


# Exploring Knowledge, Attitudes, and Practice Associated With Meditation Among Patients With Melanoma

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## Abstract

**Aim:** To explore the knowledge, attitudes, and practices associated with meditation among people with melanoma and investigate the relationship between perceived stress, trait mindfulness, and meditation. Factors associated with interest to participate in an online meditation program were also explored. **Methods:** A survey-based cross-sectional study of 291 patients attending a melanoma outpatient clinic assessed knowledge of meditation, attitudes toward meditation using Determinants of Meditation Practice Inventory (DMPI), and meditation experience. Perceived stress and trait mindfulness were measured using the Perceived Stressed Scale and Cognitive and Affective Mindfulness Scale, respectively. **Results:** Participants who had tried meditation (43%) were likely to be younger, female, and have completed higher education or be employed. Perceived stress score was higher among women, younger participants, and those treated in the past year but did not differ by melanoma stage. Participants reported a good understanding of the potential benefits of meditation, but even among people with meditation experience, common misconceptions prevailed. The main barrier to meditation was a perceived lack of knowledge about meditation. Higher DMPI scores were associated with lower education, moderate to low access to service centers, or living in disadvantaged neighborhoods. Participants practicing meditation that involved self-reflection reported less stress and higher trait mindfulness compared with participants practicing another type of meditation. People interested in participating in an online meditation-based program reported higher perceived stress than those not interested. **Conclusion:** A meditation-based intervention teaching self-reflective practices, targeted at people with melanoma, may have the potential to assist them with managing their stress.

## Keywords

melanoma, cancer, meditation, self-reflection, perceived stress, trait mindfulness

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## Introduction

Melanoma affects more than 232 000 people worldwide.<sup>1</sup> The highest incidence occurs in Australia and New Zealand, with more than 46.9 and 50.8 per 100 000, respectively.<sup>2</sup> Early-stage melanoma (ie, stage 1) has a 5-year survival rate of more than 90%,<sup>3</sup> but risk of recurrence increases 9-fold depending on age and anatomical site of the primary melanoma.<sup>4</sup> This risk remains elevated for more than 20 years after the initial diagnosis.<sup>4</sup> Despite recent progress with immune and targeted therapies in the treatment of advanced melanoma (ie, stage 4), the 5-year survival rate remains low—between 5% and 20%.<sup>3,5,6</sup> Without a promise of cure, people have to live with the uncertainty of recurrence.

A systematic review of the literature about psychological distress among people affected by, or at high risk of developing, melanoma reported that 30% of people diagnosed and treated for any stage of melanoma report clinical levels of psychological distress.<sup>7</sup> Distressed individuals with

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melanoma were more likely to use maladaptive coping strategies, such as avoidance or emotion suppression<sup>7</sup> and to have poorer quality of life,<sup>8</sup> poorer appraisal of their disease,<sup>9</sup> and delay in seeking medical advice.<sup>10</sup> Suppression of emotion such as anxiety, and expression of anger have been linked to onset and progression of melanoma through immunological responses to stress.<sup>11,12</sup> These data suggest that strategies to improve patients' coping skills may help reduce distress and that further studies are warranted.

Meditation has received increased attention as a stress reduction strategy in health care.<sup>13</sup> It is described as a self-regulation technique<sup>14</sup> to develop one's emotional and attentional control,<sup>15,16</sup> enhance mental well-being, and develop specific qualities of the mind, including calm, clarity, and concentration.<sup>17</sup>

Meditation can be practiced on its own, including components such as (but not limited to) breathing, mantra, and contemplative meditation,<sup>18,19</sup> or combined with movements, such as yoga, t'ai chi, and qigong.<sup>20</sup> Meditation has been broadly categorized into two attentional processes with distinct neurological pathways: focused attention and open monitoring.<sup>16</sup> First, breathing meditation, mantra, and yoga engage mental processes similar to focused attention,<sup>21</sup> where attention is concentrated toward a chosen object (eg, breath, words, or movements).<sup>16</sup> Second, contemplative, spiritual, and mindfulness meditation engage in open-monitoring processes that activate monitoring and acceptance of internal and external sensation to promote self-reflective awareness. Here, one remains attentive, moment by moment, to anything that occurs without focusing on any explicit object.<sup>16</sup>

In studies investigating how meditation may help various psychological conditions, such as alcoholism, anxiety, chronic pain, depression, and smoking, mindfulness-based meditation programs showed evidence of improving anxiety (effect size: 0.38 [95% CI = 0.12-0.64]), depression (0.30 [0.00-0.59]), and pain (0.33 [0.03-0.62]).<sup>22</sup> Similar findings were observed in a meta-analysis focusing on a heterogeneous group of patients receiving or having completed treatment for cancer. In this analysis, mindfulness-based meditation programs significantly reduced symptoms of anxiety (effect size: 0.37,  $P < .001$ ) and depression (0.44,  $P < .001$ ) and improved mindfulness skills (0.39,  $P < .001$ ).<sup>13</sup> Mindfulness-based therapies intend to cultivate everyday mindfulness or trait mindfulness through regular meditation practices.<sup>23</sup> Whereas the role of meditation in psychological well-being in mixed groups of cancer patients has been studied in clinical settings,<sup>22</sup> the views and attitudes toward meditation of people living with melanoma in the general community has not been investigated. Additionally, cancer supportive care online interventions have increased in number over the past decade, and evidence suggests that these interventions may be helpful to individuals regardless of age, sex, literacy level, and disease

stage.<sup>24</sup> Understanding the factors influencing knowledge, attitudes, and practices in meditation and exploring interest in online meditation programs may provide valuable information to design effective meditation-based interventions.

