Original Article

Physician-Related Factors Affecting Cardiac Rehabilitation Referral

Bahieh Moradi, MD, Majid Maleki, MD, FACC, FCAPSC, Maryam Esmaeilzadeh, MD, FACC, FCAPSC*, Hooman Bakhshandeh Abkenar, MD

Echocardiography Research Center, Rajaie Cardiovascular, Medical and Research Center, Tehran University of Medical Sciences, Tehran, Iran.

Received 04 August 2011; Accepted 28 September 2011

Abstract

Background: *Despite the positive impact of cardiac rehabilitation (CR) on quality of life and mortality, the majority of people who could benefit from this program fail to participate in it. The lack of referral from the physician is a common reason that patients give for not seeking CR. The objective of this study was to compare factors affecting CR referral by cardiologists.*

Methods: *A cross-sectional survey of 122 cardiologists, including 89 general cardiac specialists and 33 fellows in cardiology from 11 major cardiology training centers in Iran, was done in 2010. They responded to the 14- item investigator-generated survey, examining the physician's attitudinal and knowledge factors affecting CR referral.*

Results: *47.9% of the subjects reported having available CR centers but only 6.6% reported continuous medical education on the topic. 90.7% of the physicians reported that less than 15% of patients are referred to CR centers. The main factor affecting the low referral rate was limited general knowledge about CR programs (79.5%) such as program attributes and benefits, methods of reimbursement. Lack of insurance coverage, unavailability of CR centers in the community and low physicians' fee were other factors reported by the physicians.*

Conclusion: *Cardiologists' inadequate general knowledge of and attitude toward CR programs seem to be a potential threat for cardiac prevention and rehabilitation in some societies.*

J Teh Univ Heart Ctr 2011;6(4):187-192

This paper should be cited as: Moradi B, Maleki M, Esmaeilzadeh M, Bakhshandeh Abkenar H. Physician-Related Factors Affecting Cardiac Rehabilitation Referral. J Teh Univ Heart Ctr 2011;6(4):187-192.

Keywords: *Cardiovascular diseases • Rehabilitation centers • Referral and consultation • Physicians*

Introduction

According to the World Health Organization definition, cardiac rehabilitation (CR) is a process whereby a person is restored to an optimal physical, psychological, social, emotional, and economic status. Therefore, CR programs consist of risk factor modifications, dietary interventions, psychological supports, exercise training, and education.[1, 2]

CR is divided into four phases, progressing from the acute hospital admission stage to long-term maintenance of lifestyle changes:

Phase I (inpatient period): This stage is started after a 'step change' in cardiac condition; these step changes include myocardial infarction, onset of angina, any emergency hospital admission for coronary heart disease, cardiac surgery or angioplasty and/or stenting, and first diagnosis

*Corresponding Author: ***Maryam Esmaeilzadeh****, Echocardiography Research Center, Tehran University of Medical Sciences, Rajaie Cardiovascular, Medical and Research Center, Vali-Asr Ave. Adjacent to Mellat Park, Tehran, Iran. 1996911151. Tel: +98 21 23922131. Fax: +98 21 22055594. E-mail: meszadeh@rhc.ac.ir.*

of heart failure. This should begin as soon as possible after someone is admitted. The content of phase I CR encompasses assessment, education, and exercise/mobilization.

Phase II (early post discharge): At his stage, exercise consultation and behavior change strategies are advantageous to enhance adherence to both lifestyle change and maintenance of exercise in phase II and uptake of phase III in the future. This is the stage where modification of risk factors will start and the goals set in phase I CR should start to be realized (lasting over a period of between 8 and 12 weeks).

Phase III (supervised outpatient): At this stage, the risk factor changes and education established in the previous phases are continued. The structure of phase III is usually at least two supervised exercise sessions per week, lasting over a period of between 6 and 12 weeks. One session of education per week may be offered. Physical training is often the key component of phase III CR, but psycho-social counseling and education regarding risk factors and lifestyle are important. In addition to the aerobic conditioning phase, resistance training is part of CR exercise. Home-based exercise is also prescribed with self-monitoring skills being used by the patients.

Phase IV (long-term maintenance of exercise and other lifestyle changes): For the benefits of physical activity and lifestyle change to be sustained, the available evidence suggests that both need to be maintained. As clinically indicated, referral to specialist clinicians, such as smoking cessation or psychological support, may still be required. Continuation and progression of appropriate physical activities are encouraged outside the hospital setting. By this time, it is hoped that individuals will be aware of their exercise capabilities and be able to monitor themselves appropriately.

