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Psychosocial Effects of Remote Reading with Telephone Support versus In-Person Health Education for Diverse, Older Adults

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Abstract

This study evaluated initial information about psychosocial differences of 130 diverse, older adults (*M* age: 70.8 ± 9.2 years) who received a "low-tech" remote (independent reading with telephone support) or in-person education through *DREAMS* (*Developing a Research Participation Enhancement and Advocacy Training Program for Diverse Seniors*) health seminar series. Outcomes on measures of depression, quality of life, and spatial extent of lifestyle of 115 completers were analyzed at baseline, immediately post-intervention, and 8-week follow-up. Adjusted at baseline, psychosocial outcomes were compared between groups at post-test and 8-week follow-up using adjusted mean differences. Post-participation, compared to remote participants, in-person participants had significantly lower depression on Beck Depression Inventory-II, Geriatric Depression Scale, and significantly higher mental quality of life on Short Form-12. This study links knowledge acquisition via in-person learning with decreased stress, depression, and increased quality of life among seniors. Identifying effective educational delivery methods may increase clinical research involvement for aging communities.

Keywords

health education, telehealth, cognition, psychosocial wellness, COVID-19

What this paper adds

- Greater insight on how different experiences of knowledge acquisition (in-person group learning vs. remote telephone support one-on-one learning) may affect psychosocial outcomes for the aging community.
- Analyzes the *DREAMS* program to further understand how the delivery of curriculum (in-person vs. remote) may truly play a role in the health improvement of diverse, older adults.
- In-person group learning of health education reduces depression and increases mental quality of life among aging communities.

Applications of study findings

- Encourages gerontological researchers to explore additional "low-tech" health education models that emphasize in-person group learning and motivates educators to assess psychosocial well-being for aging communities.
- Future gerontological research, regarding how knowledge acquisition may impact one's health, should include *Learning Theory* concepts to guide small group discussion and maintain information retention.

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- Barriers to tele-conferencing education platforms are prominent among diverse, older adults; therefore, gerontological researchers are encouraged to utilize "low-tech" remote models to improve the overall health and well-being of aging communities in future gerontological research.

Introduction

Older populations are encouraged to learn health topics to enhance awareness of concepts studied in clinical settings and improve their well-being. In fact, research in cognitive psychology reveals that discussing educational concepts and connecting new and familiar learned material may enhance mental vitality (Mukhalalati & Taylor, 2019). Therefore, engagement in educational tasks may help older adults improve brain function, promote healthier behaviors, and enhance performance of activities of daily living (ADLs) (Willis et al., 2006). Specifically, educational programs that focus on health promotion in relation to the aging process have effectively improved the quality of life and physical well-being of diverse, older adults (Lima et al., 2017). Health education seminars, thus, may also contribute to improving cognitive mental processes, such as information processing, memory, and attention, and psychosocial well-being (Kueider et al., 2014).

In-person health education programs have historically existed as an effective method to enhance learning and may enhance psychosocial wellness (Chan et al., 2021). In-person educational environments promote collaboration which may lead to increased interpersonal group interactions and social relationships, specifically due to perspective taking and thoughtful communication that occurs in the presence of peers (Perry et al., 2019). Furthermore, amplifying social engagement with individuals beyond one's social circle of family and close friends may allow for greater level of cognitive and physical activity (Gardner, 2014). Although there are several benefits to in-person learning, substantial barriers to this type of education include limited time flexibility to learn content and difficulty in commuting to an in-person learning environment (i.e., lack of mobility and transportation) (Chan et al., 2021). Therefore, telehealth approaches are increasingly popular, and 2020's COVID-19 pandemic highlighted the need for more e-health options (Garfin, 2020).

