

Cognitive Remediation Group Therapy Compared to Mutual Aid Group Therapy for People
Aging with HIV-Associated Neurocognitive Disorder: Randomized, Controlled Trial

Abstract

Cognitive impairment is an important comorbidity for people aging with HIV, and group therapy may ameliorate the associated anxiety and stress. Combination psychosocial interventions may have better outcomes than single technique approaches. A pilot, parallel design, two-arm trial randomized people aging with HIV-Associated Neurocognitive Disorder (HAND) to Cognitive Remediation Group Therapy (Experimental; combination of brain training activities and mindfulness-based stress reduction) or Mutual Aid Group Therapy (Control). Outcomes were feasibility, acceptability, fidelity, and exploratory measures of anxiety, stress, coping, and use of mindfulness and brain training activities. Amongst forty contacted participants, 15 replied, 12 recruited, and 10 completed. Assessors confirmed intervention delivery with satisfactory fidelity. **The novel arm had statistically significant improvements in stress and mindfulness use compared to control**, and brain training and mindfulness use sustained at 3-month follow-up. Requiring a HAND diagnosis made recruitment challenging. Further research should broaden eligibility to people aging with HIV and cognitive challenges.

Keywords

HIV & AIDS; group therapy; cognition; aging; pilot randomized controlled trial; Canada

This is an Accepted Manuscript of an article published by Taylor & Francis in Social Work with

Groups on 21 Aug 2021, available at:

<https://www.tandfonline.com/doi/full/10.1080/01609513.2021.1963389>.

Background

Aging with HIV has become a priority area of focus as the epidemic enters its fifth decade. In some countries, such as Canada and the United States, approximately half of the population living with HIV is now over fifty (Bourgeois et al., 2017; Centres for Disease Control and Prevention, 2018). Longevity for people living with HIV, which now is comparable to the general population, is due to early initiation of and consistent adherence to combination antiretroviral therapy (cART) (Marcus et al., 2016). However, aging comorbidities may present at an earlier age and in greater frequency amongst HIV-positive people compared to their seronegative peers (Marcus et al., 2016). Amongst these comorbidities, HIV-related cognitive impairment's prevalence of approximately 50% is among the most common (Greene et al., 2015). This may be a result of HIV entering the nervous system in a relatively short time span; in one study of 96 HIV-positive people, HIV entered the central nervous system (CNS) at a median 77 days following infection (Spudich, 2013). With the delay between transmission and diagnosis, the brain is exposed to potential impairment, possibly due to mechanisms of inflammation and exposure to chemicals, as a result of HIV replication which can cause dysfunction and eventually damage the brain before treatment can adequately suppress the virus (Antinori et al., 2013).

Cognitive impairment in people living with HIV can arise due to many causes. One predominant nosology to encompass HIV-related cognitive impairment is HIV-associated neurocognitive disorder (HAND) (Antinori et al., 2013). HAND may result from neuronal dysfunction, possibly due to inflammation and exposure, and from structural damage to fronto-striatal-thalamatory circuits in the brain, where viral penetration prevents these neural pathways from effectively mediating cognitive, motor, and behavioural function (Clifford & Ances, 2013; Heaton et al., 2010). Severe forms of HAND have sharply decreased in the era of modern cART,

Cognitive remediation group therapy

however the milder forms persist and may be increasing in prevalence as the HIV-positive population **moves into older years** (Heaton et al., 2010). Extant literature has found a direct link between changes in cognition and changes in health-related quality of life, as HIV-related cognitive impairment can be a significant source of stress and anxiety and can be difficult to cope with (Alford et al., 2019). Biomedical interventions, predominantly use of and changes in cART, have had modest benefit but overall, have been unsuccessful in preventing or reversing the prevalence and severity of mild-to-moderate HAND (Heaton et al., 2010). In the absence of and even alongside an eventual pharmacological remedy, psychosocial approaches are needed to improve coping with HAND's symptoms (Tedaldi et al., 2015). Although existing research has illuminated unique cognitive challenges amongst people aging with HIV (Author, 2017a), such as a higher prevalence of cognitive impairment at an earlier age (Milanini & Valcour, 2017) than the general population and dual stigma associated with HIV and cognitive challenges (Hopcroft et al., 2013), psychosocial interventions have not yet been well tested for people aging with HIV and the optimal approach is unknown (Illa et al., 2014).

