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Journal

Topics in Geriatric Rehabilitation, 39(1)

ISSN

0882-7524

Authors

Ha, Anh
Wilkins, Stacy Schantz
Melrose, Rebecca J
et al.

Publication Date

2023

DOI

10.1097/tgr.0000000000000383

Peer reviewed

Depression and PTSD as Predictors of Attrition in Older Adult Exercise Programs

A Systematic Review

Anh Ha, PhD; Stacy Schantz Wilkins, PhD; Rebecca J. Melrose, PhD; Cathy Lee, MD

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Background: In older adults, exercise is extremely important and has been demonstrated to improve physical health, cognition, and mood. However, attrition in exercise programs in general is high, with up to 50% of participants leaving in the first 3 to 6 months.

Methods: A systematic review of PubMed and PsycINFO databases was conducted using PRISMA criteria assessing the association of baseline depression and/or posttraumatic stress disorder (PTSD) with attrition rates in older adult exercise programs.

Results: Ten articles were identified that assessed baseline depression and attrition in older adult exercise programs. No studies assessed baseline PTSD as a risk for attrition. Attrition rate overall ranged from 19% to 38%, and depression at baseline was found to be significantly associated with higher attrition rates. Other factors associated with attrition included anxiety, lower life satisfaction, worse cognitive health, higher illness rating, shorter program duration, common illnesses, lower social support, male sex, single relationship status, and transportation dependence.

Discussion: Depression at baseline was significantly related with increased attrition in older adult exercise programs. Screening and consideration of adjunctive mood treatment are recommended. Further study of PTSD as an attrition risk is recommended, particularly in veteran or other populations with greater base rates.

Key words: attrition, depression, drop outs, exercise, older adults, PTSD, rehabilitation

studies have found that exercise is an effective intervention to improve strength, flexibility, endurance, balance, coordination, fall risk, functional performance, activities of daily living and quality of life.² Exercise has also been shown to be effective in improving cognitive outcomes and to reduce the incidence risk of dementia³ as well as improve functional abilities in those already diagnosed with dementia.⁴ Additionally, physical exercise has been consistently shown to improve mood outcomes and has been recommended as an adjunct treatment for depression.^{5,6} To that end, group exercise initiatives for older adults have been of considerable interest, given the feasibility and accessibility of groups as a way to deliver effective interventions targeting physical, cognitive, and mood outcomes in a larger population.

Despite the demonstrated benefits of group exercise for the older adult population, it has often been difficult to maintain participation. Participants in various exercise programs have cited lack of time, work obligations, access to exercise spaces, and poor physical health as primary factors for quitting an exercise routine or for suboptimal physical activity level.⁷ In a meta-analysis examining the different barriers to physical activity as reported by middle-aged adults (50-64 years old) and older adults (≥ 65 years old), the latter group described challenges not endorsed by the former, including fear about safety to carry out physical activity, more severe health problems, and lack of guidance to start physical activity from health professionals.⁸ Older adults more often cited the socialization aspect of being engaged in a group exercise program as highly motivating, which was not observed to be a significant motivator for the younger-aged cohort.⁸ Additionally, physical activity engagement was described by older adults who identified as active as providing a “purpose in life” and “a reason to be busy,” both of which were unique motivators for the older age group.

Motivation is known to be an important variable in the initiation and maintenance of exercise programs,⁷ and low motivation has an adverse effect on the likelihood of participants engaging in group exercise programs to improve their health. Given that motivation can be highly influenced by mood, psychological health is a hypothesized factor that could play a role in determining whether older adults would maintain group exercise in various

For many older adults, aging is associated with disability and frailty.¹ Low levels of physical activity have been associated with poorer health outcomes, and

Author Affiliations: VA Northern California Clinics, Martinez (Dr Ha); Mental Health and Geriatric Research Education and Clinical Center, Greater Los Angeles VA Medical Center, Los Angeles, California (Drs Wilkins, Melrose, and Lee); and Departments of Medicine (Drs Wilkins and Lee) and Psychiatry (Dr Melrose), David Geffen UCLA School of Medicine, Los Angeles, California.

The authors have disclosed that they have no significant relationships with, or financial interest in, any commercial companies pertaining to this article.