Unfortunately, despite the clarity of the benefits and effectiveness of CR in terms of quality of life and mortality[3-5] and despite the class I indication from the American Heart Association/American College of Cardiology,[6, 7] the majority of people who could benefit from this program fail to participate in it and its underutilization is the major present problem with exercise-based CR.[8-10]

Physician referral and encouragement has been shown to be a strong motivating factor for patients to attend CR. However, attitudes held by physicians toward CR may affect their referral practice. Previous research has shown that CR referral varies according to the type of the provider such that patients receiving care from a cardiac specialist are more likely to be referred. The proportion of patients who are referred to CR varies significantly across studies, ranging from 9% to 74%,[11-23] with the exception of a few studies reporting 100% as a result of having an automatic referral system in place.[24-26] Having a referral does not guarantee participation, as the proportion of patients enrolling as recommended ranges from 11% to 69%.[18-23, 27-31] Attrition from phase II is a serious problem. Of those patients who enroll, 12 - 47% drop out before completing the program.[11, 16, 27, 28, 32, 33] Studies examining gender differences in these processes indicate that women have a significantly lower rate of referral,[11, 12, 34, 35] are less likely to enroll,[4] and drop out before completing phase II [11, 12, 27, 36] compared with their male counterparts.

There are multiple interrelated factors that influence a patient's decision to use CR services. The Healthcare Utilization Model,[37] a widely used behavior model,[29, 24, 38] conceptualizes these factors into environmental and individual categories. The healthcare delivery systems and policies within hospitals and CR programs represent factors within the internal environment. These factors are amenable to improvement. The external environment comprises factors that affect patients' ability to avail themselves of healthcare services, such as where they reside or their access to these services; these factors are not as amenable to change. Individual factors are at the patient and provider level and are composed of 4 categories. Predisposing factors are socio-demographic characteristics and prior experiences with CR. Enabling factors are any skill or resource required to enroll and participate regularly (income, social support, work/personal schedules, transportation, knowledge, attitude, and beliefs). Reinforcing factors strengthen or lessen the motivation for program attendance and adherence (strength of physician endorsement, encouragement and support of healthcare providers, family, and friends). Physicians' and patients' perceptions of need constitute the need factors, which are influenced by the clinical condition, psychological factors, and anticipated benefits of the service. Many of the barriers that arise from these categories present opportunities for healthcare professionals to intervene in an effort to improve rates of CR referral, enrollment, and adherence. This framework will be adapted to synthesize the results of contemporary studies examining environmental-, physician-, and patient-level barriers to CR referral, enrollment, and completion.

Physicians' endorsement of CR is one of the most important predictors of patient participation. In fact, the referral, particularly at the time of discharge, is a powerful predictor of CR attendance.[10, 37-43] It is not exactly clear why some physicians do not routinely refer patients. Be that as it may, underestimation of CR benefits, health professionals' lack of knowledge about exercise training performance in cardiovascular patients, and absence of exercise advocates similar to pharmaceutical representatives may be the contributing factors. Lack of physicians' motivation because they may view CR as a business that offers them no incentive for referring their patients, unavailability of CR programs in the community, difficulty in generating the referral, and reluctance of healthcare professionals are other possible barriers.[10, 39] Also, physicians are less inclined to make referrals if programs are not easily accessible for patients; if the referral process is complicated; if they are unclear

about who has the responsibility for making the referral (cardiologists, surgeons, or primary care physicians); or if the practice norm of physicians, nurses, and other healthcare professionals fails to embrace the expectation that all eligible patients should receive a referral.

Despite the absence of clear statistics, it seems that patients' participation in CR programs in developing countries is very low. Cardiologists and cardiac surgeons have the primary role in patients' referral. Furthermore, physicians' attitudes toward and knowledge of CR may affect their referral practices. We, therefore, aimed to define the factors affecting low CR referral by post-graduate cardiologists.