Psychosocial Interventions for Aging with HIV and Cognitive Challenges

A scoping review of non-pharmacological dementia interventions for people with mild cognitive impairment found that most interventions focused on cognitive training (i.e., Brain Training Activities, or BTA) (Rodakowski et al., 2015). BTA is comprised of games and activities that can be delivered via computer, tablet, or with pen and paper (Barnes et al., 2009). These activities focus on a specific cognitive domain (such as speed of processing) or cognition more broadly, based on an assessment of individual deficits (Barnes et al., 2009). When practised for 1-3 hours per week for 6-10 weeks, BTA has improved self-reported outcomes of coping and ability in the cognitive domains that the games are targeted towards (Tappen & Hain, 2014).

Cognitive remediation group therapy

Psychosocial interventions have also been trialed for people with mild-to-moderate dementia, with mindfulness approaches among the most frequently used modalities (Berk et al., 2018). Group therapies are particularly recommended due to their inherent ability to foster social connection (Toms et al., 2015). Mindfulness-Based Stress Reduction (MBSR) groups may be the preferential mindfulness approach for cognitive impairment due to its ability to reduce anxiety and cultivate calmness (Russell-Williams et al., 2018). The MBSR curriculum of eight weekly 1.5-2-hour sessions, which teaches meditation, breathing, and grounding techniques (Kabat-Zinn et al., 2017), has been found to create lasting practices for emotional regulation in participants following the intervention's conclusion (Goldin & Gross, 2010).

Combination approaches, blending intervention models, may be better suited to the complexity of HIV-associated health problems than a single technique approach (Bateganya et al., 2015). Given BTA's and MBSR's promising results with the general population living with dementia, this study combined these interventions into cognitive remediation group therapy (CRGT). CRGT was tested against mutual aid group therapy, widely considered the most recognizable form of group support and widely practiced in HIV and dementia (Bateganya et al., 2015; Toms et al., 2015). These groups use the single technique of talk therapy whereby one or two facilitators – often social workers – help the group maintain respect, stay on topic, and explicate connection and shared experience between group members (Toms et al., 2015). CRGT was tested against mutual aid in a pilot randomized, controlled trial for people aging with HAND to assess feasibility, acceptability, intervention fidelity, and exploratory outcomes.

This pilot trial's objective was to assess and compare the feasibility, acceptability, intervention fidelity, and exploratory outcomes (stress, anxiety, coping, use of mindfulness and BTA) of the novel and control arms.

Methods

This was a pilot, parallel design, two-arm randomized, controlled trial (RCT) that recruited people aging with HIV who had been diagnosed with mild-to-moderate HAND from a neurobehavioural research centre at a tertiary care hospital in Toronto, Canada. This trial was designed using a refinement framework (Justice et al., 2016) to assess whether a trial of this nature could be upscaled and, if so, what the key considerations (i.e., participants, design, interventions, outcomes) would be for that larger study. Community-based participatory research guided this trial's design as a team of ten people aging with HIV and concerned about HAND were consulted on intervention selection, questionnaire design, and eligibility and recruitment considerations. Further, people aging with HIV facilitated both intervention arms. The study protocol is published elsewhere (Author, 2019a). No changes were made from protocol to completion. Ethics approval was obtained from [masked] (17-334) and [masked] (35860) and registered on clinicaltrials.gov [ID masked] before recruitment commenced.

People living with HIV were eligible to participate in this study if they were at least forty years of age, diagnosed with mild-to-moderate HAND, and were living with HIV for five years or more. Participants were excluded if their HAND diagnosis was asymptomatic or severe, if they had been admitted to a hospital in the past month, if they were unable to communicate in English, if they were unable to use a tablet for BTA, or if the research coordinator assessed that they would be disruptive in group therapy (e.g., if they made discriminatory comments). These criteria were set to precipitate a comfortable group atmosphere where participants may share a similar level of cognitive impairment and progressed past initial concerns of an HIV diagnosis.

The novel and control arms both contained a form of group therapy comprised of a 3-hour orientation session and eight 3-hour weekly group sessions in downtown Toronto, Canada.

