exposed pregnancies (AEP). These interventions were all US-based and delivered to women of reproductive age identified as being at risk for an AEP, and included risk assessment followed by brief counseling/ motivational interviewing.

In a study involving a mail and telephone based brief MI intervention, women reported a significant decrease in risk for AEP (risky drinking and lack of/inadequate contraception use) between baseline and 6 month follow-up (100–68.8%) [29]. Another study, which examined the same intervention, found that a single session format was less effective than a multi-session intervention [30].

An evaluation of Project CHOICES, a 4-session intervention using MI, revealed significant improvements in reduced risk of AEP up to 9 months post-intervention [31]. Project CHOICES has also been delivered to American Indian women, revealing a decrease in the amount of alcohol consumed post-intervention (with average number of drinks on any one occasion decreasing from 6.8 to 3.4) and an increase in contraception use [32]. Finally, an evaluation of project CHOICES in six high risk settings found that 68.5% of women had a reduced risk of AEP at 6 month post-intervention (32.9% reduced drinking and used contraception, 12.5% reduced drinking only, and 23.1% used contraception only) [33].

**Technology assisted interventions**

Six technology assisted risk assessment and follow-up interventions were identified. Several US-based studies evaluated “Gabby”,

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**Fig. 1. Flow diagram for scoping review.**