While in-person interventions emphasize group interaction, remote learning prioritizes individual study and one-on-one accountability. Advantages of remote one-on-one learning include that it may lead to lower social anxiety and increased attention to educational material due to avoidance of overstimulation and distractions from peers (Yen et al., 2012). Disadvantages to remote learning include the following: individuals may require greater self-motivation to learn the educational material, and they might need to meet tougher technical and/or technological requirements (Alzahrani, 2020). However, remote approaches are reproducible and can be tailored to the needs of a particular population via "low-tech" methods.

Telehealth videoconferencing programs may galvanize research participation, as "senior university"-style online seminars are offered throughout the nation; however, older adults with lower socioeconomic status may have limited accessibility to technological-resources required for participation (Hansen & Reich, 2015). Although web-based programs (e.g., Zoom, Google Meet, etc.) may enhance cognition, they are also prone to technical failure (Realdon et al., 2016). Thus, active learning using "low-tech" remote tools, such as hard copy reading materials and telephone support, may act as an alternative solution. "Low-tech" programs have several advantages, including avoidance of technical difficulties and reduction on knowledge gaps in technological proficiency (Vaportzis et al., 2017). A "low-tech" telephone support design is also more barrier-free compared to videoconferencing. Answering a phone call may be a simpler approach that is widely accessible to older populations (Rush et al., 2018). Additionally, "low-tech" remote learning via workbook and telephone support may be an effective comparison study arm because it emphasizes the impact of individual learning versus group, partnered learning observed during in-person health education (Chan et al., 2021; Linton et al., 2014).

The DREAMS program, developed from 2014–2016, (*Developing a Research Participation Enhancement and Advocacy Training Program for Diverse Seniors*) is as an educational framework that utilized "low-tech" methods to increase interest in clinical research among diverse seniors (Perkins et al., 2019). This program was designed as an eight-week health education seminar and was co-taught by professional researchers and medical students (Hart et al., 2017). The curriculum educated participants about current translational and clinical aging research related to various medical disciplines, and the weekly courses improved older adults' knowledge of ongoing research and healthy-aging principles via engaging lectures and group discussion (Perkins et al., 2019). First, an in-person curriculum, the program was later adapted, prior to the COVID-19 pandemic, as a more accessible remote intervention with weekly reading modules read independently by participants followed by telephone support.

The DREAMS program effectively benefitted diverse older adults by increasing their participation, self-efficacy, and attitudes towards research. Participants also reported to be highly satisfied with the health education program and found the curriculum to be informative for improving their own health (Dillard et al., 2018). Thus, this study can further

explore if "low-tech" delivery methods of health education, In-person or Remote, may impact the psychosocial wellness of diverse, older adults.

The Present Study

This non-randomized two-arm study compares two "low-tech" programs: In-person and Remote DREAMS. In-person participants experienced interactive lectures and group discussions about health topics. Remote participants read lessons independently, receiving weekly calls telephone calls from the research team to discuss the weekly module.

The purpose of this study is (1) compare the efficacy of the Remote versus In-person DREAMS for measures of psychosocial determinants (depression, quality of life (QOL), and spatial extent of typical lifestyle); and (2) compare psychosocial performance between in-person and remote participants after intervention (immediate post-test and 8-week follow-up).

Hypothesis

If learning via lecture and small peer group discussions is related to improved psychosocial performance outcomes, In-person DREAMS will be more effective. If enhanced psychosocial performance is associated with independent learning from a take-home binder and 1:1 phone discussion, Remote DREAMS will be more effective. We hypothesized in-person participants would exhibit greater psychosocial function after intervention compared to remote participants.

Methods

EmoryUniversity Institutional Review Board approved protocol #IRB-00080676; all participants provided informed consent. Study was conducted from 2015 to 2017, prior to 2020 COVID-19 pandemic.

Participants

Older adults (55+ years) in the metro-Atlanta area were recruited from community partner organizations and senior living facilities, including but not limited to Clairmont Oaks, Wesley Woods Tower, Briarcliff, Lenbrook, and Branan Towers (Dillard et al., 2018). Interested older adults were contacted to schedule initial assessments, and those who were enrolled were sequentially assigned to an 8-week program of in-person or remote education. 130 participants in total were included in the study (In-person n = 95; Remote n = 35). Remote participants were recruited after many of the in-person participants were recruited for this study, explaining the imbalance of participants between study groups.