Cognitive remediation group therapy

Cognitive Remediation Group Therapy (Novel Arm)

The novel arm of cognitive remediation group therapy (CRGT) was held at the Centre for Mindfulness Studies in Toronto and blended mindfulness-based stress reduction (MBSR) and brain training activities (BTA). Each weekly session was divided as two hours of manualized MBSR facilitated by a physician and a social worker followed by one hour of BTA facilitated by a peer aging with HIV. For BTA, participants were provided with a Samsung tablet and a 1-year license to BrainHQ training by PositScience. As BTA has predominantly been administered as a passive, individual exercise where a participant is given the software and written instructions for use with minimal follow-up (Tappen & Hain, 2014), a participatory approach was required to incorporate BTA into active group therapy whereby the facilitator sought participant feedback on how to structure this component of CRGT. The group decided on forty minutes of discussion on training progress and challenges and twenty minutes dedicated to individual practice. **The BTA facilitator incorporated mutual aid elements like the strength in numbers phenomenon (Shulman, 1986) to help members feel less isolated in their experiences living with HAND.**

Mutual Aid Group Therapy (Control Arm)

The control arm of mutual aid group therapy was held at the AIDS Committee of Toronto and was facilitated by a social worker and a peer aging with HIV. The facilitators followed the intervention's manual (Author, 2019a) **of helping participants get to know each other, agree to the group's mandate of mutual aid, and set norms that would assist in** maintaining group safety (Steinberg, 2000) while encouraging participants to share their experiences living with HIV-related cognitive impairment and associated coping strategies with one another. **Facilitators were trained to employ the nine processes of mutual aid as defined by Shulman (1986). For example, facilitators encouraged participants to explore taboo subjects such as**

Cognitive remediation group therapy

discussing cognitive deficits, feel ‘all in the same boat’ as they had all received an MND-HAND diagnosis, and rehearse how they may disclose their HAND diagnosis to friends and family. Overall, facilitators attempted to create connections between participants by identifying commonalities in their experiences with the aim of creating a community within the group to support one another through shared challenges.

Outcomes

Feasibility was assessed against a priori targets that the research team agreed would be necessary to proceed with a larger trial, based on relevant literature (Eldridge et al., 2016) and the team’s experience with piloting and implementing interventions of this nature (Author, 2017b; Author, 2019b). The targets, based on a sampling frame of forty people, were: $\geq 30\%$ of those contacted agreed to participate, $\geq 25\%$ completed the initial assessment, $\geq 20\%$ attended the first orientation session of their treatment arm, $\geq 16\%$ completed their entire arm’s group series the final 3-month follow-up assessment.

Acceptability was measured via a satisfaction questionnaire conducted at midpoint and endpoint of each arm’s group therapy, involving the Likert-style Helping Characteristics of Self-Help and Support Groups Measure (22-items, $\alpha = 0.87$) (Schiff & Bargal, 2003) and open-ended questions about session length, number of sessions, activities used, and evaluation of facilitators.

For intervention fidelity, facilitators submitted weekly session reports comprised of checklists of therapy components and open-ended questions about activities completed in each group, dynamics between participants, and facilitation challenges. An a priori target of 80% of checklist therapy components per session was set, based on prior research (Borrelli, 2011).

Exploratory outcomes of stress, anxiety, coping, use of mindfulness strategies, and use of brain training activities were assessed at three times: preintervention, postintervention, and 3-

Cognitive remediation group therapy

month follow-up. Standardized measures used were HIV/AIDS Stress Scale (29-items, Likert, $\alpha = 0.91$) (Packenham & Rinaldis, 2003), Anxiety in Cognitive Impairment and Dementia Scale (26-items, dyadic, $\alpha = 0.87$) (Gerolimatos et al., 2015), Coping Self-Efficacy Scale of Health Problems (10-items, Likert, $\alpha = 0.85$) (Gandoy-Crego et al., 2016), and the Five Facet Mindfulness Questionnaire–Short Form⁴³ (24-items, $\alpha = 0.80$) (Bohlmeijer et al., 2011).

Sample Size

A sampling frame of forty individuals from the recruiting site met an initial screen for entry criteria. From this frame, twelve to sixteen participants was chosen as the numbers necessary to initiate this pilot RCT as: a) that would permit six to eight people in each trial arm, which is ideal for group therapy of this nature (Lenferink et al., 2019); and b) while this number limits analytical options and outcome assessment, similar numbers have been used to assess feasibility and acceptability in other pilot group therapy RCTs (Bateganya et al., 2015).

Randomization

A research coordinator enrolled participants by confirming their eligibility, attaining their informed consent, and collecting their availability for group therapy. Concealed allocation was then employed, whereby the first author provided the study sponsor with unique identifiers for each enrolled person and the sponsor then randomized participants in a 1:1 fashion using size two blocks to either the novel or control arm. These results were then communicated individually to each participant, alongside details regarding the schedule of their group therapy series.

Masking

Intervention facilitators were masked to outcome assessments, which were conducted by a research coordinator. Participants in one arm were masked to participants in the other arm. Analysts were masked to participant identities. Participants were not masked regarding the

Cognitive remediation group therapy

content of each arm; detail of the interventions – both group therapies with one more focused on discussion (control) and one on mindfulness and brain training (novel) – was described.