Records identified in database searches N=1326

Additional records identified through hand-searching N=23

Records after duplicates removed N=993

Records after title screening N=235

Studies excluded at title screening N=758

Studies included after abstract & full text screening N=57

Studies excluded at abstract/ full text screening N=178

Intervention studies N=29
<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Study type</th>
<th>Setting</th>
<th>Risk factors addressed</th>
<th>Study/Intervention Overview</th>
<th>Participants</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricola et al. 2014</td>
<td>Cohort study</td>
<td>Italy, clinic</td>
<td>Weight, smoking, alcohol, genetic diseases, chronic diseases, medication, vaccines, folic acid</td>
<td>Web-based knowledge &amp; risk factor assessment and tailored recommendations. Post-assessment invite to follow-up with GP or OB/GYN</td>
<td>Women of reproductive age (18–44 years) planning a pregnancy in the next year. Total n = 508, completers n = 282, n = 56 women who had conceived and reported planning their pregnancy</td>
<td>Decrease in alcohol consumption; increase in folic acid; improved knowledge regarding preconception care (PCC) behaviours</td>
</tr>
<tr>
<td>Beckman et al. 2014</td>
<td>Case control study</td>
<td>Australia, hospital</td>
<td>Folic acid, vaccines, healthy eating, exercise, smoking, alcohol</td>
<td>Assessed risk factors in women who received 45 min PCC consult with midwife and follow-up with OB/GYN with women who did not</td>
<td></td>
<td>Women who received PCC were more likely to: use folic acid, be vaccinated, consult with specialist regarding pre-existing health condition. No differences in smoking or alcohol use</td>
</tr>
<tr>
<td>Chaarafedine et al. 2014</td>
<td>Before and after</td>
<td>Lebanon, school based</td>
<td>Weight; infectious diseases, chronic conditions, smoking, alcohol and recreational drug use</td>
<td>Assessed preconception health awareness among adolescents and tested the effectiveness of a 20 min one-time preconception health educational session</td>
<td>n = 7, 200 high school students in grades 10 to 12 (18.9% of participants were male)</td>
<td>Mean knowledge of preconception health increased. Female students scored significantly higher than males at post-test. Grade 12 students scored significantly higher than lower grade students</td>
</tr>
<tr>
<td>Dejoy 2014</td>
<td>Pilot study, before and after</td>
<td>USA, college setting</td>
<td>Safe sex, HIV, STDs, reproductive planning</td>
<td>Pilot-tested a multi-week health education program for college women. 6 hours of education over 4 weeks in interactive, participant-led format</td>
<td>n = 26 college women; n = 20 completers</td>
<td>Increase in knowledge of preconception health and perceived importance. No significant change in preconception health behaviours</td>
</tr>
<tr>
<td>Delraham Howlett et al. 2011</td>
<td>RCT</td>
<td>USA, clinic setting</td>
<td>Alcohol</td>
<td>Tested the effectiveness of a web-based alcohol assessment and intervention. Women received either personalized feedback intervention or general health information regarding alcohol and FASD risk</td>
<td>n = 150 low-income, non-pregnant women of reproductive age engaged in risky drinking (intervention n = 75; control n = 75)</td>
<td>Overall reduction in the number of risky drinking occasions, but no difference between treatment and control</td>
</tr>
<tr>
<td>Dixon-Gray et al. 2013</td>
<td>Non-experimental; social marketing project</td>
<td>USA, radio, social media</td>
<td>Multiple risks based on CDC preconception health indicators</td>
<td>Assessed undergraduate students understanding of preconception health and gender differences, and differences for those who had studied information on pregnancy or child development vs. not</td>
<td>n = 241 undergrad students (n = 137 females; n = 104 males)</td>
<td>Facebook page viewed 11,000 times; radionovela episodes played 776 times. Positive comments from community members and local media; however, no conclusive evaluation regarding knowledge or behaviour changes Students who had taken a course with information on pregnancy and/or child development scored higher on preconception health knowledge</td>
</tr>
<tr>
<td>Delgado 2008</td>
<td>Cross-sectional</td>
<td>USA, college</td>
<td>Multiple risks: substance use, STDs, folic acid, prenatal development, pregnancy spacing</td>
<td>Assessed undergraduate students understanding of preconception health and gender differences, and differences for those who had studied information on pregnancy or child development vs. not</td>
<td></td>
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</tr>
<tr>
<td>Elsinga et al. 2008</td>
<td>RCT</td>
<td>Holland, clinic</td>
<td>Substance use, smoking, nutrition, exercise, disease</td>
<td>Risk assessment and personalized counselling by a GP, compared to standard care. Assessed knowledge on risk factors and behaviour change</td>
<td>Women aged 18–40 who were planning a pregnancy in one year (intervention n = 211, control n = 422)</td>
<td>Intervention = increased preconception health knowledge, increased folic acid and decreased alcohol use</td>
</tr>
<tr>
<td>Farrell Carnahan 2013</td>
<td>Prospective pilot intervention study</td>
<td>USA, community setting</td>
<td>Alcohol</td>
<td>Feasibility of a one-session, remote-delivered, preconception, motivational interviewing-based intervention to prevent alcohol exposed pregnancy (AEP)</td>
<td>n = 46 women of reproductive age at risk for AEP who were not trying to get pregnant</td>
<td>Feasible; participants were engaged and rated it as credible. Risky drinking and rate of unreliable contraception decreased significantly over time</td>
</tr>
<tr>
<td>Fischl et al. 2010</td>
<td>RCT</td>
<td>USA, clinic</td>
<td>Diabetes and reproductive health risks</td>
<td>Evaluated the impact of a nurse-delivered preconception counseling program tailored for teens with type 1 diabetes on cognitive, psychosocial, and behavioral outcomes</td>
<td>n = 88 teen girls with type 1 diabetes (intervention n = 43; control n = 45)</td>
<td>Significant improvements in perceived benefit and knowledge of PCC content and reproductive health</td>
</tr>
<tr>
<td>Floyd et al. 2007</td>
<td>RCT</td>
<td>USA, six diverse settings</td>
<td>Alcohol</td>
<td>Project CHOICES: 4 counselling sessions with personalized feedback and goal setting to prevent AEP. Control received written information on alcohol and women's health</td>
<td>n = 593 completers; women of reproductive age, not planning pregnancy, engaged in risky drinking (intervention n = 291; control n = 302)</td>
<td>Reduced risk of AEP in intervention group</td>
</tr>
<tr>
<td>Gardiner et al. 2013</td>
<td>Pilot test, before and after</td>
<td>USA, delivered in a hospital and university</td>
<td>Multiple risks</td>
<td>Development and testing of a web-based, virtual-agent delivered risk assessment and PCC advice</td>
<td>n = 31 young women aged 15–22 years, African American, non-pregnant</td>
<td>Majority of risks identified by participants were addressed/enacted on</td>
</tr>
<tr>
<td>Author</td>
<td>Study type</td>
<td>Setting</td>
<td>Risk factors addressed</td>
<td>Study/intervention overview</td>
<td>Participants</td>
<td>Key findings</td>
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<tr>
<td>Hammiche et al. 2011</td>
<td>Before and after</td>
<td>Holland, fertility clinic</td>
<td>Diet, folic acid, substance use, physical activity</td>
<td>Evaluated impact of tailored preconception counselling on preconception health risks.</td>
<td>n = 110 couples trying to get pregnant, majority subfertile (93.8%)</td>
<td>Improved nutrition, decreased alcohol use, increased folic acid, increased physical activity</td>
</tr>
<tr>
<td>Gordon et al. 2010</td>
<td>Before and after</td>
<td>USA, community clinic</td>
<td>Obesity, nutrition and physical activity</td>
<td>Tested a peer education PCC intervention for obese adolescents</td>
<td>n = 267 adolescents</td>
<td>Increased awareness about obesity and preconception health. Increased self-esteem</td>
</tr>
<tr>
<td>Gough et al. 2015</td>
<td>Before and after</td>
<td>Northern Ireland, clinic</td>
<td>Diabetes</td>
<td>Educational DVD on diabetes and preconception health delivery to women with diabetes</td>
<td>n = 97 women with diabetes</td>
<td>Increased knowledge regarding preconception care; high acceptability</td>
</tr>
<tr>
<td>Handler et al. 2013</td>
<td>Longitudinal, multi-</td>
<td>USA, varied (health centres)</td>
<td>Based on individual interconception care needs</td>
<td>Evaluation of a pilot interconception care program (ICCP); nurse-led case management</td>
<td>n = 220 low-income African-American women with a prior adverse pregnancy outcome</td>
<td>Majority of women developed a reproductive health goal. Women's socioeconomic needs were perceived as more pressing</td>
</tr>
<tr>
<td>Hanson et al. 2013</td>
<td>Before and after</td>
<td>USA, remote (via telephone and mail)</td>
<td>Alcohol</td>
<td>Project CHOICES, a 4 session MI-based telephone-delivered intervention to prevent AEP</td>
<td>n = 231 non-pregnant American Indian women.</td>
<td>Significant reduction in risky drinking</td>
</tr>
<tr>
<td>Homan &amp; Norman 2012</td>
<td>Prospective cohort pilot study</td>
<td>Australia, fertility clinic</td>
<td>Exercise, diet, caffeine, alcohol, smoking, stress</td>
<td>Comprehensive risk assessment and personalized counselling, using MI-techniques. One in-person (60 min) session with follow-up telephone counselling</td>
<td>n = 23 infertile couples, planning a pregnancy</td>
<td>Reductions in alcohol and caffeine use by women and men</td>
</tr>
<tr>
<td>Hussaini et al. 2013</td>
<td>Before and after</td>
<td>USA, community clinic</td>
<td>Substance use, vaccines, folic acid, genetics, chronic disease, STIs, maternity care, nutrition, exercise, stress</td>
<td>Evaluation of a preconception social marketing campaign including radio, billboards, community presentations, grand rounds</td>
<td>African American men (n = 24) and women (n = 27) aged 18–30 years</td>
<td>Increased perception of health risks and benefits. Greater effect for women than men</td>
</tr>
<tr>
<td>Ingersoll et al. 2013</td>
<td>Before and after</td>
<td>USA</td>
<td>Alcohol</td>
<td>Tested a one-session motivational interviewing AEP- prevention intervention for community women</td>
<td>n = 217 women at risk for AEP</td>
<td>Reduction in AEP risk; one session less effective than multiple sessions</td>
</tr>
<tr>
<td>Jack et al. 2015</td>
<td>RCT</td>
<td>USA, online</td>
<td>Multiple risks</td>
<td>Developed and tested “Gabby,” an online preconception conversational agent system.</td>
<td>n = 100 never-pregnant African American women aged 18–34</td>
<td>Greater reduction in number of risks in the intervention compared to the control. Rated positively, as “easy to talk to” by participants</td>
</tr>
<tr>
<td>Mittal et al. 2014</td>
<td>Before and after</td>
<td>USA, primary care clinics</td>
<td>Multiple risk factors, focusing on the chronic disease of the patient</td>
<td>Tested the use of a reproductive life plan developed with/ delivered by physicians, to improve preconception health knowledge in women with chronic diseases</td>
<td>n = 27 women of reproductive age (age 18–40) with obesity, diabetes or hypertension</td>
<td>Increase in knowledge of risks and social support</td>
</tr>
<tr>
<td>Mitchell et al. 2012</td>
<td>Cross-sectional</td>
<td>USA, secondary analysis of survey data</td>
<td>Multiple risks, access to PCC</td>
<td>Secondary analysis of survey data to understand awareness, planning, and conversations around PCH</td>
<td>n = 2736 women and men of reproductive age</td>
<td>Women more aware of preconception health risks and reported more PCC conversations than men</td>
</tr>
<tr>
<td>Ren et al. 2014</td>
<td>RCT</td>
<td>USA, web-based</td>
<td>Multiple risks (Gabby intervention)</td>
<td>Examined which health issues women are willing to discuss with a virtual agent</td>
<td>Reports on the n = 42 African American women of reproductive age randomized to the intervention group</td>
<td>Women discussed 6.3 of 23.2 health risks; reported feeling comfortable and willing to discuss risks with the virtual agent</td>
</tr>
<tr>
<td>Richards &amp; Mousseau 2012</td>
<td>Before and after</td>
<td>USA, community based</td>
<td>Multiple risk factors- alcohol, obesity, diet</td>
<td>Examined the effectiveness of a preconception health educational intervention (15 sessions) for American Indian high school students</td>
<td>American Indian North Plains girls (age 11–14 years) not planning a pregnancy; intervention (n = 39) and non-intervention (n = 38)</td>
<td>Significantly greater preconception health knowledge and obesity knowledge in intervention group</td>
</tr>
<tr>
<td>Schiavo et al. 2011</td>
<td>Before and after</td>
<td>USA, college based</td>
<td>Stress, African American health disparities, preconception health (substance use, exercise, nutrition, folic acid, weight, chronic disease, medications)</td>
<td>Preliminary evaluation of the preconception peer educator (PPE) program for African American women</td>
<td>n = 156 students trained in PPE program (93.6% female)</td>
<td>Improvements in preconception health knowledge; program deemed acceptable</td>
</tr>
</tbody>
</table>
Table 1 (continued)