Correspondence: Stacy Schantz Wilkins, PhD, Department of Mental Health, Greater Los Angeles VA Medical Center, 11301 Wilshire Blvd, Los Angeles, CA 90073 (stacy.wilkins@va.gov).

settings. It is important to note that the relationship between physical exercise and mood is likely bidirectional, such that, more severe psychological difficulties have been known to be associated with demotivation and anhedonia and lack of physical activity reduces mood.⁹ The benefit of exercise engagement for older adults extends beyond physical health and fitness and may have important implications for both mood management and life satisfaction.

Baseline screening of psychological health prior to the start of an exercise program and its relationship with exercise discontinuation/attrition is important to better understand, with a goal of implementing interventions that could improve motivation among older adults to enhance continued engagement in exercise programs. This review sought to assess the literature on factors contributing to attrition rates from older adult exercise programs, with a special emphasis on examining the role of depression and posttraumatic stress disorder (PTSD), as they relate to older adults' attrition from exercise programs. Although depression has been found to be less prevalent among older adults than their younger counterparts, depression is more common in frail older adults¹⁰ and depressed mood in older adults can have serious consequences that lead to a reduction in health behaviors with a detrimental impact on both physical and mental health.¹¹ Similarly, the prevalence of PTSD decreases in older adult populations; however, advanced age brings many events that may retrigger trauma experienced earlier in life, such as retirement or

loss of a spouse, thus potentially exacerbating symptoms in an older cohort.¹² Understanding the potential impact of depression and/or PTSD on older adults' likelihood of attrition from an exercise program may help elucidate effective methods of intervention to increase program compliance and retention.

METHODS

This review follows the guidelines of the "Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)."¹³ The search and screening results are presented in the flowchart diagram in the Figure.

Search strategy

In September 2021, the search for extant articles regarding the effect of depression and PTSD on attrition rates in older adults who participate in an exercise program was conducted on the PubMed and PsycINFO databases. Four sets of searches were conducted using the following search terms: "older adults, exercise, drop out, depression"; "older adults, exercise, attrition, depression," "older adults, exercise, drop out, PTSD"; and "older adults, exercise, attrition, PTSD." No limits were put on the publication date to return the greatest number of articles. No forward citation search was done.

Eligibility criteria, screening, and selection of studies

Articles that met the following criteria were included in the review: (1) must include older adults (defined as age 60+)

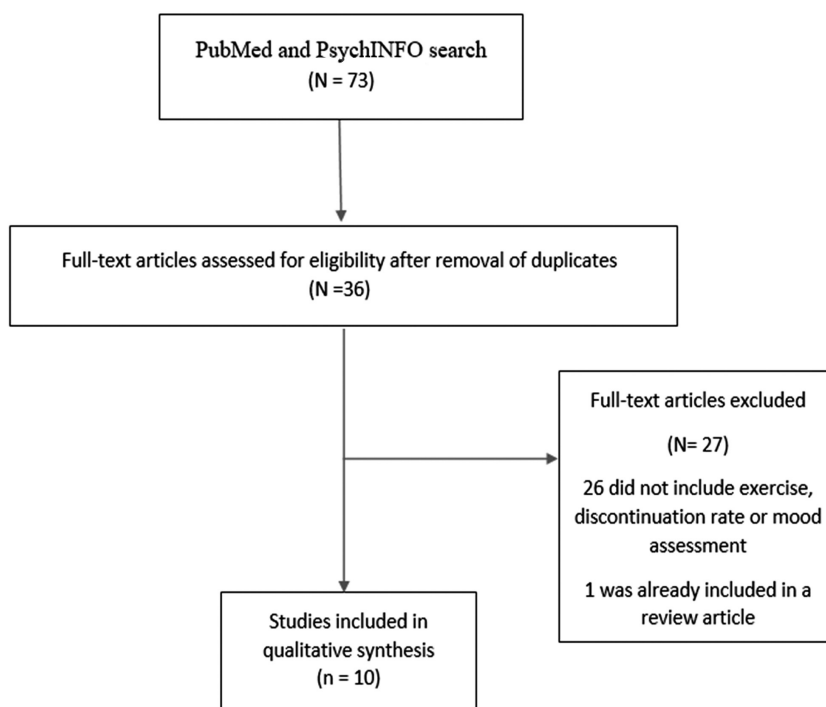


Figure. PRISMA search and screening results.

