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Factors Related to Cancer Patients' Willingness to Participate in an iPod-based MBSR Intervention

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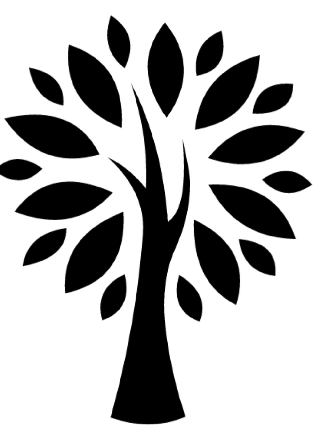

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ABSTRACT

BACKGROUND:
Studies suggest mindfulness-based stress reduction (MBSR) interventions may improve the mental health of cancer patients. It remains unclear, however, which cancer patients are willing to participate in MBSR interventions.

HYPOTHESIS:
We explored differences in demographic, medical, psychosocial, and biological characteristics between non-small cell lung cancer (NSCLC) patients (n = 65) who opted to participate and completed an MBSR intervention (n = 26), agreed to participate but did not complete the intervention (n =19), and those who declined the intervention (n = 20).

METHODS:
NSCLC patients provided demographic, psychosocial, medical, and biological information. Participants were presented with the opportunity to partake in an at home, iPod-based intervention involving a cancer-specific audio version of MBSR.

RESULTS:
A one-way ANOVA revealed a significant difference in diurnal cortisol slopes between the groups (p = .037). Patients who declined the intervention had flatter diurnal cortisol slopes than those who completed the intervention, as determined by a Dunnett's T3 post-hoc analysis. Although the Chi-square test between intervention status and lung cancer stage was not significant, 75% of those who declined the intervention had received a late-stage (III or IV) diagnosis. The Chi-square test between intervention status and current chemotherapy status revealed a significant difference between groups (p = .05). Forty two percent of those who declined the intervention were actively receiving chemotherapy, while 80% of those who completed the intervention were not receiving chemotherapy at the time. No other significant group differences emerged. Secondary analyses revealed a significant difference in mean depression scores between patients who were receiving chemotherapy and patients who were not receiving chemotherapy (p = .018).

CONCLUSIONS:
These results demonstrated statistically significant differences in diurnal cortisol slopes between NSCLC patients who opted to complete an MBSR intervention and those who declined to participate. These results suggest diurnal cortisol slope has a role in willingness to participate in an MBSR intervention, possibly due to the associated status of current chemotherapy treatment and related depressive symptoms, although more research is needed to clarify this relationship.

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INTRODUCTION

- Both mobile and mindfulness-based interventions (MBI's) have become more widely used to treat psychosocial and behavioral health concerns among medically ill populations, including cancer patients.[1]
- Evidence suggests mobile mindfulness-based stress reduction (MBSR) interventions specifically, a type of MBI, may be feasible, acceptable[2] as well as efficacious[3] in decreasing psychological symptoms and improving quality of life, improvements that were maintained for at least 3 months.
- However, it remains unclear which patients are willing to participate in MBI's.
- One study demonstrated that breast cancer survivors who were willing to participate in an MBSR intervention were younger, had received a diagnosis further from the intervention, and were more likely to utilize psychology sessions than those who declined. [5]
- To expand on this work among lung cancer patients, we explored demographic, medical, psychosocial, and biological factors related to patients' willingness to participate in a mobile MBSR intervention.

METHODS

Procedure

- Non-small cell lung cancer (NCSLC) patients (N =65) were recruited from the Brown Cancer Center during a scheduled appointment with the assistance of collaborating physicians.
- Once eligible patients were screened and had provided informed consent, participants reported on demographic and medical factors and provided a blood draw for immune assessment.
- Participants were provided with materials and instructions for 10 days of at home collection of saliva for cortisol assessment, actigraphy data, and psychosocial factors.
- Upon the return of the at home data collection materials, participants were re-introduced to the intervention.
- Willing participants were provided with an iPod containing a version of MBSR with cancer-specific content and a log to track listening behavior and were instructed to listen for 30 minutes per day, five days per week.

Statistical Analyses

- One-way ANOVAs and Chi-square tests were performed to explore demographic, medical, psychosocial, and biological differences between patients who declined participation, agreed to participate but did not complete the intervention, and completed the intervention on continuous and categorical variables, respectively.
- Secondary t-tests were conducted to explore factors associated with active versus inactive treatment status.

