

Barriers to Physical Activity Following Rehabilitation: Perspectives of Older Adults with Chronic Disease

Laura Desveaux, Roger Goldstein, Sunita Mathur, and Dina Brooks

Nonadherence to exercise is a main cause of reduced function for older adults with chronic disease following completion of rehabilitation. This quantitative study used a questionnaire to evaluate the barriers and facilitators to community-based exercise following rehabilitation, from the perspectives of older adults with chronic diseases and their healthcare professionals (HCPs). Questionnaires were administered one-on-one to 83 older adults and 35 HCPs. Those with chronic disease perceived cost (43%), travel time (43%), and physical symptoms (39%) as primary barriers to program participation, with similar perceptions across all chronic conditions. Access to a case manager (82%), a supported transition following rehabilitation (78%), and a condition-specific program (78%) were the primary facilitators. Significant between group differences were found between HCPs and older adults with chronic disease across all barriers ($p < .001$), with a greater number of HCPs perceiving barriers to exercise participation. There were no between-group differences in the perception of factors that facilitate participation in exercise.

Keywords: chronic disease, older adult, perceived barriers, exercise, community, rehabilitation

Chronic diseases are increasingly prevalent in older adults. Heart disease, stroke, diabetes, and chronic obstructive pulmonary disease (COPD) represent four of the top five causes of global mortality from noncommunicable diseases (Lozano et al., 2012), with rising numbers projected into 2030 (Mathers & Loncar, 2006). Formal rehabilitation is a key component of management for these conditions, with each respective program incorporating similar components of supervised exercise, education, and psychosocial support (Kujala, 2004). The physical improvements following formal rehabilitation are well-established (Lacasse, Martin, Lasser, & Goldstein, 2007; Milani & Lavie, 1998; Reardon et al., 1995; Tang, Marzolini, Oh, McIlroy, & Brooks, 2010; Taylor et al., 2014; Topsakal et al., 2009), however these gains often diminish soon after program completion. Nonadherence to exercise is one of the key factors associated with this functional decline (Brooks, Krip, Mangovski-Alzamora, & Goldstein, 2002; Griffiths et al., 2000). Reduced activity levels among older adults with chronic disease correlate with increased morbidity, mortality, and disease burden (World Health Organization, 2009). Innovative strategies are needed to mitigate this functional decline and achieve recommended physical activity levels in this population. Many

individuals with these conditions exhibit similar symptoms such as fatigue and dyspnea, and experience similar consequences such as reduced exercise capacity and reduced health-related quality of life (Gosker et al., 2003; Pang, Eng, Dawson, & Gylfadottir, 2006). The overlap of symptoms and program structure supports the rationale for an integrated chronic disease management model allowing for diagnosis-specific adaptations.

Community-based exercise (CBE) programs that follow intensive rehabilitation appeal to individuals with chronic disease (Desveaux, Beauchamp, Rolfe, Goldstein, & Brooks, 2014; Reed, Harrington, Duggan, & Wood, 2010) as they help maintain or even improve their functional exercise capacity (Beauchamp, Francella, Romano, Goldstein, & Brooks, 2013). CBE programs allowing for the integration of multiple chronic conditions will maximize access, and use existing community resources. The social interaction provided by CBE is an important benefit and strong motivator in older adults, regardless of whether they have a chronic condition (Fisken, Keogh, Waters, & Hing, 2015). They have the added advantage of providing an alternative for individuals who are unable to access formal rehabilitation. This approach uses minimal healthcare resources when compared with telemonitoring or institutionally-based maintenance exercise, shifting wellness maintenance from the healthcare system to the community (Cockram, Cecins, & Jenkins, 2006). Establishing partnerships between healthcare professionals (HCPs) and exercise counselors also effectively increases the frequency and total amount of weekly physical activity (Morey et al., 2006). To maximize adherence to CBE following rehabilitation, a better understanding of the barriers and facilitators to participation, from both the patient and the HCP perspective, is needed. In those with heart failure (Tierney et al., 2011), stroke (Rimmer, Wang, & Smith, 2008), diabetes (Tulloch et al., 2013), and COPD (Thorpe, Johnston, & Kumar, 2012), older age and the presence of comorbid chronic diseases has been noted to limit physical activity (Patel, Schofield, Kolt, & Keogh, 2013). Little is known of the specific barriers and facilitators to CBE programs following discharge from intensive rehabilitation, although the transition to improved health that follows rehabilitation has been highlighted as challenging in COPD (Halding & Heggdal, 2012). Moreover, despite their role in the promotion of physical activity, information is limited as to

Desveaux is with the Rehabilitation Sciences Institute, Faculty of Medicine, University of Toronto, Toronto, Canada; and the Department of Respiratory Medicine, West Park Healthcare Centre, Toronto, Canada. Goldstein is with the Department of Respiratory Medicine, West Park Healthcare Centre, Toronto, Canada; and the Department of Physical Therapy, Faculty of Medicine, University of Toronto, Toronto, Canada. Mathur is with the Rehabilitation Sciences Institute, Faculty of Medicine, University of Toronto, Toronto, Canada; the Department of Respiratory Medicine, West Park Healthcare Centre, Toronto, Canada; and the Department of Physical Therapy, Faculty of Medicine, University of Toronto, Toronto, Canada. Brooks is with the Rehabilitation Sciences Institute, Faculty of Medicine, University of Toronto, Toronto, Canada; the Department of Respiratory Medicine, West Park Healthcare Centre, Toronto, Canada; and the Department of Physical Therapy and Department of Medicine, Faculty of Medicine, University of Toronto, Toronto, Canada. Address author correspondence to Dina Brooks at dina.brooks@utoronto.ca.

how HCPs perceive these barriers. Primary care physicians identified the existence of chronic disease, transportation constraints, existing routines, and lack of confidence as barriers to engaging in physical activity for older adults (Patel, Kolt, Keogh, & Schofield, 2012). Knowledge of these barriers might assist patients and HCPs in promoting adoption of exercise after rehabilitation.

