

ORIGINAL RESEARCH

Physical activity in women after an acute myocardial infarction

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ABSTRACT

Background: Physical activity is recognized as being important in reducing mortality after an acute myocardial infarction. The study aimed to describe younger and older women's leisure time physical activity after an acute myocardial infarction, their motivations and barriers for engaging in physical activity and to assess aspects associated with referral and attendance in cardiac rehabilitation programmes.

Methods: Women diagnosed with an acute myocardial infarction were consecutively recruited and answered a questionnaire 2-3 months after hospital discharge.

Results: The majority of the respondents (86%) were physically active after their acute myocardial infarction and 34% were physically active ≥ 4 days a week for ≥ 30 minutes. Respondents ≥ 66 years were less likely than respondents < 66 years to report moderate physical activity (39% vs. 58%, $p = .03$) and more likely to report low physical activity (27% vs. 8%, $p < .01$). No differences were found between these age groups reporting high physical activity (34% vs. 34%). Respondents ≥ 66 years were also less likely than younger respondents to maintain or increase their physical activity after the acute event (59% vs. 76%, $p < .01$), to be informed about the significance of physical activity while in hospital (61% vs. 80%, $p = .01$), to be referred to a cardiac rehabilitation programme (49% vs. 75%, $p \leq .01$) and to attend such a programme (30% vs. 65%, $p < .01$).

Conclusions: Women's age was associated with physical activity as well as their possibilities regarding cardiac rehabilitation after an acute myocardial infarction.

Key Words: Myocardial infarction, Physical activity, Women

1. INTRODUCTION

Women who have recovered from an acute myocardial infarction (AMI) are at high risk for new cardiac events and premature death, and within six months the mortality rate is approximately 12%.^[1] There has been a decline in coronary mortality since the 1980's, with approximately 50% being attributed to a reduction in major risk factors, while the other half to treatment.^[2] Physical activity is recognized as being important in reducing mortality after an AMI, and sedentary

lifestyle during leisure time has been reported to be independent predictive of all-cause and cardiovascular mortality.^[3-5] After an acute event patients need support to maintain or improve functional capacity and to adopt a healthy lifestyle.^[3] International guidelines recommend a minimum of 30 minutes physical activity of moderate intensity, such as brisk walking, on most days of the week, or at least three to four times per week.^[3,6] In a large cohort study women with coronary disease who exercised for more than half an hour a

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day had a nearly 50% lower mortality than those who were inactive.^[4] It has been debated whether an extreme level of physical activity is recommended, and concerning this aspect a large prospective study reported increased mortality in patients with daily strenuous physical activity.^[7] Apart from its influence on mortality, physical activity might improve physical capacity, cardio respiratory fitness and a perception of well-being, even in elderly patients.^[1] Moreover, it could reduce the anxiety associated with a life-threatening illness, in addition to improving self-confidence.^[11,8] Information about physical activity is usually provided by health personnel before hospital discharge, and further counseling and exercise training is an important part of cardiac rehabilitation (CR) programmes.^[9] The application of CR to elderly patients has gained an increasing acceptance, and its benefits and safety have been documented.^[10] In spite of this fact, CR is vastly underutilized in the elderly, and particularly in women.^[3,11,12] A fear that physical training may not be safe, other than for patients at low risk, has led to many patients being excluded from CR programmes, even though the risk of a cardiovascular event is considered low after both high-intensity- and moderate-intensity exercise in a CR setting.^[9,13] No generalizable recommendations can be made regarding the time for the resumption of daily activities, and decisions should be individualized, and based on left ventricular function, completeness of revascularization and rhythm control.^[1] It has been well documented that the positive physiological and clinical effects of exercise can only be maintained if physical activity is performed throughout one's entire life,^[14] and maintaining regular moderate physical activity is an important aim of secondary prevention.^[3] Knowledge about women's leisure time physical activity after an AMI is limited.

The aims of the study were to describe younger and older women's physical activity after an AMI, their motivations and barriers for engaging in physical activity and to assess aspects associated with referral and attendance in CR programmes.