DREAMS Program Description

The DREAMS program incorporated Community Based Participatory Research strategies. The study team utilized vital information from patient stakeholder advisors' feedback and focus groups to build course content and target concerns, desires, biases, and questions from older adults in the metro-Atlanta area. The DREAMS curriculum included participatory elements throughout (Hart et al., 2017).

In-person DREAMS

Part 1 of DREAMS included in-person sessions co-taught by medical students and local investigators. Participants met once per week over eight consecutive weeks for 60 minutes of interactive lecture followed by 30 minutes of small group discussion. "Research and Creativity in Later Life" was the first introductory class. Other class topics concerned speakers' expertise, related to health and well-being (Dillard et al., 2018; Perkins et al., 2019). The small group discussions that followed the lecture were led by DREAMS research staff and student volunteers. The questions asked during the group discussions included:

1. What did you learn today?
2. Did anything strike you as particularly interesting, novel, new?
3. What did you know about (topic) before you arrived today?
4. How will you use this information to change your life?
5. What would you tell your peer group about today's lecture?

Learning Theory. The *Learning Theory* states that discussing educational concepts with others and drawing connections between new and familiar learned material may enhance information retention and mental vitality (Mukhalalati & Taylor, 2019). Several *Learning Theory* concepts were introduced during the first module to inform participants about the concepts underlying the DREAMS pedagogy. Therefore, during the in-person 30-minute small group/partnered sessions, participants were asked to (1) summarize the information learned with a partner in their own words, which was aided by moderators who encouraged verbal recollection from participants by teasing out the given presentation's major points (Craik & Tulving, 1975); (2) identify what participants found novel and familiar from each topic and relate how the new information adds to their prior knowledge. This step was required because a learner who utilizes prior knowledge in their comprehension is more likely to incorporate new information into their long-term memory store, that is, their "knowledge" (Medin & Ross, 2001); (3) generate three or more questions about the educational material; and (4) present the questions for the lecturer to the larger group to exchange information and receive feedback. To guide the small group discussion, moderators asked questions to exercise *Learning Theory* concepts and guide participants' information retention (See Questions for In-Person DREAMS listed above).

Remote DREAMS

Due to the strong effects peer interaction may have on the efficacy of health-educational models, the need to control for peer interaction was recognized. Therefore, a remote program that emphasized solo learning was developed and included. This program utilized take-home binders and telephone support. The take-home binders included eight weekly lesson plans, and participants were advised to complete one lesson per week (estimated completion time: 1.5 hours). Weekly lessons were derived from the in-person presentations and included the following topics: research, creativity, exercise, nutrition, infectious disease, family caregiving, kidney disease, and health disparities (Perkins et al., 2019).

Each lesson included 20–30 pages (14-point font) of accessible, eighth grade reading level material. Supplemental websites and videos were provided. Remote participants received weekly phone calls to ascertain progress and discuss each completed lesson. They were asked the same exact follow-up questions as in-person participants, such as what participants learned, if they found any concepts particularly interesting, and if they learned anything they could use later in their life. These questions provided via telephone support allowed participants to exercise the *Learning Theory* and played a significant role in participants recalling information from the educational material. Remote participants were also asked if they viewed the provided supplemental materials (e.g., informational websites) (Dillard et al., 2018).

Measures

Participants completed demographic surveys pre-intervention and were assessed at pre-intervention, post-intervention, and eight-week post-intervention follow-up. Assessors were blinded to group assignment. The following psychosocial measures were administered:

Beck Depression Inventory-II (BDI-II) and *Geriatric Depression Scale (GDS)* are self-reported surveys measuring depression. BDI-II is scored on a scale range from 0 to 63 and a higher score is associated with depression. GDS has a score range from 0 to 15, and scores higher than 5 indicate possible clinical depression (Beck et al., 1961; Yesavage et al., 1982).

