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Mindfulness as a Mediator of Psychological Wellbeing in a Stress Reduction Intervention for Cancer Patients - a randomized study

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Background

- Getting a cancer diagnose is a intensely stressful experience
- Many patients experience negative physical symptoms, emotional distress and decreased quality of life
- Common complaints are:
 - Anxiety
 - Depression
 - Post traumatic stress symptoms
 - Sleep disturbance
 - Fatigue

The effects of mindfulness on health conditions

- Mindfulness based interventions has been used for a number of health conditions such as:
 - Chronic pain
 - Anxiety
 - Depression
 - Sleep disturbance
- Research provides support for effects of mindfulness interventions on quality of life and psychological functioning

The effects of mindfulness interventions on cancer patients

- A couple of randomized trials
- Several non-randomised trials
- General conclusion:
 - improved psychological functioning, reduction of stress symptoms, enhanced coping and wellbeing
 - More research in the area is needed

Mindfulness meditation

- The most frequently studied intervention is the Mindfulness-Based Stress Reduction (MBSR) program developed by Jon Kabat-Zinn at the University of Massachusetts Medical Centre
- It is a structured educational and skill-based intervention
- 8 weekly sessions and an additional intensive silent retreat
- Participants are encouraged to practice meditation daily during the program period
- Main components:
 - self-regulation of awareness towards present mental states and processes
 - non-evaluative openness and acceptance towards moment-to-moment experiences

Mindfulness meditation, continued

- In all mindfulness exercises, participants are instructed to focus attention on breathing (or walking) and to be aware of it in each moment. When emotions, sensations, or cognitions arise, they are observed non-judgmentally
- An important consequence of mindfulness practice is to realise that most sensations, thoughts and emotions fluctuate and just pass by

Study aim

- To study the effect of mindfulness meditation training on:
 - Perceived stress
 - Depression
 - Anxiety
 - Postive states of mind
 - Post-traumatic stress symptoms
- To study the mediating effect of mindfulness skills on these outcomes

Method

Intervention

- A modified version of the original MBSR program
- Eight weekly 2 hours group sessions (8 – 10 participants)
- Theoretical, experiential and group exercises
- The theoretical foundations of mindfulness are taught as a complement to exercises
- Meditation is trained in class and at home
- Training involves body scan meditation, sitting and walking meditation and hatha yoga
- Participants were encouraged to practice meditation 6 days a week at home using an instruction tape

Method

Study design

- A randomized design was used with a waiting-list control condition
- The study was open to patients with varying cancer diagnoses.
- Participant were recruited through advertisement and e-mail list announcement through cancer patient organizations
- Eligible patients were randomized to either intervention group or waiting-list control group
- The waiting-list participants was scheduled to participate in the mindfulness training program after approximately 6 months
- Assessments were done at baseline and at 3 and 6 month after baseline
- The current analysis is based on the results collected among the 60 patients recruited to the study that got randomized and also successfully filled out and returned the baseline and three-month follow-up questionnaires

Method

Measures

- Perceived Stress Scale (PSS) – The PSS is a ten item scale measuring perception of stressful experiences during the past month
- Hospital Anxiety and Depression Scale (HADS) – a 15 item scale measuring anxiety and depression
- Positive States of Minds (PSOM) – The PSOM is a six item scale measuring different positive emotional and cognitive experiences
- Impact of Event Scale (IES) – a 15 item scale measuring the impact of stressful life events with three subscales: intrusive thinking, avoidance, and hyperarousal
- Five facet mindfulness questionnaire (FFMQ) – a previously tested and validated scale to assess changes in ability to perform mindful attention

Method

Five facet mindfulness questionnaire (FFMQ; Baer, 2006)

- 39 item scale measuring five dimensions of mindfulness
- Developed after exploratory and confirmatory factor analysis of items from several different mindfulness scales

A five factor model showed the most satisfying results:

