The FAST study: Fertility ASsessment and advice Targeting lifestyle choices and behaviours: a pilot study

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BACKGROUND: Lifestyle has been shown to affect fertility in both males and females, with compelling evidence that smoking and being under or overweight impairs natural and assisted fertility, and other factors such as stress and caffeine have also been implicated. The objective of this study was to determine whether providing infertile couples with individualized lifestyle assessments and ongoing support facilitates positive lifestyle changes enhancing healthy fertility.

METHODS: We conducted a prospective cohort pilot study of 23 infertile couples attending an Adelaide-based fertility clinic for advice and treatment relating to infertility. The intervention was a comprehensive assessment interview with the couple, focused on health and lifestyle. Motivational interviewing techniques were used and ongoing support provided. The assessment was repeated after 4 months and included an exit questionnaire. The main outcome measure(s) was self-reported lifestyle changes, including increased exercise, modified diet, reduced caffeine and alcohol consumption, ceased or reduced smoking and decreased psychological stress.

RESULTS: Following the initial lifestyle assessment interview, all participants reported adverse lifestyle behaviour.

CONCLUSIONS: The results suggest that the FAST (Fertility ASsessment and advice Targeting lifestyle choices and behaviours) approach of an individualized assessment of current lifestyle practice followed by ongoing one to two weekly telephone support is effective in promoting healthy lifestyle change. Larger studies using this methodology are now required.

Key words: lifestyle / motivational interviewing / fertility / assessment / couple

Introduction

It has been well documented that lifestyle factors can affect general health and fertility (CDC, 2006; Health Council of the Netherlands, 2006; Homan et al., 2007; Anderson et al., 2010a,b; Mutsaerts et al., 2010). Specifically, there is strong compelling evidence that smoking and being over or underweight impairs natural and assisted fertility, and there is an increasing body of evidence linking other factors such as stress, caffeine and alcohol consumption to adverse effects on health and fertility.

This is particularly relevant to the Australian population, with ~60% being overweight or obese (Australian Bureau of Statistics, 2008) and over half failing to meet the recommended physical activity guidelines (Australian Bureau of Statistics, 2004–2005); although cigarette smoking has decreased, 21% of the adult population still smoke particularly young women (Australian Bureau of Statistics, 2010). There is increasing awareness of the impact that various lifestyle factors may have on reproductive performance, in both the general and medical population (Bunting and Boivin, 2008; Anderson et al., 2010a,b). However, a recent pilot study found that while infertile couples are generally aware of the possible impact of lifestyle factors on their health and fertility, they do not necessarily make the connection between their own lifestyle and fertility (Homan and Norman, 2009). Providing individualized preconception advice on which lifestyle factors may impact on fertility is a fundamental step in assisting couples to change behaviour and improve the chance of a healthy pregnancy and live birth. This should be reinforced with resources and support to assist healthy change. To date, there are few studies to provide evidence on the effectiveness of lifestyle intervention in effecting healthy change in the infertile population and although some lifestyle advice is generally included in initial fertility consultation, effective strategies and support for making healthy change are not routinely available.

