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A feasibility study of a brief coping intervention (PRCI) for the waiting period before a pregnancy test during fertility treatment

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BACKGROUND: Waiting for a pregnancy test during fertility treatment can be particularly stressful because distress and intrusive cognitions about the nature and implications of the result can reduce quality of life. The aim of this feasibility study was to establish whether a novel brief coping intervention (positive reappraisal coping intervention, PRCI) card that encouraged women waiting for an IVF pregnancy test to redefine the waiting period more positively would be acceptable and practical in this context. METHODS: Women ($n = 55$) were randomly assigned on the day of embryo transfer. Women read either 10 statements in a PRCI ($n = 28$) or 10 statements in a positive self-affirmative (positive mood) intervention (PMI; $n = 27$) twice daily for 14 days between embryo transfer (T1) and the pregnancy test (T2). At T2, we evaluated the practicality, acceptability, perceived benefits and endorsements of these cards. RESULTS: Compared with the PMI, the PRCI was rated as more helpful and suitable for the situation, helping women to feel more positive and better helping to sustain efforts to cope. There were no differences relating to the practicality of the intervention method. CONCLUSIONS: PRCI was feasible in the IVF context and was perceived as an acceptable intervention to help minimize the strain of waiting for pregnancy test results during fertility treatment. Future research needs to evaluate the full benefits of PRCI against routine care during the waiting period.

Keywords: infertility; psychological; coping; waiting period

Introduction

The days between embryo transfer (when fertilized embryos are transferred to the uterus) and the pregnancy test are a particularly stressful stage of IVF treatment (Boivin and Takefman, 1995). A number of potentially stress-inducing characteristics (Lazarus and Folkman, 1984) typical of the IVF waiting period may help to explain why women find this experience stressful. For example, there is little, if anything, a woman can do to change or control the result of her impending IVF pregnancy test because numerous factors beyond her control can explain why an embryo does or does not implant after embryo transfer (e.g. endometrial environment, *in vitro* culture of oocyte and embryo, embryo quality; Macklon *et al*., 2002). Further, women are unlikely to be able to predict whether or not they will become pregnant and such uncertainty can lead to rumination, worry and distress as first one and then another outcome is considered (Lazarus and Folkman, 1984).

Evaluating the likelihood of pregnancy involves consideration about which of two mutually exclusive outcomes will occur (i.e. pregnant, not pregnant; Seibel and Levin, 1987), and although the objective probability of achieving pregnancy during IVF is low, (≈20–25%; Macklon *et al*., 2002), women may disregard or downplay factual information about IVF pregnancy rates and make judgements based on heuristics such as having embryo transfer on a 'special' day, or on feedback from medical staff about progress through IVF thus far (Boivin, 2000). Their expectations may therefore be more optimistic (or pessimistic) than objective probabilities suggest they should (Lazarus and Folkman, 1984; Leiblum *et al*., 1987). Persistent rumination about a possible pregnancy can be distressing during fertility treatment, with infertile women reporting levels of intrusive ideation not significantly different from patients attending a stress clinic. Furthermore, levels of intrusive ideation are related to infertility-specific distress in infertile women, after controlling for depression and anxiety (Miller *et al*., 1998). Such evidence suggests that helping infertile women to manage rumination and intrusive thoughts may help to reduce their experience of stress and distress during fertility treatment.

The psychological strain of the IVF waiting period may be further compounded because there is typically no requirement

to attend clinic for tests or procedures at this time, meaning that sources of informal expert support (e.g. patients undergoing the same procedures and medical staff) are not as easily available as they were at earlier stages of the IVF treatment cycle. This may be an important contributor to the stress experienced during medical waiting periods, as women waiting for breast biopsies have been shown to value support from medical staff and from other patients who had experience of the same medical procedures as themselves (Lebel *et al*., 2003). Moreover, other social factors such as the quality of the marital relationship, the impact of infertility on that relationship, social stigma associated with childlessness, financial costs of treatment and the practicalities of organizing IVF treatment around daily employment demands can also be stress inducing. For cogent reviews of the literature regarding other factors contributing to the experience of distress during infertility generally and IVF particularly, see Greil (1997) and Eugster and Vingerhoets (1999). In summary, the waiting period before the IVF pregnancy test can be particularly challenging and the provision of suitable psychosocial interventions that help women to manage their intrusive cognitions and associated distress may be of benefit at this time.