Data Analysis

For feasibility, proportions of participant recruitment, enrolment, and completion were calculated. Acceptability was analyzed as average scores on a satisfaction measure and reasons for participant withdrawal were also described. Fidelity was analyzed by tabulating intervention checklist items and qualitatively by two independent coders trained in the intervention models who employed content analysis for the open-ended responses to determine if interventions were delivered as designed. Exploratory outcomes were analyzed using non-parametric Wilcoxon rank sum tests run in R 3.5.1 (Feather Spray) to determine if there was a significant between group difference for change in outcomes relative to preintervention. Lacking a standardized scale to assess BTA use at the time of study design, progress reports from PositScience by BrainHQ were used for the novel arm and self-reported use of BTA was used for the control arm.

Results

The participant flow and demographics are listed below, followed by outcome results. The trial met its a priori targets for feasibility and fidelity, and the novel CRGT model proved equal or slightly better than the control's mutual aid model on acceptability and all exploratory outcomes. Fidelity measures offered qualitative insight into nuances of facilitating these interventions for people aging with HIV and cognitive challenges. Quotes are from facilitator session reports and specify the intervention arm and session number.

Participant Flow

Figure 1 displays participant flow throughout the study. There were one hundred individuals diagnosed with HAND at the recruiting clinic since 1 January 2016, of which forty were diagnosed with the mild-to-moderate form that comprised the study's sampling frame.

[Figure 1]

Recruitment

From 1 April to 30 September 2018, a clinical psychologist from the recruiting site made three distinct contact attempts to all participants in the sampling frame (n=40) at the phone number and email address that they provided at their last clinic visit. These contacts briefly detailed the study and eligibility criteria, and asked participants whether they would like to be contacted by the research coordinator to schedule a meeting to confirm eligibility and review the consent form. Twelve people consented to participate, on the lower end of our target sample. Since the sampling frame's contact attempts had been exhausted and some people had been waiting approximately four months for the trial to begin, the trial was initiated with twelve participants on 1 October 2018. Both groups were held on Wednesdays, the novel arm in afternoons and the control in the evening. Preintervention assessments were conducted on 10 October 2018. Group series ran from 17 October 2018 to 12 December 2018. Postintervention outcomes were assessed on 19 December 2018 and the 3-month follow-up was conducted on 19 March 2019. Participants received \$20 Canadian honourarium for each study visit.

Baseline Data

Participants (n=12) all identified as gay, cisgender males. All participants also had a family doctor and an HIV specialist, were taking daily antiretroviral HIV medication, and identified prescription substance misuse. Refer to table 1 for further participant characteristics.

[Table 1]

Feasibility results are presented against a denominator of forty, which is the sampling frame and is the number of people that the recruiting psychologist attempted to contact. For all other outcomes, the denominator is ten per who completed the study and all assessments.

Feasibility

Overall, 30% (n=12) of the sampling frame agreed to participate, completed the preintervention assessment, and attended the first orientation session of their arm's intervention. Two participants (one from each arm) withdrew, leaving 25% (n=10) completing the study.

Acceptability

On the standardized satisfaction scale at postintervention, the novel arm averaged 90% acceptability compared to 85% in the control. Open-ended acceptability responses were brief but positive in both arms, as participants felt session and series length were appropriate, the facilitators were skilled and non-judgmental, and the groups' activities were helpful.

Fidelity

Facilitators self-reported use of intervention components via checklists and added additional qualitative detail to support their claims. Two independent coders found that both arms were delivered with satisfactory fidelity.

Mindfulness-Based Stress Reduction (MBSR) Fidelity. The first component of the novel CRGT arm was mindfulness-based stress reduction (MBSR), which follows a manual that closely details activities including body scans, meditations, and deep breathing exercises. Each week's prescribed MBSR components were endorsed by facilitators. An illustrative quote of MBSR in practice in this study is:

Cognitive remediation group therapy

Participants identified body scans as making a big difference. They stated that they have felt so heavy since receiving a HAND diagnosis and feeling unable to share this experience with others due to fears of stigma. By focusing attention on their bodies in the present, they shift away from negative thoughts about perceived discrimination and say they feel less anxious and agitated. (CRGT novel arm, session 7)

Brain Training Activities (BTA) Fidelity. The second component of the novel arm involved a peer facilitator leading discussion on progress and challenges with tablet-based BTA, and time dedicated to practice with the activities. The facilitator stated that all sessions sustained this plan, and that participants stated that, through repeated practice, speed-of-processing and memory recall events in their daily lives appeared to become easier. The facilitator identified that the group setting was facilitative of BTA practice:

