Effectiveness and Benefits of Exercise on Older People Living With Mental Illness’ Physical and Psychological Outcomes in Regional Australia: A Mixed-Methods Study

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Regular exercise is reported to improve depressive symptoms and quality of life for people experiencing mental illness. For older adults, including strength and balance can also decrease falls. Mental health services seldom include funding for Accredited Exercise Physiologist programs. A 9-week Accredited Exercise Physiologist-led program for older adults receiving mental health treatment with a community Older People’s Mental Health Service was trialed in regional Australia. This clinician-conceived small-scale feasibility study utilized a two-phase concurrent triangulation mixed-method design to evaluate physical and psychological program outcomes and identify factors related to engaging in physical activity. This tailored exercise program led to improvements in measures of psychological distress and physical and psychological function. These changes corresponded with participants identifying benefits of exercising as a group of adults living with mental illness. Such findings suggest a supervised, individualized program for older mental health consumers confers physical and psychological benefits; however, further research evaluating exercise interventions with this population is required.

Keywords: older adults, exercise physiology, community mental health services, socialization

People living with mental illness in rural Australia have three times the risk of premature death than the total population (Roberts et al., 2018). A significant burden is already placed on regional health services, as rural Australians face greater risk factors for disease compared with city dwellers (Australian Institute of Health and Welfare, 2020), and projections of increasing rates of mental illness in this population will increase this demand on the health system. Additionally, those diagnosed with a mental illness have higher rates of poor physical health, being twice as likely to develop cardiovascular or metabolic diseases (Firth et al., 2019), as well as facing a reduced life expectancy by 15–30 years compared with those without a mental illness (Houben et al., 2019; Thornicroft, 2011).

The benefits of exercise in reducing all-cause mortality are well-known in those experiencing severe mental illness (De Hert et al., 2011; McTiernan et al., 2019; Vancampfort, Guelinckx, Probst, Ward, et al., 2015). There is also strong evidence outlining the effectiveness of exercise as an adjunct treatment for those living with mental illness. Exercise has been shown to decrease symptoms of depression, anxiety, stress, and schizophrenia (Firth et al., 2015; Rosenbaum et al., 2014; Stanton et al., 2014; Stanton & Happell, 2014; Stanton & Reaburn, 2014), decrease social isolation (Richardson et al., 2005), and improve quality of life (Schuch et al., 2015; Vancampfort, Guelinckx, Probst, Ward, et al., 2015), including in the aging population (Windle et al., 2010). Exercise has also been shown to be as effective or more effective than antidepressants at reducing depression in older adults after periods of 16 weeks (Blumenthal et al., 1999) and in the middle-aged population after 8 months (Pilu et al., 2007). Another benefit of exercise in the older population is a reduction in the risk of falls (Sherrington et al., 2017) especially with the use of strength and balance activities (Clemson et al., 2010).

While the benefits of exercise for older adults living with mental illness have been well-described, it is important to recognize that there are multiple factors aside from mental illness that influence an older person’s engagement with physical activity. At a personal level, factors such as enjoyment, satisfaction, commitment, and feeling energized have been identified as contributing to an older person’s choice of activity (Beck et al., 2016). Older adults with low levels of physical activity identified issues such as poor health, lifetime inactivity, low motivation, and a perception that decreased activity is to be expected or inevitable as barriers to exercise (Rai et al., 2020). For some, access to and the cost of acceptable exercise opportunities limit engagement in physical activities (Rai et al., 2020). Social and environmental factors have also been identified as impacting older adults’ engagement in physical activity. A wide range of sociodemographic factors, social support, and social engagement, in combination with factors related to an older adult’s living conditions, access to options for exercise, and local policies supporting safety and movement, also influence physical activity (Noh & Kim, 2022).

Despite the known benefits of exercise and calculated cost benefits (Deloitte Access Economics, 2016), limited dedicated...
funding within healthcare exists to provide access to supervised exercise programs with Accredited Exercise Physiologists. Within the Australian Health System, Accredited Exercise Physiologists are tertiary trained, accredited allied health practitioners who are the only exercise practitioners who have a scope of practice that enables working with clinical populations (Exercise and Sports Science Australia, n.d.). As a result of this lack of funding, a reliance on pharmacological interventions predominates with exercise as a potential intervention to alleviate both mental and physical symptoms often overlooked. Australian research focused on adults with mental illness identified a preference for group-based physical activities that include a social component and support from a professional instructor (Chapman et al., 2016). Although research evidence demonstrating the efficacy of exercise programs in improving both mental and physical health of those with mental illness exists, there is a gap in the implementation and evaluation of pragmatic and sustainable physical activity interventions within existing State Health services (Lederman et al., 2017), particularly in older populations and within regional areas.

Seeking to address this gap, an Accredited Exercise Physiologist-led exercise program for older adults receiving treatment for a diagnosed mental health condition with the community-based Older People’s Mental Health Service was initiated and implemented by clinicians in central western New South Wales, Australia. This paper reports on a clinician-conceived, small-scale research project designed to evaluate whether access to and participation in this exercise program for older adults, delivered in a community setting, could improve markers of physical and psychological health, and enhance engagement in regular exercise.

