

A mindful self-compassion videoconference intervention for nationally recruited posttreatment young adult cancer survivors: feasibility, acceptability, and psychosocial outcomes

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Abstract

Purpose Young adult (YA) cancer survivors report substantial distress, social isolation, and body image concerns that can impede successful reintegration into life years after treatment completion. Mindful Self-Compassion (MSC) interventions focus on developing mindfulness and self-compassion for managing distress, hardships, and perceived personal inadequacies. An MSC intervention would be beneficial in supporting YA survivors' management of psychosocial challenges that arise in survivorship; however, a telehealth intervention modality is essential for reaching this geographically dispersed population. We conducted a single-arm feasibility study of an MSC 8-week videoconference intervention for nationally recruited YA survivors (ages 18–29).

Methods The MSC intervention was group-based, 90-minute videoconference sessions, held weekly over 8 weeks, with

audio-supplemented home practice. Feasibility and acceptability were assessed via attendance rate and an intervention satisfaction scale. Baseline to post-intervention changes in psychosocial outcomes (body image, anxiety, depression, social isolation, posttraumatic growth, resilience, self-compassion, mindfulness) were assessed using paired *t* tests and Cohen's *d* effect sizes.

Results Thirty-four participants were consented and 25 attended a videoconference group. Feasibility was established with 84% attending at least six of the eight sessions, and intervention acceptability was high ($M = 4.36$, $SD = 0.40$, score range = 1–5). All psychosocial outcomes, except for resilience, demonstrated significant changes ($p < 0.002$), with medium to large effect sizes (Cohen's $d > 0.5$).

Conclusion YA survivors are interested in receiving an MSC videoconference intervention. Feasibility, acceptance, and potential psychosocial benefits of the intervention were demonstrated. Findings can be applied toward the design of an efficacy randomized controlled trial to improve quality of life for YA survivors in transition after cancer treatment.

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Young adult (YA; aged 18–29) cancer survivors report psychosocial struggles that persist into long-term survivorship. For example, 1 year after diagnosis, 23–27% of adolescent-young-adult (AYA) survivors report clinically significant distress [1, 2] and 44% report posttraumatic symptoms [3]. They also have a significantly higher risk for suicidal behavior (attempts or completed) in the year after diagnosis and up to 5 years thereafter compared to non-cancer controls [4]. Two years after diagnosis, AYA survivors still report concerns with

body image, unpleasant emotions, social isolation, and difficulties with school or work [5]. Even more than 5 years after treatment completion, 25–40% of YA survivors report unmet needs relating to survivorship, self-identity, unpleasant emotions, social isolation, and life direction [6]. Although there are some survivors who report improvements in distress or even posttraumatic growth from their cancer experience [5, 7], there remains a substantial proportion of young survivors for whom these psychosocial struggles have a lasting impact on their quality of life and future prospects. This points to an urgent need for interventions that can empower them with skills to effectively manage distress and the psychosocial challenges that continue to present along the survivorship trajectory. An intervention that teaches mindfulness and self-compassion has high potential for helping young survivors by addressing distress, hardships, and perceived personal inadequacies [8].

Mindful Self-Compassion (MSC) is an 8-week program developed by Neff and Germer, which has a mindfulness foundation, but more centrally focuses on developing self-compassion [9]. Self-compassion is particularly applicable during difficult experiences and consists of being aware of our own suffering and its universality across humanity, and then actively directing compassion toward oneself, similar to how one would treat a good friend [10]. Development of self-compassion can be beneficial for young cancer survivors' posttreatment adjustment in a number of ways. First, *mindfulness*, one of the three components of self-compassion, can reduce excessive worrying and rumination that leads to anxiety and depressive symptoms [11]. *Self-kindness*, the second component, can result in fewer critical self-judgments regarding changes in physical appearance, psychosocial difficulties, or life limitations imposed by the cancer experience [12–14]. Finally, being able to frame one's experience in light of *common humanity* (i.e., shared experience with other young survivors), the third component, can provide a sense of social connectedness that can counteract feelings of social isolation that are so common in this population [5, 15]. Self-compassion has been gaining recognition for its associations with emotional wellbeing among healthy [9, 16–18] and, to a lesser extent, clinical populations [12–14, 19] that include YA ages. However, to date, no study has examined an MSC intervention for YA cancer survivors despite that members of this population have expressed interest in interventions that target relaxation and emotional support [20] and 48% reported unmet need for complementary alternative therapies [21].

