

Technical Note

Acute Exercise in Vietnam Veterans is Associated with Positive Subjective Experiences

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ABSTRACT

Int J Exerc Sci 3(1): 36-42, 2010. A person's subjective experience to their first exercise session is likely to influence their long-term adherence to regular exercise. The aim of the current pilot study therefore is to quantify the subjective exercise experience of previously sedentary Vietnam War Veterans undertaking an initial bout of one of three different exercise interventions. Thirty-two Vietnam Veterans presenting with one or more chronic diseases/conditions participated in one of three acute exercise bouts: 1) lower-body vibration, upper-body resistance and stretching (WBVT); 2) lower-body vibration, upper-body resistance, aerobic exercise and stretching (WBVT+CV); and 3) full-body resistance, aerobic exercise and stretching (R+CV). Pre and post acute exercise measures of positive well being, psychological distress and fatigue were assessed with the Subjective Exercise Experiences Scale (SEES). A 3(conditions) x 2(time) repeated measures ANOVA with post-hoc Tukey HSD was used to identify any significant differences in SEES between exercise groups and pre and post-exercise. All interventions increased positive well being, with WBVT and R+CV reporting improvements across all areas of the SEES. The WBVT+CV group reported slightly increased psychological distress and the greatest increase in fatigue. An acute bout of exercise increases positive well-being in previously sedentary War Veterans however a longer-duration exercise bout containing multiple exercise modes may be too demanding for this population. Exercise professionals should consider commencing with a simple program to minimise psychological distress and fatigue as this may negatively impact on exercise adherence.

KEY WORDS: Ex-servicemen, fatigue, training, elderly

INTRODUCTION

Vietnam War Veterans experience significantly increased mortality and morbidity as a result of chronic diseases as compared to the Australian population (2,7). Regular exercise is known to improve health, fitness (12) and psychological health (15) in Vietnam Veterans, therefore this cohort should undertake regular exercise to reduce the likelihood and occurrence of mortality/morbidity attributed to chronic

diseases and psychological conditions (16). Perceived barriers to exercise compliance include poor health, lack of physician support, lack of time, inadequate instruction and lack of social support (1,19), with long-term exercise adherence reported at 46-50% for the older population (18) and specifically War Veterans (12,14). Further, a person's subjective experience of their first exercise session may indicate their likelihood of long-term exercise compliance (8), and therefore should be considered by

those designing exercise interventions particularly for elderly participants. Due to their largely sedentary lifestyles, Vietnam Veterans may also be at risk of noncompliance due to fatigue associated with commencing an exercise program, therefore innovative exercise interventions that are reported as more time efficient and less fatiguing than the traditional exercise modalities may provide a viable alternative. One such exercise modality is vibration training. While more time efficient and less fatiguing than other modalities (4) vibration training results in similar functional improvements in the elderly compared to exercise without vibration (17). Further, vibration training improves strength (9), cardiovascular fitness (5), mobility (11) and glycemic control (3), is effective for relieving pain (10) and results in sustained exercise participation (4) in the elderly.

The aim of the current pilot study was to determine the effect of an acute bout of exercise on the subjective exercise experience of Vietnam Veterans, and to determine which exercise intervention results in the most positive acute outcome. Specifically, this study included the use of a combination of traditional exercise modes (stretching, aerobic exercise and resistance training) and innovative exercise (vibration trainers). It was hypothesised that following an acute exercise bout, programs incorporating vibration training would result in the least fatigue and that all acute exercise bouts would elicit improved positive well being and decreased psychological distress. This research has practical significance to those training the elderly, previously sedentary population. Specifically, the long-term implementation of the intervention eliciting the most positive acute subjective experience should

increase exercise adherence, resulting in improved health, fitness and quality of life of the elderly population.

METHOD

Participants

Vietnam Veterans (n = 32, age = 62 ± 4 yr, BMI = 33 ± 5 kg m²) volunteered, obtained medical clearance from their Medical Practitioner and gave written informed consent to participate in the study. The participants presented with a high prevalence of chronic diseases/conditions with the most prevalent being psychological conditions such as post-traumatic stress disorder and depression (63%), followed by high blood pressure (56%), high cholesterol and knee pain (45%), back pain (40%), cardiovascular disease (25%), and diabetes and neurological conditions (13%). Prior to participation in this study, all participants had been previously sedentary for at least 24 months. All procedures were approved by the University Human Ethics Subcommittee prior to the commencement of the project, with procedures carried out in accordance with the declaration of Helsinki.