- **Observing**
- **Describing**
- **Act with awareness**
- **Non-judging** of inner experiences
- **Non-reactivity** to inner experiences

Results

Descriptives

- All patients except one were women
- 46 had breast cancer, 7 gynecological cancer, 5 lymphatic cancer, 1 pancreatic cancer, and 1 had cancer in the neck
- Eight patients had received their diagnosis within the last year, 32 patients between 1 and 2 years ago, and 20 patients had been diagnosed with cancer more than 2 years ago

Results

Descriptive analysis and randomization check

- The mean age was 52.2 years (SD=9.40)
- 36 of the participants (60.0%) had at least a bachelor degree
- 25 participants (41.7%) had full or part-time employment
- 23 participants (38.3%) used antidepressants

- There were no significant differences between the intervention and control group concerning age, education, work status, or use of antidepressants
- No differences were found on any of the psychological outcome variables perceived stress, depression, anxiety, positive states of mind, post traumatic stress symptoms, or mindfulness

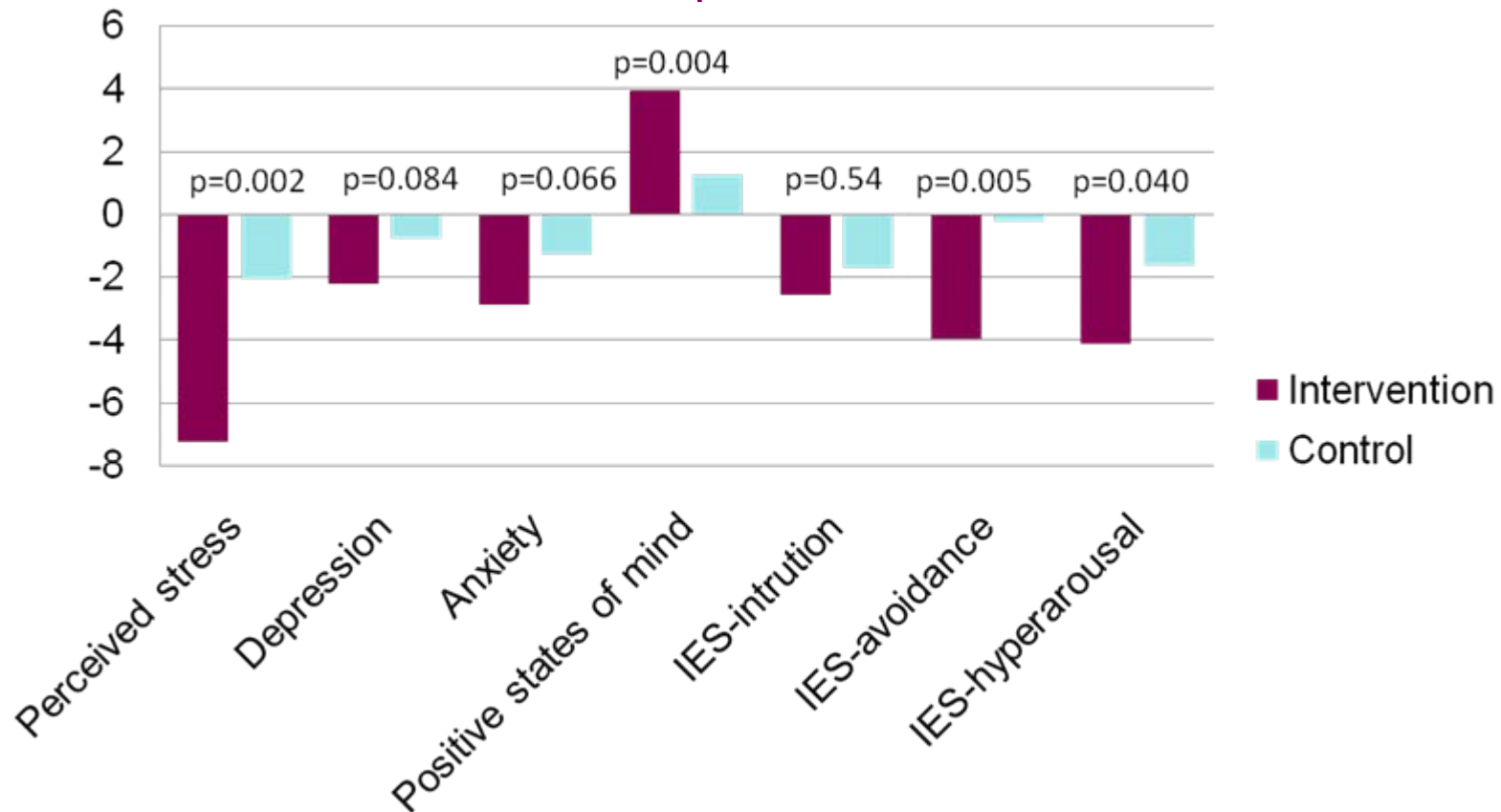
Results

Change in psychological distress and positive states of mind

- A multivariate analysis with baseline and follow-up on psychological outcomes showed a significant time × group interaction effect
- The intervention group reported a larger reduction of psychological distress and increase in positive states of mind than the control group

Results

Change scored for psychological outcome variables between baseline and 3 month follow-up