The Short Form 12 (SF-12), a self-reported outcome measure, was used to evaluate mental and physical components of Quality of Life (QOL), with Physical Component Summary (PCS) and Mental Component Summary (MCS) subscales used for composite scores (Ware et al., 1996).

Life Space Questionnaire (LSQ) was used to measure the participants' spatial extent of their typical lifestyle. This questionnaire examines participants' living circumstances, routine behavior, and the extent of their functional mobility. LSQ assesses how much an individual engages with different places in a time frame and evaluates participants' spatial extent, their mobility, and independence in the typical life space of community-dwelling older adults. LSQ asks nine questions about whether respondents have been to certain environmental spaces, from rooms within their homes to traveling outside of their home region, in the last three days. Scores range from 0 to 9, with 1 point corresponding to each time respondents answer "yes" (Peel et al., 2005; Stalvey et al., 1999).

Data Analysis

Demographics were compared between groups using Chi-square and Fischer's exact tests for categorical variables and one-way analysis of variance for continuous variables. For outcome analyses, covariates age, sex, education years, and fall worry were controlled for demographic group differences. Adjusting for baseline values collected at pre-test and covariates, analysis of covariance was used to compare psychosocial differences between groups after intervention. Group × timepoint interaction was first included but then dropped due to non-significance found in the change of outcomes from post-test to eight-week follow-up between groups. Thus, performance outcomes were analyzed after intervention (at post-test and at eight-week follow-up) without group × time interaction to obtain the adjusted group mean differences (β coefficients) between in-person and remote groups with baseline variance removed. Adjusted mean differences were compared with the remote group coded as 0 and in-person group coded as 1. For example, negative coefficients for variables in which higher values indicated a better outcome suggests remote participants performed better after intervention. Significance level was p-value <.05. Statistical analyses were completed using R software (version 3.4.4).

Results

130 older adults participated (age 70.8 ± 9.2; In-person DREAMS, n = 95; Remote DREAMS, n = 35). In-person DREAMS participants were significantly older than remote participants. Other demographic characteristics were similar (Table 1).

Psychosocial Outcomes

Based on the hypothesis that in-person participants would exhibit greater psychosocial function after intervention compared to remote participants, the BDI-II, GDS, and SF-12 MCS test results were indicative of this forethought. In-person participants had significantly lower depression compared to remote participants after intervention on BDI-II ($\beta = -1.7$, $p = .002$) and GDS ($\beta = -0.3$, $p = .02$). In-person participants had significantly higher SF-12 MCS ($\beta = 2.4$, $p = .01$) compared to remote participants following intervention. In-person participants did not perform significantly different in comparison to remote participants on PCS ($\beta = -1.1$, $p = .1$) and LSQ ($\beta = -0.2$, $p = .1$) after intervention (Table 2).

Table 1. Demographic Characteristics by Group (In-person vs. Remote).

