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An Exploration of the Impact of the "Open Gym" Scheduling Model of Cardiovascular Rehabilitation on Completion, Attendance, and Health Outcomes

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Structured Abstract

Purpose—To explore the effects of implementation of the "Open Gym" scheduling model of Cardiovascular Rehabilitation (CR) administration on the rate of patient engagement, and change in commonly measured clinical outcomes. Little data exist on the potential benefits of the Open Gym model on patient completion, attendance, and clinical outcomes.

Methods—A retrospective chart review was conducted that included the 1-year period both before and after Open Gym model implementation. Bootstrapped regression and analysis of variance were utilized to determine 1) if the scheduling model is associated with number of sessions attended and program completion, and 2) among those who meet their goals and thus complete the program, if the scheduling model predicts change in CVPR clinical outcomes when controlling for baseline values (i.e. percent weight change, 6-min walk distance, and peak METS during exercise). Follow-up analyses controlled for and explored interactions related to age, race, and gender.

Results—In this racially diverse sample (34% non-white), patients under either the Open Gym model (N=125) or the Traditional model (N=82) attended an equivalent number of sessions and were just as likely to complete their treatment. However, clinical outcomes favored the traditional model, even as more patients participated in the Open Gym model, especially racial minority patients.

Conclusions—Though the Open Gym model is more consistent with patient-centered care, gains in functional capacity may be diminished. Further, better controlled experiments are needed to examine the effects of implementing the Open Gym model, and should include measures of possible mechanisms influencing racial differences.

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Introduction

The American Association of Cardiovascular and Pulmonary Rehabilitation's (AACVPR) "Roadmap to Reform" (www.aacvpr.org/r2r) details various strategies that aim to increase enrollment and adherence in response to changes by the Centers for Medicare and Medicaid Services to a bundled payment structure. One such strategy is the "Open Gym," in which patients attend appointments similarly to how they would do so upon completing Cardiovascular Rehabilitation (CR) in a community gym. That is, there are no longer scheduled classes which patients must attend at specific times. This patient-centered approach provides patients the freedom to schedule appointments at their convenience, but still receive individual staff attention (though specific providers could differ upon each visit) and engage in supervised exercise with ECG telemetry monitoring.

Patient factors, such as socioeconomic status, depression, age, gender, and race are consistently strong predictors of CR engagement (number of sessions attended and completion rates).[1–4] These factors could be impacted by a more flexible scheduling model that could minimize barriers such as transportation issues and time limitations that are also predictive of poorer program engagement.[3–6] For example, a recent qualitative systematic review and meta-analysis of patient barriers to CR engagement concluded that scheduling was a major factor due to transportation issues and competing social and occupational demands, especially among women.[6] The flexibility of the Open Gym model has potential to ameliorate such issues. At the same time, other factors could negatively impact patient engagement, such as variability in specific providers and the detrimental effect that could have on patient-provider relationship quality. Although many CR programs throughout the country are moving toward the Open Gym model, little research exists to determine the advantages and disadvantages of this model in terms of patient engagement and outcomes. We sought to compare program engagement (attendance and completion rates) and clinical outcomes (6-minute walk test distance, peak METS during exercise, and percent weight change) prior to, and subsequent to, implementation of the Open Gym scheduling model.

Methods

Participants and Procedures

Participant data were accessed via the AACVPR Cardiac Rehabilitation Registry for patients participating in CR for the 12 months prior to, and following, implementation of the Open Gym model. Missing data were identified via initial review, and available data were entered into the Registry and re-downloaded to form the final dataset. As a retrospective chart review study, informed consent was not obtained. All procedures were approved by the East Carolina University and Medical Center Institutional Review Board.

The Traditional Scheduling Model

The Traditional model involved 3, 1.5 hour, weekday training sessions which included half-hour educational sessions offered 3 days per week. Patients arrived to the CR facility at a scheduled time to engage in telemetry recording (all 36 sessions), supervised exercise (30–45 minutes), et cetera, per their individualized treatment plans. Medical, nutritional, and

psychological education occurred via set class times, and participants were strongly encouraged to attend. A relaxation group is also offered weekly.

The Open Gym model

Our center's Open Gym differs in some ways from the plan outlined in the Roadmap to Reform (R2R). The R2R suggests a model reminiscent of a community gym where participants sign up for specific 15-minute time slots on their own and then attend CR at these selected times. Our center offers broad, 4-hour morning and 3.5-hour afternoon time slots, 3 days per week, that patients drop into without pre-scheduling. This allows for more flexibility, as many of our patients travel over 30 minutes to reach the center. Upon arrival during their appointment window, patients are greeted by a staff member who provides telemetry monitoring based both on the patients' number of sessions competed and individual risk factors, and who helps them engage in individualized exercise and nutrition goals. Time allotted to exercise was not limited by this model, only by the patients' medical limitations, and allowed patients the freedom to rest more frequently but still achieve 30–45 minutes of exercise. Patients also are welcomed to the same frequency and content of education classes as the Traditional model. In contrast to the Traditional model, patients were not directed to education sessions as a group; education sessions were announced and patients could choose to attend. In both models, staff tracked patient CR attendance during progress review meetings and case managers contacted patients whose attendance appeared to be waning.

