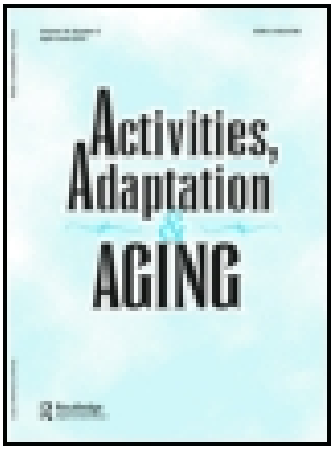

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Feasibility of a Yoga Intervention for Enhancing the Mental Well-Being and Physical Functioning of Older Adults Living in the Community

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Feasibility of a Yoga Intervention for Enhancing the Mental Well-Being and Physical Functioning of Older Adults Living in the Community

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This study assessed the feasibility of a yoga intervention to improve the mental and physical well-being of older adults. Convenience sampling was used to recruit 18 older adults living in a low-income housing complex. Utilizing a classical experimental design, the participants were assigned to either a yoga group or a socialization group; both met twice a week for an hour for four weeks. Results showed that although there is inconclusive evidence to demonstrate that the yoga intervention was superior to the socialization group in improving mental and physical health, yoga could provide some benefit for older adults.

KEYWORDS aging, intervention, evidence-based practice, recruitment, retention, yoga, older adults

The purpose of this study was to test the feasibility of a yoga intervention to improve the mental and physical well-being of older adults. The practice of yoga is holistic because it can help address issues of the body, mind, and spirit. In addition to the physical benefits of the practice of yoga, philosophical teachings, meditation, introspection, and self-study may stimulate the mind and increase hope, thereby reducing anxiety and helping to prevent or reduce the chance of depression. If an older adult can improve his or her physical functioning, it may increase not only his or her mental well-being but also his or her capacity for independent living. Regular physical activity

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can postpone disability and decrease morbidity and mortality, thus potentially counterbalancing some of the negative effects associated with aging (Lautenschlager, Almeida, Flicker, & Janca, 2004).

Yoga's self-regulatory approach (Singh, 2006) is congruent with the strengths-based perspective in social work, which focuses on the individual's own strengths and capacities. Yoga encourages the individual to take responsibility for his or her own care, possibly reducing the dependence on a physician or the use of medication (Singh, 2006). Furthermore, yoga connects to and strengthens parts of the self that lead to greater contentment. One of the principle philosophies of yoga is that everything that one needs psychologically and spiritually comes from within. The yogic philosophies encourage persons to look within themselves for their own happiness, rather than looking for external means of gratification.

Many of the studies that examine yoga as an intervention address the physical and mental health conditions that affect the older adult population, for example, depression, anxiety, stress, and low blood pressure; however, only eight studies specifically targeted older adults (Brown, Koziol, & Lotz, 2008; Chen et al., 2008; Chen & Tseng, 2008; Chen, Tseng, Ting, & Huang, 2007; Haber, 1983; Krishnamurthy & Telles, 2007; Lee, 2006; Oken et al., 2006). Of these studies, only two used a control and/or comparison group (Krishnamurthy & Telles, 2007; Oken et al., 2006). With the exceptions of Krishnamurthy and Telles (2007), who looked specifically at depression, and Oken et al. (2006), who examined cognition and quality of life, there are no studies that included a mental health–related outcome in older adults. Although the study conducted by Krishnamurthy and Telles (2007) showed positive results for yoga reducing depression in a controlled study, these findings may be limited to their study population, which was older Indian persons living in a residential facility in India. Pilkington, Kirkwood, Rampes, and Richardson (2005) found in their systematic literature review that none of the studies examining yoga as an intervention for depression included participants older than age 50. Thus, there are no studies looking at yoga as an intervention for depression in older adults except for older persons living in a residential facility in India.

METHODS

Research Design

This study followed a pretest–posttest control-group design with a random assignment of older adults to either a yoga intervention or a socialization comparison group. The entire intervention was conducted on three separate occasions and occurred at a Section 202 US Department of Housing and Urban Development (HUD) 60-unit low-income senior housing building in

a suburban area of Philadelphia. The data were collected on-site at the senior housing building by a nurse practitioner on three separate occasions (October 2007, January 2008, and March 2008).