Coping with waiting

Theory and research suggest that people prefer to know *what* is going to happen, even (especially) when that event may be unpleasant (e.g. failed fertility treatment) because this knowledge allows them to engage in anticipatory coping that might offset the psychological consequences of the event (Lazarus and Folkman, 1984; Greco and Roger, 2003). Sustaining the coping process during a period of ongoing stress may be understood as attempts to 're-engage in efforts to cope with the ongoing stressor' (Folkman, 1997, p. 1216), which begins with the way in which one evaluates or appraises the stressor. One meaning-based coping strategy that seems particularly likely to make (re)appraisal more positive is positive reappraisal coping, which may be understood as 'cognitive manoeuvres' or cognitive efforts (Lazarus and Folkman 1984, p. 151) that change the meaning of the situation. Finding positive meaning may involve appreciating the benefits that the situation has brought to one's life (e.g. closer relationships), comparing oneself more favourably with others who are less well off, or redefining the situation such that it seems more positive (Thompson, 1985). Because positive reappraisal coping involves effortful derivation of benefit from a difficult situation, individuals may focus more on positive aspects of a situation rather than ruminating about (or conversely trying not to think about) negative and distressing aspects. Such efforts in the IVF context may involve focusing on the fact that the most advanced fertility treatment is being tried, or that a partner is especially loving and supportive. Research certainly suggests that positive reappraisal coping has beneficial effects in difficult health-related circumstances (e.g. breast cancer, failed fertility treatment, care-giving and bereavement), with relationships found between efforts to redefine the experience and positive psychological states, renewed coping efforts, post-traumatic growth and physical health (e.g. Moskowitz *et al*., 1996; Folkman, 1997; Terry and Hynes, 1998; Sears *et al*., 2003).

In a series of studies with couples where one spouse was dying, Folkman and colleagues (e.g. Moskowitz *et al*., 1996; Folkman, 1997) found that the types of coping associated with positive psychological states during care-giving and bereavement were meaning-based strategies that focused on efforts to derive some benefit from the experience (e.g. positive reappraisal coping). In other research with women living with breast cancer, Sears *et al*. (2003) found that pre-surgery levels of positive reappraisal coping were positively related to positive mood and physical health at 3 and 12 month follow-ups. These results converge with those of Terry and Hynes (1998), who found that a greater use of problem-appraisal coping (e.g. trying to see the positive side of the situation) was related concurrently and prospectively to women's self-reported adjustment to failed fertility treatment. Together, this evidence suggests that efforts to redefine a difficult situation in a more positive way may have benefits for psychological well-being during various demanding life-events. Therefore, we decided that an intervention for the IVF waiting period which would promote or reinforce positive reappraisal efforts could be one way of helping women cope with such a demanding experience.

Psychological intervention and the IVF waiting period

Various psychosocial interventions are available to help women deal with the strain of infertility, although one study has shown that only 10–15% of infertile patients used the counselling provided (Boivin *et al*., 1999) and some interventions may provide few benefits (Boivin, 2003). Moreover, the IVF waiting period is brief and women do not attend clinic at this time which means that the mode of intervention delivery is crucial. Existing interventions can be time intensive (e.g. 4–12 sessions of 45–90 min; e.g. McQueeney *et al*., 1997; McNaughton-Cassill *et al*., 2000) as well as being clinic-based. As most women undergoing IVF procedures are employed (e.g. Lancastle and Boivin, 2005), extra attendance at clinic may be inconvenient, and because such interventions are delivered by trained professionals, the financial costs can also be considerable. These issues indicated that a home-based intervention which women used without supervision might be a practical mode of intervention delivery in the IVF waiting period.

A literature search yielded only one other self-administered coping intervention specifically designed for patients to use at home during medical waiting periods (Phelps *et al*., 2006; Bennett *et al*., 2007). The distraction intervention comprised a leaflet that included distraction techniques and information about genetic risk assessment. Qualitative data showed that patients waiting for the results of their risk assessment used the intervention and found the distraction techniques helpful (Phelps *et al*., 2006). In a subsequent randomized controlled trial (Bennett *et al*., 2007), patients who were highly distressed at baseline and who received the distraction intervention reported significantly lower distress at a follow-up assessment than highly distressed patients in the routine care control group. Such evidence suggests that a self-help coping intervention

could be feasible and potentially helpful for people waiting for threatening medical test results.

Development of the positive reappraisal coping intervention card

Campbell *et al*. (2000) propose a framework for the development of interventions from preclinical, theoretical exploration to long-term implementation. Pilot studies conducted in the initial stages of positive reappraisal coping intervention (PRCI) development and validation, covered the Preclinical and Phase I phases and are summarized in the following sections relating to PRCI development. Full details are available from the corresponding author. The main aim of the present study was to examine whether a self-help coping intervention would be feasible in an IVF context and would be acceptable to women (i.e. Phase II intervention development; Campbell *et al*., 2000).