The group had frequent conversations about navigating feelings of frustration when they don't perform well on a brain training activity. Members shared strategies such as taking a break, switching to an activity that felt easier to bolster confidence, and taking deep breaths and doing a body scan. Members stated that group discussion of brain training activities kept them motivated to continue practicing. (CRGT novel arm, session 5)

Mutual Aid Group Therapy Fidelity. Mutual aid involves a structured check-in and check-out process to each session, with facilitators providing consistent therapeutic skills such as active listening, reflecting feelings, and presenting similarities in participant experiences. These components were endorsed by facilitators and confirmed by the independent assessors. A quote from facilitator reports that sums up this group's experience is as follows:

Group members marvel at the new experience of being able to discuss cognitive challenges and HIV with others experiencing similar issues, as they have never felt

Cognitive remediation group therapy

comfortable opening up about these topics before. Members commented on the commonalities they have found in the group, and how much they have learned from each other about coping with HAND. (Mutual aid control arm, session 8)

Exploratory Outcomes

Exploratory outcome assessments of anxiety, stress, coping, and use of mindfulness activities were assessed at preintervention (T1), postintervention (T2), and 3-month follow-up (T3). Anxiety decreased for all participants in the CRGT novel arm and for half of the mutual aid control, although a change was not significantly different between the two groups at T3 relative to T1 ($p=0.17$). Stress decreased for approximately half of the participants in each arm, and this decrease was significantly greater in the novel arm compared to the control at T3 relative to T1 ($p<0.01$). Coping also improved for about half of each group, with an insignificant difference between the novel arm and control at T3 compared to T1 ($p=0.75$). Half of each group's participants increased in use of mindfulness activities with the novel arm's increase being significantly greater than the control's at T3 compared to T1 ($p=0.035$). Based on usage data from PositScience by BrainHQ, the novel arm's six participants sustained over three hours of BTA practice per week for the 21-week duration of the study. The control arm's six participants self-reported BTA use of 1-3 hours per week during the study's timeline.

Discussion

The principal findings of this pilot are that group therapy may be feasible and acceptable to people aging with HIV and cognitive challenges and, further, that a complex intervention combining mindfulness and brain training activities **with mutual aid elements** may be preferential to the standard mutual aid type of group support, although the small sample size limits interpretation. **This aligns with mutual aid literature showing that activities–MBSR**

Cognitive remediation group therapy

and BTA in this study, although other studies have employed a range of activities—may engender mutual aid amongst group members (Miller et al., 2021; Rosenwald et al., 2013)

Compared with other studies, a strength of this pilot was its use of an active comparator as mindfulness trials are often limited by an inactive control (Dunning et al., 2019). Another strength was involvement of people aging with HIV and community-based organizations as this community connection may enhance the pilot's potential for a full-scale trial following refinement (Justice et al., 2016).

Compared with other studies, the consistent practice of BTA and MBSR activities was unusually sustained for a three-month follow-up (Russell-Williams et al., 2018; Vance et al., 2018). This may be attributable to the CRGT model of administering these interventions together, in a group setting. BTA has been delivered as a predominantly individual intervention (Tappen & Hain, 2014), whereby brain training software or activity books are given to people individually with the expectation that they will practice in isolation (Vance et al., 2018). This passive approach leads to high drop-off rates; while completers receive the self-reported coping benefit discussed above, upwards of half of a BTA trial's participants do not adhere to the training regimen as prescribed (Barnes et al., 2009; Tappen & Hain, 2014). MBSR has stronger completion rates, possibly due to its delivery in group settings where participants attend not solely for their own therapy but also for the social connection inherent in support groups (Goldin & Gross, 2010). Yet, MBSR participants living with mild-to-moderate dementia bemoan the intervention's lack of practical resources to address their cognitive deficits (Russell-Williams et al., 2018). Therefore, the novel CRGT arm blending the practical (e.g., BTA) and emotional (e.g., MBSR) may offer an intervention package that supports regular practice of these activities, enhancing their potential to ameliorate the effects of cognitive impairment.

Cognitive remediation group therapy

Group therapy for people aging with HIV and cognitive challenges is a novel form of support for this population and may ease the burden of living with these comorbid challenges. This pilot found that a complex group intervention that involved physical movement of MBSR, talk therapy, and online BTA use with a tablet were all feasible and acceptable intervention components for participants. Requiring a formal HAND diagnosis may limit eligibility too greatly, given the intensive screening requirements and the lack of sites that offer screening. Broadening these intervention techniques to people aging with HIV with cognitive challenges regardless of a formal HAND diagnosis may enhance the success of a larger study.