The aim of this study was to explore the knowledge, attitudes, and practices associated with meditation among people with melanoma and investigate the relationship between perception of stress, trait mindfulness, and meditation. A secondary aim was to identify factors associated with interest to participate in an online meditation program.

## Methods

### Participants

Patients attending outpatient clinics at a comprehensive cancer center in Melbourne, Australia, between September and December 2015 were invited to participate in the study. Inclusion criteria were having a diagnosis of melanoma (any stage), age 18 years or older, and sufficient understanding of English to consent and complete the questionnaire. People were excluded if they had a cognitive, psychological, or psychiatric disorder as identified on medical records or if they were too distressed as judged by the specialized melanoma nurse.

### Procedure

Eligible participants were identified through the melanoma outpatient clinic appointment lists, and eligibility was confirmed with a specialist melanoma nurse. Patients were approached by a research assistant in the outpatient clinic waiting area. A booklet containing study information and the survey were handed to potential participants. Patients were given the option to complete the survey while waiting for their appointment or to take it home to complete with a reply paid envelope. This latter group received a follow-up call approximately a week later to inquire about their interest in participating in the study. Patients were made aware that return of the completed questionnaire implied consent. Data on age, sex, and disease stage of people declining participation were collected to compare characteristics between participants and nonparticipants. This study was reviewed and approved by the relevant Human Research Ethics Committees.

### Measures

A questionnaire booklet assessing knowledge of, attitude toward, and practice of meditation was developed. Its face validity was assessed by five independent research officers examining the questionnaire's legibility and clarity, and sensibility of the skip logic questions.

Knowledge of meditation was assessed through 10 statements on general facts and misconceptions about

meditation. These statements were generated for the purpose of this study from a review discussing the role of meditation in cancer-related cognitive impairment,<sup>25</sup> a narrative describing seven misconceptions about meditation,<sup>26</sup> a report from the National Centre for Complementary and Alternative Medicine,<sup>27</sup> and an online blog addressing various aspects of meditation (<http://liveanddare.com/>). Seven items stated general facts about meditation, and three items stated common misconceptions. Response options “agree,” “I don’t know,” and “disagree” were scored 1, 0, and -1, respectively, with the score for the three misconception items reversed. Higher total scores indicated increased general knowledge about meditation.

The practice of meditation was assessed by enquiring about the type of meditation practiced, duration of practice (months/years), and whether the practice was found useful. Participants were also asked about their level of interest in participating in an online meditation program should one be available to them.

The Determinants of Meditation Practice Inventory (DMPI)<sup>28</sup> is a 17-item self-report survey that identifies perceived barriers to meditation on a five-point Likert scale. The DMPI was used to extrapolate participants’ attitudes toward meditation. The items covered three domains: perceptions and misconceptions, pragmatic concerns, and sociocultural beliefs. Scores range from 17 to 85, with a higher score indicating increased perceived barriers to meditation. The DMPI was designed for meditation-naïve participants only and has been tested for validity and reliability in 150 caregivers of patients attending chemotherapy (Cronbach’s  $\alpha$  of 0.87).<sup>29</sup>

The Cognitive and Affective Mindfulness Scale-Revised,<sup>30</sup> a 10-item instrument (four-point Likert scale) assessed how mindful individuals are during their everyday lives. The scale captures different aspects of mindfulness (ie, attention, present-focus, awareness, and acceptance/nonjudgment of thoughts and feelings<sup>30</sup>). Scores range from 10 to 40; higher scores indicate greater self-reported mindfulness. The survey has been validated in two large groups of university students, with Cronbach’s  $\alpha$  of 0.74 and 0.77.<sup>30</sup>

The Perceived Stress Scale (10-item version),<sup>31</sup> a self-report questionnaire, was used to measure overall perception of stress (five-point Likert scale). The items evaluate how unpredictable, uncontrollable, and overloaded respondents have found their lives to be within the past month. Scores range from 0 to 40, with higher scores indicating greater perceived stress. Internal consistency ranges from 0.75 to 0.87.<sup>31-33</sup>

Participants’ demographic characteristics (age, sex, postcode, marital status, country of birth, and religion) and medical information (initial diagnosis, disease stage, and type of treatment received) were collected. Postcodes were used to derive a proxy for participants’ socioeconomic status, using the Socio-Economic Indexes for Areas,<sup>34</sup> and

level of accessibility to service centers, using the Accessibility/Remoteness Index of Australia.<sup>35</sup> Both indices were obtained from the Australian Bureau of Statistics.

