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ORIGINAL ARTICLE

Validation of the Physician Attitudes toward Cardiac Rehabilitation and Referral (PACRR) Scale

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Background One of the key drivers of cardiac rehabilitation under-utilisation is physician referral failure. The Physician Attitudes toward Cardiac Rehabilitation & Referral (PACRR) scale was developed to understand factors that impact their referral practices, so they can be ultimately reliably be identified and mitigated. The objectives of this study were to assess the reliability, factor structure, and validity of the PACRR.

Methods Data were retrospectively analysed from three cohorts administering the PACRR, a 19-item scale. The first cohort consisted of 185 cardiologists or family physicians; the second of 51 of the same, and the third of 97 cardiologists. Internal consistency was assessed by Cronbach's alpha, factor structure by confirmatory factor analysis, construct validity by significant differences in PACRR scores by physician specialty, and criterion validity by testing for significant differences in PACRR scores by referral.

Results Cronbach's alpha was 0.81, 0.71, and 0.69 in each of the three cohorts, respectively. Factor analysis in the latter two cohorts revealed four factors: referral norms, preference to manage patients independently of cardiac rehabilitation (CR), perceptions of program quality, and referral processes. Construct validity was established in the first cohort, as significant differences in PACRR scores were found by physician specialty. Criterion validity was supported by significant differences in mean scores by referral in each cohort. Physicians rated bad experiences with CR programs, poor program quality, skepticism of CR benefits and lack of familiarity with local programs as the most important factors that affected their referral to CR.

Conclusions In conclusion, the PACRR scale was demonstrated to have good reliability and validity.

Keywords Physicians' practice patterns • Health knowledge • Attitudes • Practice • Questionnaires • Cardiac rehabilitation

Introduction

Cardiovascular diseases (CVDs) are among the leading burdens of disease and cause of disability worldwide [1,2]. Cardiac rehabilitation (CR) is an outpatient secondary prevention program comprised of structured exercise training and comprehensive education and counselling designed to mitigate this burden [3]. Indeed, participation in CR has been shown to reduce morbidity and mortality by 20%, in a cost-effective manner [4–7]. Despite these well-established benefits and clinical practice guideline recommendations to refer CVD patients [3,8–12], CR is grossly under-used [13].

Previous research has examined the multifactorial reasons utilisation rates are so low, at the health system, physician,

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program and patient levels [14–17]. Given CR use is dependent upon physician referral [18,19] physician factors are key. In our review of the literature on physician factors associated with referral to CR programs, medical specialty, perceptions of patient motivation to attend, familiarity with local programs, automatic referral systems, ease/accessibility of referral forms, and their attitudes toward CR were identified [14]. It has also been well-established that patients are more likely to enrol if physicians strongly and positively endorse the importance of CR participation [20]; this requires positive attitudes about CR services.

Upon a rapid review of the literature, no psychometrically-validated scale to assess physician attitudes toward CR and referral could be found (see below). Our group developed a 19-item scale to assess this, and it has now been administered in three cohorts (results from the scale are presented in two publications for two of the cohorts) [15–18,21]. We have received several requests to use the scale, and although some preliminary validation work has been done [16], clearly there is need to establish its psychometric properties. Hence, the objectives of this study were to assess the reliability, factor structure, and validity (construct and criterion) of the Physician Attitudes toward Cardiac Rehabilitation & Referral (PACRR) scale.

Methods

First, a rapid literature search to identify measures of physician attitudes toward CR was performed with the help of an information specialist. Literature published from database inception until July 2017 was searched in MEDLINE, PsycINFO, Google Scholar and HaPI computerised databases. Search results were downloaded into bibliographic software.

Design

Data from two cross-sectional, observational studies (again, data from one is presented in two papers) [15–17] and one prospective, multi-level study (with data presented in two papers) [18–21] were retrospectively analysed. Ethics approval was obtained for each study, and participants completed a consent form on paper or online. In each study, response rate was optimised through repeated contacts using a modified Dillman approach [22]. The sample size and response rate for each are shown in Table 1.

