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Mechanisms of change of a cognitive-existential group intervention for fear of cancer recurrence: mediation analyses of the FORT trial

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Abstract

Background: Meta-analyses have demonstrated that brief interventions can address fear of cancer recurrence (FCR), but their mechanisms of action are largely unknown. Our goal was to identify the mediators of treatment efficacy of the Fear Of Recurrence Therapy (FORT) intervention using data from a multisite randomized controlled trial targeting FCR. That randomized controlled trial compared a 6-week cognitive-existential group intervention with an active control group.

Methods: Participants (n = 135) were women diagnosed with stage I-III breast or gynecological cancer who were assessed at 4 time points (pretherapy, post-therapy, 3-month, and 6-month follow-up). The primary outcome, changes in FCR at 6 months, was measured with the Fear of Cancer Recurrence Inventory. We examined 6 mediators based on our theoretical model of FCR: perceived risk of recurrence, uncertainty in illness, intolerance of uncertainty, positive beliefs about worrying, reassurance-seeking, and cognitive avoidance. Changes in the possible mediator variables were simultaneously investigated to predict changes in FCR using Generalized Structural Equation Models with robust variance estimation.

Results: FORT predicted FCR at 6 months in univariate analyses ($\beta = -8.93$, $P = .0001$). In the model including the 6 possible mediators, changes in uncertainty in illness ($\beta = -8.72$, $P < .0001$) and cognitive avoidance ($\beta = -8.36$, $P < .0001$) mediated the relationship between treatment and changes in FCR. However, FORT still predicted changes in FCR at 6 months ($\beta = -6.35$, $P = .02$), suggesting partial mediation.

Conclusions: We identified 2 mechanisms of action that can be incorporated in future interventions. However, other processes that underlie the efficacy of these interventions need to be uncovered.

Keywords: Cancer survivorship, Fear of cancer recurrence, Group intervention, Mechanisms of action, Mediators

1. Introduction

Fear of cancer recurrence (FCR) is defined as the fear, worry, or concern that cancer may come back or progress.[1] FCR is the number one unmet need of cancer survivors after treatment.[2] It manifests itself on a continuum with 49% of cancer survivors reporting moderate to severe levels of FCR,[2] often referred to as clinical FCR. FCR does not decrease over time; thus, if left unaddressed, it can become a lifelong concern.[2,3] This is problematic because FCR is associated with many negative consequences. At the individual level, FCR is associated with impairment in functioning, psychological distress, sleep difficulties, stress response symptoms, and lower quality of life.[4–7] At the system level, FCR is associated with increased costs to the medical system.[8] Research on FCR is rapidly growing, with more information on its prevalence across cancer types and its risk factors.[2] There is now evidence from 2 meta-analyses that clinical FCR can be mitigated among cancer survivors by either group or individual therapy,[9,10] with effect sizes in the moderate range and evidence of sustained improvements at follow-up (on average 8 months post-therapy). FCR therapies also reduce intrusive thoughts, anxiety, and depression and improve quality of life.[11,12] Most interventions have a cognitive behavioral therapy framework and share common ingredients such as mindfulness, cognitive restructuring, especially challenging beliefs about worries, and decreasing maladaptive coping (eg, avoidance, excessive reassurance-seeking, and body checking).[9,10]

Despite this increased effort in developing and testing FCR interventions, there has been only 1 mediation study of an intervention, the ConquerFear trial.[13] The mediation analyses identified that reductions in unhelpful metacognitions (positive and negative beliefs about worry) and intrusive thoughts during treatment were the most likely mechanisms of treatment efficacy, although they partially mediated the impact of treatment on FCR. Additional mediation studies are needed as the field moves toward

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adapting existing FCR interventions to different cultural contexts and implementation in clinical settings. Indeed, a recent international Delphi study of FCR experts identified defining the mechanisms of action and active components across FCR interventions as the third highest priority after intervention research and evaluation of the effectiveness in real-world settings.[14]