Motivational interviewing is a style of counselling that has been shown to be effective in promoting behavioural change in a variety...
of health areas (Miller and Rollnick, 2002), especially in the lifestyle-related behaviours, e.g. smoking (Lai et al., 2010); hazardous drinking (Vasilaki et al., 2006); substance abuse (Smedslund et al., 2011), physical activity (Rubak et al., 2005; Martins and McNeil, 2009) and weight loss (Rubak et al., 2005; Martins and McNeil, 2009; Armstrong et al., 2011). Nevertheless, uptake of motivational interviewing in the primary care setting has been variable (Rubak et al., 2005; Thijs, 2007; Fanaian et al., 2010). Education, helping people understand their health and take responsibility for long-term lifestyle changes is important; however, there are often challenges associated with the process. Motivational interviewing is an approach that focuses on the ambivalence that a person has in initiating or sustaining changes in health-related behaviour. Ambivalence is the conflict between two courses of action and the counsellor facilitates both containing changes in health-related behaviour. Ambivalence is the conflict between two courses of action and the counsellor facilitates both sides while guiding the individual towards an acceptable resolution leading to behavioural change (Miller and Rollnick, 2002). Motivational interviewing has both relational and technical components (Miller and Rose, 2009) and patient outcomes can be both positively and adversely influenced by the clinician–patient relationship. Relational components, which include empathy, reflective listening and a respect for patient autonomy, help to make the interaction a positive influence (Miller and Rose, 2009; Hartzler et al., 2010). Technical components are strategies that increase the amount of ‘change talk’ by the patient and can include using ladder scales (Rollnick et al., 2008a,b,c), a decision balance (Miller and Rollnick, 2009; Sim et al., 2009), generating cognitive dissonance (Britt et al., 2004).

The FAST (Fertility ASeessment and advice Targeting lifestyle choices and behaviours) study was developed to assist couples in a fertility setting to make lifestyle choices to enhance their general and reproductive health. The study hypothesized that providing couples with an individualized lifestyle assessment, using motivational interviewing techniques and providing ongoing support would promote healthy behavioural change and ultimately enhance fertility. Therefore, the aim of the study was to determine whether the FAST approach facilitated an enhanced healthy fertility.

### Materials and Methods

#### Participants and recruitment

Participants were couples attending an Adelaide-based fertility clinic, Repromed, for advice and treatment relating to infertility between 2008 and 2009. Selection was based on the following criteria: couples had completed a scheduled first or subsequent medical appointment with one of the doctors and they were both able to understand and speak English.

Couples were recruited to the study after the doctor’s permission and an initial phone call, asking whether they were interested in participating. We felt that was important for the couples fertility doctor to approve them taking part in the study in case there were any medical issues that would impact on them taking part in a lifestyle modification programme. Those who expressed an interest were sent an information sheet, consent form and introductory letter. A week later, they were phoned again and invited to participate. Each individual in the couples were sent an assessment pack that contained a series of questionnaires relating to their lifestyle, a blood examination request form for fasting glucose and lipids and a reply paid envelope to return the completed questionnaires. An appointment date and time for a lifestyle assessment was also organized. The research protocol was approved by the Children, Youth and Women’s Health Service Human Research Ethics Committee.

## Intervention and follow-up

### Lifestyle assessments

All lifestyle assessments were conducted at the fertility clinic by one of the four specialist fertility nurses who had received training in motivational interviewing from an expert in the field (J.L.). Each interview took ~45–60 min to complete. Couples were interviewed together and screening questionnaires from each partner reviewed. At the interview, physical measurements were taken and discussion focused on individual lifestyle took place, using motivational interviewing techniques (Fig. 1).

Screening questionnaires included: (i) a 24 h food diary to assess diet against the National Health and Medical Research Council (NHMRC) nutrition guidelines (NHMRC), (ii) the Active Australia Questionnaire (AAQ, 2002) to assess exercise levels against the national guidelines (Australian Government DoHA, 2011), (iii) the DASS 42 (Depression Anxiety Stress Scales) a standardized psychological test for depression, anxiety and stress (Lovibond and Lovibond, 1995) and (iv) a general preconception screening questionnaire from The March of Dimes (March of Dimes) used to collect further information pertaining to other risk factors for healthy conception and pregnancy. This questionnaire included a question on the use of over the counter supplements, including folate, which can have a significant impact on the risk of neural tube defects.

A specialist clinician with more than 20 years experience in training health professionals in motivational interviewing and qualifications in patient education and counselling was engaged to train the interviewers (J.L.). Training consisted of two sessions incorporating a mixture of interactive presentations and practice interviews with simulated patients, portraying typical scenarios encountered in the fertility clinic setting. The interviewers were provided feedback and practice totalling 6 h. Training methods included strategies associated with greater skills mastery, specifically situated, experiential learning with reflective practices from a skilled practitioner (Martino et al., 2011; Soderlund et al., 2011). Interviewers received identical training and the learned communication methods and skills to be used during the interviews.

