



Research Article

# Changes in Depressive Symptoms and Perceived Stress in Women Coping with Infertility, Following Mind-Body Interventions

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## Abstract

The present study's focus was to examine changes in depressive symptoms and perceived stress in women experiencing fertility challenges after participating in a mind-body intervention program. In addition, the potential protective effect of religiosity on depressive symptoms and perceived stress was tested. A total of 83 women attended the intervention groups at a non-profit organization, providing support to women with fertility challenges. A mixed analysis MANOVA was used to examine between measures effects of differences in the dependent variables (depressive symptoms and perceived stress) before and after the interventions. We found reductions in perceived stress and depressive symptoms following participation in mind-body interventions with an added benefit to interventions that included CBT components. Religiosity was not found to affect treatment outcome. These study further supports interventions, primarily CBT to assist women in coping with fertility challenges.

## Introduction

Infertility affects the physical and mental health of several million women and men worldwide. Couples experiencing infertility experience shame, low self-esteem, depressive symptoms, and psychological stress [1]. Israel is a diverse immigrant's society with social attitudes towards (in)-fertility affected by the biblical approach of infertility as shameful and the largest number of IVF clinics per capita in the world [2] enabling government funded IVF up to two live births. Therefore, the pressure to conceive may be higher for Israeli couples and they may experience higher stress and depression levels. Psychological interventions have been shown to reduce stress and improve coping of women undergoing IVF [3]. While the literature on the effect of stress on fertility is

inconclusive [4], reducing stress and depressive symptoms is a worthwhile endeavor to improve women's quality of life when undergoing IVF. The goal of this study is to examine changes in depressive symptoms and perceived stress of women experiencing fertility challenges after participating in mind-body groups. In addition, we aim to examine differences between the types of groups (ie mind-body vs mind-body with a cognitive behavioural therapy (CBT) component) in reducing depressive symptoms and perceived stress. The primary hypothesis is that participating in the groups will lead to reductions in depressive symptoms (H1a) and perceived stress (H1b). Furthermore, levels of religiosity will influence treatment efficacy, individuals with higher religiosity will have increased reductions in depressive symptoms (H2a)

and perceived stress (H2b). An exploratory hypothesis aimed to examine whether personality dimensions had a relationship with perceived stress, depressive symptoms and their change following participation in the workshops.

## Methods

### Procedure

This is a pre and post comparative study tailored to examine changes in perceived stress and depressive symptoms of women experiencing fertility challenges following participation in mind-body groups. Participants signed informed consent and filled out questionnaires before (T1) and after (T2) participating in the groups. Demographic and personality questionnaires were completed at consent. The study was approved by the ethics committee of the Faculty of welfare and health sciences at the University of Haifa (approval number 069/17). Participants were asked to fill out questionnaires and were told that not agreeing would not affect their treatment in any way.

### Participants

Participants were 83 women who attended mind-body and fertility preservation groups at Keren Gefen, which is a non-profit organization that provides emotional and wellness support to fertility challenged women in Israel.

### The interventions

The mind-body interventions were conducted by licensed psychologists and are based on the work of Alice Domar [5]. The Mind Body group with the CBT component included interventions such as cognitive restructuring, progressive relaxation, breathing retraining and guided imagery and psycho-education to empathize, normalize and legitimize infertility treatment and the various responses to infertility treatment. The sub-group of women attending Gefen programing for fertility preservation received similar and appropriately tailored psycho-educational interventions. Every session ended with homework assignments and began with a review of the previous homework assignment.

### Measures

**The Big Five personality questionnaire** [6] the Big Five measures five different dimensions of personality: Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. These basic factors can explain and predict individual differences over a wide range of settings, including mental health, job satisfaction, and work performance.

**The Center for Epidemiologic Studies Depression Scale (CES-D)** [7] Is a 10-item scale, which is well known and remains as one of the most widely used instruments for the measure of depressive symptoms. The scale is highly reliable and in our study Cronbach  $\alpha=0.834$ .

**The perceived stress scale** [8] Is a 10-item scale designed to measure the level of perceived stress of the individual. Each item asks questions related to a different potential aspect of psychological stress and are tailored to measure the degree to which individuals find their lives unpredictable, uncontrollable and overloaded. The questions probe about the occurrences of an individual's perception of a variety of situations in the past month on a scale from 0- not at all to 4- all the time. The scale is widely used and reliable, in our study Cronbach  $\alpha=0.857$ .