Characteristics	Total (n = 130) Mean (SD)/*N* (%)	In-Person (n = 95) Mean (SD)/*N* (%)	Remote (n = 35) Mean (SD)/*N* (%)	*p* Values
Sex[a]				.8
Female	84 (64.6)	62 (65.2)	22 (62.8)	
Male	46 (35.3)	33 (34.7)	13 (37.1)	
Age (years)[b]	70.8 (9.2)	72 (9.5)	68 (8.0)	.03*
Educations (years)[b]	15.8 (2.2)	16 (2.2)	15.5 (2.2)	.4
Marital status[a]				.6
Single	16 (12.3)	10 (10.5)	6 (17.1)	
Married	61 (47)	45 (47.4)	16 (45.7)	
Other	53 (40.8)	40 (42.1)	13 (37.1)	
Ethnicity[a]				.4
Black	51 (39.8)	35 (37.6)	16 (45.7)	
White	66 (51.6)	48 (51.6)	18 (51.4)	
Other[c]	11 (8.6)	10 (10.8)	1 (2.9)	
Housing[a]				.06
House/Apt/Condo	96 (73.9)	65 (68.4)	31 (88.6)	
Senior housing	31 (23.9)	27 (28.4)	4 (11.4)	
Other[d]	3 (2.3)	3 (3.2)	0 (0)	
Transportation[a]				.9
Drive own vehicle	102 (79.7)	74 (79.6)	28 (80)	
Other[e]	26 (20.3)	19 (20.4)	7 (20)	
Years retired[b]	11.6 (10.7)	12.3 (11.7)	9.4 (6.7)	.3
Number of comorbidities[b]	3.1 (2.2)	3 (2.1)	3.2 (2.7)	.7
Use assistive device for walking[a]				.054
No	97 (74.6)	72 (75.8)	25 (71.4)	
Yes	20 (15.4)	11 (11.6)	9 (25.7)	
Sometimes	13 (10)	12 (12.6)	1 (2.9)	
Number of medications[b]	4.1 (3.5)	3.9 (3.3)	4.7 (4.1)	.3
Falls in previous year[b]	0.9 (2.7)	0.7 (1.8)	1.7 (4.2)	.06
Fall worry[b]	2.5 (1.4)	2.6 (1.5)	2.2 (1.2)	.1
Self-rated quality of life[b]	5.5 (1.2)	5.5 (1.2)	5.6 (1.4)	.7
Composite Physical Function (CPF) Score (/24)[b]	20 (5.1)	20.1 (5)	19.6 (5.5)	.7
Frequency of leaving house[a]				.4
<1 per week	2 (1.5)	2 (2.1)	0 (0)	
1–2 times per week	8 (6.2)	4 (4.2)	4 (11.4)	
3–4 times per week	48 (37)	34 (35.8)	14 (40)	
Everyday	72 (55.4)	55 (57.9)	17 (48.6)	

[a]Chi-square tests or Fisher's exact tests were used for categorical variables.
[b]One-way ANOVA were used for continuous variables.
[c]Includes Asian, Hispanic/Latino, Native American, Multiracial, and other races.
[d]Includes assisted living, relative homes, and others.
[e]Includes family/friends drive, transportation service, and public transportation.
*p values indicate significant differences between groups at the 0.05 level.

Discussion

The present study compared In-person and Remote DREAMS to examine measures of psychosocial function among older adults. After adjusting for demographic covariates and baseline values, we can conclude that there is a significant difference in psychosocial performance for in-person and remote participants following the intervention.

We hypothesized in-person participants would exhibit greater overall psychosocial outcomes after intervention compared to remote participants, and the results aligned with our hypothesis.

Psychosocial Performance

Compared to remote and independent learning, in-person group learning reduces stress and increases purpose among

Table 2. Pre-test, Post-test, and Follow-Up Values for Psychosocial Measures in DREAMS In-person versus Remote Group.

	Pre Mean ± SD/*N* (%)	Post Mean ± SD/*N* (%)	Follow-up Mean ± SD/ *N* (%)	F Statistic	Adjusted Group Mean Difference (β)[a]	*p* Values of Group × Time Interaction[b]	*p* Values[c,d]
Beck Depression Index-II (/63)[e]				9.7	−1.7	1.0	.002*
In-person	7.3 ± 6.2	6.8 ± 6.4	6.4 ± 5.5				
Remote	8 ± 7.1	8.9 ± 7.1	8.5 ± 8.3				
Geriatric Depression Scale (/15)[f]				5.5	−0.3	0.4	.02*
In-person	2.1 ± 2.3	2.2 ± 2.2	2.3 ± 2.8				
Remote	2.6 ± 2.5	3 ± 3.1	2.7 ± 3.1				
Short form-12 (/100) Mental component summary				7.2	2.4	0.5	.01*
In-person	53 ± 7.8	54 ± 8.2	54 ± 8.2				
Remote	52.4 ± 9.8	50.8 ± 8.7	52.1 ± 9.6				
Physical component summary				2.4	−1.1	0.8	.1
In-person	46 ± 9.6	44.9 ± 11	45.1 ± 11.5				
Remote	46 ± 12.3	46.2 ± 12	46.8 ± 11				
Life Space Questionnaire				2.2	−0.2	0.5	.1
In-person	6.5 ± 1	6.2 ± 1.1	6.4 ± 1.3				
Remote	6.4 ± 1.3	6.4 ± 1.2	6.7 ± 1				