Our team recently evaluated the efficacy of a cognitive-existential intervention called FORT (**F**ear **O**f **R**ecurrence **T**herapy). FORT was pilot-tested with 56 breast or ovarian cancer survivors, showing that the intervention was feasible and acceptable.[15] We subsequently completed a multisite randomized controlled trial (RCT) of FORT with 164 female cancer survivors to evaluate its efficacy.[16] From preintervention up to 6 months postintervention, survivors in the experimental arm experienced significantly greater reduction in FCR compared with those in the active control group, Living Well With Cancer (moderate effect size; d = 0.56). The experimental arm also experienced significant decreases in secondary outcomes such as uncertainty in illness (d = 0.66), positive beliefs about worry (d = 0.43), and reassurance-seeking (d = 0.50). FCR scores at baseline, disease type and stage, age, education, and ethnicity did not moderate the impact of FORT on FCR at 6 months, suggesting that the intervention was equally effective for participants with varying characteristics.

FORT is based on an empirically supported blended theoretical model of FCR[17] that identifies the following vulnerability factors: internal and external triggers, exaggerated perceived risk of recurrence, a hyperfocus on ambiguous physical sensations, maladaptive coping, uncertainty around cancer and its treatments or care, intolerance of uncertainty, and beliefs about the benefits of worrying about one's health (Fig. 1). More specifically, according to this model, internal and external triggers increase perceived risk of recurrence, which in turn heightens FCR. Internal triggers include physical symptoms while external triggers include medical appointments, conversations about cancer, and media exposure to cancer.[2] Hence, one of the goals of FORT is to help participants identify their own triggers of FCR. Once survivors perceive being at risk for recurrence, they tend to hyperfocus on physical sensations such as aches and pains and to engage in catastrophization, that is, to interpret these sensations as evidence of a recurrence. Hence, another goal of FORT is for participants to learn cognitive restructuring, so they can generate alternative reasons for these physical sensations. According to the model, survivors engage in various coping strategies to manage their FCR, some of which, such as body checking, excessive reassurance-seeking from health care providers or family members, and cognitive avoidance, actually increase their FCR in the long term.[18,19] Hence, a central goal of FORT is to promote the learning of new coping strategies such as relaxation techniques.

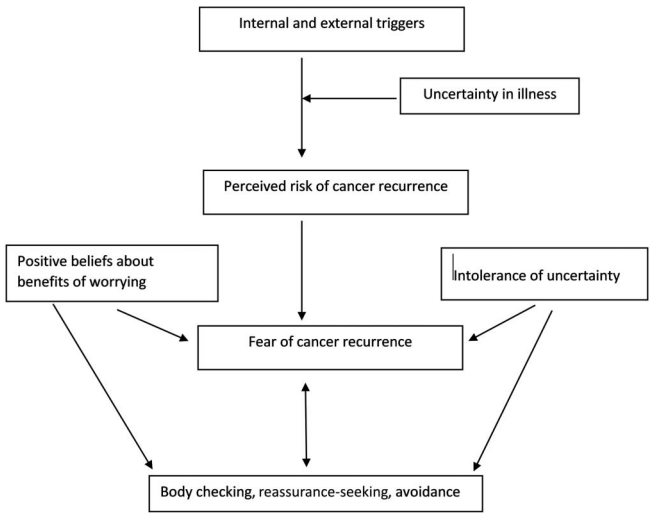

Figure 1. Blended model of fear of cancer recurrence.

Our FCR model includes elements of the Mishel Uncertainty in Illness theory, which postulates that uncertainty is generated when components of the illness or treatment possess the characteristics of inconsistency, randomness, complexity, unpredictability, and lack of information in situations of importance to the individual.[20] There is inherent uncertainty in the experience of cancer, starting with if and when it will recur, and also with persistent, vague, and complex physical symptoms during the survivorship period. In our model of FCR, we postulate that illness uncertainty affects FCR by increasing the chance that physical symptoms are interpreted as signs of recurrence, thus augmenting the perceived risk of recurrence, which in turn contributes to FCR (Figure 1). During FORT, we teach participants about possible signs of cancer recurrence through psychoeducation provided by a health care specialist.