Cohorts and Associated Procedures

In the first cohort [16,17], a stratified, random sample of physicians who treat patients indicated for CR (i.e., family physicians and cardiac specialists) listed in the Canadian Medical Directory were invited to participate in the study in 2003; 185 consented. Physicians were mailed a survey including the PACRR; please note the survey also included an additional seven items where physicians were asked whether various patient-related factors promoted or discouraged (five-point Likert scale as well) referral (e.g., patient expresses disinterest, patient has arthritis; these were included in the original factor analysis). A case scenario was provided, and physicians were asked whether or not they would refer a hypothetical patient (yes/no) and why. There were also questions to assess training, specialty and practice characteristics.

In the second cohort [15], a random sample of family physicians and cardiac specialists were again recruited from the Canadian Medical Directory, between February and June 2012. Fifty-one (51) consented; of these, there was complete, valid data from 36. Physicians made referral judgments and decisions regarding 32 hypothetical cardiac patients (e.g., would you refer this patient for cardiac rehabilitation, yes or no?) online and completed a questionnaire containing the PACRR, among other items.

In the third cohort [18,21], cardiologists in Ontario, Canada were recruited again through the Canadian Medical Directory in 2005. Ninety-seven (97) consenting cardiologists completed the PACRR. They were also visited by a research assistant to extract a consecutive sample of approximately 20 each of their recent CVD outpatients who were eligible for CR, who were subsequently invited to participate in the study. Cardiac rehabilitation referral and enrolment were ascertained (self-report verified with programs) in these 1,490 consenting patients 9 months later (i.e., prospective design).

Measure: The PACRR Scale

The PACRR was developed to assess CR attitudes among health care providers who refer patients to CR via self-report, which consists primarily of cardiologists, cardiovascular surgeons, internists, primary care physicians and nurse-practitioners. Factors affecting referral were considered through the lens of Anderson's Behavioral Model of Healthcare Utilization [21,23].

Table 1 **Participant Characteristics by Cohort.**

	Cohort 1 [16,17]	Cohort 2 [15]	Cohort 3 [18,21]
N	185	51	97
Response rate	41.8%	5.0%	33.0%
Sex (% male)	105 (56.8%)	30 (58.0%)	32 (85.6%)
Mean years in practice (±SD)	33.0 ± 9.75	22.2 ± 10.4	35.0 ± 8.5
Specialty (% cardiology)	58 (31.4%)	11 (22.0%)	97(100.0%)
Mean patient volume/week (±SD)	75.0 ± 59.2	NR	46.3 ± 33.5

Abbreviations: NR, not reported; SD, standard deviation

Development followed several steps. First, an extensive review of literature was undertaken. The factors affecting physician referral identified formed the basis for item development. Input on the long list of 36 drafted items was solicited from health care professionals with expertise in CR (including family doctors, internists, cardiologists, and cardiovascular surgeons) to ensure content and face validity. Finally, some items were deleted and many others revised based on the input.

The PACRR comprises 19 items to assess physicians' attitudes and beliefs about CR and referral (see Appendix; includes instructions for scale completion to respondents). Response options were 1 = strongly disagree, 2 = agree, 3 = neutral, 4 = agree, and 5 = strongly agree. Five (5) items are reverse-scored to mitigate acquiescence bias (denoted with *), such that higher scores reflect more positive attitudes toward CR and referral. A mean score is computed for the total (where at least 80% of items were completed; i.e., 15/19) scale and subscales. A final open-ended item asks physicians to list the most important factors that influence their decision to refer a patient to CR (not administered in second cohort).

Statistical Analysis

SPSS Version 24.0 (IBM SPSS for Windows, version 24.0, Armonk, NY, USA) was used [24]. Psychometric properties were tested as per the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) taxonomy [25]. In each cohort, first, internal consistency or reliability was assessed by Cronbach's alpha. Values higher than 0.60 were considered acceptable [26].

Second, factor structure observed in the first cohort [16] was assessed for fit in the second [15] and third [18] cohorts using confirmatory factor analysis (again, please note there were an additional seven patient-related items in the original paper not administered in subsequent studies and therefore some differences in factor structure were expected). The main component method for factor extraction was used, considering only those with eigenvalues > 1.0. After the selection of the factors, a correlation matrix was generated, where the associations between items and factors were observed through factor loadings greater than 0.30 on only one factor. The varimax method with Kaiser normalisation was used to interpret the matrix [27].