Methods

The protocol for this cross-sectional study was approved by the institutional Review Board. All new graduated general cardiologists and different fellows in cardiology in Iran in 2010, including 70 men and 52 women, were targeted in this study. A questionnaire was developed on the basis of an extensive literature review and input from cardiologists with expertise in CR before piloting. The survey included socio-demographic items, i.e. sex, age, size of practice location, and university expertise in cardiology training. Also, the study included 14 investigator-developed items which were scored on a 5-point Likert-type scale. The first four items asked about general knowledge about CR (definition, phases, indications, and duration). The next item inquired about the physician's attitude toward the effects of CR on mortality. The next four items asked which patient characteristics influenced the physician's referral practices (e.g., patient/family's request, patient's age, type of disease, and risk status); response options ranged from "strongly encourages" to "strongly discourages". The four items that followed sought to elucidate factors affecting the physician's referral practices (CR costs, insurance coverage, etc.); sample items included "My colleagues generally refer patients to CR", "I prefer to manage my patients' secondary prevention myself", and "The CR program does not provide me with patient discharge summaries". Here, response options ranged from "strongly agree" to "strongly disagree". The final item, in an open-ended fashion, asked about the most important factors that influenced the physician's decision to refer a patient to CR or not to do so and what percentage of the patients was referred by the physician himself or herself.

The construct validity of the questionnaire was investigated via factor analysis using the principle component method.

Qualitative responses generated by the physicians were coded. Finally, the chi square test, Fisher exact test, Mann Whitney U test, and Student t-test were employed to test significant differences between the two groups of physicians. Data analyses were performed using SPSS 19 for Windows CSPSS Inc., Chicago, Illinois). P value less than 0.05 was considered statistically significant.

Results

The participants' characteristics are shown in Table 1. Of the 122 responding physicians, 73% were general cardiac specialists and the other 27% were fellows in cardiology. They were graduated from 9 medical schools throughout the country, 42.6% of them were female, and all of them had urban practice experience.

A total of 47.9% of the respondents reported having available CR centers but only 6.6% reported regular medical education on the topic. Additionally, 90.7% of the physicians reported less than 15% patient referral to CR centers. The duration of post-graduation employment and the number of visited patients per week in the group of fellows were more than those in the group of general cardiologists; there was, however, no significant difference with respect to the reported factors between the two groups. The referring rate was not significantly different between the two groups of general cardiologist and fellows.

As regards the most important factors affecting referral to CR, most of the participants (79.5%) believed that the main factor was low general knowledge about CR programs such as program attributes, benefits, nature of the referral process, and CR as the standard of care. The other factors reported were as follows: lack of availability of CR centers in the community and low geographic accessibility (5.3%); lack of insurance coverage, methods of reimbursement, and low physician fees (7%); and patient's motivation, quality of the CR program, and patient's medical characteristics (i.e., obesity, sedentary lifestyle, and type of cardiac diagnosis) (Table 2).

Table 1. Characteristics of physician respondents

Characteristics	General Cardiac Specialists (n=89)	Fellow in Cardiology (n=33)	Total (n=122)
Age (y)	35.6±7.3	37.9±4.4	36.3±6.6
Female	38(42.7)	14(42.4)	52(42.6)
Post graduate employment (y)	1.0±0.5	6.4±3.7*	3.2±2.4
Number of visited patients / week	74.3±20.1	115.6±25.0**	95.4±15.7

Data are Presented as mean±SD or n(%)

P value < 0.05 was considered significant

*P < 0.01 **P < 0.001

Table 2. The reported reasons for low cardiac rehabilitation referral

Low general knowledge about CR	79.5
Lack of availability of CR centers	5.3
Insurance uncoverage	3.6
Methods of reimbursement, and low physician fees	3.4
Patient motivation	2.9
Medical characteristics of patients	2.3
Cardiac disease	1.5
Low quality of the CR programs	1

Data are presented as percentage

CR, Cardiac rehabilitation

Discussion

Participation in CR is associated with reductions in mortality and recurrent myocardial infarction and improvement in quality of life. Many researches and meta-analyses of randomized clinical trials of exercise-based CR have demonstrated that participation in CR is associated with significant reductions in both all-cause mortality and cardiac-specific mortality.[3-5] Despite these proven cost-benefits of CR, however, previous studies from predominantly single centers within the U.S. reported referral rates of less than 25% to 30%.[44-46] Brown et al. reported that in 35% of hospitals, less than 20% of eligible patients were referred, while only one-third referred over 60%.[39]

The present study is the first of its kind to examine a comprehensive list of physician-related factors affecting CR referral in Iran. Although the overall results confirm those having been presented in the literature to date, unfortunately this study shows that the referral rate for Iranian physicians is less than the previously published rates. Whether this lack of endorsement is due to time constraints during healthcare visits, negative physicians' perceptions of CR, or perception that other healthcare providers should provide such endorsement is unknown.