Among the barriers to implementing psychosocial interventions with YA cancer survivors are the population's geographic dispersion, mobility limitations, and competing schedule demands [22, 23]. Telehealth modalities, such as videoconference, can help overcome participation barriers and broaden intervention reach to isolated populations. The efficacy of videoconference psychosocial interventions in clinical populations has been demonstrated and research

comparing videoconference to in-person interventions has achieved comparable effects on outcomes [24, 25]. Furthermore, a mindfulness-based intervention delivered by videoconference demonstrated feasibility and acceptability among adult cancer survivors [25]. Telehealth interventions for childhood and YA cancer survivors that were implemented by phone, website, and Facebook have demonstrated feasibility and acceptability [26–29], but greater benefits might be derived from face-to-face, group-based interventions implemented via videoconference.

We conducted a feasibility study of an MSC group-based, videoconference, 8-week intervention. We focused on YA (aged 18–29 years) recruited across the USA who had completed their initial cancer treatment and were transitioning into long-term survivorship. Our aims were (1) assess feasibility, acceptability, and technical challenges of a videoconference MSC intervention for YA cancer survivors and (2) examine trends in changes in psychosocial outcomes that are meaningful to this population (e.g., distress, body image, social isolation, posttraumatic growth, resilience).

Methods

Recruitment

Participants were nationally recruited using social media (Facebook, Twitter), university mass e-mail, letters mailed to patients under the care of a local oncology clinic, and online national study recruitment websites (i.e., Research Match, Join the Conquest). Interested individuals were directed to the study website, which provided study details and a link to the online screening questionnaire. Our goal was to have 25 participants begin the intervention (i.e., attend at least one videoconference session). The study was approved by The University of North Carolina at Chapel Hill Institutional Review Board.

Participants

Study eligibility criteria included the following: (1) current age 18 to 29 years, (2) cancer diagnosis at age ≥ 15 years, (3) initial cancer treatment completed (defined as not currently scheduled for or undergoing treatment (adjuvant therapies were allowed, e.g., breast cancer hormonal therapies)), (4) computer and high speed internet, (5) able to communicate via e-mail, (6) no participation within 6 months in a mindfulness- or compassion-based program, (7) no consistent meditation practice (≥ 30 min daily), and (8) fluent in English language. Webcams were loaned to participants who indicated they did not have one. We chose to exclude YAs undergoing initial cancer treatment due to the potential feasibility bias of factors related to initial treatment (i.e., clinical appointments,

feeling ill), and our goal was to focus on supporting those in the survivorship period.

Intervention

The intervention was adapted from the MSC program and the Making Friends with Yourself program developed by Germer and Neff [8] and Bluth [16], which have been manualized. It was led by an instructor (Bluth) who completed the MSC teacher training program and had 3 years of mindfulness-based instructor experience. The intervention consisted of eight 90-min sessions with didactic instruction, experiential activities, introduction of different meditations and daily tools, and group discussion (see Table 1 for session topics). The experiential activities demonstrated the concepts of self-compassion and mindfulness, such as writing a letter to oneself from the standpoint of a compassionate friend or mindfully eating a raisin. To assure consistency of intervention delivery across the videoconference study groups, research staff compared recordings of four randomly selected sessions from each study group against the intervention protocol.

Measures

Sociodemographic and medical characteristics These were self-reported in the baseline questionnaire, prior to beginning a videoconference group.

Feasibility and acceptability Our benchmark for feasibility was that 75% of participants would attend at least six out of eight MSC videoconference sessions. Participant attendance was collected by the principal investigator at the beginning of each session. Feasibility was also assessed in terms of technical challenges experienced by the instructor and participants during the intervention and was noted by the instructor. Participants' satisfaction with and acceptability of the intervention were assessed with eight single items on the Intervention Satisfaction scale, which was developed by the researchers (ISS, 1 = *strongly disagree* to 5 = *strongly agree*).