Finally, two forms of validity were tested. Construct validity was established in the first cohort, as significant differences in PACRR scores were observed by physician specialty (see below) [17]. This was not assessed in the second cohort [15] due to the small sample size, and could not be undertaken in third cohort [18,21] as it consisted of cardiologists only.

Lastly, criterion validity was considered by testing for significant differences in PACRR scores by referral. This was already established in the first and third cohorts (see below). The overall association with the total PACRR was computed using a Student's t-test or Pearson's correlation (number of hypothetical patients referred) in cohorts one and two respectively.

Results

Availability of Other Scales

The literature search for measures of physician attitudes toward CR yielded 537 unique records. Upon consideration of the citations, eight studies were identified. In addition to the five studies being analysed herein [15–18,21], in two papers an unvalidated semi-structured questionnaire was administered [28,29], and, in another, physician attitudes were assessed via an interview in German [30]. Therefore, it can be concluded there are no other validated scales of physician attitudes toward CR and referral available.

Participant Characteristics

The characteristics of physician participants from the three cohorts are described in Table 1. Overall, 318 physicians completed the PACRR, of which 209 (65.7%) were male and 189 (59.4%) were cardiologists.

Psychometric Validation

First, the internal consistency was assessed by Cronbach's alpha in each cohort. Results for cohorts one (without the seven patient-related items), two and three were 0.81, 0.71, and 0.69 respectively.

In regards to factor analysis, the four factors identified in the first cohort (with seven additional patient-related items) were: skepticism/preference to self-manage patients; patient characteristics; site referral processes; and, referral norms. This was assessed for fit in the second and third cohorts. For the second cohort, results from the Kaiser-Meyer-Olkin index (KMO = 0.49) and Bartlett's Sphericity tests ($X^2 = 266{,}154$, $p < 0.001$) indicated that the data were suitable for factor analysis. Four (4) factors were extracted, accounting for 50.4% of the total variance. Factors were generally internally consistent and well-defined by the items. Factor one reflected referral norms, factor two preference to manage patients on own, factor three referral processes, and factor four perceptions of CR quality.

For the third cohort, results from the KMO index (0.64) and Bartlett's Sphericity tests ($X^2 = 458{,}286$, $p < 0.001$) also indicated that the data were suitable for factor analysis. Four (4) factors were also extracted (accounting for 52.2% of the total variance). Again, factors were generally internally consistent and well-defined by the items, with similar factors from cohort two. Table 2 shows the factor loadings for each item, as well as the factors extracted in each cohort, based on loadings greater than 0.30 on only one factor. Cronbach's alpha for the factor subscales are also shown; most are at or above the acceptable threshold.

With regard to construct validity, in cohort one [16] significant differences in PACRR scores by physician specialty were demonstrated. Primary care physicians were more likely to endorse lack of familiarity with CR site locations ($p < 0.001$), lack of standardised referral forms ($p < 0.001$), inconvenience ($p = 0.04$), program quality ($p = 0.004$), and

Table 2 Factor loadings from factor analysis in cohorts 2 and 3.

PACRR Item	Cohort 2 [15]				Cohort 3 [18,21]			
	Factor 1: Referral norms	Factor 2: Preference to self-manage patients	Factor 3: Referral processes	Factor 4: Perceptions of CR quality	Factor 1: Perceptions of CR quality	Factor 2: Referral processes	Factor 3: Preference to self-manage patients	Factor 4: Referral norms
1. Practice guidelines promote referral	0.45							0.54
2. Colleagues generally refer to CR	0.77							0.80
3. Department refers all eligible patients	0.67							0.75
4. Reimbursement policy is disincentive	0.46							0.38
5. Referral completed by other professional	0.37					0.44		
6. Intend to refer patients	0.74							0.41
7. Not familiar with local CR programs		0.41			0.47			
8. Not familiar with non-local CR programs				0.68	0.47			
9. No standard referral for sites closer to home			0.80			0.69		
10. Need help filling out referral forms			0.46			0.78		
11. Inconvenient to make referral				0.30		0.48		
12. Manage patient on his/her own		0.70					0.69	
13. Educational materials in office		0.62					0.88	
14. Prescribe exercise regimen		0.56					0.85	
15. Female patients do not like exercise		0.68			0.52			
16. Skeptical of CR benefits		0.70			0.76			
17. CR program poor quality				0.39	0.86			
18. Bad experience with CR program		0.38			0.85			
19. No patient discharge summaries				0.30	0.40			
Eigenvalue	3.9	2.5	1.7	1.5	4.0	2.3	1.9	1.7
Percentage of variance	20.4%	12.9%	9.0%	8.0%	21.2%	12.1%	10.2%	8.7%
Cronbach's alpha	0.69	0.65	0.55	0.52	0.74	0.55	0.73	0.57