in the sample, (2) participants must have participated in an exercise program, (3) the study must have included *at least* one measure to assess psychological health at baseline (either depression or PTSD), and (4) the study must have included the attrition or attrition rate of their participants. From the 4 sets of searches, 73 articles were initially identified, with publication years ranging from January 1950 to March 2020. Articles were then excluded from inclusion if they were duplicates (n = 36) or if they did not include an exercise component, a discontinuation rate, and a mood assessment (n = 27). After screening, 11 met the inclusion criteria. However, one of the articles¹⁴ was reviewed within a more inclusive literature review¹⁵ and was excluded from the final analysis, resulting in a total of 10 articles to be reviewed in detail. Of the 10 articles, only 1 met the criteria of a randomized clinical trial.¹⁶

Data analysis and synthesis

The articles included in this review were examined systematically by the lead author for the following factors: population's age and distinguishing characteristic, gender, demo-

graphic factors, mood assessment and relevant findings related to mood and psychological health, type and duration of the exercise program, socialization aspect of the exercise program, discontinuation rate, and other factors contributing to discontinuation.

RESULTS

Study characteristics

Of the 10 articles, 2 focused on a sample recruited from general exercise programs for older adults, 2 were pulmonary rehabilitation studies, and 6 were cardiac rehabilitation studies. Of the cardiac rehabilitation studies, 1 study followed patients with cardiovascular disease, 1 followed patients who were posttransient ischemic attacks, and 4 followed patients who had experienced heart failure at any point in their lives (Table 1).

Regarding other characteristics of the studies, 1 of the articles selected for review was a meta-analysis consisting of 9 other empirical studies.¹⁵ Only 1 study included in this review¹⁶ was a true randomized clinical trial with 2 control

TABLE 1 Demographic Variables of the 10 Studies Included in this Review

Article	n	Study Characteristic	Age, y	Gender	Ethnicity
Picorelli et al ¹⁵	1370	Meta-analysis of 9 studies	Meta-analysis, mostly >60	No data	No data
Herman et al ¹⁶	166	Patients who have been diagnosed with depression	Mean = 56.72, range 50-77	20% male	88% White
Garrod et al ¹⁷	74	Patients with COPD	Mean = 68, SD = 10	55% male	No data
Heerema-Poelman et al ¹⁸	70	Patients with COPD	Mean = 61.6, SD = 10.35	46.5% male	Dutch sample, no racial breakdown
Marzolini et al ¹⁹	85	Patients who have experienced at least one TIA	Mean = 67.5, SD = 10.7	53% male	No data
Corvera-Tindel et al ²⁰	39	Patients who have experienced heart failure	Mean = 63.2, SD = 10.1	99% male	No data
Glazer et al ²¹	46	Patients in a cardiac rehabilitation program	Mean = 58, SD = 10.2	74% male	74% White, 22% Black, 2% Hispanic, and 2% other
Kerins et al ²²	267	Patients in a cardiac rehabilitation program	Attenders: mean = 61.87, SD = 10.27 Nonattenders: mean = 61.38, SD = 10.24 Noncompleters: mean = 60.16, SD = 10.55	72% male	No data
McGrady et al ²³	135	Patients in a cardiac rehabilitation program	Mean = 62.8, SD = 13.1	85% male	No data
Pardaens et al ²⁴	489	Patients in a cardiac rehabilitation program	Mean = 60, SD = 11	80% male	Belgian sample, no racial breakdown

Abbreviations: COPD, chronic obstructive pulmonary disease; TIA, transient ischemic attack.

groups and an intervention group; the remaining 8 studies were rehabilitation programs without a control group. This may be attributed to the fact that the focus of these studies was on attrition/discontinuation rate and the different factors that contributed to discontinuation in rehabilitation programs rather than the efficacy of the program itself. Collectively, the eligible studies examined 3273 older adults who were enrolled in a physical exercise program, including 1370 participants in studies already reviewed in the meta-analysis from Picorelli et al¹⁵ (Table 2).

Statistical comparisons between the studies could not be made for most variables due to different study designs and different measures used. We did look to see whether there would be any differences in the 5 cardiac versus 4 noncardiac rehab studies (see Table 1 for how the studies were characterized). The only significant finding between these groups was that the mean age of the participants in cardiac rehabilitation programs versus noncardiac exercise programs was significantly higher, 62.8 years compared with 60.1 years (analysis of variance, $F = 5.054$, $df = 1$, $P = .02$).