2. METHODS

2.1 Design

A cross-sectional study was conducted over a 15-months period in 2012 and 2013. All women diagnosed with acute myocardial infarction, ST-segment elevation (STEMI) and non ST-segment elevation (NSTEMI), and discharged from the coronary care units in two Norwegian hospitals were invited to participate. The diagnosis of AMI was based on the definition according to European Society of Cardiology guidelines.^[1]

2.2 Data collection and participants

Eligible patients were consecutively registered by a research assistant at each hospital, and an invitation to participate and a written consent form were distributed 2-3 months after hospital discharge. Potential participants were informed that they could withdraw at any time and no incentive for participation was provided. When agreeing to participate, a questionnaire was distributed to the respondents. Included in the study were 142 respondents. Furthermore, the study conformed to the principles outlined in the Declaration of Helsinki and was approved by the Regional Ethics Committee for Medical Research in Norway.

2.3 Measures

The self-reported questionnaire was developed for this study and included information provided by health professionals while in hospital, physical activity level, motivations and barriers to physical activity, aspects associated with referral to and attendance in CR programmes and socio-demographics. Regarding information while in hospital they were asked whether a nurse or a physician had informed them about the significance of physical activity, or whether they had received a written pamphlet concerning this information. Concerning their motivations for being physical active, the respondents were requested to consider the following seven statements: "My physician told me to", "I do it for my own health", "it makes me happy", "it is a great way of being with others", "I see myself as an active person", "it gives me a sense of achieving something" and "it is essential for my wellbeing". Response options concerning these statements were "totally agree", "partially agree", "partially disagree" and "totally disagree". In a reliability test the internal consistency of these statements in the current study showed a Chronbach's Alpha of 0.79. Further, they were requested to assess whether their current physical activity were "maintained", "increased" or "reduced", compared to the time before the AMI. Respondents who reported reduced physical activity after the AMI were additionally presented 15 statements concerning barriers associated with this reduction. These statements included five barriers concerning their health, five barriers concerning their attitudes toward physical activity and five barriers concerning their access to activity centres. They were requested to consider these statements given the response options "very important", "quite important" and "not important". In a reliability test the internal consistency of the statements concerning this item in the current study showed a Chronbach's Alpha of 0.74. Further, they were requested to assess whether their physical activity after the AMI was "similar", "higher" or "lower" compared to other women of the same age. These four preceding items about physical activity have been used in a well-established Norwegian health

survey,^[15] and the remaining eight items were developed by the researchers for this study. They were asked to specify in what way they were physical active, and further to state whether they performed this activity for ≥ 30 minutes or < 30 minutes. To measure how often they were physically active for ≥ 30 minutes, they were given seven response options between “< once a month” and “daily”, as used in a population study measuring physical activity among adults.^[16] They were informed that this activity did not include house work. High physical activity was defined as ≥ 30 minutes activity ≥ 4 days a week, medium physical activity as ≥ 30 minutes activity 1-3 days a week and low activity as ≥ 30 minutes \leq three days a month. Further the respondents were requested to state whether they had been referred to a CR programme, and additionally, whether they had attended such a programme. Moreover, the respondents who had not attended any programme were asked about their reasons for non-attendance. The following six alternatives concerning non-attendance were presented; “transportation problems”, “the programme did not fit me”, “not being referred”, “health problems”, “family obligations” and “time is not enough”, allowing additional alternatives. The selected alternatives were based on previous research.^[14] Socio-demographics included age, marital status, education level and residence (rural or urban). Moreover, to test the user-friendliness and face validity regarding the questionnaire, a pilot study was conducted in 12 women (with no AMI diagnose) between the ages of 60 and 90 years. As these women assessed the questions to be clear and easy to understand, no changes were made in the questionnaire.

2.4 Statistical analyses

The analyses were conducted with SPSS for Windows version 20^[17] and two-tailed chi square tests were used to compare patient characteristics. Logistic regression analyses were performed to analyze the relationship between multiple independent variables and a categorical dependent variable. In these regression analyses the age variable was dichotomized into “< 66 years” and “ ≥ 66 years”, and education level was dichotomized into high (\geq high school) and low (primary school). Regression analyses were performed to assess how the respondents’ age and education (independent variables) were associated with the following dependent variables: whether they had received information while in the hospital, levels of physical activity (high, medium and low), whether they had been referred to any CR program and whether they had attended any CR program. In these analyses adjustments were made for whether they had a rural or an urban residence in addition to their marital status. Logistic regression analyses were also performed to assess how age was associated with whether they had increased/maintained

or decreased their physical activity after the AMI, adjusted for education level, marital status, residence and level of physical activity. The results were expressed as an Odds Ratio (OR) and a 95% Confidence Interval (CI). Lastly, p values $< .05$ or a 95% CI that excluded the null value were considered statistically significant.