## Data Analysis

Categorical variables were summarized as frequencies and percentages, and numerical variables as mean ( $M$ ) and standard deviations (SD). The  $\chi^2$  test was used to explore association between the following: (1) participants and nonparticipants in terms of age group, sex, and disease stage; (2) interest in a meditation program, and demographic and clinical characteristics; and (3) practice of meditation and participants’ demographic and clinical characteristics, and knowledge and misconceptions about meditation. Numerical variables (perceived stress score, DMPI, and trait mindfulness mean scores) were compared across participants’ demographic and clinical characteristics and meditation experience using ANOVA. Multivariate regression models were used to adjust for the potential confounding effect of age, sex, and treatment status on the association between perceived stress and disease stage. Statistical analyses were carried out in SPSS, version 23.

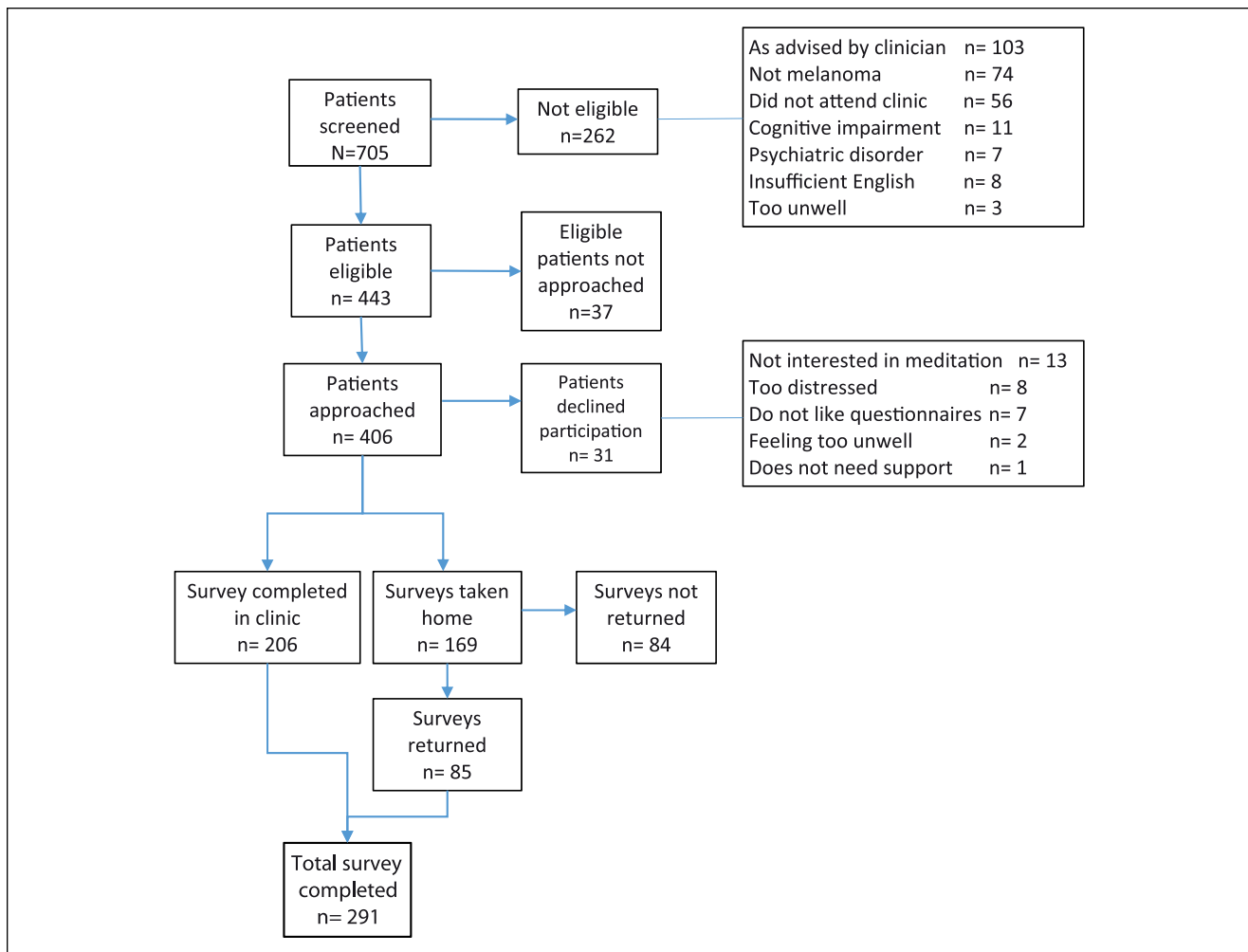
## Results

Of the 705 patients screened, 443 were deemed eligible and 406 were approached to participate (37 eligible patients could not be approached because of the researcher’s time constraints); 291 (72%) completed the survey (Figure 1). There was no significant difference in age, sex, or disease stage between participants and nonparticipants.

Table 1 summarizes participants’ characteristics. Overall, 55% were male, ranging in age from 25 to 96 years old. About half were employed (51.2%) and had completed a tertiary education (49.8%). The majority of participants were married (77.0%) and born in Australia (81.8%). A total of 45 participants (15.5%) reported having a religious belief where meditation was commonly practiced. In this subgroup, Christianity was the most commonly reported religion ( $n = 39$ ; 86.7%).