### Statistical Methods

Statistical analyses were conducted with SPSS version 23 (IBM, Armonk, NY). Descriptive statistics were used to calculate means and standard deviations for the entire population and the subgroups. A mixed analysis MANOVA was used to examine between measures effects of differences in the dependent variables (depressive symptoms and perceived stress) before and after the interventions. Paired t-tests were used to examine changes in depressive symptoms and perceived stress before and after participating in the intervention groups in those who filled out questionnaires before and after the intervention. An ANOVA with a Sheffe post hoc test was used to examine differences in changes in depressive symptoms and perceived stress among the different intervention groups. ANOVA was used to measure differences in personality factors between the sub groups and the norm scores retrieved from the literature.

### Results

Of the 83 women who participated in the study, 61 attended mind-body workshops. A subgroup of those had a CBT component in their workshop (23 women). 22 women had a fertility preservation focus to their workshop (embryo preservation). Table 1 depicts the demographic details and personality dimensions of the entire cohort as well as each sub-group and in comparison to age equivalent norms [6]. Table 2 describes changes in depressive symptoms and perceived stress before and after participation in the groups as well as mean scores based on religiosity. Depressive symptoms and perceived stress were examined with one-way MANOVA comparing participants in the three groups on both dependent variables. Findings revealed a significant multivariate main effect for treatment on depressive symptoms, Wilks'  $\lambda = .374$ ,  $F(1, 27) = 45.1$ ,  $p < .01$  (H1a); and perceived stress Wilks'  $\lambda = .320$ ,  $F(1, 27) = 57.4$ ,  $p > .01$  (H1b). Mean depressive symptoms in women in the entire sample was 19.9 (sd=6.25) at T1 and 11.49 (sd=5.29) at T2  $t(df=31)=6.86$ ,  $p<0.01$ . A score above 10 is considered depressed [9]. Mean perceived stress in women in the entire sample (N=75) was 23.01 (sd=5.53) and 17.87 (sd=5.09) at T2  $T(df=42)= 6.44$ ,  $p=0.01$ . The norm perceived stress score is 15.7 (sd=7.5) [10]. Following the significant MANOVA results we further explored the differences in changes in depressive symptoms

and perceived stress between the groups. There were no statistically significant differences in reductions in depressive symptoms between the 3 intervention groups means as determined by one-way ANOVA  $F(2,29) = 1.78, p > .05$ . However, there were statistically significantly higher reductions in perceived stress in the mind body groups with a CBT component in comparison to the mind-body interventions  $F(2,40) = 3.91, p < .01$ . There were no overall differences in changes in depressive symptoms (H2a) or perceived stress (H2b) based on religiosity means as determined by one-way MANOVA. Participants in the four categories of religiosity: secular, traditional, religious and orthodox revealed a non-significant multivariate main effect for treatment on depressive symptoms and perceived stress [ $F(1,25) = 363, p > .05$ ]. In addition, personality did not significantly affect treatment outcome, other than increased emotional stability at T2 [ $F(3,39) = 3.86, p = 0.02$ ]. A Sheffe post-hoc test indicated that the emotional stability of the orthodox participants ( $M = 5.09, SD = 1.46$ ) was significantly higher than the secular participants ( $Mean = 3, SD = 1.27$ ). There was no clear relationship shown between personality factors and changes in depressive symptoms or perceived stress, except agreeableness at T2 which was correlated with reductions in depressive symptoms  $r = 0.6, p = 0.01 (p < 01)$ . There were no statistically significant differences between the groups in terms of the personality measures. There were also no differences between our sample and the standardized norms of the Big Five, except for openness to experience, which was lower in our participants,  $t(177) = -2.54, p = 0.012$ .

