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Effectiveness of Interdisciplinary Team's Collaborative Care in Reducing Depressive Symptoms in Older Adults

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Abstract

Depression in older adults is a widespread mental health concern, with risk factors including chronic illness, social isolation, and functional decline. Despite its prevalence, it is frequently underdiagnosed, as its symptoms often overlap with those of normal aging or coexisting medical problems, thereby complicating timely detection and effective treatment. This study examined the effectiveness of interdisciplinary team's collaborative care in reducing depressive symptoms in older adults enrolled in a community-based comprehensive care program. A retrospective one-group pretest and posttest design was utilized, reviewing health records of 49 participants who underwent initial and follow-up depression screenings using the Patient Health Questionnaire-9. During a six-month period, a structured care model was implemented that included regular meetings among eleven interdisciplinary professionals. The team developed and applied individualized care plans addressing each participant's physical, psychological, and social needs. Results demonstrated a statistically significant reduction in depressive symptoms, with mean scores decreasing from 5.76 to 2.84, and over 70 percent of participants shifting from higher severity categories to the minimal symptom category. Analysis using a non-parametric statistical test confirmed the reliability of this change. The findings suggest that interdisciplinary collaborative care effectively reduces depressive symptoms in older adults by enabling comprehensive, person-centered interventions. This model may serve as a valuable strategy to address depression in aging populations and improve overall quality of life. Future research is recommended to explore its long-term impact and applicability to broader settings.

Keywords

Collaborative Care, Depression, Interdisciplinary Team, Older Adults, Patient Health Questionnaire-9 (PHQ-9)

INTRODUCTION

Older adults are particularly susceptible to depression, often triggered by significant life alterations such as the loss of loved ones, retirement, chronic health concerns, diminished physical capabilities, side effects from multiple medications, social isolation, and other unavoidable circumstances [1]. Recent estimates suggest that approximately 19.2% of older adults globally experience depression [2], and a meta-analysis reported prevalence rates as high as 28.4% in certain populations [3]. Despite its high occurrence, depression in older adults remains widely underdiagnosed and undertreated due to inadequate screening, overlapping symptoms with chronic medical conditions, and stigma surrounding mental health [4], [5].

In this population, depressive symptoms may manifest not only emotional disturbances, but also as physical complaints such as chronic joint pain, chronic headaches, muscle aches, gastrointestinal issues, and worsening of existing health problems [6]. Common clinical features include sleep disturbances, appetite changes, persistent sadness, feelings of guilt, difficulty concentrating, loss of interest in previously enjoyed activities, feelings of being a burden, and suicidal ideation. If left untreated, depression can exacerbate chronic diseases, increase the risk of falls and injuries, lead to frequent emergency room visits and hospitalizations, and elevate suicide risk [7]. These consequences have a substantial impact on the quality of life for older adults and impose significant emotional and financial burdens on families and the healthcare system.

Concept Analysis

Key concepts relevant to this study include interdisciplinary team, collaboration, depression in older adults, and the Patient Health Questionnaire-9 (PHQ-9). An interdisciplinary team (IDT) is defined as a group of professionals from multiple disciplines who jointly develop and implement patient-centered care plans through shared decision-making. Collaboration in this context extends beyond coordination; it involves each team member contributing distinct expertise toward a unified goal, while maintaining autonomy in their respective roles [8], [9]. Depression is defined by the American Psychiatric Association as a serious mood disorder negatively affecting how one feels, thinks, and functions [10]. Its subtypes include major depressive disorder, persistent depressive disorder, seasonal affective disorder, premenstrual dysphoric disorder, perinatal depression, and perimenopausal depression [11]. In older adults, depressive disorders often manifest through somatic and cognitive symptoms, complicating timely recognition. The PHQ-9 is a standardized screening tool used to measure depression severity. It evaluates nine key symptoms over a two-week period, scoring each from 0 (*not at all)* to 3 (*nearly every day*) [12].