Methodological Approach

This feasibility study utilized a two-phase concurrent triangulation mixed-methods design (Creswell, 2014; see Figure 1). This approach is underpinned by a pragmatic paradigm, with the strengths and weaknesses of each approach complementing the other (Regnault et al., 2018). The qualitative component of this mixed-methods design followed a qualitative descriptive approach (Kim et al., 2017) with thematic analysis (Yin, 2010) utilized to capture the complexity of the data while presenting the detail and richness of participants’ perspectives (Vaismoradi et al., 2013). Qualitative and quantitative data were collected pre and post the program. Analysis of the quantitative data and qualitative data was undertaken separately with final interpretation utilizing a triangulation of the two analyzed data sets and the demographic data to validate the evidence obtained from each method of data collection. A priori power calculations identified that a sample size of 15 would be needed to obtain statistical power.

Participants

After obtaining ethics approval, a purposive sample was sought from people receiving support for a diagnosed mental health condition (such as depression, anxiety), from a community-based mental health service in regional central western New South Wales, who were aged 65 years and older and could speak English. Prior to inclusion in the study, potential participants completed an adult preexercise screening (Exercise and Sports Science Australia, 2019) to identify possible comorbid conditions contraindicating participation in physical activity. Those unable to give informed consent were excluded from the study. Restrictions arising from the COVID-19 pandemic resulted in the exclusion of any potential participant residing in an aged care facility. This purposive sample identified 48 of the older adults provided with case management as eligible for the exercise program, 20 expressed interest and agreed to participate in the program; however, due to the COVID-19 limitations imposed in the Australian context, only seven were able to undertake the program.

Recruitment and Enrollment

Case managers from the Older People’s Mental Health Service (one of whom were part of the research team) informed potential participants of the project, providing each with a written information sheet, explained the study, and responded to any questions. Any additional recruitment assistance or questions were referred to the clinician leading the research who was aligned to the service and research team. Constraints associated with the pandemic resulted in an extended recruitment period from February to November 2020. Recruitment to the program was left open following commencement of the intervention through the initial 3 weeks. Seven people consented and participated in the study. Pandemic conditions also meant that our participant pool was reduced from an initial expression of interest of 20 down to a total of seven who started the project.

The Intervention

The program was based on the Fit For Your Life Workshop delivered by Professor Maria Fiatarone Singh and Sydney North Health Network (Sydney North Health Network, 2018) which outlined the use of balance and resistance exercises for the older person. However, we adapted this approach for older adults with mental illness. Participants underwent pre- and postprogram testing individually, but the exercise program itself was group based. The 9-week multimodal program consisted of cardiovascular exercise (walking, dynamic movements, shadow boxing, and mini sports), resistance exercise (body weight, free weights, and therabands), balance and falls prevention, and coordination and flexibility.

Figure 1 — Two-phase concurrent triangulation mixed-methods design.

(Ahead of Print)
Program goals were generally falls prevention and strength based as per the Fit for Your Life Workshop. Initially, the length of the program was to be 12 weeks; however, due to delays from COVID-19, the program had to be shortened to 9 weeks.

The program comprised a maximum of three, 1-hr exercise sessions per week. The intensity of the sessions was guided by a participants’ affect on the day; however, a general guide of a rate of perceived exertion from 4 to 5 was also given. For resistance exercise, a standard two to three sets of eight to ten repetitions at a comfortable weight (supported body weight or additional weights) were determined by the participant and closely monitored by the Accredited Exercise Physiologist. Safe progression of volume was considered case by case. Participants attended a pretesting session to identify the goals they wanted to achieve attending the program. This also provided the opportunity for each person to speak about both their confidence in their ability and their fears/apprehension to exercise and goals they wanted to achieve by their compliance with the program. The consultative approach continued throughout to enable increases in intensity and range of exercises as fitness improved. To further maximize participation a mental health clinician known to participants was present at each session. This method of prescription and progression was utilized to provide ecological validity to the exercise program, thus creating a program that was partially dictated by the affect of the participants and their goals and desires rather than just by one specific exercise mode or set intensity.

For a number of potential participants, limited access to transport (other than paying for a taxi) and financial constraints were a potential barrier to engaging with this program. To remove cost and access as a barrier, transport was arranged at no cost for participants.

Quantitative Data Collection
(For comprehensive details of tests undertaken see Appendix A).

Physical Function
Physical function was assessed pre and post the Accredited Exercise Physiologist-led exercise program using the following physical function tests: the Timed Up and Go test (Podsiadlo & Richardson, 1991), the 30-s sit to stand (Jones et al., 1999), the 10-m walk test (Peters et al., 2013), and the Berg Balance Scale (Lima et al., 2018). All tests were carried out by the Accredited Exercise Physiologist for test–retest reliability. Final test scores as well as observational notes for each test on any movement difficulties faced by the participants were recorded.

Psychological State
Two self-reported measures of psychological function were used: the Kessler 10 (K10; Andrews & Slade, 2001) and the Depression, Anxiety, and Stress Scale (DASS-21; Henry & Crawford, 2005). The K10 provides a measure of psychological distress over the preceding 4 weeks with higher scores indicating greater distress. The K10 results can be interpreted with severity categories as follows: 10–19 are likely to be well, 20–24 are likely to have a mild mental disorder, 25–29 are likely to have a moderate mental disorder, and 30–50 are likely to have a severe mental disorder (Australian Bureau of Statistics, 2012). The DASS-21 measures and discriminates between depression, anxiety, and stress with a set of three self-report scales, the scores for each domain calculated by summing the relevant items. See Table 1 for severity categories for each DASS subscale (Lovibond & Lovibond, 1995). Both these tests have shown to improve significantly in response to exercise in a period of 6 weeks (Hartmann et al., 2021).

