MINDFULNESS-BASED INTERVENTIONS & INFERTILITY CARE

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what is that?

oh, just my mind
WHAT IS MINDFULNESS?

- Concept stemming from ancient Buddhist philosophy and Yoga and practiced to achieve enduring happiness and to gain insight into a view of the true nature of existence.

- J. Kabat-Zinn 1990 (University of Massachusetts): paying attention in a particular way: on purpose, in the present moment, and non-judgementally.

- Bishop et al. 2004. Two components model:
  1. Regulation of attention in order to maintain it on the immediate experience (including one’s sensations, thoughts, body states, consciousness and environment).
  2. Approaching one’s experience with an orientation of curiosity, openness and acceptance, regardless of their valence and desirability.

- Mindfulness-based therapy (MBT) popular in psychotherapy:
  - MBCT (Mindfulness-based cognitive therapy)
  - MBSR (Mindfulness-based stress reduction)
The practice of mindfulness meditation encompasses focusing attention of the experiences of thoughts, emotions and body sensations, simply observing them as they arise and pass away.
USE OF MINDFULNESS

IN PATIENTS

- Psychiatric conditions
  - Anxiety: Hofmann et al., 2010; Roemer, et al. 2008
  - Depression: Hofmann et al., 2010; Teasdale et al., 2000
  - Substance abuse: Bowen et al., 2006
  - Eating disorders: Tapper et al., 2009

- Somatic conditions
  - MBSR: Positive effects on pain, anxiety and stress in people with chronic disorders, such as fibromyalgia, coronary artery disease, back pain and arthritis
  - MBCT: Decrease depression, anxiety and fatigue in some physical conditions, such as coronary heart disease, diabetes and cancer

IN HEALTHY INDIVIDUALS

- Positive effect on psychological well-being: Carmody et al., 2008; Chiesa et al. 2009
- Enhances cognitive functioning: Jha et al., 2007; Ortner et al., 2007; Pagnoni et al., 2007; Slagter et al., 2007.
small to medium effect sizes on psychological and physical symptoms across a range of chronic somatic conditions including cancer, cardiovascular disorders and chronic pain

Best effect size in patients with anxiety and depression
HOW DOES MINDFULNESS MBCT/MBSR WORK?

- MBCT/MBSR helps people:
  - learn that habitual reactive patterns stem from unhelpful habits of the mind; that fear, denial and discrepancy-based thinking create and exacerbate distress;
  - that skillful ways of relating to experience can be developed through awareness, wise discernment and practice which offer the potential for (moments of) freedom from reactivity”

Crane et al. 2017
MECHANISMS OF CHANGE

Universal:
• Learning to stabilize attention (mindful attention)
• Decentering from negative thinking (emotion regulation strategy)
• Acceptance

Disease specific:
CVD: self-awareness of cardiac experiences, attention control of CVD risk factors
Depression: Decrease in cognitive reactivity (the degree to which a mild dysphoric state reactivates negative thinking patterns)

Alsubaie et al. 2017
Mindfulness practice leads to increases in regional brain gray matter density.

Anatomical magnetic resonance (MR) images from 16 healthy, meditation-naïve participants were obtained before and after they underwent the 8-week program. Changes in gray matter concentration were investigated using voxel-based morphometry, and compared with a waiting list control group of 17 individuals.

MBSR is associated with changes in gray matter concentration in brain regions involved in learning and memory processes, emotion regulation, self-referential processing, and perspective taking.  