Analysis Plan—Bootstrapped ANOVA/ANCOVA or logistic regression analyses (IBM SPSS V.24) were used, to determine if 1) the scheduling model was associated with the number of sessions attended and program completion, and 2) if the scheduling model predicted change in CVPR patient outcomes among treatment completers when controlling for baseline values (i.e. percent weight change, 6-min walk distance, and peak METS during exercise). Follow-up analyses controlled for age, gender, and race (entered into the model as white versus non-white), and any significant interactions between main outcomes and covariates were explored.

Enrollment and discharge dates were examined, and for patients who dropped out of treatment, their last date attended was considered their discharge date. One month of experience with a scheduling model was considered sufficient for categorization. Participants who experienced greater than one month of both models, or less than one month of both models, were excluded from outcomes analyses. Participants who experienced greater than one month of one model, but less than one month of the other model were categorized based on the model they experienced for greater than one month. Completion was defined as meeting pre-defined individualized exercise and other health-behavior goals and graduating from the program, or completing 36 sessions.

Results

Of the 220 patients presenting to CR, 95 presented in the one-year period prior to the implementation of the Open Gym scheduling model, and 125 presented in the 1-year period that began with implementation (see Table 1). Ineligible participants were excluded ($N = 13$)

and remaining patients were categorized as defined in the Analysis Plan. Groups (Traditional N= 82; Open Gym N= 125) did not differ based on age or gender; however, only 26% (N=21) of patients under the Traditional model were minority (non-white) patients, whereas 40% (N=49) under the Open Gym model were minority patients (X^2 = 4.2; p = 0.04).

Patients attended equivalent numbers of sessions between the two groups (Traditional = 22; Open Gym = 20; p = 0.22, η^2 = .007). Attendance results were consistent when accounting for age, race, and gender (p = 0.21, η^2 = .008). Program model did not significantly predict program completion (OR = .94 (95% CI = .52–1.69). Under the Traditional model, 52 (64%) participants completed the program, whereas 82 (65%) of participants under the Open Gym model completed. Results maintained when accounting for age, race, and gender (OR = .84 (95% CI = .45–1.56).

Analyses of health outcomes included change in the primary clinical outcomes (i.e. percent weight change, change in 6-min walk test distance, or change in peak METS), controlling for baseline/pre-treatment values within each patient are shown in table 2.

Among completers (N = 132), patients under the Traditional model lost a statistically equivalent amount of weight (M = −0.95%; SD = 3.7%) compared to patients under the Open Gym model (M = 0.11%; SD = 3.1%). However, when including age, race, and gender in the model, the difference in percent weight loss between the Traditional and Open Gym models were statistically significant. This is likely due to a significant interaction between race and scheduling model (p = 0.02, η^2 = .043). Examination of the interaction showed that non-white participants lost more weight under the Traditional model (M = −2.3%; SD = 3.4%) than the Open Gym model (M = −0.9%; SD = 2.9%; p = 0.01, η^2 = .055).

Patients under the Traditional model had a greater increase in 6-minute walk test distance (M = 82.1ft; SD = 57.5ft) than those under the Open Gym model (M = 57.2ft; SD = 59.8ft), and results were consistent when accounting for age, race, and gender. Peak METS also differed based on scheduling model, with patients achieving a greater increase in Peak METS under the Traditional model (M = 1.5; SD = 1.4) versus the Open Gym model (M = 1.0; SD = 1.4); however, this finding did not remain significant following covariate analysis.

Discussion

Patients under either the Open Gym model or the Traditional model attended a statistically equivalent number of sessions and were just as likely to complete their treatment. However, differences in clinical outcomes emerged when comparing the two scheduling models. On average, patients engaged in the Traditional model demonstrated more improvement in performance on the 6-minute walk test and weight loss. Though the Open Gym model is more consistent with patient-centered care, these findings suggest that functional status outcomes could suffer in this model. There are several theoretical possibilities as to why outcomes may be less optimal in the Open Gym model. For example, it is possible that there is decreased consistency in patient-staff relationships and less one-on-one attention in the Open Gym model; due to variability in providers with whom the patient interacts, establishing consistent rapport that may enhance patient engagement and accountability

could prove more difficult. This may be especially true among minority patients, as we noted a concerning finding that non-white patients lost less weight under the Open Gym model compared to the Traditional model. Also, staff observed anecdotally that attendance at education sessions was lower under the Open Gym model, and this may have influenced differences between scheduling models.