These were related to the intervention design (i.e., frequency and duration of sessions, 8-week intervention length), enjoyment and perceived usefulness of MSC sessions for self and other survivors, and enjoyment of participating through videoconference. Our primary benchmark for acceptability was an average score of 4 or higher on participants' responses to two items on this scale: (1) "Overall, I really enjoyed the Mindful Self-Compassion Intervention" and (2) "I would recommend the Mindful Self-Compassion classes to other young adult cancer survivors."

Psychosocial outcomes Participants completed the following psychosocial measures prior to their first videoconference session (baseline) and after their last session (post-intervention): the Self-Compassion Scale (SCS) [10], Mindful Attention Awareness Scale (MAAS) [30]; the Patient-Reported Outcomes Measurement Information System's (PROMIS) Anxiety [31], Depression [31], and Social Isolation [32]; Body Image Scale (BIS) [33]; Brief Resilience Scale (BRS) [34], and Posttraumatic Growth Inventory (PTGI) [35]. Details about these measures are provided in Table 2.

Home practice The weekly online home practice questionnaires assessed how many days and minutes per week participants engaged in the formal exercises and how many days per week used the informal exercises. Formal exercises were those requiring reserved time to practice (e.g., meditations) and informal exercises were those one could do "in the moment" (e.g., loving kindness phrases for self).

Procedures

Eligible participants provided informed consent online (Qualtrics) and then completed the online baseline questionnaire. Next, based on their availability, participants were enrolled into one of five videoconference study groups, a trial videoconference session was scheduled, and their study materials (e.g., headphones and supplies for session exercises) were mailed. The purpose of the trial videoconference

Table 1 Mindful self-compassion intervention session topics

Session	Topics	Example exercises
1	Introduction to Mindful Self-Compassion	Compassionate friend meditation
2	Mindfulness part I: paying attention on purpose	Body scan
3	Mindfulness part II: reacting vs. responding	Here- and-now stone
4	Self-compassion in depth	Affectionate breathing meditation
5	Self-esteem vs. self-compassion	Lovingkindness for a loved one meditation
6	Finding your compassionate voice	Lovingkindness for oneself meditation
7	Core values and compassionate strategies for managing difficult emotions	Soften-soothe - allow meditation
8	Embracing your life—gratitude and self-appreciation	Gratitude phone photos

Table 2 Psychosocial measures assessed at baseline and postintervention

Measure	Subscales	Score range	Chronbach's alpha (baseline, postintervention)
Self-Compassion Scale (SCS, 26 items)	Self-kindness, self-judgment, common humanity, isolation, mindfulness, over-identification	Subscale average scores and total average score: 1–5; higher scores indicate greater total self-compassion or the subscale item.	0.91, 0.93
Mindful Attention Awareness Scale (MAAS, 15 items)	–	Total average score: 1–6, higher scores indicate greater mindfulness.	0.89, 0.83
PROMIS—Anxiety v1.0 short-form (7 items)	–	Total raw sum score translated to T score (mean of 50, standard deviation 10); higher scores indicate greater anxiety.	0.85, 0.86
PROMIS—Depression v1.0 short-form (8 items)	–	Total raw sum score translated to T score (mean of 50, standard deviation 10), higher scores indicate greater depressive symptoms.	0.91, 0.91
PROMIS—Social Isolation v2.0 short-form (6 items)	–	Total raw sum score translated to T score (mean of 50, standard deviation 10); higher scores indicate greater social isolation.	0.89, 0.87
Body Image Scale (BIS, 10 items)	–	Total sum score: 0–30, higher scores indicate greater body image distress.	0.84, 0.81
Brief Resilience Scale (BRS, 6 items)	–	Total average score: 1–5, higher scores indicate greater resilience.	0.89, 0.78
Posttraumatic Growth Inventory (PTGI, 21 items)	Relating to others, new possibilities, personal strength, spiritual change, appreciation of life	Subscale sum scores (range for subscale scores varies) and total sum score: 0–105; higher scores indicate greater total posttraumatic growth or the subscale item.	0.92, 0.93