3. RESULTS

3.1 Characteristics of study objects

The respondents’ mean (SD) age was 66.3 (11.62), median age 65 years, the 25% percentile 58 years and the 75% percentile 75.25 years. The majority were married or cohabiting, and had a low education level (see Table 1).

Table 1. Socio demographic characteristics among women after an AMI

Characteristics	n = 142 (%)
Age	
<55 years	22 (15)
56-65 years	49 (35)
66-75 years	36 (25)
> 75 years	35 (25)
Married/cohabiting	86 (61)
Education	
primary school	83 (59)
high school	26 (18)
university/college	33 (23)
Residence	
urban	68 (48)
rural	74 (52)

3.2 Information while in hospital

More than two-thirds of the respondents (70%) were informed about the importance of physical activity while in the hospital, and regression analyses showed that respondents 66 years and older were significantly less likely than younger respondents to report being informed (see Table 2). When performing analyses based on four age groups, information received by the youngest age group (< 55 years) was 87% compared to 54% ($p = .04$) among the oldest age group (> 75 years). There were no differences regarding education level.

3.3 Physical activity

A majority of the respondents (86%) reported that they were physically active after their AMI, and that their predominant activity was walking (80%). Respondents 75 years and younger were more likely than respondents older than 75 years to report walking (85% vs. 67%, $p = .01$). The three most commonly reported motives for being physically active and graded as “very/ quite important” were: “I do it for my health” (75%), “It makes me happy” (68%) and “It is essen-

tial for my wellbeing” (64%). The majority of the respondents (68%) reported that they had increased or maintained their physical activity level after the AMI, and most likely among respondents younger than 66 years (76% vs. 59%, $p < .01$). In a regression analysis respondents < 66 years was more than four times more likely than older respondents (≥ 66 years) to maintain or increase their physical activity after the AMI (OR. 4.50, CI. 1.79-11.35). Among respondents ≥ 65 years 41% reported that they had reduced their physical

activity level after the AMI, compared to 24% among respondents < 65 years ($p = .03$). Among these respondents ($n = 49$), the four most commonly reported barriers to physical activity were “having health problems” (45%), “I need more rest” (37%), “have no companion” (20%) and “no suitable activity options”(18%), all graded as “very important” barriers. When the respondents were asked to compare their own activity to other women of the same age, 59% assessed their physical activity as similar as or higher than other women.

Table 2. Information received by women with an AMI while in hospital, referral and attendance in CR programs and differences between two age groups. Odds ratio(OR) and 95% Confidence Interval (CI)

	< 66 years n = 71 (%)	≥ 66 years n = 71 (%)	OR (CI)
Information in hospital	57 (80)	43 (61)	0.34 (0.16-0.74)
Referral to a CR program	53 (75)	34 (49)	0.26 (0.12-0.56)
Attending a CR program	46 (65)	21 (30)	0.22 (0.10-0.48)

Note. Logistic regression analyses adjusted for education, marital status, residence and physical activity level.

High physical activity (≥ 30 minutes ≥ 4 days a week) was reported by 34% of the respondents, medium physical activity (≥ 30 minutes 1-3 days a week) by 49% and low activity (≥ 30 minutes ≤ 3 days a month) by 18% (see Table 3). Respondents with high education were five times more likely than those with a lower education level to report high physical activity (77% vs. 51%, OR.5.15, CI. 1.83-14.47). Respondents < 66 years were significantly more likely to report medium physical activity than older respondents (≥ 66 years), however, no significant difference was found in reported high physical activity. Respondents < 66 years were

also significantly less likely than older respondents to report low activity (see Table 4).