There were no significant differences found in adherence rate or depression link to attrition between the 2 groups.

Since group exercise programs may involve extra support from the group process, we also looked to see whether there were any significant differences in attrition rates or the impact of depression on attrition by comparing the 5 group exercise intervention studies to the 2 individual intervention studies (see Table 2). Glazer et al's²¹ and Picorelli et al's¹⁵ studies were not included here, as they included both group and individual interventions. No significant differences were found per independent-samples t tests.

Finally, no significant differences in age, sex, or depression impacting attrition rates were found between the 3 programs with higher attritions (>36%) compared with the 5 programs with lower attritions (19%-23%; see Table 3) per independent-samples t tests.

Attrition rate

The attrition rate among the articles examined ranged from 19% to 38% (Table 3). More specifically, for general

TABLE 2 Types, Duration, and Social Aspect of the Exercise Programs Included in this Review

Article	Type and Duration of Exercise	Socialization Effect
Picorelli et al ¹⁵	Various types—review paper	On-site group exercise has higher attendance than at-home exercise programs
Herman et al ¹⁶	16-wk aerobic exercise program, 3 meetings/wk	No significant difference in attrition rate between group exercise sample and sertraline-only sample
Garrod et al ¹⁷	7-wk rehabilitation program. Patients attended 2 meetings/wk, 1-h exercise class + education session. Concurrent home exercise program for 20 min/d 5 d/wk	Group setting; no control group with which to compare
Heerema-Poelman et al ¹⁸	Length of exercise program varied based on patient's goal; ranged from 9 to 12 wk, 3 d/wk. Then, maintenance program was initiated at home (supervised by primary care physiotherapists)	Individually tailored exercise programs; no control group with which to compare
Marzolini et al ¹⁹	Individualized cardiac rehabilitation for 6 mo, including health education sessions, as well as supervised exercise classes, which include aerobic and resistance training	Supervised group exercises classes; no control group with which to compare
Corvera-Tindel et al ²⁰	Patients were asked to walk once a day, 5 d/wk for a period of 12 wk. The exercise program was low-intensity. A nurse visited patients weekly for the first 6 wk and biweekly in the last 6 wk	At-home individual exercise programs; no control group with which to compare
Glazer et al ²¹	Cardiac rehab program consisting of 36 exercise sessions and 24 didactic lectures. Exercise sessions were held 3 times/wk for ~90 min, and included 30 min of aerobic training and stretching.	A mix of group and individual exercises; no between-group comparison available
Kerins et al ²²	Programs ran for 8 wk, 2 sessions/wk, or for 6 wk, 3 sessions/wk. Each session lasted 2 h and encompassed exercise and education	Group setting; no control group with which to compare
McGrady et al ²³	Cardiac rehab program consisted of 36 sessions, 3 times/wk for 12 wk	Group setting; no control group with which to compare
Pardaens et al ²⁴	Patients had the choice to train 2 or 3 times weekly for 60 min during a period of 3-5 mo with a maximum of 45 reimbursed sessions. The exercise training program consisted of a combination of aerobic and strengthening exercises	Group setting; no control group with which to compare

TABLE 3 Mood Findings, Attrition Rate, and Their Association Among the Studies Included in This Review