session was to introduce the platform (Cisco WebEx) and answer remaining questions. Participants were also referred to our instructional video at the study website on connecting to and using the WebEx platform. Headphones with built-in microphones were provided to prevent an echo effect and to minimize background noise. The videoconference study groups were scheduled for evening times on a weekday because we viewed this time as having the least potential conflicts with participants' schedules (e.g., university class and work schedules) [23] and to simplify when scheduling different time zones. We aimed to limit the maximum size of the groups to five participants to support interactive participation and group cohesion because six was the maximum number of participants' thumbnail images that could be displayed on a single screen on the videoconference platform. Due to two participant withdrawals in the first scheduled group and needing to assign additional participants to the remaining four groups, group sizes ranged from three to seven participants. Participants were advised to attend their videoconference sessions from their home or a private location to limit distractions and to protect group members' privacy. Each study group had a "secret group" on Facebook (i.e., identities and comments were private) where they could interact with their group outside of the sessions (data not collected). During each videoconference session, the study investigator was available to assist with technical issues and could private message the instructor or participants through WebEx if needed.

Each week, research staff e-mailed a reminder and the link and password to access the upcoming videoconference session. Participants who missed a group session could view the recorded session through a videoconference session attended with the principal investigator, if the entire study group had consented to the recordings being used for this purpose. Missing a session, but viewing the recording counted as an absence.

The day before each videoconference session, participants were e-mailed an online home practice questionnaire to record their completed practice for the week. After each videoconference session, participants were e-mailed links to access the audio recordings for that week's home practice (e.g., meditations). These links were available at the study website, accessible through smart phones and other electronic devices, and were downloadable.

Results

Recruitment and enrollment

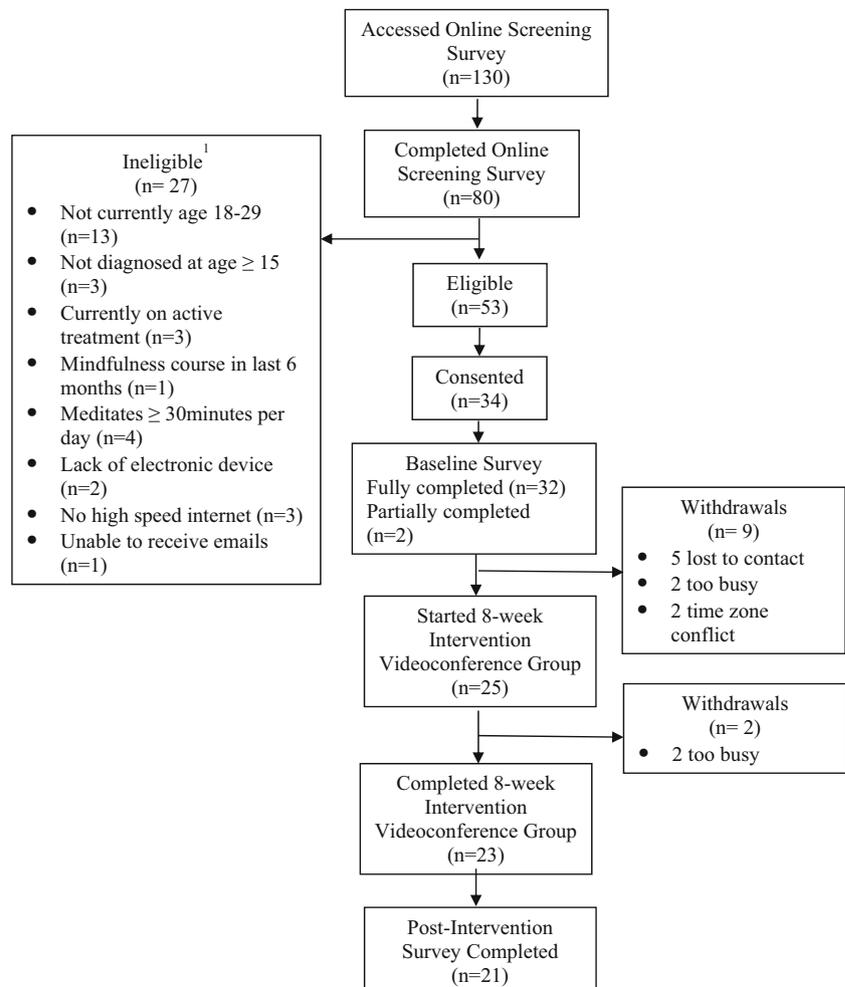
Over 3 months, 130 individuals accessed the online screening questionnaire. Of the 95 survivors who reported how they learned about the study, 81% learned about it through social media (Facebook, Twitter), followed by word of mouth (15%), an AYA community meeting (2%), or the

