Title: Perceptions of cardiology administrators about cardiac rehabilitation in South America and the Caribbean

Short Title: Professionals' perception of CR in South America and the Caribbean

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Abstract

Background: Cardiac rehabilitation (CR) programs can address the cardiovascular disease epidemic in South America. However, there are factors limiting CR access at the patient-, provider- and system-level. The latter 2 have not been extensively studied. The objective of this study was to investigate cardiology administrator's awareness and knowledge of CR and perceptions regarding resources for CR.

Methods: This study was cross-sectional and observational in design. Cardiology administrators from South American and Caribbean countries were invited to participate by members of the Grupo Interamericano de Prevención y Rehabilitación Cardiovascular. Participants completed a piloted questionnaire online. A descriptive examination was performed and differences in CR knowledge, awareness, perception, and attitudes regarding CR were described overall, by institution funding source (private vs public) and presence of within-institution CR (yes vs no).

Results: Most of the 55 respondents from 8 countries perceived CR as important for outpatient care (mean=4.83±0.38/5 with higher scores indicating more positive perceptions), with benefits including reducing hospital re-admission (4.31±0.48) and length of stay (4.64±0.71), not only for cardiac patients but for those with other vascular conditions (4.34±0.68). Those working in public institutions (50.9%) and in institutions without a CR program (25.0%) were not as aware of, and less likely to value, CR services (p<.05). Only 13.2% of programs had dedicated funding.

Conclusions: Similar to findings from high-income settings, cardiology administrators and cardiologists in South America value CR as part of cardiac patients' care, but funding and availability of programs restrict capacity to deliver these services.

Keywords: Hospital administrators; attitude of health personnel, outpatient health services, rehabilitation centres, cardiac care facilities.

Condensed Abstract

Cardiac rehabilitation (CR) awareness and knowledge, as well as perceptions regarding resources for CR were investigated in a convenience sample of 55 cardiology administrators from 8 South American and Caribbean countries. Respondents valued CR as part of patients' care, but funding availability restricts capacity to deliver these services.

Introduction

Cardiovascular diseases (CVDs) are the leading cause of mortality worldwide, accounting for approximately one-third of annual deaths.[1,2] In South America (SA), mortality due to CVD is 30%, resulting in 11 million deaths annually. Almost one-quarter of these deaths were among those younger than 60 years of age.[3,4] Cardiac rehabilitation (CR) – a comprehensive outpatient program of secondary prevention and lifestyle changes – can mitigate this burden.[5] Robust evidence demonstrates that CR participation reduces mortality up to 25% as well as decreases re-hospitalization in high-income countries (HICs)[5], and reduces risk factors as well as increases quality of life and functional capacity in low and middle-income countries (LMICs) such as those in SA.[6]. It is also demonstrated to be cost-effective, and "value for money"[7], and hence is recommended as standard care in clinical practice guidelines.[8]

Despite its benefits, and the burgeoning implementation of expensive interventional cardiology in LMICs[9], CR is grossly under-developed in SA. Only 56% of centres with cardiac catheterization facilities offer CR.[10] It is estimated only 14% of patients access CR.[11] With a density of 1 program per 0.2 to 3.6 million inhabitants in SA[9], clearly there is need to increase use and capacity.

Barriers to CR delivery and participation must be understood to increase its use. Health system[12], provider[13-16], and especially patient-level[13,14,17-19] barriers to CR utilization have been elucidated in the literature in HICs. Key patient-level factors include cost, distance to CR, transportation barriers, and time constraints due to family or work responsibilities.[20]

Provider-level factors include intentions to refer patients and perceptions of the benefits of CR.[21] Finally, health system-level factors identified in the few previous studies to examine this includes level of integration of CR within the hospital setting, degree of automation of CR referral in the inpatient setting, and capacity constraints.[12,16,22,23] To our knowledge, there are no studies assessing provider and system-level factors related to the utilization of CR in SA or the Caribbean. The objective of this study was to describe cardiology administrator's awareness and knowledge of CR, as well as perceptions regarding resources for CR. Furthermore, differences in their perceptions of and attitudes toward CR as a function of institution funding (public vs. private), and presence of within-institution CR were investigated.

Methods

Design and Procedure

This study was observational and cross-sectional in design. Approval was obtained from the institutional research ethics board at the Federal University of Minas Gerais, Brazil.