The target population was adults age 60 and older who live independently in the community. The goal was to test yoga as an intervention in the general older adult population, rather than in a population with a specified illness or condition, in order to include as many participants as possible. The study population was the residents of the low-income housing building as well as their friends and/or family. A senior housing building was selected to minimize the difficulty of transportation and inconvenience for the participants. Individuals were ineligible if they were bedbound, age 59 or younger, currently participating in a yoga program, or unable to follow verbal commands in English.

This study utilized convenience sampling. Recruitment began with posting and distributing flyers to each resident, holding informational sessions, and the researcher attending the building's social and community events. The building social worker and building manager also helped promote awareness through word of mouth. Recruitment was considered exhausted after each eligible resident was contacted personally either by the researcher or the building social worker. If the resident expressed interest in participating, she or he was instructed to show up during the enrollment period.

The housing complex had 65 residents at the time of the study, 51 of whom were eligible. Of the 51 eligible residents, 18 (33.3%) enrolled in the study. All (100%) of the potential participants that were screened met the eligibility criteria. The sample contained a total of 18 participants, with 8 assigned to the yoga group and 10 assigned to the social group.

Intervention

The participants assigned to the yoga group were asked to participate in eight yoga sessions, which were held twice a week for four weeks. Each session lasted 1 hour and consisted of 45 minutes of posturing and breathing and 15 minutes of relaxation and teachings. The yoga intervention was held on-site at the housing building. A treatment manual that was created for the implementation of the intervention was developed in consultation with a nurse practitioner, a registered yoga teacher (RYT) experienced in teaching classes to older adults, and an exercise physiologist.

The participants who were assigned to the socialization comparison group attended hour-long sessions twice a week for four weeks where they were shown movies that were administered by the researcher. The participants in the socialization group were asked to continue with their daily routines and activities, to not participate in yoga classes, and to not discuss any of the parts of the intervention with the experimental group.

Measures

Depression measure

Depression was assessed using the 10-item Center for Epidemiological Studies Depression Scale (CES-D), which has been widely used in studies of depression in later life. The CES-D has a possible range of 0–10, with a higher score indicating a higher level of depression. In older adults, the 10-item CES-D was reported to have sensitivity at 100%, specificity at 93%, and positive predictive value at 38% (Irwin, Artin, & Oxman, 1999). The internal consistency reliabilities for this study at pre- and posttest were $\alpha = .80$ and $\alpha = .82$, respectively.

Morale measure

Morale was measured by the Philadelphia Geriatric Center Morale Scale-Revised (PGMS), a 17-item scale designed to measure psychological well-being in older adults in three factors: agitation, attitude toward one's own aging, and loneliness. The possible range is 0–17, with a higher score indicating a lower level of morale. The PGMS has a reported reliability of 0.81–0.85. Grann (2000) documented an average correlation of 0.73 with nine other measures of well-being. The internal consistency reliabilities for this study at pre- and posttest were $\alpha = .86$ and $\alpha = .86$, respectively.

Hope measure

Hope was measured using the Herth Hope Index (HHI; Herth, 1992), a 12-item index that measures areas of an individual's inner sense of temporality and future, inner positive readiness and expectancy, and interconnectedness with self and others. The possible range of scores is 12–48, with a higher score indicating a lower level of hope. The HHI has a reported reliability between 0.88 and 0.97 and a reported criterion validity between 0.73 and 0.92 (Grann, 2000). The internal consistency reliabilities for this study at pre- and posttest were $\alpha = .88$ and $\alpha = .84$, respectively.

Social isolation measure

Isolation was measured by using the 3-item UCLA Loneliness Scale. It has a possible range of 3–9, with a higher score indicating a higher level of loneliness. The UCLA Loneliness Scale is correlated with the 20-item Revised–UCLA Scale at 0.82 (Hughes, Waite, Hawkley, & Cacioppo, 2004). This version of the scale was developed specifically for older adults and has a reported alpha of 0.72. The internal consistency reliabilities for this study at pre- and posttest were $\alpha = .76$ and $\alpha = .86$, respectively.