Qualitative Data Collection
Semistructured interviews were conducted by one of the research team with extensive training and experience in qualitative research guided by the interview schedules (see Appendix B). The researcher was accompanied by a clinician known to the participants although not involved in their direct clinical care. The clinician’s role was simply to introduce the researcher conducting the interview to the participant and be an observer. The interviewer conducted the first interview with input from the observer. The second interview for each participant was conducted without the observer as the interviewer was already known to the participant. The first interview was conducted at the commencement of the intervention and the second postcompletion of the intervention. Both written consent and verbal consent were obtained prior to audio recording of the interviews. Initial interviews were conducted within 2 weeks of commencement of the intervention and follow-up interviews up to 2 weeks postcompletion of the intervention.

Given the complex array of factors that can impact on a person’s engagement in exercise, including previous experiences of exercising and lifetime inactivity, the initial interview sought participant’s descriptions of their engagement with exercise and physical activity from childhood, through adulthood, and into older age. The interview also provided an opportunity for participants to describe how they felt about the upcoming program and benefits they anticipated from participating.

The follow-up interview conducted at the completion of the intervention provided participants a space to reflect on the experience of participating in the exercise program, impacts that they had noted, any changes in ideas and intention to continue exercising.

Table 1 DASS-21 Severity Ratings

<table>
<thead>
<tr>
<th>Severity</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0–9</td>
<td>0–7</td>
<td>0–14</td>
</tr>
<tr>
<td>Mild</td>
<td>10–13</td>
<td>8–9</td>
<td>15–18</td>
</tr>
<tr>
<td>Moderate</td>
<td>14–20</td>
<td>10–14</td>
<td>19–25</td>
</tr>
<tr>
<td>Severe</td>
<td>21–27</td>
<td>15–19</td>
<td>26–33</td>
</tr>
<tr>
<td>Extremely</td>
<td>28+</td>
<td>20+</td>
<td>34+</td>
</tr>
</tbody>
</table>

Note. DASS = Depression, Anxiety, and Stress Scale.

Data Analysis

Quantitative Data
Means and SD were calculated for pre- and posttest data (n = 6). Using the Statistical Package for the Social Sciences, pre- and posttest data were analyzed using two-tailed paired t tests with significance set at p < .05. Effect sizes were calculated according to Cohen (Cohen, 2013) and designated within the specified range for effect: >0.2 = small, >0.5 = medium, and >0.8 = large.

Qualitative Data
Qualitative data collected by audio-recorded interviews were transcribed verbatim and then analyzed to identify key themes using
Yin’s “Five Phases of Analysis” (Yin, 2010): (a) compiling, (b) disassembling, (c) reassembling (and arraying), (d) interpreting, and (e) concluding. Methodological rigor was assured by cross-referencing of responses posed with initial analysis undertaken by an independent research assistant experienced in qualitative analysis. Phases 2 and 3 were then checked against transcripts by the interviewer before proceeding to interpretation of the data.

Results

Demographics and clinical characteristics of the seven participants are shown in Table 2. Participation throughout the study is shown in Figure 2. One participant discontinued the physical intervention part way through as they transitioned from community to residential aged care.

Quantitative Findings

Physical Function

There were significant improvements from pre- to posttest data ($p < .05$) for the 30-s sit-to-stand test and for both the 10-m walk (normal) and the 10-m walk (fast) tests (see Table 3). Effect sizes were medium, small, and small, respectively. Both the Berg Balance Scale and the Timed Up and Go showed improvements. The Timed Up and Go test showed a trend to be significantly faster ($p = .06$; small effect size), but the Berg Balance Scale was not significantly different.

Psychological Status

There were significant improvements from pre- to posttest data ($p < .05$) in both the Kessler 10 (K10) and DASS-21 responses (see Table 4). On final testing, all participants who completed the K10 ($n = 5$) rated an improvement, with three participants scoring under 20 and no participants scoring over 30. Preintervention there were two participants categorized as likely to have a severe mental disorder compared with none postintervention (Australian Bureau of Statistics, 2012). Changes in the K10 reached a medium effect size.

Regarding the DASS-21, all participants ($n = 6$) rated an improvement on all scales at final testing ($p < .05$; see Table 4). DASS-21 ratings across depression, anxiety, and stress on average changed from severe, severe, and moderate, respectively, at

Table 2 Demographics and Clinical Characteristics of the Participants

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Gender</th>
<th>Age</th>
<th>Functional status</th>
<th>Diagnosis</th>
<th>Sessions attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paul</td>
<td>M</td>
<td>76</td>
<td>Living independently in own home with aged care support services</td>
<td>Bipolar affective disorder</td>
<td>8</td>
</tr>
<tr>
<td>Margery</td>
<td>F</td>
<td>72</td>
<td>Living with partner in own home</td>
<td>Depression</td>
<td>20</td>
</tr>
<tr>
<td>Jack</td>
<td>M</td>
<td>87</td>
<td>Living with partner (who is his primary carer) in own home, with aged care support services</td>
<td>Depression; cognitive impairment</td>
<td>25</td>
</tr>
<tr>
<td>Helen</td>
<td>F</td>
<td>77</td>
<td>Living in independent living unit (self-contained)</td>
<td>Depression/anxiety</td>
<td>25</td>
</tr>
<tr>
<td>Ruth</td>
<td>F</td>
<td>70</td>
<td>Residing in independent living unit (self-contained)</td>
<td>Bipolar affective disorder</td>
<td>27</td>
</tr>
<tr>
<td>John</td>
<td>M</td>
<td>72</td>
<td>Living with partner (who is his primary carer) in own home</td>
<td>Depression</td>
<td>20</td>
</tr>
<tr>
<td>Mick</td>
<td>M</td>
<td>84</td>
<td>Living independently in own home</td>
<td>Depression; anxiety; mild cognitive impairment</td>
<td>16</td>
</tr>
</tbody>
</table>

Note. M = male; F = female.