The primary objective of the study was to describe the perceived barriers and facilitators to participation in CBE after rehabilitation, from the perspective of older adults with heart failure, stroke, amputations secondary to diabetes, and COPD. The purpose was to better understand this transition to better support it. The secondary objectives were to: (1) compare the perception of barriers and facilitators from the perspective of individuals with chronic conditions; and (2) describe the perceived barriers and facilitators from the perspective of HCPs and compare them to those of patients.

Methods

Study Design

This quantitative study used a cross-sectional design involving a modified version of the Cardiac Rehabilitation Barriers Scale (CRBS) (Shanmugasagaram et al., 2012), a patient-based barriers questionnaire. The clinical supervisor of each rehabilitation program identified eligible individuals and approached them to describe the study. Interested individuals were approached by a member of the research team, who further explained the study and obtained either written or verbal informed consent. Participants were consecutively recruited following completion of formal rehabilitation. Individuals were excluded if they were actively participating in a maintenance exercise program, as the study aimed to capture the perspectives of older adults who were not currently engaged in maintenance exercise, in an effort to help facilitate this transition. HCPs working with each chronic disease population were also invited to participate. Both older adults with chronic disease and their HCPs completed the same questionnaire to quantitatively evaluate the perceived barriers to patient participation in CBE. As the rehabilitation facilities for pulmonary, cardiac, stroke and amputee patients were located in two separate centers, the study protocol was approved by the Joint Bridgepoint/West Park/Toronto Central Community Care Access Centre Research Ethics Board and the University Health Network Research Ethics Board.

Inclusion Criteria

Four chronic disease populations, including heart failure, stroke, diabetes, and COPD, were selected for inclusion in this study. These four conditions represent four of the top five causes of global mortality in the category of noncommunicable diseases (Lozano et al., 2012). The fifth chronic disease, lung cancer, was excluded as a result of limited access to this population. The most widespread rehabilitation programs in Canada include cardiac, neurological, prosthetic, and pulmonary rehabilitation.

Heart Failure

Older adults with heart failure who previously enrolled in rehabilitation at the Toronto Rehabilitation Institute were included. Diagnosis of heart failure was confirmed by ejection fraction and physician diagnosis.

Stroke

Older adults with a diagnosis of ischemic stroke who were previously enrolled in rehabilitation at West Park Healthcare Centre

(WPHC) were included in the study, provided they were able to ambulate independently (with or without the use of a gait aid). Stroke was confirmed by medical imaging and physician diagnosis. Individuals were excluded if they demonstrated cognitive impairments as determined and documented by their HCP.

Amputation Secondary to Diabetes

Older adults with a diagnosis of diabetes and a lower extremity amputation secondary to limb ischemia who were previously enrolled in rehabilitation at WPHC were included in the study, provided they were able to ambulate independently (with or without the use of a gait aid). Individuals were excluded if they had bilateral amputations.

Chronic Obstructive Pulmonary Disease

Older adults with COPD who were previously enrolled in rehabilitation at WPHC were included in the study. Diagnosis of COPD was made by a physician according to international guidelines (Global Initiative for Chronic Obstructive Lung Disease, 2015), including a postbronchodilator $FEV_1/FVC < 0.70$.

Healthcare Professionals

All registered physicians and nonphysician HCPs (physiotherapists and kinesiologists) who worked directly with the specified populations at their respective hospital were invited to participate in the study.

Questionnaire

The questionnaire is a modified version of the CRBS (Shanmugasagaram et al., 2012), which assesses barriers to program enrollment across four subscales, including healthcare, logistical, work/time conflicts, and comorbidities. CRBS scores are significantly related to participation in rehabilitation, and subscales demonstrate good internal consistency (Shanmugasagaram et al., 2012).

The CRBS was modified using expert opinion and the addition of specific barriers and facilitators to participation outlined in the existing literature. HCPs with expertise in rehabilitation and maintenance of exercise provided feedback on the questionnaire. As the participant population included older adults who were predominantly retired, the work/time conflicts subsection was removed. The resulting questionnaire included four subscales, including healthcare (no HCP support, referral from HCP, supported transition, access to a case manager, and a condition-specific program); personal (motivation, confidence, and opportunity for social interaction); logistical (cost, distance); and physical (severity of symptoms). The patient guide was modified slightly for administration to HCPs, asking them to evaluate the barriers their patients encounter. In addition, HCPs were asked unique demographic questions, as the patient demographic categories were not relevant. The guide was then pilot tested on HCPs ($n = 10$) working in the field of heart disease, stroke, amputees, and COPD, and their patients ($n = 12$). As no recommendations were made as a result of the pilot test, no subsequent revisions were made to either guide. The final questionnaire included a total of 18 questions, including four demographic questions, 12 questions rating the impact of barriers and facilitators, and two open-ended questions to identify additional barriers and facilitators. As no changes were made to the questionnaire following the pilot testing, the items retained their construct validity as established for the CRBS (Shanmugasagaram et al., 2012).

Participants were asked to rate the perceived impact of each barrier and facilitator on a 5-point Likert-type scale that ranges from

1 (strongly disagree) to 5 (strongly agree). Higher scores indicate that the associated barrier or facilitator has a greater impact on the participant's ability to participate in CBE. Open-ended questions were asked at the end of each section to allow for participants to identify additional barriers and facilitators that were not previously identified in the literature (refer to Appendix). Recruitment continued in each diagnostic category for a total of six months, at which time participant responses were demonstrating consistent responses across barriers. Questionnaires were administered one-on-one, and in person wherever possible. When distance prevented the ability to meet in person, the questionnaire was conducted over the phone and verbal consent was documented on the participant's consent form.