Balance measure

The one-leg stand is a test used to measure balance (Gehlsen & Whaley, 1990; Kaye et al., 1994; Oken et al., 2006). Participants are asked to stand on one leg with their eyes open for as long as they can. The score is determined by the average duration, in seconds, the participant stands on each leg. The longer the duration, the greater the participant's balance. For this study, the test–retest reliability for this measure was $r = .63$ ($p < .04$).

Lower body strength measure

The sit-to-stand test is widely used (Guralnik et al., 1994; Oken et al., 2006) to measure lower body strength. The seated participant is asked to stand without the use of his or her arms. If the participant is successful, then she or he is timed doing it five more times. The score is the total time it took to stand from sitting. A shorter time indicates greater lower body strength. The test–retest reliability for the lower body strength measure for this study was $r = .61$ ($p < .02$).

Flexibility measure

The sit-and-reach test (Hoeger, 1992; Hong, Li, & Robinson, 2000; Hui, Yuen, Morrow, & Jackson, 1999; Oken et al., 2006; Shephard, Berridge, & Montelpare, 1990) was designed to measure flexibility in the hamstrings and lower back. The participant is asked to sit on the floor in with his or her legs in a V shape. A ruler is placed to measure how many centimeters she or he can reach forward. The score is the number of centimeters the participant is able to reach, with a higher score indicating a higher level of flexibility. The test–retest reliability for the flexibility measure for this study was $r = .20$ ($p > .05$).

RESULTS

Demographic Information

Participants were primarily Caucasian (72.2%); the remainder of the participants were African American (27.8%). The majority of the participants were female (88.9%). The mean age of the participants was 74.9 years ($SD = 8.4$), with a range of 62–91 years. The mean years of education for the participants was 13.6 ($SD = 2.7$), with a range of 8–18 years. Sixty-one percent of the participants were Protestant, with the remainder of the participants self-identified as "other." The majority (72.2%) of the participants reported religion as "very important," 16.7% reported religion as "somewhat important," and 11.1% reported religion as "not important." The average income

was $952 per month (*SD* = 319.02), with a range of $561–$1,532. One participant (5.6%) was married, seven (38.9%) were widowed, four (22.2%) were divorced, and five (27.8%) had never married. Statistical analyses were nonsignificant between the yoga and comparison groups with regard to demographics (see Tables 1 and 2).

To determine if the intervention and treatment groups differed with regard to the dependent variables, independent *t* tests were conducted between group membership and the pretest scores of the CES-D, the PGMS, the HHI, the UCLA Loneliness Scale, the one-leg stand test, the sit-to-stand test, and the sit-and-reach test. The results showed that the PGMS was

TABLE 1 Characteristics of Yoga Group (n = 8) and Socialization Group (n = 10) for Variables Measured at the Categorical Level

Characteristic	Yoga group		Socialization group		Fisher's exact test
	n	(%)	*n*	(%)	
Gender					
Male	0	(0%)	2	(20%)	
Female	8	(100%)	8	(80%)	.48
Ethnic background					
Caucasian	5	(62.5%)	8	(80%)	
African American	3	(37.5%)	2	(20%)	.61
Religious affiliation					
Protestant	5	(62.5%)	6	(60%)	
Other	3	(40.5%)	4	(40%)	1.00
Religious importance					
Very important	7	(87.5%)	6	(60%)	
Somewhat important	0	(0%)	3	(30%)	
Not important	1	(12.5%)	1	(10%)	[a]
Self-rated health					
Excellent/very good	2	(25%)	8	(53.3%)	
Good	4	(50%)	2	(20%)	
Fair	2	(25%)	2	(20%)	[a]
Current marital status					
Married	0	(0%)	1	(10%)	
Widowed/divorced	3	(42.9%)	8	(80%)	
Never married	4	(57.1%)	1	(10%)	[a]

[a]Variable not tested for association; used for descriptive purposes only.

TABLE 2 Characteristic Differences Between Yoga and Socialization Groups at Baseline for Variables Measured at the Continuous Level

Characteristic	Yoga group		Socialization group		*t* (*df*)
	M	(*SD*)	*M*	(*SD*)	
Age	75.5	(9.24)	74.5	(8.09)	.245 (16)
Education (in years)	11.9	(2.97)	13.9	(2.33)	−1.16 (15)
Monthly income (in dollars)	828.8	(314.44)	1105.5	(287.87)	−1.36 (7)

significantly different at pretest, with the yoga group showing much lower levels of morale than the social group. No other significant differences in pretest scores existed between the two groups.