It has been established that different types of providers have different rates of CR referral. The present study compared the referral rates between two groups of physicians who were different in terms of post graduation and employment. Knowledge about CR programs and awareness of CR site locations in our cardiology fellows was less than that in our newly graduated general cardiac specialists. Therefore, it is integral to examine physicians' perceptions of factors affecting their referral practices.

There has been a great deal of discussion on this issue in the existing literature. Nonetheless, intervention is required to ensure that physicians endorse CR to patients. It is vitally important that awareness be heightened among physicians regarding the importance of CR endorsement. Indeed, advice coming from the cardiologist is more likely to be heeded than advice from other healthcare providers. Such endorsement could be included in cardiac care maps for example, or as an order for all cardiac patients.[47] As Marques-Vidala indicated in a short report from Europe, post-graduate courses on cardiovascular prevention and rehabilitation are infrequent and the topics covered vary considerably.[48] Setting these courses providing adequate accredited training in cardiovascular prevention and rehabilitation would be of great benefit. We believe that international and national cardiac health organizations and societies through regular congress and meeting programs can effectively enhance motivation and knowledge among physicians. Referral promotion to preventive care should include provision of information on CR site location. CR centers should have online directories of CR programs and locations, with program and contact information. Perhaps incorporation of geographic information system software into these directories could enable cardiologists to enter the patient's postal code to locate the closest CR center. This could also include a link to the corresponding CR referral form for the physician's convenience and referral ease. Moreover, non physician-related factors that lead to low CR referral such as low quality of the CR programs, methods of reimbursement, low physician fees, and lack of insurance coverage should be yielded to private and governmental health care systems.

Conclusion

CR programs have evidence-based beneficial effects for cardiac patients; still, only less than 15% of the patients eligible for CR are referred to rehabilitation centers by cardiologists in Iran. Low general knowledge about CR programs such as program attributes and benefits, nature of the referral process, lack of availability of CR centers in the community, low geographic accessibility, and some healthcare-system-related factors were the most important reasons reported by the cardiologists in the present study.

Acknowledgments

We would like to thank the colleagues who responded to the questionnaires. Also, we have special thanks to Ms. Leila Sari (for cooperation on data collection), Mr. Behrouz Shahnaz (for cooperation in manuscript writing), and Ms. Husseini (for cooperation in statistical analysis).

References

1. Brown RA. Rehabilitation of patients with cardiovascular disease. Report of WHO Expert Committee. World Health Organ Tech Rep Ser 1964;270:3-46.
2. No authors listed. Rehabilitation after cardiovascular disease with special emphasis on developing countries. World Health Organ Tech Rep Ser 1993;831:1-122.
3. Taylor RS, Brown A, Ebrahim S, Jolliffe J, Noorani H, Rees K,