Finally, our model was informed by cognitive theories of worry [21] that identify intolerance of uncertainty and positive beliefs about the benefits of worrying as predisposing risk factors. In the context of cancer, intolerance of uncertainty is correlated with greater FCR.[22] Thus, one of the goals of FORT is to increase tolerance for uncertainty by reminding participants that uncertainty is part of daily life and that they have all successfully faced some uncertainty in the past and by helping them identify and act on what is within their control while living meaningfully. In addition, cognitive theories of worry suggest that one of the functions of worry is to avoid feared outcomes by interfering with emotional processing.[21] Thus, to decrease cognitive avoidance, we actively promote the expression of specific feared outcomes and existential concerns throughout FORT. We also have participants write their worst-case scenario and expose themselves to this scenario as part of their homework.[23] Because survivors with high FCR may hold positive beliefs about worry such as that worry promotes a sense of preparedness, or may prevent potential negative events from occurring,[24] we actively challenge these beliefs and discuss the negative aspects of worrying.

The goal of this study was to identify the mediators of treatment efficacy, through secondary analysis of the FORT trial data.[16] Based on our model of FCR, we predicted that, compared with those assigned to the active control group, survivors who were randomized to FORT would experience greater reductions in perceived risk of recurrence, uncertainty in illness, intolerance of uncertainty, positive beliefs about worrying, reassurance-seeking, and cognitive avoidance over treatment, which would predict lower FCR at the 6-month follow-up.

2. Methods

2.1. Design and participants

The data analyzed for this study are part of a RCT examining the efficacy of FORT in reducing FCR compared with an active, structurally equivalent control group[16] (registered with ISRCTN: ISRCTN83539618). This RCT recruited 164 breast or gynecological cancer survivors (61% of those assessed for eligibility). Of the 164 consenting participants randomly assigned to FORT (n = 84) or the control group (n = 80), T1 measures

were completed by 70 participants in the intervention arm and 65 in the control arm. The analyses reported below are based on these 135 participants. Among these, 68 participants received FORT and 58 received the control intervention. There were no between-group differences in FCR at T1 between participants who completed T2 (mean = 95.2; standard deviation [SD] = 22.1) when compared with those who had missing data at T2 (mean = 88.4; SD = 20.5), t(132) = 1.65, P = .101.

2.2. Procedure

Participants were recruited from 4 hospitals within 3 locations: Princess Margaret Cancer Centre in Toronto, The Ottawa Hospital, and the Jewish General Hospital and McGill University Hospital Centre in Montreal. This study was approved by the research ethics board at all the institutions involved (OHSN-REB #20140561-01H; JGH #15-178; MUHC #MM-CODM-FLP-15-178; UHN# 14-8036-CE). Potential participants were informed about the study through flyers in cancer survivorship centers, letters mailed to eligible participants, and referrals from oncology health professionals and community partners. The inclusion criteria were as follows: women with breast or gynecological cancer who had completed treatment (with the exception of hormonal therapy), diagnosed at stages I-III, disease-free at the start of the group, 18 years or older, and with a score of 13 or higher on the Fear of Cancer Recurrence Inventory (FCRI) Severity Scale[25] and a score of 24 or higher on a cancer-specific distress measure, the Impact of Events Scale.[26] Exclusion criteria were as follows: non-English speakers, previous cancer recurrence, enrolled in another group psychotherapy at the time of the start of the study or during the 6 sessions, and preexisting or co-occurring mental health disorder that was not managed/stable and judged to be clinically contraindicated and/or likely to affect the group work (based on disclosure by the potential participant or identified by the group leader through a semistructured clinical interview during a pretherapy meeting). Interested participants contacted the respective site study coordinators who confirmed eligibility. All participants provided written informed consent before enrolling. The research assistants confirmed eligibility and kept a logbook of all information on women referred to the study, outcome of eligibility assessment, and any refusal to provide consent.