Table 1. *Patient Demographic and Medical Characteristics.*

	Declined Participation		Agreed/Did Not Complete		Agreed/ Completed		Total	
N	20	30.8%	19	29.2%	26	40.0%	67	100.0%
Gender								
Male	6	10.0%	6	10.0%	7	11.7%	19	31.7%
Female	9	15.0%	13	21.7%	19	31.7%	41	68.4%
Race/Ethnicity								
White	8	17.8%	11	24.4%	15	33.3%	34	75.5%
Black or African American	3	6.7%	3	6.7%	2	4.4%	8	17.8%
Hispanic or Latino	0	0.0%	0	0.0%	1	2.2%	1	2.2%
Asian or Asian American	1	2.2%	0	0.0%	0	0.0%	1	2.2%
Other	0	0.0%	1	2.2%	0	0.0%	1	2.2%
Stage								
I	4	6.2%	6	9.2%	4	6.2%	14	21.6%
II	1	1.5%	2	3.1%	4	6.2%	7	10.8%
III	7	10.8%	10	15.4%	11	16.9%	28	43.1%
IV	8	12.3%	1	1.5%	7	10.8%	16	24.6%
Early stage	5	7.7%	8	12.3%	8	12.3%	23	32.3%
Late stage	15	23.1%	11	16.9%	18	27.7%	44	67.7%
Annual Household Income								
< $15,000 - $49,999	11	20.8%	13	24.6%	14	26.4%	38	71.8%
$50,000 - $149,999	2	3.8%	4	7.6%	8	15.1%	14	26.5%
$150,000- $249,999	1	1.9%	0	0.0%	1	1.9%	2	3.8%
Active Treatment Status:								
Chemo currently								
Yes	6	10.5%	10	17.5%	5	8.8%	21	36.8%
No	8	14.0%	8	14.0%	20	35.1%	36	63.1%
Radiation currently								
Yes	0	0.0%	2	3.4%	1	1.7%	3	5.1%
No	14	24.1%	16	27.6%	25	43.1%	55	94.8%

RESULTS

- A one-way between subjects ANOVA revealed a significant difference in log transformed diurnal cortisol slopes between the groups [F (2,48) = 3.55, *p* = .037; *Figure 1*].
- Patients who declined the intervention (M = -.02, SD =.05) had flatter diurnal cortisol slopes than those who completed the intervention (M = -.09, SD =.07), as determined by a Dunnett's T3 post-hoc analysis (*Figure 2*).
- Although the Chi-square test between intervention status and lung cancer stage was not significant, 75% of those who declined the intervention had received a late-stage diagnosis (stage III or IV).
- A Chi-square test between intervention status and current chemotherapy status revealed a significant difference between groups χ^2 (2, *N*= 60) = 5.974, *p* = .05. Forty two percent of those who declined the intervention were actively receiving chemotherapy, whereas 80% of those who completed the intervention were not.
- Secondary analyses revealed a significant difference in mean depression scores between patients actively receiving chemotherapy (M = 19.09, SD = 9.19) and those who were not (M = 12.89, SD = 9.35); t(56) = -2.439, *p* = .018.