Motivational interviewing techniques taught included several key principles and components to be used during counselling in the interview. The core principles included: (i) resisting telling clients what to do; (ii) understanding their motivation; (iii) more active listening (including reflective listening) and (iv) empowering clients (Miller and Rollnick, 2002; Rollnick et al., 2008a,b,c).

Consistent with the guiding, client-centred philosophy, the interviewer used a collaborative, non-judgemental and holistic approach to encourage autonomy and respect. Initial interaction was aimed at establishing a rapport between the couple and interviewer, an important aspect of gaining trust (Belcher and Jones, 2009; Mazza et al., 2011). All interviews began with a general question ‘do you have any concerns about your general health and wellbeing and how this might relate to your fertility?’, followed by further open-ended questioning. For example, one partici- pant who smoked was asked ‘if you stopped smoking how do you think this might affect you?’ and ‘would it affect the chance of getting pregnant?’

The interviewer continued the dialogue with the couple using reflective listening and responding to change talk. Examples of change talk include expressions of: desire to change, ability to change, reasons why a change is needed and how important the change is (Rollnick et al., 2008a,b,c). Reflective listening is a fundamental part of motivational interviewing, to help in clarifying the individuals meaning and encourage continued exploration. Response to a change talk is also important and will vary
depending on the extent to which the counselling is aimed at eliciting change of a particular kind (Miller and Rollnick, 2002; Rollnick et al., 2008a,b,c). The study aim was to promote healthy lifestyle change such as stopping smoking and the interviewers responses to the couple were directed towards particular change goals. For example ‘what if you quit smoking?’ The interviewers were trained to be non-judgmental, empathetic and to encourage the individual to continue with responses by using further open-ended questions such as—‘what else have you noticed or wondered about?’ ‘How else could you do it?’ Discussion and questioning continued, exploring the individuals and couples motivation and confidence to make changes and their cognitive dissonance and ambivalence in relation to particular aspects of their lifestyle. For example, one participant who smoked was asked; ‘what are the things that you like about smoking?’ and ‘what would be positive for you about quitting?’ Informing patients through asking permission, offering choices and discussion of how others make changes were strategies to minimize the perception of ‘advice’ giving or ‘directing’ that are approaches often used by health counsellors. Outcomes from changing behaviour were explored. Mechanisms to enhance skills and confidence to make changes were suggested, for example, using the ‘smoking quit line’ or hypnotherapy.

A blood sample was taken prior to the assessment for fasting plasma glucose and lipids. At the assessment, blood pressure, weight, height and waist circumference were measured and a fitness test (on a stationary bike) was offered. Those who chose to complete the fitness test signed a standard risk assessment sheet before proceeding. Maximum aerobic power (VO₂ max) was estimated from a submaximal Astrand–Rhyming test corrected for age (Astrand and Rodahl, 1986), using a Polar Electro heart rate monitor and a calibrated Monark cycle ergometer (Varberg, Sweden, Model 868). In this test, subjects had to cycle at submaximal exertion for 6 min. For those participants who chose to do the fitness test, measurements of heart rate were taken to estimate the relative and absolute VO₂ max. Comparison of the results with published reference values based on sex and age were used to classify fitness, thereby providing a tangible benchmark against which to measure improvement.

From the interview, an individually tailored plan was developed in conjunction with the participant, including strategies to achieve realistic goals of lifestyle change. For some the plan included referral to allied health professionals (AHP) including a dietician, physiotherapist or counsellor. The couples were responsible for the cost for these visits.