Article	Mood Assessment Used	Attrition rate	Findings Related to Drop Out
Picorelli et al ¹⁵	Various types	No data	Higher adherence associated with higher MMSE, self-efficacy, health, absence of depression, fatigue, lower SES, higher loneliness, and pacemaker use
Herman et al ¹⁶	Hamilton Depression Scale, Beck's Depression Inventory (BDI), and clinical interview	21%	Baseline level of anxiety and life satisfaction were the best indicators of attrition. Logistic regression anxiety OR = 6.3
Garrod et al ¹⁷	Brief Assessment of Depression	31%	Depressed patients were found to be considerably more at risk of attrition than nondepressed patients (OR = 8.7; CI: 2.8-27.1)
Heerema-Poelman et al ¹⁸	Hospital Anxiety and Depression Scale (HADS)	36.7%	Higher level of depressive symptoms predicted attrition, but also higher illness and shorter duration of the rehab program. The odds for adherence decrease by 0.77 (95% CI: 0.62-0.97) with a 1-unit increase in the HADS depression score ($P = .025$)
Marzolini et al ¹⁹	Center for Epidemiologic Studies Depression Scale (CES-D)	38%	Regression analysis revealed a higher depression score ($\beta = 1.10$, $P = .02$), male sex ($\beta = 4.932$, $P = .02$), and less social support ($\beta = 4.085$, $P = .04$) as predictors of attrition
Corvera-Tindel et al ²⁰	Multiple Affect Adjective Checklist (MAACL)	21%	Significant predictors of noncompliance were higher Charlson comorbidity index score, longer heart failure duration, lower hostility scores, and lower BMI with ORs of 2.7, 1.1, 0.47, and 0.76, respectively
Glazer et al ²¹	Beck's Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI)	22%	Dropouts were more likely to be younger and had higher depression scores at baseline, $r^2 = 0.12$
Kerins et al ²²	Qualitative clinical interviews	19%	Patients cited reasons for dropping out to include common illnesses (ie, cold and flu), work, readmission to hospital, or that the exercise program was unsuitable for their needs and family reasons. Many patients alluded to stress in their life, worries about health, and family were the main stressors discussed. A large proportion of the patients interviewed said they were depressed.
McGrady et al ²³	Beck Depression Inventory II (BDI-II), and the Beck Anxiety Inventory (BAI)	36%	The highest scores on the BDI-II and BAI were correlated with the lowest number of sessions completed ($r = -0.281$, $r = -0.230$). The highest SF-36 mental health scores were correlated with the largest number of sessions completed.
Pardaens et al ²⁴	Hospital Anxiety and Depression Scale (HADS)	20%	Singles were more likely to attrition (2.89 [1.56-5.35]), as well as those patients who were dependent on others to get to cardiac rehab (CR) (2.01 [1.16-3.47]). Finally, a higher percentage of patients with an increased risk of depression (HADS-D ≥ 11) was seen in the group that dropped out early from CR ($P < .05$), and a similar trend was seen for patients with an increased risk of anxiety (HADS-A ≥ 11) ($P = .058$).

Abbreviations: BMI, body mass index; CI, confidence interval; MMSE, Mini-Mental State Examination; OR, odds ratio; SES, socioeconomic status; SF-36, 36-item Short Form Health Survey.

older adult exercise studies, the attrition rate ranged from 21% to 38%. For cardiac rehabilitation programs, the attrition rate ranged from 19% to 36%. For pulmonary rehabilitation programs, the attrition rate ranged from 31% to 36.7%, among the highest discontinuation rates for the studies reviewed. In our secondary analyses, we used attrition rate as a continuous variable.

Frequency and intensity of exercise programs

The studies ranged in the frequency and intensity of exercise provided. The duration of the exercise programs ranged from 7 weeks¹⁷ for a pulmonary rehabilitation program to 5 months for a cardiac rehab program,^{24,25} with 12 weeks as the modal length of exercise programs reviewed.^{18,20,21,23,24}

Three of the exercise programs included a combination of aerobic and strength or resistance exercises, 1 study did not describe the exercise component (Picorelli et al,¹⁵ due to being a review paper), and 6 involved only aerobic exercises. Overall, no general trend was observed between attrition rate and the intensity and type of exercise from a qualitative standpoint. It is noteworthy that the programs with the lowest attrition rates of approximately 20% ranged in duration from 8 weeks to 5 months.^{16,20,22,24}

Psychological health variables

Interestingly, no studies looked at PTSD in relationship to attrition in older adult exercise programs. All included studies focused on depression and each included at least one depression measure, ranging from those commonly seen in psychological literature, such as the Beck Depression Inventory, to assessments more often used in health care settings, such as the Hospital Anxiety and Depression Scale. Four of the studies also included measures of anxiety, most commonly using the State-Trait Anxiety Inventory and the Beck Anxiety Inventory. One of the studies assessed mood using qualitative interviews. Eight of the 10 studies reported that higher depression level was associated with a higher attrition/attrition rate; one study that did not have this finding was in patients who all had major depression and they found that attrition rate was associated with higher levels of anxiety and lower life satisfaction.¹⁶ The other study had the smallest sample size of only 39.²⁰ Only 2 studies that included an anxiety outcome (out of 4 total) reported an association between anxiety level and attrition rate.