While the small sample requires that this trial's positive results be interpreted with some caution, we found no evidence of study-related harms. As MBSR and BTA have helped ameliorate the stress and anxiety of cognitive decline in the general population with dementia and given that their combination here was feasible and acceptable to people aging with HIV, the continuation of this expansion of this CRGT approach may be justified for this population. A larger trial would require a more substantial sampling frame, likely consisting of multiple sites. To feasibly implement a larger trial of this nature with similar community connectedness, a pragmatic trial design such as a waitlisted crossover may be the ideal method since it would offer CRGT to all participants, eventually, while assessing outcomes against a waitlisted control. This direction for future research would only be possible once the COVID-19 pandemic is contained and in-person group therapy resumes. As physical spaces for MBSR are already required to be spacious (sufficient for participants to lie down on yoga mats, for example), a physically distanced group space may be possible. Nonetheless, long-term persistence of COVID-19 and its associated restrictions on in-person gatherings would require that CRGT be adapted to a remote

Cognitive remediation group therapy

form of delivery. Monitoring the pandemic's course would help determine when it may be contained and to what extent, if any, adaptations to the CRGT intervention would be needed.

Limitations

This trial has several limitations. A small sample size limits outcome assessment and interpretation. This small sample may be the result of limiting recruitment to a single site and/or a formal diagnosis of mild-to-moderate HAND, which requires intensive neuropsychological screening. The lack of participant masking poses a risk to performance bias whereby participant responses may have been affected by allocation to the novel or control arm. Assessing fidelity from facilitator reports risks reporting bias, where the facilitators may have exaggerated the groups' progress. Recording sessions may be a more rigorous measure of fidelity, although this method raises privacy concerns in a stigmatized population.

Conclusion

This pilot study presents results from the first known implementation of group therapy for people with HAND, with a multifaceted evaluation and an active comparator. **The novel arm of cognitive remediation group therapy combined MBSR and BTA with mutual aid elements, which may be a powerful combination of treatment strategies.** A larger trial is needed to determine the effectiveness of cognitive remediation group therapy for people aging with HIV and cognitive challenges.

References

Author, 2017a; 2017b; 2019a; 2019b

Alford, K., & Vera, J. H. (2018). Cognitive impairment in people living with HIV in the ART era: A review. *British Medical Bulletin*, *127*(1), 55-68. <https://doi.org/10.1093/bmb/ldy019>

Antinori, A., Arendt, G., Grant, I., Letendre, S., Muñoz-Moreno, J. A., Eggers, C., & the Mind Exchange Working Group. (2013). Assessment, diagnosis, and treatment of HIV-associated neurocognitive disorder: A consensus report of the mind exchange program. *Clinical Infectious Disease* *56*(7), 1004-1017. <https://doi.org/10.1093/cid/cis975>

Barnes, D. E., Yaffe, K., Belfor, N., Jagust, W. J., DeCarli, C., Reed, B. R., & Kramer, J. H. (2009). Computer-based cognitive training for mild cognitive impairment: Results from a pilot randomized, controlled trial. *Alzheimer Disease & Associated Disorders*, *23*(3), 205-210. <https://doi.org/10.1097/WAD.0b013e31819c6137>

Bateganya, M. H., Amanyiwe, U., Roxo, U., & Dong, M. (2015). Impact of support groups for people living with HIV on clinical outcomes: A systematic review of the literature. *JAIDS*, *68*, S368-S374. <https://doi.org/10.1097/QAI.0000000000000519>

Berk, L., Hotterbeekx, R., van Os, J., & van Boxtel, M. (2017). Mindfulness-based stress reduction in middle-aged and older adults with memory complaints: A mixed-methods study. *Aging and Mental Health*, *22*(8), 1113-1120. <https://doi.org/10.1080/13607863.2017.1347142>

Bohlmeijer, E., ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*, *18*, 308-320. <https://doi.org/10.1177/1073191111408231>

Cognitive remediation group therapy

Borrelli, B. (2011). The assessment, monitoring, and enhancement of treatment fidelity in public health clinical trials. *Journal of Public Health Dentistry*, 71(s1), S52-S63.

<https://doi.org/10.1111/j.1752-7325.2011.00233.x>

Bourgeois, A. C., Edmunds, M., Awan, A., Jonah, L., Varsaneux, O., & Siu, H. (2017). HIV in Canada – Surveillance report. *Canadian Communicable Disease Reports*, 43(12), 248-256. <https://doi.org/10.14745/ccdr.v43i12a01>

Centres for Disease Control and Prevention. (2018). *HIV among people aged 50 and older*.