The overall attendance rate for the entire study was 71.5%. The attendance rate was higher for those who were assigned to the yoga group (78.1%) than to the social group (66.4%), with the average number of sessions attended by each participant being 6.3 for the yoga group and 5.3 for the social group (out of 8 sessions). Attendance adherence steadily declined by wave for the overall study and for both groups (yoga group: October 2007 = 91.7%, January 2008 = 70.8%, March 2008 = 68.8%; social group: October 2007 = 91.7%, January 2008 = 65.6%, March 2008 = 41.6%). The overall mean number of sessions attended was 7.3 for October 2007, 5.4 for January 2008, and 4.2 for March 2008.

At the time of pretest, the overall the mean score for all the participants for the CES-D was 2.39 (SD = 2.5). For level of morale, the mean score of the PGMS for all the participants at pretest was 5.72 (SD = 4.32). The mean score for the HHI for all the participants at pretest was 17.39 (SD = 5.18). The mean score of the UCLA Loneliness Scale for all the participants at pretest was 5.17 (SD = 1.69).

The overall mean for the participants for the one-leg stand score at pretest was 5.45 seconds (SD = 3.29). The mean score for the sit-to-stand test was 20.41 seconds (SD = 13.24), with a range of 38. The overall mean score for the sit-and-reach test at the time of pretest was 24.85 centimeters (SD = 10.01), with a range of 36.5. With the exception of the sit-and-reach test, more variance in the scores for the yoga group existed than for the social group, indicating a wider range of functioning for the participants in the yoga group than in the social group.

Comparison of Group Scores at Posttest

The yoga group showed improvement from pre- to posttest in all the measures of mental well-being (CES-D, PGMS, HHI, and UCLA Loneliness Scale). The yoga group also showed improvement in the sit-to-stand and the sit-and-reach tests. A slight decrease was present in the score for the one-leg test, but it was not significant. The social group also showed improvement from pre- to posttest in all the measures of mental well-being (again, CES-D, PGMS, HHI, and UCLA Loneliness Scale), and showed improvement in the sit-and-reach test. However, the social group showed a decline in the one-leg and sit-to-stand tests.

Paired t tests were also conducted for each group to understand the differences between pre- and posttest. Statistical significance existed for improvement in the loneliness scale for the socialization group (p = .025), and a trend toward significance for the yoga group in the measures of sit-to-stand (p = .085) and sit-and-reach (p = .066). No other significant differences

TABLE 3 Mean Difference Between Pre- and Posttest by Group

	Mean difference	(*SD*)	*t* (*df*)	*p*
Yoga group				
CES-D	.857	(1.86)	1.22 (6)	.270
PGMS	2.14	(2.91)	1.95 (6)	.099
HHI	1.29	(2.87)	1.19 (6)	.281
UCLA Loneliness Scale	.43	(.98)	1.16 (6)	.289
One-leg test	−.70	(1.80)	−.67 (2)	.571
Sit-to-stand test	6.66	(6.55)	2.27 (4)	.085
Sit-and-reach test	−6.06	(5.39)	−2.52 (4)	.066
Socialization group				
CES-D	−.20	(1.99)	−.318 (9)	.758
PGMS	.70	(1.89)	1.17 (9)	.271
HHI	.50	(3.34)	.473 (9)	.647
UCLA Loneliness Scale	.70	(.82)	2.69 (9)	.025
One-leg test	.86	(2.87)	.84 (7)	.427
Sit-to-stand test	−10.36	(13.55)	−2.29 (8)	.051
Sit-and-reach test	−2.72	(17.94)	−43 (7)	.681

existed within groups from pre- to posttest. Table 3 shows the results of the paired *t* tests by group.

Based on the results of an independent *t* test, no significant differences existed in any of the dependent variables between the groups. However, unlike at pretest, at posttest the measure of PGMS was not significantly different between the two groups. This indicates a decreasing gap in the scores from pre- to posttest. The mean scores for pre- and posttest by group are presented in Table 4.