Theoretical Framework

This project is guided on Carl Rogers' Person-Centered Theory and Virginia Henderson's Need Theory. Carl Rogers' Person-Centered Theory underscores the significance of personalized care that honors individual's unique experiences and inherent potential for development. Rogers suggested that healthcare providers facilitate self-actualization through empathy, unconditional positive regard, and authenticity [13]. In the context of interdisciplinary collaborative care, this perspective empowers older adults to actively engage in managing their health, thereby enhancing autonomy and dignity. Contemporary implementations, such as Person-Centered Therapeutics, extend Rogers' principles into interdisciplinary practice by prioritizing patient involvement in shared decision-making [13]. Virginia Henderson's Need Theory delineates 14 fundamental human needs encompassing physical, psychological, emotional, and social dimensions. Henderson maintained that nursing should assist individuals in performing essential activities necessary for health, recovery, or a peaceful death—activities they would undertake independently if able [14]. Her framework aligns closely with interdisciplinary care models by advocating holistic, patient-centered approaches that address interconnected needs. Together, Rogers' and Henderson's theories provide a robust foundation for designing interdisciplinary interventions. Integrating these models supports a comprehensive approach to managing depression in older adults, fostering independence, enhancing quality of life, and promoting sustained community engagement.

Literature Review

A comprehensive literature review conducted using Academic Search Complete, Cumulative Index to Nursing and Allied Health Literature Ultimate, EBSCO (Elton Bryson Stephans Company) host, and Medline Complete identified 19 relevant studies that support interdisciplinary collaborative care for managing depression in older adults. The studies [15-30] indicate that multifaceted care is essential, as late-life depression is closely interlinked with frailty, comorbidity [31], rheumatoid arthritis [32], anxiety, spiritual struggle [33], polypharmacy, nutritional imbalance [15] and decreased physical function. Patients with rheumatoid arthritis demonstrated high scores in both frailty and depression assessments [32], while elderly individuals with diabetes and obesity exhibited elevated inflammatory markers and depression scores [34], likely associated with reduced physical activity, poor appetite, loss of interest, feelings of helplessness, and fatigue. The studies indicate that individuals with arthritis, obesity, or diabetes had higher depression scores and may benefit from a multidisciplinary approach to improve physical function, alleviate depressive symptoms, and enhance quality of life [25], [33], [34]. Interventions integrating medical, nursing, rehabilitation services, psychiatric services, and social services demonstrated improvements in depressive symptoms and patient satisfaction [16], [19], [21-23]. Some studies have utilized behavioral health integration within primary care as an intervention, rather than employing a multidisciplinary care approach [16], [17], [32]. The PHQ-9 was the most widely used tool to monitor outcomes [16], [18], [19], [21], [22], [24], [26], [27], [29], [30], [31]. However, other studies have utilized different depression screening tests, including Beck's Depression Inventory [34] and the Geriatric Depression Scale-15 [17], [20], [25]. Additional studies showed that physical activity programs, self-care education, spiritual support, and home-based care positively influenced mental health [20], [24], [28], [29], [33]. However, gaps remain in the literature regarding diversity in both patient populations and team composition. Many studies relied on grant-funded models, limiting real-world applicability. This study addresses these limitations by evaluating a real-world, community-based program with a diverse interdisciplinary team. Given the complexity of depression in older adults, the variability in its symptoms, and the challenges of treatment within isolated primary care settings, a collaborative care model may offer a more comprehensive and sustainable solution.

OBJECTIVES

This study aimed to evaluate the effectiveness of interdisciplinary team-based collaborative care in reducing depressive symptoms in older adults enrolled in a Program of All-Inclusive Care for the Elderly (PACE). Specifically, it sought to determine whether person-centered, integrated interventions provided by diverse interdisciplinary team members could improve depression outcomes as measured by the Patient Health Questionnaire-9 (PHQ-9). Using a retrospective one-group pretest and posttest design, the study compared depressive symptom severity before and after a six-month intervention period. The objective aligns with evidence-based practice and contributes to the development of scalable, community-based mental health strategies for aging populations.