Table 3 Results From Each Physical Function Test Pre and Post the Exercise Intervention

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre</th>
<th>Post</th>
<th>Difference</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUG</td>
<td>11.8 s</td>
<td>8.9 s</td>
<td>-2.9</td>
<td>0.27</td>
</tr>
<tr>
<td>SD</td>
<td>6.5</td>
<td>3.1</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>30STS</td>
<td>9.8</td>
<td>14.0*</td>
<td>4.2</td>
<td>-0.65</td>
</tr>
<tr>
<td>SD</td>
<td>2.5</td>
<td>2.4</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>10mNORM</td>
<td>6.3 s</td>
<td>4.9 s*</td>
<td>-1.4</td>
<td>0.47</td>
</tr>
<tr>
<td>SD</td>
<td>1.3</td>
<td>1.3</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>10mFAST</td>
<td>5.1 s</td>
<td>4.0 s*</td>
<td>-1.1</td>
<td>0.37</td>
</tr>
<tr>
<td>SD</td>
<td>1.5</td>
<td>1.2</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>BBS</td>
<td>44.6</td>
<td>47.8</td>
<td>2.2</td>
<td>-0.18</td>
</tr>
<tr>
<td>SD</td>
<td>10.1</td>
<td>6.9</td>
<td>4.6</td>
<td></td>
</tr>
</tbody>
</table>

Note. TUG = Timed Up and Go test; 30STS = 30-s sit to stand; BBS = Berg Balance Scale; 10mNORM = 10-m walk test (normal); 10mFAST = 10-m walk test (fast).

*Significant difference at $p < .05$.

Figure 2 — Timeline of participant recruitment and discontinuation across the study period.
preintervention, to all three being normal postintervention (Lovibond & Lovibond, 1995). Effect sizes for each category (depression, anxiety, and stress) were small, medium, and medium, respectively.

**Qualitative Findings—Preintervention**

The qualitative findings are presented in two sections. This first section focuses on participant’s accounts of physical activity and exercise from childhood, onto adulthood, and older age and each person’s goals for participation in the program.

**Changing Engagement With Exercise and Physical Activity From Childhood to Adulthood**

While lifelong inactivity has been identified as a contributing factor to low levels of physical activity in later life (Rai et al., 2020), all participants recalled playing sport or undertaking some form of physical activity in their youth, including football, swimming, athletics, cricket, hockey, and tennis. For many, riding a push bike to school was a regular form of exercise. Several participants grew up on a farm in rural/remote regions with limited access to organized sport or recreational activities. For these participants, running, horse riding, and helping on the farm were the main forms of physical activity.

On reaching adulthood, some had maintained active involvement in sporting activities, including squash, golf, swimming, football, croquet, cycling, and surfing. “Mick” recalled “I used to look forward to that [playing squash], I felt real good after it.” Others described remaining physically active while raising children, and performing daily tasks such as housework, gardening, lawn mowing, and vegetable growing. For “Margery,” raising her children on a farm meant that “I was always in the garden or out in the paddock.”

The demands of work and family responsibilities have previously been identified as factors contributing to decreased physical activity in mid-life (Kelly et al., 2016; McArthur et al., 2014). These participants likewise identified employment in physically demanding careers including baker, butcher, nurse, and personal caretaker led to exhaustion at the end of the working day. This was described as a barrier to continuing with regular exercise. Working long hours, and changing priorities once married and raising a family also disrupted regular engagement in formal exercise. “Mick”s previous enjoyment of sport, disappeared “When I got married, I sort of drifted away from it and well I was working 11 or 12 hr a day, so I didn’t feel like doing much exercise after that.”

**Benefits and Barriers to Physical Activity in Older Age**

For some sporting activities such as golf, walking, and swimming, albeit less physically demanding, had continued for several years while several had previously engaged in exercise programs, joined a gym, or sought treatment with an exercise physiologist. Some reported continuing to garden and grow vegetables, deriving great pleasure from their garden. “Mick” noted “I love gardening, I love growing my vegetables.” Others reported that gardening was associated with relief from mental health issues. “Margery” described gardening as “good therapy for me . . . I prefer to go and poke around the garden. Just kind of be my own sometimes.” While these participants engaged in gardening as a solitary activity, the pleasure and relief they found in gardening are consistent with research demonstrating positive health benefits associated with gardening (Howarth et al., 2020; Soga et al., 2017).

Rai et al. (2020) identified poor health as a prominent barrier to being physically active, with low motivation also reported as an additional barrier. In this study, participants reported ill health, either personal or caring for a partner as a barrier to active engagement in physical activity. Factors related to mental illness including social anxiety and reduced social skills were identified as problematic. “John” noted “You start up and go for a while and then you sort of give it away you know,” while “Jack” spoke of his difficulty being away from home, “I used to find that I would go to town, and I would just want to come straight back.” Reduced motivation and anhedonia were also described, for “Helen” “. . . nothing appeals to me at the moment, it’s just the way I am,” while “Ruth” noted “You just lose interest in things.”

