Validation of the Factor Structure of the Five Facets of Mindfulness Questionnaire in men diagnosed with advanced prostate cancer

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Key Points

- The Five Facets of Mindfulness Questionnaire (FFMQ) has been widely used for patients with non-communicable disease, including cancer, but not validated with this population.
- Study purpose was to validate the factor structure of the FFMQ in men with advanced prostate cancer.
- Confirmatory factor analysis showed poor model fit for the original five facets.
- Exploratory factor analysis showed a six-factor solution (53.2% variance explained) in which ‘Act with awareness’ separated into two facets; one reflecting awareness and the other focussed attention.
- Further research is needed to confirm these findings and establish stability of the FFMQ structure in cancer populations.

Keywords: Mindfulness, Prostate Cancer, Validity, Five Facets of Mindfulness Questionnaire, Factor Analysis

Introduction

Mindfulness interventions are increasingly popular in cancer care, emerging in both literature and practice [1, 2]. Evidence suggests mindfulness is helpful for women diagnosed with breast cancer [1] but this may not be the case in other settings [3]. In order to understand when, how, and which mindfulness skills promote effective coping with cancer, well-validated measures are needed.

The Five Facets of Mindfulness Questionnaire (FFMQ) [4] is a self-report measure of engagement in mindfulness practices. The five facets include: observing or noticing ones' reaction; ability to describe this reaction; acting with awareness; non-judging of inner experience; non-reactivity to inner experience. The FFMQ was originally validated with university students [4], and is widely used to measure mindfulness for patients with non-communicable disease (depression [5]), including cancer [1, 2]. However, these studies over-represent women with breast cancer; present a factor structure which differs in clinical populations from that originally proposed [5]; and none examine construct validity of the FFMQ in cancer populations. Accordingly, we validated the FFMQ using confirmatory factor analysis (CFA) in men diagnosed with advanced prostate cancer (PCa).

Method

Baseline data were obtained (pre-trial commencement) from 190 Australian men diagnosed with metastatic PCa or castration-resistant biochemical progression participating in a randomised controlled trial of a mindfulness intervention [3]. Participants gave written informed consent. Griffith University and participating hospitals granted ethics approval. Men were mean age 70.8 years (SD=8.7); 75% married/de-facto; 66% university/college educated; 68% retired; mean 6 years since diagnosis (SD=4.9). Men completed FFMQ, Brief Symptom Index, Functional Assessment of Cancer Therapy-PCa and Impact of Events scales. Full trial details are reported elsewhere [3, 6].

CFA with maximum likelihood estimation was conducted using AMOS 22.0. Good model fit criteria were: non-significant chi-square, comparative fit index (CFI) >0.9 ; standardised root mean square residual (SRMR) and residual mean square error of approximation (RMSEA) ≤ 0.08 [7]. Akaike Information Criterion (AIC) compared fit across models; lower scores indicate better fit [8]. Exploratory factor analysis (EFA) (maximum likelihood with oblimin rotation allowing correlation between factors [7]), and Kaiser normalization examined the structure solution best representing the data.

Results

Preliminary checks confirmed data were factorable (Bartlett's test of sphericity=4075.78, $df=741$, $p<0.05$; Kaiser-Meyer-Olkin measure of sampling adequacy=0.87; communalities >0.30). Both the five-factor model and alternative hierarchical five-factor model proposed by Baer [4] were tested and proved to be a poor fit (Table 1).

The EFA produced an eight-factor solution initially, but Cattell's scree test and eigenvalues >1 indicated a six-factor solution. A second EFA constrained the analysis to six-factors (53.2% total variance; Table 2) which broadly replicated the FFMQ, except 'Act with awareness' emerged as two separate factors. One factor contained items reflecting being on auto-pilot which if reverse scored (as per original scale scoring) is consistent with the original 'Act with awareness' facet. The second factor contained items reflecting distraction which if reverse scored represents attention (*Focused attention*). This structure was replicated 9-months post-trial completion (except item 36 which loaded onto the Observing factor).

Factors had adequate to good internal consistency (Table 2). Mindfulness facets showed small to moderate significant correlations between factors ranging from $r=0.03$ (*Focused attention* and Non-reactivity) to $r=0.56$ (Act with awareness and *Focused attention*). Bivariate correlations indicated small to moderate significant correlations between

factors (except Non-reactivity). Significant correlations between factors, general and cancer-specific distress (negative correlation), and QoL (positive correlation) support convergent and divergent validity (Table 1), and concur with Baer [4].