Table 2. *Measures and One-way ANOVA results.*

	df	SS	MS	F	p
Demographics					
Age at Diagnosis	2	29.68	14.84	0.189	0.828
Gender†	-	-	-	-	-
Race/Ethnicity	2	3.384	1.692	1.699	0.194
Education	2	0.017	0.009	1.604	0.21
Income	2	28.949	14.474	1.349	0.268
Pack Years	2	545.152	272.576	0.538	0.588
Medical					
Cancer Stage†	-	-	-	-	-
Karnofsky Rating	2	179.25	89.625	0.365	0.696
Psychosocial					
Positive Affect (PANAS)	2	16.514	8.257	0.11	0.896
Negative Affect (PANAS)	2	337.743	168.871	2.753	0.073
Cancer-Specific Distress (IES-R)	2	220.224	110.112	0.506	0.606
Coping (B-COPE)					
Denial	2	0.023	0.011	0.319	0.729
Behavioral Disengagement	2	0.039	0.02	0.799	0.455
Mindfulness (FFMQ)	2	204.576	102.288	0.581	0.563
Optimism (LOT-R)	2	0.598	0.299	0.016	0.984
Fatigue (FSI)	2	509.351	254.676	0.305	0.738
Anxiety (GAD-7)	2	16.303	8.151	0.351	0.705
Depressive Symptoms (CES-D)	2	57.085	28.542	0.278	0.758
Symptom Distress (SDS)	2	20.366	10.183	0.225	0.8
Adjustment (MINI-MAC)					
Helplessness/Hopelessness	2	0.059	0.03	0.139	0.87
Anxious Preoccupation	2	0.203	0.101	0.203	0.817
Cognitive Avoidance	2	0.439	0.22	0.399	0.673
Fatalism	2	1.192	0.596	1.979	0.148
Health Behavior (HPLP-II)	2	0.22	0.011	0.06	0.942
Biological					
Actigraphy					
Daytime Sedentariness	2	0.031	0.015	0.159	0.854
Nighttime Restfulness	2	0.242	0.121	1.006	0.373
Rest/Activity Rhythm	2	0.012	0.006	1.358	0.267
Salivary Cortisol					
Diurnal Cortisol Mean	2	0.634	0.317	1.383	0.26
Diurnal Cortisol Slope	2	0.037	0.018	3.547	0.037*
Immune Markers					
IL10	2	2.809	1.404	1.330	0.273
IL12	2	3.81	1.905	2.22	0.12
IL13	2	2.212	1.106	0.669	0.518
Il17a	2	1.174	0.587	0.952	0.393
IL1b	2	2.593	1.297	1.318	0.277
IL5	2	3.838	1.919	1.41	0.289
IL6	2	2.339	1.17	1.206	0.309
IL7	2	0.821	0.411	0.647	0.528

*= significant at p<.05 †= dichotomous variable, tested with χ^2

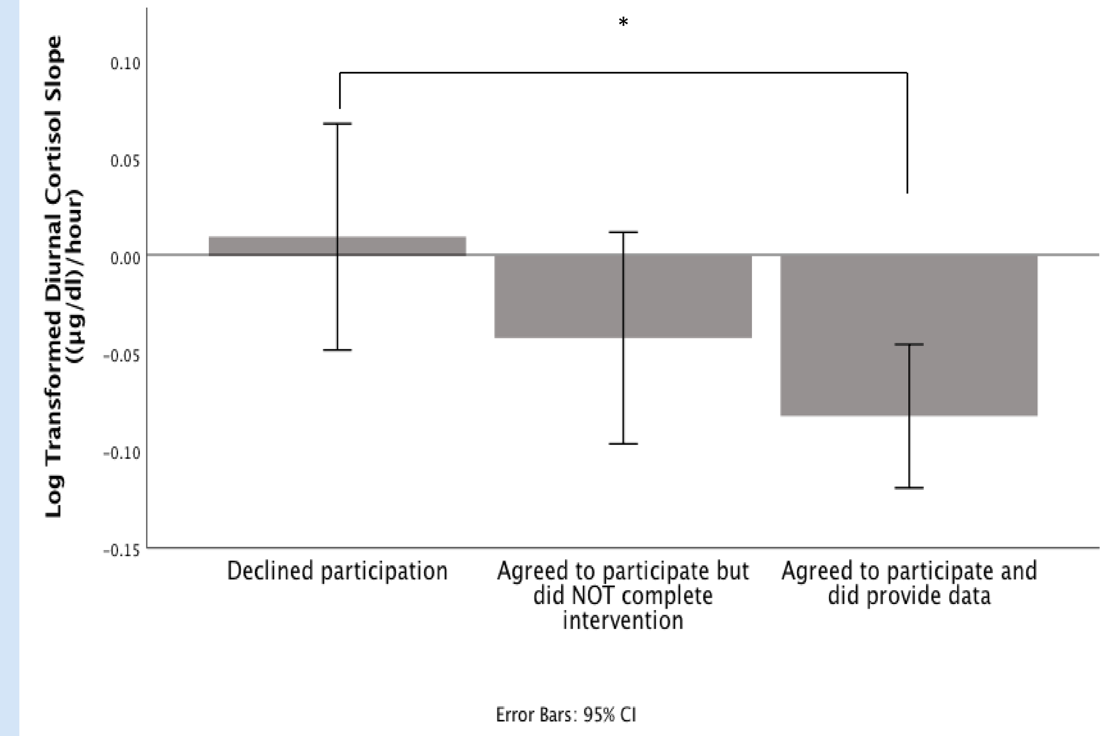

Figure 1. Differences in log transformed diurnal cortisol slopes across groups.

