ORIGINAL RESEARCH

Evaluation of Community Exercise Classes for Cardiovascular Diseases

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ABSTRACT

Background: Community-based exercise classes have the potential to sustain the benefits of cardiac rehabilitation for the prevention of future cardiovascular events. Such classes can be designed to address this need; however, whether such classes meet these objectives is rarely evaluated.

Methods: Facility managers, instructors, and class participants completed questionnaires. Two assessors observed exercise classes called "Heartmoves." A maximum of 10 participants per class wore heart rate (HR) monitors. Mean and highest HR as percentage of age-predicted maximum were recorded for class components. At the end of classes, participants completed a 10-point rating of perceived exertion (RPE) scale. Data were compared with international guidelines for community exercise classes for individuals with cardiovascular disease (CVD).

Results: Twelve classes were observed with 82 participants. All classes included guideline-recommended components of warm-up, cooldown, strength, and aerobic conditioning; 58% of classes (n=7) incorporated strength and aerobic conditioning in a circuit. Class participants exercised at low to moderate intensities as indicated by mean±SD: HR (warm-up 55%±11% age-predicted maximum HR; cooldown 52±11; strength 59±11; aerobic conditioning 58±12); and overall RPE (6±2). Class participants' mean age was 70±8 years; 27% (n=24) were referred by health professionals; 73% (n=61) attended for fitness; 61% (n=50) had CVD risk factors; and 21% (n=17) reported diagnosed CVD.

Conclusion: Community exercise classes for individuals with CVD, specifically those aligned with Heartmoves, may comply with international guidelines, although few class participants have diagnosed CVD. *Journal of Clinical Exercise Physiology*. 2020;9(2):52–58.

Keywords: cardiac rehabilitation, heart rate, Heartmoves

INTRODUCTION

Exercise-based cardiac rehabilitation (CR) for coronary artery disease (CAD) reduces the risk of cardiovascular mortality and the risk of CAD-related hospitalization at 1 year (1). Current guidelines support CR in patients with a range of cardiac conditions, including after acute coronary syndrome, coronary artery bypass grafting, coronary stent placement, and stable chronic systolic heart failure (2). Patients who have been hospitalized with a cardiac event are recommended to participate in phase II outpatient CR, usually consisting of up to 36 sessions of physical activity and lifestyle education (2,3). On completion of this formal supervised CR program, the emphasis shifts to the long-term maintenance of physical activity and other lifestyle behaviors (4,5). Many of the benefits of CR are a consequence of the exercise training component of CR, including improved endothelial function, blood lipids and blood pressure, and greater quality of life for the participants. Therefore, strategies to support patients to continue exercising following completion of formal CR are important to provide the long-term benefits of CR.

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One specific community-based exercise program developed and widely implemented in Australia is Heartmoves. Heartmoves was developed by the National Heart Foundation (NHF) of Australia in 1999 to provide widely available, supervised, low-cost, safe exercise training for people with health conditions generally and specifically for those with cardiac conditions or cardiovascular disease (CVD) risk factors (6). According to guidelines for community-based classes from the NHF, American Heart Association (AHA), and Scottish Intercollegiate Guidelines Network (SIGN, endorsed by the British Association for Cardiac Rehabilitation), exercise programs designed for people with stable CVD should include core components of warm-up, aerobic conditioning, muscle conditioning (strength or endurance training), and cooldown (4,7,8). Each component should be performed at appropriate intensities to optimize cardiovascular risk reduction (7,8). Consistent with these guidelines, Heartmoves classes were designed to include warm-up and cooldown, low-moderate intensity aerobic conditioning, strength or resistance training, and balance activities; additional components addressing flexibility, coordination, or functional ability could also be incorporated. Heartmoves was designed to be run by qualified exercise professionals (program leaders) with cardiopulmonary resuscitation (CPR) qualifications, professional indemnity insurance, and specific NHF Heartmoves training that licensed them to deliver the program. The Heartmoves program underwent initial evaluation (6), which determined it to be safe and have appropriate quality, reach, and acceptability. Perceived barriers to attendance by individuals transitioning from hospital-based exercise programs and factors associated with their attendance have been explored (9,10). However, no subsequent evaluation determined whether the implementation of the program continued to meet the objectives or retain the quality, particularly as its delivery was provided by a wide range of instructors and in varied settings.