Identification of cardiology administrators was facilitated through the SA CR Working Group (Grupo Interamericano de Prevención y Rehabilitación Cardiovascular; http://www.cuidesucorazon.org/) and contacts from the International Council of Cardiovascular Prevention and Rehabilitation (ICCPR; www.globalcardiacrehab.com). Participants were recruited via email by the corresponding association member from their country. Recruitment occurred between November 2014 and January 2015. Voluntary completion of the survey constituted informed consent. Email reminders were sent after

30 days. All participants were assigned a survey identification number to ensure anonymity.

Participants

Cardiology administrators from SA and Caribbean hospitals offering advanced cardiac services were eligible to participate in the study. Hospital administration was defined as planning, organizing, directing, or coordinating cardiovascular health services, including inpatient cardiac care and ambulatory clinics.[24] There were no exclusion criteria.

Measures

The survey administered had been developed to assess Canadian hospital administrators' CR perceptions by Grace et al.[16] It consisted of investigator-generated items with open and close-ended response options, as well as Likert-type response options. The survey was slightly modified to the SA and Caribbean context (e.g., additional question regarding whether the respondents' institution is privately or publically-funded, and the costs to deliver CR were revised to reflect costs in SA; see [9]). The survey was translated to Portuguese (for administration in Brazil) by a researcher that is fluent in English and Portuguese, and to Spanish by a certified translator for administration in the other SA countries.

In the first part of the survey, respondents were requested to self-report sociodemographic and occupational information (e.g., job role, highest degree obtained, year they graduated from their most advanced degree, sex, and type of institution in which they work). In the second part of the survey respondents rated their knowledge, awareness, and perceptions of CR.

Statistical analysis

SPSS Version 20 was used (IBM Inc 2011, NY). Descriptive statistics were first computed to describe the sociodemographic and occupational characteristics of participants. T-tests were computed to assess relationships between respondent's knowledge and awareness of CR in relation to the following characteristics: institution type (private vs. public), and presence of within-institution CR (yes vs. no). A value of $p<.05$ was used to denote significance.

Results

Respondent characteristics

One hundred and forty-seven surveys were emailed to staff meeting inclusion criteria in 8 countries. The sample included 55 respondents from 8 countries (response rate 37.4%). Respondent characteristics are summarized in Table 1. "Other" job roles specified were the following: medical director of the CR program (n=4), coronary care unit manager (n=2), nurse coordinator (n=1), CR specialist (n=2), research sub-manager (n=1), and sub-manager of the cardiology section (n=1). Two respondents did not report their job title.

Cardiology administrator's knowledge, awareness, perceptions, and attitudes regarding CR

Table 2 displays the responses to the questions with forced-choice response options regarding the nature of the relationship between inpatient cardiac units and CR programs, for those working in institutions with such units. As shown, most respondents perceived inpatients' access to CR as limited, and that although healthcare providers are perceived to be encouraged to refer inpatients to CR, this is not actively promoted or facilitated. It also displays the responses to the questions with forced-choice response options regarding their perceptions of funding, location and support for CR, for those working in institutions with CR programs. As shown, most programs did not have dedicated funding, but were perceived by their larger institution as fully-resourced. Most respondents perceived CR should be delivered in both hospital and community settings, and that the average cost to provide CR is a good use of healthcare dollars. Finally, most respondents perceived the Ministry of Health Promotion should fund CR services.

Table 3 summarizes respondents' knowledge, awareness, perceptions and attitudes related to CR, overall and by institution funding, and presence of within-institution CR. In regards to knowledge and awareness, overall, respondents reported that they had quite good awareness of the location of the closest CR program. Respondents employed at a private institution reported significantly more knowledge of what CR entails than those employed at a public institution. Respondents who worked in an institution with a CR program were also significantly more likely to be aware of the location of the closest CR program, perceive greater awareness of CR among their colleagues, and awareness of the use of CR by patients in their institution than respondents who did not work in an institution with a CR program.

In regards to perceptions (also Table 3), overall, respondents reported that CR is important for outpatient care and that access to CR plays an important role in reducing patient re-admission and length of stay. In addition, respondents also identified CR access among patients with other vascular conditions as highly valuable. Respondents employed at a privately-funded institution perceived significantly more importance of CR for outpatient care and greater value in serving patients with non-cardiac vascular conditions than their counterparts working in publically-funded institutions. Respondents who worked in an institution with a CR program were also significantly more likely to perceive greater importance of CR for outpatient care, as well that their institutions placed great value on the importance of CR for outpatient care, perceived a greater role of CR in reducing re-admissions, and greater value of CR for patients with other vascular conditions within CR, than their counterparts working in publically-funded institutions.