Participants diagnosed with stage 1, 2, 3, or 4 melanoma were fairly equally represented in the study (30.2%, 18.6%, 28.5%, and 22.7%, respectively), and half had been diagnosed within 1 and 5 years; 39.9% had been treated with surgery in the past year. The socioeconomic distribution of participants was comparable to that of the Victorian population, although participants were more likely to live in a major city (Table 2).

Overall, 125 (43%) participants reported having tried meditation. They were more likely to be younger ( $P = .001$ ), female ( $P < .001$ ), have completed higher education ( $P < .001$ ), be employed ( $P = .01$ ), be living in areas with good access to service centers ( $P = .016$ ), or not hold a religious



**Figure 1.** Flow diagram of the recruitment process.

belief where meditation is commonly practiced ( $P = .01$ ; Table 3, first column).

Overall, 63 had maintained some level of meditation practice (30 reported to practice “only when I feel the need for it,” 12 everyday, 15 at least once a week, and six less than once a week). The most common types of meditation practiced were breathing meditation (66.4%), yoga (40.0%), and contemplative meditation (30.4%). As summarized in Table 4, the most frequently reported benefit of meditation was feeling relaxed (89.6%).

Table 5 summarizes participants’ knowledge of different aspects of meditation. The majority believed that meditation is the act of calming the mind (88.9%) and could help cope with stress (87.2%); 63.3% agreed that meditation contributes to a healthy lifestyle. Most participants (76.5%) were unable to discriminate between meditation and relaxation.

People who had tried meditation were significantly more likely to agree with general facts about meditation (items

1-5, 8, 10) than those who had never meditated, with larger differences observed for concepts such as “Meditation keeps us focused on the present moment” (77.2% vs 47.9%,  $P < .001$ ), “Meditation contributes to a healthy lifestyle” (81.5% vs 49.7%,  $P < .001$ ), “Meditation can be practiced in different ways” (83.9% vs 59.4%,  $P < .001$ ), and “Meditation should be practiced regularly to feel a benefit” (66.9% vs 40.0%,  $P < .001$ ). People who had never tried meditation were more likely to answer “I don’t know” to any of the 10 statements (37% vs 15% of those who had tried meditation).

Both groups had similar proportions of people holding misconceptions about “mediation being the same as relaxation” (44.8% vs 48.4%,  $P = .554$ ) and “not only for religious people” (3.0% vs 1.0%,  $P = .242$ ). A significantly greater proportion of participants among those who had tried meditation believed that meditation was about emptying the mind as compared with those who had never meditated (66.9% vs 38.8%,  $P < .001$ ).

**Table 1.** Sociodemographic and Medical Characteristics of People Diagnosed With Melanoma (n = 291).

	n (%)		n (%)
Male	161 (55.3)	Employment status	
Age (years)		Employed	149 (51.2)
26-39	38 (13.1)	Not employed	38 (13.1)
40-49	41 (14.1)	Retired	104 (35.7)
50-59	62 (21.3)	Education level	
60-69	71 (24.4)	Primary	16 (5.5)
70-79	54 (18.6)	Secondary	130 (44.7)
>80	25 (8.6)	Tertiary (university, TAFE, diploma)	145 (49.8)
Marital status		Country of birth (n = 289)	
Single	23 (7.9)	Australia	238 (81.8)
Married/De facto	224 (77.0)	Europe	38 (13.1)
Divorced/Separated	28 (9.6)	Other (New Zealand, UAE, Israel, USA, Nepal, Canada)	13 (4.5)
Widowed	16 (5.5)	Religious belief where meditation is commonly practiced	
Disease stage		None	246 (84.5)
Stage 1	88 (30.2)	Christianity	39 (13.4)
Stage 2	54 (18.6)	Other (Buddhism, Islam, Pagan)	6 (2.1)
Stage 3	83 (28.5)	Time since diagnosis (n = 282)	
Stage 4	66 (22.7)	Less than 1 year	66 (22.7)
Cancer treatment received in the past 12 months (n = 166)		Between 1 year and 5 years	147 (50.5)
Surgery	116 (39.9)	Between 5 and 10 years	69 (23.7)
Immune therapy	47 (16.2)	Accessibility/Remoteness index for Australia	
Radiotherapy	33 (11.3)	Major cities (0)	199 (68.4)
Targeted therapy	11 (3.8)	Inner regional (1)	62 (21.3)
Other	8 (2.7)	Outer regional (2)	29 (10.0)
No treatment	76 (26.1)	Remote (3)	1 (0.3)
Socioeconomic index for areas		Very remote (4)	1 (0.3)
Quintile 1	29 (10.0)		
Quintile 2	53 (18.2)		
Quintile 3	63 (21.7)		
Quintile 4	89 (30.6)		
Quintile 5	57 (19.6)		

**Table 2.** Comparison of the Study Population With Population of Victoria using the Socioeconomic Index for Areas and Accessibility/Remoteness Index for Australia Categories.