Socialization aspect

The socialization aspect of exercise programs was evaluated by the setting of the exercise program (ie, group vs individual program, see Table 2). The studies included in this review ranged in their amount of socialization: 5 of the programs were conducted in on-site groups, 2 were individualized programs in which the participants received an exercise regimen recommendation from a provider, 1 did not mention the number of participants, just classes, 1 involved both participants who attended groups and participants who exercised alone, and 1 was a meta-analysis of other studies. The programs without a socialization component ranged from 21% to 36.7% in participant attrition, and programs with a socialization component ranged from 19% to 38%, making it difficult to conclude whether socialization has an impact on discontinuation based on the studies included.

Other factors that predict attrition

In addition to variables that have been hypothesized to affect attrition rate, such as mental health status and the intensity of the exercise program, the authors of these studies reported other factors felt to be associated with attritions.

These items included cognitive health,¹⁵ level of life satisfaction,¹⁶ higher illness rating,¹⁸ shorter duration of the program,¹⁸ common illnesses,²² lower social support,¹⁹ male sex,¹⁹ relationship status,²⁴ and transportation dependence.²⁴

DISCUSSION

Engagement in physical exercise has been found to have multiple positive benefits for older adults, ranging from improving physical health and fitness, improved cognition, and increased functional abilities in those diagnosed with dementia, to reduced symptoms of psychological distress, most notably depression.^{2,4,6} Additionally, many older adults are at risk for health conditions that involve the use of exercise as an adjunct treatment, such as cardiopulmonary diseases. It is thus important to find ways to encourage sustained participation in exercise programs and minimize attrition in this population. Previous literature has identified certain barriers for exercise in older adult populations, but few have focused on the effect of mood disorders on attrition rates of older adults in exercise programs. Mood disorders, specifically depression and PTSD, have been related to poor health behaviors and lower motivation^{9,12,26}; thus, it is important to understand the impact of these baseline symptoms on attrition from exercise programs for older adults.

The main goal of this review was to examine the role of baseline depression and PTSD symptoms, as they relate to attrition rates for older adults participating in an exercise program. Each of the 10 studies reviewed included a measure of depression taken at baseline, and 9 of the 10 studies found that a higher baseline rate of depression was correlated with a higher rate of attrition among participants.

No empirical studies of attrition were identified in the extant literature that assessed for symptoms of PTSD at baseline for older adults engaged in physical exercise programs. Given the findings about baseline depression and its relationship to higher attrition, it will be important to also examine the effect of other mood disorder symptoms on exercise attrition. Specifically, as the authors of this review work primarily with older veterans in a clinical setting, PTSD as a potential risk factor for exercise attrition is of special interest. PTSD has been linked with multiple health problems and poor self-care²⁶; thus, it was surprising that there was no extant literature that has assessed the relationship between PTSD and exercise attrition in older populations. In our review, anxiety was found to correlate with higher attrition rates in 2 of 4 studies, which may have implications for PTSD.

While program attrition rates were found to be quite high, averaging about a third in many studies, they are far below the 50% mean attrition rate expected in Dishman and Buckworth's seminal work²⁷ on exercise adherence in the general population, which examined attrition rates in different exercise programs compiled over a period of

20 years. Several hypotheses may explain this difference in expected attrition rates. Given that these studies were conducted as many as 30 years after the 1997 review, the cohort may play a role. Also, many of the programs examined in this review were part of cardiac or pulmonary rehabilitation and treatment programs, and thus an older clinical population may be more adherent than the general population at large.

Neither exercise intensity nor frequency was found to be related to attrition in the studies examined. This is interesting as fear of exercise safety was a concern in prior studies among older participants. It may be that fearful participants never engage in exercise to begin with, and thus these participants do not contribute to increasing the attrition rate. Future studies may wish to examine this factor more closely, as a quantitative meta-analysis of exercise intensity and frequency on attrition rate may yield results that may help improve exercise program design.