METHODS

Study Design

This study used a one-group pretest and posttest design, conducted as a quantitative, exploratory study, and employed a retrospective chart review. A convenience sample was selected, and depressive symptoms were compared before and after the intervention within the same group. No separate control group was used. Data were abstracted from electronic medical records (EMRs) after the intervention period had ended. There was no direct patient contact during the research, and all personal identifiers were removed. Each participant was assigned a randomly generated identification number to ensure anonymity.

Data

Two sets of data were collected to assess the impact of the intervention. A numerical value ranging from 0 to 27 in the

data set indicated the severity of depression, with higher scores denoting more severe depressive symptoms. The Patient Health Questionnaire-9 (PHQ-9), illustrated in Table 1, was utilized as an instrument for screening depression. Table 2 explains the depression score thresholds and corresponding levels of depression severity. One set of data listed the scores of each participant's PHQ-9 test prior to the intervention, while the other set listed the scores of each corresponding participant's PHQ-9 test following the completion of six-month intervention. A social worker or primary care provider conducted the depression screening, by inquiring about the symptoms the participant experienced over the past two weeks. The data collected included only the total PHQ-9 scores without the descriptions of symptoms or severity.

Intervention

The intervention consisted of collaborative care delivered by an interdisciplinary team (IDT) as part of the Program of All-Inclusive Care for the Elderly (PACE). The IDT included the center manager, primary care provider, registered nurse case manager, Master-level social worker, physical therapist, occupational therapist, registered dietitian, activity coordinator, home care coordinator, personal care attendant, and transportation coordinator [35]. Each team member contributed specialized care addressing participants' medical, psychosocial, functional, and nutritional needs.

During the intervention period, the IDT met twice weekly to review each participant's clinical status and to discuss physical, emotional, social, and environmental factors affecting well-being. These meetings facilitated prompt identification of depressive symptoms and individualized responses from multiple disciplines. Interventions included medication management by the primary care provider and RN, counseling and resource linkage by the social worker, physical and occupational therapy to improve mobility and independence with assistive devices, activity engagement to reduce isolation by motivating activities, and dietary counseling to support overall health. Team members collaborated to implement and adjust shared care plans, with the common goal of improving participants' quality of life and reducing depressive symptoms through holistic and patient-centered strategies.

Sampling

The sample consisted of newly enrolled participants in the Program of All-Inclusive Care for the Elderly (PACE) who met the inclusion criteria during the study period. A total of 56 participants were initially identified through a convenience sampling method. After applying the exclusion criteria, 49 participants were included in the final analysis.

Inclusion Criteria

Participants were included if the EMR documented that they were 55 years of age or older and had enrolled in the PACE program during the specified period. Eligible EMRs had to include documentation confirming that the participant met enrollment criteria for PACE, received care coordination, transportation, meals, social services, and connection to community resources. Additionally, participants must

Table 1. Patient Health Questionnaire (PHQ-9)

PHQ-9 Item	Not At All (0)	Several Days (1)	More Than Half the Days (2)	Nearly Every Day (3)
1. Little interest or pleasure in doing things	☐	☐	☐	☐
2. Feeling down, depressed, or hopeless	☐	☐	☐	☐
3. Trouble falling or staying asleep, or sleeping too much	☐	☐	☐	☐
4. Feeling tired or having little energy	☐	☐	☐	☐
5. Poor appetite or overeating	☐	☐	☐	☐
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	☐	☐	☐	☐
7. Trouble concentrating on things, such as reading the newspaper or watching television	☐	☐	☐	☐
8. Moving or speaking so slowly that other people could have noticed, or the opposite, being so fidgety or restless that you were moving around more than usual	☐	☐	☐	☐
9. Thoughts that you would be better off dead, or thoughts of hurting yourself in some way	☐	☐	☐	☐