		Entire study N=83	Mindbody workshop N=38	Mindbody+ CBT N=23	Fertility preservation N=22	Age Equivalent Norms
Age		34.12(5.85)	34.58(6.08)	32.96(6.99)	34.09(3.92)	
Education	High school or less	8(9)	2(6)	5(24)	1(5)	
	University (BA, MA PhD)	72(78)	34(94)	16(78)	19(95)	
Marital status	Married or co- habitating	53(57)	27(73)	18(78)	4(20)	
	Divorced, separated, widowed	2(2)	2(5)	--	2(10)	
	Single	28(30)	8(22)	5(22)	14(70)	
	Orthodox	14(15)	3(8)	11(50)	--	
Religiosity	Religious	45(49)	21(57)	7(32)	15(75)	
	Traditional	12(13)	1(5)	1(5)	2(10)	
	Secular	11(12)	5(14)	3(14)	3(15)	
Country Born§	Israel	64(70)	26(74)	17(74)	18(95)	
	Other	16(17)	9(26)	6(26)	1(5)	
Children	Yes	18 (19)	12(36)	4(17)	4(17)	
	No	47(51)	21(64)	19(83)	5(83)	

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Employment	Yes	78(85)	35(95)	21(91)	19(100)	
	No	4(4)	2(5)	2(9)	--	
The Big Five Personality Inventory	Extraversion T1	3.62 (1.43)	3.15 (1.36)	3.59 (1.46)	4.08(1.37)	4.2 (+1.6)
	Extraversion T2	3.91(1.46)	4.04 (1.77)	4.06 (1.43)	3.69(1.32)	
	Agreeableness T1	4.91(1.01)	4.96 (1.14)	4.59 (1.02)	4.92(1.12)	5.0 (+1.2)
	Agreeableness T2	5.2 (1.11)	(0.91) 5.58	5.09 (0.97)	4.96(1.27)	
	Contentiousness T1	5.61 (1.34)	5.12 (1.43)	5.65 (1.21)	5.50(1.86)	5.0 (+1.4)
	Contentiousness T2	5.62 (1.29)	5.42 (1.38)	5.59 (1.36)	5.69(1.42)	
	Emotional Stability T1	4.10 (1.34)	3.65 (1.20)	4.06 (1.25)	4.17(1.59)	4.3 (+1.5)
	Emotional Stability T2	4.43 (1.32)	4.19 (1.45)	4.71(1.29)	3.92(1.34)	
	Openness to Experience T1	5.05 (1.33)	4.96 (1.39)	4.82 (1.50)	5.04(1.42)	5.5 (+1.1)
	Openness to Experience T2	5.02 (1.17)	5.35 (0.88)	4.71(1.20)	5.00(1.46)	

**Table 1:** Demographics and personality dimensions of the entire study population and sub-groups.

	Entire sample N=32/43	t(df)	Mind body N=12/17	t(df)	Mind body + CBT N=12/15	t(df)	Fertility pres- N=8/11	t(df)	Secular	Tradit- ional	Religious	Highly Religious
T1 Depres- sion	19.69 (6.46)		22.29 (7.17)		19.2 (6.52)		17.46 (3.15)		16.66 (4.18)	21.5 (5.08)	20.72 (6.76)	20.57 (6.65)
		6.86 (31)**		5.5 (11)**		4.14 (11)**		2.34 (7)*				
T2 Depres- sion	11.94 (5.65)		11.85 (4.59)		10.53 (6.17)		12.69 (5.59)		14.5 (6.74)	12.71 (5.58)	12.21 (4.35)	8.09 (5.03)
T1 Per- ceived Stress	23.28 (5.68)		23.3 (5.93)		24.43 (5.46)		21.35 (4.69)		20.90 (5.02)	23.00 (5.35)	23.04 (5.74)	24.67 (5.69)
		6.44 (42)**		3.73 (16)**		4.9 (14)**		4.92 (10)				
T2 Per- ceived Stress	17.95 (5.06)		18.68 (5.19)		15.75 (5.28)		18.77 (4.68)		18.00 (5.79)	16.5 (4.14)	18.45 (4.48)	17.4 (6.43)

\*p<0.05; \*\*p<0.005

**Table 2:** Depressive symptoms and perceived stress before and after the interventions in the entire study population and in the sub-groups and based on religiosity.