Statistical Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 22.0 (IBM Inc., Chicago, IL). The demographic characteristics of each respondent sample and the perception of barriers and facilitators for each patient subgroup were described using frequencies. For the purposes of group comparison, a participant was considered to view a factor as a barrier or facilitator if they responded with "Agree" or "Strongly Agree". The resulting categorical variable was used to analyze the perceptions of individuals with chronic disease compared with those of HCPs using a chi-squared test, with a significance level of $p < .05$. Results of open-ended questions were reported directly as no specific ratings were requested. Finally, chi-squared analyses were conducted to assess whether there were significant differences in the perception of barriers and facilitators across chronic conditions. For each comparison, participants with the condition in question (e.g., heart failure) were compared with all other participants as a whole (e.g., stroke, diabetic amputees, and COPD). A Bonferroni correction was applied to control against inflated error due to multiple comparisons, resulting in a p -value $< .005$ (.05/11), considered as statistically significant.

Results

Study Sample

Participants were recruited between April 2012 and December 2014. The diagnostic categories of the individuals approached and enrolled

in the study were as follows: 24/32 COPD, 24/45 poststroke, 16/17 heart failure, and 19/24 amputees. Patients declining participation cited a lack of time (60%) or disinterest (40%) as their reason for refusal. In addition, 34/46 HCPs were approached, none of whom were involved with piloting the interview guide, and participated in the study. In total, 83 patients (49 males and 34 females), mean age 67 ± 9 years, and 35 HCPs (19 physiotherapists, 10 kinesiologists, and 6 physicians) completed interviews. All interviews were conducted one-on-one, with the majority conducted in person. Five interviews were conducted over the phone as distance prevented participants from meeting face-to-face.

Individuals with Chronic Disease

The demographic characteristics of each patient subgroup can be found in Table 1. All participants were able to walk independently, with or without the use of a gait aid and would therefore be able to access a community exercise facility. Cardiovascular comorbidities were the most frequently reported (71%), followed by metabolic comorbidities (55%) (Table 1).

Patients perceived cost (43%), travel time (43%), and severity of physical symptoms (39%) to be the top three barriers to program participation (Figure 1). Several participants reported weather as an additional barrier, while a lack of guidance regarding appropriate exercises and the lack of availability of a nearby facility were also noted. The top three facilitators perceived to impact on participation included assigning an HCP as a case manager (82%), a facilitated transition from rehabilitation which includes an introduction to the program by an HCP (78%), and a program designed specifically for the patient's condition (78%) (Figure 2). Participants elaborated on program design expressing their desire for the program to be designed specifically for chronic disease populations and that the instructor be trained on an appropriate approach to progressing individual exercise programs for these populations. Many individuals noted that the opportunity for group exercise is preferred as it presented an added benefit of establishing a weekly routine and a sense of accountability, in addition to social support. Of the 83 patient participants, 78 (94%) indicated that they would participate in a CBE program. Of the remaining five individuals, one was unsure, three stated that they did not like exercise, and one cited a busy schedule.

Table 1 Participant Demographics

Individuals with Chronic Disease	Heart Disease <i>n</i> = 16	Stroke <i>n</i> = 24	Amputees <i>n</i> = 19	COPD <i>n</i> = 24
Age (mean $\pm$ SD)	66 $\pm$ 9	68 $\pm$ 9	64 $\pm$ 9	68 $\pm$ 7
Male/female, <i>n</i> (%)	10/6 (63/37)	18/6 (75/25)	10/9 (53/47)	11/13 (46/54)
Comorbidities (<i>n</i>)				
Cardiovascular	11	19	11	18
Arthritis	6	7	5	2
Asthma/COPD	2	4	0	2
Metabolic	5	14	1	8
Other	2	4	10	13

Abbreviation: COPD = chronic obstructive pulmonary disease.

Note. Cardiovascular comorbidities include previous myocardial infarction, atrial fibrillation, hypertension, coronary artery bypass graft, and aneurysm repair. Metabolic comorbidities include diabetes and dyslipidemia. Other comorbidities include peripheral vascular disease, depression, anxiety, and cancer, among others.