university mass e-mail (2%). None reported learning about the study through a national study recruitment website or as a patient under the care of the local oncology clinic. Of those who accessed the screening questionnaire, 61% ($n = 80$) fully completed it, of which 66% were eligible to participate (Fig. 1). The most common ineligibility reason was that they were not currently between the ages 18 and 29 ($n = 13$), but more than 20% of the ineligibility reasons ($n = 6$) were due to lacking the technology (i.e., computer, high speed internet, e-mail communication; Fig. 1). Thirty-four YA survivors were consented and enrolled into the study.

Participant characteristics

Sociodemographic and medical characteristics are presented in Table 3 and self-reported cancer types are presented in Fig. 2. Participants' US time zones consisted of 68% Eastern, 15% Central, 12% Pacific, 3% Atlantic (Puerto Rico), and 3% Alaska daylight time zones.

Fig. 1 Study flow chart.
Superscript number multiple ineligibility reasons could apply



Feasibility, acceptability, and videoconference technology challenges

Feasibility Nine participants withdrew before starting their assigned videoconference group and, meeting our goal, 25 participants began a videoconference group. Two participants withdrew after starting a group due to a busy schedule, resulting in 23 total participants completing the 8-week intervention. For our feasibility benchmark, 84% of participants attended six out of eight classes, which exceeded our goal of 75%.

Acceptability For our acceptability benchmark, the average score was 4.69 (SD = 0.43) on the two items specified for this purpose, which exceeded our goal for an average score of 4. For the other ISS items, 95% of participants reported that they enjoyed participating in the sessions through videoconference, 86% reported once a week was the right frequency for the sessions, 62% reported 90-min sessions were the right length, and 71% reported 8 weeks was a sufficient length. Finally, 100% reported that MSC would help them cope better with stress.

Table 3 Participants' sociodemographic and medical characteristics

	Baseline survey sample ($n = 32$) ^a	Intervention sample ($n = 25$) ^b
Female % (n)	97% (31)	100% (25)
Current age M (SD)	26.7 (2.0)	26.9 (2.12)
Non-Hispanic ethnicity % (n)	94% (30)	92% (23)
Race ^c % (n)		
White	81% (26)	80% (20)
Black or African American	3% (1)	0% (0)
Asian	6% (2)	8% (2)
American Indian or Alaska Native	3% (1)	0% (0)
Other race	9% (3)	12% (3)
Marital status % (n)		
Married or living as married	28% (9)	32% (8)
Single (never married)	69% (22)	68% (17)
Divorced	3% (1)	0% (0)
Parental status (yes) % (n)	19% (6)	12% (3)
Education level % (n)		
Some college or vocational training	16% (5)	12% (3)
Associate degree	6% (2)	4% (1)
College degree	53% (17)	56% (14)
Post-graduate	25% (8)	28% (7)
Years since cancer diagnosis M (SD)	3.7 (3.9)	3.2 (2.9)
Years since treatment completion M (SD)	2.9 (3.1)	2.6 (3.1)

^a Baseline sample includes participants who completed the baseline survey. Two participants did not answer the demographic/medical items, thus $n = 32$

^b Intervention sample includes participants who did not withdraw before their assigned videoconference study group began

^c Participants could select multiple races

Videoconference technology challenges Overall, the technological challenges were infrequent and minor (exact frequencies not recorded). The most commonly experienced was disrupted internet connectivity, resulting in a few seconds of a participant losing her video while maintaining audio. In the rare occurrence of being completely dropped from the session, the study investigator would call the participant to walk through reconnecting, or the participant could return to the session by phone. Phone participation was only used as a back-up due to the background noise associated with this. An additional challenge was that in study groups with more than five participants, not all of the participants' video thumbnails were viewable on one screen page, and viewing additional participants would require scrolling to the next screen page. Finally, not all sounds used in some of the meditations (meditation bell) translated well over videoconference.