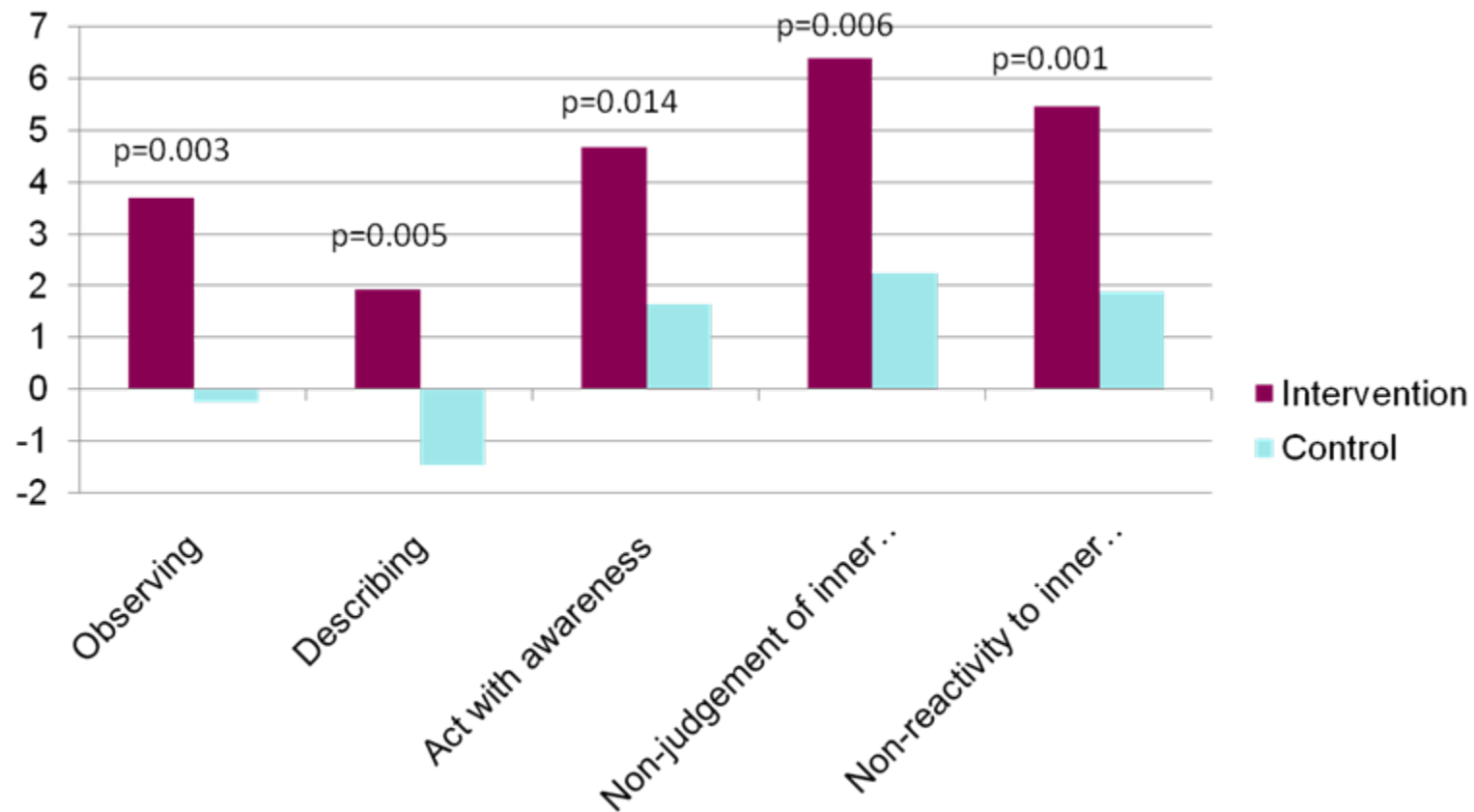
Results

Change in mindfulness

- A multivariate analysis with baseline and follow-up on mindfulness subscales showed a significant effect for the time × group interaction
- The intervention group reported a larger increase on