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BRIEF REPORT

A stepped down physical activity support program for military service veterans: The *Active Choices* pilot study

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Abstract

Issue Addressed: Referral to supervised physical activity (PA) programs is an effective treatment for military service veterans (MSVs) suffering from a range of chronic diseases. However, many MSVs fail to maintain PA regimes once discharged from supervision. This pilot study assessed *Active Choices*, a stepped-down program to support MSVs in the transition from allied health treatment to self-managed PA.

Methods: Participants were 34 Australian MSVs (mean [SD] age = 61 [15.8] years) who were completing supervised referral to an exercise physiologist or physiotherapist. MSVs stepped-down to *Active Choices* and received a 12-week, evidence-based PA support program (2020–2021). Analyses compared within-group changes in accelerometer-assessed PA at three time points (Weeks 0, 12, and 24; linear mixed model). Program retention, PA choices, and allied healthcare service costs were also evaluated.

Results: Relative to baseline (64 [26] min/day), mean (SD) moderate-to-vigorous PA increased (74 [28] min/day; $p < .05$) and was maintained (62 [28] min/day) at weeks 12 and 24, respectively. Retention in the program was high (86% [29/34 participants] completion rate at 12 weeks), with water-based group activities the most popular PAs of choice (14/24 activities). Average allied healthcare service costs during the study were lower than typical costs for MSVs (60.51 vs. 97.06 AUD/week).

Conclusion: The findings highlight the potential of *Active Choices* to support MSVs in the transition from supervised to self-managed MVPA.

So What? The program could promote the health of veterans and reduce costs for ongoing referral if impact is replicated at scale.

KEYWORDS
accelerometers, healthcare service utilisation costs, military service veterans, program retention, self-managed PA support

1 | INTRODUCTION

The health of military service veterans (MSVs) is a concern in Australia, the United Kingdom, and the United States.[1] Compared with the Australian general population, MSVs are three times more likely to have a heart attack or stroke, twice as likely to have type 2 diabetes, and 1.5 times more likely to have a diagnosable lifetime mental health disorder.[2]

Physical activity (PA) programs, supervised by allied health professionals (e.g., exercise physiologists or physiotherapists), offer an effective means of treatment for a wide range of chronic disease risk factors and conditions.[3] However, like many other clients, the positive changes MSVs achieve through short-term referral programs often regress following a treatment cycle when supervision is withdrawn, and PA adherence dissipates.[4] This has implications not only for MSVs who need to remain in supervised treatment to maintain PA and health benefits, but also for governments and organisations who fund ongoing referral of MSVs to allied healthcare service providers.[5]

Recognising the need for interventions that facilitate independent engagement in active and healthy lifestyles, we developed *Active Choices*, a 12-week stepped down program designed to support MSVs in the transition from supervised to self-managed PA.[6] The primary aim of this pilot study was to test the impact of *Active Choices* on maintenance of PA in MSVs who had been referred to, and were ready to step-down from, supervised PA. With a view to informing larger future trials, the secondary aims were to assess retention of MSVs in the program, the types and frequencies of activities chosen by MSVs, and the utilisation and costs of allied healthcare services in this context.

2 | METHODS

2.1 | Study design

The original study protocol is published in which a cluster randomised controlled trial was planned and powered.[6] However, ongoing COVID-19 restrictions on face-to-face research during implementation (August 2020 to November 2021) led to the study requiring adaptation to a pre-post design, with 12-week follow-up. The study was registered with the *Australian and New Zealand Clinical Trials Registry* (#ACTRN12620000559910) and received ethics approval (*The University of Queensland Human Research Ethics Committee* #2020000034; *Department of Defence and Veterans' Affairs Human Research Ethics* Committee (DDVAHREC/OUT/2019/BN11979933).

2.2 | Recruitment and participants

Recruitment strategies targeted MSVs based in Brisbane Australia, through veteran newsletters and social media advertisements shared by Government and other MSV organisations. In addition, client referrals were received through medical and allied health practices, as well as recommendations from other participants.