Participants completed questionnaires online or on paper on randomization (T1) and at each follow-up assessment (T2 = immediately after intervention, T3 = 3 months after intervention, and T4 = 6 months after intervention). Sociodemographic and medical data (self-reported) were collected at T1. In addition, treatment credibility and expectancy were assessed after the first session,[27] group cohesion,[28] therapeutic alliance,[29] and satisfaction with therapy and therapist[30] were assessed at T2. In this article, we examine changes from T1 to T4.

All group therapy leaders (8 for FORT and 10 for the control group) received a 1-day protocol training for either the FORT or the control group and received yearly booster training sessions. All sessions were video-recorded. Two study authors conducted random fidelity checks of 2 sessions per group using standardized fidelity checklists to assess the reliability and consistency of both interventions delivery and noted no deviations and an adherence rate >80%.

2.3. Interventions

FORT consists of 6 consecutive weekly sessions of 90–120 minutes offered in a closed group format and led by 2 health care professionals with psychotherapy training. It includes weekly homework assignments (see Table 1 for content of sessions). Key components of FORT include (1) principles of group therapy (eg, promoting group cohesion by facilitating participants' self-disclosure), (2) cognitive behavioral therapy–based techniques (eg, cognitive restructuring), and (3) elements of contemporary existential therapy (eg, outlining fears related to death and dying). FORT is standardized and manualized.

Table 1

Overview of FORT sessions.

Session No.	Session description
1	Introduction with a focus on participants' experience with FCR
	Introduce FCR model
	Identification of triggers
	Teach cognitive restructuring
	Progressive muscular relaxation
2	Discuss ways of regaining sense of control
	Prepare questions for the health care provider visit
	Calming self-talk phrases and use of relaxation files
3	Visit from a health care professional to provide information about signs of recurrence and follow-up care
	Explore reasonable levels of worry
	Challenge faulty beliefs about benefits of worry
	Review maladaptive coping strategies such as reassurance-seeking and avoidance
	Guided imagery
4	Provide psychoeducation about worry and the need for exposure to underlying fears
	Promote emotional expression and confront specific fears that underlie each participant's FCR
	Write down worst-case fear scenario
	Mindfulness exercises
5	Review exposure to worst-case scenario
	Discuss ways of coping with some of the feared outcomes
	Encourage participants to become reengaged with important life goals, people, or activities they may have given up
	Discuss what the future and planning now means for each participant
6	Review content and current FCR
	Discuss future goals
	Promote the expression of saying goodbye to the group and provide closure

FCR, fear of cancer recurrence.

The active control group, Living Well With Cancer, is a support group that had been offered as a clinical service in one of the participating sites. It was chosen because it was structurally equivalent to FORT, that is, consisted of 6 consecutive weekly support group sessions of 90–120 minutes offered in a closed group format and led by 2 health care professionals with psychotherapy training. However, it did not address FCR; the focus of the support group was general exchange of information and support around cancer survivorship, with a weekly topic and some structured exercises (eg, general coping styles, incorporating wellness, self-care). The control group was standardized and manualized. There were no significant findings between groups for group cohesion, therapeutic alliance, treatment credibility and expectancy, and satisfaction with therapy and therapist.

2.4. Measures

2.4.1. Main outcome. The FCRI[25] was used to measure FCR. The 42-item FCRI is a multidimensional instrument that uses a 5-point Likert scale to measure concerns about cancer recurrence in

patients with cancer. It has demonstrated excellent internal consistency, test–retest reliability, and content and construct validity. Internal consistency for the FCRI in this study was $\alpha = 0.93$. The FCRI contains 7 subscales: Triggers, Severity, Psychological Distress, Coping Strategies, Functioning Impairment, Insight, and Reassurance and a total score. This score ranges from 0 to 168 with higher values indicating greater FCR.