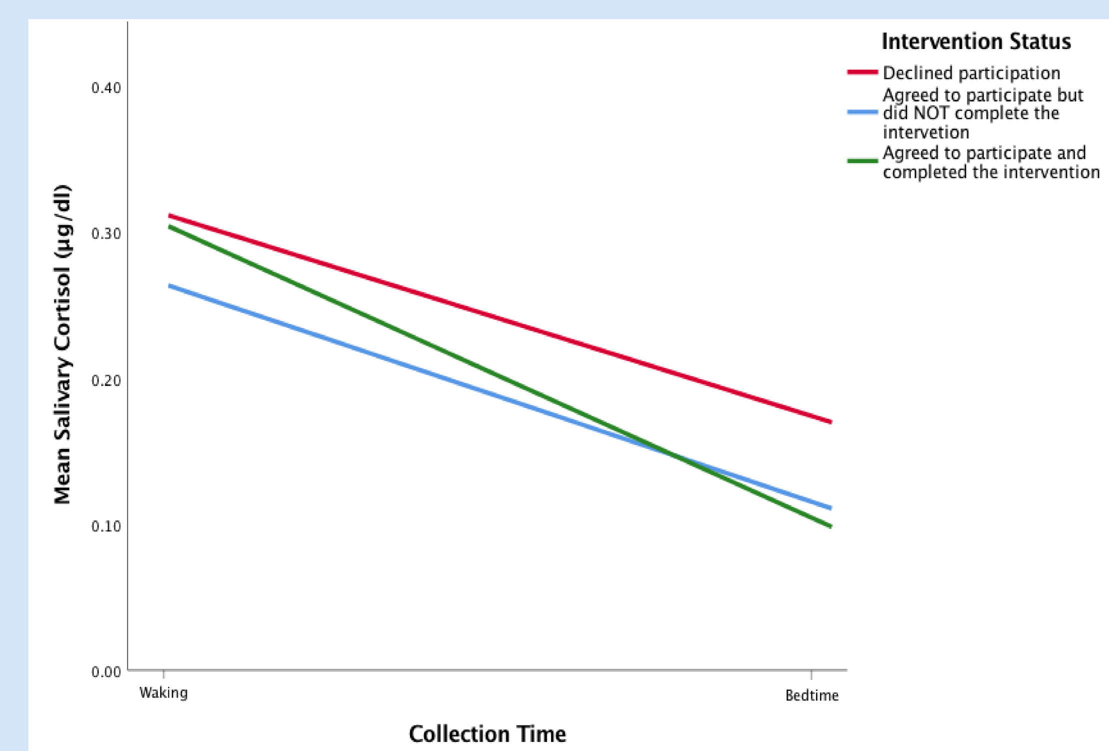

Figure 2. Diurnal cortisol slopes by intervention status.

DISCUSSION

- Given the opportunity to participate in a mobile MBSR intervention, NSCLC patients with flatter diurnal cortisol slopes were more likely to decline, whereas patients with steeper diurnal cortisol slopes were more likely to complete the intervention.
- Further, patients actively receiving chemotherapy during study enrollment were more likely to decline the intervention and were significantly more depressed than those who were not receiving chemotherapy.
- Interestingly, no other factor tested differentiated intervention group status.
- These results suggest diurnal cortisol profiles may play a role in patients' willingness to participate in mobile MBI's, particularly during chemotherapy when greater depressive symptoms were reported.
- Dysregulated cortisol profiles are reflective of poor neuroendocrine function[6], have been strongly linked to depression[7], and are prognostic of shorter survival in lung cancer[8].
- Thus, it seems diurnal cortisol profiles may be more strongly related to psychosocial behavior, including willingness to engage in supplementary interventions than indicators of physical or psychological health individually.
- Although chemotherapy poses significant physical and psychological challenges for the patient, these data suggest patients may be too burdened during active treatment to engage in supplementary stress-reduction interventions, even when the intervention is mobile.
- Future research should test the benefits of MBI's with respect to diurnal cortisol slope regulation as well as other physical and psychological symptom alleviation, including depression, among patients who are both receiving and not receiving chemotherapy.

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