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Motivational Interviews to Improve Contraceptive Use in Populations at High Risk of Unintended Pregnancy: A Systematic Review and Meta-analysis

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Abstract

Objective: Effective contraceptive use has the potential to prevent around 230 million births each year. An estimated 222 million women want to delay pregnancy or cease childbearing, but are not actively using contraception. Lack of education is a known barrier for effective contraceptive use. Motivational interviews are presumed to improve effective contraceptive use, but studies to date report varied findings. Some studies demonstrate an improvement and others report no effect.

Study Design: A systematic review of evidence on the impact of motivational interviews on contraceptive use in women of childbearing age was carried out using MEDLINE, EMBASE, BNI, Cochrane library, CINHAL, African Index Medicus, Web of Science, the Reproductive Health Library, and the Science Citation Index (inception-January 2013) without language restriction. Search terms included 'motivational interview* AND contraception OR family planning OR maternal OR pregnancy'. Randomised controlled trials comparing the effect of motivational interviews with standard practice on effective contraception use in women of reproductive age were included. The outcome measures were use of effective contraception or use of high-level contraception, and subsequent births or pregnancies. The random effects model was used to pool the risk ratios from individual studies.

Results: Eight randomised controlled trials were included in the review with a total of 3424 women at high risk of pregnancy. Meta-analysis showed an increase in effective contraceptive use with motivational interviews when compared with control (RR 1.32 95%CI 1.11, 1.56: P=0.002) in the period of zero to four months post intervention. No difference in effective contraceptive use was shown at four to eight months (RR 1.10, 95%CI 0.93, 1.32: P=0.27), and between eight to twelve months (RR 1.18 95%CI 0.96, 1.46: P=0.12). No evidence of effect in the reduction of subsequent pregnancies or births at twelve to twenty-four months was seen with motivational interviews (RR 0.80 95%CI 0.51, 1.26. P=0.34).

Conclusion: Motivational interviews significantly increase effective contraceptive use immediately after and up to four months post-intervention. The effect without reinforcement is short lasting as no evidence of effect is seen after four months post-intervention.

Keywords: Motivational interviews; Contraception; Family Planning; Pregnancy.

Introduction

An estimated 222 million women want to delay pregnancy or cease childbearing, but are not actively using contraception (1). Known barriers to contraceptive use are inadequate contraceptive education, social constraints or opposition against contraceptive use (1), and the side effects of some contraceptive methods (2). Consistent and effective use of contraceptives can also be problematic, as good compliance with some methods has been demonstrated to be low in some regions (3). Research has demonstrated that half of women using oral contraceptives (48.5%) use this method incorrectly, thus resulting in an unintended pregnancy (3).

Effective family-planning can empower women. It can also directly reduce the incidence of maternal deaths by preventing around 230 million potential births each year (4). The maternal mortality ratio in the USA has increased within the last two decades from 12 maternal deaths per 100,000 live births in 1990, to 21 maternal deaths per 100,000 live births in 2010. Globally, the maternal mortality ratio of industrialised countries has also risen by 2% between 1990 and 2010 (5). Reducing rates of unintended pregnancies through effective family-planning reduces the need for unsafe abortion, and the morbidity and mortality associated with this procedure. Effective family-planning also has the potential to benefit the wider community, as it can reduce poverty and malnutrition, particularly in regions where poverty and food security problems are present (6).

Despite the barriers the global use of modern contraceptive use has increased with a rise from 54% in 1990 to 57% in 2012 (4). However the level of unmet need for contraception (definition in Box 1) remains high (7). It is estimated that in 2015 153 million women globally will have an unmet need for contraception, of which 138 million women will be in developing countries (7).

The use of behavioural and theory based interventions to improve contraceptive uptake and contraceptive compliance have recently been addressed (8-10). Motivational interviews are a counselling approach that aims to facilitate and engage the participants' intrinsic motivation to change their behaviour. When compared with non-directive counselling, motivational interviewing

is suggested to be more goal-orientated and more participant-centred. Motivational interviewing encourages the participant to think about the changes that could be made, rather than the counsellor offering suggestions. The key concepts of motivational interviews are the participant recognising and accepting the need to make changes in their lives; this approach encourages the participants to consider their readiness to change their behaviour (11, 12). For this reason motivational interviews are commonly associated with targeting changing addictive behaviours, (13-17) and they have recently been used with adolescents (18) and pregnant women (19-21). However the evidence of their effectiveness to improve contraceptive use includes conflicting findings, with some studies reporting an improvement and others reporting no effect. This systematic review and meta-analysis were performed to examine the effects of motivational interviews on effective contraceptive use when compared with standard practice.

Materials and Methods

Databases were searched for randomised controlled trials investigating the effects of using motivational interview to improve effective contraceptive use. We searched MEDLINE, EMBASE, BNI, Cochrane library, CINHAL, ASSIA, African Index Medicus, the Reproductive Health Library, and the Science Citation Index (from database inception to January 2013). Hand searching complemented electronic searches, and reference lists were checked. The search terms were terms were 'motivational interview* AND contraception OR family planning OR maternal OR pregnancy'. No language restrictions were applied to the search.