2.4.2. Potential mediators. Perceived risk of cancer recurrence was measured using a one-item question "On a scale of 0–100, where 0 = no perceived risk of cancer recurrence and 100 = complete certainty of risk of cancer recurrence, how would you rate your perceived risk of cancer recurrence?" Uncertainty in illness was assessed using the Mishel Uncertainty in Illness Scale [20] (MUIS). The MUIS comprises 32 items that measure uncertainty in diagnosis, treatment, the future, and symptomatology. Internal consistency for the MUIS in this study was $\alpha = 0.87$. Intolerance of uncertainty was measured with the Intolerance of Uncertainty Scale[31] (IUS). The IUS is a 27-item questionnaire that represents uncertainty as unfair, stressful, and upsetting, leading to the inability to act and to be avoided. Internal consistency of the IUS in this study was $\alpha = 0.94$. The Why do people Worry about Health questionnaire[32] was used to measure positive beliefs about the benefit of worrying. In this study, internal consistency was $\alpha = 0.86$. Coping was measured through the Cognitive Avoidance Questionnaire and the Reassurance Questionnaire. The Cognitive Avoidance Questionnaire consists of 25 items that measure 5 cognitive avoidance strategies (thought suppression, transforming images into thoughts, distraction, thought substitution, and avoidance of threatening stimuli).[33] In this study, internal consistency was $\alpha = 0.95$. The Reassurance Questionnaire contains 8 items and measures the perceived reassurance a patient receives from their physician,[34] with higher scores indicating feeling less reassured by one's physician and indicating poorer outcomes. In this study, internal consistency was $\alpha = 0.72$.

2.5. Statistical analysis

First, we report descriptive data on the sample. Second, we performed bivariate correlations to detect sociodemographic or medical variables that showed a significant relationship with FCR at the 6-month follow-up. Categorical variables were transformed into dichotomous variables. Finally, changes in the possible mediator variables (from T1 to T4) were simultaneously investigated to predict changes in FCR (from T1 to T4) using Generalized Structural Equation Models with robust variance estimation. Mediation analyses were conducted using the bias-corrected bootstrapping method using robust variance estimation.[35] Traditional multiple linear regression methods for assessing mediation (eg, Baron and Kenny) may not be suitable for multilevel settings, particularly because the assumption of independence is violated in the clustered data. To remedy this issue, Generalized Structural Equation Models consider all level 1 variables as latent variables, which correct the sampling and the measurement errors. Analyses were conducted with STATA 14.2.

3. Results

3.1. Participants

Study arms were balanced because FORT (n = 70) and control group (n = 65) participants did not differ on medical, demographic characteristics, or baseline study outcomes. At T1, FORT and the control group had similar FCRI total scores (X = 92.2; SD = 20 vs X = 93.1; SD = 24.7; $P = .840$). Study participants were on average aged 55.6 years (SD = 10.6); married (66%); university educated (49%); employed (32%) or retired (25%); White (75%); with a family income > $81,00 Canadian Dollars (45%); diagnosed with stage II (47%) breast cancer (84%) 2.2 years ago (SD = 1.8); and treated with radiation, chemotherapy, and adjuvant chemotherapy (42%).

3.2. Correlations

There were no significant correlations between any baseline medical (eg, disease type, type of treatment, stage, time since diagnosis) or sociodemographic variables (eg, age, education, ethnicity) and FCRI at T4. Hence, we did not control for medical or sociodemographic variables in the mediation analyses.