Socioeconomic Index for Areas by Quintile <sup>a</sup>	Study Population <sup>b</sup> (%)	Victoria Population <sup>c</sup> (%)	Accessibility/Remoteness Index for Australia	Study Population <sup>b</sup> (%)	Victoria Population <sup>c</sup> (%)
Quintile 1	10.4	13.8	Major cities (0)	71.2	39.1
Quintile 2	17.2	18.7	Inner regional (1)	20.9	40.9
Quintile 3	20.5	22.1	Outer regional (2)	7.9	18.9
Quintile 4	31.2	25.2	Remote (3)	0	1.0
Quintile 5	20.5	20.5			

<sup>a</sup>Quintile 1 is the relatively most disadvantaged, and quintile 5 is the relatively most advantaged area.

<sup>b</sup>The study population in this table excludes 13 participants (n = 278) living outside Victoria.

<sup>c</sup>Victorian population data were collected from the 2011 Census of Population and Housing.

Figure 2 presents barriers to meditation among participants who had never meditated. Responses of “agree” and

“strongly agree” were combined for each item of the DMPI scale. Barriers to meditation mainly related to perceptions

**Table 3.** Characteristics of Participants Associated With Practice of and Interest in an Online Meditation Program (n = 291).

		Have You Ever Tried Meditation?			Are You Interested to Participate in an Online Meditation Program?		
		n (%)		P Value	n (%)		P Value
		Yes (n=125)	No (n = 166)		Yes (n = 127)	No/I Don't Know (n = 164)	
Age	25-39	25 (20.0)	13 (7.8)	.001	24 (18.9)	14 (8.5)	<.0001
	40-49	25 (20.0)	16 (9.6)		24 (18.9)	17 (10.4)	
	50-59	26 (20.8)	36 (21.7)		33 (26.0)	29 (17.7)	
	60-69	22 (17.6)	49 (29.5)		30 (23.6)	41 (25.0)	
	70-79	19 (15.2)	35 (21.1)		13 (10.2)	41 (25.0)	
	>80	8 (6.4)	17 (10.2)		3 (2.4)	22 (13.4)	
Gender	Male	49 (39.2)	112 (67.5)	<.001	55 (43.3)	106 (64.6)	<.0001
	Female	76 (60.8)	54 (32.5)		72 (56.7)	58 (35.4)	
Marital status	Single	16 (12.8)	7 (4.2)	.052	13 (10.2)	10 (6.1)	.369
	Married/De facto	89 (71.2)	135 (81.3)		95 (74.8)	129 (78.7)	
	Divorced/ Separated	13 (10.4)	15 (9.0)		14 (11.0)	14 (8.5)	
	Widowed	7 (5.6)	9 (5.4)		5 (3.9)	11 (6.7)	
Education level	Primary	4 (3.2)	12 (7.2)	<.001	4 (3.2)	12 (7.3)	.014
	Secondary	39 (31.2)	91 (54.8)		48 (37.8)	82 (50.0)	
	Tertiary	82 (65.6)	63 (38.0)		75 (59.1)	70 (42.7)	
Employment status	Employed	75 (60.0)	74 (44.6)	.013	78 (61.4)	71 (43.3)	<.0001
	Not employed	17 (13.6)	21 (12.7)		22 (17.3)	16 (9.8)	
	Retired	33 (26.4)	71 (42.8)		27 (21.3)	77 (47.0)	
Religious belief where meditation is commonly practiced	Yes	29 (23.2)	16 (9.6)	.01	15 (11.8)	30 (18.3)	.087
	No	96 (76.8)	150 (90.4)		112 (88.2)	134 (81.7)	
Socioeconomic index by areas	Quintile 1	11 (8.8)	18 (10.8)	.137	8 (6.3)	21 (12.8)	.210
	Quintile 2	15 (12.0)	38 (22.9)		28 (22.0)	25 (15.2)	
	Quintile 3	31 (24.8)	32 (19.3)		26 (20.5)	37 (22.6)	
	Quintile 4	40 (32.0)	49 (29.5)		37 (29.1)	52 (31.7)	
	Quintile 5	28 (22.4)	29 (17.5)		28 (22.0)	29 (17.7)	
Accessibility/ Remoteness index for Australia	Good access	118 (94.4)	143 (86.1)	.016	116 (91.3)	145 (88.4)	.270
	Moderate-low access	7 (5.6)	23 (13.9)		11 (8.7)	19 (11.6)	
Disease stage	Stage 1	40 (32.0)	48 (28.9)	.464	36 (28.3)	52 (31.7)	.488
	Stage 2	18 (14.4)	36 (21.7)		21 (16.5)	33 (20.1)	
	Stage 3	38 (30.4)	45 (27.1)		36 (28.3)	47 (28.7)	
	Stage 4	29 (23.2)	37 (22.3)		34 (26.8)	32 (19.5)	
Treatment received in the past 12 months	Yes	73 (58.4)	93 (56.0)	.721	77 (60.6)	89 (54.3)	.277
	No	52 (41.6)	73 (44.0)		50 (39.4)	75 (45.7)	

and misconceptions (items 1, 4, 7) and pragmatic concerns (item 12). Lack of knowledge about meditation was reported by 72% of the participants.

The average score on the DMPI scale was 45.34 (SD = 8.6). Participants who reported fewer barriers to meditation were more likely to have completed higher education ( $P = .009$ ), live in areas with socioeconomic advantages ( $P = .048$ ), and have good access to service centers ( $P = .008$ ; Table 6).