Our aim was to develop a PRCI that was (i) theoretically derived, (ii) simple enough for women to use with no training, (iii) could be used whenever and wherever patients felt the need, (iv) was cost-effective enough to be made freely available to all patients and (v) was generic enough to be used by any patient waiting for the results of medical tests and procedures in the future. Consideration of these criteria led us to develop a simple, pocket-sized card containing statements designed to prompt or promote positive reappraisal coping efforts. Table I presents the PRCI card used in the present study. The rationale for delivering the PRCI via statements on a card was derived from Velten positive mood induction (PMI) procedures (Velten, 1968). The original Velten PMI procedure involves reading 60 positive statements (e.g. I really do feel good), and this procedure has been shown to have a positive effect on mood (e.g. Velten, 1968; Riskind *et al*., 1982) and cognitive problem-solving (e.g. Raps *et al*., 1980; Riskind *et al*., 1982), even in depressed individuals, those who receive helplessness training (Raps *et al*., 1980) and when controlling for suggestibility and pretreatment mood (Velten, 1968). PRCI statements were positively toned, but specifically designed to prompt women to think about positive aspects of their situation, thereby promoting positive reappraisal coping efforts that have been shown to have beneficial effects on psychological well-being and coping during other health stressors.

A pool of potential PRCI items was generated from sources which examined ways of coping with stressful experiences. Seventeen positive reappraisal items with face validity as intervention items were selected from: (i) the positive reinterpretation and growth scale of the COPE (Carver *et al*., 1989); (ii) the problem-appraisal coping scale (Terry and Hynes, 1998) and (iii) the positive reappraisal scale from the Ways of Coping questionnaire (Folkman and Lazarus, 1988). The fourth source (Folkman and Moskowitz, 2000) was a qualitative interview question assessing positive, meaningful events, adapted to make two potential items. Seven filler items representing alternative ways of coping were also used to ensure that positive reappraisal coping items distinguished themselves as more beneficial for the experience of waiting for important medical test results in pilot work. Items were adapted to fit on a pocket-sized card and pilot work showed that Cronbach's alpha for positive reappraisal coping items was high ($\alpha = 0.89$). Final decisions about which items would be included on the PRCI were based on which were most likely to (i) be helpful, (ii) have a positive effect on mood and (iii) be used by patients waiting for medical test results. Item selection was based on evaluation of all positive reappraisal and filler coping items by a sample of patients waiting for assessment or treatment in an accident and emergency department (unpublished data).

Table I. PRCI items and control PMI items.

PRCI items	PMI items
During this experience I will:	***During this experience I feel that:***
Try to do something that makes me feel positive	I'm energized
Focus on the positive aspects of the situation	I really do feel positive
Find something good in what is happening	I'm creative
See things positively	I feel good about the world
Make the best of the situation	I feel completely aware
*Try to think more about the positive things in my life	It's great to be alive
Look on the bright side of things	Nothing can depress me
Try to do something meaningful	I'm a great person
Focus on the benefits and not just the difficulties	Life is great
Learn from the experience	I feel happy

Note: * Changed from 'Discover what is important in life' on the basis of patient feedback.
Note: For full intervention instructions to patients please contact corresponding author.

The PMI control intervention

As the present study was a Phase II exploratory trial, the feasibility and acceptability of the PRCI was evaluated against an 'appropriate alternative' (Campbell *et al*., 2000, p. 695). The alternative was a PMI intervention card (Table I). The PMI was used to control for the possibility that demand characteristics arising from presenting women with positive statements or distraction from reading the items on the card could make the PRCI seem more acceptable than was warranted. Our PMI contained 10 items, seven of which were adapted from among 24 PMI items used in a study evaluating valence and arousal ratings for Velten mood induction items (Jennings *et al*., 2000). The number of items was reduced to 10 to correspond with the number on the PRCI. These were selected according to the following criteria to ensure they were suitable in the context of a stressful event: (i) they did not suggest a desired outcome *would* happen, (ii) they did not refer to social support (hence social support coping intervention items), (iii) they did not imply that the individual could control an outcome and (iv) the content was not insensitive. After exclusions, seven items from Jennings *et al*. (2000) were considered suitable for the PMI card and three further PMI items with face validity as PMI items were developed ('I feel on top of the world', 'I'm a great person' and 'I can't remember when I last felt so good'). PMI items were validated

by undergraduate students waiting for final examination results (unpublished data).

The present study

The main aim was to establish whether the PRCI was feasible in the IVF context and an acceptable intervention for women waiting for an IVF pregnancy test. A double-blind methodology was used and participants were randomly assigned to PRCI and PMI intervention groups after embryo transfer. The outcome variables were evaluation dimensions relating to the practicality, acceptability, psychological effects and endorsements of the intervention cards, taken on the day before the pregnancy test. Although we expected both interventions to be similarly practical because of the simple method of delivery, we expected the PRCI to be evaluated as a more acceptable and helpful intervention because positive reappraisal coping has been found to be associated with positive psychological outcomes during other demanding health stressors (Moskowitz *et al*., 1996; Folkman, 1997; Terry and Hynes, 1998; Sears *et al*., 2003). This study is part of a larger research programme of PRCI evaluation and presents data relating to the feasibility and acceptability of the PRCI intervention card method.