In 2014, the NHF determined that the program was too costly to administer and made a business decision to cease offering the program, although it sought partnership with other organizations to take on this role; the YMCA subsequently partnered with the NHF, but this ended in 2016. The study described here took place in 2014 during a period of uncertainty regarding the future of Heartmoves and when several facilities could no longer attain instructors with Heartmoves training. Although the original study plan was to evaluate the delivery of Heartmoves in the community after 15 years of operation, circumstances meant that we evaluated the legacy of the Heartmoves program.

The aims of this study were to investigate three issues: First, identify the features of community exercise classes for CVD, including the facilities where they were conducted and the instructors used, and compare them with guidelines from the NHF, AHA, and SIGN (4,7,8). Secondly, analyze the heart rates (HRs) and ratings of perceived exertion (RPEs) of class participants to determine the relative intensity at which participants exercise during these classes and compare these intensities with those recommended for safe community-based CVD-related exercise programs (4,7,8). Finally, identify the characteristics of the populations participating in these classes.

METHODS

Study Design

This was an observational study to determine the characteristics of community-based exercise classes (either those still marketed as Heartmoves or still listed on the NHF website in early 2014), the program instructors, and the facilities where the classes were offered, as well as the class participants (4,7,8). Approval was obtained from the University of Newcastle's Human Research Ethics Committee (H-2014-0133).

Participants

Exercise classes were identified through the NHF website from the Hunter Region Heartmoves Locality Guide, which continued to operate during 2014. All gyms and community centers listed as providing classes within a 20-km radius of the University of Newcastle, Australia were invited to participate (n=9). The facility managers, class instructors, and up to 10 participants per class (limited due to the number of available HR monitors) who were recruited provided written consent and formed the participant samples.

Data Collection

Specifically designed questionnaires were used to obtain information from facility managers, class instructors, and class participants. Facility managers completed a questionnaire regarding the number and frequency of these types of exercise classes in their facility, the number of participants attending, how they screened participants, whether they employed trained Heartmoves instructors, and the number of instructors required to supervise a single class. Exercise class instructors were asked about their age, sex, exercise instructor experience and qualifications, and any Heartmoves training they had received, how many participants attended their classes, and if and how they monitored exercise intensity in their classes. Class participants completed a questionnaire providing their age, height, weight and history of medical conditions, including CVD, stroke, myocardial infarction or recent cardiac surgery, and questions regarding medications that may affect HR such as beta-blockers. Additional information included how long and for what reasons the participants had been attending the exercise class and other exercise habits.

Although the specific class components were not known, they were expected to include warm-up, aerobic conditioning, muscle conditioning (strength or muscle endurance), and a cooldown to be considered safe and efficacious for participants with CVD (4,7,8). Instructors were asked to indicate when they transitioned between activities during class. The assessor recorded each component throughout the exercise class, its duration and the exercises intended, and then compared these across all exercise classes observed and against the recommended guidelines (4,7,8).

Participants were asked to participate as usual. HR was measured using Polar Indoor Team Sports HR monitors and software (version 1.0.1, Polar Team, Kempele, Finland) with signals transmitted to an iPad (4th generation, Foxconn, Taiwan, New Taipei, Tucheng District) using Bluetooth technology, which provided a calculation of the participant's HR as a percentage of their age-predicted maximum HR. The assessor recorded mean and highest HRs for each participant and component of the exercise class. HRs provided an indication of the relative intensity of the different class components for each individual assessed. The HR data were then compared with the recommended guidelines (4,7,8). At the completion of the class, participants rated their perceived effort using the 10-point Borg RPE Scale, scored from lowest exertion of 1 (rest) to 10 (maximal) (11). Participants rated their perceptions of average (overall) and peak (highest level) exertion during class. As a comparator, they also rated their level of exertion during warm-up.