<https://www.cdc.gov/hiv/group/age/olderamericans/index.html>

Clifford, D. B., & Ances, B. M. (2013). HIV-associated neurocognitive disorder (HAND).

Lancet Infectious Disease, 13, 976-986. [https://doi.org/10.1016/S1473-3099\(13\)70269-X](https://doi.org/10.1016/S1473-3099(13)70269-X)

Dunning, D., Griffiths, K., Kuyken, W., Crane, C., Foulkes, L., Parker, J., & Dalgleish, T. (2018).

Research review: The effects of mindfulness-based interventions on cognition and mental health in children and adolescents – a meta-analysis of randomized controlled trials. *Journal of Child Psychology and Psychiatry*, 60(3), 244-258. <https://doi.org/10.1111/jcpp.12980>

Eldridge, S. M., Lancaster, G. A., Campbell, M. J., Thabane, L., Hopewell, S., Coleman, C. L.,

& Bond, C. M. (2016). Defining feasibility and pilot studies in preparation for randomised controlled trials: Development of a conceptual framework. *PLoS One*, 11(3), e0150205. PMID:26978655

Gandoy-Crego, M., Clemente, M., Gómez-Cantorna, C., González-Rodriiguez, R., & Reig-Botella, A.

(2016). Self-efficacy and health: The SEH scale. *American Journal of Human Behavior*, 40, 389-395. <https://doi.org/10.5993/AJHB.40.3.11>

Cognitive remediation group therapy

- Gerolimos, L. A., Ciliberti, C. M., Gregg, J. J., Nazem, S., Bamonti, P. M., Cavanagh, C. E., & Edelstein, B. A. (2015). Development and preliminary evaluation of the anxiety in cognitive impairment and dementia (ACID) scales. *International Psychogeriatrics*, 27(11), 1825-1838. <https://doi.org/10.1017/S1041610215001027>
- Goldin, P. R., & Gross, J. J. (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion*, 10, 83-91. <https://doi.org/10.1037/a0018441>
- Greene, M., Covinsky, K. E., Valcour, V., Miao, Y., Madamba, J., Lampiris, H. ... Deeks, S. G. (2015). Geriatric syndromes in older HIV-infected adults. *Journal of AIDS*, 69(2), 161-167. <https://doi.org/10.1097/QAI.0000000000000556>
- Heaton, R. K., Franklin, D. R., Deutsch, R., Letendre, S., Ellis, R. J., Casaletto, K., ... & Grant, I. (2015). Neurocognitive change in the era of HIV combination antiretroviral therapy: The longitudinal CHARTER study. *Clinical Infectious Diseases*, 60(3), 473-480.
- Hopcroft, L., Bester, L., Clement, D., Quigley, A., Sachdeva, M., Rourke, S. B., & Nixon, S. A. 'My body's a 50 year-old but my brain is definitely an 85 year-old': Exploring the experiences of men ageing with HIV-associated neurocognitive challenges. *Journal of the International AIDS Society*, 16(18506). <https://doi.org/10.7448/IAS.16.1.18506>
- Illa, L., Echenique, M., Bustamante-Avdellaneda, V., & Sanchez-Martinez, M. (2014). Review of recent behavioral interventions targeting older adults living with HIV/AIDS. *Current HIV/AIDS Reports*, 11, 413-422. <https://doi.org/10.1007/s11904-014-0231-y>
- Justice, J., Miller, J. D., Newman, J. C., Hashmi, S. K., Halter, J., Austad, S. N., Barzilai, N., & Kirkland, J. L. (2016). Frameworks for proof-of-concept clinical trials of interventions that target fundamental aging processes. *The Journals of Gerontology: Series A*, 71(11), 1415-1423. <https://doi.org/10.1093/gerona/glw126>