Randomised controlled trials were selected if the study examined the effect of motivational interviews on contraceptive use or family planning of women of reproductive age, and compared it with standard practice (control). Initially the electronic searches were scrutinised and full manuscripts of appropriate studies were acquired. Final decisions on inclusion or exclusion of

manuscripts were made after inspection of these manuscripts by two reviewers (AW and KN) (Figure 1). Information on study characteristics, data quality and outcome data were extracted from each article by multiple reviewers (AW, KN) (Table 1). The outcome measures were: use of effective contraception, or use of high-level contraception, and subsequent births or pregnancies, these outcomes were measured at various time points throughout the studies.

The studies were assessed for methodological quality using quality assessment tools appropriate for the study design. The CONSORT (22) Statement was used to evaluate the randomised controlled trials against a 25 item checklist for trial design, intervention, randomisation, blinding and analysis. Risk of bias in the studies was assessed using the Cochrane risk of bias tool.

The random effects model was used to pool the risk ratios from individual studies at time periods of zero to four months, four to eight months, and eight to twelve months past the intervention to include and group various time-points selected for outcome assessments in the reports.

The follow up assessments were carried out at highly heterogeneous time-points and the rationale for the choice of the assessment timings were not provided by the authors. The follow up assessments were pooled for comparison into three time periods starting from the point of intervention: zero to four months, four to eight months, and eight to twelve months. If a study reported two time points within the pooled time category, the first reported time point was used within the analysis. Pregnancy rates were reported as described in the trials (12-24 months). Heterogeneity of treatment effects were evaluated using forest plots, χ^2 and I^2tests and I^2 values of over 25%, 50%, and 75% respectively were assigned labels of low, moderate, and high heterogeneity. Revman 5.0 statistical software was used for the analyses.

Results

The processes of literature search and selection are provided in Figure 1. Eight randomised controlled trials were included in the review with a total of 3424 women at high risk of pregnancy.

Study characteristics and quality

The characteristics of the included studies are provided in Table 1. All studies were set in upper-middle income countries. The participants were women of reproductive age, although there were some variations in population characteristics between the studies. Two studies included only adolescents under the age of eighteen (18, 23) and two studies included only participants aged 18-24 (24, 25). Half of the studies included women participating in high level alcohol consumption ('Risky drinking') (24, 26-28) who were also deemed as prone to ineffective contraceptive use.

There was also clinical heterogeneity in the intervention arms of the studies, although all used motivational interviews. Three studies offered single sessions, lasting between 60-75 minutes (24, 25, 27), one study offered two sessions including a booster session at two months (10), three studies delivered the intervention through five (24, 25) and nine sessions (18), whereas another study initiated one face to face session with up to nine follow-up phone calls (23). Baseline rate of effective contraceptive use varied across the studies, with some studies reporting a complete absence of effective contraceptive use at baseline (26-28), and others reporting a 59% baseline rate of effective contraceptive use (10).

The eight studies achieved scores between 16 and 30 on the CONSORT (22) statement checklist (Web table 1), with most studies reporting adequately on background and objectives, as well as limitations, generalisability and interpretation. When assessed for risk of bias most studies scored low risk of bias in random selection, incomplete outcome data and selective reporting, with an unclear risk of bias in blinding of participants, outcome assessors and allocation concealment (Web

table 2). All studies apart from one scored (19) high on risk of bias in other sources of bias due to the data collection methods.

Effective contraceptive use from zero to four months post intervention

Six studies (10, 24-28) reported on effective contraceptive use at zero to four months post intervention. Meta-analysis showed a significant increase in effective contraceptive use with motivational interviews when compared with the control arm (RR 1.32 95%CI 1.11,1.56: P=0.002: Figure 2). Heterogeneity was moderate in the analysis (I^2= 67%: P=0.010).

Effective contraceptive use from four to eight months post intervention

Four studies (10, 23, 27, 28) reported on effective contraceptive use between four and eight months. Meta-analysis showed no difference in effective contraceptive use with motivational interviews when compared with the control arm (RR 1.10, 95%CI 0.93, 1.32: P=0.27: Figure 3). Heterogeneity was high in the analysis (I^2= 83%, P=0.0004).

Effective contraceptive use from eight to twelve months post intervention

Four studies (10, 23, 26, 28) reported on effective contraceptive use between eight and twelve months. Meta-analysis showed no difference in effective contraceptive use with motivational interviews when compared with the control arm (RR 1.18, 95%CI 0.96,1.46: P=0.12: Figure 4). Heterogeneity was high (I^2= 86%: P=<0.0001).

Reduction in subsequent pregnancies or births reported at 12-24 months post intervention delivery

Reduction in subsequent pregnancies during the period of twelve to twenty- four months following the intervention was reported in two studies (10, 18). No significant differences were seen in subsequent pregnancies rate in the group exposed to the motivational interviews compared with control (RR 0.80 95%CI 0.51, 1.26. P= 0.34: I^2=39%, P=0.20: Figure 5).

Comment

Motivational interviews appear to significantly improve effective contraceptive use between zero to four months, but effects are reduced with time. There appears to be no difference in subsequent pregnancies or births at the two year period as measured at one year and two years post intervention, although only two studies reported this outcome. There was moderate to high statistical heterogeneity in all analyses, as well as clinical heterogeneity within the intervention arms within the trials.