In sum, current results provide novel identification of both key benefits and potential risks to consider when transitioning to an Open Gym model for. The Open Gym model is more consistent with a patient-centered care approach and likely reduces the barriers associated with transportation and time limitations, which are significant predictors of poor patient engagement.[3–6] It is notable that there were more patients who initiated CR following the Open Gym model, and this model may have attracted more minority patients with no significant changes in attendance or completion rates. It therefore appears plausible that a meaningful benefit of the model overall is enhanced enrollment and accessibility, major goals of the R2R. At the same time, however, results suggest that some clinical outcomes may be poorer in the Open Gym model. If this pattern of apparent increased engagement, combined with less improvement in clinical outcomes when comparing the two scheduling models, is borne out in other clinics and data, program evaluation and modification to strengthen clinical effects of the Open Gym model will be warranted.

There are several key limitations of the current study which should be noted when interpreting the results. Other unmeasured changes in policy, staff, etc. could also have influenced the differences seen in this study; it is possible that we measured outcomes during a period of transition in which staff were becoming accustomed to providing their typical quality of care within a new treatment delivery structure. Additionally, due to a lack of follow-up data, some outcomes which may have been improved by the transition to an Open Gym model (e.g. maintenance of home exercise following CR completion; attendance to education or relaxation sessions) were unable to be assessed. Finally, given that our sample was quite racially diverse (32% African-American), it is possible that these results may not generalize to other CR programs that primarily serve populations with different demographics.

There are several areas of future research for comparing the Traditional model and Open Gym model for CR. We observed a concerning finding that the Open Gym model may be particularly detrimental to minority participants, though the model may also attract more minority patients. Further, better controlled experiments are needed to examine the effects of implementing the Open Gym model, and should include measures of the mechanisms driving group differences such as less staff attention/encouragement, greater inclusion of patients who are more likely to have poorer outcomes, less intense exercise sessions, et cetera. Additionally, if future studies corroborate these results and suggest that outcomes in the Open Gym model may suffer, more research would be beneficial to determine specific interventions which may be used to improve outcomes within the Open Gym model. One possible area for future research in this direction would be to incorporate the use of mobile phone apps or other technology which may aid patients in engaging in exercise at home, to supplement their CR activities.

As more CR sites embrace the Roadmap to Reform, additional valuable opportunities to empirically examine its effects will emerge, and should be embraced to determine how to provide optimal patient care. This study provides a preliminary exploration of the effects of the implementation of the Open Gym model of CR on the rate of program engagement and change in commonly measured health outcomes.

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Table 1

Descriptive Characteristics of Study Population.

	Traditional	Open Floor Plan	Total
Age, yrs	63.0 ± 12.4	63.5 ± 11.6	63.3 ± 11.9
Female Sex	31 (38)	60 (48)	91 (45)
Race			
African American	18 (22)	48 (38)	66 (32)
Non-Hispanic White	60 (73)	74 (59)	134 (65)
Other	3 (4)	1 (1)	4 (2)
6-MWT, ft baseline	433.4 ± 114.8	393.7 ± 115.8	410.0 ± 116.8
6-MWT, ft discharge	529.6 ± 124.5	450.6 ± 108.4	483.3 ± 121.3
Weight, lb) baseline	210.5 ± 51.6	200.8 ± 44.3	205.0 ± 47.7
Weight, lbs discharge	211.6 ± 49.8	199.3 ± 35.9	204.6 ± 42.8
Peak METs baseline	3.2 ± 1.1	2.9 ± 0.81	3.0 ± 0.92
Peak METs discharge	4.8 ± 1.6	3.9 ± 1.6	4.3 ± 1.7

6-MWT, 6-Minute Walk Test

Data reported as Mean ± SD or n (%)

Percentages that do not sum to 100% are due to missing data

Table 2

Effect of Traditional versus Open Gym models on completer outcomes in ANCOVA models.

Outcomes	*P*	η^2
Without demographic covariates		
Change in Body Weight	.137	.017
Change in 6MWT Distance	.015	.050
Change in peak METS	.029	.039
With demographic covariates		
Change in Body Weight	.032	.038
Change in 6MWT Distance	.004	.078
Change in peak METS	.081	.027

6MWT, six-minute walk test

Note: Models without demographic covariates controlled for baseline weight, baseline 6MWT distance, and baseline peak METS, respectively. Models including demographic covariates also controlled for age, sex, and race (white vs. non-white).