Psychosocial outcomes

Paired t tests were conducted to examine change from baseline to post-intervention in the psychosocial outcomes and

the effect size of these changes was calculated with Cohen's d (small effect = 0.20, medium effect = 0.50, large effect = 0.80) [36]. These analyses included participants who completed both the baseline and follow-up questionnaires ($n = 21$). Findings indicated that all psychosocial outcomes, except for resilience, had significant change from baseline to post-intervention (Table 4). Most of the effect sizes for changes were large (Table 4), with the largest occurring for body image ($d = 1.39$), anxiety ($d = 1.24$), and self-compassion ($d = 1.23$).

Home practice

For formal exercises, participants reported practicing an average of 3.11 days (SD = 1.61, range = 0 to 5.86) and 33.45 min (SD = 16.59, range = 0 to 65.71) per week. For the informal exercises, participants reported practicing an average of 4.02 days per week (SD = 1.53, range = 0.50 to 7.00). Minutes of informal exercises were not collected because of the difficulty in assessing minutes of use in everyday experiences.

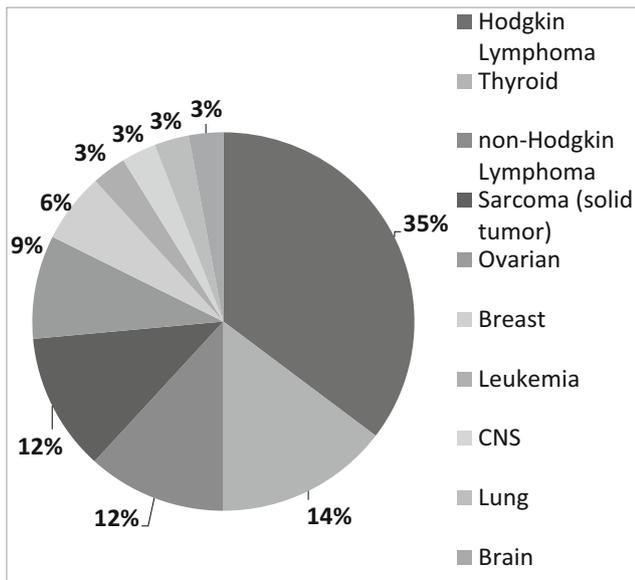


Fig. 2 Cancer types

Discussion

YA cancer survivors report substantial distress and psychosocial challenges years after treatment completion [1, 5, 6, 15, 37, 38]. Yet, there have been few interventions to support their transition into long-term survivorship. Furthermore, telehealth

intervention modalities are essential for reaching this dispersed population and overcoming their participation barriers [23]. This study examined the feasibility, acceptability, and technical challenges of an MSC videoconference intervention that recruited YA cancer survivors from across the USA who had completed cancer treatment. Additionally, we examined whether there were potential benefits in psychosocial outcomes.

First, within a relatively short period of 3 months and with minimal resources, we were able to recruit 130 cancer survivors and more than half completed the screening procedures. Similar to a study with AYA-aged childhood cancer survivors [39], we found that social media was the most effective recruitment strategy. Perhaps because it capitalized on this age group’s frequent use of social media [40], but also because AYA cancer survivors have been unifying as a national community, which largely communicates through social media (e.g., Stupid Cancer). We also achieved an enrollment rate of 64%, which is higher than rates of 46 to 58% reported in telehealth intervention studies with AYA-aged childhood survivors or YA survivors [26, 29, 39, 41]. This enrollment rate is encouraging considering that young cancer survivors are challenging to recruit and have low research participation rates [39, 42].