Abbreviations; CR, cardiac rehabilitation

lack of discharge communication from CR ($p < 0.001$) as factors negatively impacting CR referral practices than cardiac specialists. Cardiac specialists were significantly more likely to perceive that their colleagues and department would regularly refer patients to CR than primary care physicians ($p < 0.001$).

Finally, in regard to criterion validity, this was established in cohort one [17]. A hierarchical logistic regression analysis was computed to predict CR referral of the hypothetical patient. After considering sex, specialty, graduation year, patient volume, and CR program availability within 30 minutes the "referral norms" factor of the PACRR was significantly associated with referral of the patient. A t-test was computed to test the association of the total PACRR score to referral of the patient, and it was significant ($t = 5.68$, $p < 0.001$).

In cohort two, a total score summing how many of the 36 hypothetical patients the physician would refer was computed (mean = 35.00 ± 27.08). We then ran a Pearson's correlation to test the association between the total PACRR score and number of patients referred. Results showed that physician attitudes were significantly related to referrals ($r = 0.40$, $p < 0.01$).

Finally, in the third cohort, in one of the publications it was reported that the following PACRR items were associated with verified referral of the cardiologists' actual patients: standard referral in department/practice, intention to refer, standard referral forms, perceptions of the benefits of CR, perceptions of the quality of the CR programs, and experiences with the CR programs [18]. Most of these attitudes sustained adjustment in hierarchical analysis. In the other publications from this cohort, some of these attitudes (i.e., intention to refer, perceptions of CR benefit, and previous experiences with CR) were even associated with patient enrolment [21], demonstrating PACRR items have excellent criterion validity.

Physicians' Attitudes Toward CR and Referral

Table 3 displays the means and standard deviations of each PACRR item in each cohort, as well as total scores. Items generally with the highest scores across all cohorts (i.e., the most important factors) were with regard to: being skeptical about the benefits of CR, poor quality programs available, bad experience with a program, and lack of familiarity with local programs. The least important factors (i.e., items with lowest scores) generally across all cohorts were with regard to: lack of familiarity with programs outside their local area and lack of standardised referral forms.

Physicians were also asked to state the most important factors that affect their referral of patients to CR. In the first cohort, the most common responses were: geographic accessibility (n = 48, 9.5%), perceptions of patient motivation (n = 34, 6.7%), physical characteristics of patients (n = 13, 2.6%), and patient benefit (n = 20, 3.9%), among some other

Table 3 PACRR item scores in each cohort.