Depression was found to be related to attrition, such that a higher level of depressive symptoms at baseline was related to a higher attrition rate among participants. Exercise has been shown to be a helpful adjunct treatment for depression in this population. It is recommended that providers screen for depression prior to the start of a physical exercise program and identify higher risk groups, who may benefit from more frequent follow-ups and reminders from the group leaders or providers. Concurrent exercise and psychotherapy treatment for depression may be helpful, such as engagement in individual or group cognitive behavioral therapy for depression. Additionally, the incorporation of more psychoeducational materials about depression into the exercise program may help improve depressive symptoms and reduce attrition due to mental health reasons.

It should be noted that the clinical severity of depressive symptoms as gathered in this systematic review was difficult to compare across studies, as most studies included in this review assessed the level of depressive symptoms without using a clinical cutoff to diagnose depression among their participants. In several studies using the Beck Depression Inventory and the Hamilton Depression Rating Scale,^{16,21,23} the clinical severity of depression was noted to be mild to moderate among participants. It will be important for future studies to examine the level of depression and its relationship to attrition in exercise programs (ie, examine the relationship in low vs the high depression ratings and exercise attrition). Furthermore, we were unable to quantify the duration of depressive symptoms or depression diagnosis among the participant samples due to lack of reported data; in future studies, it will also be important to examine duration of mood symptoms as a possible predictor of attrition in the older adult population.

The review also revealed that baseline level of anxiety as well as a participant's satisfaction with life holistically is related to attrition rate. Although anxiety was not a focus

of this review, this finding is interesting to observe, as anxiety has a high comorbidity rate with other mood and anxiety disorders, such as depression and PTSD.²⁸ Similarly, holistic quality of life is an important variable that may be improved with further engagement in physical activity to address both physical health and mental well-being. Thus, anxiety and satisfaction with life may also represent important variables to screen for prior to enrollment in an exercise program, and those who may be at risk for attrition may benefit from being closely followed by program managers, as increased activities have been shown to be beneficial to alleviate mood and anxiety symptoms^{29,30} as well as increased satisfaction with life,³¹ making engagement and continued attendance in the exercise program essential.

Socialization has been identified in prior studies as a valued part of groups exercise for older adults.³² Exercise programs run in groups may be implemented more efficiently and less costly in addition to providing this socialization aspect, thus a push toward group exercise may be seen across various settings. It is possible that certain participants who prefer individual versus group settings for exercise programs may share certain demographic or other characteristics, including existing support network system, mental health and mood status, or personality differences. While no differences were found in studies with and without a group/social component in this study, the area remains an important one for future study.

Other items were noted as linked to attrition in these studies. These included worse cognitive health,¹⁵ lower level of life satisfaction,¹⁶ higher illness rating,¹⁸ shorter duration of the program,¹⁸ common illnesses,²² lower social support,¹⁹ male sex,¹⁹ single relationship status,²⁴ and transportation dependence.²⁴ These possibly represent risk factors that may prove valuable for future studies to consider when implementing an exercise program with older adults, as identifying those at higher risk of attrition may offer an avenue for greater retention effort for those select participants.

Limitations of this review include the small number of studies that have looked at baseline depression and its impact on attrition from exercise programs in older adults. As previously mentioned there was no uniform measure of depression, and the studies did not address diagnosis or whether participants were potentially receiving adjunctive treatment for a mental health condition. Most studies were also performed within cardiopulmonary programs and thus specific disease-related processes may have impacted the results as well.

CONCLUSION

Physical exercise for older adults remains an area of active inquiry, both for its demonstrated benefits across multiple domains of health and well-being and for the factors that

KEY POINTS

- Depression at baseline is significantly associated with increased attrition from older adult exercise programs.
- Screening and intervention for depression are recommended to increase adherence.
- Further study of the risk of baseline PTSD on exercise adherence of older adults in exercise programs is recommended, especially in groups at higher risk for PTSD (eg, veterans).

may lead to attrition from exercise programs. In this review, baseline depression was associated with greater levels of exercise attrition in older adults, with some implications for anxiety and anxiety-related disorders as additional areas of further examination. Screening for mental health problems in older adults who enroll in exercise programs and implementing effective intervention to address mood symptoms in this population may serve to increase ongoing attendance potentially improving mood and other health outcomes.

[AQ02] References

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AUTHOR QUERIES

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AUTHORS: Anh Ha, Stacy Schantz Wilkins, Rebecca J. Melrose, and Cathy Lee

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