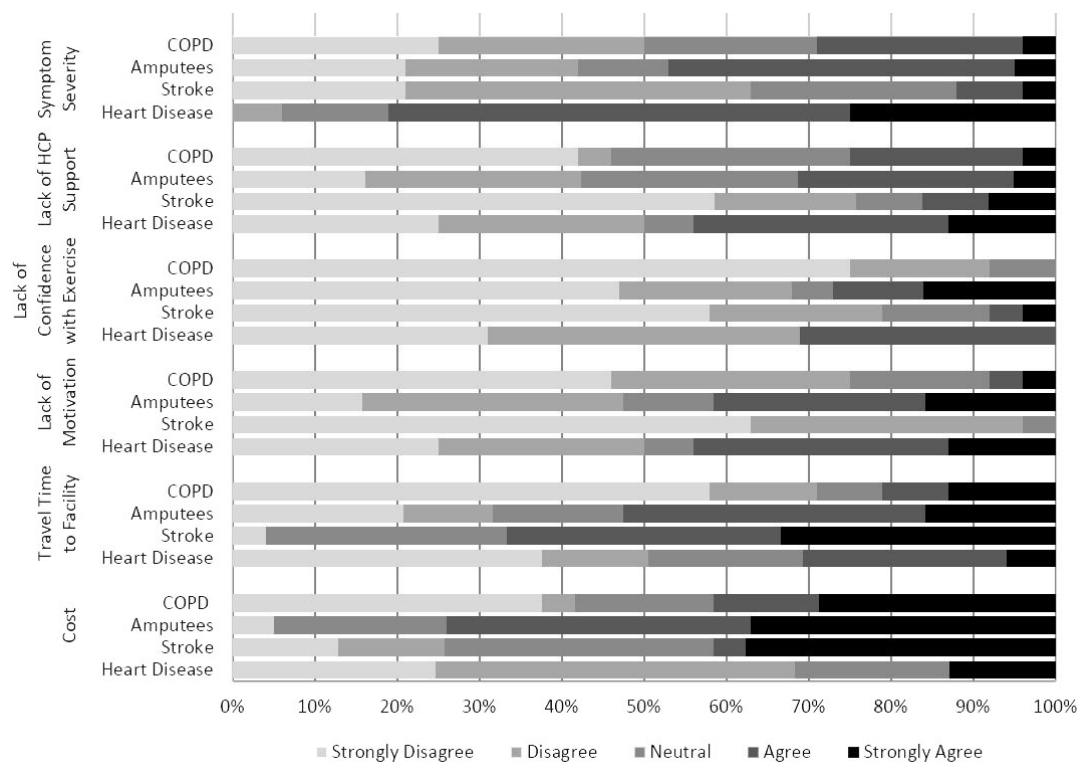


Figure 1 — Perceived barriers to participation in community-based exercise by condition. The impact of barriers is plotted for each condition (Likert scale). Darker colors indicate a greater impact. Although agreement across conditions is strong for most barriers, older adults with heart failure were more likely to perceive symptom severity as a barrier and amputees were more likely to perceive cost as a barrier. Note that older adults poststroke were less likely to perceive a lack of motivation as a barrier. COPD = chronic obstructive pulmonary disease; HCP = healthcare professional.

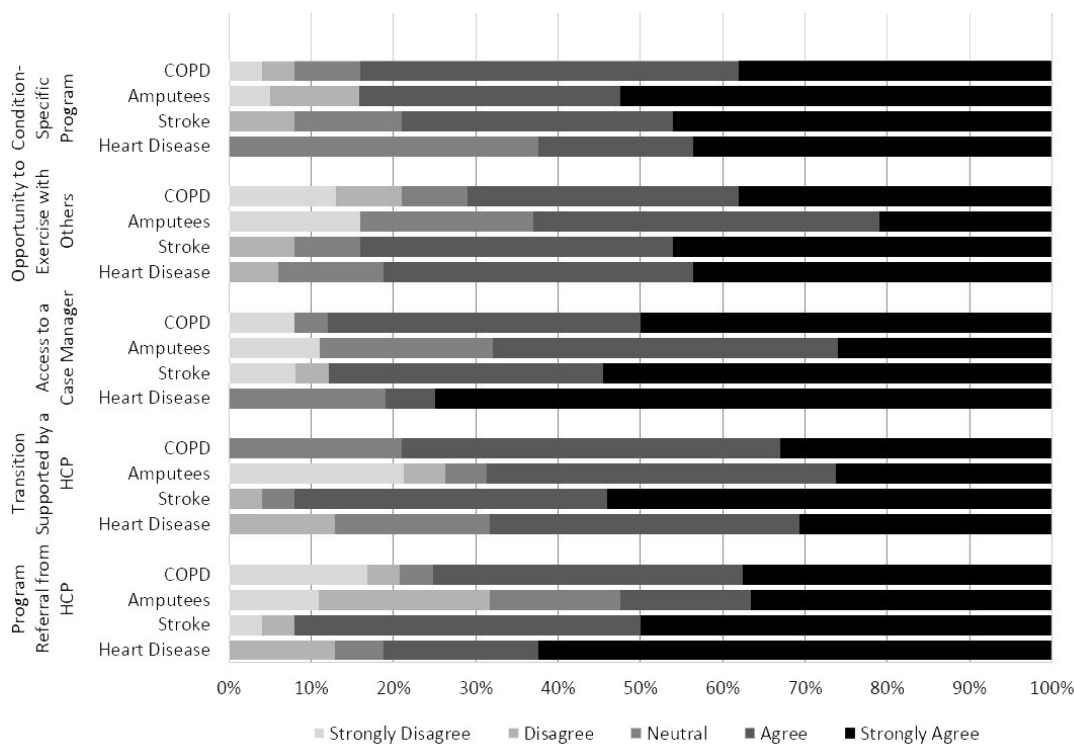


Figure 2 — Perceived facilitators of participation in community-based exercise by condition. The impact of facilitators is plotted for each condition (Likert scale). Darker colors indicate a greater impact. There were no differences in the perceptions of facilitators across conditions. COPD = chronic obstructive pulmonary disease; HCP = healthcare professional.

Comparison Across Chronic Conditions

Although there are many barriers for which agreement among groups is strong, there were a few differences in responses across the patient groups. Older adults with heart failure were significantly more likely to perceive symptom severity as a barrier to participation in CBE as compared with other older adults with other chronic conditions ($p < .001$). Older adults with an amputation secondary to diabetes were significantly more likely to perceive cost as a barrier to participation ($p = .002$). Older adults poststroke were significantly less likely to perceive a lack of motivation and symptom severity as a barrier compared with participants with heart failure, diabetic amputations, or COPD ($p = .003$ and $p = .002$, respectively). There was no significant difference across conditions for the remaining barriers. Responses were consistent across all conditions for facilitators.

Healthcare Professionals

The majority of HCPs were physiotherapists (54%) who split their time between inpatient and outpatient programs (64%). HCPs perceived travel time (91%), lack of motivation (89%), cost (86%), and severity of symptoms (86%) to be the primary barriers to program participation (Table 2). HCPs also identified the ability to communicate in English and the lack of program awareness as barriers to participation. The main facilitators identified as having a positive impact on program participation included a referral from a HCP (91%) and a facilitated transition to the program (91%). Suggested strategies to improve program participation included: a short transition time from rehabilitation to community maintenance exercise, a clear transportation strategy, and a physically accessible and socially supportive community environment.