Following the assessment interview, a report was written and sent to the couple and a copy sent to their clinic doctor and general practitioner. The report was written using a standardized format that included the findings from the assessment, as well as individual goals and strategies for healthy lifestyle changes. If AHP were recommended, they were sent a written referral.

**Support and follow-up**

Ongoing support was provided by one to two weekly phone calls, when progress was reviewed and positive outcomes encouraged. Two open-ended questions were asked—‘how are things going for you?’ and ‘are you encountering any problems?’ and dialogue evolved from the responses using the same key principles as before. These phone calls were generally well received.

Repeat assessments using the same tools and processes as assessment 1 were conducted after 4 months and an additional exit questionnaire was included. Blood tests were also repeated and participants who had completed the fitness test at assessment 1 were encouraged to repeat the test at assessment 2.

**Statistics**

Data were analysed using paired t-test (Microsoft Office Excel 2007 SP3 MSO, Australia) and qualitative analysis was applied to the exit questionnaire to determine common themes.

Fidelity measurement was by way of consistency in training and the expectation that the nurse conducting the interview followed the key learned principles associated with motivational interviewing.

**Results**

**Demographics**

Seventy-six couples were approached and asked whether they would be interested in receiving information about the study. Following this initial phone call, information was sent to 75 couples. Of these 35 agreed to participate, 32 declined and 8 were unable to be re-contacted.

Of the 35 couples who agreed to participate, 1 couple consented and was unable to be contacted again and 11 couples consented and then withdrew before assessment 1 started. Reasons for withdrawing included lack of time, relationship problems, the male partner changed his mind and one overweight female had decided to have gastric banding to lose weight (Fig. 2).
Participants resided in a range of locations, mainly within the outer metropolitan area of Adelaide. The average age was 35 years (range 22–51), average BMI was 32.3 (range 22.3–53.5), most had been attempting to conceive for ≏2 years and almost half of the group had previously been treated with assisted reproductive technology.

Lifestyle assessments were conducted on 46 individuals (23 heterosexual couples) who identified 43 reported adverse lifestyle-related behaviours. Healthy lifestyle was discussed with all participants, including individual goals and strategies for behavioural change. Adverse lifestyle-related behaviours were defined as cigarette smoking, taking recreational drugs, failing to meet the Australian national dietary or exercise guidelines, consuming more that one to two caffeinated drinks per day, females drinking any alcohol and males consuming alcohol in excess of two standard drinks per day and increased psychological stress. Changes included modifying diet, increasing exercise, ceasing or reducing smoking, ceasing recreational drugs, reducing alcohol or caffeine consumption and decreasing psychological stress. Six individuals withdrew from the study due to lack of time, relationship problems and one couple had become pregnant and miscarried. Repeat assessments were therefore carried out on 40 individuals with all instituting healthy lifestyle change to some extent. This was measured by reported changes in lifestyle in response to specific individual goals discussed at assessment 1.

<table>
<thead>
<tr>
<th>Assessments of aspects of the lifestyle of 46 individuals</th>
<th>Smoking</th>
<th>Drugs</th>
<th>Alcohol</th>
<th>Caffeine</th>
<th>Exercise</th>
<th>Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside guidelines at assessment 1</td>
<td>8</td>
<td>2</td>
<td>18</td>
<td>12</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>Improved at follow-up</td>
<td>7</td>
<td>2</td>
<td>10</td>
<td>11</td>
<td>21</td>
<td>39</td>
</tr>
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</table>

From lifestyle assessments of 46 individuals, the number who were outside the recommended guidelines at assessment 1 and those who had improved at follow-up.
Main outcome measure: lifestyle behaviour changes

Smoking and recreational drugs
At initial assessment eight individuals were smokers (five males and three females). At follow-up, two individuals had stopped smoking, five had decreased and one had not altered their smoking habits. One couple was taking ecstasy on a regular basis at assessment, and they had both stopped at follow-up (Table I).