Variable	Cohort 1		Cohort 2		Cohort 3	
	Mean	SD	Mean	SD	Mean	SD
1. Clinical practice guidelines promote referral to CR*	4.02	0.78	4.18	0.65	4.11	0.85
2. My colleagues generally refer patients to CR*	3.30	0.99	3.46	0.81	3.76	0.87
3. My department/practice generally refers all eligible patients to CR as a standard of care*	3.30	1.15	3.60	1.16	3.67	0.96
4. Reimbursement policies are a financial disincentive to CR referral	3.29	0.98	4.09	1.44	2.91	1.22
5. Follow-up care, including referral, is handled by another healthcare professional	3.34	1.10	3.40	1.36	3.43	1.07
6. I generally intend to refer patients to CR*	3.96	1.07	4.02	1.14	4.28	0.77
7. I am not familiar with the CR programs in my area	3.93	1.19	4.13	1.21	4.54	0.69
8. I am not familiar with CR sites outside my geographic area	2.56	1.22	3.02	1.57	3.17	1.33
9. There is no standard referral form for CR, making it more effort to refer to sites closest to patients' homes	2.90	1.39	2.76	1.23	3.1	1.43
10. An allied health professional fills out referral forms on my behalf*	2.09	1.03	2.54	1.26	2.26	1.12
11. It is inconvenient to make a referral to CR	3.46	1.14	3.81	1.12	3.71	1.06
12. I prefer to manage my patients' secondary prevention myself	3.51	1.05	3.51	1.14	3.24	1.15
13. I have patient education materials in my office that are sufficient for promoting behavioural change	3.72	0.94	4.02	1.05	3.84	1.05
14. I can prescribe an exercise regimen for my patients myself	3.59	1.03	3.85	1.10	3.73	1.11
15. Female cardiac patients generally don't like to exercise	4.11	0.89	3.96	1.08	3.95	0.98
16. I am skeptical about the benefits of CR	4.48	0.71	4.62	0.64	4.60	0.54
17. The available CR program is of poor quality	4.33	0.82	4.28	0.78	4.44	0.75
18. I have had a bad experience with a CR program	4.39	0.80	4.60	0.88	4.55	0.68
19. The CR program does not provide me with patient discharge summaries	3.93	1.12	3.89	1.34	4.53	0.72
Factor: Skepticism	3.93	0.58	4.10	0.56	4.24	0.54
Factor: Patient characteristics	2.09	1.03	–	–	–	–
Factor: Referral process/CR policies	3.55	0.76	2.62	0.75	3.11	0.54
Factor: Referral norms	3.66	0.78	3.80	0.67	3.77	0.55
Factor: Perceptions of the CR program	–	–	3.75	0.77	3.61	0.86
Total	3.66	0.45	3.78	0.43	3.78	0.38

Items were scored in a range from 1 (strongly agree) to 5 (strongly disagree).

Abbreviations: NA, not applicable; SD, standard deviation; CR, cardiac rehabilitation.

*Reverse-scored items.

responses. In the third cohort the most common responses were: perceptions of patient benefit (n = 22, 5.7%), patient motivation/willingness to participate (n = 18, 4.7%), geographic accessibility (n = 13, 3.4%), and characteristics of the program (such as long wait to start, presence of core components like education; n = 12, 3.1%).

Discussion

Although physician-related factors have been well-established as major barriers to CR utilisation, until now there was no available validated tool to assess these. Herein, the reliability, factor structure, as well as content, face, construct and criterion validities of the PACRR were all established, across several cohorts. Moreover, validity was demonstrated prospectively, with PACRR scores related to not only actual patient referral, but also their subsequent enrolment, thus lending particular credence to the strength of this scale. The four subscales of the PACRR are referral norms, preference to manage patients independently of CR, perceptions of program quality, and referral processes.

The open-ended responses physicians provided were generally reflected well in the PACRR items; this again supports the content and face validity of the PACRR. Researchers may wish to add the following items to the scale: ''I don't refer when my patient expresses disinterest'', and/or ''I don't refer when I perceive my patient is unlikely to enrol'' (as per the patient-related factors our group administered in cohort one). Geographic accessibility should not be a barrier to referral given evidence of benefit of home-based programs. The scale contains items regarding lack of familiarity of sites to which they can refer patients. However, if there is lack of reimbursement of home-based models, lack of physician awareness regarding such models, or limited capacity for home-based services at programs, researchers may wish to add an item such as: ''sometimes my patients live too far from available programs, and there are limited home-based CR offerings''.

The key attitudes related to referral were being skeptical about the benefits of CR, poor quality programs available, and negative experiences with a program. Now that we can reliably measure these, we need interventions to address the issues identified to ensure patients access CR. Strategies such as systematic referral work because they circumvent physician referral failure [18], but standardised interventions to educate providers about CR and its benefits should be developed using rigorous approaches (e.g., intervention mapping) [31] and then be rigorously tested in a randomised trial, as physician encouragement to patients promotes their subsequent enrolment. At a health systems level, these findings reiterate the need for more programs, that are properly-resourced to provide high-quality care.

There are several clinical and policy implications of this research. By understanding the factors that impede physician referral through the PACRR, we can then develop strategies to mitigate them. This may ensure more patients access CR, and hence can achieve the associated benefits of reduced morbidity and mortality. The PACRR could be administered in institutions where CR referral and enrolment rates are low, to reliably and accurately identify the issues impeding utilisation. Institutions could then work with physicians to address identified factors. The PACRR could then be re-administered and referral rates revisited to see if utilisation has increased. However, while it is low-cost to administer a self-report paper-and-pencil scale of only 19 items, feasibility may be limited by low response rates of busy clinicians.