Statistical Analysis

Questionnaire data from all participants were reported with descriptive statistics. Components of exercise classes were reported descriptively with the average time spent on each component, along with the mean HR for all class components, including and excluding those on beta-blocker medications. Class components and intensities (HR) were compared with guidelines (4,7,8). For participant-reported intensity of exercise, comparisons between RPE for their average exertion (overall), peak exertion (highest level), and warm-up were made using a repeated measures (stage) ANOVA with Bonferroni post hoc tests. Data were analyzed in SPSS Statistics for Windows, Version 21.0 (IBM Corp, Armonk, New York). Data are presented as mean ± SD.

RESULTS

Nine facilities were identified and approached. Of the 7 that participated, 5 were fitness centers and 2 were community centers. Of these 7 facilities, 6 had managers (5 completed the questionnaire). Three facilities still identified their classes as Heartmoves, whereas the remaining 4 now identifying their classes as "Heartsmart," "Stay Active," or "Mature Movers." All facilities reported they still used the Heartmoves Pre-exercise Assessment and Referral Form they were required to use during previous Heartmoves program delivery as the means of screening class participants. A total of 12 exercise classes were observed, all with one instructor per class; one instructor taught two of the classes but at different facilities. All participating exercise class instructors (n = 11) completed the instructor questionnaire. A total of 217 exercise class participants attended the classes observed, with class sizes ranging from 7 to 25; 82 class participants completed the questionnaire and were observed and monitored during a class.

The length of time classes had been offered at the facility ranged from 1 to 15 years (mean 7 ± 6 years). The number of classes per week ranged from 3 to 16 (mean 7 ± 6), with an average size of 16 ± 7 participants per class. All instructors (n = 11) were females, aged between 21 and 56 years (mean age 35 ± 15 years), and 73% (n = 8) had been accredited by Heartmoves. The remaining 27% (n = 3) held a Certificate III in fitness (a minimum 6-month course certifying them to teach a variety of group exercise classes) but had not been accredited by Heartmoves (13). All instructors monitored the intensity of each class based on participants' perceptions. A majority (73%) of the instructors reported they used the standardized Borg RPE (scaled 1 to 10) asking participants to maintain exertion between ratings 3 and 5. The remaining 27% monitored intensity by observing how difficult it was for participants to talk during exercise.

All classes included warm-up and cooldown components. Other components varied: in 5 classes (42%), separate strength and aerobic components were conducted, whereas in 7 classes (58%) both these components were incorporated in a circuit (Table 1). Of the classes that used a circuit, 2

TABLE 1. Common components of exercise classes and participant heart rates (HR) during these components.

Component	% Classes With Component[a]	Average Duration (min)	Number of Participants	Average HR[b]	Peak HR[b]	Average HR, no. Beta-Blockers[c]	Peak HR, no Beta-Blockers[c]	Average HR, Beta-Blockers	Peak HR, Beta-Blockers	Participants Above Guidelines[d]
Warm-up	100	10.9 ± 4.2	82	55 ± 11	62 ± 12	55 ± 12	63 ± 12	50 ± 13	56 ± 13	8 (10)
Cooldown	100	4.2 ± 1.2	82	52 ± 11	57 ± 11	53 ± 11	58 ± 11	48 ± 14	54 ± 15	0
Strength	42	11 ± 1.0	36	59 ± 11	66 ± 12	60 ± 11	66 ± 12	47 ± 11	55 ± 5	5 (14)
Aerobic	50	9.7 ± 1.3	46	58 ± 12	65 ± 12	59 ± 11	66 ± 12	46 ± 9	52 ± 8	5 (11)
Circuit[e]	58	20.1 ± 7.8	46	53 ± 12	62 ± 12	54 ± 12	64 ± 12	51 ± 13	59 ± 16	5 (11)
Balance	50	4.8 ± 2.6	42	54 ± 12	59 ± 13	55 ± 12	61 ± 13	50 ± 15	54 ± 15	5 (12)