Table 3. Frequency of physical activity for ≥ 30 minutes among women after an AMI

	n = 142 (%)
< once a month	23 (16)
1-3 days a month	2 (1)
Once a week	11 (8)
2-3 days a week	58 (41)
4-6 days a week	26 (18)
Daily	22 (16)

Table 4. Physical activity among women after an acute MI and differences between two age groups. Odds Ratio (OR) and 95% Confidence Interval (CI)

	< 66 years n = 71 (%)	≥ 66 years n = 71 (%)	OR(CI)
High physical activity	24 (34)	24 (34)	0.99 (0.96-1.03)
Medium physical activity	41 (58)	28 (39)	0.95 (0.92-0.98)
Low activity	6 (8)	19 (27)	3.36 (1.23-9.20)

Note. logistic regression adjusted for education, residence and marital status

3.4 Referral to and attendance in CR programmes

Almost two-thirds (62%) of the respondents had been referred to at least one CR programme, and 47% reported that they had attended such a programme. Respondents who were 66 years and older were significantly less likely than younger respondents to be referred to a CR programme as well as to attend a CR programme (see Table 2). When analyzing attendance among those who had been referred to CR ($n =$

88) age differences were also statistically significant, as 85% of the respondents 66 years and younger and 60% of the respondents 66 years and older had attended a CR programme ($p < .01$). Among non- attendees, the most commonly reported reasons for no-attendance were “not being referred to a CR programme” (55%), “transportation problem” (17%), “the programme did not fit me” (13%) and “health problems” (12%). Among respondents reporting transportation prob-

lems as a reason of non-attendance a significant aspect was residence, as 83% (vs. 17%, $p < .01$) of respondents with transportation problems reported a rural residence.

4. DISCUSSION

Women 66 years and older were less likely than younger women to be informed about the significance of physical activity, to increase or maintain their level of physical activity after the acute MI and to be referred and to attend CR programmes. Information about the benefit of physical activity before hospital discharge is an important part of reducing risk factors after an AMI,^[3,5] to the old as well as to the young. Our results indicate that it might be necessary to give increasing priority to women 65 years and older. One-third of the women reported ≥ 30 minutes physical activity level for ≥ 4 days, which is higher than reported in a large Norwegian population study.^[4] When comparing medium activity our results were almost similar to this study (40%), while other studies also reported a lower level of physical activity among women.^[18,19] The higher level of physical activity in our study might be due to the increasing focus on the significance of physical activity over the past decade, thus resulting in a higher level than in previous studies. Additionally, our findings that high physical activity was not significantly lower in older than younger women might be unexpected, but have also been indicated in another study.^[20] As recommended in the guidelines,^[6] the majority of the respondents rated walking as the most usual physical activity, though this was less likely among older women. Since older persons consume more metabolic energy than younger persons when walking it is a recommended type of physical activity that should be included in rehabilitation plans.^[21] That almost half the respondents 65 years and older had reduces their physical activity after the AMI indicates that they were not aware of the significance of physical activity, and that they might think that this activity might be dangerous. Many adults, and particularly older women, lack ingrained exercise behaviour as a part of routine self-care.^[22] That two of the barriers to physical active after the AMI was lack of suitable activity options in addition to lack of an activity companion indicate that these women need more support and information. That even small increases in functional capacity decrease mortality and morbidity might be valuable knowledge to these women.^[22] Our findings about referral to CR programmes are somewhat higher than the EuroAspire study (45%) including patients from 22 countries, and with significant differences between the countries.^[23] Two US studies^[19,23] also reported lower referral rates (43% and 59%). The total CR attendance in our study was similar to the Swedish results in the EuroAspire

study (between 40% and 50%) but somewhat higher than other reports.^[24] Our results that older women were less likely than younger women to be referred or to attend CR programmes, as well as less attendance among women with low education, co-existing health problems and long distance to CR are in agreement with others.^[3,11,25] It has been suggested that older adults may perceive their health problems as being successfully treated and that their coronary event is not a chronic condition. Hence, CR might therefore be assessed as not being necessary.^[26] This perspective highlights the importance of information. Moreover, it has been reported that a low knowledge or scepticism about the benefits of CR is a main barrier to referral^[27] and that some health professionals might be unaware of the significance of physical activity in older women.^[12] The recommendation from the AHA Science Advisory regarding education to health professionals about the benefit from CR, might be an important step in broadening the referral base.^[28]

Methodological considerations

The women's assessment of their physical activity prior to the AMI was elicited retrospectively, with the possibility of inaccuracy. However, the strength of this study is that it was a population-based sample, which included hospitals of various sizes. Moreover, these hospitals were the only options for AMI patients in the acute setting in the region in Norway we studied. Information about non-responders was not obtained due to lack of permission from the Regional Ethics Committee.