**Anticipation and Anxiety**

While participants described looking forward to the program, others spoke of feeling a little anxious. All participants hoped for benefits from the program. For “Ruth,” the secrecy of self-stigmatization was apparent “I just think . . . getting to know other people with the same sort of problems . . . would be good because other people don’t really know that I have depression. I don’t tell anyone.” It seemed that this opportunity to be with other people who experience similar mental health issues provided an environment for selective disclosure (talking to people who will understand; Corrigan & Rao, 2012). Hopes for improvements in mental and physical health, reduction in falls, and overall fitness emerged as a priority. Participants identified improvements in mobility, strength, and balance as important. “Jack” hoped that participation in the program would result in “Some sanity like I used to have.”

**Qualitative Findings—Postintervention**

This second section reports participants’ reflections upon completion of the program, the benefits and challenges encountered, and for some, plans to continue physical activity. Most participants described their experience as “very good,” “very positive,” and “very encouraging.” For “Helen,” the program exceeded expectations.

### Table 4 Results From Each Psychological Status Test Pre and Post the Exercise Intervention

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre</th>
<th>Post</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>K10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>29.71</td>
<td>13.14</td>
<td>0.64</td>
</tr>
<tr>
<td>SD</td>
<td>10.15</td>
<td>9.73</td>
<td></td>
</tr>
<tr>
<td>DASS-21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>20.7</td>
<td>8.3*</td>
<td>0.49</td>
</tr>
<tr>
<td>SD</td>
<td>11.8</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>18.3</td>
<td>8*</td>
<td>0.60</td>
</tr>
<tr>
<td>SD</td>
<td>8.3</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>23.0</td>
<td>9*</td>
<td>0.66</td>
</tr>
<tr>
<td>SD</td>
<td>8.4</td>
<td>7.1</td>
<td></td>
</tr>
</tbody>
</table>

*Significant difference at *p* < .05.

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*Note. BBS = Berg Balance Scale; DASS-21 = Depression, Anxiety, and Stress Scale; K10 = Kessler 10.*
I think it was more positive than I expected, with the progress, we started off very light and then we moved up the scale and there were fun things to do that were still exercise like playing hockey, throwing balls . . . .

**Perceived Improvements in Mental/ Psychological Health, Physical Health, and General Fitness**

Consistent with findings in previous studies (Mason & Holt, 2012), participants reported feeling brighter, more energetic with an associated improvement in mood. They described improvements in general well-being, balance, and more awareness of falls related risks. “Helen” spoke of “feeling much safer on my feet and we have been taught how to walk which is important.” Several also reported noticeable changes in cognition such as improved memory and coordination. Others also reported a more positive outlook with increased motivation to exercise, but more significantly, having a new experience to talk about with family and friends.

**Breaking Down Barriers**

Several participants overcame preexisting barriers to attend, including amotivation, difficulties with committing and/or continuing with an activity or program, and previous experiences of social disconnection/isolation and fears of socializing. “Margery” who traveled into town to the program had previously avoided going out much, but going to the program was “really good, yes . . . . My husband reckons it has helped me. He just thinks it is good that I am going out.”

**Creation of a Regular Routine and Structure for the Day**

Participants talked about the exercise program providing a structure and routine to their day, an incentive to get up in the morning and something to look forward to. Prior to the program, Jack struggled to get out of bed, “it has given me an incentive to get up because once I am up and go . . . . I don’t come home and go back to bed . . . . I go around the house or yard.”

**Regaining a Feeling of Purpose and of Being Needed**

Other participants reported regaining a feeling of purpose and of being needed. “Margery” reported, “One particular lady said she would miss me when I didn’t come.” For “Jack” not only did he now have an incentive to get up, “it has given me another purpose in life . . . . it has been really good you know.”

**Increased Social Contact and Feelings of Togetherness, Community, and Belonging**

Social interactions as a part of group-based exercise activities have reported to reduce social isolation and loneliness (Franke et al., 2021; Stevens et al., 2021). Strongly threaded throughout participants’ reflections was the value of social interactions. Interacting with others and being part of a group appeared linked to a sense of belonging and responsibility. As members of the exercise program, they relied on the attendance of others for support and encouragement. Two group members specifically described the value of the shared interactions. For “Helen,” “I think it is the group; we have bonded quite well, and everybody encourages each other,” while “John” described the other participations as “. . . just a good bunch of people and the participants included you in everything they did.” “Margery” reported her experience as “Everyone is like me and everyone is nice, and we chatted sometimes. It felt really comfortable.” The program was described as a safe and comfortable space affording the opportunity to exercise with people perceived as “like me.”

**Uncomfortable Comparisons**

“Helen” described a feeling of not doing very well in comparison with the other participants in the program who were thought to be more able. “I don’t compare myself with other people, but I don’t think I have done very well; I don’t think I have improved much, but that is my fault.” “Mick’s” wife noted that “Only one day he came home down . . . . things he was asked to do were a little bit difficult. He is very competitive, and he came home depressed almost because someone could do it and he couldn’t.”