[a]Percentage of classes with component (n = 12)
[b]HR as a percentage of age-predicted maximum
[c]HR as a percentage of age-predicted maximum excluding participants taking beta-blockers
[d]Number (percentage) of participants per component who raised their heart rates above recommended guidelines
[e]Circuit training: combination of strength and aerobic conditioning
Data are presented as mean ± SD, counts or percentages

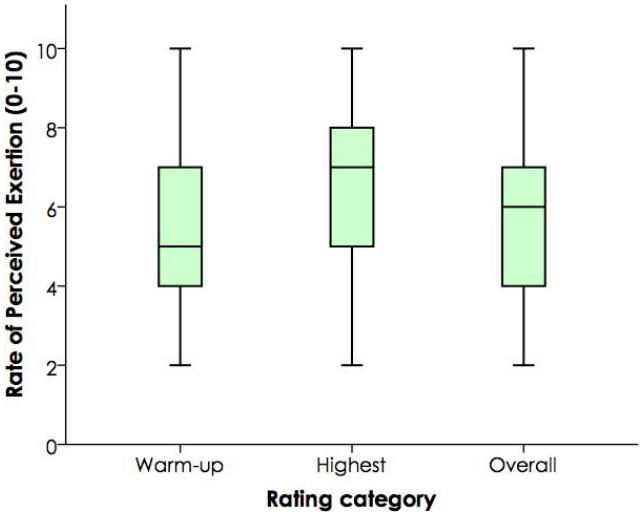

FIGURE 1. Comparison of rates of perceived exertion reported by exercise class participants for the warm-up component, their peak level of exertion in the class (highest), and their average rate of exertion throughout the whole class (overall).

added an additional aerobic component whereas 5 used a circuit only. Fifty percent of classes incorporated a balance component.

Table 1 shows the average duration of components, and the mean and highest HRs (as a percentage of age-predicted maximum) during each exercise component from all classes. Most participants exercised within the recommended guidelines, although there were a small number whose HR exceeded the recommended guidelines. There were no meaningful differences between HRs obtained when including or excluding participants taking beta-blockers (Table 1).

Figure 1 illustrates the comparison of RPE reported by class participants for their average (overall) and peak (highest level) exertion and warm-up. There was a significant difference in RPE reported among overall, peak, and warm-up ($P<0.001$), with significant differences between peak and warm-up (mean difference 1.0; 95% CI 0.6, 1.3; $P<0.001$) and peak and overall (0.6; 95% CI 0.4, 0.9; $P<0.001$).

The characteristics of class participants are provided in Tables 2 and 3, with mean age 70±8 years, most likely to be female, retired, and attending two times per week on average (Table 2). Only 21% (n=17) of participants had a self-reported diagnosis of CVD, although 61% (n=50) reported at least one risk factor (e.g., diabetes, blood pressure, blood cholesterol) for CVD (Table 3). Ten percent of participants (n=8) reported they did not have a health condition.

TABLE 2. Characteristics of participants in exercise classes (n=82).

Characteristics	Number (%)
Demographics	
Age, mean±SD	70±8
Female	68 (83)
Retired	77 (94)
Employed	5 (6)
Attended classes prior to cardiac event/surgery	3 (4)
Reason for attendance	
General fitness	61 (73)
Social	6 (7)
Family history of heart disease	5 (6)
Referral initiated by health professional	24 (27)
Referral by	
General practitioner	18 (21)
Physiotherapist	3 (4)
Other health care professional	3 (4)
How aware of Heartmoves and related programs	
Friends/family	46 (56)
Advertisement	5 (6)
Other physical activity participation	
Walking	42 (50)
Attending other gym classes	16 (19)
Domestic duties/gardening	4 (5)
Walking and other exercise	3 (4)
No other exercise	15 (18)

DISCUSSION

This observational study demonstrated that the structure and intensities of community exercise classes provided by gym fitness instructors and open to the public in a regional area of Australia complied with the recommended national (NHF) (7) and international guidelines (AHA, SIGN) (4,8) for community-based exercise classes for individuals with CVD, regardless of whether or not they were still identified as Heartmoves classes. A very low proportion of class participants reported diagnosed CVD, although a high proportion had CVD risk factors or other chronic health conditions. Only a small percentage were referred by health professionals. Most class participants were healthy older adults wishing to maintain general health and engage in exercise in a social environment.