The overall mindfulness mean score was 28.3 (SD = 5.5). Trait mindfulness was positively associated with age ( $r = 0.195$ ;  $P = .006$ ) and negatively associated with perceived stress ( $r = -0.506$ ;  $P < .0001$ ). The overall perceived stress mean score was 15.8 (SD = 6.7). Perceived stress was not associated with disease stage even after controlling for age, sex, and treatment (Table 7).

Among the 63 participants who were currently practicing meditation, those engaged in a form of self-reflective

**Table 4.** Participants' Reported Benefits From a Meditation Practice (n = 96).<sup>a</sup>

Reported benefits	n (%)
I felt relaxed	86 (89.6)
I was able to concentrate well	38 (39.6)
I was feeling stronger	24 (25.0)
I was able to stay healthy	18 (18.8)
Other (more energy, sleeping better, better able to control nausea)	6 (6.3)

<sup>a</sup>Some participants did not report any benefit, and some reported more than 1 benefit.

meditation, that is, contemplative, mindfulness, or religious (n = 26), reported higher mindfulness scores ( $M = 30.9$ ,  $SD = 4.6$ , vs  $M = 27.7$ ,  $SD = 5.4$ ;  $P = .017$ ) and lower perceived stress scores ( $M = 14.0$ ,  $SD = 4.8$ , vs  $M = 18.1$ ,  $SD = 6.1$ ;  $P = .005$ ). After controlling for age and sex, these associations remained significant ( $P = .041$  and  $P = .016$ , respectively).

A total of 127 (44%) people reported being interested in participating in an online meditation program. Characteristics of these participants were similar with respect to age, sex, education level, and employment status to those who had tried meditation (Table 3, last column). People interested in participating reported higher perceived stress than others ( $M = 16.91$ ,  $SD = 6.5$ , vs  $M = 14.97$ ,  $SD = 6.7$ ;  $P = .014$ ). Among the 130 participants not interested in participating in a meditation program, 20.8% (n = 27) did not have a smartphone or a computer; 25.4% (n = 33) did not want to do a meditation program using a smartphone or a computer; and 39% (n = 51) were not interested in meditation.

## Discussion

This study explored the knowledge, attitudes, and practices associated with meditation in a cohort of people diagnosed with all stages of melanoma. Participants' global perception of stress and trait mindfulness were assessed, and associations with participants' characteristics were explored.

The majority of participants reported understanding the benefits of meditation. This may be a result of media attention about meditation in the past few years.<sup>36</sup> People who had tried some form of meditation had, in general, more knowledge about meditation than those who had never tried meditation. However, two common misconceptions about meditation ("meditation is about emptying the mind" and "is the same as relaxation") were highly prevalent among people who had experience with meditation. Meditation is described as "a series of mental exercises designed to effect certain changes in how a person sees or relates to the world."<sup>37</sup> Hence, instead of "emptying the mind" of thoughts, meditation develops an awareness or familiarity with thought patterns. Meditation is not the same as relaxation.<sup>38-40</sup> The main differences between these two practices