3.3. Mediation analyses

The intervention group predicted FCR at 6 months in univariate analyses ($\beta = -8.93$, $P = .0001$), with FORT participants reporting greater changes than those randomized to the control group. In the mediation model, participants who received FORT reported greater changes in cognitive avoidance ($\beta = -8.36$, $P < .0001$) and uncertainty in illness ($\beta = -8.72$, $P < .0001$) compared with those in the control group (Fig. 2). These 2 variables mediated the relationship between intervention group and changes in FCR at 6 months. Partial mediation is suggested because the intervention group is still significant ($\beta = -6.35$, $P = .02$) in the model. The other potential mediating variables of intolerance of uncertainty ($\beta = 0.28$, $P = .002$), positive beliefs about worrying ($\beta = 0.53$, $P = .02$), perceived risk of recurrence ($\beta = 0.30$, $P < .0001$), and reassurance-seeking ($\beta = -0.65$, $P = .04$) predicted significant changes in FCR regardless of the intervention group (Table 2).

4. Discussion

Our goal was to investigate mediators of treatment efficacy of the FORT intervention. We found that participants randomized to FORT had greater improvements in cognitive avoidance and uncertainty in illness over treatment. These changes partially mediated the relationship between treatment group and FCR at the 6-month follow-up. Thus, our results suggest that FORT's mechanisms of action are reductions in uncertainty in illness and cognitive avoidance. To address uncertainty in illness, we have a health care provider educate participants about signs of recurrence and follow-up care in session 3. Similarly, a recent evaluation of a brief psychological intervention for patients with melanoma found that increased engagement with melanoma-related information was a probable active ingredient, highlighting the role of information in decreasing FCR.[36]

Given the similarities between FCR and worry,[37] FORT has a strong focus on decreasing cognitive avoidance. This is encouraged throughout the 6 sessions but is also the focus of session 4 where participants are asked to write down their worst-case scenario. We have conducted an analysis of the impact of this exercise and found that women who exposed themselves to their written scenario between sessions 4 and 5 had lower FCR scores after, but not before treatment.[23] Using a Buddhist doctrine-based practice to reduce FCR, Bannaasan et al[38] also used scenarios of current fears and anticipated difficulties in the case