In regards to attitudes regarding CR (also Table 3), overall, respondents strongly agreed that CR programs promote sustained behavioral changes that improve health outcomes, that it is the hospital's responsibility to provide all eligible inpatients with the information they need to begin an outpatient CR program, and that CR programs provide benefits beyond what primary care can offer. They strongly disagreed that they are skeptical about the benefits of CR and that government health insurance should not cover CR services. Respondents who worked in an institution with CR were also significantly more likely to perceive that CR programs promote sustained behavioral changes that improve patients' health outcomes, and less likely to perceive that they do not have enough space to run a program, than their counterparts working in institutions without CR.

Discussion

This was the first study to assess cardiology administrator's perceptions about CR in SA and the Caribbean, to elucidate provider and health system-level factors affecting access and delivery. Respondents perceived that CR is important for outpatient care, with benefits including reduced hospital re-admissions and length of stay, not only for CVD patients but for those with other vascular conditions. Those working in public institutions and in an institution without a CR program may not be as aware of, and less likely to value, CR services.

Most respondents perceived that CR programs should be situated in hospitals and in community centers. Indeed, this would ensure broader access, to both high- and lower-risk outpatients. A study performed in Brazil[25] identified distance as one of the main patient-related barriers to CR participation, hence the availability of CR programs in the community could overcome this barrier.

The majority of respondents perceived that investing in CR is a good use of healthcare dollars; contrarily however, only 13.2% of respondents reported that their institutions have dedicated CR funding. In addition, the majority reported that government Ministries should pay for CR services. To convince payers to support broader CR delivery and service reimbursement, evidence is needed to demonstrate that CR not only improves heart-health behavior and successfully controls risk factors[6], but that it significantly reduces mortality in the SA context. There is a need to perform a randomized controlled trial of CR in LMIC with mortality as an outcome, considering a recent review of CR in LMICs identified only 2 trials, neither of which assessed mortality or were undertaken in SA.[26]

Results from this study are similar to those observed in the study of Canadian administrators.[16] In both studies, respondents valued CR as part of patients' care, and were supportive of greater CR provision. In regards to who should pay for CR, again in both studies the majority reported that government Ministries should pay. In addition, when asked where CR programs should be situated, respondents from both studies mostfrequently reported both hospitals and community settings. Clearly, administrators resoundingly support CR across different contexts and countries.

The chief limitation of this study was selection bias. It is unknown how generalizable the findings are, considering the number of advanced cardiac centers in the region is not known, and that a convenience sample was recruited. This is compounded by the fairly low response rate. However, emerging evidence suggests nonresponse bias may be less impactful than previously thought.[27] Second, the design was cross-sectional and therefore no causal conclusions should be drawn. Third, although previously administered, the items were not validated. Moreover, the translation process may have introduced error and hence caution is warranted in over-interpreting comparisons to the findings reported in the Canadian study. Finally, multiple comparisons were undertaken, which may inflate error rates.

In conclusion, cardiology administrators in SA value CR as part of cardiac patients' care, but funding and availability of programs restrict patient benefit from these services. Administrators and providers working in public institutions and in those without a CR program should be educated about the availability and utility of CR.

All authors have read and approved of the manuscript.

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Table 1: Respondent characteristics, N=55

Characteristic		**n (%)**
Country	Colombia	14 (25.5%)
	Peru	12 (21.8%)
	Brazil	11 (20.0%)
	Cuba	7 (12.7%)
	Chile	3 (5.5%)
	Paraguay	3 (5.5%)
	Uruguay	3 (5.5%)
	Barbados	1 (1.8%)
	Missing	1 (1.8%)
Sex	Female	20 (16.4%)
Institution Funding Source	Public	28 (50.9%)
	Private	27 (49.1%)
Institution Type	Cardiac Centre	26 (47.3%)
	Academic Hospital	20 (36.4%)
	Rehabilitation Institution	11 (20.0%)
	Community Hospital	10 (18.2%)
	Government	3 (5.5%)
Job Title	Coordinator of the Cardiology Department	12 (21.8%)
	Clinical director	9 (16.4%)
	Coordinator of CR Program	8 (14.5%)
	General director	5 (9.1%)
	Cardiologist	5 (9.1%)
	Manager	3 (5.5%)
	Other	13 (23.6%)
Years of service in current role	< 1 year	2 (3.6%)
	1-5 years	24 (43.6%)
	6-10 years	13 (23.6%)
	> 10 years	16 (29.1%)
Primary clinical area	Cardiac	44 (80.0%)
	Non-cardiac specific area	11 (20.0%)
	Surgery	3 (5.5%)
	Sports medicine	1 (1.8%)
	Pulmonary	1 (1.8%)
	Prevention	1 (1.8%)
	Did not specify	5 (9.1%)
Highest level of education	Medical school	33 (60.0%)
	Graduate degree	20 (36.4%)
	Undergraduate degree	2 (3.6%)
Graduation year (mean±SD)		2000.58±11.12