It is possible that the heterogeneity in the analysis in Figure 2 and Figure 4 may be due to the difference in the population in one study by Rendall-Mkosi et al (26), as the largest effect was seen in favour of the intervention. The study by Rendall-Mkosi et al included women of a similar age range (18-44) at risk of alcohol exposed pregnancy, however unlike the other studies, it was reported that the women within this study were predominantly poor, often part-paid with alcohol for working within the agricultural sector, experienced poor living conditions and had a low level of education. One further study by Floyd et al (28) showed a larger effect when compared with other studies. It is possible that the heterogeneity in figure 3, and the larger effect in both the studies by Rendall-Mkosi et al and Floyd et al (26, 28) may be due to the educational difference in the population. Only a third of the population in the study by Floyd et al had college education and most participants were recruited from women jails or alcohol treatment centres. All of the other studies included in the review recruited university students only. Compliance in the studies by Rendall-Mkosi et al and Floyd et al was low (51% (26) and 63% (28) yet they had the greatest effect. Thus is it assumed that populations with a lower educational level are less likely to have the knowledge or information about contraception, so the motivational interview would be providing this as well, rather than solely the motivation to change behaviour.

One explanation could be that the significant improvement in the first reported time period (between zero to four months post intervention), compared to subsequent time periods could be due to the participants forgetting the contents of the intervention. Studies that provided booster

sessions at 2 months post intervention (10) showed improved contraceptive usage when compared with other reported time periods in the study, implying the need for repeated contraceptive counselling to encourage or maintain effective use of contraception.

Strengths and Limitations

The heterogeneity in the intervention, the delivery of the intervention, and the intervention concentration are recognised as limitations within the analysis. An additional limitation in the analysis could be the pooling of the time periods reported, and including estimations of outcome for two studies (10, 23) within the analysis. Due to the variability in the actual reported time periods across the eight studies, there were insufficient data in each category to provide meaningful analysis. Therefore the time periods reported in the studies were plotted on a graph to observe if a cluster effect was present around time specific time points, as this was not observed when the time periods were pooled into categories (zero to four, four to eight, eight to twelve). Steps were taken to avoid data assumptions, and report authors were contacted, however precise numerators and denominators could not be obtained.

There could also be possible risk of reporting bias in the primary data, as the majority of the studies relied on self –reported contraceptive use, and of episodes of risky behaviour in relation to unsafe sexual activity method. Therefore there may be bias in the outcome data reported by the participants, with some outcomes being under-reported. This was therefore assessed to have a high risk of bias within the category of 'other biases'. There were also some discrepancies in the data that we attempted to resolve by contacting authors. However due to the methods of statistical analysis used in the primary analysis the exact numbers for the control and intervention arm could not be provided, and only estimates were given (23), thus introducing a further limitation within our analyses.

Interpretation

Motivational interviews were included in a Cochrane Review that tested theory based interventions that aimed to promote or inform contraceptive use (9), however this also included studies with other types of interventions to promote contraceptive uptake, including home-based mentoring, pamphlets, computer-delivered interventions, general health counselling, group youth and parent programs, educational tools as well as motivational interviews. Four trials (10, 23, 24, 28) in the review examined the effect of motivational interviewing on alcohol exposed pregnancy (24, 28), the prevention of pregnancy and sexually transmitted infections (10), and improvement in contraceptive use (23). No key patterns were identified with theory type, intervention, or target population, therefore it is suggested that more thorough use of single theories would help to provide evidence for an effective intervention. A systematic review of motivational interviewing training for general practitioners (29) evaluated different aspects of motivational interviewing training for GPs. The review included studies of interventions that addressed alcohol counselling for pregnant women, abuse counselling, smoking counselling, medication adherence, diabetes counselling, as well as lifestyle, exercise and diet counselling. The review concluded that motivational interviewing can improve client communication and counselling concerning lifestyle related issues, however the methodological inconsistency and clinical heterogeneity of the studies within this review meant that the results had to be interpreted conservatively.

Conclusion

It is apparent from this review that motivational interviews increase effective contraceptive use in a population at high risk of unintended pregnancy in the period of zero to four months after the intervention has been delivered. The effect however, without reinforcement is short lasting. The individual trials in which the intervention was delivered on multiple occasions showed a greater and more prolonged effect (26, 28), when compared with individual trials that delivered the intervention on a single occasion (24, 25, 27). Collectively no effect is seen on contraceptive use after four months post intervention.

As the World Health Organisation is working to promote contraception by producing evidence-based guidelines on service delivery of contraceptive methods and adapt, implement and improve the delivery methods to meet the needs of individuals, this research report adds to the current global health research on improving family planning.

Box 1:

Unmet need for family planning: The number of women of reproductive age who are married or in a union, who are fecund and sexually active, but are not using any method of contraception, and report not wanting any more children or wanting to delay the birth of their next child (1).

Conflicts of interest

We declare that we have no conflicts of interest

Contribution to authorship

A. Wilson: Conceived the systematic review, performed the literature search, and the study selection. AW performed the data extraction, data analysis, data interpretation and discussion. Quality assessment of the studies and risk of bias was also completed by AW.

K. Nirantharakumar: Performed the study selection, the data extraction, provided critical input,.

E.G. Truchanowicz: Provided critical input.