Future research is needed to further establish the psychometric properties of the PACRR. First, in relation to the potential strategies to address low physician referral above, it should be determined whether the scale is sensitive to change (i.e., responsiveness), such as after physician education or changes in referral practices at their institution (e.g., initiation of systematic referrals). Second, there are other measurement properties of the scale that require assessment, such as test-retest reliability. Third, the PACRR should be administered in other health systems and countries than Canada, to ensure it is appropriate and performs well more generally. In addition, the translation and cross-cultural validation of this tool is warranted, in order to understand physicians' attitudes toward CR in different contexts, given the great burden of CVD globally [1,2]. Finally, the interpretability of PACRR scores is low, and this is a limitation of the scale. It would be valuable to have the ability to assign qualitative meaning to scores, such as, for example, a threshold value over which physician scores reflect that they consistently refer their patients.

In conclusion, the PACRR proved to have strong psychometric properties, with evidence of its reliability and validity to assess physicians' attitudes toward CR and referral provided herein. The availability of this tool can enhance our understanding of factors that affect CR referral and management of cardiac patients, which, in turn, could increase identification of impeding factors, and ultimately give rise to actions to overcome them.

Conflict of Interest Statement

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.hlc.2018.07.001.

References

[1] Roth GA, Johson C, Abajobir A, Abd-Allah F, Abera SF, Abyu G, et al. Global, regional, and national burden of cardiovascular diseases for 10 causes, 1990 to 2015. J Am Coll Cardiol 2017;70:1–25.

[2] World Health Organization (WHO). Global health observatory data repository; 2016. http://apps.who.int/gho/data/node.main.

[3] Hamm LF, Sanderson BK, Ades PA, Berra K, Kaminsky LA, Roitman JL, et al. Core competencies for cardiac rehabilitation/secondary prevention professionals: 2010 update: position statement of the American association of cardiovascular and pulmonary rehabilitation. J Cardiopulm Rehabil Prev 2011;31:2–10.

[4] Clark AM, Haykowsky M, Kryworuchko J, MacClure T, Scott J, DesMeules M, et al. A meta-analysis of randomized control trials of home-based secondary prevention programs for coronary artery disease. Eur J Cardiovasc Prev Rehabil 2010;17:261–70.

[5] Davies E, Moxham TI, Rees K, Singh S, Coats AJ, Ebrahim S, et al. Exercise training for systolic heart failure: cochrane systematic review and meta-analysis. Eur J Heart Fail 2010;12:706–15.

[6] Anderson L, Oldridge N, Thompson DR, Zwisler AD, Rees K, Martin N, et al. Exercise-based cardiac rehabilitation for coronary heart disease. J Am Coll Cardiol 2016;67:1–12.

[7] Wood DA, Kotseva K, Connolly S, Jennings C, Mead A, Jones J, et al. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster-randomised controlled trial. Lancet 2008;371:1999–2012.

[8] Smith Jr SC, Benjamin EJ, Bonow RO, Braun LT, Creager MA, Franklin BA, et al. AHA/ACCF secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 update: a guideline from the American heart sssociation and American college of cardiology foundation. Circulation 2011;124:2458–73.

[9] Balady GJ, Ades PA, Bittner VA, Franklin BA, Gordon NF, Thomas RJ, et al. Referral, enrollment, and delivery of cardiac rehabilitation/secondary prevention programs at clinical centers and beyond: a presidential advisory from the American heart association. Circulation 2011;124:2951–60.

[10] Corra U, Piepoli MF, Carre F, Heuschmann P, Hoffmann U, Verschuren M, et al. Secondary prevention through cardiac rehabilitation: physical activity counselling and exercise training: key components of the position paper from the cardiac rehabilitation section of the European association of cardiovascular prevention and rehabilitation. Eur Heart J 2010;31:1967–74.

[11] Piepoli MF, Corra U, Benzer W, Bjarnason-Wehrens B, Dendale P, Gaita D, et al. Secondary prevention through cardiac rehabilitation: from knowledge to implementation: a position paper from the cardiac rehabilitation section of the European association of cardiovascular prevention and rehabilitation. Eur J Cardiovasc Prev Rehabil 2010;17:1–17.