<table>
<thead>
<tr>
<th>Author</th>
<th>Setting</th>
<th>Study type</th>
<th>Study/Intervention overview</th>
<th>Participants</th>
<th>Risk factors addressed</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenkku et al.</td>
<td>USA, college community based</td>
<td>Before and after</td>
<td>Evaluation of a web-based, self-guided change intervention designed to address risk for AEPs in a community sample of women.</td>
<td>N = 458 women, ages 18–44 years and at risk for AEP</td>
<td>Alcohol use, Chronic and genetic conditions, medications, substance abuse, folic acid, obesity, smoking, alcohol use, vaccinations, chronic disease, genetic risks, and medications</td>
<td>Project CHOICES, a 4 session MI-based intervention program for college women which engaged in risky drinking revealed no significant difference in quit rates between the web-based versus mail-delivered intervention using MI for women at risk of AEP [39], which consisted of four self-paced modules along with tailored messaging based on a pre-intervention assessment, revealed no significant difference in quit rates between the mail (22%) and web-based groups (23.1%). At four-month follow-up, 58% of women who participated in the intervention were no longer at risk for an AEP.</td>
</tr>
<tr>
<td>Wade et al.</td>
<td>USA, college community based</td>
<td>Before and after</td>
<td>Pilot peer education preconception health promotion nursing course</td>
<td>N = 53 college women in a sophomore health promotion nursing course</td>
<td>Increased knowledge and awareness of preconception health issues</td>
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</table>