Materials and Methods

Participants

Women ($n = 84$) scheduled for embryo transfer at the assisted reproduction unit of a large urban hospital were interviewed and agreed to participate in the study. Of these $n = 55$ completed the study (65.48%) and returned all study materials. Of the final sample, 28 were randomly assigned to the PRCI group and 27 to the PMI group. There were no significant differences between intervention groups on demographic or medical history variables. Women were in their mid-30s ($M = 35$, SD = 3.91) and had lived with their partners for 8–10 years ($M = 8.91$, SD = 4.00). Around 95% were educated to $\geq$16 years of age. There was no significant association between intervention group and type of treatment (e.g. IVF and intracytoplasmic sperm injection), $\chi^2 = 3.36$, df = 2, $P > 0.05$.

Baseline assessment (embryo transfer day)

Demographic and fertility history questionnaire

This form was used to obtain demographic information (e.g. age and education) and gynaecological history (e.g. infertility diagnosis) and expectations (e.g. chances of conceiving, perceived control over the outcome, 0–100% scale).

Dispositional optimism and infertility coping style

Dispositional optimism and the coping strategies women generally employed when coping with infertility were assessed at baseline. These measures were included to establish group equivalence on enduring psychological predictors which may influence the coping strategies that individuals favour and employ in a particular situation (e.g. Carver *et al*., 1989; Carver and Scheier, 1994). Such predispositions may influence engagement and persistence with, and evaluations of, the positive reappraisal coping strategies promoted by the PRCI.

Dispositional optimism

The Life Orientation Test-Revised (LOT-R) assessed dispositional optimism (Scheier *et al*., 1994), which can be defined as general expectancies that future outcomes will be positive. Higher scores indicated greater dispositional optimism. Normative scores for a sample of medical (heart bypass) patients ($n = 159$) were 15.16 (SD = 4.05) and the LOT-R showed good psychometric properties (Scheier *et al*., 1994). In the present study, Cronbach's alpha for the LOT-R was good, $\alpha = 0.81$.

Coping with infertility questionnaire

Items on this questionnaire were originally presented by Holahan and Moos (1987) and Lazarus and Folkman (1984), some of which were adapted by Terry and Hynes to refer specifically to 'fertility problems' (Terry and Hynes, 1998, p. 1092). The questionnaire comprised four subscales assessing the extent to which women generally used problem-management, problem-appraisal, emotional approach and escapism to cope with their fertility problems (Terry and Hynes, 1998). Cronbach's alphas for the present study were between $\alpha =$ 0.69 and $\alpha = 0.76$ (seven items), except for the problem-management scale which was low, $\alpha = 0.48$.

Post-assessment (1 day before pregnancy test result)

Intervention evaluation form

The intervention evaluation form (IEF) was an in-house measure developed for the study, which contained 24 items. Two items enquiring about the helpfulness and suitability of the interventions were adapted from Borkovec and Nau (1972). Items developed were concerned with (i) practicality (e.g. how quick and easy the cards were to use), (ii) acceptability (e.g. how helpful and enduring the effects were), (iii) perceptions of psychological effects (e.g. positive thinking, distraction), (iv) endorsements (e.g. recommendations to others), (v) effects on waiting period stress, (vi) helping women to see the situation in a different light and (vii) perceived duration of intervention effects. A manipulation check question asked whether women thought they had received the 'new' (i.e. PRCI) intervention (yes/no), although the latter question was not asked of women who participated at the beginning of the study period ($n = 42$ for this item). Women noted the number of times per day they read the card.

Biological assessment (after medical treatment)

Treatment information collected from medical charts at the end of treatment included the type of treatment (e.g. IVF and ICSI), number of embryos transferred to the uterus, and pregnancy outcomes, in terms of whether a biochemical (i.e. bhCG $>$ 100 mIU/ml) or clinical (i.e. positive fetal heartbeat at 7 weeks gestation) was observed. Biological data were collected to ensure group equivalence on treatment success at embryo transfer (of which the number of embryos transferred is the key indicator) and at pregnancy test. This was done because women who are not pregnant may receive advance warning that treatment has been unsuccessful prior to the pregnancy test (e.g. cramps and vaginal bleeding). Such information is likely to cause distress and depression beyond the remit of the intervention aim (i.e. to help women cope with the uncertainty of waiting for the outcome) and influence opinions about the acceptability of the intervention cards.