mindfulness subscales than the control group

Results

Change scores on the five subscales of mindfulness from baseline and 3 month follow-up



Results

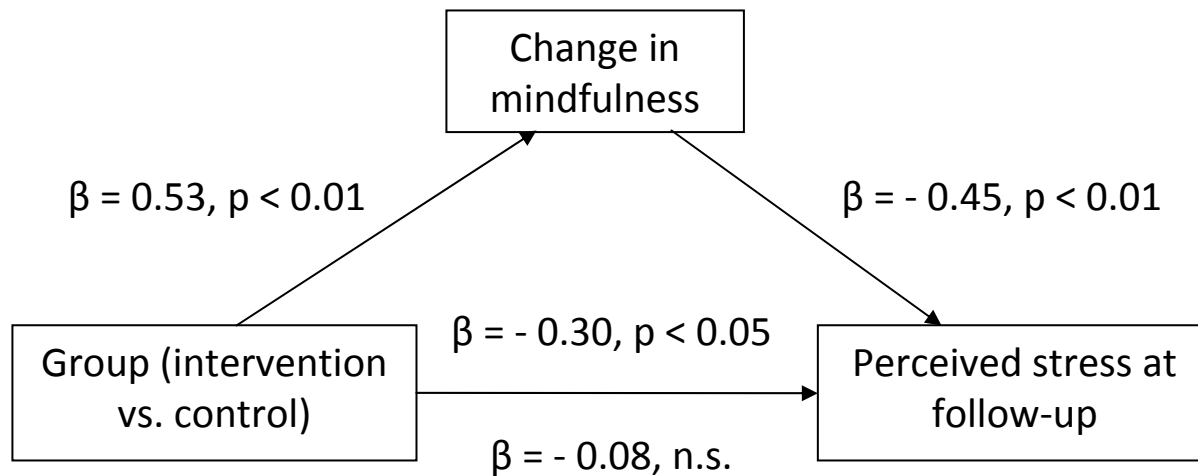
Correlation between change in mindfulness and changes in psychological wellbeing