Skidmore B, Stone JA, Thompson DR, Oldridge N. Exercise-based rehabilitation for patients with coronary heart disease: systematic review and meta analysis of randomized controlled trials. Am J Med 2004;116:682-692.
4. Witt BJ, Jacobsen SJ, Weston SA, Killian JM, Meverden RA, Allison TG, Reeder GS, Roger VL. Cardiac rehabilitation after myocardial infarction in the community. J Am Coll Cardiol 2004;44:988-996.
5. Stukel TA, Alter DA. Analysis methods for observational studies: effects of cardiac rehabilitation on mortality of coronary patients. J Am Coll Cardiol 2009;54:34-35.
6. Thomas RJ, King M, Lui K,Oldridge N, Ileana LP, Spertus J, Masoudi FA, DeLong E, Erwin III, PJ, Goff Jr, DC, Grady K, Green LA, Heidenreich PA, Jenkins KJ, Loth AR, Peterson ED, Shahian DM. Performance Measures on Cardiac Rehabilitation for Referral to Cardiac Rehabilitation/Secondary Prevention Services A Report of the American Association of Cardiovascular and Pulmonary Rehabilitation and the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures. J Am Coll Cardiol. 2010;56;1159-1167.
7. European Association of Cardiovascular Prevention and Rehabilitation Committee for Science Guidelines; EACPR, Corrà U, Piepoli MF, Carré F, Heuschmann P, Hoffmann U, Verschuren M, Halcox J; Document Reviewers, Giannuzzi P, Saner H, Wood D, Piepoli MF, Corrà U, Benzer W, Bjarnason-Wehrens B, Dendale P, Gaita D, McGee H, Mendes M, Niebauer J, Zwisler AD, Schmid JP. Secondary prevention through cardiac rehabilitation: physical activity counseling and exercise training. Eur Heart J 2010;31:1967-1974.
8. Scott IA, Lindsay KA, Harden HE. Utilisation of outpatient cardiac rehabilitation Queensland. Med J Aust 2003;179:341-345.
9. Bunker SJ, Goble AJ. Cardiac rehabilitation: underreferral and underutilisation. Med J Aust 2003;179:332-333.
10. Parkosewich JA. Cardiac rehabilitation barriers and opportunities among women with cardiovascular disease. Cardiol Rev 2008;16:36-52.
11. Caulin-Glaser T, Blum M, Schmeizl R, Prigerson HG, Zaret B, Mazure CM. Gender differences in referral to cardiac rehabilitation programs after revascularization. J Cardiopulm Rehabil 2001;21:24-30.
12. Halm M, Penque S, Doll N, Beahrs M. Women and cardiac rehabilitation: referral and compliance patterns. J Cardiovasc Nurs 1999;13:83-92.
13. Grace SL, Evindar A, Kung T, Scholey P, Stewart DE. Increasing access to cardiac rehabilitation: automatic referral to the program nearest home. J Cardiopulm Rehabil 2004;24:171-174.
14. Grace SL, Abbey SE, Shnek ZM, Irvine J, Franche RL, Stewart DE. Cardiac rehabilitation II: referral and participation. Gen Hosp Psychiatry 2002;24:127-134.
15. Gallagher R, McKinley S, Dracup K. Predictors of women's attendance at cardiac rehabilitation programs. Prog Cardiovasc Nurs. 2003;18:121-126.
16. King KM, Humen DP, Smith HL, Phan CL, Teo KK. Predicting and explaining cardiac rehabilitation attendance. Can J Cardiol 2001;17:291-296.
17. Allen JK, Scott LB, Stewart KJ, Young DR. Disparities in women's referral to and enrollment in outpatient cardiac rehabilitation. J Gen Intern Med 2004;19:747-753.
18. Blackburn GG, Foody JM, Sprecher DL, Park E, Apperson-Hansen C, Pashkow FJ. Cardiac rehabilitation participation patterns in a large, tertiary care center: evidence for selection bias. J Cardiopulm Rehabil 2000;20:189-195.
19. Barber K, Stommel M, Kroll J, Holmes-Rovner M, McIntosh B. Cardiac rehabilitation for community-based patients with myocardial infarction: factors predicting discharge recommendation and participation. J Clin Epidemiol 2001;54:1025-1030.
20. Bittner V, Sanderson B, Breland J, Green D. Referral patterns to a university-based cardiac rehabilitation program. Am J Cardiol 1999;83:252-255.
21. Evenson KR, Rosamond WD, Luepker RV. Predictors of outpatient cardiac rehabilitation utilization: the Minnesota Heart Surgery Registry. J Cardiopulm Rehabil 1998;18:192-198.
22. Harlan WR, 3rd, Sandler SA, Lee KL, Lam LC, Mark DB. Importance of baseline functional and socioeconomic factors for participation in cardiac rehabilitation. Am J Cardiol 1995;76:36-39.
23. Husak L, Krumholz HM, Lin ZQ, Kasl SV, Mattera JA, Roumanis SA, Vaccarino V. Social support as a predictor of participation in cardiac rehabilitation after coronary artery bypass graft surgery. J Cardiopulm Rehabil 2004;24:19-26.
24. Grace SL, Evindar A, Kung TN, Scholey PE, Stewart DE. Automatic referral to cardiac rehabilitation. Med Care 2004;42:661-669.
25. Smith KM, Harkness K, Arthur HM. Predicting cardiac rehabilitation enrollment: the role of automatic physician referral. Eur J Cardiovasc Prev Rehabil 2006;13:60-66.
26. Grace SL, Scholey P, Suskin N, Arthur HM, Brooks D, Jaglal S, Abramson BL, Stewart DE. A prospective comparison of cardiac rehabilitation enrollment following automatic vs usual referral. J Rehabil Med 2007;39:239-245.
27. O'Farrell P, Murray J, Huston P, Le Grand C, Adamo K. Sex differences in cardiac rehabilitation. Can J Cardiol 2000;16:319-325.
28. Gallagher R, McKinley S, Dracup K. Predictors of women's attendance at cardiac rehabilitation programs. Prog Cardiovasc Nurs 2003;18:121-126.
29. Allen JK, Scott LB, Stewart KJ, Young DR. Disparities in women's referral to and enrollment in outpatient cardiac rehabilitation. J Gen Intern Med 2004;19:747-753.
30. Farley RL, Wade TD, Birchmore L. Factors influencing attendance at cardiac rehabilitation among coronary heart disease patients. Eur J Cardiovasc Nurs 2003;2:205-212.
31. Filip J, McGillen C, Mosca L. Patient preferences for cardiac rehabilitation and desired program elements. J Cardiopulm Rehabil 1999;19:339-343.
32. Sanderson BK, Bittner V. Women in cardiac rehabilitation: outcomes and identifying risk for dropout. Am Heart J 2005;150:1052-1058.
33. Sanderson BK, Phillips MM, Gerald L, DiLillo V, Bittner V. Factors associated with the failure of patients to complete cardiac rehabilitation for medical and nonmedical reasons. J Cardiopulm Rehabil 2003;23:281-289.
34. Bongard V, Grenier O, Ferrières J, Danchin N, Cantet C, Amelineau E, Cambou JP. Drug prescriptions and referral to cardiac rehabilitation after acute coronary events: comparison between men and women in the French PREVENIR Survey. Int J Cardiol 2004;93:217-223.
35. Norris CM, Jensen LA, Galbraith PD, Graham MM, Daub WD, Knudtson ML, Ghali WA. Referral rate and outcomes of cardiac rehabilitation after cardiac catheterization in a large Canadian city. J Cardiopulm Rehabil 2004;24:392-400.
36. Norris CM, Jensen LA, Galbraith PD, Graham MM, Daub WD, Knudtson ML, Ghali WA. Predictors of drop-out from an outpatient cardiac rehabilitation programme. Clin Rehabil 2007;21:222-229.
37. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav 1995;36:1-10.
38. Sanderson BK. The ongoing dilemma of utilization of cardiac rehabilitation services. J Cardiopulm Rehabil 2005;25:350-353.
39. Brown TM, Hernandez AF, Bittner V, Cannon CP, Ellrodt G, Liang L, Peterson ED, Piña IL, Safford MM, Fonarow GC; American Heart Association Get With The Guidelines Investigators. Predictors of cardiac rehabilitation referral in coronary artery disease patients. J Am Coll Cardiol 2009;54:515-521.
40. Grace SL, Krepostman S, Brooks D, Jaglal S, Abramson BL, Scholey P, Suskin N, Arthur H, Stewart DE. Referral to and discharge from cardiac rehabilitation: key informant views on continuity of care. J Eval Clin Pract 2006;12:155-163.
41. Scott LB, Allen JK. Providers' perceptions of factors affecting women's referral to outpatient cardiac rehabilitation programs: an