Pertinent to our main purpose, the intervention was found to be feasible and acceptable. Feasibility, assessed by the percentage who attended six or more of the eight sessions, was

Table 4 Psychosocial outcomes at baseline and post-intervention (N = 21)

	Baseline M (SD)	Post M (SD)	p value ^a	Cohen’s d ^b
Mindful Attention Awareness Scale	3.38 (0.8)	4.03 (0.6)	.001	0.87
Self-compassion Scale total	2.56 (0.7)	3.3 (0.5)	.03	1.23
Self-Kindness subscale	2.32 (0.6)	3.29 (0.6)	<.0001	–
Self-Judgment subscale	3.67 (1.0)	2.91 (0.8)	.002	–
Common Humanity subscale	2.62 (0.8)	3.27 (0.8)	.008	–
Social Isolation subscale	3.37 (0.9)	2.57 (0.9)	.001	–
Mindfulness subscale	2.94 (0.7)	3.61 (0.7)	.002	–
Over-Identification subscale	3.44 (0.9)	2.83 (0.7)	.001	–
PROMIS anxiety	60.52 (4.2)	54.27 (5.7)	<.0001	1.24
PROMIS depression	57.09 (6.2)	50.49 (7.1)	<.0001	0.99
PROMIS social isolation	54.12 (7.8)	46.11 (6.8)	<.0001	1.10
Body Image Scale	13.57 (5.0)	6.76 (4.7)	<.0001	1.39
Brief Resilience Scale	3.14 (0.8)	3.40 (0.6)	.11	0.33
Posttraumatic Growth Inventory	49.8 (19.8)	60.23 (19.3)	.008	0.50
Relating to Others subscale	15.05 (7.2)	19.48 (6.8)	.005	–
New Possibilities subscale	11.76 (4.7)	14.28 (5.3)	.03	–
Personal Strength subscale	11.23 (5.2)	13.00 (4.8)	.06	–
Spiritual Change subscale	3.33 (3.6)	3.90 (3.4)	.23	–
Appreciation of Life subscale	9.81 (3.2)	10.24 (2.9)	.49	–

Sample includes participants who completed the baseline and post-intervention and surveys

^a Paired t tests were conducted

^b Cohen’s d for change from baseline to post-intervention, not calculated for subscales (small effect = 0.20, medium effect = 0.50, large effect = 0.80)

9% higher than our benchmark. Additionally, the majority of participants reported that the MSC intervention helped them cope better with stress and they enjoyed participating in the sessions through videoconference. We believe the MSC intervention was acceptable because it was responsive to young survivors' interest in stress management and meditation-based interventions [20, 21]. Furthermore, videoconference provided access to an intervention that may not be locally available and it connected young survivors with their peers. Likewise, in our screening questionnaire (unpublished data), respondents' reported interests in the study were to learn mindfulness, self-compassion, and coping skills; have help with transitioning back to "normal" life; and to connect with other young survivors. The later point of connecting with peers is important because young survivors report social isolation in their cancer experience and a loss of support from their healthcare team after treatment completion [43]. Connecting with similar others and understanding that one's emotional struggles are not unique is reflected in one of three self-compassion components—common humanity—and should be important for decreasing the sense of social isolation in this population [5, 10, 15].

We also examined technical challenges associated with videoconference. The most common challenge was disrupted internet connectivity that would result in dropping the participant's image, but not audio, for a few seconds. This challenge has also been reported in another videoconference study with adult cancer survivors [44] and is likely to be common among videoconference interventions until reliable high-speed internet service is widely available. Another challenge was that only six people could be seen on the same screen page of the videoconference platform. In the larger group, one would have to scroll to the second screen page to see the remaining members. This made it challenging for the instructor to effortlessly monitor all participants and could negatively affect group cohesion if members are less likely to interact with those not visible. Future studies should utilize a videoconference platform that allows all members to be seen on a single screen page, but also keep the group size minimal (less than ten) to maintain group cohesion. Another issue pertinent to the intervention was that not all live sounds, such as a meditation bell, translated well over videoconference. Future adaptation may consider substituting digital recordings for live sounds.