5. CONCLUSION

The majority of the women were physically active, though only a few were active more than four days a week. Women's age was significantly associated with information from health professionals while in hospital as well as whether they were referred and attended CR programmes. Older women were also more likely than younger women to reduce their physical activity. Thus, the benefits of physical activity in all age groups need to be increasingly recognized by health professionals.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

REFERENCES

- [1] Steg PG, *et al.* ESC guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J.* 2012; 33: 2569-2619. PMID:22922416 <http://dx.doi.org/10.1093/eurheartj/ehs215>
- [2] Mosca L, *et al.* A guideline from the American Heart Association. Effectiveness-base guidelines for the prevention of cardiovascular disease in women- 2011 update. *J Am Coll Cardiol.* 2011; 57: 1404-1423. PMID:21388771 <http://dx.doi.org/10.1016/j.jacc.2011.02.005>
- [3] Piepoli MF, *et al.* Secondary prevention through cardiac rehabilitation: physical activity counseling 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: 1967-1976. PMID:20643803 <http://dx.doi.org/10.1093/eurheartj/ehq236>
- [4] Moholdt T, Wisløff U, Nilsen TIL, *et al.* Physical activity and mortality in men and women with coronary heart disease: a prospective population-based cohort study in Norway (the HUNT study). *Eur J Cardiovasc Prev Rehab.* 2008; 15: 639-645. PMID:18779734 <http://dx.doi.org/10.1097/HJR.0b013e3283101671>
- [5] Al-Khalili F, Janszky I, Andersson A, *et al.* Physical activity and exercise performance predict long-term prognosis in middle-aged women surviving acute coronary syndrome. *J Int Med.* 2007; 261: 178-187. PMID:17241183 <http://dx.doi.org/10.1111/j.1365-2796.2006.01755.x>
- [6] Smith SC, *et al.* AHA/ACCF. Secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 update. *J Am Coll Cardiol.* 2011; 58: 2432-2446. PMID:22055990 <http://dx.doi.org/10.1016/j.jacc.2011.10.824>
- [7] Mons U, Hahnmann H, Brenner H. A reverse J-shaped association of leisure time physical activity with prognosis in patients with stable coronary heart disease: evidence from a large cohort with repeated measurements. *Heart.* 2014; 100: 1043-1049. PMID:24829374 <http://dx.doi.org/10.1136/heartjnl-2013-305242>
- [8] Yohannes AM, Doherty P, Bundy C, *et al.* The long term benefits of cardiac rehabilitation on depression, anxiety, physical activity and quality of life. *J Clin Nurs.* 2010; 19: 2806-2813. PMID:20738450 <http://dx.doi.org/10.1111/j.1365-2702.2010.03313.x>
- [9] Bethell H, Lewin R, Dalai H. Cardiac rehabilitation in the United Kingdom. *Heart.* 2009; 95: 271-275. PMID:18208830 <http://dx.doi.org/10.1136/hrt.2007.134338>
- [10] Suaya JA, Stason WB, Ades PA, *et al.* Cardiac rehabilitation and survival in older coronary patients. *J Am Coll Cardiol.* 2009; 54: 25-33. PMID:19555836 <http://dx.doi.org/10.1016/j.jacc.2009.01.078>
- [11] Dallongeville J, *et al.* On behalf of the EUROASPIRE Study Group. Gender differences in the implementation of cardiovascular prevention measures after an acute coronary event. *Heart.* 2010; 96: 1744-1749. PMID:20956490 <http://dx.doi.org/10.1136/hrt.2010.196170>
- [12] O'Gara PT, *et al.* 2013 ACCF/AHA Guidelines for the management of ST-Elevation myocardial infarction. A report of the American College of Cardiology Foundation/American Heart Association. Task Force on Practical Guidelines. *Circulation.* 2013; 127: e362-e425. <http://dx.doi.org/10.1161/CIR.0b013e3182742c84>