Table 2. PHQ-9 Scoring and depression severity

PHQ-9 Score	Depression Severity	Recommended Action
0–4	None to Minimal	Monitor; no active treatment needed
5–9	Mild	Watchful waiting; consider follow-up screening
10–14	Moderate	Develop treatment plan; consider counseling
15–19	Moderately Severe	Initiate active treatment (counseling and/or medication)
20–27	Severe	Immediate intervention; possible psychiatric referral

have signed consent for enrollment and agreed to receive comprehensive care. The EMR also had to show a signed care plan with electronic signatures from the participant and every IDT member. Documentation was required to verify that the participant received IDT collaborative care during the intervention period and attended center activities at least twice weekly. Finally, the EMRs had to include completed PHQ-9 depression screenings conducted both prior to intervention (by February 1, 2023) and after intervention (in July 2023), with corresponding documentation of depressive symptoms and interventions provided by all IDT members, including the transportation coordinator, home care coordinator, and patient care technician.

Exclusion Criteria

Participants were excluded if they were disenrolled from the program during the intervention period, failed to complete the initial PHQ-9 depression screening by February 28, 2023, or were absent from care for more than three weeks due to hospitalization, travel, or other unreported reasons. Participants were also excluded if a major life-changing event occurred during the study period that could have significantly influenced their depression status, as determined by the investigator.

Data Analysis

A total of 56 participants were initially enrolled in the study. Of these, 7 participants were excluded from the final analysis due to disenrollment, terminal illness diagnosis, death, relocation, or prolonged absence during the intervention period. As a result, 49 participants were included in the final dataset. Data were analyzed using IBM SPSS version 29. Descriptive statistics were used to summarize the pre- and post-intervention PHQ-9 scores, including minimum, maximum, mean, and standard deviation. To assess the effectiveness of interdisciplinary team collaborative care, a Wilcoxon signed-rank test was used to compare the pre- and post-intervention scores. This non-parametric test was selected due to the small sample size and the ordinal nature of PHQ-9 scores. A p value of less than 0.05 was considered statistically significant.

Ethical Consideration

This project was reviewed and approved by the Institutional Review Board (IRB) and was determined to involve minimal risk due to its retrospective design. No direct contact with participants occurred, and only existing data from electronic medical records (EMRs) were reviewed. All personal identifiers were removed prior to data analysis to ensure confidentiality. The study was conducted in adherence to the ethical principles of beneficence, nonmaleficence, justice, and respect for persons. No financial support was received for this project.

RESULTS

A total of 56 participants were initially enrolled. After applying the exclusion criteria, 49 participants remained for the final analysis. Descriptive statistics and inferential testing were performed to assess the impact of interdisciplinary team (IDT) collaborative care on depression outcomes, as measured by PHQ-9 scores.

PHQ-9 Scores

The mean PHQ-9 score, calculated from all participants' scores, declined from 5.76 at baseline to 2.84 post-intervention, indicating a notable reduction in depressive symptoms. This change is visualized in Figure 1, which illustrates the average score shift across all participants following the six-month intervention.

Depression Severity Shifts

Participants were categorized based on PHQ-9 severity levels. Prior to the intervention, scores placed 22 participants in the *minimal* range, 19 in *mild*, 6 in *moderate*, and 3 in *moderately severe*. After the intervention, 38 participants scored in the *minimal range*, with no participants remaining in the *moderately severe* or *severe* categories. These results are presented in Figure 2 and Figure 3. This shift suggests that the interdisciplinary team-based collaborative care intervention not only reduced average depression scores but also helped move individuals out of clinically concerning categories. The substantial increase in the number of participants with minimal symptoms after the intervention reflects meaningful improvements in mental health and quality of life, while the elimination of higher severity cases highlights the potential effectiveness of team-driven personalized support.