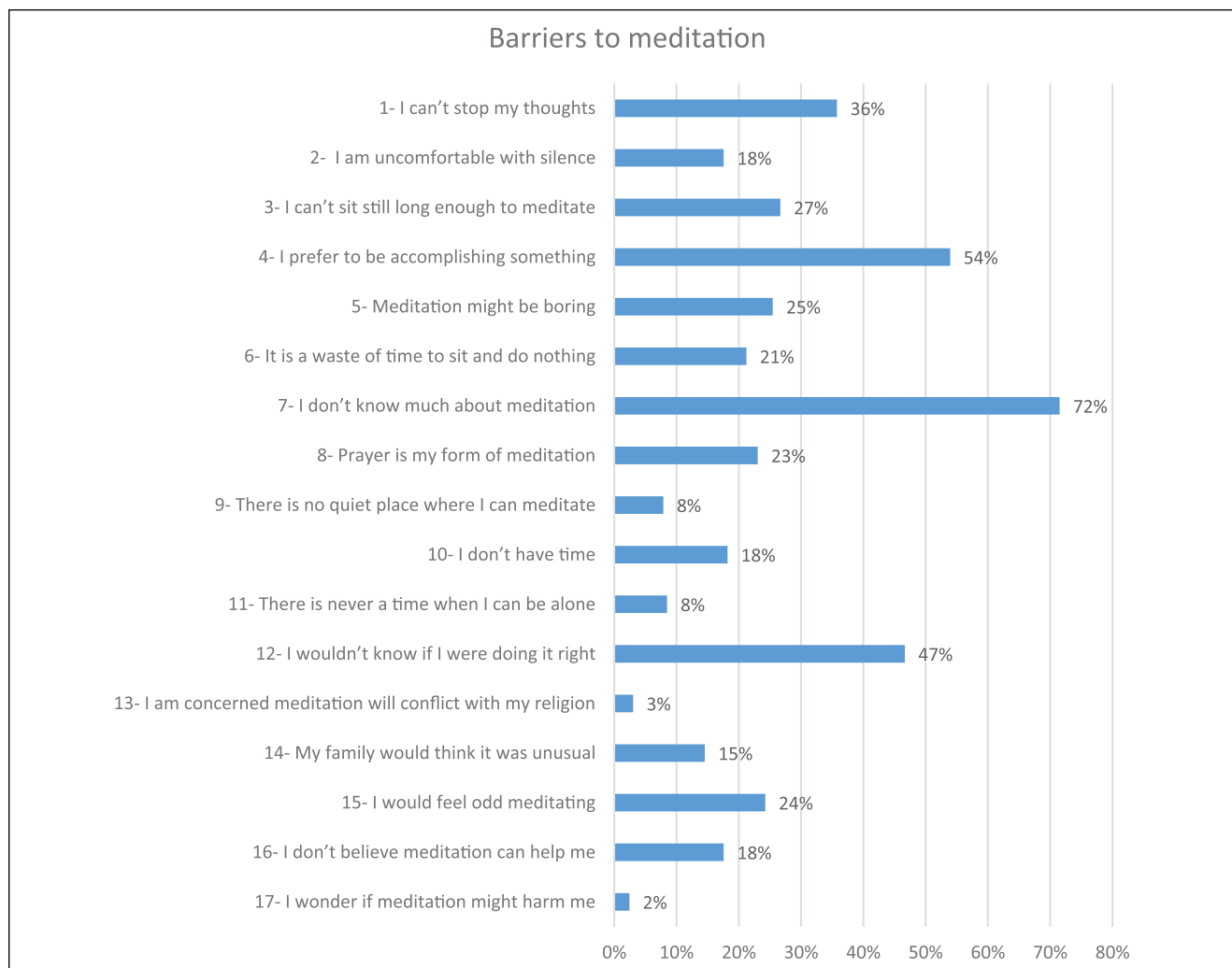
reside in neural activation patterns. Meditation practices have shown to concurrently alter the structure or activities of brain regions associated with emotion regulation, body awareness, learning and memory, and sensory reception, and regulate the autonomic nervous system (ANS) responsible for internal organ functions.<sup>41</sup> A study comparing the effects of a relaxation and short-term meditation program on brain systems and physiological responses found that the meditation program led to better regulation of the ANS, improved heart rate, and respiratory amplitude and rate, and better skin conductance response than the relaxation program.<sup>42</sup> Better regulation of the ANS was subsequently associated with improved attention and self-regulation in the meditation group compared with the relaxation group.<sup>43</sup> Therefore, although meditation may induce a state of physiological relaxation, changes involved in the brain regions suggest that meditation is associated with active states involving cognitive restructuring and learning.<sup>44</sup> Misunderstanding the practice of meditation by having unrealistic expectations about its outcome (ie, feeling relaxed or emptying the mind) may result in unrewarding and disappointing experiences leading to abandonment of the practice. Enhancing people's health literacy with regard to the purpose of meditation and its potential benefits for emotional well-being may be important for future studies.

Half of the participants reported that they did not know much about meditation as assessed by the DMPI, but a majority correctly acknowledged some benefits of meditation on the questionnaire. This gap between people's actual knowledge of meditation and their perception of understanding meditation may leave participants with a lack of confidence to engage with the practice and potentially lead to negative attitudes regarding the practice.<sup>45</sup> Educating people about the purpose of meditation and how it could help them enhance their well-being may enhance their motivation or interest in participating in a program. Furthermore, participants living in more disadvantaged areas or further away from service centers are less likely to engage with meditation. This may be a result of a lack of availability of meditation programs in these areas or additional cost involved in participating in such programs. A low-cost online meditation-based program may, therefore, provide an opportunity for participation currently unavailable to some groups of patients. Evidence for online mindfulness-based meditation interventions in chronic illnesses is sparse.<sup>46</sup> In the oncology setting, only one study has so far reported the effects of an online mindfulness-based intervention in 62 distressed participants completing treatment for different types of cancer.<sup>47,48</sup> This pilot study tested the feasibility and efficacy of an online synchronous Mindfulness-Based Cancer Recovery program compared with a wait-list controlled group.<sup>47</sup> Preliminary results showed positive effects of the intervention on stress symptoms ( $d = 0.49$ ;  $P = .021$ ). Once individuals in the waitlist

**Table 5.** Knowledge of Meditation in People Diagnosed With Melanoma (n = 289).

	Agree, n (%)	I Don't Know, n (%)	Disagree, n (%)
1. Meditation is the act of calming the mind	257 (88.9)	30 (10.4)	2 (0.7)
2. Meditation keeps us focused on the present moment	174 (60.2)	99 (34.3)	15 (5.2)
3. Meditation can help people cope with stress	252 (87.2)	35 (12.1)	2 (0.7)
4. Meditation can make people become more aware of their negative thoughts	133 (46.0)	139 (48.1)	17 (5.9)
5. Meditation contributes to a healthy lifestyle	183 (63.3)	103 (35.6)	3 (1.0)
6. Meditation is the same as relaxation <sup>a</sup>	134 (46.4)	87 (30.1)	68 (23.5)
7. Meditation is about emptying your mind <sup>a</sup>	147 (50.9)	94 (32.5)	48 (16.6)
8. Meditation can be practiced in different ways	202 (69.9)	87 (30.1)	0 (0)
9. Meditation is only for religious people <sup>a</sup>	6 (2.1)	24 (8.3)	258 (89.3)
10. Meditation should be practiced regularly to feel a benefit	149 (51.6)	116 (40.1)	24 (8.3)

<sup>a</sup>Indicates misconceptions.