[12] Grace SL, Turk-Adawi K, Contractor A, Atrey A, Campbell N, Derman W, et al. Cardiac rehabilitation delivery model for low-resource settings: an international council of cardiovascular prevention and rehabilitation consensus statement. Prog Cardiovasc Dis 2016;59:303–22.

[13] Chan PS, Oetgen WJ, Buchanan D, Mitchell K, Fiocchi FF, Tang F, et al. Cardiac performance measure compliance in outpatients: the American college of cardiology and national cardiovascular data registry's pinnacle (practice innovation and clinical excellence) program. J Am Coll Cardiol 2010;56:8–14.

[14] Ghisi GL, Polyzotis P, Oh P, Pakosh M, Grace SL. Physician factors affecting cardiac rehabilitation referral and patient enrolment: a systematic review. Clin Cardiol 2013;36:323–35.

[15] Beckstead JW, Pezzo MV, Beckie TM, Shanraki F, Kentner AC, Grace SL. Physicians' Tacit and stated policies for determining patient benefit and referral to cardiac rehabilitation. Med Decis Making 2014;34:63–74.

[16] Grace SL, Evindar A, Abramson BL, Stewart DE. Physician management preferences for cardiac patients: factors affecting referral to cardiac rehabilitation. Can J Cardiol 2004;20:1101–7.

[17] Grace SL, Grewal K, Stewart DE. Factors affecting cardiac rehabilitation referral by physician specialty. J Cardiopulm Rehabil Prev 2008;28:248–52.

[18] Grace SL, Gravely-Witte S, Brual J, Monette G, Suskin N, Higginson L, et al. Contribution of patient and physician factors to CR referral: a prospective multi-level study. Nat Clin Pract Cardiovasc Med 2008;5:653–62.

[19] Ades PA, Waldmann ML, McCann WJ, Weaver SO. Predictors of cardiac rehabilitation participation in older coronary patients. Arch Intern Med 1992;152(5):1033–5.

[20] Tsui CK, Shanmugasegaram S, Jamnik V, Wu G, Grace SL. Variation in patient perceptions of healthcare provider endorsement of cardiac rehabilitation. J Cardiopulm Rehabil Prev 2012;32:192–7.

[21] Grace SL, Gravely-Witte S, Brual J, Monette G, Suskin N, Higginson L, et al. Contribution of patient and physician factors to cardiac rehabilitation enrollment: a prospective multilevel study. Eur J Cardiovasc Prev Rehabil 2008;15:548–56.

[22] Dillman DA. Mail and Internet Surveys; The Tailored Design Method. New York: John Wiley; 2000.

[23] Andersen RM. National health surveys and the behavioral model of health services use. Med Care 2008;46(Jul):647–53.

[24] IBM Corp. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp; 2016.

[25] Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. Qual Life Res 2010;19:539–49.

[26] Kaiser HF. The application of electronic computers to factor analysis. Educ Psychol Meas 1960;20:141–51.

[27] Hair JF, Anderson RE. Multivariate data analysis. New Jersey: Prentice Hall; 1998.

[28] Sarikaya S, Sonel Tur B, Kurtais Y, Uzumcugil Karapolat H, Soyupek F, Hafiz M, et al. The awareness of physicians and allied health professionals about cardiopulmonary rehabilitation: a cross-sectional survey study. Turk Fiz Tip Rehab D 2014;60:S19–24.

[29] Suter PM, Suter WN, Perkins MK, Bona SL, Kendrick PA. Cardiac rehabilitation survey: maintenance of lifestyle changes and perception of program value. Rehabil Nurs 1996;21:192–5.

[30] Vogel H, Faller H, Zimmermann R, Holderied A. Physicians' attitudes regarding medical rehabilitation after acute care in myocardial infarction patients: an empirical investigation in Northern Bavaria. Prev Rehabil 1997;9:139–46.

[31] Bartholomew Eldridge LK, Markham CM, Ruiter RAC, Kok G, Parcel GS, et al. Planning health promotion programs; an Intervention Mapping approach, 4th Edition, San Francisco, CA: Jossey-Bass; 2016.