	Δ Total mindfulness score	Δ observing	Δ describing	Δ non-judging of inner experience	Δ non-reactivity to inner experience	Δ acting with awareness
Δ Perceived stress	-0,54***	-0,20	-0,41***	-0,36**	-0,55***	-0,36**
Δ Depression	-0,40***	-0,16	-0,25	-0,28*	-0,41***	-0,32*
Δ Anxiety	-0,36**	-0,06	-0,38**	-0,23	-0,32*	-0,26*
Δ Positive states of mind	0,52***	0,39**	0,41***	0,33*	0,40**	0,28*
Post-traumatic stress symptoms:						
Δ IES-Intrusion	-0,17	-0,03	-0,16	-0,07	-0,29*	-0,07
Δ IES-Avoidance	-0,49***	-0,14	-0,37**	-0,44***	-0,39**	-0,33**
Δ IES-Hyperarousal	-0,30*	-0,06	-0,23	-0,13	-0,35**	-0,33**

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

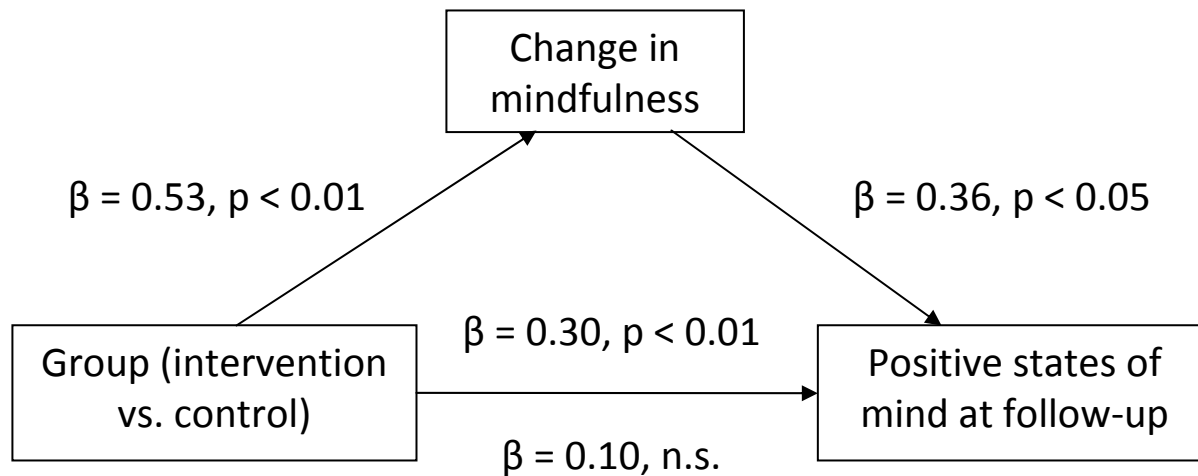
Results

The effect of mindfulness as a mediator



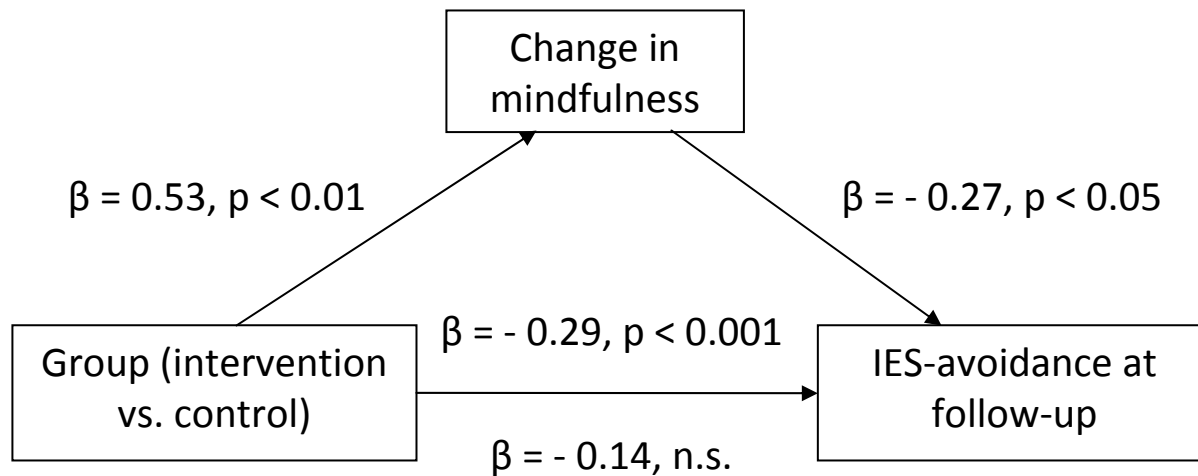
Results

The effect of mindfulness as a mediator



Results

The effect of mindfulness as a mediator



Summary

- Mindfulness training seems to:
 - Reduce perceived stress
 - Increased positive states of mind
 - Reduce post traumatic avoidance symptoms
 - Reduce post traumatic hyperarousal symptoms
- Mindfulness training seemed to increase mindfulness and different dimensions of mindfulness as measured with the FFMQ
- Change in mindfulness mediated the relationship between intervention participation and:
 - Perceived stress
 - Positive states of mind
 - Post traumatic avoidance symptoms

Conclusions

- The present study indicates that the improvements in psychological wellbeing resulting from mindfulness stress reduction training can be explained by increased levels of mindfulness
- This supports the use of mindfulness stress reduction training to increase wellbeing among cancer patients, and suggests a causal pathway in which the mindfulness training influences positive outcomes
- The study also gives support for the use of the FFMQ in the measurement of mindfulness as it shows that the scale is both sensitive to change over time, and to the development of mindfulness, as promoted by a mindfulness-based stress reduction program

Limitations and future directions