Alcohol and caffeine consumption
The generally accepted preconception guidelines for alcohol consumption at the time of this study were no alcohol for females and no more than two standard drinks per day for males. At assessment 1, 18 individuals (4 males, 14 females) were drinking in excess of these guidelines. At follow-up, half of the females consuming alcohol had stopped and the remaining seven continued to consume an occasional alcoholic drink. Of the males, all but one was drinking within the recommended guidelines at follow-up. Twelve individuals were consuming caffeine in excess of the recommended guidelines of no more than the equivalent of one to two cups of coffee per day. Only one male continued to do so at follow-up (Table I).

Exercise and diet
Half of the group was failing to meet the exercise national guidelines. At follow-up, all but 2 had increased their exercise; however, 10 remained outside the guidelines. Most of this group was eating outside the Australian national guidelines, in particular, not eating the recommended fruit and vegetable, suggesting an overall picture of poor diet. While at follow-up most were still outside the guidelines, almost all had improved their diet (Table I).

Over the counter supplements
At initial assessment, all females were taking a daily supplement of folic acid and the majority were taking multivitamins. In addition, one male took a daily supplement of Vitamin B and fish oil (Table II).

Referral to AHP
Most participants were referred to AHP, including a dietician, physiotherapist or fitness leader, psychologist or counsellor. As is demonstrated in Table III, attendance was low.

Psychological stress
At initial assessment, 10 participants were identified as having elevated stress levels (using the DASS 42)—5 mild, 3 moderate and 2 severe. They were all referred to a psychologist, the unit counsellor or their general practitioner and received support from the study nurses over the 4 months. At follow-up, all stress levels were reduced with only four now in the elevated stress category.

Other outcome measures
Blood tests for lipids and fasting blood glucose
There were no significant changes in the total cholesterol, total triglycerides, high-density lipoprotein or low-density lipoprotein. Blood glucose levels (BGL) showed a small but significant decrease ($P = 0.023$; Table IV).

Measurements
At initial assessment, nine participants (three females and six males) had elevated blood pressure of $\geq 140/80$ and at final assessment five of these had decreased and were now within the normal range. The majority of the group (89%) had a BMI above the normal range of 20–25 at initial assessment. At follow-up, 47% of the overweight participants had a modest weight loss of between 1 and 5 kg (not statistically significant). Of the remaining participants, most did not change weight and seven females were pregnant. A similar pattern was seen.

| Table II Use of over the counter (OTC) supplements. |
|---------------|-----------------|-----------------|
| **OTC**      | **Male (N = 23)** | **Female (N = 23)** |
| Folic acid   | 0               | 23 (100%)       |
| Multivitamin | 11 (48%)        | 19 (83%)        |
| Other        | 1 (4%) Vitamin B + fish oil | 0 |

<table>
<thead>
<tr>
<th>Table III</th>
<th>Referral to AHP numbers of referrals to AHP and attendance.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td><strong>Physiotherapy/fitness leader</strong></td>
</tr>
<tr>
<td>(n = 46)</td>
<td>23 (50%)</td>
</tr>
<tr>
<td>Referred</td>
<td>41 (89%)</td>
</tr>
<tr>
<td>Attended</td>
<td>17 (41%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table IV Mean cholesterol and BGL levels at initial assessment and follow-up.</th>
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<tbody>
<tr>
<td><strong>Initial assessment</strong></td>
</tr>
<tr>
<td>Total triglycerides (SD)</td>
</tr>
<tr>
<td>Total cholesterol (SD)</td>
</tr>
<tr>
<td>HDL (SD)</td>
</tr>
<tr>
<td>LDL (SD)</td>
</tr>
<tr>
<td>Fasting blood glucose (SD)</td>
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HDL, high-density lipoprotein; LDL, low-density lipoprotein; SD, standard deviation.
that once couples attend a fertility clinic they are focused on being offered specific fertility treatment rather than lifestyle advice.