**Engagement in Exercise**

Most participants reported positive experiences during the exercise sessions. Consistent with previous research identifying a preference for exercise groups facilitated by a professional instructor (Chapman et al., 2016), these participants described feeling safe and “in good hands” and valued the encouragement, support, and guidance provided by the trainers. “Margery” described the exercises as having a positive effect on her mental health. “It just made you feel good and more relaxed I think after you did the exercises, and you don’t think of anything else when you are exercising.” There was a sense of a strong level of engagement from participants who showed not only in their enjoyment but also through their buy in to the program and wanting to remember what they had learnt. “Ruth” remarked “Our stretches got easier as we got along and I am trying to memorize those.” Not only did “Jack” find the program beneficial for enabling his engagement in exercise, but he also suggested that “there must be other people in similar situations as we who went to the weekly group, and I am sure you could help more people.”

**Intentions to Continue Exercising**

Most participants reported that their ideas about exercising regularly had changed following attendance at the program, which also translated into the majority expressing an interest to continue exercising regularly. “Helen’s” enthusiasm was such that she said, “I am planning on continuing on, I don’t want to just stop now.” When asked whether they would participate in a similar program if it was offered as part of their treatment provided by the community mental health team, the response was positive. Although some raised barriers and considerations such as transportation and program costs as well as a request for the group to comprise similar, like-minded people. For “Margery,” a group need to include “People that are probably like me and understand how you feel about things.”

**Triangulation of Results**

**Barriers and Motivational Factors to Exercise**

Prior to beginning the exercise intervention, participants described some of the barriers to participating in exercise. One participant described being in a state where “nothing appeals to me at the moment” (Helen) and another where they had “just [lost] interest in things” (Ruth). These feelings of amotivation and anhedonia are expected in those who are experiencing a high level of distress as rated by the K10 and DASS-21 scores. Five of six of the
participants were experiencing at least a moderate degree of anxiety according to the DASS-21 scores, and three participants rated as at least having a moderate level of distress in regard to the K10. High levels of anxiety were also reflected in the social anxiety described by participants as they expressed the challenges of doing something new and having to interact with new people.

Motivational factors also mirrored the scores attributed to participants in the K10 and DASS-21 scores. Jack expressed hoping to get “some sanity like I used to have” by taking part. Another participant (Mick) recalled that when they had previously undertaken exercise, they had “felt really good after it,” suggesting they knew that participation in the program could assist them with their mood.

**Improved Physical Function**

Participants described improvements in fitness, balance, and more awareness of falls related risks, which converged with their physical test scores. Scores from the physical function tests all showed a degree of improvement. Participants talked about such fitness improvements as “I guess it is like anything, the more you do, you get better” (Jack) and describing the 30-s sit to stand as having “got up to 15 of those and so that got easier” (Ruth).

Improvements in functional mobility, gait, and balance showed in the 10-m walk test at both speeds, as well as the Timed Up and Go test. All participants walked faster in each walk test, and they described how the program had helped them learn how to walk more effectively: “I am feeling much safer on my feet and we have been taught how to walk which is important” (Helen). Participants also described how they had overcome challenges during the exercises which ultimately improved their mobility, gait, and balance: “Yes, it is getting better. At first it was very difficult, but they included me in all these things of balance and they weren’t easy and they said come on let’s do it, put your walking stick away you don’t need that” (John). This is reflected in the Timed Up and Go test clinician notes which scored each participant’s postural stability, gait, stride length, and sway during the test. The post-intervention Timed Up and Go clinician notes scored fewer marks than the preintervention test, indicating that observationally, the participant’s ability to perform the test had improved. The Timed Up and Go scores themselves also indicated that the cohort now fell within the range of being nonfallers (Shumway-Cook et al., 2000).

These improvements in physical function also created an achievement narrative as previously observed (Mason & Holt, 2012), whereby there was a sense of reward and achievement leading to confidence in future activity. “Helen” clearly described occasions “where . . . I would think I can’t do this, and the staff would say just try and stay with you and you were able to get through it.”

**Improved Psychological Function**

Participants reported feeling improvements in mood such as feeling brighter, having a more positive outlook and increased motivation. These changes were reflected in both the K10 and the DASS-21 scores, with all participants improving their scores on each scale to some degree. The cutoff scales used for the K10 changed from having two participants scoring within the “likely to have a severe mental illness” range preintervention, to none postintervention. On average, K10 scores went from being “likely to have a moderate mental disorder” to “likely to be well.” The DASS-21 scores also improved from three participants having extremely severe or severe levels preintervention, to only one participant falling into the severe category postintervention. Changes in severity of symptoms, such as amotivation and anhedonia, were reflected in how participants talked of feeling like they had something to look forward to and being able to have a much more functional day after the sessions as they “gave me a purpose” and “I don’t come home and go back to bed” (Jack). Participants also talked of the social element of the exercise, in that it “has been really good to mix with a good bunch of people” (Jack). They described the support that they gave to each other to complete the exercises as well as developing bonds within the group. Social aspects of exercise have previously been acknowledged as improving the psychological status in older adults (Seino et al., 2019) and is a likely component to the improved distress scores of our participants.

**Discussion**

The objective of this research was to evaluate whether access to and participation in an Accredited Exercise Physiologist-led regular exercise intervention for older adults, in a community setting, improved markers of physical and psychological health and enhanced willingness to engage in regular exercise. Incorporating interview data enabled a rich perspective of individual experiences of engagement in exercise since childhood, barriers to exercise, and the experience of engagement in this intervention. It also provided an opportunity to translate research methods into clinical practice outside of a metropolitan area as well as test the project design amidst COVID-19 pandemic restrictions.