- Participants were self-selected which might have generated a group of highly motivated participants
- Our follow-up period was relatively brief
- The wait-list control design is limited as it is unclear what part of the intervention is actually influencing outcomes and a study design using an active placebo intervention would give stronger support for the specific effects of the mindfulness intervention
- The study also suffers from the limitations associated with self-report
- Future research could focus on understanding which specific elements of the mindfulness training influence particular sub dimensions of mindfulness and psychological outcomes
- Studies among patients with specific cancer diagnoses at particular times after diagnosis might clarify when and for whom mindfulness interventions are the most efficient.

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Results

Means and standard deviations of psychological outcome variables at baseline and 3 month follow-up

	Mindfulness intervention				Wait-list control				Change scores						
	Pre		Post		Pre		Post		Intervention		Control		Intervention effect		Effect size
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F(1,55)	p	d _{diff} ^a
Perceived stress	22.88	6.15	15.64	6.42	20.40	5.35	18.33	6.12	-7,24	6,80	-2,07	5,99	10.47	0.002	0.80
Depression	6.84	4.64	4.61	4.45	7.09	3.56	6.31	3.24	-2,23	3,25	-0,77	2,93	3.09	0.084	0.47
Anxiety	10.60	4.64	7.69	4.15	10.14	4.52	8.86	3.68	-2,91	4,11	-1,28	3,24	3.51	0.066	0.44
Positive states of mind	18.72	3.71	22.64	4.35	18.74	3.85	20.00	4.26	3,92	3,84	1,26	3,48	9.22	0.004	0.73
Post-traumatic stress symptoms:															
IES-Intrusion	12.72	5.88	10.15	4.35	15.17	6.55	13.43	6.78	-2,57	4,31	-1,74	5,34	0.38	0.54	0.17
IES-Avoidance	10.17	6.59	6.18	6.30	12.09	7.62	11.86	7.41	-3,99	4,73	-0,23	5,26	8.43	0.005	0.75
IES-Hyperarousal	9.56	5.43	5.44	4.73	10.77	5.76	9.11	5.58	-4,12	3,69	-1,66	4,45	4.42	0.040	0.60

^a The effect size was calculated based on the difference between the groups regarding baseline and follow-up change scores.