Procedure

The study received ethical approval from the Local Research Ethics Committee (LREC). On the first day of IVF treatment (14–21 days before embryo transfer), clinic staff provided women with an information sheet describing the objectives and requirements of the study. On the day of embryo transfer, an embryologist asked women whether they would like to meet with the researcher and the researcher met those who expressed an interest, individually. The researcher

described the study in more detail, explaining how and when to complete the materials and showed women an envelope containing an intervention card. Neither the information sheet nor verbal information referred to positive reappraisal or coping, and no information was provided about the content of either card, other than that the statements would be positively toned. The following script was also used:

> We ask women to read this card at least twice a day—for example, once in the morning and once in the evening. However, the card is 'this big', [indicating size] and laminated. Therefore it's small enough to put in a purse or pocket if you want to carry it with you and read it at other times. You may read the card as many times as you wish each day, but we do ask you to read it at least *twice* a day.

Women who wished to participate signed the consent form. Random assignment to experimental groups was made by a research colleague not affiliated with the study and the researcher was blind to which intervention card was in the sealed envelope provided to patients. Days rather than participants were assigned to conditions because recruitment took place in a group recovery room, meaning that women could otherwise compare different intervention cards. The PRCI group received the PRCI card and women in the PMI group received the PMI card (Table I). The researcher was informed about group assignment at the end of the study.

Data analysis

Missing data (<2%) were replaced with mean values from the intervention group to which the cases(s) belonged. Missing values for the manipulation check item were not replaced for those who had not received the item. Parametric variables were analysed using *t*-tests and chi-square analyses (Fisher's exact test where appropriate) were used for non-parametric variables. Results were evaluated using a two-tailed ($P < 0.05$) probability level.

Results

Experimental validity and baseline equivalence at randomization

Attrition

Of the 84 women who agreed to participate in the study, 55 (65.5%) returned the IEF. There was no significant association between intervention group and attrition, $\chi 2 = 1.50$, df = 1, $P > 0.05$. Those who did not return the IEF reported using less problem-management coping, $t(79) = 3.04$, $P < 0.01$, and thought they had less control over the outcome of that IVF cycle, $t(79) = 3.33$, $P < 0.001$, than those who did.

Integrity of double-blind experimental design

There was no significant association between intervention group and women's opinions about whether or not they had received the new intervention ($P > 0.05$, Fisher's exact). Overall, 28.6% believed they had received the new intervention.

Number of times cards read per day

The PRCI card was read a little less than twice a day ($M = 1.86$, SD = 0.68), and the PMI card was read a little more ($M = 2.22$, SD = 0.74). This difference was marginally significant, $t(53) = 1.90$, $P = 0.10$.

Table II. Mean psychological characteristics at baseline (standard deviations in parentheses).

Variable	Intervention group		*t*(53)
	PRCI ($n = 28$)	PMI ($n = 27$)	
Chance of success (%)	38.27 (17.48)	37.31 (17.22)	0.21
Control over outcome (%)	28.57 (22.06)	26.30 (24.52)	0.36
LOT-R	13.93 (4.16)	14.07 (3.72)	0.14
Problem appraisal coping	2.65 (0.45)	2.66 (0.44)	0.02
Problem management coping	2.89 (0.54)	2.94 (0.41)	0.15
Escapist coping	2.28 (0.64)	2.21 (0.62)	0.16
Emotional expression coping	2.73 (0.69)	2.79 (0.59)	0.11

Reproductive and psychological profile

Women did not differ significantly in years infertile, $t(53) = 0.01$, $P > 0.05$, infertility diagnosis, $\chi^2 = 2.31$, df = 2, $P > 0.05$, or previous IVF experience, $\chi^2 = 0.52$, df = 2, $P > 0.05$. On average, women had been infertile for 6.23 years (SD = 3.67) and 49.1% had previously had IVF treatment. Groups were also similar in terms of the number of embryos transferred to the uterus, $t(53) = 0.27$, $P > 0.05$, beta-hCG levels, $t(53) = 1.49$, $P > 0.05$, and the number of women in each group who had biochemical and/or clinical pregnancies (ps > 0.05, Fisher's exact). Table II shows that groups were also similar on psychological variables that may influence their reactions to the waiting period and engagement with the PRCI.

Intervention evaluation

Regardless of intervention group, the majority of women rated the duration of intervention effects as ≤20 min. Chi-square analyses showed that 25% of women in the PRCI group and 11.1% in the PMI group recalled intervention effects lasting >20 min, but there was no significant association between intervention group and duration of intervention effects ($P > 0.05$, Fisher's exact). Figure 1 shows that there were no significant differences in opinions about how quick and easy the interventions were, $t(53) = 0.26$, $P > 0.05$, and $t(53) = -0.86$, $P > 0.05$ (respectively), nor in the extent to which they fitted into daily routines, $t(53) = 0.43$, $P > 0.05$. Neither did opinions differ with regards to how difficult it was to remember to read the cards, $t(53) = 0.61$, $P > 0.05$, or how memorable the items were, $t(53) = -0.10$, $P > 0.05$.