DISCUSSION

Despite the ongoing demand for evidence-based practice, intervention research continues to have practical difficulties that were found throughout this study. Researchers have been urged to share with their colleagues struggles and successes in regard to recruitment and not to underestimate the difficulty in recruiting frail older adults into research (Harris & Dyson, 2001). Although this study yielded little statistically significant results, there is value in highlighting challenges faced by intervention researchers. This study failed to meet its desired sample size, even though many strategies suggested by other researchers were incorporated: providing a monetary incentive; conducting the study at the participants' home, which negated the need for transportation; and using the same person to observe the pre- and post measures in order to minimize participant confusion (Arean, Alvidrez, Nery, Estes, & Linkins, 2003). As noted previously, recruiting was considered exhausted after every eligible resident had been contacted.

TABLE 4 Mean Scores at Pre- and Posttest by Group

	Yoga group			Socialization group				
	N	*M*	(*SD*)	*N*	*M*	(*SD*)	*t* (*df*)	*p*
Depression								
Pretest	8	3.50	(3.16)	10	1.5	(1.43)	1.66 (9.30)	.13
Posttest	7	3.14	(3.03)	10	1.7	(2.21)	1.14 (15)	.27
Morale								
Pretest	8	8.25	(4.37)	10	3.70	(3.20)	2.56 (16)	.02
Posttest	7	6.71	(4.68)	10	3.00	(3.06)	1.99 (15)	.07
Hope								
Pretest	8	18.88	(5.87)	10	16.20	(4.44)	1.10 (16)	.29
Posttest	7	17.29	(4.68)	10	15.70	(4.30)	.72 (15)	.49
Loneliness								
Pretest	8	5.75	(1.83)	10	4.70	(1.50)	1.34 (16)	.20
Posttest	7	5.57	(2.15)	10	4.00	(1.25)	1.91 (15)	.08
One-leg test								
Pretest	3	4.50	(4.76)	8	5.67	(2.92)	−.51 (9)	.62
Posttest	4	4.46	(3.95)	8	4.81	(2.19)	−.21 (10)	.84
Sit-to-stand test								
Pretest	7	27.00	(13.04)	9	15.28	(11.55)	1.91 (14)	.08
Posttest	5	18.24	(10.12)	9	25.63	(20.90)	−.74 (12)	.48
Sit-and-reach test								
Pretest	7	26.18	(9.71)	8	23.68	(10.79)	.47 (13)	.65
Posttest	6	27.75	(11.19)	10	25.31	(13.37)	.373 (14)	.72

In fact, some strategies for successful recruitment and retention may negatively impact other methodological issues of the study. For example, to avoid transportation problems, this study was conducted on-site at a senior housing building, as suggested by past researchers (McNeely & Clements, 1994). However, this type of design also increases the threats to validity because it increases the chance of contamination and reactivity to selection. Perhaps one of the prices to pay for recruiting participants at the site of their residence is the issue of contamination. When the intervention and the comparison groups share living space, the participants will undoubtedly see and/or talk about the elements of the study. In this study, it was common for the participants to try to attend the group to which they were not assigned or to look into the room while the session was being conducted. Because the members of the comparison group were aware of their status, there was a potential for the so-called John Henry effect. Researchers need to be aware and carefully weigh the potential ramifications of location when considering where to recruit and conduct an intervention study. If researchers decide to conduct an intervention study at a site that presents these complications, they must be vigilant about minimizing possible contamination. Conducting a study where participants report to a research site at assigned times may minimize some of these risks. Another strategy to possibly reduce contamination is to consider how the study is advertised.

In this study, it was described as a study to test yoga. As a result, being assigned to the yoga group became the preferred group. It may have been wiser to simply state that the study would compare two different types of group socialization.

Many other barriers to recruiting participants are worth discussing. First, many potential participants voiced a fear of physical strain or medical conditions as a reason for declining to be in the study. Thus, the misunderstanding of the components of the intervention presented as a barrier to participation. Although it was continually stressed that yoga can be helpful for chronic and painful conditions, can be modified to meet the needs of the most severely impaired person, and is not physically demanding and would be conducted while seated, there was still a great deal of reluctance. Studies involving physical activity may also pose some special challenges when recruiting participants (Jancey et al., 2006), especially when targeting older adults. Thus, for treatments and interventions that require physical activity, coaxing, education, and continual explanation and/or a lengthier recruitment period may be necessary.