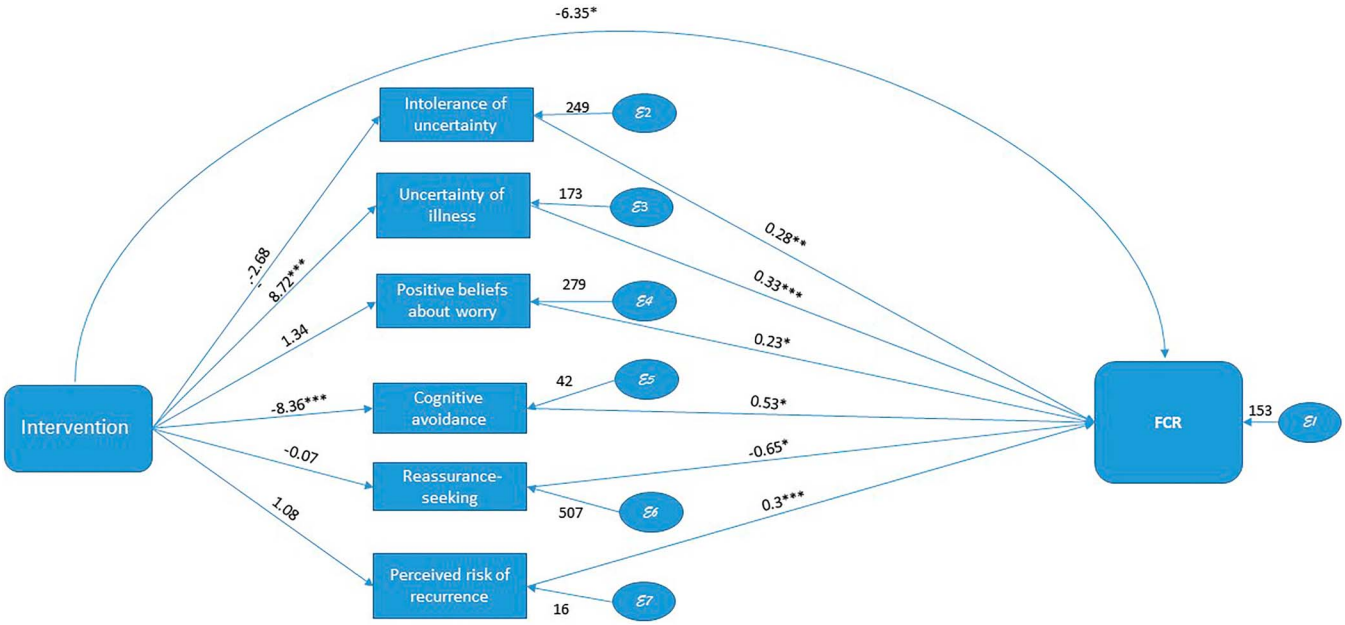

Figure 2. Mediation analyses testing the effect of the intervention group and 6 possible mediators on changes in fear of recurrence from baseline to 6 months postintervention. Note. Intervention: FORT versus active control group; FCR, changes in fear of cancer recurrence over 6 months. *$P < .05$; **$P < .01$; ***$P < .001$.

of a recurrence and found it effective at addressing FCR and hopelessness.

Unlike the mediation analyses of the ConquerFear trial,[13] we did not identify changes in positive beliefs about worry as a mediator of the FORT trial, although there was a trend toward significance ($P = .08$). This result could be explained by a greater focus on metacognitions in the ConquerFear trial, including both positive and negative beliefs about worrying.[11] Thus, it seems that FORT and ConquerFear work through different mechanisms that are strongly related to their respective session content. Perhaps clinical FCR treatment plans could be tailored based on what the individual cancer survivor's concerns are: for example, high levels of maladaptive beliefs about worry versus high degree of cognitive avoidance or uncertainty around their illness.

Table 2.

Generalized Structural Equational Model analysis testing potential mediators of the relationship between intervention groups and FCR at the 6-month follow-up.

Regression path	Coefficient	SE	95% CI	*P*
Change in FCR				
Intervention	−6.346	2.784	−11.803 to −0.888	.023
Change in IUS	0.284	0.092	0.104 to 0.464	.002
Change in MUIS	0.329	0.100	0.132 to 0.526	.001
Change in CAQ	0.225	0.089	0.051 to 0.399	.011
Change in WW	0.530	0.221	0.098 to 0.962	.016
Change in PRC	0.303	0.061	0.183 to 0.423	<.0001
Change in RQ	−0.645	0.307	−1.248 to −0.043	.036
Independent mediators:				
Change in IUS				
Intervention	−2.688	2.072	−6.750 to 1.374	.195
Change in MUIS				
Intervention	−8.721	1.725	−12.102 to −5.340	<.0001
Change in CAQ				
Intervention	−8.362	2.240	−12.751 to −3.972	<.0001
Change in WW				
Intervention	1.343	0.774	−0.174 to 2.859	.083
Change in PRC				
Intervention	1.080	2.691	−4.195 to 6.355	.688
Change in RQ				
Intervention	−0.067	0.512	−1.070 to 0.936	.896

CAQ, Cognitive Avoidance Questionnaire; CI, confidence interval; FCR, total score of the Fear of Cancer Recurrence Inventory; IUS, Intolerance of Uncertainty Scale; MUIS, Mishel Uncertainty in Illness Scale; MUIS, Mishel Uncertainty in Illness Scale; PRC, Perceived Risk of Recurrence; RQ, Reassurance Questionnaire; WW, Why Worry Questionnaire