Class Structure

The classes adhered to national (7) and international (4,8) guidelines overall, including the core components of warm-up, cooldown, aerobic conditioning, and strength conditioning. Instructors either performed separate aerobic and strength conditioning (42%) or engaged participants in a circuit consisting of alternating aerobic and strength training stations (58%). Fifty percent of the observed exercise classes incorporated a component to challenge balance and proprioception at the end of the class when participants were

TABLE 3. Medical conditions and co-morbidities reported by participants in exercise classes (n = 82).

Medical History	Number (%)
Cardiovascular co-morbidities	
Myocardial infarction	8 (10)
Percutaneous coronary intervention	10 (12)
Cardiac device	1 (1)
Hypercholesterolemia	28 (34)
Hypertension	40 (49)
Beta-blocker medication	13 (16)
Other comorbidities	
Diabetes	11(13)
Stroke	4 (5)
Asthma	11 (13)
Chronic obstructive pulmonary disease	5 (6)
Cancer	11 (13)
Parkinson's disease	1 (1)
Osteoarthritis	24 (29)
Rheumatoid arthritis	2 (3)
Osteoporosis	1 (1)
Chronic pain	
Knee	27 (33)
Hip	12 (15)
Neck	14 (17)
Shoulder	15 (18)
Lower back	30 (37)
Feet	17 (21)

fatigued, which is not specifically recommended in any of the guidelines but was recommended in the Heartmoves training. The balance component acknowledges that these classes were addressing additional health concerns typical in an older population, such as fall prevention (12).

Exercise Intensity

All observed classes included a low intensity warm-up and cooldown (50%-65% of percentage age-predicted maximal HR). Although guidelines suggest exercising at a moderate intensity (65%-75% of age-predicted maximal HR) for aerobic and strength training (1,6) there was little distinction among the mean HRs for warm-up (55 ± 11 b·min^{-1}), aerobic conditioning (58 ± 12) and strength conditioning (59 ± 11) (Table 1). Within a circuit, both mean (53 ± 12 b·min^{-1}) and highest (62 ± 12) HRs remained consistently low, whether participants on beta-blockers were included or excluded from analysis. The alternating pattern of aerobic and strength conditioning provided participants with a period of rest between stations which may have contributed to HRs remaining relatively low. Nevertheless, the HRs recorded were consistent with the Heartmoves program recommendation of offering low-to-moderate intensity exercise training, suggesting the classes complied with the mandate of the Heartmoves program—a low-to-moderate intensity program that caters to individuals across a broad range of health statuses (6).

Most participants reported a level of exertion (overall RPE 6 ± 2, Figure 1) of "somewhat hard" to "hard," and this perceived level of intensity was higher than the recommended range of 3 to 5 and higher than that expected based on participants' average and peak HRs for class components, even when removing participants on beta-blockers from the analysis (Table 1). This suggests that participants found the classes challenging but were still exercising at a level that would be regarded as safe based on their HRs (7,8). These relatively higher RPE scores may be a consequence of the participants' older ages or associated with the substantial number of people reporting chronic pain, making them feel challenged by exercise that may be lower intensity in terms of HR.