R. Surenthirakumaran: Undertook quality assessment of the studies and provided critical input

C. MacArthur: Provided critical input.

A. Coomarasamy: Provided critical input. AC is the guarantor

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Table 1: Study characteristics of studies included in the review

Population, Setting	Intervention	Control	Outcome
RCTs: Women of reproductive age			
Ingersoll 2005: USA (24)			
University student's aged 18-24 risk of alcohol exposed pregnancy from a mid-Atlantic urban university. Sexual intercourse with a man in past 90 days using ineffective contraception, risky drinking levels.	(n=114) BALANCE package (Birth Control and Alcohol Awareness: Negotiating Choices Effectively) Sessions included 90 day recording timeline follow back data on drinking and contraception, exercises on decisional balance, temptation and confidence charts. No details provided on training of counsellors. Baseline rate of contraceptive use not reported. 47% did not use contraception (inc withdrawal). **Duration: One session lasting 60-75 mins**	(n=114) Informational pamphlet about women's health. No baseline rate of effective contraception 44% did not use contraception (inc withdrawal)	Risk drinking (five or more standard drinks per occasion at least once in past 90 days or eight or more per week), ineffective contraception use (sexual intercourse in last 90 days with ineffective contraceptive use), risk of alcohol exposed pregnancy.
Petersen 2007: USA (10)			
Aged 16-44 in 3 primary healthcare facilities in North Carolina, Mar 2003 and Sept 2004, at risk of unintended pregnancy, not pregnant or planning pregnancy within a year, not currently using IUD or partners not sterilised. Approx 60% participants aged 26-44	(n=365) Pregnancy and STD prevention counselling; emphasizes the development of the clients self efficacy. Explore discrepancy between pregnancy intention and contraceptive use, between STD risk and condom use; sharing information with participants; promoting behaviours to reduce risk. Intervention delivered by experienced health educators trained for project. Booster session two months later by phone or face to face, (85% had both sessions). Counselling standardised by providing counsellors with 30-40 hours training on contraceptives, pregnancy and STD prevention counselling, motivational interviewing, clinic operation, study design and implementation, basics of smoking cessation, exercise and nutrition counselling. Quality control measures were used through the study period. Baseline rate 59% effective contraceptive use **Duration: Two sessions (at least one face to face) over three months, no detail on length of session**	(n=372) Session of general health counselling. Baseline rate 58% effective contraceptive use	Change in level of contraceptive use, e.g. from a non-user to low or high-level user. Low level, missed contraceptive pills, used condoms inconsistently, diaphragm, contraceptive patch. High level, oral contraceptive taken every day, consistently used the patch, vaginal ring or condoms.
Floyd 2007: USA (28)			
Aged 18-44, at risk of alcohol exposed pregnancy from 6 diverse settings in Florida, Texas, Virginia between Jul 2002-Jan 2004. No condition causing infertility, not pregnant or planning pregnancy in next 9 months, sexual vaginal intercourse in last 3 months with fertile man without effective contraception, engaged in risky	(n=416) Motivational intervention counselling and contraceptive consultation. Sessions involved rapport building, review of current and advice on contraceptive practice and alcohol consumption, use of contraception journal, intercourse and alcohol consumption, self evaluation of behaviour, feedback on journal recordings, review goals and commitment to change. Contraceptive counselling visit involved determining appropriate and suitable methods of counselling. Counselling delivered by 21 trained counsellors (master's level education and above), supervised by project choices efficacy study team and six contraceptive care providers. 98% received at least one session, 63% received all 4 sessions; mean number of visits 3.2 sessions.	(n=414) Received information only. Baseline rate 0% effective contraceptive use	Risky drinking (five or more standard drinks in one day or eight or more drinks in a week), ineffective contraception (occurrence of vaginal sex when contraception not used or used ineffectively), risk for alcohol exposed pregnancy