Eligible MSVs needed to be receiving an Australian Government funded PA program supervised by an exercise physiologist or physiotherapist, who confirmed capacity to safely transition to self-managed PA. MSVs who were under medical management for severe chronic or complex conditions (e.g., spinal cord or complicated orthopaedic injury) were excluded from the study. Those who met the eligibility criteria and expressed interest in participating received a full briefing

on the research and progressed to intervention following the return of signed informed consent.

2.3 | The active choices program

Informed by the COM-B model,[7] *Active Choices* is a 12-week program that incorporates evidence-based behaviour change techniques (BCTs) to build 'Capability, Opportunity, and Motivation' to engage in self-managed PA. The program is delivered through reflective tasks that map onto BCTs in the COM-B model, identified through our systematic review as *education, goal setting, goal review, self-monitoring, action planning, barrier identification, problem-solving, and social support.*[8]

Reflective tasks explored these BCTs through a resource booklet and four contact sessions with a member of the *Active Choices* research team at Weeks 1, 4, 8, and 12. These 1-h sessions (face-to-face [Weeks 1 and 12], and telephone Weeks 4 and 8]) facilitated linkages to preferred activities and helped veterans to navigate PA challenges relative to BCTs. The program was not prescriptive and recognised the value of all types of activities, regardless of format and intensity. However, contact sessions encouraged MSVs to consider group-based PA to promote peer support and social connectivity. In-line with recognised guidelines, the program also emphasised engagement in moderate-to-vigorous PA through educational materials, as the most effective means for ongoing management of chronic disease conditions and associated risk factors.[9]

2.4 | Measures

Participants wore an accelerometer (ActiGraph GT9X; Pensacola, FL) on the non-dominant wrist 24-h/day for 7 consecutive days at Weeks 0 (baseline), 12 (end-intervention), and 24 (follow-up to assess whether PA was maintained post-intervention). Raw acceleration signals (30 Hz) were processed into daily time in light or moderate-to-vigorous PA, and sedentary behaviour, using a machine learned random forest PA classifier.[10] Only data from participants with four or more valid monitoring days at each time point (wear time ≥960 min) were entered in PA analyses.

Research records collected at contact sessions were used to assess program retention rate, with drop-out classified as non-attendance at a scheduled session and no response to follow-up contact by the research team. Data on participant characteristics (age, sex, and measured height/weight) were collected at baseline, and PA choices recorded in the program resource booklet, monitored and collated at each contact session. In addition, and as part of post-program interviews and feedback, participants were asked whether the program increased, or had no effect on self-managed PA.

For allied healthcare service utilisation, de-identified individual-level data from the Department of Veterans' Affairs (DVA) were accessed to assess the number of government-funded exercise physiology and physiotherapy treatment services participants used from

baseline to Week 24, and the associated costs of these services. As a comparator, we accessed aggregated normative-level data from the DVA on the average per client cost of government-funded exercise physiology and physiotherapy treatment services for MSVs utilising these services in an overlapping period (i.e., 2020).

2.5 | Analyses

Descriptive statistics (mean [SD], frequencies, and/or percentages) were calculated for all variables. Analyses were performed using a linear mixed model to investigate changes in PA and sedentary behaviour outcomes over time (STATA 16.1). Time was included as the fixed effect and participants as the random effect. Linear mixed modelling accounted for missing data with the assumption that data were missing at random. For health service utilisation, average weekly costs were calculated for the individual-level and normative data. To facilitate comparison, the normative data were weighted by the age distribution of the study sample.

3 | RESULTS

Table 1 shows the demographic profile of participants ($N = 34$), and the average daily minutes spent in PA and sedentary behaviour at the three measurement time points for those who met accelerometer assessment criteria ($N = 20–30$). The sample largely comprised of older male MSVs, who were overweight (BMI 25.0–29.9 kg/m^2) or obese (BMI ≥30 kg/m^2).