CR indicates cardiac rehabilitation, SD standard deviation.

Table 2: Cardiac Inpatient Unit and CR Program Characteristics, N=55

Characteristic	Response Options	n (valid%)
Cardiac Inpatient Unit		
Cardiac Inpatient Unit at the institution where you work (% yes)		43 (81.1%)
Inpatients' access to CR services	Excellent	15 (34.9%)
	Limited	23 (53.5%)
	Poor	5 (11.6%)
Processes to systematize referral of inpatients to CR (% yes)		27 (62.8%)
Transition to outpatient care for these inpatients on the agenda or discussed at internal meetings at your institution	Often (e.g., monthly)	21 (52.5%)
	Sometimes (e.g., semi-annually)	10 (25.0%)
	Very infrequently to never	9 (22.5%)
Physicians and medical trainees encouraged to refer their inpatients to CR	Yes, systematically	14 (35.0%)
	Yes, although this is not actively promoted or facilitated	21 (52.5%)
	No	5 (12.5%)
CR Program		
CR program at the institution where you work (% yes)		39 (75.0%)
The program has dedicated funding	Yes	5 (13.2%)
	Somewhat	15 (39.5%)
	No	18 (47.4%)
How do you perceive your institutions' perspective on the scope and size of the program	It is fully supported and can manage patient volumes.	20 (50.0%)
	It is under-funded and struggling to provide care to referred patients, but the institution would provide	18 (45.0%)

	more support if funding was available.	
	It is under-funded and struggling to provide care to referred patients, but the institution has no intention to support the program.	2 (5.0%)
Where CR should be situated:	Hospitals	12 (22.6%)
	Community	0 (0.0%)
	Both	37 (69.8%)
	Neither	0 (0.0%)
	Other	4 (7.5%)
The average cost to provide a comprehensive 36-week CR program in South American countries is USD$396 per person if paid by the public healthcare system, or USD$576 if paid out-of pocket. Do you perceive this to be a good use of healthcare dollars?*	Yes	34 (66.7%)
	Moderately	9 (17.6%)
	No	8 (15.7%)
The average cost to the public healthcare system per CR session in South American countries is USD$11 per session if paid by the public healthcare system, or USD$16 per session if paid out-of-pocket. Do you perceive this to be a good use of healthcare dollars?*	Yes	32 (62.7%)
	Moderately	11 (21.6%)
	No	8 (15.7%)
How would you rate an acute care institutions' responsibility for specialized outpatient services?	The full continuum of care should be bundled and included in the patient care map	31 (58.5%)
	The acute care institution is responsible to provide linkages to outpatient	22 (41.5%)

	services for care continuity for the patients we serve	
	Hospitals should focus on acute care only.	0 (0.0%)
Who do you think should pay for CR services?	Ministry of Health Promotion	27 (49.1%)
	Hospitals – ministry-allocated funding envelope	15 (27.3%)
	Patients	14 (25.5%)
	Health insurance companies	13 (23.6%)
	Hospitals – global budget	13 (23.6%)
	Community non-profit agencies	4 (7.3%)
	Foundation	3 (5.5%)
	Community government organizations	3 (5.5%)

CR indicates cardiac rehabilitation.
*Prices described using US Dollars, based on reference 9.

Table 3: Cardiology Administrator's mean CR knowledge, awareness, perceptions, and attitudes regarding CR (±SD), overall, by institution funding, and presence of within-institution CR.