Results

Means and standard deviations of the five subscales of mindfulness at baseline and 3 month follow-up

	Mindfulness intervention				Wait-list control				Change scores				Intervention effect	Effect size	
	Pre		Post		Pre		Post		Intervention		Control				
Mindfulness subscales:	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F(1,55)	p	d _{diff} ^a
Observing	28.96	5.98	32.66	4.12	27.54	6.01	27.31	5.62	3,70	5,26	-0,23	4,49	9.41	0.003	0.80
Describing	27.66	7.77	29.60	8.05	28.27	7.92	26.83	8.50	1,94	4,80	-1,44	4,16	8.35	0.005	0.75
Act with awareness	24.03	6.78	28.72	6.02	20.31	6.52	21.97	6.39	4,69	4,76	1,66	4,54	6.44	0.014	0.65
Non-judgment of inner experiences	24.96	8.18	31.36	6.58	23.46	7.75	25.71	7.78	6,40	6,87	2,26	5,20	8.24	0.006	0.68
Non-reactivity to inner experiences	16.73	4.83	22.20	4.34	17.60	4.86	19.48	5.19	5,47	3,21	1,88	3,54	16.18	0.001	1.06

^a The effect size was calculated based on the difference between the groups regarding baseline and follow-up change scores.

Evidence for effects of mindfulness on other health conditions, continued

- A meta-analysis published in 2003 by Baer showed an average effect size of 0.59 for mindfulness interventions
- Mean effect sizes were similar for studies using pre-post and between-groups designs
- Mean effect size was somewhat larger when participants had been randomly assigned
- Studies using waiting-list control groups yielded slightly larger effect sizes than those using control groups treated as usual
- Mean effect sizes ranged from 0.31 for pain measures to 0.86 for measures of depression

The effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients Specia, M, Carlson, LE & Goodey, E et al. (2000)

- 90 patients, heterogeneous in type and stage of cancer
- Randomly assigned to either intervention or wait-list control group
- Intervention consisted of 7 weekly 90-minutes group sessions
- Outcome measures: Profile of mood states and Symptoms of stress inventory
- Results: Significant decrease in distress and stress symptoms
- Minutes of practice and number of sessions attended increased the effect
- Effects were maintained after 6 months (Carlson et al. 2001)

The efficacy of mindfulness-based stress reduction in the treatment of sleep disturbance in women with breast cancer

Shapiro, SL et al. (2003)