It is worth noting that reluctance to engage in mental health treatment was not given as a reason for not enrolling in the study. This could be because of a lack of knowledge of what yoga is and what the intervention entailed. Although yoga philosophy essentially mirrors many aspects of cognitive behavioral therapy, it is a way of "hiding the peas in the mashed potatoes," so to speak. If activities that promote self-awareness can be continued to be validated for the improvement of mental well-being, then yoga could be an ideal alternative and an adjunct treatment for those opposed to conventional mental health treatment.

Although the dropout rate for this study was only one 1 of 18 (5.6%), recruitment and retention of participants became increasingly difficult as the study progressed. Recruitment in the first wave required only flyers and informational sessions. The participants were eager to learn more about the study and sought out the researcher. However, for the third wave, personal invitations and continual follow up were necessary for enrollment and retention, which required that the researcher seek out the participants. Although the third wave required a more aggressive recruitment strategy, it still yielded a lower enrollment rate than the previous waves. This trend may be something that other researchers conducting intervention studies in similar populations may want to closely monitor. It may be related to the notion that health affects retention. Other research findings have suggested that intervention adherence was significantly correlated with baseline measures of depression, fatigue, and the physical components of health-related quality (Flegal, Kishiyama, Zajdel, Haas, & Oken, 2007). Other researchers may want to ensure that the data collection period is sufficient for the researchers to recruit adequate numbers depending on the self-rated health of the population, and if the study involves physical exercise.

It is also the possible that the lack of statistically significant findings from this study may be attributed to the length of the intervention. It is possible that the intervention was not long enough to engender change in older adults, and that a more sustained intervention is needed to make an impact on mental and physical health. Given the initial improvements and some of the trends toward significance for some of the measures, it is possible that that a more sustained intervention would have produced significant results.

In addition to the implications of sample size, several other limitations to this study are worth noting. The treatment integrity of the intervention was compromised because the sessions needed to be modified according to the participants' abilities and comfort level. For example, the intervention included standing poses to increase balance. However, some of the participants were hesitant to stand, so the entire sessions were conducted seated. Given this, it is no surprise that there was no improvement in the balance scores. In addition, this might mean that there was insufficient stimulation for the higher-functioning participants. It will be necessary to modify practices in order to simulate similar effects in participants to meet the needs of a wide range when there are no cutoff scores at pretest.

One limitation to the external validity of this study is that the sample was self-selected. Because the study utilized convenience sampling, all the participants showed interest in the study. Thus, the findings of the study may not be generalized to all older adults who might not be as willing to engage in such a study. In this study, for example, those who were severely depressed, isolated, or physically disabled may have not been eligible or interested and/or the adherence and retention rates could have differed.

Although this study produced little statistically significant results, there is value in it. This study can also serve as a pilot for other studies. First, it tested the feasibility of the treatment manual. Given that the intervention could not be carried out in the way it was originally designed because of the participants' comfort level, the treatment manual can be adapted for persons with specific conditions. The target population in this study (older adults living in the community) may have been too broad to test for efficacy. Modifications for specific conditions, both mental and physical, can be developed and tested. Because a 4-week period may not have been long enough to produce significant results, the intervention can also be tested for dosage to ascertain how much of an intervention is needed to achieve the desired outcomes. Second, the study addresses the needs of older adults in a holistic manner, acknowledging the mind-body-spirit connection. Interventions focusing on strengths of individuals may have some impact on overall well-being.

Lastly, much of the merit of this study stems from the lessons learned concerning what was done well and what could have been improved to increase recruitment and retention for studies targeting older populations. Special efforts for recruitment as well as the location of the study need to be carefully considered when designing studies. Another possibility is to

reconsider the design of the study if such a small sample size is attained. Although we attempted to carry out a methodologically rigorous study, the reality is that the state of knowledge at that time in this area could have merited a more exploratory and uncontrolled design, or even a series of single system designs. Although these designs produce concerns of validity, some data would be better than no data when a sample size precludes any meaningful statistical analysis.

It is hoped that offering the lessons learned in this study to other researchers will add to the knowledge base of conducting more effective intervention studies. In order to conduct intervention studies for community samples, realistic and practical feedback is essential to continually increase and develop trustworthy knowledge in what is effective in serving older adults.

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