It has previously been reported that when older adults are engaged in exercise, there is an improvement in depressive symptoms and quality of life (Windle et al., 2010) as well as a reduction in the risk of falls (Sherrington et al., 2017) especially with the use of strength and balance activities (Clemson et al., 2010). The results should be interpreted with caution due to the small participant numbers and lack of control group; however, our research demonstrated four key findings in older adults in a regional setting: (a) that older adults in this setting actively bought into and adhered to a program that was led by an experienced professional and tailored to their needs, (b) exercise supported an improvement in depressive and other mood-related symptoms, (c) exercise improved physical function outcomes, and (d) exercising as a group provided a sense of belonging and important social interactions.

**Engagement in Physical Activity**

The exercise intervention was adapted to encourage participants to take an active role in program design and content. Providing participants with an opportunity to individualize their exercise likely had significant benefits, contributing to engagement during the program and the desire to continue afterward. This was reflected in the participants’ perceptions of exercise and general appreciation in having an exercise program offered. Additionally, prior to beginning the exercise program, participants cited similar reasons previously cited as barriers to exercise for populations with severe mental illness, such as low mood and lack of motivation (Watts et al., 2018). These barriers were clearly overcome by participants as a result of the individualization, the encouragement of both the group and Accredited Exercise Physiologist, and the sense of achievement the participants gained from being involved.

**Psychological Status**

Previous research has reported significant improvements in depressive symptomology following exercise interventions in both the general population with mental illness (Hartmann et al., 2021;
Physical Function

Older adults are well known to be at risk of falling leading to debilitation, social isolation, and reduced confidence (Clemson et al., 2010). Our results showed significant improvements in physical functioning following completion of the exercise program. Of the four physical function tests, two showed significant improvements, the 30-s sit-to-stand (medium effect size) and the 10-m walk test for both normal and fast speeds (small effect size). The sit-to-stand test is associated with future disability levels (Makizako et al., 2017) and falls (Buatois et al., 2008) among older adults, as well as higher limb strength which allows for activity levels to be maintained in older people (Jones et al., 1999). Further, the changes in the 10-m walk test being greater than 0.05 m/s could be classed as showing a substantial clinically meaningful change (Perera et al., 2006). Gait speed in the 10-m walk test is also associated with rates of cognitive decline (Dumurgier et al., 2017); thus, improvements in this test are important in this population from both a physical and cognitive perspective.

Scores of the Berg Balance Scale improved from pre- to postintervention from 44.6 to 47.8, although not significantly (no effect size). Changes in this score may be an indicator of those who are not at risk of falling, especially with a score over 45 (Shumway-Cook et al., 1997), suggesting our population were not at risk of falling postintervention. The Timed Up and Go scores of 11.8 and 8.9 s fall within previously reported healthy normative values for this population (Faria et al., 2013) and the postintervention time places this cohort on comparison to those assessed as cohorts previously reported as being nonfallers (Shumway-Cook et al., 2000).

Improvements in physical function tests such as standing from a seated position, standing balance, and walking speed have been linked to improved mortality in older adults (Cooper et al., 2010) suggesting the exercise intervention was successful in this aspect. Importantly, based on normative data (Rikli & Jones, 1999) all women exceeded criterion fitness standard to maintain physical independence. The small participant numbers and lack of control group mean these results should be interpreted tentatively; however, the changes in physical function were supported by interview responses which described a change in fitness.

Social Interaction

These data are in support of previous qualitative assessments of group exercise programs in those with a mental illness that they are viewed as socially inclusive and effective in aiding recovery (Firth et al., 2016). In addition to demonstrating improvements in physical and psychological measures, improved psychosocial aspects were reported. Psychosocial functioning is a well-reported factor involved in the improvement of older adults’ mental health through physical activity (Doménech-Abella et al., 2021; Sen & Prybutok, 2021). It should be noted that it is difficult to tease apart improvements in depression scores due to the exercise program or from the social interaction that occurred. Previous research has shown that compared with social contact, while exercise was not significantly better than social contact at improving mental health symptoms, exercise provided a decrease in the somatic symptoms subscale of the Beck Depression Inventory compared with social contact, suggesting that exercise contributes independently of social interaction to changes in mental health status (McNeil et al., 1991). Exercise has also been shown to be more effective than other activities that involve some social interaction, in reducing mental health symptoms (Singh et al., 1997, 2001). Additionally, exercising alone has also shown to have a positive effect on mental health in addition to exercising with others (Seino et al., 2019), suggesting that it is not the social contact that mediates the change in mental health symptoms from exercise, it is the exercise itself. There is also a significant narrative throughout the qualitative data of this study that indicates participants attributed performing the exercises to what made them feel better.

Limitations

The limitations to this study are the small participant numbers and lack of control group. An additional concern was that the study took place during COVID-19 which has implications on the perceptions of exercise as beneficial to social engagement, when people had been experiencing a degree of pandemic restrictions. However, despite this, these results suggest an exercise intervention provides positive results for both physical function and psychological well-being in this population. Equally, social engagement is a cited benefit in exercise programs for older adults (de Sousa et al., 2021; Sen & Prybutok, 2021) and is likely a legitimate finding rather than being solely as a response to COVID-19.

Conclusion

Overall, this research tentatively demonstrates optimistic results for the benefits of an Accredited Exercise Physiologist-led, self-determined intensity exercise program on physical function and psychological outcomes in older people with mental illness in a regional community setting. Improving access to exercise for older adults with a mental illness is crucial to reducing physical health comorbidities that exist in this population, as well as promoting social interaction and providing a sense of belonging, key to those living in regional areas where social isolation may be more frequent.