Protocol

Prior to participating in the acute exercise bout, participants were measured for height and mass to determine their BMI; and had their resting heart rate and blood pressure assessed as a precautionary measure, with all participants cleared to participate in the exercise session.

Participants were allocated to one of three exercise groups, 1) lower-body vibration exercises plus upper-body resistance (WBVT) 20-30 min; 2) lower-body vibration

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Table 1: Exercises included in the three acute exercise intervention groups.

WBVT session	WBVT+CV session	R+CV session
Full-body dynamic stretches	Full-body dynamic stretches	Full-body dynamic stretches
Lower-body vibration	Aerobic exercise	Aerobic exercise
Static stand	Lower-body vibration	Lower-body resistance
Dynamic squat	Static stand	Dumbbell squat/leg
Dynamic lunge	Dynamic squat	extension
Dynamic calf raise	Dynamic lunge	Dumbbell lunge/leg curl
Upper-body resistance	Dynamic calf raise	Dumbbell calf raise
Chest press-seated row	Upper-body resistance	Upper-body resistance
Bicep curl-tricep extension	Chest press-seated row	Chest press-seated row
Full-body static stretches	Bicep curl-tricep extension	Bicep curl-tricep extension
	Aerobic exercise	Aerobic exercise
	Full-body static stretches	Full-body static stretches

plus upper-body resistance plus aerobic exercise (WBVT+CV) 40-60 min or 3) full-body resistance plus aerobic exercise (R+CV) 40-60 min (Table 1). Any participant who presented with a potential contraindication to vibration training exercise such as metal pins/plates (n=5) or pacemakers (n=1) were assigned to group 3, with the rest of the participants randomly allocated to one of the three groups. Group 1 contained 10 participants while groups 2 and 3 each contained 11 participants. There were no significant differences in age, BMI, resting heart rate or resting blood pressure between groups.

Aerobic exercise consisted of a combination of treadmill walking, ergometer cycling and/or ergometer rowing at a moderate

intensity (unable to maintain a conversation due to associated breathlessness) for 10 minutes at the start and 10 minutes at the end of the session. Lower-body vibration exercises (Table 1) were performed on a vibrating platform with handles (HyperVibe™, Noosaville, Australia) at a vibration frequency of 15Hz for 30s, for two sets. The upper-body resistance exercises (Table 1) consisted of two sets of 10 repetitions. The resistance exercises were performed on hydraulic exercise machines (Fitness technology, Skye, Australia) with the level of resistance set individually for each participant to achieve muscle fatigue (but not failure) by the end of each set. This single bout, acute investigation represents a portion of a larger 12-week training intervention study.

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Immediately before and 5 min after the single exercise bout, participants were asked to sit down and complete the Subjective Exercise Experience Scale, a valid and reliable instrument (SEES) (13) used previously to describe acute exercise affect (6,8). The SEES is a 12-item instrument with four items each representing positive well being (great, positive, strong, terrific), psychological distress (awful, crummy, discouraged, miserable) and fatigue (drained, exhausted, fatigued, tired) with each item rated along a Likert scale from 1 (not at all) to 7 (very much so). Scores for positive well being, psychological distress and fatigue are reported as the sum of the scores for the four items that represent each category, with a maximum attainable score of 28 for each category.

Statistical Analysis

Data was analysed using the Statistical Package for the Social Sciences (SPSS inc, V16.0) and reported as means \pm SD. A 3x2, conditions (WBVT, WBVT+CV, R+CV) x time (pre-exercise, postexercise), repeated measures ANOVA with *post hoc* Tukey

HSD was used to identify significant differences in the four SEES items. Alpha significance was set at $P \leq 0.05$.

RESULTS

The mean \pm SD scores for positive well being, psychological distress and fatigue before and after the exercise bout for each of the exercise interventions are shown in table 2.

DISCUSSION

The purpose of the current study was to compare the effect of an acute bout of different exercise interventions on the subjective experience of Vietnam Veterans. All exercise bouts improved positive well being. While not significant, the WBVT and the R+CV bouts decreased fatigue and psychological distress while the WBVT+CV increased these factors.

Twenty-three participants (72%) reported improved positive well being following an acute bout of exercise, resulting in a significant increase in positive well being

Table 2: Mean \pm SD scores reported by Vietnam Veterans for positive well being, psychological distress and fatigue before and after an acute bout of either WBVT, WBVT+CV or R+CV exercise.