drinking.	Baseline rate 0% effective contraceptive use **Duration: Five sessions over 14 weeks, lasting between 45-60 minutes**		
Barnet 2009: USA (18)			
Pregnant teenagers, aged 12-18 >24 weeks gestation. Excluded if the pregnancy was not a live birth and withdrawn if infant died in neonatal period. Intervention implemented in post partum period.	(n=167) Initiated 6 weeks postpartum, continuing quarterly to 24 months postpartum. *Nine* sessions were possible, yet >7 sessions classed as adherence. Computer-assisted motivational intervention: CAMI uses software developed for study and programmed with algorithms based on trans-theoretical model. CAMI counsellors conducted a *20-minute* stage matched motivational interviewing session to enhance teen's motivation to use contraception and remain non-pregnant. Half of participants received enhanced home based visit. Intervention ceased if participant became pregnant. Counsellors trained by completing a 2.5 day course on trans-theoretical model, motivational interviewing and CAMI protocol. Counsellor proficiency ascertained by videotaping the sessions. 24% attended > 7 intervention sessions. Baseline contraceptive use not reported, 23% always used condom **Duration: Nine sessions conducted for a period of up to two years. Sessions were 20 minutes in duration**	(n=68) Usual care, no description provided. Details for baseline effective contraceptive use not reported, 19% always used condom	Repeat births at 24 months and repeat pregnancy outcomes.
Kirby 2010: USA (23)			
Reproductive health clinic in San Francisco aged 14-18 2005-2007, not pregnant or trying to become pregnant, had sexual intercourse in last three months, not consistently using a hormonal method of contraception (IUD or contraceptive implant).	(n=402) Motivational interviewing principles and techniques included in phone calls. Staff trained in family planning methods, adolescent risk behaviour and counselling techniques, also received training on content of calls and appropriate conduct. Interviewers trained on motivational interviewing by trained psychologists, and received motivational interviewing guide and training materials designed for intervention. four calls observed before allowed to conduct intervention alone. Counsellors completed 2.7 calls per participant rather than 9 specified in protocol, only 11% received 6 or more phone calls. Baseline effective contraceptive use not reported separately, 11% hormonal contraception at baseline. **Duration: One face to face visit followed by nine phone calls over 12 months. Length of phone calls was not reported.**	(n=403) Regular clinic services no regular follow up calls. Details for baseline effective contraceptive use not reported separately for intervention and control, 11% used hormonal contraception at baseline.	Measures of contraceptive use (condom and hormonal); frequency, compliance, non-use of contraception. Emergency contraceptive use, STDs, pregnancy, abortion, birth. Correct use of contraceptive method
Ceperich 2011: USA (25)			
University students aged 18-24 at risk of alcohol exposed pregnancy from a mid-Atlantic urban university. Not planning pregnancy in next year.	(n=101) BALANCE package (Birth Control and Alcohol Awareness: Negotiating Choices Effectively) included personalized feedback. Sessions included 90 day recording timeline follow back data on drinking, contraception, exercises on decisional balance, temptation and confidence charts. Counsellors had	(n=106) Informational pamphlet about women's health. No baseline rate of effective contraceptive use	Risk drinking (consuming five or more standard drinks per occasion at least once in past 90 days or eight or more per week), ineffective contraception

Sexual intercourse with man in last 90 days used contraception ineffectively and partook in risky drinking.	master's degrees in psychology or social work, received training in motivational interviewing and balance counselling manual. Interviews videotaped for quality control. Motivational interview techniques and principles were practised at least twice a month. Baseline rate of contraceptive use not provided but 53% did not use contraceptive means (inc withdrawal). **Duration: One session lasting 60-75 minutes**	provided but 48% did not use contraceptive means (inc withdrawal).	use (sexual intercourse in the last 90 days with ineffective contraceptive use), risk for alcohol exposed pregnancy, rate of alcohol exposed pregnancy at 4 months
Ingersoll 2012: USA (27)			
Aged 18-44 from 2 cities and surrounding areas Virginia, risk of alcohol exposed pregnancy (at least one episode of unprotected vaginal sex with a male partner and drinking alcohol at risky levels during the past 90 days. Without confirmed infertility, English speaking, intending to reside in local community for next 6 months. Excluded women current or intending to get pregnant, opioid dependence without antagonistic treatment, actively suicidal and cognitive problems.	(n=73) Build rapport; provide personalized feedback on drinking, contraception and alcohol exposed pregnancy risk. Information given on alcohol exposed pregnancy and fetal alcohol syndrome. Counsellors encouraged a contraception visit to explore options and referred participants to community women's health resources and offered informational brochures. Counsellors had post graduate degrees and trained in motivational interviews. Weekly supervision of counsellors. Baseline rate 0% effective contraceptive use **Duration: One session lasting 60 minutes**	(n=144) either informational brochure or informational video. Baseline rate 0% effective contraceptive use	Drinks per drinking day, ineffective contraception rate, alcohol exposed pregnancy risk at 3/6 months.
Rendall-Mkosi 2012: South Africa (26)			
6 primary care clinics in Western Cape, South Africa aged 18-44, not pregnant, engaged in risky drinking, ineffective or no contraceptive use, not undergone sterilisation or hysterectomy, had vaginal sex in last 3 months, resided in 25 km of main town.	(n=82) Rapport building, session programme, assessing the participants readiness to change and confidence in enacting behaviour change, development of change plan, implementation of the plan, assessing challenges and problem solving. Contraception was integrated throughout. Sessions conducted by locally recruited and trained lay counsellor. Sessions held 2 months in a convenient place and time for participants. Quality control of intervention ensured through regular meetings between trainers and counsellors. 51% participants completed 5 sessions, 12% (10) did not attend any sessions. Baseline rate 0% effective contraceptive use **Duration: Five sessions over two months lasting 60 minutes**	(n=83) Information pamphlet on fetal alcohol syndrome prevention and women's health handbook. Baseline rate 0% effective contraceptive use.	Risk of alcohol exposed pregnancy at 12 months, risky drinking and ineffective contraception at 3 and 12 months, risk of alcohol exposed pregnancy at 3 months (engaged in risky drinking and not using effective contraception at follow-up).