Comparing the Perspectives of Patients and Healthcare Professionals

HCPs perceived more barriers to participation than did patients (Table 2). There were significant between-group differences for the perceived impact of all six barriers ($p < .001$), with effect sizes

ranging from moderate ($\phi = 0.38$ for lacking HCP support) to large ($\phi = 0.74$ for motivation). The two groups had similar perceptions of program facilitators.

Discussion

This study is the first to examine the perspectives of older adults with chronic disease and those of HCPs regarding participation in CBE after intensive rehabilitation. Older adults with heart failure, stroke, diabetes, and COPD perceive similar barriers and facilitators with respect to participation in CBE. The results highlight a discrepancy between the barriers perceived by HCPs and those with chronic disease, which underscores the importance of engaging those with chronic disease in planning their transition to CBE. Of note, both groups had similar perceptions of facilitators, suggesting that a therapeutic alliance based on facilitators may be an effective approach to encouraging participation.

The identification of barriers to CBE, such as cost and symptom distress, were consistent with previous reports (Benzo, Wetzstein, Neuenfeldt, & McEvoy, 2015; Rimmer et al., 2008; Yates, Price-Fowlkes, & Agrawal, 2003). The impact of symptom distress on participation is particularly relevant as it underscores the unique experience of older adults with chronic disease compared with their healthy peers, which has been alluded to previously in the literature (Patel et al., 2012). However, patient participants perceived that the facilitators were more likely to influence their participation. Motivation to participate was high despite the presence of limited mobility and shortness of breath. Coupling this high motivation with care transition strategies, such as patient empowerment, improved self-care, and bridging the discharge process (Kelly, 2011), might be effective in encouraging continued physical activity during the transition from institution-based rehabilitation to community-based maintenance exercise.

A significantly greater percentage of HCPs perceived that barriers would negatively impact participation compared with patients with chronic disease. Perceptions of physiotherapists and patients regarding barriers to exercise following general physical therapy have been previously reported (Zalewski, Alt, & Arvinen-Barrow,

Table 2 Comparing the Perceived Impact of Barriers and Facilitators

Barriers and Facilitators	Individuals with Chronic Disease <i>n</i> = 83	Healthcare Professionals <i>n</i> = 35	<i>p</i> -value
Perceived barriers, <i>n</i> (%)			
Cost	36 (43)	30 (86)	< .001
Travel time/distance to facility	36 (43)	32 (91)	< .001
Lack of motivation	17 (20)	31 (89)	< .001
Lack of confidence with exercise	12 (14)	23 (66)	< .001
Lack of HCP support	23 (28)	24 (69)	< .001
Severity of physical symptoms	32 (39)	30 (86)	< .001
Perceived facilitators, <i>n</i> (%)			
Referral to the program from a HCP	63 (76)	32 (91)	.052
Introduction to program and transition supported by HCP	65 (78)	32 (91)	.089
Access to a case manager	68 (82)	26 (74)	.346
Opportunity to exercise with other people	62 (75)	28 (80)	.536
Condition-specific program	65 (78)	26 (74)	.634

Abbreviation: HCP = healthcare professional.

2014). Participants over the age of 65 completed a self-report questionnaire evaluating five internal and two external barriers. As in our findings, there was a discrepancy in perceptions with patients identifying lack of willpower and lack of skill as barriers more frequently than did the physical therapists (Zalewski et al., 2014). In contrast, the physical therapists perceived that fear of injury and lack of time were the main barriers to patient participation (Zalewski et al., 2014). Our study was more specific, tackling older adults with a variety of chronic conditions who were preparing to transition to CBE maintenance following formal intensive rehabilitation.

A narrative review of qualitative studies noted that patients did not play as active a role as they desired in the physiotherapist–patient interactions (Schoeb & Burge, 2012). Although the patients wanted to be asked their opinions in regard to their overall program and goals, the therapist's lack of communication skills and the struggle around shared responsibility were barriers to patient participation. This review underscores the relevance of engaging patients in order for HCPs to appreciate patient barriers and facilitators of participation. Patient preference should inform the delivery and style of exercise interventions when possible (Hillier & English-Jassiem, 2010); it may be pivotal as a precursor to the development of successful CBE programs. The optimal strategies to improve communication between patients and HCPs to enable an understanding of the patients' perspective and to encourage collaborative decision-making surrounding transitions remain to be established.

CBE programs promote wellness maintenance through physical activity, a strategy that reduces healthcare utilization (Canyon & Meshgin, 2008; Hoogendoorn, van Wetering, Schols, & Rutten-van Molken, 2010) and shifts the management of chronic conditions from healthcare-based acute rescue to community-based preventative maintenance. When older adults with COPD completed a minimally supervised community-based program following formal rehabilitation (Beauchamp et al., 2013), they demonstrated improved functional exercise capacity (Beauchamp et al., 2013). A structured program for individuals with chronic cardiorespiratory conditions that offered weekly classes led by a fitness instructor was both feasible and sustainable (Adsett, Hickey, Nagle, & Mudge, 2013). Both programs featured facilitated transition coupled with condition-specific design through the incorporation of fitness instructors trained to supervise individuals with chronic disease. In addition, participants were provided with the opportunity for group exercise and social support, two key program features desired by patients.