**Counselling for women/couples with pre-existing health conditions**

**Women with chronic conditions**

Three studies evaluated counseling interventions for women with pre-existing chronic conditions, which integrated advice into health visits related to the chronic condition. A US study evaluated the use of a reproductive life plan to support preconception health awareness in women with chronic diseases. Following assessment, women met with their family doctor to develop a reproductive life plan, which focused on how their chronic condition may impact pregnancy and birth outcomes [7]. They reported significant increases in knowledge of pregnancy risks and reproductive planning.

A brief individual preconception counseling program (READY-Girls) for teen girls with diabetes reported significant improvements in perceived benefit and knowledge of preconception counseling content and reproductive health at 9-months follow-up [40]. In a UK study, focus groups were held with women and health care providers to inform the development of a preconception counseling...
Community-based social marketing interventions

Three studies described or evaluated community-based social marketing interventions. These studies did not measure behaviour change, but reported changes in knowledge of preconception health behaviours.

Two studies evaluated social marketing interventions for youth. Following Amor y Salud, a radionovela developed to introduce a range of preconception health information to Latina girls in the US, the community sample reported high levels of viewer-ship and positive feedback [51]. Healthy From Birth For Life, a youth driven social marketing campaign in which adolescents at risk of poor birth outcomes due to obesity and diabetes led community education on preconception risks [52], revealed increased knowledge, and improved self-esteem among participants.

A preconception social marketing campaign targeting African American women and men in the USA included radio and billboard advertisements, community presentations, presentations for health professionals and training of barbers and beauticians regarding preconception care [53]. One-third of participants interviewed recalled seeing campaign materials, and of these, most reported sharing information with family or friends. The campaign appeared to be more effective for women, with female participants in both the community presentations and presentations for health professionals reporting greater preconception health knowledge.

Interconception interventions

The evidence on interconception interventions (offered between pregnancies) is limited to one pilot study which evaluated a case management intervention for low-income African American women with a prior adverse pregnancy outcome [54]. A care management team coordinated a range of services for women, including: social services, family planning and medical care. They reported an increase in women’s reproductive health goals (66% vs 55%), but the authors noted that women prioritized efforts to improve their socioeconomic status.