Recognition of the importance of preconception counselling to address and reduce risk factors prior to becoming pregnant is increasing (Macklon, 2005; Elsinga et al., 2006). However, while there is a substantial body of evidence linking a range of lifestyle factors to both general and reproductive health, the most effective methods of facilitating change are not yet established. Making lifestyle changes can be a difficult and daunting task for many.

A major strength of this study was the individualized approach, followed by support and follow-up after the preconception counselling interview. This was also a feature in a recent study by Hammiche et al. (2011) where they found that individually tailored preconception counselling was effective in encouraging couples to make healthy changes. Four hundred and nineteen (mostly sub-fertile) couples planning pregnancy received dietary and lifestyle counselling and advice using self-administered questionnaires. At repeat counselling, they reported an increase in the number of participants consuming the recommended fruit and fish in their diet.

Individualized preconception counselling for infertile couples is unique, as most other studies have focused on group interventions and the collection of data on women only (Clark et al., 1995, 1998; Crozier et al., 2009; Pinto et al., 2009). Furthermore, much of the literature relating to lifestyle and fertility to date has also focused on women, although there is emerging evidence of the effect of lifestyle factors such as weight, alcohol and cigarette smoking on male fertility (Gaur et al., 2010; Bakos et al., 2011).

A group approach has been used successfully for overweight infertile women. Clark et al. (1995, 1998) demonstrated that a 6-month group programme for overweight infertile women, providing dietary and exercise advice and support to make healthy changes, was effective. The women had an average weight loss of 10.2 kg/m² and most of the anovular women in the group resumed spontaneous ovulation.

Providing simple medical advice has also been shown to be effective. A recent retrospective study of overweight polycystic ovary syndrome women found that providing simple medical advice promoted weight loss which was maintained for 3 years or more (Pelletier and Baillargeon, 2010).

The results of a large multicentre randomized controlled trial currently being conducted in the Netherlands will add to the evidence relating to which method is most effective in promoting healthy lifestyle change. This study is investigating the effect of a 6-month structured lifestyle programme in promoting weight loss in overweight or obese infertile women. The aim is to reduce pregnancy-related complications and to improve perinatal outcomes and the results will be available in 2014 (Mutsaerts et al., 2010).

Another strength of the current study was the use of motivational interviewing to explore and resolve ambivalence and centre on the motivational processes within the individual to facilitate change (Miller and Rollnick, 2002). However, it is acknowledged that there was no objective measure of fidelity to ensure that motivational interviewing was actually delivered. Fidelity can be difficult to assess, especially when different people are delivering the intervention and interviews in this study were not recorded for subsequent objective review. Ideally, a larger follow-up study with provision for the interviews to be taped and analysed using one of the available motivational

with waist circumference measurements with half of those attending follow-up and not pregnant showing a decrease (3.8 cm). Overall there was not a statistically significant change (paired t-test).

**Fitness**

At initial assessment, 33 (72%) participants chose to undertake the fitness test. Reasons for declining included feeling stressed, raised blood pressure, feeling unwell and undergoing an IVF cycle. Of these 33, 19 did not consent to repeat the test at follow-up due to a variety of reasons, including being pregnant, undergoing IVF treatment, lack of time and feeling unwell. Of the remaining 14 individuals who did, VO₂ increased in 12, 1 remained the same and 1 decreased.

**Exit questionnaire**

Results of the exit questionnaire indicated that most participants found the assessment useful and the recommendations appropriate. There was a qualitative component to the questionnaire and common themes included finding the nurses’ friendly, easy to communicate with and enjoying the support over 4 months. Participants also reported common barriers to making lifestyle changes, including lack of time, lack of willpower and what was referred to as ‘bad habits’ (Table V).