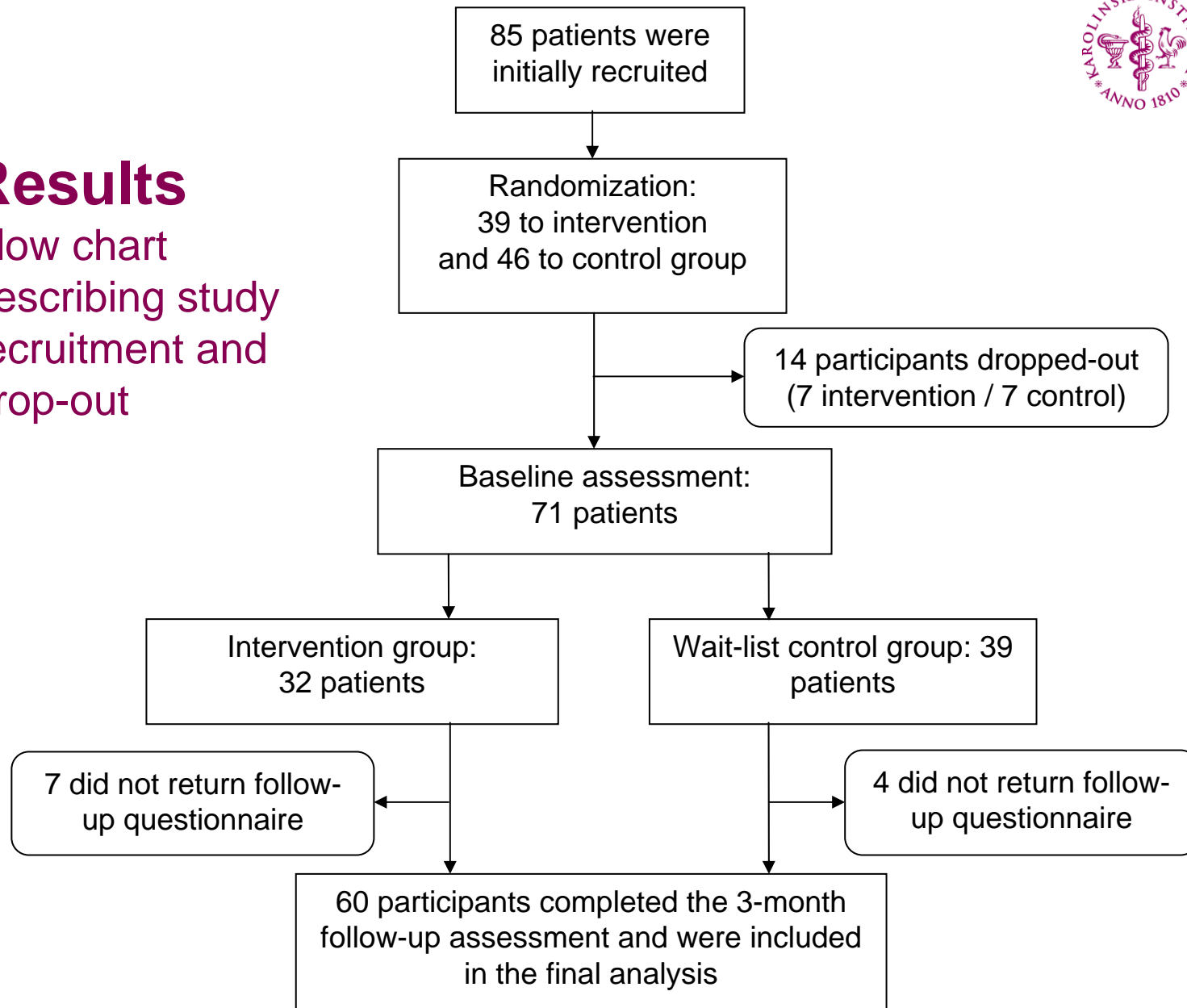
- 54 patients, women with stage II breast cancer
- Part of a larger randomised study
- Intervention consisted of 6 weekly 120 minute sessions + retreat
- Outcome measures: Sleep quality measures
- Results: Significant increase in sleep quality

Change in women's diet and body mass following intensive intervention for early-stage breast cancer Hebert, JR et al. (2001)

- 172 patients, women with stage I or II breast cancer
- Intervention consisted of either nutrition education, mindfulness training or usual supportive care
- Outcome measures: Dietary fat consumption and body mass
- Results: No decrease in dietary fat or body mass in mindfulness training group

Results

Flow chart
describing study
recruitment and
drop-out



Mindfulness meditation

How can mindfulness skills help?

- Exposure – Prolonged focus on and non-judgmental observations of a phenomena (e.g. pain, anxiety) may lead to desensitisation, with a reduction over time of the emotional responses or reactivity. Fear and avoidant behaviour might diminish with prolonged non-judgmental observation of current thought and emotions
- Cognitive change – the non-judgmental, decentred view of one's thoughts encouraged by mindfulness training may interfere with negative patterns of thoughts characteristic of depressive episodes
- Self-management – Improved self-observation, resulting from mindfulness training, may promote use of a range of coping skills e.g. awareness of early signs of a problem like depression or urge to binge eat

Mindfulness meditation

How can mindfulness skills help?

- Relaxation – Relaxation is not a primary target for mindfulness meditation but may be a result of mindfulness exercises. Relaxation might have a beneficial effect on stress-related conditions
- Acceptance – Mindfulness meditation includes acceptance of pain, thoughts, feelings, urges, or other bodily, cognitive, and emotional phenomena, without trying to change, escape, or avoid them