Cognitive remediation group therapy

- Kabat-Zinn, J., Blacker, M., Herbert, G., & Fulwiler, C. (2017). *Mindfulness-based stress reduction (MBSR) authorized curriculum guide*. <https://www.umassmed.edu/globalassets/center-for-mindfulness/documents/mbsr-curriculum-guide-2017.pdf>
- Lenferink, L. I. M., de Keijser, J., Wessel, I., & Boelen, P. A. (2019). Cognitive behavioural therapy and mindfulness for relatives of missing persons: A pilot study. *Pilot and Feasibility Studies*, 5, 93. <https://doi.org/10.1186/s40814-019-0472-z>
- Marcus, J. L., Leyden, W. A., Alexeeff, S. E., Anderson, A. N., Hechter, R. C., Hu, H., Lam, J. O., Towner, W. J., Yuan, Q., Horberg, M. A., & Silverberg, M. J. (2020). Comparison of overall and comorbidity-free life expectancy between insured adults with and without HIV infection, 2000-2016. *JAMA Network Open*, 3(6), e207954. <https://doi.org/10.1001/jamanetworkopen.2020.7954>
- Milanini, B., & Valcour, V. (2017). Differentiating HIV-associated neurocognitive disorders from Alzheimer's disease: An emerging issue in geriatric neuro HIV. *Current Opinion in HIV/AIDS Reports*, 14, 123-132. <https://doi.org/10.1007/s11904-017-0361-0>
- Miller, R., Mason, S., & Skolnik, S. (2021). Psychodrama for schizophrenia: Adaptive techniques in mutual aid groups. *Social Work with Groups*, 44(3), 273-287. <https://doi.org/10.1080/01609513.2021.1936844>
- Packham, K. J., & Rinaldis, M. (2002). Development of the HIV/AIDS stress scale. *Psychology & Health*, 17(2), 203-219. <https://doi.org/10.1080/08870440290013680>
- Rodakowski, J., Saghafi, E., Butters, M. A., & Skidmore, E. R. (2015). Non-pharmacological interventions for adults with mild cognitive impairment and early stage dementia: An updated scoping review. *Molecular Aspects of Medicine*, 43-44, 38-53. <https://doi.org/10.1016/j.mam.2015.06.003>

Cognitive remediation group therapy

Rosenwald, M., Smith, M., Bagnoli, M., Riccelli, D., Ryan, S., Salcedo, L., & Seeland, D.

(2013). Relighting the campfire: Rediscovering activity-based group work. *Social Work with Groups*, 36(4), 321-331. <https://doi.org/10.1080/01609513.2013.763326>

Russell-Williams, J., Jaroudi, W., Perich, T., Hoscheidt, S., El Haj, M., & Moustafa, A. A.

(2018). Mindfulness and meditation: Treating cognitive impairment and reducing stress in dementia. *Review of Neuroscience*, 29(7), 791-804.

<https://doi.org/10.1515/revneuro-2017-0066>

Schiff, M., & Bargal, D. (2000). Helping characteristics of self-help and support groups: Their

contribution to participants' subjective well-being. *Small Group Research*, 31(3), 275-

304. <https://doi.org/10.1177/104649640003100302>

Shulman, L. (1986). The dynamics of mutual aid. *Social Work with Groups*, 8(4), 51-60.

https://doi.org/10.1300/J009v08n04_06

Spudich, S. (2013). HIV and neurocognitive dysfunction. *Current HIV/AIDS Reports*, 10, 235-

243. <https://doi.org/10.1007/s11904-013-0171-y>

Steinberg, D. M. (2000). The impact of time and place on mutual-aid practice with short-term

groups. *Social Work with Groups*, 22(2-3), 101-118.

https://doi.org/10.1300/J009v22n02_07

Tappen, R. M., & Hain, D. (2014). The effect of in-home cognitive training on functional

performance of individuals with mild cognitive impairment and early-stage Alzheimer's disease. *Research in Gerontological Nursing*, 7(1), 14-24.

<https://doi.org/10.3928/19404921-20131009-01>

Cognitive remediation group therapy

- Tedaldi, E., Minniti, N., & Fischer, T. (2015). HIV-associated neurocognitive disorders: The relationship of HIV infection with physical and social comorbidities. *BioMed Research International*, 2015(641913), 1-13.
- Toms, G. R., Clare, L., Nixon, J., & Quinn, C. (2015). A systematic narrative review of support groups for people with dementia. *International Psychogeriatrics*, 27(9), 1439-1465. <https://doi.org/10.1017/S1041610215000691>
- Vance, D. E., Jensen, M., Tende, F., Raper, J. L., Morrison, S., & Fazeli, P. L. (2018). Individualized-targeted computerized cognitive training to treat HIV-associated neurocognitive disorder: An interim descriptive analysis. *Journal of the Association of Nurses in AIDS Care*, 29(4), 604-611. <https://doi.org/10.1016/j.jana.2018.04.005>
- Wong, W. P., Coles, J., Chambers, R., Wu, D. B., & Hased, C. (2017). The effects of mindfulness on older adults with mild cognitive impairment. *Journal of Alzheimer's Disease Reports*, 181-193. <https://doi.org/10.3233/ADR-170031>