**Table V Exit questionnaire.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was the assessment useful?</td>
<td>Yes</td>
<td>40 (100)</td>
</tr>
<tr>
<td>Extremely useful</td>
<td>31 (78)</td>
<td></td>
</tr>
<tr>
<td>Moderately useful</td>
<td>8 (20)</td>
<td></td>
</tr>
<tr>
<td>Slightly useful</td>
<td>1 (3)</td>
<td></td>
</tr>
<tr>
<td>Were the recommendations appropriate for you?</td>
<td>Yes</td>
<td>40 (100)</td>
</tr>
<tr>
<td>Extremely appropriate</td>
<td>34 (85)</td>
<td></td>
</tr>
<tr>
<td>Moderately appropriate</td>
<td>5 (13)</td>
<td></td>
</tr>
<tr>
<td>Slightly appropriate</td>
<td>1 (3)</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

This study demonstrates that infertile couples make positive lifestyle changes subsequent to an individualized lifestyle assessment, using motivational interviewing techniques and follow-up with ongoing support. The primary objective of the study was to facilitate healthy lifestyle change for couples attending a fertility clinic to improve their reproductive and general health. At follow-up assessment, all participants had made at least some of the discussed changes.

There was a substantial number of couples who declined the intervention or withdrew before assessment 1, which may have been due to a reluctance to address lifestyle issues, associated with common problems in our society such as overweight. Making healthy lifestyle changes can be difficult and popular culture often promotes unsubstantiated weight loss methods such as extreme dieting, which can result in failure (Thomas et al., 2008; Varnado-Sullivan et al., 2010). This type of experience and the well-known difficulties associated with making lifestyle changes may have contributed to couples opting not to pursue the intervention. It could also be speculated...
interviewing scales would provide an objective measure of fidelity (Moyers et al., 2005; Haddock et al., 2012). Motivational interviewing have been used successfully in a number of healthcare areas (Soderlund et al., 2011) including weight loss (West et al., 2007). West et al. (2011) found that using motivational interviewing in a behavioural weight control programme for women with diabetes, resulted in significantly more weight loss than the control group, and similar results were found in a more recent study.

Infertile couples are strongly motivated to achieve a healthy pregnancy and child and are therefore likely to respond well to motivational interviewing to achieve behavioural change. Although there is an increasing body of evidence of an association between lifestyle behaviours and fertility, using motivational interviewing to counsel infertile couples and encourages lifestyle behavioural change has not been widely practiced. With the success of this style of counselling in other areas such as smoking, weight loss and reducing alcohol consumption (Soria et al., 2006; LaBrie et al., 2007; Harris et al., 2010; Armstrong et al., 2011; Ceperich and Ingersoll, 2011), it is likely to be a useful technique to apply when counselling infertile couples. The use of motivational interviewing may be responsible for the success of the current study.

Other studies aimed at assisting individuals in making healthy lifestyle changes generally target-specific problems such as weight, smoking or alcohol. Individuals with adverse lifestyle behaviours will often demonstrate a range of unhealthy habits and it is also recognized that the consequences of poor lifestyle such as overweight can affect self-esteem and motivation to make changes (Johnson, 2002). This study focused on a more holistic approach addressing a range of lifestyle factors rather than focusing on one potentially sensitive area. This may have been more acceptable to individuals and contributed to the success of the intervention.

The use of nurses to conduct the assessment interviews and to provide ongoing support was another strong point. Nursing is well recognized as one of the most trusted and honest professions (McCabe, 2006) and as such nurses are in an excellent position to provide preconception counselling using motivational interviewing. Providing follow-up support has also been shown to be an important component to the success of individuals making and maintaining positive changes (James, 2009; Nanchahal et al., 2009). A recent study of eight general practices in the UK found that using nurses to lead a structured lifestyle support programme was very successful in facilitating weight loss. In this study, patients were assisted in setting realistic goals and provided with support to achieve these goals (Nanchahal et al., 2009).

Participants in the current study reported that they felt well supported by the study nurses and enjoyed the interaction over the 4-month follow-up. The role of midwives (van van Heesch et al., 2006) and fertility nurses (Allan and Barber, 2005) includes informal non-structured counselling, which could be built on and formalized to become an integral part of preconception health care in fertility clinics.

