Overview Of Cardiac Rehabilitation Programs In Malaysia
Updates & Innovations

Aizai Azan Rahim
Cardiology Department
National Heart Institute
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR
- Conclusions
Simple Description

Process of helping patients by whatever means to recover from any cardiac event and return to an active productive life and to prevent recurrence of further events.
‘If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health’

But did anyone listen then?

Hippocrates 460 BC – 377 BC
There is a disorder of the breast, marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, of which I do not recollect any mention among medical authors. The seat of it, and sense of strangling and anxiety with which it is attended, may make it not improperly be called Angina Pectoris.

“I know one who set himself a task of sawing wood for half an hour every day, and was nearly cured"

"the symptoms of debility of the heart are often removable by a regulated course of gymnastics, or by pedestrian exercise"

His "pedestrian cure" consisted of comfortable walking initially on level ground, the distance and gradient being increased as tolerance improved—always, however, cautioning against excessive fatigue, breathlessness, or chest pain.

1804-1878

Stokes W. *The diseases of the heart and the aorta*. Dublin: Hodges & Smith, 1854.
1912: James B. Herrick described coronary thrombosis in MI. The concept “aroused no interest. It fell like a dud.”

Recommend patients be managed with 2 months of bed rest.

Herrick JB. Clinical features of sudden obstruction of the coronary arteries. JAMA 1912;59:2015–2020
Institut Jantung Negara

Historical Perspective

1930’s

- Following a heart attack, complete bed rest for 8 weeks followed by long recovery period.
- This was based on the observation by Dr Mallory & White that necrotic myocardial tissue transformed into scar tissue after 6 weeks to prevent aneurysm, CHF, ventricular rupture & SCD.
- Also lead to deconditioning & depression.
- But events about to be challenged!!
"We believe that by getting patients with acute coronary thrombosis promptly out of bed and into a chair, we achieve more rest for the heart than it attained with traditional bed rest procedures."

81 patients with acute coronary thrombosis received armchair treatment starting at day two of hospitalization. During hospitalization of 15-35 days there were 8 deaths (9.9%), but overall experience considered highly favorable, especially enhanced sense of well-being.
The rehab-exercise cardiologist was often described as being "too aggressive", "too dangerous" and even "barbaric"
1940’s In USA, Levine & Lown challenged the need for enforced bed rest & prolonged inactivity after AMI. They allowed patients to recuperate in armchair for 7 days.

“Chair Therapy”

But met strong opposition!

1950’s Hellerstein & Turell introduced graded prototype cardiac rehabilitation, 3-5 mins of daily walking at 4 weeks post AMI.
Early Concepts Of Cardiac Rehabilitation

Historical Perspective

Get out of Bed!

- 1950s: ambulation advocated.
- 3-5 minutes of walking 2x/day.
- Starting 4 weeks post MI.
- 1956: 1st report of ambulation within 14 days of AMI.

*Emphasis was on early ambulation & exercise!*
Dwight Eisenhower
34th President Of USA
Myocardial Infarction In 1955
Continued as president
Early Rehabilitation
Example for millions of coronary patients that life can go on after an AMI
But …… 6 additional AMI until his death in 1969
Early Concepts Of Cardiac Rehabilitation

Historical Perspective

Rehabilitation of the Patient with Acute Myocardial Infarction

Patients transferred after two weeks of hospitalization to Cardiac Rehabilitation Section. Program included:

- Low fat and salt diet
- Smoking discourage
- Medications to reduce anxiety
- Psychological testing & counseling
- Exercise tolerance test on treadmill, physical conditioning
- Weight reduction
- Vasodilators used
- Vocational rehabilitation

Program considered successful - the average hospital stay of 89 days was not felt to be excessive.

Early Concepts Of Cardiac Rehabilitation

Historical Perspective

1960’s
In USA, Kellerman showed that exercise was safe for post heart attack patients

Development of Inpatient Rehab Programs
Introduction of CCU

1967
Introduction of CABG and heart transplantation

1970’s
Several RCT provided evidence that post heart attack patients did better if there were mobilized early after the event.
Routine early ambulation.
Beginnings of Comprehensive Inpatient & Outpatient Rehab Programs
Emphasis on Risk Factor Modification.
Historical Perspective

  - LOS falls from 14-10 days following AMI.
- 6-7 days by the early 1990s.
  - 3-4 days, currently.
- 1980s-1990s: cardiac rehab programs designed to comprehensively reduce risk develop.
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR
- Conclusions
Cardiac rehabilitation

Class I

1. All eligible patients with ACS or whose status is immediately post coronary artery bypass surgery or post-PCI should be referred to a comprehensive outpatient cardiovascular rehabilitation program either prior to hospital discharge or during the first follow-up office visit.\textsuperscript{55,154,161,163} \textit{(Level of Evidence: A)}

2. All eligible outpatients with the diagnosis of ACS, coronary artery bypass surgery or PCI \textit{(Level of Evidence: A)}, chronic angina \textit{(Level of Evidence: B)},\textsuperscript{161,163} and/or peripheral artery disease \textit{(Level of Evidence: A)}\textsuperscript{158,164} within the past year should be referred to a comprehensive outpatient cardiovascular rehabilitation program.