Item	**Institution Funding**		**Presence of within-institution CR‖**		**Total N=55**
	Public (n=28; 50.9%)	**Private (n=27; 19.1%)**	**Yes (n=39; 75.0%)**	**No (n=13; 25.0%)**	
Knowledge and Awareness†					
My knowledge of what CR entails	3.5±0.9	4.3±0.8**	4.0±0.8	3.4±1.0	3.9±0.9
My awareness of the location of the closest CR program to the institution where I am employed	3.9±1.4	4.5±1.0	4.5±0.7***	2.4±1.4	4.0±1.3
In my opinion, my colleagues' level of awareness of CR is	2.±1.3	2.3±1.3	2.8±1.3*	1.9±1.1	2.6±1.2
My awareness of the use of CR by patients in the institution where I am employed	3.5±1.2	3.2±1.6	3.7±1.3**	2.2±1.1	3.3±1.4
Perceptions‡					
Your perceptions of the importance of CR for patients' outpatient care	4.7±0.5	5.0±0.2*	5.0±0.2**	4.5±0.5	4.8±0.4
Your institution's perceptions of the importance of CR for patients' outpatient care	3.9±0.8	4.1±1.1	4.1±1.0*	3.4±0.9	4.0±1.0
Your perceptions of the role of CR programs in reducing patient re-admissions	4.6±0.5	4.8±0.5	4.9±0.4	4.3±0.5**	4.7±0.4
Your perceptions of the role of CR access programs in reducing patient length of stay	4.6±0.5	4.6±1.0	4.7±0.8	4.5±0.5	4.6±0.7
Your perceptions of the value of serving	4.1±0.7	4.6±0.6**	4.5±0.7**	3.9±0.5	4.3±0.7

patients with other vascular conditions within CR programs					
Attitudes regarding CR§					
Ministry funding models are a financial disincentive to CR provision	4.1±1.4	4.0±1.0	4.0±1.3	4.2±1.2	4.0±1.2
Provincial health insurance should not cover CR services for cardiac patients post-hospitalization	1.6±0.5	1.5±0.9	1.5±0.8	1.5±0.9	1.5±0.8
CR programs provide benefits beyond what primary care providers can offer	4.1±1.0	4.6±1.0	4.4±1.0	4.2±0.8	4.4±1.0
I am skeptical about the benefits of CR programs	1.5±1.1	1.0±0.0	1.1±0.3	1.9±1.6	1.3±0.9
The closest available CR program is of good quality	4.2±1.2	3.8±1.2	4.2±1.0	3.9±1.8	4.1±1.2
Scarce healthcare dollars should not be spent on outpatient care at the expense of acute care	2.4±1.3	1.9±0.8	2.2±1.0	1.8±0.8	2.1±1.1
We do not have enough space to run a CR program at my institution	2.1±1.3	2.4±1.5	2.1±1.2	3.7±1.5**	2.4±1.4
CR programs promote sustained behavioral changes that improve their health outcomes	4.7±0.5	4.9±0.4	4.9±3.7*	4.5±0.5	4.8±0.4
CR services are generally one of the first programs to be cut-back when we make budget reductions.	3.6±1.6	3.7±1.3	3.6±1.4	3.6±1.3	3.6±1.4
Patients and their families should be responsible for their own health behaviour changes and risk reduction self-management post-hospitalization	4.0±1.2	4.0±0.9	4.1±1.0	3.9±0.8	4.0±1.0
The government should provide more funding for CR programs	4.6±0.7	4.9±0.3	4.7±0.7	4.5±0.8	4.6±0.7
It is likely that government funding for	4.0±1.2	4.0±1.2	4.0±1.2	3.5±0.9	3.9±1.1

CR programs will be sustained over time					
Healthcare providers on the cardiac floor have other more important clinical duties than to refer patients to CR	2.1±1.3	2.3±1.4	2.1±1.4	2.2±1.1	2.1±1.3
It is the hospital's responsibility to provide all eligible inpatients with the information they need to begin an outpatient CR program.	4.8±0.4	4.6±0.9	4.7±0.7	4.0±1.2	4.6±0.9

CR=cardiac rehabilitation; SD = standard deviation.

*p<.05; **p<.01; ***p<.001.

† Items were scored on a scale from 1 "poor" to 5 "excellent".

‡Items were scored on a scale from 1 "not even considered" to 5 "extremely important"

§Items were scores on a scale from 1 "strongly disagree" to 5 "strongly agree"

‖only 52 participants responded, and hence valid percentages are reported.