Another strength of the current study was the inclusion of both males and females and that recruitment was not restricted to those with an obvious lifestyle problem such as overweight. This could be viewed as a less confronting approach, which was more acceptable to individuals, contributing to the success of the intervention.

Most participants were referred to one or more AHP; a dietician, physiotherapist or counsellor for specialized advice and support, but the majority did not attend. The scope of this study did not include examining the reason; however, possible explanation could include lack of time, expense or the inconvenience of making an appointment to visit yet another health professional. Investigating the cause would be useful in a future study.

It is encouraging that all the females in this sample were taking a daily supplement of folic acid. In a previous study of infertile couples attempting to conceive, only 50% of the females were taking folic acid supplements (Homan and Norman, 2009). Other studies have also reported that women do not routinely take folic acid when attempting to conceive. For example, a recent study of spontaneously pregnant women found that only 19% were taking folic acid prior to conception as recommended (McNulty et al., 2011), and a large survey by The March of Dimes in 2002 found that 20% of women knew that folic acid could prevent certain birth defects and the proportion who stated that they took a vitamin supplement containing folic acid daily increased from 25% in 1995 to only 31% in 2002 (Erickson, 2002).

**Limitations**

There were several limitations to the study, including the inability to determine causation through the absence of a concurrent control group, and to determine exactly which portion of the intervention was effective. Most of the outcome measurements were through self-reporting which has inherent limitations and a potential bias could have been associated with participants desire to appease the researchers. Limitations in measuring fidelity because of the absence of a validated scoring tool are also acknowledged.

Other limitations to the study include small numbers, possible Hawthorne effect (due to lack of concurrent controls), moderate dropout rates, a relatively short period of time to demonstrate changes in major physiological parameters, incomplete data at follow-up and failing to attend the recommended AHP. The results of blood tests were limited as only 25 participants returned a follow-up blood test (23 for BGL). The results of the fitness test were also of limited value as the test was voluntary and over half of the participants who elected for testing chose not repeat the test.

While blinding was not within the scope of this study, participant confidentiality was assured. A future study should include the use of a randomized design with a control group, larger numbers of participants and be conducted over a longer period of time. It may also be prudent to offer a subsidy for allied health visits to encourage attendance. However, the primary outcome in this study was making healthy lifestyle changes, which occurred for all participants.

Preconception health should be considered an essential component of health care. The concept is relatively new and carried out in a variety of ways in different countries and practices and is receiving more attention (Health Council of the Netherlands, 2006). There is a growing knowledge base from which the best means of providing optimum preconception health care to infertile couples can be drawn. This study adds to this knowledge base.

**Conclusion**

This primary objective of this study was to develop a programme to effectively counsel infertile couples and promote healthy lifestyle change and demonstrate the proof of concept. Following the lifestyle
assessment interview, all participants with adverse lifestyle behaviours made positive changes, demonstrating that an individualized assessment of current lifestyle practice for couples attending a fertility clinic, followed by ongoing support, is likely to affect healthy lifestyle changes.

Acknowledgements

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Authors’ roles

G.H. and R.J.N. were central to the conception and design of the study. J.L. provided expertise in the motivational interviewing and was responsible for the training. G.H. conducted and co-ordinated the study. G.H. analysed and interpreted the data. G.H., R.J.N. and J.L. were integral to the drafting and revision of the manuscript.

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Conflict of interest

None declared.

References

Bakos HW, Henshaw RC, Mitchell M, Lane M. Paternal body mass index is associated with decreased blastocyst development and reduced live birth rates following assisted reproductive technology. Fertil Steril 2011;95:1700–1704.
James KS. People who were obese tried diets but felt they needed ongoing support to empower them to make lifestyle changes. *Evid Based Nurs* 2009;12:92.