As shown in Fig. 2, ratings of the helpfulness, $t(53) = 2.55$, $P < 0.05$, and suitability, $t(53) = 2.62$, $P < 0.05$, of the PRCI

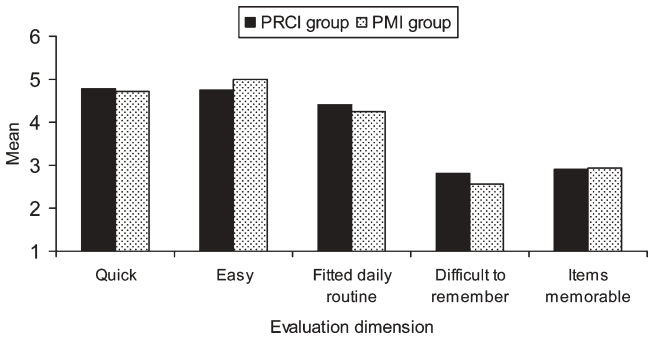

Figure 1: Ratings of the practicality of the interventions by group.

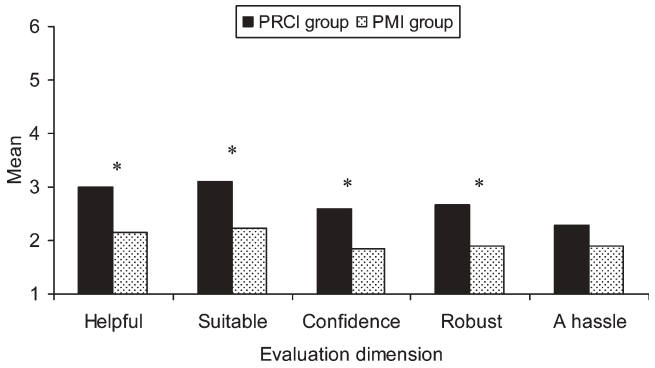

Figure 2: Ratings of the acceptability of the interventions by group. *$P < 0.05$.

were significantly more positive than those of the PMI. Compared with women who received the PMI, those who received the PRCI were more confident that their intervention had influenced the stressfulness of the waiting period, $t(53) = 2.46$, $P < 0.05$, and the PRCI was rated as having had significantly more enduring effects than the PMI, $t(53) = 2.62$, $P < 0.05$. Women did not consider either intervention to be a hassle (mean scores <3), and there were no significant differences between groups on this dimension, $t(53) = 1.23$, $P > 0.05$. Figure 3 shows that the PRCI card was perceived as reducing stress to a greater extent than the PMI card, although this difference was not significant, $t(53) = -1.63$, $P = 0.11$.

Compared with the PMI group, the PRCI group reported feeling significantly more positive during the IVF waiting period, $t(53) = 3.07$, $P < 0.01$, and rated their intervention more positively in terms of the extent to which it helped them to carry on or keep going at this time, $t(53) = 2.71$, $P < 0.01$. Ratings of the PRCI were also more positive than those of the PMI in terms of the extent to which this card helped women to think what to do after the pregnancy test, $t(53) = 2.58$, $P < 0.05$. The PRCI seemed to offer more of a distraction than the PMI, but this difference was marginally significant, $t(53) = 1.73$, $P < 0.10$. There were no significant differences in the extent to which either card helped women to see the situation in a different light, $t(53) = 0.34$, $P > 0.05$.

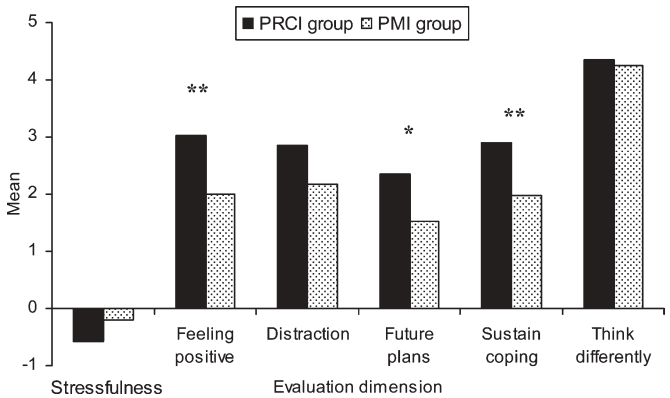

Figure 3: Ratings of the perceived psychological effects of the interventions by group.
*$P < 0.05$; **$P < 0.01$.