Discussion

There has been progress in intervening on preconception health. The majority of interventions offered assessment or screening followed by brief intervention or counselling. In general, these interventions have demonstrated improvements in some of the outcomes measured. Technology assisted risk assessment interventions reach a wide range of women and men and offer privacy when disclosing risk behaviours. The “Gabby” intervention has been identified as a promising approach by the CDC [55]. Further development, implementation and evaluation of the use of social media, mobile phone apps and other innovative technology based formats for delivering preconception care is warranted.

Most of the interventions included women who were either planning to become pregnant, or who were identified as “at risk” of poor maternal or child health outcomes, including: ethnic minority women, women at risk of AEP, or women with pre-existing chronic diseases. While only one interconception intervention was identified, it also focused on women identified as high risk (African American women with a previous adverse birth outcome). However, rather than creating a new service or silo for preconception care [12], risk assessment, preconception and interconception advice should be provided to all women and men, and not just those identified as being at-risk.

Including partners in preconception care is a priority identified by the CDC preconception health care initiative in the USA, but relatively few interventions specifically for (male or female) partners are reported in the academic literature. In our review, the only interventions that included men were those delivered to couples in fertility clinic settings, and health education and awareness-raising interventions. Evaluation of broad preconception approaches are needed that engage men in family planning,
improve men’s health and the health of their partner, and prepare men for parenting [11]. Addressing men’s preconception health has the potential to improve: reproductive health for men and their partner/s, sperm health, partner support in the event of a pregnancy, education on reproductive planning/ pregnancy intention, and overall wellness [12].

Preconception care for women, men and couples with chronic diseases is another important area of intervention development and research. Focus groups held with non-pregnant women with chronic health conditions, including obesity, diabetes and hypertension, revealed that women were often not aware of pregnancy related risks and were not intending to engage in preconception health promotion [56]. Similarly, in a US study with pregnant women with type 2 diabetes who had delivered between 2002 and 2010, only a small minority of women (4%) reported receiving preconception care [57]. However, the limited amount of evidence we identified for this sub-group suggests that preconception health interventions may improve knowledge of risks and reproductive life planning. Given that women and men with chronic diseases interface more often with the health-care system, health care providers should be trained to regularly engage with these patients regarding preconception health.

Overall, interventions tend to be clinical and focus on individual level behaviour change (i.e. counselling women not to engage in risk behaviours) rather than examining social, structural and environmental factors that shape preconception health. Calls have been made for integrating a life-course approach to preconception health, recognizing health as a continuum from birth through to pregnancy and delivery, and how the accumulation of risks and social determinants impact health [58,59]. This is echoed in the most recent strategic plan released by the CDC, which (under goal 2) notes the need “to create health equity and eliminate disparities in adverse maternal, fetal, and infant outcomes” [60].

The promise of preconception care is that it avoids gender-exploitative prenatal health promotion that focus narrowly on fetal health and shaming women about the impact of their actions on the health of the fetus or child [61]. Prenatal messages that focus on women’s individual responsibility to ensure fetal health have the potential to stigmatize women who are burdened with multiple forms of disadvantage and who may lack the support and resources to make changes during pregnancy [62]. To avoid the perpetuation of gender based inequities, future research, program development and policy-making should be mindful of these issues and concerns. Indeed, preconception care interventions, policies and initiatives would benefit greatly from utilizing gender transformative principles that address and challenge harmful gender norms and stereotypes and promote health and equity among all women, girls, men and boys, within the same interventions [62]. In this context, gender transformative approaches would question existing roles and attitudes, and widen the options for reproduction, contraception and parenting for both women and men.

Conclusion

Preconception health care has the potential for substantial public health benefit given the large number of unplanned pregnancies, the gap between conception and pregnancy confirmation where health can be compromised, and the continuity of health risks before and beyond pregnancy. While the interventions reviewed report positive improvements in some risk factors, or increased knowledge of preconception care, there is appreciable room for further research and intervention development to expand the health benefits to all women and men. Specifically, additional research is required to understand: how service systems can support the provision of preconception care and the integration of gender transformative principles; what interventions are effective for training and engaging providers to deliver preconception care; and men’s preferences for preconception care (health issues/ topics, and provision of care); the effectiveness of virtual assessment and technology assisted interventions; how best to deliver preconception care; how to engage partners/men in preconception care; and how preconception care can be empowering for, and inclusive of, all women, men, girls and boys.

Acknowledgment

Funding for this project was provided by the Canadian Institutes of Health Research (funding reference number: 142070).

References