Relative to baseline, moderate-to-vigorous PA significantly increased at end-intervention ($+10$ min/day; $p < .05$), with baseline levels of around 60 min/day maintained at 24 weeks follow-up. No significant changes were observed at end-intervention or follow-up for light intensity PA or sedentary behaviour.

Of the 34 participants recruited into the study, 29 (86%) completed the *Active Choices* program. Twenty-four different PA choices were selected by participants (Figure 1). Water-based activities were the most popular (14 from 24 choices; 41%), followed by walking and fitness classes (13 from 24 choices; 38%), with chosen activities tending to be group-based rather than individual. The average total cost of the exercise physiology and physiotherapist services used by participants during the study was 60.51 AUD/week, which was lower than the typical/client costs calculated for the same government funded treatment services in 2020 (97.05 AUD/week). Lower allied healthcare service utilisation costs were supported by data indicating that 86% of participants (25/29 interviewed at Week 12), felt that their self-managed PA had increased because of the program.

4 | DISCUSSION

The primary aim of this pilot study was to assess the impact of *Active Choices* on the PA of MSVs who were transitioning from allied healthcare supervised PA treatment to self-managed PA. The study is novel and the first to evaluate a stepped-down support program for Australian MSVs, with previous research limited to MSVs from the United States; over half of these studies (54% from 26 reviewed) reported positive intervention effects with a mean increase in self-reported PA of 80 min/week at 10–12 months.[8]

In keeping with the key aim of our program, a significant increase of around 10 min/day in accelerometer-assessed moderate-to-vigorous PA was found at 12 weeks, with no significant decrease at 24 weeks, relative to active baseline levels at the beginning of the stepped-down, transition process. We have no true baseline on PA levels before referral, but these data, triangulated with strong program retention, lower healthcare service utilisation costs relative to normative data, and self-reported increases in self-managed PA, suggest *Active Choices* provided a valuable PA support framework for transitioning MSVs in our sample. If replicated at scale, the findings not only have implications for the health of veterans, but also potential cost savings in reducing the need for ongoing referral. MSVs seek assistance from allied health professionals for a wide range of reasons, and Australian government data are illustrative of this point, with increases in allied healthcare service uptake significantly underpinned by large increases in the number of MSVs who saw an exercise physiologist or physiotherapist for treatments involving PA.[5]

In line with the overarching program focus and BCTs, process data collected through consultations also highlighted that many of our participants chose to engage in group-based PA contexts, such as aqua-aerobics, walking clubs, and fitness classes. This is noteworthy because self-management of PA is challenging, and greater support
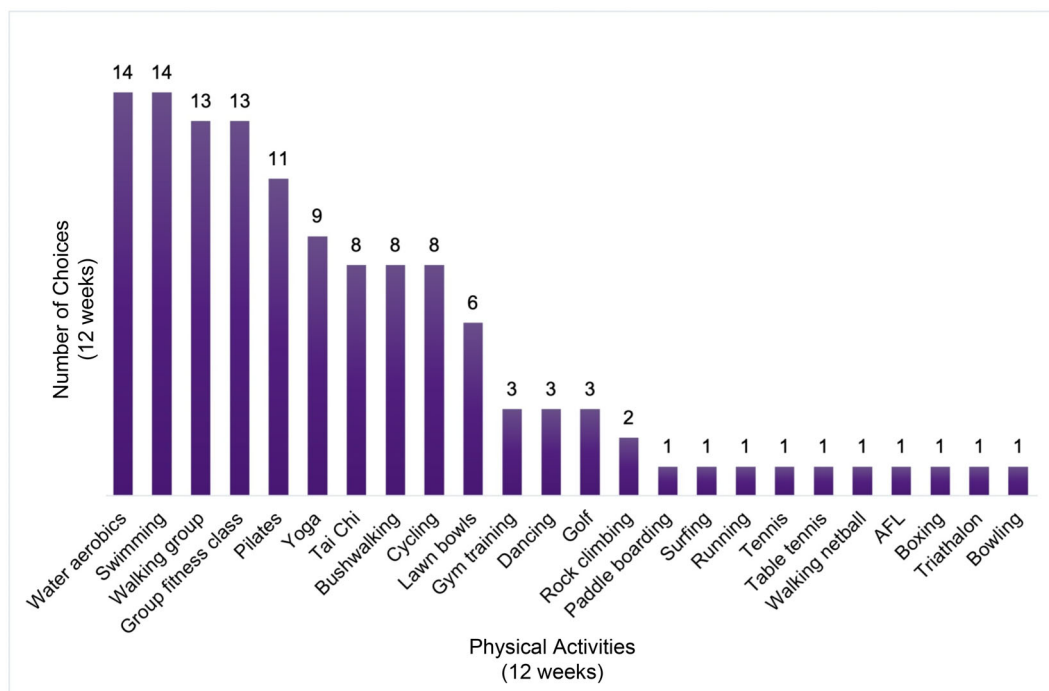
TABLE 1 Demographic characteristics, and physical activity and sedentary behaviour at baseline (Week 0), end-intervention (Week 12), and follow-up (Week 24).