Wilcoxon Signed Rank Test

A Wilcoxon signed-rank test confirmed a statistically significant reduction in depressive symptoms. This non-parametric test is used to compare two related samples—in this case, pre- and post-intervention PHQ-9 scores—by

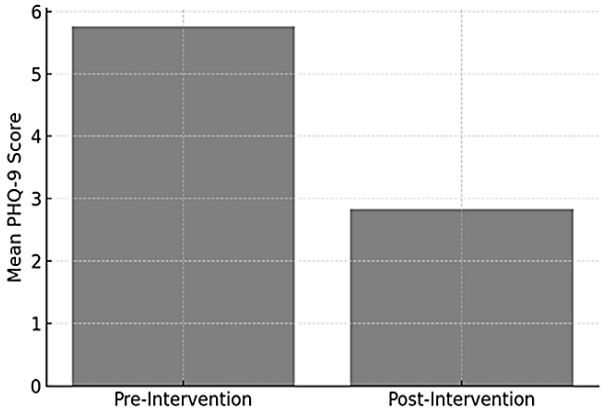

Figure 1. Mean PHQ-9 scores before and after intervention

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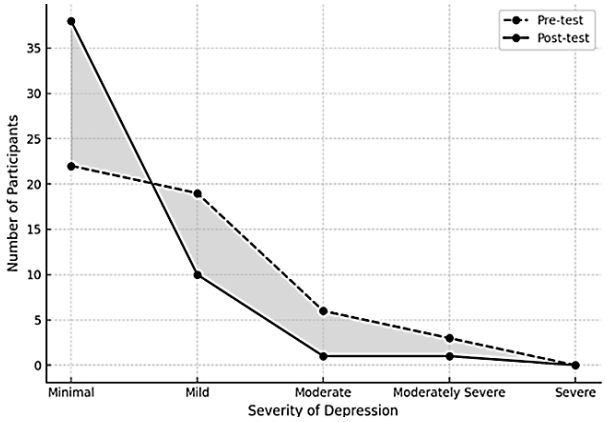

Figure 2. Pre- and post-intervention PHQ-9 severity distribution

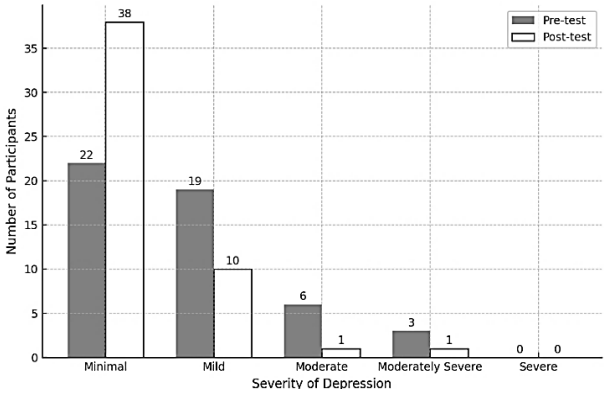

Figure 3. Number of participants by PHQ-9 depression severity categories before and after intervention

ranking the absolute differences between paired scores, assigning signs based on the direction of change, and evaluating whether the median of those differences is significantly different from zero. The null hypothesis assumes that the intervention produces no effect—that is, the median difference between pre- and post-intervention scores is zero, and any observed changes are due to random variation. Rejecting the null hypothesis, as this study did, implies that the intervention produced a consistent and meaningful change in depressive symptoms. The significant test result supports the conclusion that the interdisciplinary team (IDT) collaborative care was effective in reducing depression severity among participants.

Among the 49 participants, 42 demonstrated decreased PHQ-9 scores after the intervention, 6 showed increased scores, and 1 remained unchanged. The test produced a z-score of –4.478, indicating that the majority of score changes were in the negative direction (i.e., improvement). A negative z-score reflects that more participants had reductions rather than increases in depressive symptoms. The associated *p*-value was < .001, meaning the probability that these improvements occurred by chance is less than 0.1%. This provides strong statistical evidence that the interdisciplinary team (IDT) collaborative care intervention was effective in reducing depressive symptoms. The distribution of rank shifts is visually summarized in Figure 4, and full statistical results are shown in Table 3.