Our study limitations include recruitment from two urban centers, which may limit generalizability beyond urban areas. As all participants in this study were able to ambulate independently, the results may not be generalized to include those in whom ambulation is more severely impaired. Notwithstanding the above, the responses provided by patients and HCP support the potential utility of CBE to alleviate the strain on institutionally-based programs where appropriate. Although the sample size was modest, participant responses were consistent across each group for both barriers and facilitators at the conclusion of the study. This suggests that recruiting additional participants was not likely to provide new information. As the study design was cross-sectional, the consistency of these barriers over time is unknown. Given that we evaluated patients previously enrolled in a formal hospital-based rehabilitation program, the results may be less applicable to individuals without access to prior more intensive rehabilitation services. Lastly, as municipal resource allocations for postrehabilitation community maintenance will vary among different jurisdictions, the recommended approaches to removing barriers and promoting facilitators may not be consistently implemented in some regions.

In summary, the results of this study will inform strategies for developing and facilitating successful transitions to community exercise programs that promote long-term physical activity in older adults with chronic disease. The perception of similar barriers and facilitators across chronic conditions supports the potential for an integrated approach to management following the completion of formal rehabilitation. Program costs, travel time, and severity of symptoms were identified as the top three barriers to enrollment. The transition from hospital-based rehabilitation to community-based maintenance exercise can be facilitated by the presence of a case manager, in response to referral by a HCP. A focus on enhancing facilitators rather than reducing barriers may be the more effective approach to encouraging long-term exercise in a community setting.

Acknowledgments

Funding for this study was provided by the Ontario Lung Association through an Ontario Respiratory Care Society Research Grant and the Canadian Lung Association through a Canadian Respiratory Health Professionals Research Grant.

References

- Adsett, J., Hickey, A., Nagle, A., & Mudge, A. (2013). Implementing a community-based model of exercise training following cardiac, pulmonary, and heart failure rehabilitation. *Journal of Cardiopulmonary Rehabilitation and Prevention*, 33(4), 239–243. [PubMed doi:10.1097/HCR.0b013e3182930cea](#)
- Beauchamp, M.K., Francella, S., Romano, J., Goldstein, R., & Brooks, D. (2013). A novel approach to long-term respiratory care: Results of a community-based post-rehabilitation maintenance program in COPD. *Respiratory Medicine*, 107(8), 1210–1216. [PubMed doi:10.1016/j.rmed.2013.04.014](#)
- Benzo, R., Wetzstein, M., Neuenfeldt, P., & McEvoy, C. (2015). Implementation of physical activity programs after COPD hospitalizations: Lessons from a randomized study. *Chronic Respiratory Disease*, 12(1), 5–10. [PubMed](#)
- Brooks, D., Krip, B., Mangovski-Alzamora, S., & Goldstein, R. (2002). The effect of post-rehabilitation programs among individuals with COPD. *The European Respiratory Journal*, 20, 20–29. [PubMed](#)
- Canyon, S., & Meshgin, N. (2008). Cardiac rehabilitation: reducing hospital readmissions through community based programs. *Australian Family Physician*, 37(7), 575–577. [PubMed](#)
- Cockram, J., Cecins, N., & Jenkins, S. (2006). Maintaining exercise capacity and quality of life following pulmonary rehabilitation. *Respirology (Carlton, Vic.)*, 11(1), 98–104. [PubMed doi:10.1111/j.1440-1843.2006.00791.x](#)
- Desveaux, L., Beauchamp, M., Rolfe, D., Goldstein, R., & Brooks, D. (2014). Participant experiences of a community-based maintenance program post-pulmonary rehabilitation. *Chronic Respiratory Disease*, 11(1), 23–30. [PubMed doi:10.1177/1479972313516880](#)
- Fisken, A., Keogh, J.W., Waters, D.L., & Hing, W.A. (2015). Perceived benefits, motives, and barriers to aqua-based exercise among older adults with and without osteoarthritis. *Journal of Applied Gerontology*, 34(3), 377–396. [PubMed doi:10.1177/0733464812463431](#)
- Global Initiative for Chronic Obstructive Lung Disease. (2015). Global Strategy for the Diagnosis, Management and Prevention of COPD. Retrieved from <http://www.goldcopd.org/guidelines-global-strategy-for-diagnosis-management.html>.
- Gosker, H.R., Lencer, N., Franssen, F., Vusse, G.V.D., Wouters, E., & Schols, A. (2003). Striking similarities in systemic factors contributing to decreased exercise capacity in patients with severe chronic heart failure or COPD. *Chest*, 123(5), 1416–1424. [PubMed doi:10.1378/chest.123.5.1416](#)
- Griffiths, T.L., Burr, M., Campbell, I., Lewis-Jenkins, V., Mullins, J., Shiels, K., . . . Turnbridge, J. (2000). Results at 1 year of outpatient