4.1. Clinical implications

This study has several clinical implications. First, our results highlight the importance of reducing uncertainty in illness, which many health care providers can do by providing clear and consistent information about symptoms of recurrence and follow-up care. Indeed, a systematic review of FCR interventions by nonmental health specialists found that clear delivery of information was associated with less FCR.[39] In addition, there are other positive outcomes of interventions that address uncertainty in illness among cancer survivors, including improvements in cognitive reframing, cancer knowledge, patient–health care provider communication, self-efficacy, coping strategies, and quality of life.[40–42] In a validation study of our theoretical model, we found that uncertainty in illness moderated the relationship between triggers and FCR; that is, triggers were more likely to be associated with FCR when cancer survivors reported high levels of uncertainty in illness.[17] Providing information about which physical symptoms are possible signs of recurrence as is performed in FORT may help decrease the likelihood that survivors' FCR will be triggered by benign body symptoms. A pilot study of the Mini-AFTERc intervention, which consists of a 30-minute nurse-led session addressing misconceptions about signs of cancer recurrence, is currently underway and may add further evidence about the benefits of education about symptoms of recurrence.[43]

Anecdotally, in our study, we found that cognitive avoidance was the coping strategy most often reported by our participants, who tried to "keep themselves busy from morning until night." All health care providers can address cognitive avoidance. For example, there is evidence that the level of patients' emotional talk

during a meeting with a radiographer was associated with lower levels of FCR 6–8 weeks later.[44] Exposure tasks such as asking survivors to talk or write about their worst-case scenario could be incorporated in FCR interventions because they may improve the efficacy of existing treatments. In addition, it would be interesting to uncover the mechanisms of mindfulness or Acceptance Commitment Therapy interventions that have proven to be effective at reducing FCR.[9,10] It may be that these therapies also decrease cognitive avoidance but through acceptance of the impermanence of thoughts and physical sensations rather than behavioral exposure.

4.2. Future directions

Some factors were beneficial regardless of the treatment arm: Decreases in perceived risk of recurrence, positive beliefs about worry, intolerance of uncertainty, and reassurance-seeking predicted lower FCR at 6 months. Future FCR interventions should investigate these variables as potential mediators. Our results revealed partial mediation of the relationship between treatment and FCR, suggesting there are other factors that explain the efficacy of FORT. Potential mediators that could be investigated include intrusive thoughts and death anxiety. Death anxiety in particular would be interesting to measure because it is the main fear that gets addressed by the worst-case scenario, but it has rarely been measured (nor directly addressed) in therapy for FCR, despite its strong association with FCR.[45] Interestingly, a brief 6-week gratitude-writing intervention was found to be effective at reducing FCR and death anxiety through increased pursuit of meaningful activities,[46] which is also a therapeutic target of FORT in sessions 5 and 6. Thus, increased engagement in meaning-making activity could be a common mechanism to several FCR interventions that needs to be formally tested in future interventions.

4.3. Study limitations

We experienced attrition over the trial, and our sample has limited generalizability because it consisted mostly of White, highly educated women with breast cancer. Therefore, the present results may not be generalizable to men, patients with a diverse ethnic background, or those with other tumor sites. We measured changes in the mediators using the same time frame as the change in FCR (ie, T1–T4), which limits our ability to infer whether the changes in the mediators proceeded the change in FCR. This study has some noteworthy strengths: We achieved a well-controlled trial with a strong theoretical foundation and demonstrated that FORT results in greater FCR reduction than an active control group, with gains maintained at a 6-month follow-up.

5. Conclusion

FORT is a brief, effective, and theoretically driven group intervention for managing clinical FCR. The mediation analyses of the FORT trial indicate that participants randomized to FORT experienced greater reductions in FCR compared with an active control group and that FORT works by reducing uncertainty in illness and cognitive avoidance.

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Conflicts of interest statement

The authors report no conflicts of interest.

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Author Contributions

S. Lebel and C. Maheu established the research questions. The methodology was elaborated by S. Lebel, C. Maheu, C. Tomei, B. Mutsaers, L.J. Bernstein, C. Courbasson, C. Harris, M. Lefebvre, and M. Singh. Data analyses were performed by S. Lebel, C. Maheu, A.V. Ramanakumar, and J. Parrott. C. Maheu wrote the initial version of the paper. All authors edited the initial version of the paper. C. Maheu and S. Lebel oversaw the writing of the final manuscript.

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