Figure 1: Results of search strategy and identification of publications included in the review

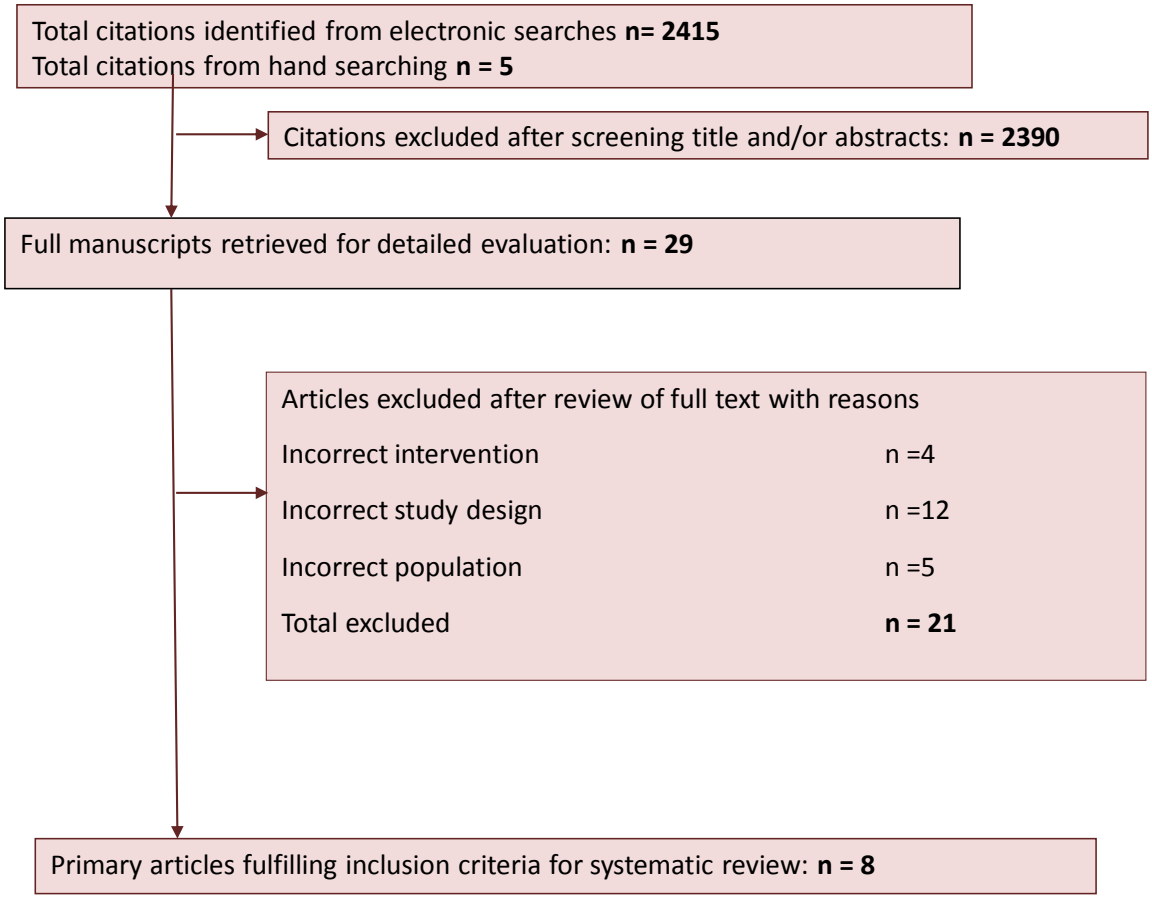


Figure 2: Effective contraceptive use between zero to four months with participants that have participated in motivations interviews and participants that have received standard care

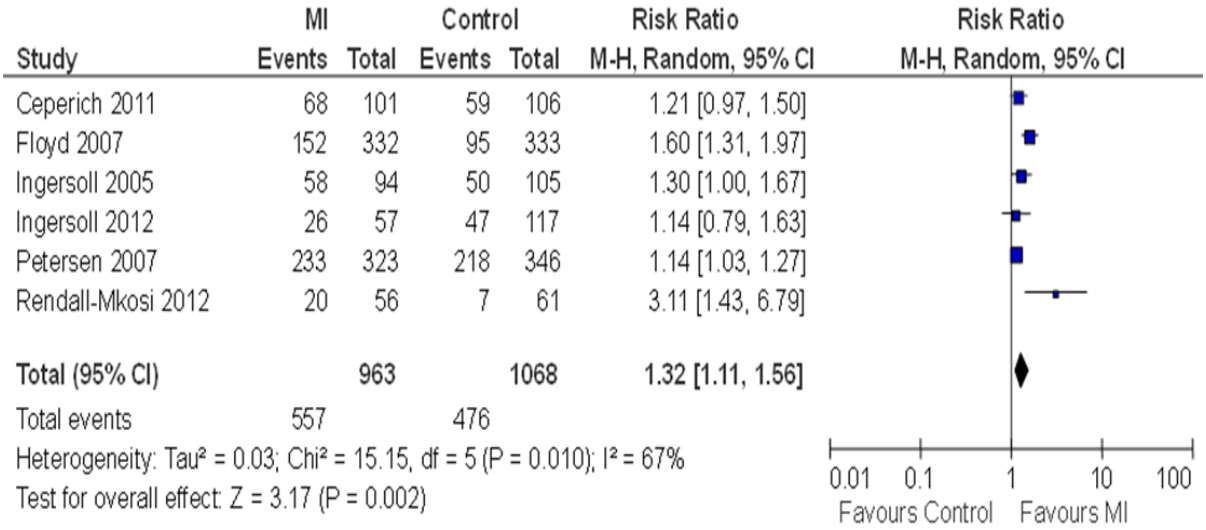


Figure 3: Effective contraceptive use between four and eight months with participants that have participated in motivations interviews and participants that have received standard care