- multidisciplinary pulmonary rehabilitation: A randomised controlled trial. *Lancet*, 355(9201), 362–368. PubMed doi:10.1016/S0140-6736(99)07042-7
- Halding, A.G., & Heggdal, K. (2012). Patients' experiences of health transitions in pulmonary rehabilitation. *Nursing Inquiry*, 19(4), 345–356. PubMed doi:10.1111/j.1440-1800.2011.00573.x
- Hillier, S., & English-Jassiem, G. (2010). Rehabilitation for community-dwelling people with stroke: Home or centre based? A systematic review. *International Journal of Stroke*, 5, 178–186. PubMed doi:10.1111/j.1747-4949.2010.00427.x
- Hoogendoorn, M., van Wetering, C., Schols, A., & Rutten-van Molken, M. (2010). Is INTERdisciplinary COMMunity-based COPD management (INTERCOM) cost-effective? *The European Respiratory Journal*, 35(1), 79–87. PubMed doi:10.1183/09031936.00043309
- Kelly, M. (2011). Self-management of chronic disease and hospital readmission: A care transition strategy. *Journal of Nursing and Healthcare of Chronic Illness*, 3, 4–11. doi:10.1111/j.1752-9824.2010.01075.x
- Kujala, U.M. (2004). Evidence for exercise therapy in the treatment of chronic disease based on at least three randomized controlled trials – summary of published systematic reviews. *Scandinavian Journal of Medicine & Science in Sports*, 14, 339–345. PubMed doi:10.1111/j.1600-0838.2004.413.x
- Lacasse, Y., Martin, S., Lasserson, T., & Goldstein, R. (2007). Meta-analysis of respiratory rehabilitation in chronic obstructive pulmonary disease. A Cochrane systematic review. *Europa Medicophyica*, 43(4), 475–485. PubMed
- Lozano, R., Naghavi, M., Foreman, K., Lim, S., Shibuya, K., Aboyans, V., . . . Memish, Z.A. (2012). Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: A systematic analysis for the global burden of disease study 2010. *Lancet*, 380(9859), 2095–2128. PubMed doi:10.1016/S0140-6736(12)61728-0
- Mathers, C.D., & Loncar, D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Medicine*, 3(11), e442. PubMed doi:10.1371/journal.pmed.0030442
- Milani, R.V., & Lavie, C. (1998). Disparate effects of out-patient cardiac and pulmonary rehabilitation programs on work efficiency and peak aerobic capacity in patients with coronary disease or severe obstructive pulmonary disease. *Journal of Cardiopulmonary Rehabilitation*, 18, 17–22. PubMed doi:10.1097/00008483-199801000-00002
- Morey, M.C., Ekelund, C., Pearson, M., Crowley, G., Peterson, M., Sloane, R., . . . Bosworth, H. (2006). Project LIFE: A partnership to increase physical activity in elders with multiple chronic illnesses. *Journal of Aging and Physical Activity*, 14(3), 324–343. PubMed
- Pang, M.Y., Eng, J.J., Dawson, A.S., & Gylfadottir, S. (2006). The use of aerobic exercise training in improving aerobic capacity in individuals with stroke: A meta-analysis. *Clinical Rehabilitation*, 20(2), 97–111. PubMed doi:10.1191/0269215506cr926oa
- Patel, A., Kolt, G., Keogh, J., & Schofield, G. (2012). The green prescription and older adults: What do general practitioners see as barriers? *Journal of Primary Health Care*, 4(4), 320–327. PubMed
- Patel, A., Schofield, G.M., Kolt, G.S., & Keogh, J.W. (2013). Perceived barriers, benefits, and motives for physical activity: Two primary-care physical activity prescription programs. *Journal of Aging and Physical Activity*, 21(1), 85–99. PubMed
- Reardon, J.Z., Levine, S., Peske, G., Elnaggar, A., Normandin, E., Clark, B., & ZuWallack, R. (1995). A comparison of outpatient cardiac and pulmonary rehabilitation patients. *Journal of Cardiopulmonary Rehabilitation*, 15, 277–282. PubMed doi:10.1097/00008483-199507000-00004
- Reed, M., Harrington, R., Duggan, A., & Wood, V. (2010). Meeting stroke survivors' perceived needs: A qualitative study of a community-based exercise and education scheme. *Clinical Rehabilitation*, 24, 16–25. PubMed doi:10.1177/0269215509347433
- Rimmer, J.H., Wang, E., & Smith, D. (2008). Barriers associated with exercise and community access for individuals with stroke. *Journal of Rehabilitation Research and Development*, 45(2), 315–322. PubMed doi:10.1682/JRRD.2007.02.0042
- Schoeb, V., & Burge, E. (2012). Perceptions of patients and physiotherapists on patient participation: A narrative synthesis of qualitative studies. *Physiotherapy Research International*, 17(2), 80–91. PubMed doi:10.1002/pri.516
- Shanmugasagaram, S., Gagliese, L., Oh, P., Stewart, D.E., Brister, S.J., Chan, V., & Grace, S.L. (2012). Psychometric validation of the cardiac rehabilitation barriers scale. *Clinical Rehabilitation*, 26(2), 152–164. PubMed doi:10.1177/0269215511410579
- Tang, A., Marzolini, S., Oh, P., McIlroy, W., & Brooks, D. (2010). Feasibility and effects of adapted cardiac rehabilitation after stroke: A prospective trial. *BMC Neurology*, 10, 40. PubMed doi:10.1186/1471-2377-10-40
- Taylor, R.S., Sagar, V., Davies, E., Briscoe, S., Coats, A., Dalal, H., . . . Singh, S. (2014). Exercise-based rehabilitation for heart failure. *Cochrane Database of Systematic Reviews*, 4. PubMed doi:10.1002/14651858.CD003331.pub4
- Thorpe, O., Johnston, K., & Kumar, S. (2012). Barriers and enablers to physical activity participation in patients with COPD: A systematic review. *Journal of Cardiopulmonary Rehabilitation and Prevention*, 32, 359–369. PubMed doi:10.1097/HCR.0b013e318262d7df
- Tierney, S., Elwers, H., Sange, C., Mamas, M., Rutter, M.K., Gibson, M., . . . Deaton, C. (2011). What influences physical activity in people with heart failure: A qualitative study. *International Journal of Nursing Studies*, 48(10), 1234–1243. PubMed doi:10.1016/j.ijnurstu.2011.03.003
- Topsakal, R., Kalay, N., Ozdogru, I., Cetinkaya, Y., Oymak, S., Kaya, M.G., . . . Ergin, A. (2009). Effects of chronic obstructive pulmonary disease on coronary atherosclerosis. *Heart and Vessels*, 24, 164–168. PubMed doi:10.1007/s00380-008-1103-4
- Tulloch, H., Sweet, S.N., Fortier, M., Capstick, G., Kenny, G.P., & Sigal, R.J. (2013). Exercise facilitators and barriers from adoption to maintenance in the diabetes aerobic and resistance exercise trial. *Canadian Journal of Diabetes*, 37(6), 367–374. PubMed doi:10.1016/j.jcjd.2013.09.002
- World Health Organization. (2009). Global health risks: Mortality and burden of disease attributable to selected major risks. Geneva. Retrieved from http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf
- Yates, B.C., Price-Fowlkes, T., & Agrawal, S. (2003). Barriers and facilitators of self-reported physical activity in cardiac patients. *Research in Nursing & Health*, 26, 459–469. PubMed doi:10.1002/nur.10108
- Zalewski, K., Alt, C., & Arvinen-Barrow, M. (2014). Identifying barriers to remaining physically active after rehabilitation: differences in perception between physical therapists and older adult patients. *The Journal of Orthopaedic and Sports Physical Therapy*, 44(6), 415–424. PubMed doi:10.2519/jospt.2014.5171