3. A home-based cardiac rehabilitation program can be substituted for a supervised, center-based program for low-risk patients.\textsuperscript{153,159,160} \textit{(Level of Evidence: A)}

Class IIa

1. A comprehensive exercise-based outpatient cardiac rehabilitation program can be safe and beneficial for clinically stable outpatients with a history of heart failure.\textsuperscript{158,158a-158c} \textit{(Level of Evidence: B)}
Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation

The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology:

Recommendations:

- Physical Activity

- Exercise test guided moderate intensity aerobic exercise at least 5 X per week (Class I Level of evidence B)
- Medically supervised cardiac rehabilitation programs for at risk patients (Class I Level of evidence B)
9. CARDIAC REHABILITATION IN STEMI

All patients' post STEMI (including those post PCI or CABG surgery) should undergo comprehensive cardiac rehabilitation. This programme aims at improving the long-term prognosis and optimizing the physical, psychological and social well-being of the patient. It comprises prescribed exercise training and education, counseling, risk factor modification and behavioral interventions.

Cardiac rehabilitation should start in the cardiac care unit, continue to out-patient settings and extend to community care. It is a proven effective intervention and every effort must be made to ensure minimal dropouts so as to maximize beneficial effects of the programme.

7.1 Cessation of smoking

Smoking cessation reduced CHD mortality by 36% as compared to those who continue smoking\(^\text{65}\). This lifestyle change confers a risk reduction which is at least as great as other pharmacological interventions.

Trials of nicotine replacement therapy using either transdermal nicotine patch or nicotine chewing gum have proven to greatly increase abstinence rates after cessation. Such pharmacological programmes, as well as physician-guided counseling, are cost-effective and should be encouraged\(^\text{66}\).

7.2 Diet

Dietary intervention has been shown to reduce cardiac event rates post STEMI\(^\text{97}\):

Recommendations include:

- Total calorie intake should be tailored to the desirable body weight
- Wherever possible, substitute saturated and trans fat with polyunsaturated fat.
  Use more high fibre food and whole grains instead of rapidly digested carbohydrates.
- Take more fruits, nuts and vegetables.
- Increased intake of omega 3 – fatty acids (1g daily) is beneficial\(^\text{98,99}\). Eat fish at least twice a week.

7.3 Regular Exercise

Recommended exercises include brisk walking, jogging, cycling, swimming or other aerobic activity for at least 30 to 60 minutes on most days of the week. It should be supplemented with an increase in daily life-style activities such as walking up stairs whenever possible\(^\text{100}\).

7.4 Control of Hypertension

After STEMI, prognosis is affected by both the pre existing and the subsequent blood pressure. The higher the pre existing blood pressure, the higher the fatality rate\(^\text{101}\). The target blood pressure should be <130/80mmHg. Drugs of choice include β- blockers, ACEIs and Valsartan\(^\text{102}\) (if ACEI intolerant).

7.5 Good Glycemic control

Good control of the blood glucose is important\(^\text{102}\). Target fasting blood glucose should be <6.0mmol/l and HBA1C < 6.5%
ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012

The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC

### Recommendations for exercise prescription and multidisciplinary management

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is recommended that regular aerobic exercise is encouraged in patients with heart failure to improve functional capacity and symptoms.</td>
<td>I</td>
<td>A</td>
<td>262, 263</td>
</tr>
<tr>
<td>It is recommended that patients with heart failure are enrolled in a multidisciplinary-care management programme to reduce the risk of heart failure hospitalization.</td>
<td>I</td>
<td>A</td>
<td>236, 259, 264</td>
</tr>
</tbody>
</table>
CR in ambulatory HF patients is a Class I Indication with Level of Evidence B
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR
- Conclusions
Historical Background

- Cardiac Rehabilitation Program (CRP) is a relatively "young" program in Malaysia

- Started at Kuala Lumpur and Ipoh General Hospitals in 1982 with the establishment of the 1st Cardiology & Cardiothoracic Departments
  Mainly exercise based & not comprehensive

- 1st CABG in Malaysia done in 1982

- 1st PTCA done in 1984

- 1st Heart Transplant done in 1997
National Heart Institute (IJNI) was established in 1992 in Kuala Lumpur and Phase I CRP was started.