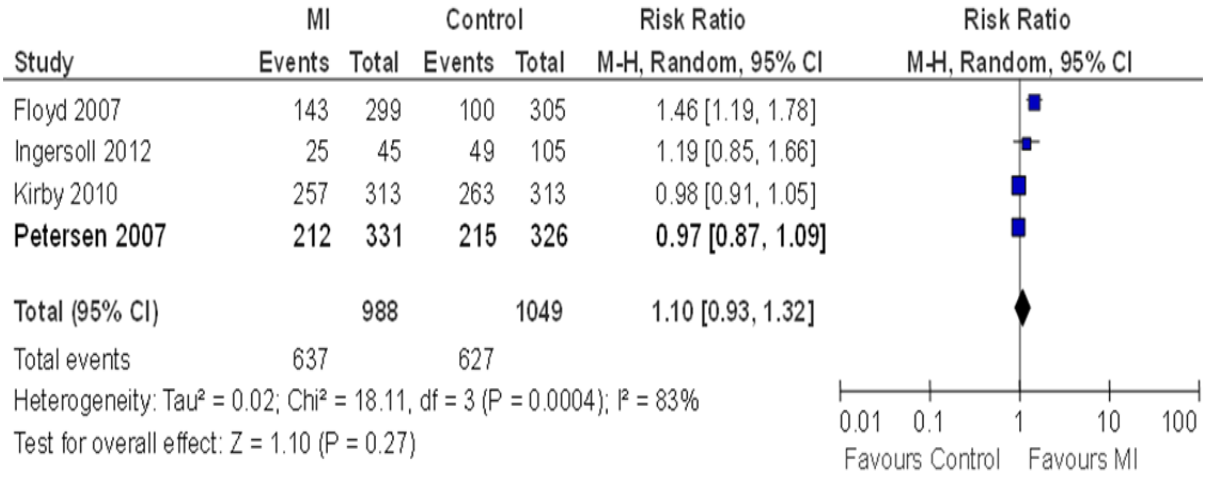


Figure 4: Effective contraceptive use between eight and twelve months with participants that have participated in motivations interviews and participants that have received standard care

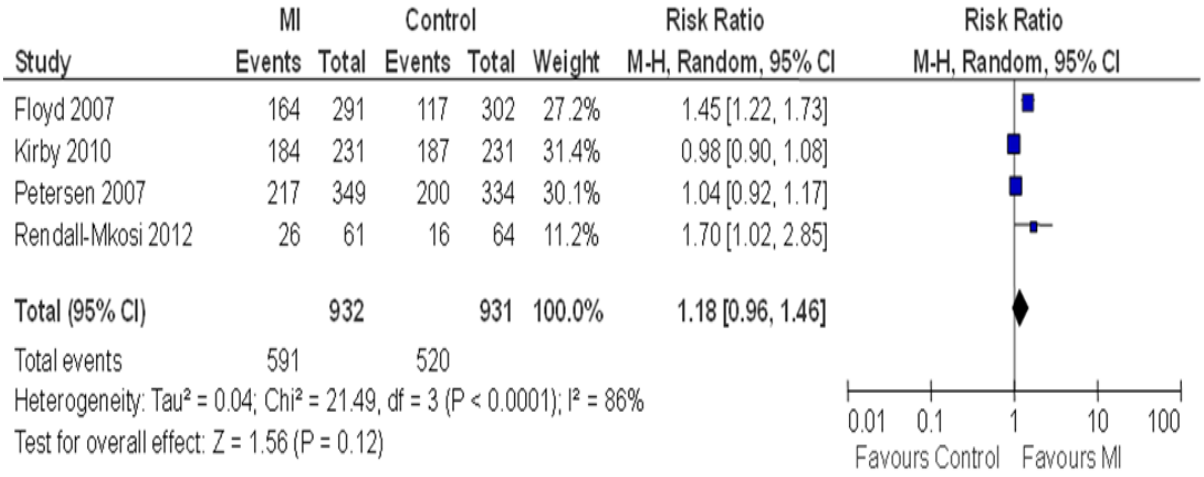
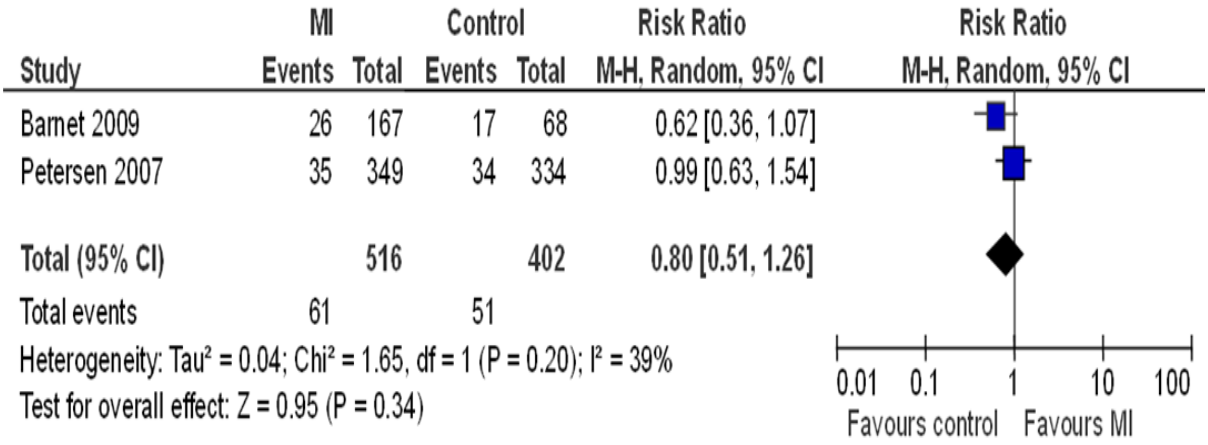