The study also revealed some encouraging technical insights. First, our participants were able to install the videoconference application onto their personal computers and use it with relative ease. In contrast, Zhou [44] reported participants' difficulties with the hardware and software, although participants were provided with tablets with WebEx installed and underwent a trial videoconference session. We also provided a trial session and e-mailed participants detailed instructions and a link to our instructional video on how to download and use the platform. Perhaps our YA participants had a minimal

learning curve with the software and using the videoconference because of this age groups' avid use of computer-based communication [45]. Finally, this study demonstrated that videoconference is possible for interventions that include a variety of physical activities, such as lying down, standing, or small movements. This points to opportunities for implementing videoconference interventions that include small movement (e.g., tai chi, restorative yoga) to make these services available to other similarly isolated and underserved populations.

We also found that the MSC intervention had potential psychosocial benefits for YA cancer survivors. There were significant improvements in the psychosocial outcomes and most were associated with large effect sizes for the changes. These findings are consistent with a mindfulness-based videoconference intervention with older adult cancer survivors that found significant improvements in mood, stress, and spirituality, although with medium effect sizes [25]. However, we did not find significant changes in all psychosocial measures, such as resilience and some PTGI subscales. Potential reasons for this may be ceiling effects, the dynamic nature of these variables during the survivorship period is not suitable to a pre-post measurement, or that mindful self-compassion does not operate through these factors. Overall, the potential benefits of the intervention are encouraging considering that young cancer survivors experience greater distress than do healthy peers or older adult cancer survivors [37, 38]. Yet, we also need to be cautious in interpretation of these findings because the study was not powered to examine efficacy.

It should also be noted that in future efficacy trials, having a trained and experienced interventionist is essential for increasing the probability of the intervention's success. The current study's MSC instructor had extensive MSC teacher training and experience with leading MSC programs to distressed adolescent and young adult populations. Additionally, a manualized program is of importance for standardizing delivery and allowing for replication by different researchers. Furthermore, there is potential for implementation of the MSC program in telehealth clinical settings for AYA cancer survivors if oncology supportive care staff were to receive training in the MSC teacher program.

Finally, there are a few study limitations to note. First, the improvements in psychosocial outcomes are encouraging, but interpretation of these is limited without comparison to a control group in a larger sample. A randomized controlled trial (RCT) is needed to confirm that these findings are not due to non-specific factors such as providing attention and support. Second, all participants were well-educated females (more than half had college degrees, almost a third were in graduate school); therefore, findings cannot be generalized to females with lower levels of education or to males. Two males completed the screening procedures, but one was not assigned to a group because his time zone was incompatible (i.e., Africa), and the second was not interested in participating. The lack of

recruitment response from males may reflect gender differences in intervention preferences [46]. A third point regarding the study sample is that participants were self-selected and likely highly motivated to participate. As noted prior, social media recruitment (i.e., Facebook AYA cancer organizations) was the most effective strategy. Individuals who were active in these organizations may have felt motivated to support AYA cancer survivor research and/or were seeking supportive activities for themselves. Fourth, we included conservative eligibility criteria of a current age range between 18 to 29 years and access to necessary technology. The age range of AYA cancer survivors has been defined by national oncology guidelines as ages 15–39 (AYA Oncology Progress Review Group; National Comprehensive Cancer Network) [47, 48] or even as ages 15–29 (National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEERs)) [49]. However, we chose to further narrow the eligibility age range between 18 and 29 for a more efficient test of feasibility due to the heterogeneity of psychosocial developmental stages in the AYA-defined age range of 15 to 39 years. Although this age range was within that of guidelines, half of ineligible participants did not meet this age requirement and a few did not meet the technology requirement. Future trials should consider testing the intervention in a broader age range of AYA cancer survivors and to provide technological resources to survivors without these.

Despite these limitations, our study has a number of strengths. There has been a lack of interventions to address young survivors’ management of distress after cancer treatment completion, and this study demonstrated the ability to deliver a psychosocial intervention to YA survivors across the nation with minimal resources. Utilizing videoconference to bring young cancer survivors together to learn stress management skills has the potential to positively impact quality of life for an underserved cancer survivor population. Additionally, as noted prior, we discovered that the YA survivor population can use videoconference with relative ease and the intervention, which consisted of a variety of activities, can be implemented by videoconference. In summary, findings from this study support the feasibility and acceptability of an MSC videoconference intervention for YA cancer survivors and will inform the design of an efficacy RCT to support their transition into survivorship.

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