## Discussion

Like other studies [1,11,12], we demonstrated reductions in depressive symptoms and perceived stress following participation in mind-body interventions for women coping with infertility. Thus, justifying the investment in resources for stress reduction in women coping with infertility. Furthermore, it appears that there is an added benefit in teaching CBT skills to women coping with infertility to reduce perceived stress. Possibly, by changing their negative thinking, they are able to look at their situation in more realistic and less catastrophic ways and can problem solve and change their behaviour that is adding to their stress and negative emotions. In addition, it is possible that having tangible exercises to practice at home provided this extra benefit. While the debate regarding the effect of stress on infertility is far from being resolved, a large body of research has documented the effect of infertility on stress and the benefit of stress reduction interventions [3]. We did not find a main effect of religiosity on stress reduction and depressive symptoms. We hypothesized that women who are more religious would have higher reductions in depressive symptoms and perceived stress based on the presupposition that individuals who are religious have higher levels of social support and the techniques offered in the groups would be familiar from their religious practice. While this is true for depressive symptoms, these differences are not statistically significant. We had some missing data regarding religiosity and these results may be more reflective of the small numbers, rather than their not being a difference. Further studies are needed to definitively answer this question. Our results are like another cross-sectional study, with a larger sample, that found mixed effects of religiosity on psychotherapy outcome, however these were based on recall of effect rather than a real time measurement. The results of this study should be considered with its limitations that this is a pre-post design and not a randomized controlled trial, which would be the best methodology to determine efficacy of our interventions.

Furthermore, it would have been beneficial to have equal numbers of women in each of the groups and more women in each group. Having said that, the results of this study support the notion that creating the means in which to support and assist women undergoing infertility is a worthwhile endeavor.

## Conclusions

Women coping with fertility challenges have elevated perceived stress and depressive symptoms. Participating in mind-body groups is beneficial in reducing those symptoms and cognitive behavioural interventions added to mind-body groups is even more helpful in reducing perceived stress, perhaps because of the concrete nature of the interventions and the homework and practicing components. Religiosity did not seem to have a protective effect on stress, possibly due to the societal pressures and traditional childbearing roles of religious women. Further research utilizing randomized clinical trials and more participants is needed to deepen our understanding of mind-body interventions and the effect of religiosity on the mental health of women coping with fertility challenges.

## References

1. Gameiro S, Boivin J, Dancet E, Klerk CD, Emery M, et al (2015) ESHRE guideline: routine psychosocial care in infertility and medically assisted reproduction a guide for fertility staff. Human Reproduction. 30: 2476-2485.
2. Remennick L (2000) Childless in the land of imperative motherhood: Stigma and coping among infertile Israeli women. Sex roles. 43: 821-841.
3. Rooney KL, Domar AD (2018) The relationship between stress and infertility. Dialogues in Clinical Neuroscience. 20: 41-47.
4. Nicoloro-SantaBarbara J, Busso C, Moyer A, Lobel M (2018) Just relax and you'll get pregnant? Meta-analysis examining women's emotional distress and the outcome of assisted reproductive technology. Sco Sci Med. 213: 54-62.

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5. Domar AD, Rooney KL, Wiegand B, Orav EJ, Alper MM, et al (2011) Impact of a group mind/body intervention on pregnancy rates in IVF patients. *Fertility and sterility*. 95: 2269-2273.
6. Gosling SD, Rentfrow PJ, Swann WB (2003) A very brief measure of the Big-Five personality domains. *Journal of Research in personality*. 37: 504-528.
7. Radloff LS (1977) The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Applied Psychological Measurement*. 1: 385-401.
8. Cohen S, Kamarck T, Mermelstein R (1983) A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*. 24: 385-396.
9. Cole JC, Rabin AS, Smith TL, Kaufman AS (2004) Development and validation of a Rasch-derived CES-D short form. *Psychological assessment*. 16: 360.
10. Cohen S, Janicki-Deverts D (2012) Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009. *Journal of applied social psychology*. 42: 1320-1334.
11. Stefanaki C, Bacopoulou F, Livadas S, Kandaraki A, Karachalios A, et al (2015) Impact of a mindfulness stress management program on stress, anxiety, depression and quality of life in women with polycystic ovary syndrome: a randomized controlled trial. *Stress*. 18: 57-66.
12. Paterson J, Francis AJP (2017) Influence of religiosity on self-reported response to psychological therapies. *Mental Health, Religion & Culture*. 20: 428-448.