Demographics ($N = 34$)			
Age (years)			
Mean (SD)	61.4 (15.8)		
Range	31–86		
Sex (%)			
Male	26 (77%)		
Female	8 (24%)		
BMI (kg/m^2)			
Mean (SD)	28.6 (4.9)		
Normal (20–24.9)	11 (32%)		
Overweight (25–29.9)	12 (36%)		
Obese (≥30)	11 (32%)		

Mean (SD) PA and SB	Baseline ($N = 30$)	End-intervention ($N = 22$)	Follow-up ($N = 20$)
Light PA (min/day)	390 (70)	380 (74)	374 (79)
MVPA (min/day)*	64 (26)	74 (28)	62 (28)
SB (min/day)	527 (100)	530 (76)	540 (81)

Abbreviations: BMI, body mass index; MVPA, moderate-to-vigorous PA; PA, physical activity; SB, sedentary behaviour.

*$p < 0.05$: Baseline (Week 0) versus End-intervention (Week 12).

FIGURE 1 The PA types and frequencies chosen by participants in the *Active Choices* program.

for sustained behaviour change is obtained through engagement in PA with others. This speaks to the inherent value of group-based interventions, where a strong sense of social connection and identity develops in parallel with physical and psychological benefits.[11] Promotion of positive, shared social identity through group-based PA, is a central feature of *Active Choices* and a key BCT which future trials of the program should emphasise to help MSVs deal with the challenges of disconnection from peers and the military.[12]

Study strengths included accurate measurement of PA using accelerometers, implementation of a theory-driven behaviour change program, and collection of process, as well as outcome data, to inform program retention, the types and frequencies of PA chosen, and healthcare service utilisation and costs during the intervention period. The main study limitations were the pre-post design, the relatively small sample size and loss to follow-up, which were unavoidable, in view of the COVID-19 pandemic. This prevented the planned recruitment of an education-only group against which PA and cost data could be directly compared. For the utilisation and costs of allied healthcare services it is important to note that data were calculated from overlapping but not entirely identical periods (i.e., from 2020 for the normative and 2020/2021 for the study group data) and that the normative data is based on a synthetic control group.

5 | CONCLUSIONS

The findings from this pilot study provide initial support for the potential of *Active Choices* as a behavioural support program for

MSVs transitioning from supervised to self-managed PA. Participants increased and maintained moderate-to-vigorous levels of PA relative to baseline at the start of the stepped-down process. The majority completed the 12 week program, engaged with a wide range of activities, and preliminary evidence also suggests that the program may have impacted allied healthcare service utilisation costs. Future studies should build on these promising data, to test the program using a powered, randomised controlled trial design.

CONFLICT OF INTEREST STATEMENT
The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

The University of Queensland Human Research Ethics Committee #2020000034. Department of Defence and Veterans' Affairs Human Research Ethics Committee (DDVAHREC/OUT/2019/BN11979933).

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