- [13] Rognmo O, *et al.* Cardiovascular risk of high-versus moderate-intensity aerobic exercise in coronary heart disease patients. *Circulation.* 2012; 126: 1436-1440. PMID:22879367 <http://dx.doi.org/10.1161/CIRCULATIONAHA.112.123117>
- [14] Vanhees L, *et al.* Importance of characteristics and modalities of physical activity and exercise in the management of cardiovascular health in individuals with cardiovascular disease (Part III). *Eur J Prev Cardiol.* 2012; 19: 1333-1356. PMID:22637740 <http://dx.doi.org/10.1177/2047487312437063>
- [15] Norwegian Institute of Public Health. OPPHED 2000-2001. Available from: http://www.fhi.no/eway/default.aspx?pid=239&trg=List_6212&Main_6157=6261:0:25,6726&MainContent_6261=6464:0:25,7875&List_6212=6218:0:25,7882:1:0:0:::0:0
- [16] The Norwegian School of Sport Sciences. 2008: KAN 1: A multi-centre study involving 10 University Colleges in Norway monitoring physical activity and fitness.
- [17] IBM SPSS Statistics. IBM Corporation, New Orchard Road, New York, US. 2013. Available from: <http://www.ibm.com/ibm/selection/us/en/>
- [18] Leung YW, Ceccato N, Steward DE, *et al.* A prospective examination of patterns and correlates of exercise maintenance in coronary artery disease patients. *J Behav Med.* 2007; 30: 411-421. PMID:17616799 <http://dx.doi.org/10.1007/s10865-007-9117-4>
- [19] Sanderson BK, Shewchuk RM, Bittner V. Cardiac rehabilitation and women: what keeps them away? *J Cardiopulm Rehabil Prev.* 2010; 30: 12-21. PMID:20068418 <http://dx.doi.org/10.1097/HCR.0b013e3181c85859>
- [20] Dolansky MA, Stepanczuk B, Charvat JM, *et al.* Women's and men's exercise adherence after a cardiac event: Does age make a difference? *Res Gerontol Nurs.* 2010; 3: 30-38.
- [21] Molino-Lova R, *et al.* The improvement of walking speed after cardiac rehabilitation is associated with the reduction in the metabolic cost of walking in older persons. *Gait Posture.* 2012; 35: 458-461. PMID:22154115 <http://dx.doi.org/10.1016/j.gaitpost.2011.11.007>
- [22] Daniels KM, Arena R, Lavie CJ, *et al.* Cardiac rehabilitation across the lifespan. *Am J Med.* 2012; 125: 937.e1-937.e7.
- [23] Grace SL, *et al.* Contribution of patient and physician factors to cardiac rehabilitation enrollment: a prospective multilevel study. *Eur J Cardiovasc Prev Rehab.* 2008; 15: 548-556. PMID:18830085 <http://dx.doi.org/10.1097/HJR.0b013e328305df05>
- [24] Bjarnason-Wehrens B, *et al.* Cardiac rehabilitation in Europe: results from the European Cardiac Rehabilitation Inventory Survey. *Eur J Cardiovasc Prev Rehab.* 2010; 17: 410-418. PMID:20300001 <http://dx.doi.org/10.1097/HJR.0b013e328334f42d>
- [25] Grace SL, Gravelly-Witte S, Bakken H, *et al.* A multisite examination of sex differences in cardiac rehabilitation barriers by participation status. *J Women's Health.* 2009; 18: 209-216. PMID:19183092 <http://dx.doi.org/10.1089/jwh.2007.0753>
- [26] Keib CN, Reynolds NR, Ahijevych KL. Poor use of cardiac rehabilitation among older adults: A self-regulatory model for tailored interventions. *Heart Lung.* 2010; 39: 504-511. PMID:20561883 <http://dx.doi.org/10.1016/j.hrtlng.2009.11.006>
- [27] Clark AM, King-Shier KM, Duncan A. Factors influencing referral to cardiac rehabilitation and secondary prevention programs: a systematic review. *Eur J Prev Cardiol.* 2013; 20: 692-700. PMID:23847263 <http://dx.doi.org/10.1177/2047487312447846>
- [28] Arena R, *et al.* Increasing referral and participation rates to outpatient cardiac rehabilitation: The valuable role of healthcare professionals in the inpatient and home health setting. Science Advisory from the American Heart Association. *Circulation.* 2013; 127: 2233-2249.