Class Participant Characteristics

Most participants had made independent self-initiated decisions to attend the classes; only 27% had their attendance initiated with referral of a healthcare professional. These findings are consistent with previous findings that suggest clinicians are reluctant to provide patient referrals to community-based exercise classes such as Heartmoves (6). As 85% of individuals visit their general practitioner (GP) at least once a year (16), GPs have the potential to screen for inactivity and prescribe physical activity. Recent evidence suggests patients whose GPs recommend physical activity are 1.6 times more likely to increase their total physical activity by 60 min per week (13). Low referrals in the current study may have been because health professionals were unaware of the core components and intensities of these classes and whether they were safe for their patients (14,15). At the time of this study, however, the NHF had spent years providing this information to health professionals, particularly GPs; therefore, given the standing of the NHF within the healthcare community, it is interesting that NHF endorsement and program oversight were not enough to garner much endorsement from health professionals in this cohort. In addition, the observed components and intensities of these classes were consistent with recommended guidelines for prevention or management of diabetes (16), osteoarthritis (17), osteoporosis (18,19), and stroke (20), which should have reassured health care professionals that these classes were a safe exercise environment for patients with preexisting health concerns and comorbidities. A previous study examined the attendance rates at Heartmoves of individuals referred by health professionals following completion of hospital-based exercise programs (9,10). They reported only 59% attended classes after referral, with a major barrier being participant confidence in the training/experience of the community-based fitness instructors. This highlights the

disconnect that frequently exists between public hospital settings and community programs. It is possible that referrals might have existed in the current study but those were not the individuals attending the classes. Another explanation may be the cost of classes, as the fitness professionals providing community-based exercise classes would not be eligible for compensable schemes that might encourage referrals from healthcare professionals. Together, these factors may be indicative of the challenges of getting healthcare professionals to recommend low-cost, community-based primary or secondary preventative interventions involving exercise. Specifically following a patient's access to exercise programs led by health professionals within a healthcare setting, there need to be safe affordable community exercise programs available to maintain cardiovascular health, which the fitness industry delivered and the Heartmoves program provided.

Most participants (61%) who attended the exercise classes had risk factors for CVD or other health-related conditions such as diabetes, stroke, or bone and joint disorders, consistent with one earlier evaluation of the Heartmoves program (6). A large proportion of the participants reported chronic musculoskeletal pain (Table 3). This might have been related to the perception that these exercise classes were "easier" or more suited to individuals with health conditions as compared with standard exercise classes. The number of individuals with chronic pain in the study sample may have contributed to the high mean RPEs in comparison to the HRs recorded. Some participants (10%) did not report having any particular health-related disease but attended the classes to maintain general health and engage socially. Also, participants were motivated to maintain a general level of fitness as demonstrated by their involvement in other forms of recreational physical activity. Hence, the classes attracted a variety of older participants, possibly due to the relatively safe low-to-moderate exercise intensities and the NHF endorsement, and perhaps because of the designated supervision, pay-as-you-go opportunities, low cost, and the social nature of the classes.

LIMITATIONS

Sample size was limited to a single regional city in Australia, so the number of classes and data may not have been representative of classes elsewhere. There were technical limitations in the number of HR monitors that could be used during a single class, potentially introducing bias in larger classes where the first participants to volunteer were monitored, who may or may not be representative of the class as a whole (i.e., perhaps individuals with a particular interest in their heart rate, those more confident in their ability to complete class activities, were more regular participants, or were further advanced in their rehabilitation). Finally, participants were asked to rate their perceived exertion at the end of the class, which may have contributed to recall bias in the reporting of RPEs.

FUTURE RESEARCH

The NHF's business decision to relinquish support for the Heartmoves program was made without any current evaluation of the program's contribution to the heart health of the Australian community. Approximately 30,000 people enrolled in Heartmoves classes during the years of operation and many instructors were trained who still conduct classes based on this model. In the wider Hunter region where this study took place, as of the publication of this manuscript, there are still ~40 classes per week taught following the Heartmoves class model, although it is now illegal to use the Heartmoves brand to advertise these classes. Future research might evaluate community exercise programs more broadly to determine whether without the Heartmoves program in the market, there is still maintenance of similar program standards or more differentiation. Additionally, studies are needed to determine whether community exercise programs result in clinical outcomes for patients in terms of maintenance of cardiovascular health or prevention of further CVD and its associated health sequelae.

CONCLUSION

Our study suggests that the NHF had developed an excellent model of training instructors and sustaining quality delivery of community-based exercise classes that were developed based on research evidence. Although there are still benefits to this program, its demise leaves a gap in service provision for individuals with CVD that no organization currently provides and, in its place, offers a reminder of the difficulties in sustaining high quality community-based exercise programs for people with cardiovascular health conditions.

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