Figure 5: Subsequent pregnancies or births at 12-24 months Motivational interviews with participants that have participated in motivations interviews and participants that have received standard care



Web table 1: Quality assessment: CONSORT statement reporting checklist

Item	Checklist item	Ingersoll 2005(24)	Floyd 2007 (28)	Ceperich 2011 (25)	Kirby 2010 (23)	Petersen 2007(10)	Barnet 2009 (18)	Ingersoll 2012 (27)	Rendall-Mkosi 2012 (26)
Title and abstract									
	Identification in title	N	Y	N	N	Y	Y	N	Y
	Structured summary	N	Y	N	Y	Y	Y	Y	Y
Introduction									
Background and objectives	Scientific background &rationale	Y	Y	Y	Y	Y	Y	Y	Y
	Specific objectives	Y	Y	Y	Y	Y	Y	Y	Y
Methods									
Trial design	Description of trial design	N	Y	N	N	N	N	Y	N
	Changes to methods	N	N	N	N	N	N	N	Y
Participants	Eligibility criteria	Y	Y	Y	Y	Y	Y	Y	Y
	Settings where data collected	N	Y	N	N	Y	N	N	N
Interventions	Interventions with sufficient details	Y	Y	Y	Y	Y	Y	Y	Y
Outcomes	Completely defined pre-specified outcome measures	Y	Y	Y	Y	Y	Y	Y	Y
	changes to trial outcomes	N	N	N	N	N	N	N	N
Sample size	sample size	N	Y	N	Y	Y	N	N	Y
	Interim analyses/stopping	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Randomisation:									
Sequence generation	Method of allocation sequence	Y	Y	Y	Y	Y	Y	Y	Y
	randomisation	N	Y	N	Y	Y	Y	Y	Y
Allocation concealment	implement random allocation sequence	N	Y	N	N	Y	N	Y	Y
Implementation	generation of allocation sequence	Y	N	Y	N	N	N	Y	Y
Blinding	blinding after assignment	N	Y	N	Y	N	N	Y	Y
	Intervention similarity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statistical methods	Statistical methods used	Y	Y	Y	Y	Y	Y	Y	Y
	Methods for additional analyses	Y	Y	Y	Y	Y	Y	Y	Y

Results									
Participant flow	Numbers of participants assigned	Y	Y	Y	Y	Y	Y	Y	Y
	Losses and exclusions	Y	Y	Y	N	N	Y	Y	Y
Recruitment	Dates of recruitment and follow-up	N	Y	N	Y	Y	Y	Y	Y
	Trial ended or stopped	N	N	N	N	N	N	N	N
Baseline data	Baseline demographics	Y	Y	Y	Y	Y	Y	Y	Y
Numbers analysed	Number of participants in analysis	Y	Y	Y	N	Y	Y	Y	Y
Outcomes and estimation	Primary and secondary outcome	Y	Y	Y	N	N	Y	Y	Y
	Absolute and relative effect sizes	N	Y	Y	N	Y	N	Y	Y
Ancillary analyses	Results of any other analyses	N	Y	Y	N	N	Y	Y	Y
Harms	Important harms	Y	N	Y	N	N	N	N	N
Discussion									
Limitations	Trial limitations	Y	Y	Y	Y	Y	Y	Y	Y
Generalisability	Generalisability of findings	Y	Y	Y	N	Y	Y	Y	N
Interpretation	Interpretation consistent	Y	Y	Y	N	Y	N	Y	Y
Other information									
Registration	Registration number, trial registry	N	Y	N	N	N	N	Y	N
Protocol	full trial protocol can be accessed	N	Y	N	N	N	N	N	N
Funding	Sources of funding and support	Y	Y	Y	Y	Y	Y	Y	Y

Web table 2: Risk of Bias in Included Studies: RCTs

Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Ingersoll 2005 (24)						
LOW	UNCLEAR	UNCLEAR	UNCLEAR	LOW	LOW	HIGH
Floyd 2007 (28)						
LOW	LOW	HIGH	LOW	LOW	LOW	HIGH
Petersen 2007 (10)						
LOW	LOW	UNCLEAR	UNCLEAR	UNCLEAR	LOW	HIGH
Barnet 2009 (18)						
LOW	LOW	UNCLEAR	UNCLEAR	LOW	LOW	LOW
Kirby 2010 (23)						
LOW	UNCLEAR	UNCLEAR	LOW	LOW	LOW	HIGH
Ceperich 2011 (25)						
LOW	UNCLEAR	UNCLEAR	UNCLEAR	LOW	LOW	HIGH
Ingersoll 2012 (27)						
UNCLEAR	UNCLEAR	UNCLEAR	LOW	UNCLEAR	LOW	HIGH
Rendall-Mkosi 2012 (26)						
LOW	LOW	UNCLEAR	HIGH	LOW	LOW	HIGH

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