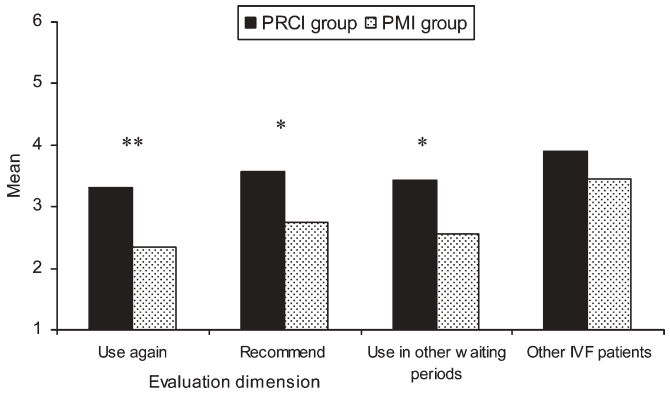

Figure 4: Endorsements of the interventions by group.
*$P < 0.05$; ** $P < 0.01$

As shown in Fig. 4, the PRCI group would be significantly more likely to use the PRCI again than the PMI group would be to use the PMI, $t(53) = 2.78$, $P < 0.01$, and the PRCI group was significantly more likely to recommend the positive reappraisal intervention than the PMI group was to recommend the PMI intervention, $t(53) = 2.51$, $P < 0.05$. Compared with the PMI group, women receiving the PRCI were also significantly more positive about the likelihood of this intervention reducing the stress of other medical waiting periods, $t(53) = 2.39$, $P < 0.05$. Ratings of the likelihood of other IVF patients using these cards were not significantly different between groups, $t(53) = 1.31$, $P > 0.05$.

Discussion

Theory and research suggest that positive reappraisal coping, which can be understood as efforts to control the meaning of the problem by focusing on positive aspects of the situation, has beneficial effects on psychological outcomes during periods of unresolved stress and uncertainty (e.g. Moskowitz *et al*., 1996, Folkman, 1997; Park and Folkman, 1997; Terry and Hynes, 1998; Folkman and Greer, 2000; Sears *et al*., 2003). The results of the present study suggest that women considered the PRCI, which was derived from this theoretical framework, to be an acceptable and feasible intervention for the experience of waiting for an IVF pregnancy test.

The PRCI was perceived to have benefits with respect to helping women feel more positive and helping them to 'carry on or keep going' during the IVF waiting period. These were in keeping with the main principle of meaning-based (e.g. positive reappraisal) coping (Folkman, 1997), and suggest that the PRCI had achieved what it was designed to do, namely to help women sustain their efforts to cope, despite the strains of the waiting period. One of the key strengths of the present research was that the PRCI was evaluated more positively than the PMI as the experimental control. Specifically, the PRCI and PMI groups were similar in terms of reproductive and psychological characteristics at study entry, and were similar in terms of the percentage believing they had received the active intervention. The integrity of the double-blind design allows the conclusion that demand characteristics did not account for instances where women were more satisfied with the PRCI than the PMI.

Moreover, the PRCI group evaluated this intervention more favourably even though there was minimal contact with research or clinical staff and women were not trained in the use of the PRCI, nor informed about the expected benefits of positive reappraisal coping. The aim of this study was to establish whether the PRCI could be implemented as part of routine care and whether women would find this intervention card acceptable. We have established that this is the case. Although the absence of follow-up psychological measures precluded assessment of intervention benefits on mood or coping post-pregnancy test, our results suggest that the PRCI could be sufficiently powerful to produce meaningful effects in planned studies of PRCI effectiveness (i.e. Phase III randomized controlled trial, Campbell *et al*., 2000).

The benefits of reading positive statements in the present study were specific to the 10 positive reappraisal statements on the PRCI card and superior to the effects of the 10 positive self-affirmation items on the control intervention (PMI) card, despite the latter items being based on a reputable PMI procedure which has been widely used to good effect (e.g. Velten, 1968; Raps *et al*., 1980; Riskind *et al*., 1982; Jennings *et al*., 2000). Our assumption is that the perceived benefits of PRCI were due to the promotion of positive reappraisal coping, but it could be argued that these were due to possibly negative effects of self-affirmation statements, which were not detected because we did not use a no-treatment control group. Meichenbaum (1977) argued that self-affirmation could be ineffective or counterproductive in the face of a challenge that contradicts the self-statement in question (e.g. when the person feels worse, not better, than before). Future research evaluating the effectiveness of PRCI should also incorporate a routine care control group to investigate this possibility. Women also found the PRCI to be marginally more distracting than the PMI and it would be worth investigating this effect further, because distraction has been shown to be beneficial during other medical waiting periods (e.g. Phelps *et al*., 2006; Bennett *et al*., 2007). Finally, although Velten mood induction procedures are often presented in a modified form, we cannot rule out the possibility that reducing the number of items presented on the PMI had weakened our PMI intervention.