Discussion

We replicated the original FFMQ factor structure [4] with the exception that a six-factor model emerged dividing ‘Act with awareness’ into two facets. The first, *Focused attention*, contained items representing a person’s capacity to be easily distracted and differed from the second facet, which included the remaining ‘Act with awareness’ items reflecting a person’s tendency to operate on auto-pilot. This finding converges with cognitive psychological research in which awareness and attention are proposed as different mental processes (a person can be aware of a stimuli but it may not have their full attention) [9]. One implication of this finding is that mindfulness interventions may need to target these distinct variables. Chambers et al. [6] found that acting with awareness correlated with higher health-related quality of life and lower psychological distress for men in the current study. Further research is needed to establish if these outcomes relate to acting with awareness as well as focused attention, in order to determine on which facet(s) to intervene effectively.

Critical factors underlying and interacting with mindfulness may also differ for men and women (ability to identify and experience emotions) [2]; older adults may display higher levels of trait mindfulness (awareness of emotions/sensations without judgement) than younger adults [10]; and engagement with mindfulness may differ with illness or meditation experience [5]. Given the FFMQ was originally validated with predominantly young, female university students, who were inexperienced meditators [4], this study suggests the structure obtained may not be generalizable to male cancer populations. However, study limitations including the moderate sample size (within acceptable guidelines [7]), and non-assessment of meditation experience are noted.

Better understanding of the relationship between mindfulness skills and cancer-related distress is needed and well-validated measurement is critical to achieve this. Further research validating the FFMQ structure in cancer populations will enable researchers and clinicians to confidently and accurately assess the mechanisms underpinning the effects of mindfulness interventions.

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Table 1. Confirmatory factor analysis testing model fit of the FFMQ (n=175)

Model	$\chi^2(df)^*$	CMIN/DF	CFI	SRMR	RMSEA	AIC
Five-factor	1654.25(692)	2.39	.74	.17	.09	1830.25
Five-factor hierarchical	2922.10(702)	4.16	.39	.29	.13	3078.10

CMIN/DF=chi-square/df ratio.

*All χ^2 statistically significant $p<0.001$

Table 2. Factor loadings of FFMQ items and correlations of factors with distress and QoL

FFMQ Items	Non-reactivity (F1)	Observing (F2)	Focused attention (F3)	Act with Awareness (F4)	Describing (F5)	Non-judging (F6)
19...“step back”/aware of thought/image without taking over.	.543					
21...pause without reacting.	.500					
24...feel calm after distressing thoughts/images.	.524					
29...notice distressing thoughts/images without reacting.	.840					
33...notice distressing thoughts/images and let go.	.640					
1...notice sensations of body.		.567				
4...perceive emotions without reacting.		.388				
6...stay alert to sensations on body.		.608				
9...watch feelings without getting lost in them.		.331				
11...notice foods/drinks affecting thoughts/sensations/emotions.		.395				
15...pay attention to sensations.		.783				
20...pay attention to sounds.		.647				
26...notice smells/aromas.		.485				
31...notice visual elements.		.461				
5...do things...mind wanders/distracted.			.738			
8...don't pay attention doing because daydreaming/worrying/distracted.			.635			
13...easily distracted.			.810			
18...difficulty focusing on present.			.475			
23...“running on automatic” without awareness of doing.				.584		
28...rush activities without being attentive.				.507		
34...do jobs/tasks automatically without awareness.				.879		
38...do things without attention.				.709		
2...good at describing feelings.					.702	
7...easily put beliefs/opinions/expectations into words.					.701	
12...hard to describe thoughts.					.489	
16...trouble expressing feelings.					.582	
22...difficulty describing sensations.					.375	
27...when upset, can put into words.					.478	
32...tendency to put experiences into words.					.777	
37...can describe feelings in-detail.					.728	

3...criticize irrational/inappropriate emotions.						.452
10...tell myself shouldn't feel this way.						.724
14...believe thoughts abnormal/bad.						.625
17...judge thoughts good/bad.						.715
25...tell myself shouldn't think this way.						.675
30...think emotions bad/inappropriate.						.780
35...have distressing thoughts/images, judge myself good/bad.						.712
36...pay attention to emotions affecting thoughts/behavior.						.323
39...disapprove irrational ideas.						.707
α	0.80	0.81	0.90	0.83	0.86	0.88
Pearson's Correlations between Mindfulness Facets and Baseline Outcome Measures	F1	F2	F3	F4	F5	F6
BSI	-.11	.20*	-.56*	-.46*	-.33*	-.62*
FACT-PCa	.12	-.15*	.48*	.40*	.34*	.51*
IES	-.02	.22*	-.47*	-.42*	-.31*	-.59*

F=factor. Items with minimum loadings of 0.30 are displayed.

Items loading onto two factors were assigned based on the highest loading.

Bolded items correspond to item loadings on Baer's [4] original five facets.

*=p<.05