Acknowledgments

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Research Ethics Committee and the Charles Sturt University Human Research Ethics Committee.

References


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EXERCISE IMPROVES OUTCOMES FOR OLDER PEOPLE WITH MENTAL ILLNESS


### Appendix A: Data Collection Procedures

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Purpose</th>
<th>Procedures</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantitative</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Physical function</td>
<td>Functional mobility, balance, walking ability, and falls risk</td>
<td>Participant asked to stand up from the chair, walk 3 m, turn and walk back to the chair and sit down again. Participant given a practice attempt with second attempt recorded.</td>
<td>Time was recorded in seconds for the time spent by the participant to complete the task.</td>
</tr>
<tr>
<td>TUG</td>
<td>Functional mobility, balance, walking ability, and falls risk</td>
<td>Undertaken on a chair placed against a wall. Participant asked to stand up and return to a sitting position as many times as they could in 30 s. Final score recorded. If participant over half-way to standing at 30-s mark, this is counted as a stand.</td>
<td>The number of times a participant achieved a standing position in 30 s was recorded.</td>
</tr>
<tr>
<td>30STS</td>
<td>Functional mobility and lower limb strength</td>
<td>Participant asked to walk 10 m with the intermediate 6 m time recorded. The 10MWT is completed at two walking speeds; a normal walking pace (10mNORM) and as fast as is safely possible (10mFAST).</td>
<td>Walking time was recorded to the nearest second.</td>
</tr>
<tr>
<td>10-m walk</td>
<td>Functional mobility, gait, and balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBS</td>
<td>Balance and falls risk</td>
<td>Each item scored on a 5-point ordinal scale ranging from 0 to 4. Participant scored for each movement and final summative score recorded.</td>
<td>The minimum score was 0, indicating the participant was unable to complete the task and the maximum score awarded was 4 indicating the volunteer was able to perform the task independently.</td>
</tr>
<tr>
<td>14-item scale</td>
<td></td>
<td></td>
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<tr>
<td>Psychological state</td>
<td>Kessler Psychological Distress Scale (K10)*</td>
<td>Validated and reliable instrument measuring psychological distress over the preceding 4 weeks and related disability</td>
<td>Self-administered questionnaire with 10 items measured on 5-point Likert-type scale (none of the time, a little of the time, some of the time, most of the time, all of the time)</td>
</tr>
<tr>
<td>DASS</td>
<td>Validated and reliable set of three self-report scales measuring emotional states of depression, anxiety, and stress over the previous week</td>
<td>Self-administered questionnaire with 21 items measured on a 4-point Likert-type scale (did not apply to me at all, applied to me to some degree, or some of the time, applied to me to a considerable degree or a good part of time, applied to me very much or most of the time)</td>
<td>Scored using recommended cutoff scores for normal, moderate, and severe for each scale.</td>
</tr>
<tr>
<td>Qualitative</td>
<td>Semistructured interview guide—preintervention</td>
<td>To elicit participant’s accounts of engagement with physical activity from childhood through to older age. Goals for participation.</td>
<td></td>
</tr>
<tr>
<td>Semistructured interview guide—postintervention</td>
<td>To elicit participant’s accounts of participating in the AEP program, perceived benefits and challenges and plans for continuing physical activity</td>
<td>Face-to-face interviews conducted at location identified by participant</td>
<td>Thematic analysis</td>
</tr>
</tbody>
</table>

*Note. BBS = Berg Balance Scale; 10-m walk = 10-m walk test; DASS = Depression, Anxiety, and Stress Scale; TUG = Timed Up and Go test; 30STS = 30-s sit to stand; 10mNORM = 10-m walk test (normal); 10mFAST = 10-m walk test (fast); AEP = Accredited Exercise Physiologist. *Measure collected as part of treatment as usual.
Appendix B: Excerpts From Interview Schedules

<table>
<thead>
<tr>
<th>Preprogram Question</th>
<th>Follow-up/probe</th>
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</thead>
<tbody>
<tr>
<td>Introductory question</td>
<td>Can we start by talking about the types of exercise or physical activity that you used to do when you were a child and teenager? Do you remember enjoying exercise? As you got older, did you continue with regular exercise? Now that you are older, do you do any regular exercise? How do you feel about the program you are just about to start?</td>
</tr>
<tr>
<td>Can you tell me more about these activities? If yes, what type of exercise? Did you enjoy participating in this exercise? What did you enjoy about it? If no, what got in the way of exercise for you? If yes, can you tell me about what you do? Do you enjoy participating in this exercise? What do you enjoy? If no, are there particular reasons why you don’t do any exercise?</td>
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<table>
<thead>
<tr>
<th>Postprogram Question</th>
<th>Follow-up/probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory question</td>
<td>Can we start by talking about your experience of this “Fit for your life” program? Was the program what you expected or were there some surprises for you? Were there any aspects of the program that were particularly challenging for you? Have you changed your ideas about exercising regularly from attending this program? Are you interested in continuing to exercise regularly?</td>
</tr>
<tr>
<td>Did you manage to attend every session? If you weren’t able to attend each session, what got in the way? What did you particularly enjoy about the program? How did you feel during and after the exercise sessions? At the start? Did it get easier as you continued through the program? Are you still challenged by those aspects? What do you think would help you to continue exercising? What things do you thinking might get in the way of you continuing with regular exercise? If a program like this was available as part of your treatment as usual with the community mental health team would you participate?</td>
<td></td>
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</tbody>
</table>