SEES category & time	WBVT (n=10)	WBVT+CV (n=11)	R+CV (n=11)	Combined (n=32)
Positive well being				
Pre	17.2 \pm 4.6	17.5 \pm 3.6	15.7 \pm 3.2	16.7 \pm 3.8
Post	18.9 \pm 3.9	18.9 \pm 4.0	19.3 \pm 3.9	19.0 \pm 3.8 [†]
Psychological distress				
Pre	9.2 \pm 4.2	5.0 \pm 1.9	9.7 \pm 4.9	7.9 \pm 4.3
Post	6.4 \pm 3.5	5.2 \pm 2.5	7.4 \pm 4.0	6.3 \pm 3.4 [†]
Fatigue				
Pre	12.2 \pm 5.5	8.8 \pm 3.8	12.9 \pm 4.9	11.3 \pm 4.9
Post	11.2 \pm 4.5	13.3 \pm 5.4	12.0 \pm 5.1	12.2 \pm 4.9

[†]Significantly different to pre, $p < 0.01$.

for the combined participants. Further, all individual exercise interventions showed non-significant improvements in positive well being, with the R+CV group demonstrating the biggest change. The improved positive well being after exercise is in agreement with research on both young and middle-aged female adults (6, 8) with participants reporting improved positive well being after low, moderate and high intensity walking. However neither study showed a significant effect of exercise intensity on fatigue or psychological distress. In the current study, fifteen participants (47%) reported less psychological distress following exercise while five participants reported increased psychological distress. As a combined group, a significant decrease in psychological distress after exercise was reported. While not significant, the WBVT and R+CV groups demonstrated a decline in psychological distress, while the WBVT+CV group reported slightly increased psychological distress following exercise. Fifteen participants (47%) increased fatigue, six participants reported no change and 11 participants decreased fatigue following exercise. Despite no significant differences between groups, WBVT and R+CV groups reported slight decreases in fatigue while WBVT+CV increased fatigue. Specifically, while WBVT+CV reported the lowest pre-exercise fatigue levels, this group reported the highest post-exercise fatigue.

The current study indicates that an acute bout of exercise, regardless of the intervention, resulted in increased positive well being for previously sedentary Vietnam Veterans, with the WBVT and R+CV groups both reporting improvements across all areas of the SEES. While

increasing positive well being, WBVT+CV resulted in slightly increased psychological distress and the greatest increase in fatigue, therefore this intervention may be the least effective in eliciting an overall positive subjective experience of acute exercise in Vietnam Veterans. A reason for these results may be that the participants found WBVT+CV too complicated, with the program containing a combination of four types of activities (stretching, vibration, resistance and aerobic exercise) while the other interventions utilised only three activities. Commencing an exercise regime with a program that elicits immediate positive responses may increase exercise adherence (8). Given the risk of non-compliance in the current cohort with previous reports of 48% long-term exercise adherence for Vietnam Veterans (12), exercise professionals may best serve their clients by commencing with a simple exercise program to provide the greatest likelihood of positive experience after the first session.

It has already been established that vibration training improves a variety of health (3), fitness (5, 9, 11, 17) and quality of life (10) measures in the largely sedentary, elderly population. These known benefits, along with the current finding that acute vibration training elicits positive subjective experiences in the elderly, indicate that vibration training may provide a useful alternative to traditional exercise, however further investigation is warranted to determine whether vibration training alone elicits positive responses to exercise.

The positive experience associated with acute exercise is an important finding for the Vietnam Veteran population. The

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increased incidence of chronic disease (2), the low exercise adherence (12) and the health, fitness and quality of life benefits of regular exercise (12, 15) in Vietnam Veterans is well documented. Prescribing exercise that elicits an acute positive experience is likely to result in increased exercise adherence, which may decrease the incidence and severity of chronic disease and increase overall quality of life in Vietnam Veterans.

Overall this pilot study has demonstrated that an acute bout of exercise for previously sedentary elderly War Veterans presenting with a combination of chronic conditions elicits improved positive well being and reduced psychological distress, and therefore warrants further research with a larger cohort to determine which exercise intervention results in the most beneficial subjective experience. The identification of specific exercise interventions that elicit acute positive exercise experiences has important implications for long-term exercise adherence in at-risk populations.

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