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Exemplary instructions</th>
<th>Self-reported and experimental behavioral findings</th>
<th>Associated brain areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attention regulation</td>
<td>Sustaining attention on the chosen object; whenever distracted, returning attention to the object</td>
<td>Enhanced performance: executive attention (Attention Network Test and Stroop interference), orienting, alerting, diminished attentional blink effect</td>
<td>Anterior cingulate cortex</td>
</tr>
<tr>
<td>2. Body awareness</td>
<td>Focus is usually an object of internal experience: sensory experiences of breathing, emotions, or other body sensations</td>
<td>Increased scores on the Observe subscale of the Five Facet Mindfulness Questionnaire; narrative self-reports of enhanced body awareness</td>
<td>Insula, temporo-parietal junction</td>
</tr>
<tr>
<td>3.1 Emotion regulation: reappraisal</td>
<td>Approaching ongoing emotional reactions in a different way (nonjudgmentally, with acceptance)</td>
<td>Increases in positive reappraisal (Cognitive Emotion Regulation Questionnaire)</td>
<td>(Dorsal) prefrontal cortex (PFC)</td>
</tr>
<tr>
<td>3.2 Emotion regulation: exposure, extinction, and reconsolidation</td>
<td>Exposing oneself to whatever is present in the field of awareness; letting oneself be affected by it; refraining from internal reactivity</td>
<td>Increases in nonreactivity to inner experiences (Five Facet Mindfulness Questionnaire)</td>
<td>Ventro-medial PFC, hippocampus, amygdala</td>
</tr>
<tr>
<td>4. Change in perspective on the self</td>
<td>Detachment from identification with a static sense of self</td>
<td>Self-reported changes in self-concept (Tennessee Self-Concept Scale, Temperament and Character Inventory)</td>
<td>Medial PFC, posterior cingulate cortex, insula, temporo-parietal junction</td>
</tr>
</tbody>
</table>
Infertility:
- chronic condition – long treatments
- higher level of stress, anxiety and depression
- decreased quality of life
- marital dysfunction
- treatment discontinuation
- diminished chance to conceive

Cousineau et al. 2007
Development of new psychosocial intervention with mind-body approaches in infertile patients

MBSR  Yoga
Meditation  Mindfulness
Breathing exercises  Relaxation

Infertility and its medical treatment are stress inducing conditions. The use of mindfulness with infertile patients may be adequate.
MINDFULNESS BASED PROGRAM FOR INFERTILITY (MBPI)

- 10 weekly sessions: first session introductory, 8 sessions of 2 hours, last session of one day
- maximum 15 women, male partners invited in 3 sessions
- MBPI sessions with a similar structure:
  - Begin with a first half-hour of sharing
  - Formal mindfulness practice (commonly used in mindfulness program)
  - Sharing how the experience was for them
  - Finish with breathing exercise
    - Each session included metaphors and experiential exercises and counseling in healthy lifestyle

Galhardo et al. 2013
MIND BODY THERAPEUTIC PROGRAM

Figure 1. The mind-body therapeutic program. Note. GnRH = gonadotropin-releasing hormone; B-hCG = β-human chorionic gonadotropin; HCG = human chorionic gonadotropin.

Kim et al. 2014
MIND BODY-BASED INTERVENTIONS IN INFERTILE WOMEN

- Systematic review of literature conducted in January 2017 (PubMed, PsychINFO, EMBASE, the Cochrane Library)

**Keywords**: infertility, mind body based interventions

- Studies eligible if:
  - data on infertile individuals or couples
  - evaluated the effect of a mind-body intervention (mindfulness, yoga or mindfulness, stress reduction program (MBSR))
  - Effect on anxiety, depression, pregnancy rates and quality of life
ANXIETY: STATE-TRAIT ANXIETY INVENTORY (STAI)

- 7 studies (5 controlled, 2 uncontrolled)
- **Significant reduction in anxiety state scores** after intervention
- Small effect on anxiety in 4 studies (Effect size d of 0.19, 0.23, 0.29, 0.34, respectively) and a large effect (Effect size d of 1.52) in one study

<table>
<thead>
<tr>
<th>Author Year</th>
<th>Study design</th>
<th>Number of participants (intervention, control)</th>
<th>Measurement timing</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim 2014</td>
<td>NRCT</td>
<td>26, 24</td>
<td>Before and after intervention</td>
<td>1.52</td>
</tr>
<tr>
<td>Galhardo 2013</td>
<td>NRCT</td>
<td>55, 37 (women and men)</td>
<td>Before and after intervention</td>
<td>0.34</td>
</tr>
<tr>
<td>Chan 2011</td>
<td>RCT</td>
<td>114, 110</td>
<td>At randomization, starting ovarian stimulation, embryo transfer</td>
<td>0.23</td>
</tr>
<tr>
<td>Chan 2006</td>
<td>RCT</td>
<td>101, 126</td>
<td>Day of recruitment (T1), 1st day of ovarian stimulation (T2), day of embryo transfer (T3)</td>
<td>0.29</td>
</tr>
<tr>
<td>Domar 1990</td>
<td>UCT</td>
<td>54, N/A</td>
<td>Before and after intervention</td>
<td>N/A</td>
</tr>
<tr>
<td>Oron 2015</td>
<td>UCT</td>
<td>49, N/A</td>
<td>Before and after intervention</td>
<td>N/A</td>
</tr>
<tr>
<td>Valoriani 2014</td>
<td>NRCT</td>
<td>45, 75</td>
<td>At baseline and after 3 months</td>
<td>0.19</td>
</tr>
</tbody>
</table>