The essence of meaning-based positive reappraisal coping is that it sustains the coping process through increasing positive mood, via cognitive processing. The regular, deliberate focus on positive aspects of the IVF experience, facilitated by repeated reading of the PRCI, may explain why the PRCI was evaluated more positively than the PMI. Sears *et al*. (2003, p. 494) assert that it could be 'the effortful and regular use of benefit-related information as a coping strategy (i.e. positive reappraisal coping) . . . that predicts future physical and psychological well-being' and not '. . . the simple identification of benefit (i.e. benefit finding)'. In other words, the cognitive underpinning (e.g. level of processing) required to actively derive benefit from challenging circumstances (by using the PRCI) may be greater than that required to count, list or repeat benefits that may or may not be applicable to the individual (i.e. the PMI). To extend the words of Meichenbaum, 'Saying the right things to yourself may not be a sufficient condition for change' (23, p. 160), and we would add, 'you have to mean it before it helps'. However, given that the results show no significant differences in ratings of the extent to which the interventions had helped women to think differently, and given that the PRCI was rated as marginally more distracting than the PMI, future research would do well to determine the mechanisms underpinning PRCI effects before concluding that the PRCI has altered cognitive appraisal processes rather than simply distracting the individual from her worries. However, we feel the effects reported in comparison with the control intervention are of sufficient magnitude to warrant further investigation and evaluation of the PRCI, despite these considerations.

The main limitation of this study is that women who took part in this research were volunteers. As no data were available for women who did not participate, we cannot determine whether these differed from those who did take part. We therefore acknowledge that the sample contributing data to analyses in this study may differ in some degree from the population of women attending this clinic and that the generalizability of findings to all women undergoing IVF treatment may be limited. However, as there was no significant difference in attrition between intervention groups, it does not seem that attrition was due to particular dissatisfaction with either intervention card. Around one-third of women did not complete the study, and these had used less problem-focused coping to help with their infertility and felt less in control of the treatment outcome at baseline. We have argued that PRCI worked mainly because it promoted a type of coping associated with better adjustment in low control contexts such as waiting for threatening medical test results. The distraction intervention of Phelps and colleagues (2006, 2007) operates on different principles to the PRCI and future research could determine whether different subgroups of women would benefit more from one intervention than another. For example, a distraction intervention may be more appealing to women who are less keen on problem-focused strategies. Furthermore, in the present study, *a posteriori* zero-order correlations between infertility coping styles and intervention evaluation dimensions suggested that women who used more problem-management coping to deal with fertility problems evaluated the PRCI more favourably and the PMI less favourably on some intervention evaluation dimensions (confidence in the intervention and perceived helpfulness). Terry and Hynes (1998) argue that cognitive problem-appraisal strategies are more adaptive for situations in which an individual has no control over the outcome (e.g. the IVF waiting period), and hence women who would normally favour strategies that focus on changing or controlling the problematic situation may especially benefit from applying strategies which change the meaning of a situation that cannot itself be changed or controlled. These differential associations between a problem-management coping style and reactions to specific interventions suggest that coping habits may moderate the effectiveness of particular coping interventions. It would therefore be important to consider the influence of coping style in future research evaluating the efficacy of coping interventions.

Other psychosocial interventions for infertile patients include face-to-face interventions such as psychotherapy,

educational programmes and infertility counselling, which have shown important benefits in terms of reductions in depression and anxiety when administered by trained professionals (Boivin, 2003). However, these may be difficult and impractical (e.g. number and length of sessions needed for therapeutic benefit) to organize in the short-time span represented by the 2 week IVF waiting period. Furthermore, patients waiting for the results of other medical tests or procedures (e.g. breast cancer diagnosis) also find the waiting period before these medical events challenging, experiencing anxiety at clinical levels (Lowe *et al*., 2003), and becoming more anxious as the day of diagnosis or treatment approaches (e.g. Lebel *et al*., 2003). A self-administered home-based intervention such as the PRCI could be an important adjunct to the routine care offered by medical clinics and to more comprehensive care provided by mental health professionals. However, it is vital that intervention provision fits the specific needs of the patient, and the PRCI is not intended as a therapy for those in significant psychological distress. More comprehensive psychosocial intervention programmes should be offered to those experiencing depression, anxiety or interpersonal problems during medical treatment and future research is needed to establish the extent to which this simple, cost-effective PRCI benefits psychological well-being in patients waiting for potentially threatening medical test results. Covington (2006) recently called for greater collaboration between infertility counsellors in the development of interventions that have better fit to patient need. We see PRCI as an intervention that could stimulate discussion about novel interventions and hope that with further evaluation it can be a useful adjunct to the collaborative reproductive healthcare model Covington proposes (Covington, 2006).

Conclusions

In the present study, women waiting for an IVF pregnancy test found a PRCI to be acceptable and this intervention was feasible within the context of IVF treatment. Notably, women perceived that the PRCI helped them to feel more positive and to sustain their efforts to cope with this demanding experience. One of the key strengths of the present research was that PRCI benefits were observed, despite an experimental control. The results of this feasibility and acceptability study suggest that the PRCI warrants further investigation to establish the extent to which this intervention is a beneficial addition to the routine care women receive when waiting for a pregnancy test during fertility treatment.

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