**Figure 2.** Assessing barriers for meditation among meditation-naïve participants (n=165). Percentage of combined responses “agree” and “strongly agree” to each item on the Determinant of Meditation Practice Inventory scale.



**Table 6.** Barriers to Meditation by Meditation-Naïve Participant Characteristics.

		Determinant of Meditation Practice Inventory Scores (n = 165)		
		n	Mean (SD)	P Value
Age (years)	25-39	13	47.08 (6.7)	.938
	40-49	16	45.75 (8.1)	
	50-59	36	44.33 (8.5)	
	60-69	49	45.84 (8.0)	
	70-79	35	45.08 (10.4)	
	>80	16	44.87 (8.1)	
Gender	Male	111	45.18 (8.5)	.726
	Female	54	45.68 (9.1)	
Marital status	Single	7	43.86 (13.2)	.250
	Married/De facto	134	45.94 (8.5)	
	Divorced/Separated	15	41.4 (8.9)	
	Widowed	9	44.22 (5.4)	
Education level	Primary	12	49.33 (10.6)	.009
	Secondary	90	46.52 (8.1)	
	Tertiary	63	42.9 (8.5)	
Employment status	Employed	74	44.84 (8.1)	.697
	Not employed	21	44.9 (8.1)	
	Retired	70	46.01 (9.4)	
Socioeconomic index by areas	Quintile 1	18	47.28 (7.8)	.048
	Quintile 2	37	46.57 (7.2)	
	Quintile 3	32	45.25 (9.8)	
	Quintile 4	49	46.33 (8.7)	
	Quintile 5	29	41.03 (8.6)	
Accessibility/Remoteness index for Australia	Good access	142	44.63 (8.4)	.008
	Moderate-low access	23	49.78 (8.6)	
Disease stage	Stage 1	48	46.38 (9.1)	.575
	Stage 2	35	46.17 (8.4)	
	Stage 3	45	44.36 (8.8)	
	Stage 4	37	44.43 (8.1)	
Treatment received in the past 12 months	Yes	93	45.76 (8.5)	.482
	No	72	44.81 (8.8)	
Religious belief where meditation is commonly practiced	Yes	16	45.25 (8.5)	.963
	No	149	45.35 (8.7)	

**Table 7.** Regression Model Analysis of Perceived Stress by Disease Stage, Age, Gender, and Treatment Status.

		Mean (SD)	Univariate P Value	Multivariate P Value
Disease stage	Stage 1	15.7 (7.0)	.785	.693
	Stage 2	15.7 (7.6)		
	Stage 3	15.5 (6.0)		
	Stage 4	16.5 (6.4)		
Age (years)	<50	17.8 (6.8)	<.001	.001
	50-59	16.0 (6.2)		
	60-69	16.3 (6.2)		
	70+	13.2 (6.7)		
Gender	Male	14.6 (6.4)	<.001	.020
	Female	17.3 (6.7)		
Treatment received in the past 12 months	Yes	16.6 (6.4)	.024	.005
	No	14.8 (6.9)		

group completed the intervention, a pre-post analysis revealed improvement in stress in younger participants compared with older participants ( $P = .03$ ) and posttraumatic growth in men compared with women ( $P = .010$ ).<sup>48</sup>

Among participants who had tried meditation in our study, only a few had maintained consistent levels of practice. Factors influencing practices of meditation are complex,<sup>29,49,50</sup> and maintaining regular practice is not easy, even for long-term meditators, because it requires ongoing commitment and self-discipline.<sup>50</sup>

The association between self-reflective meditation, perception of stress, and trait mindfulness may suggest that meditations involving self-reflection may enhance appraisal aptitude. Overall, perception of stress reported in this study was similar to that reported by the general population.<sup>51</sup> Participants, more likely to appraise their situation as stressful had received treatment in the past 12 months. Following treatment for melanoma, people have reported feelings of abandonment as visits to the hospital for face-to-face follow-up become less frequent over time, a sense of “watchful waiting” for recurrence, difficulty living with ongoing physical limitations and a distorted body image after surgery, and struggling to find positive meaning in life.<sup>52</sup> Another study interviewed 20 melanoma survivors about their melanoma-related beliefs and experiences, psychological adjustment to melanoma risk, and supportive care needs.<sup>53</sup> This study reported that the fear of developing a new melanoma lasted for years after treatment completion for some people, creating a persistent sense of uncertainty. Levels of stress did not differ by participants’ disease stage in our study; however, similar to the literature on patients with melanoma<sup>7</sup> and the general population,<sup>51</sup> age and sex were correlated with high levels of stress. These characteristics were also associated with an interest in participating in a potential online meditation program. Hence, a meditation-based intervention may have more relevance to people who perceive their life as stressful.

In this study, most people understood the psychological benefits of meditation, but many did not feel confident that they knew enough about meditation to engage in practice. People reporting high levels of stress showed more interest in participating in an online meditation-based program compared with participants with lower levels of stress. An intervention teaching self-reflective practices could benefit people with melanoma who are feeling stressed.

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