NRCT: non-randomized controlled trial, RCT: randomized controlled trial, UCT: uncontrolled trial, N/A: not applicable
4 studies found significant decrease in depression

<table>
<thead>
<tr>
<th>Author year</th>
<th>Study design</th>
<th>Number of participants</th>
<th>Scale</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galhardo 2013</td>
<td>NRCT</td>
<td>55/37</td>
<td>BDI</td>
<td>T1:11.02 +/-7.1, T2 6.18 +/-4.05; p&lt;.001</td>
</tr>
<tr>
<td>Oron 2015</td>
<td>UCT</td>
<td>49/ NA</td>
<td>BDI</td>
<td>T1:7.77 +/-5.97, T2:5.26 +/-3.9; p&lt;.001</td>
</tr>
<tr>
<td>Valoriani 2014</td>
<td>NRCT</td>
<td>45/75</td>
<td>EDS</td>
<td>T1:9.27 +/-5.50, T2:6.60 +/-4.77; p&lt;.001</td>
</tr>
<tr>
<td>Psaros 2016</td>
<td>UCT</td>
<td>51/NA</td>
<td>BDI</td>
<td>T1:17.9 +/-1.2, T2:10.1 +/-1.3; p&lt;.001</td>
</tr>
</tbody>
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Beck Depression Inventory (BDI), Edinburgh Depression Scale (EDS)
2 studies demonstrated significant improvement in pregnancy rate after intervention

A study showed a non-significant increase in pregnancy rate

2 studies showed no difference in pregnancy and implantation rates

<table>
<thead>
<tr>
<th>Author year</th>
<th>Pregnancy rate Experimental group (%)</th>
<th>Pregnancy rate Control group (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li 2016</td>
<td>45</td>
<td>26</td>
<td>0.04</td>
</tr>
<tr>
<td>Domar 2011</td>
<td>52</td>
<td>20</td>
<td>0.05</td>
</tr>
<tr>
<td>Chan 2006</td>
<td>28</td>
<td>15</td>
<td>0.07</td>
</tr>
<tr>
<td>Chan 2011</td>
<td>30</td>
<td>24</td>
<td>0.3</td>
</tr>
<tr>
<td>Kim 2014</td>
<td>65</td>
<td>46</td>
<td>0.16</td>
</tr>
</tbody>
</table>
QUALITY OF LIFE

- A significant increase was found in FertiQol score for 2 studies and in the WHO well-being scores for 1 study
- 2 studies showed also improvement on marital satisfaction after intervention (Sharg 2016, Chan 2011)

<table>
<thead>
<tr>
<th>Author year</th>
<th>T1</th>
<th>T 2</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FertiQol score</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Li 2016</td>
<td>59.04 +/-14.94</td>
<td>71.72 +/-11.43</td>
<td>0.002</td>
</tr>
<tr>
<td>Oron 2015</td>
<td>55.4 +/-14.3</td>
<td>64.7 +/-15.3</td>
<td>0.027</td>
</tr>
<tr>
<td><strong>WHO wellbeing score</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sheratt 2013</td>
<td>8.89 +/-3.44</td>
<td>17.11 +/-2.15</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Petit BamBou

- Launch in January 2015
- 850k users, 850k FB fans
  - Free access to 8 meditation sessions
  - Freemium: monthly subscription to access the rest of the catalogue 5€/month
  - 440 guided meditations
  - new health section

https://www.petitbambou.com
Development of a new module: guided meditation for infertility

- Exploring your wish to have a baby
- When pregnancy takes longer than expected
- The female body
- A couple meditation
- The inner process
- Connecting to your inner resources
- Developing self-compassion
- Have a break
- Taming your fear
- Preparing for ART procedures
- A new life begins

Available in French in September 2017!

Frédérique TETTAMANTI (Mindfulness Instructor HUG) & Isabelle STREULI (Specialist in reproductive medicine) collaboration with petit Bambou
Take home message

- Mindfulness-based interventions could be useful in infertile women with a positive impact:
  - Anxiety
  - Depression
  - Pregnancy rate and quality of life
- Adapted programs
- E-tools