Comprehensive Phase I & II CRP was offered at IJNI since 1997.

Ministry Of Health (MOH) Heart Centers in Penang & Johor Baru started services in late 1994 & 1997 respectively.
Background

Questionnaire Based Survey in October 2012
Sent to 4 Universities With Teaching Hospitals and 15 General Hospitals with/without Cardiac Units (Total 19 Centers)
Private Hospitals not surveyed
3 Non-respondents
16 Respondents (84%) out of which 1 University replied that they have stopped cardiac rehab services due to manpower issues
Provision Of Cardiac Rehab Programs In Malaysia

- > 10 Years: 46%
- 5 - 10 Years: 34%
- < 5 Years: 20%
Phases Of Cardiac Rehab Programs In Malaysia

<table>
<thead>
<tr>
<th>Phase</th>
<th>Number Of Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>7%</td>
</tr>
<tr>
<td>Phase I,II</td>
<td>67%</td>
</tr>
<tr>
<td>Phase I,II,III</td>
<td>26%</td>
</tr>
</tbody>
</table>
Average Duration Of Cardiac Rehab Programs

- < 2 Weeks: 13%
- 2 - 4 Weeks: 33%
- 4 - 12 Weeks: 54%
How Soon Do Patients Enroll In Phase II Cardiac Rehab Programs

- Number Of Centers
  - < 1 Month: 22%
  - 1 - 2 Months: 78%
  - 3 - 4 Months: 0%

Institut Jantung Negara
Frequency of Phase II Cardiac Rehab Programs

- 3 Sessions/Wk: 0%
- 2 Sessions/Wk: 43%
- 1 Session/Wk: 57%
Duration Of Phase II Cardiac Rehab Programs

Percentage Of Centers

- 1 Month: 7% (n=1)
- 1 - 3 Months: 21% (n=3)
- 4 - 6 Months: 72% (n=10)
Health Professionals Involved In Cardiac Rehab Programs

- Doctors: 93%
- Nurses: 93%
- Physiotherapists: 100%
- Dietician: 100%
- Social Worker: 40%
- Pharmacists: 93%
- Psychologists: 13%
- Occupational Therapist: 53%

Institut Jantung Negara
Types Of Patients Enrolled In Cardiac Rehab Programs

- Post AMI: 100%
- Post PCI: 73%
- Stable CAD: 67%
- CHF: 33%
- Post Surgery: 60%
- Others (Post Device Implantation): 7%

Percentage Of Patients
Educational Components Of Cardiac Rehab Programs

- Exercise Training
- Dietary Advice
- Smoking Cessation
- Medication Counseling
- Psychological Support
- Risk Factor Modification
- Vocational Training
- Others

Number Of Centres

- 0% 20%
- 60%
- 93%
- 100%
- 93%
- 100%
- 100%
- 100%
- 100%
<table>
<thead>
<tr>
<th>Perceived Institutional Barriers To Cardiac Rehab Programs</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack Of Qualified Staff</td>
<td>6 (40%)</td>
<td>0</td>
<td>9 (60%)</td>
</tr>
<tr>
<td>Inadequate Physical Space</td>
<td>10 (67%)</td>
<td>2 (13%)</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>Lack Of Equipment</td>
<td>9 (60%)</td>
<td>1 (7%)</td>
<td>5 (33%)</td>
</tr>
<tr>
<td>Lack Of Funding</td>
<td>11 (80%)</td>
<td>2 (13%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Cardiac Rehab Not Supported By Hosp Policies</td>
<td>3 (20%)</td>
<td>4 (27%)</td>
<td>8 (53%)</td>
</tr>
<tr>
<td>Rehab Not Beneficial For Pts</td>
<td>0</td>
<td>1 (7%)</td>
<td>14 (93%)</td>
</tr>
<tr>
<td>Perceived Patient Barriers To Cardiac Rehab Programs</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Cannot Afford</td>
<td>4 (27%)</td>
<td>5 (33%)</td>
<td>6 (40%)</td>
</tr>
<tr>
<td>Far Distance To Program</td>
<td>10 (67%)</td>
<td>2 (13%)</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>Lack Of Knowledge Rgd Benefits Of CR</td>
<td>8 (54%)</td>
<td>2 (13%)</td>
<td>5 (33%)</td>
</tr>
<tr>
<td>Lack Of Support / Recommendation From Doctors</td>
<td>9 (60%)</td>
<td>3 (20%)</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>Time Constraints</td>
<td>13 (86%)</td>
<td>1 (7%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Work / Family Commitments</td>
<td>15 (100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others (Limited CRP Centres)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary Of CR Programs In Malaysia