[a]β coefficient; remote coded as 0 and in-person coded as 1; for example, negative coefficients for variables in which higher values indicated a better outcome suggests remote group performed better after intervention.
[b]Performance difference with group × time interaction (not used for analyses due to non-significance).
[c]Repeated measures analysis of covariance (ANCOVAs) analyzing adjusted mean differences on psychosocial measures between DREAMS in-person (n = 80) versus remote group (n = 35) after intervention; adjusted for baseline performance and covariates age, sex, education years, and fall worries.
[d]Performance difference with the main effect of group that does not include group × time interaction (used for analyses).
[e]Higher Scores indicate worsening function/performance.
[f]Score >5 points suggests depression.
*p values indicate significant differences at the 0.05 level.

students due to peer support, which may have contributed to overall lower depression among in-person participants (Hammond, 2004). Higher mental QOL after intervention suggests in-person participants, in comparison to remote participants, had fewer role limitations caused by emotional problems, vitality, social functioning, and mental health. Increased mental QOL after intervention also suggests in-person participants had greater confidence and reduced anxiety when collaborating with peers in comparison to remote participants. The different experiences of remote, independent workbook learning via telephone support versus group learning via in-person lectures may have acted as a determinant factor on psychosocial outcomes.

Limitations

This study had several limitations. Participants were recruited solely from the metro-Atlanta region and the findings may not be generalizable to older populations not living in this region. Remote DREAMS had a smaller sample size than In-person DREAMS. Thus, unequal sample sizes may reduce power to detect effects and increase the chances of making a Type I, that is, "false positive," error (Rusticus & Lovato, 2014). Also, our participant groups had unequal sample sizes due to remote participants being recruited later after many in-person participants had already been recruited for this study. We recruited as many remote participants as the timeline could support—admittedly, resources for the remote group were somewhat limited (e.g., staff members to make calls to participants). Therefore, a convenient sample of 35 individuals was assigned to Remote DREAMS. Participants also were not offered a treatment choice; therefore, the trial was not randomized. Our study was a non-randomized two-arm study intervention, thus, unmeasured differences in Remote versus In-person DREAMS may have affected results unknowingly. A potential confounding variable includes lack of blinding to group treatment, although participants were not informed whether they were in the experimental or control group. Furthermore, assessor biases may have not been controlled for; although our research staff with great effort tried to retain objectivity during assessments, staff members may have not been fully objective when assessing participants due to varying factors.

Conclusion

In conclusion, studying aging communities may be useful for understanding how knowledge acquisition from in-person and remote methods links to health wellness. Future measures of clinical significance may determine *how* meaningful psychosocial performance differences are in aging communities (Ranganathan et al., 2015). To determine if improved psychosocial wellness among in-person participants is a long-lasting effect from our study, a follow-up assessment after a few years could be compelling. Specific differences in performance between both groups will be utilized to power a larger, controlled trial in the future.

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection, and data analysis were performed by Liang Ni, Allison A. Bay, Ariel Hart, Molly Perkins, and Madeleine E. Hackney. The first draft of this manuscript was written by Anjali Shah and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

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Ethical Approval

Emory University Institutional Review Board provided ethical approval and approved protocol #IRB-00080676.

Informed Consent

All participants provided informed consent.

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