Appendix

Patient Questionnaire

Sociodemographic and Medical Information

For the following items, please place a mark in the appropriate box that indicates your response.

1. What is your gender?
☐ ₁ Female ☐ ₂ Male
2. What is the primary nature of your chronic condition?
☐ ₁ Heart Condition
☐ ₂ Lung Condition
☐ ₃ Other, please specify:
3. What is your age?
4. Do you have any of the following co-conditions: (Check all that apply)
☐ ₁ Coronary Artery Disease
☐ ₂ Previous Myocardial Infarction
☐ ₃ Atrial Fibrillation
☐ ₄ Hypertension
☐ ₅ Arthritis
☐ ₆ Asthma
☐ ₇ Emphysema
☐ ₈ Diabetes
☐ ₉ Peripheral Vascular Disease
☐ ₁₀ Cerebral Vascular Disease
☐ ₁₁ Other, please specify:

Barriers

The following questions ask about your perceptions of the potential barriers that exist and the likelihood that they would impact your participation in a community-based exercise program after you complete your rehabilitation. For the following items, please place a mark in the appropriate box that indicates your response. Indicate how much you feel each of these factors is a barrier to participation in a community-based exercise program.

5. Cost of the Program
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 6. Travel Time/Distance to the Community Center
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 7. Personal Motivation to Exercise
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 8. Lack of Confidence Exercising in a Community Facility
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 9. Lack of Physician or Physiotherapist Support Throughout the Program
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 10. How I am Feeling on a Given Day
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
 11. Please list any additional barriers to program access or adherence:
-

Facilitators

The following questions ask about your perceptions of the potential positive factors that exist and the likelihood that they would encourage your participation in a community-based exercise program after you complete your rehabilitation. For the following items, please place a mark in the appropriate box that indicates your response. Indicate how each of these factors will encourage your participation in a community-based exercise program.

12. Introduction to Program/Transition by a Healthcare Professional

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

13. Peer and Social Support

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

14. Recommendation to Attend Program by your Physician or Physiotherapist

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

15. Access to a Case Manager to Answer Specific Questions Throughout the Program

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

16. Program Specific to my Condition

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

17. Please list any additional factors that would promote program access or participation:

18. Would you access a community-based exercise program?

☐₁ Yes ☐₂ No

If no, please explain:

Healthcare Provider Questionnaire

Practice Information

For the following items, please place a mark in the appropriate box that indicates your response.

1. What is your area of practice?
☐ ₁ Inpatient ☐ ₂ Outpatient
2. Which category represents the majority of your patients?
☐ ₁ Cardiovascular
☐ ₂ Respiratory
☐ ₃ Amputee
☐ ₄ Stroke

Barriers

The following questions ask about your perceptions of the potential barriers that exist and the likelihood that they would impact patient participation in a community-based exercise program after the completion of rehabilitation. For the following items, please place a mark in the appropriate box that indicates your response. Indicate how each of these factors is a barrier to patient participation in a community-based exercise program after they complete rehab.

3. Cost of the Program
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
4. Patient Lacks Personal Motivation to Exercise
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
5. Patient Lacks Confidence Exercising in a Community Facility
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
6. Travel Time/Distance to Community Center
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
7. Lack of Health Professional Support at the Community Facility
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
8. Severity of Condition
☐ ₁ Not at all a barrier ☐ ₂ Not very likely to be a barrier ☐ ₃ Neutral ☐ ₄ Very likely to be a barrier ☐ ₅ Extremely likely to be a barrier
9. Please list any additional barriers to program participation:

Facilitators

The following questions ask about your perceptions of the potential facilitators that exist and the likelihood that they would promote patient participation in a community-based exercise program after the completion of rehabilitation. For the following items, please place a mark in the appropriate box that indicates your response. Indicate how each of these factors will facilitate patient participation in a community-based exercise program after they complete rehab.

10. Referral to Program from Healthcare Professional
☐ ₁ Not at all likely ☐ ₂ Not very likely ☐ ₃ Neutral ☐ ₄ Very likely ☐ ₅ Extremely likely
11. Introduction/Transition Supported by a Healthcare Professional
☐ ₁ Not at all likely ☐ ₂ Not very likely ☐ ₃ Neutral ☐ ₄ Very likely ☐ ₅ Extremely likely
12. Peer Support/Social Relationships
☐ ₁ Not at all likely ☐ ₂ Not very likely ☐ ₃ Neutral ☐ ₄ Very likely ☐ ₅ Extremely likely

13. Access to a Case Manager (Health Professional) to Provide Ongoing Support

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

14. Program Specific to the Patient's Condition

☐₁ Not at all likely ☐₂ Not very likely ☐₃ Neutral ☐₄ Very likely ☐₅ Extremely likely

15. Please list any additional facilitators of program participation:

16. Would you promote patient participation in a community-based secondary prevention program?

☐₁ Yes ☐₂ No

If no, please explain:

Copyright of Journal of Aging & Physical Activity is the property of Human Kinetics Publishers, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.