- Number of Hospitals providing CR services is increasing over time
- Majority (70%) provide Phase I & II over 1 – 3 months period
- Physiotherapists, dieticians, doctors, nurses & pharmacists are the core personnel involved
- Post AMI, PCI & cardiac surgery patients more frequently attend CR
- Frequency of Phase II is 1 session per week for 4 – 12 weeks
- Main core educational topics covered except for psychological & vocational aspects
- The common institutional barriers are lack of funding, space & equipment
- Frequent patient barriers are work / family commitments, time constraints, distance & lack of referrals from doctors
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR
- Conclusions
Challenges For Cardiac Rehabilitation

- "Cinderella Service"
- "Not glamorous enough"

- Limited number of centers provide comprehensive cardiac rehabilitation services

- Theory / Science  Practice

- Gross Underutilization

Institut Jantung Negara
In UK, (2008-2009)

41% of eligible patients participated in CRP

- Post CABG 76%
- Post AMI 40%
- Post PCI 28%

Participation growing at 1-3% annually
Challenges For Cardiac Rehabilitation

- In USA (2007)
  30% of eligible patients participated in CRP
  (Range: 6.6% - 53.5%)

- In Australia (2009)
  50% attendance rates in CRP
  (Range: 30% - 60%)
Challenges For Cardiac Rehabilitation

- Increasing participation (extended hours eg. evening or weekends for working patients, Women’s only session, )

- Increasing compliance by educating both doctors & patients (educational talks, seminars, videos, leaflets, social media such as YouTube, Facebook, CR reminder cards)
Challenges For Cardiac Rehabilitation

- Capacity Building (increase number of trained staff, hospitals, clinics that can provide CR at every state & district level)

- Increasing choices (menu based options, group vs one to one contact, home based CR, web / internet based options)
Online Study of CArdiac Rehabilitation
The OSCAR Trial

• **Aim** – Investigate the effectiveness and acceptability of this new web-based CR programme.

• **Participants** – Individuals with a confirmed diagnosis of angina are being recruited from primary care.

• **Design** – All outcome measures are assessed at baseline and at a 6 week follow up.

Devi, R¹., Powell, J²., & Singh, S¹.
¹Coventry University, Priory Street Coventry, CV1 5FB.
²Medical School Building, Gibbet Hill Road, University of Warwick, Coventry CV4 7AL.
• Used ‘Sensewear Pro3 Armband’.

• **Primary Outcome Measure** –
  • Daily average step count, daily average energy expenditure (EE)
  • EE & duration of physical activity (DPA) at a light/moderate (3 MET) & moderate/vigorous (5MET) intensity.
Institut Jantung Negara

Web based CR
www.activateyourheart.org.uk

Personal Details
It is important for you to understand your own risk factors for Coronary Heart Disease. If you are in any doubt about any of the following questions, we suggest you consult your GP before proceeding.

<table>
<thead>
<tr>
<th>Question</th>
<th>27.5%</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you smoke?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Are you diabetic?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Blood Pressure:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Diastolic</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>How would you rate your current level of stress?</td>
<td>No stress</td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Physical Activity Changes

17 patients have completed the programme (13 males, 4 females), mean age of 69.1 years.

Energy Expenditure > 5 MET *
p<0.05

Duration of Physical Activity > 5 MET *
p<0.05

Pre/post web based CR

Pre/post web based CR
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR
- Conclusions

Institut Jantung Negara
Tips On Improving CRP

- Physician education & endorsement vital
- Secure strong clinical leadership
- Engage all stakeholders (patients, families, health professionals, administrators, policy makers)
- Collaborate, share & make best use of available resources
- MECC (Make Every Contact Count)
Tips On Improving CRP

✓ CR must be part of usual expected care of patients ie. Clinical Pathways
✓ Advocacy from professional groups, health NGO’s and peer groups eg. Zippers Club
✓ Secure reimbursement from government agencies, insurance companies, managed care providers, employers
Topics

- Historical Perspective Of Cardiac Rehabilitation
- CPG Recommendations On CR
- Availability Of CR Services In Malaysia
- Challenges Facing CR
- Tips On Improving CR

Conclusions
Cardiac rehabilitation works! It is an evidenced based approach in reducing burden of CVD (Class 1 Recommendation)

CR is alive and thriving in Malaysia

Overcome issues and find holistic solutions

Ultimate CR goal is to provide;

“Right Care, Right Time, Right Person, Right Place“

“Right Price“