exploratory study. J Cardiopulm Rehabil 2004;24:387-391.
42. Grace SL, Grewal K, Stewart DE. Factors affecting cardiac rehabilitation referral by physician specialty. J Cardiopulm Rehabil 2008;28:248-252.
43. Sharp J, Freeman C. Patterns and predictors of uptake and adherence to cardiac rehabilitation. J Cardiopulm Rehabil Prev 2009;29:241-247.
44. Papadakis S, Reid RD, Coyle D, Beaton L, Angus D, Oldridge N. Cost-effectiveness of cardiac rehabilitation program delivery models in patients at varying cardiac risk, reason for referral, and sex. Eur J Cardiovasc Prev Rehabil 2008,15:347-353.
45. Ades PA, Waldmann ML, Polk DM, Coflesky JT. Referral patterns and exercise response in the rehabilitation of female coronary patients aged-62 years. Am J Cardiol 1992;69:1422-1425.
46. Barber K, Strommel M, Kroll J, Holmes-Rovner M, McIntosh B. Roblin D, Diseker RA III, Orenstein D, Wilder M, Eley M. Delivery of outpatient cardiac rehabilitation in a managed care organization. J Cardiopulm Rehabil 2004;24:157-164.
47. Comoss P. Improving utilization of cardiac rehabilitation services where to start? J Cardiovasc Nurs 2008;23:480-481.
48. Marques-Vidal P, Saner H. Postgraduate teaching of cardiovascular prevention and rehabilitation in Europe: first results. Eur J Cardiovasc Prev Rehabil 2010;17:613-614.