Discussion

This study examined the effectiveness of interdisciplinary collaborative care in reducing depressive symptoms in older adults enrolled in a PACE program. The statistically significant reduction in PHQ-9 scores ($z = -4.478$, $p < .001$) demonstrates the value of team-based interventions. The mean PHQ-9 score reduction of 2.92 exceeds that reported in comparable studies, such as Gilbody et al. [18], where a 1.31-point reduction was achieved using a less diverse care team. The broader disciplinary scope of this study's interdisciplinary team, including 11 roles, may account for this enhanced outcome. Each team member provided specialized, coordinated care targeting all the medical, nursing, the physical, psychological and social needs of the participants. conditions.

In addition to serving as a validated depression screening tool, the PHQ-9 functioned as a continuous, symptom-specific outcome measure that informed individualized care. Because the PHQ-9 captures nine distinct depressive symptoms with severity ratings, it

Table 3. Wilcoxon signed-rank test results for PHQ-9 score changes

Metric	Value
Number of participants	49
Ranks with decreased scores	42
Ranks with increased scores	6
Ranks with no change	1
Total reduced rank sum	775.00
Total increased rank sum	86.00
z value	–4.478
p value	< .001

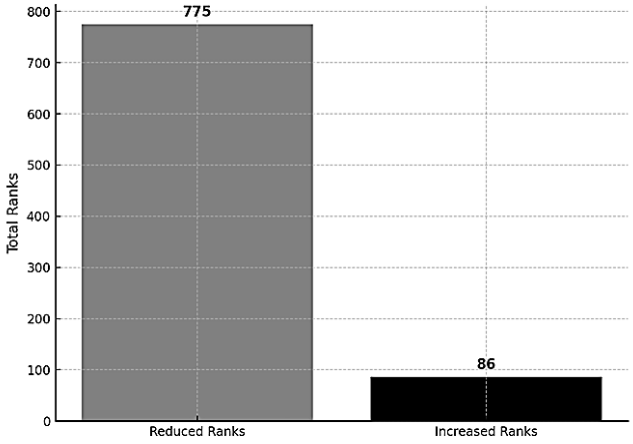

Figure 4. Total signed ranks from Wilcoxon signed-rank test comparing reduced and increased PHQ-9 scores

allowed the interdisciplinary team to identify which depressive symptoms were most affected (e.g., sleep disturbance, appetite change, concentration problems, loneliness, fatigue, lack of motivation, frustration, etc.), and also helped tailor interventions accordingly. This approach enabled each discipline to formulate patient-centered goals linked directly to the symptom patterns identified. As Zimmerman notes, the PHQ-9 not only quantifies depression severity but also supports guideline-based treatment planning by highlighting specific therapeutic targets and tracking patient progress over time [30]. In this study, the integration of personalized care plans, regular team meetings, and real-time interdisciplinary adjustments created a responsive system that adapted to the evolving needs of each patient.

Limitations

Several limitations must be acknowledged. The absence of a control group limits causal conclusions. The sample was drawn from a single PACE site, potentially affecting generalizability. Additionally, the retrospective chart review relied on the completeness of existing records. Moreover, the availability of a highly structured IDT may not reflect standard conditions in all care facilities, posing challenges for broader implementation. Lastly, depression management often requires long-term care, and this study only examined a six-month intervention period.

CONCLUSION

This study demonstrates that interdisciplinary team-based collaborative care significantly reduced depressive symptoms in older adults enrolled in a PACE program. The statistically significant reduction in PHQ-9 scores highlights the effectiveness of integrated, patient-centered care that addresses the full spectrum of physical, emotional, and social needs. The use of PHQ-9 not only facilitated early detection of depression but also guided the formulation of targeted interventions across disciplines. These findings support the implementation of collaborative care models in geriatric populations, where complex needs demand comprehensive and coordinated treatment strategies. Future studies should explore long-term sustainability, broader demographic applicability, and cost-effectiveness to further validate this approach in diverse clinical settings

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