



Cardiac Rehabilitation

In the Era with COVID-19

Dr. Michael Wong

Grantham Hospital

What is Cardiac Rehabilitation?

- ▶ Cardiac rehabilitation (CR) is the process by which patients with cardiac disease, in partnership with a multidisciplinary team of health professionals are encouraged to support and achieve and maintain optimal physical and psychosocial health.
- ▶ CR is an accepted form of management for people with cardiac disease
- ▶ Historically CR was offered mainly to people recovering from a MI but now encompasses a wide range of cardiac problems

Eligible patients

- ▶ Myocardial infarction (STEMI, NSTEMI)
- ▶ Revascularization procedures (PCI, CABG)
- ▶ Controlled heart failure
- ▶ Heart transplant/ VAD patients
- ▶ Other vascular or heart disease

Separate programs will be provided for people with different diagnosis

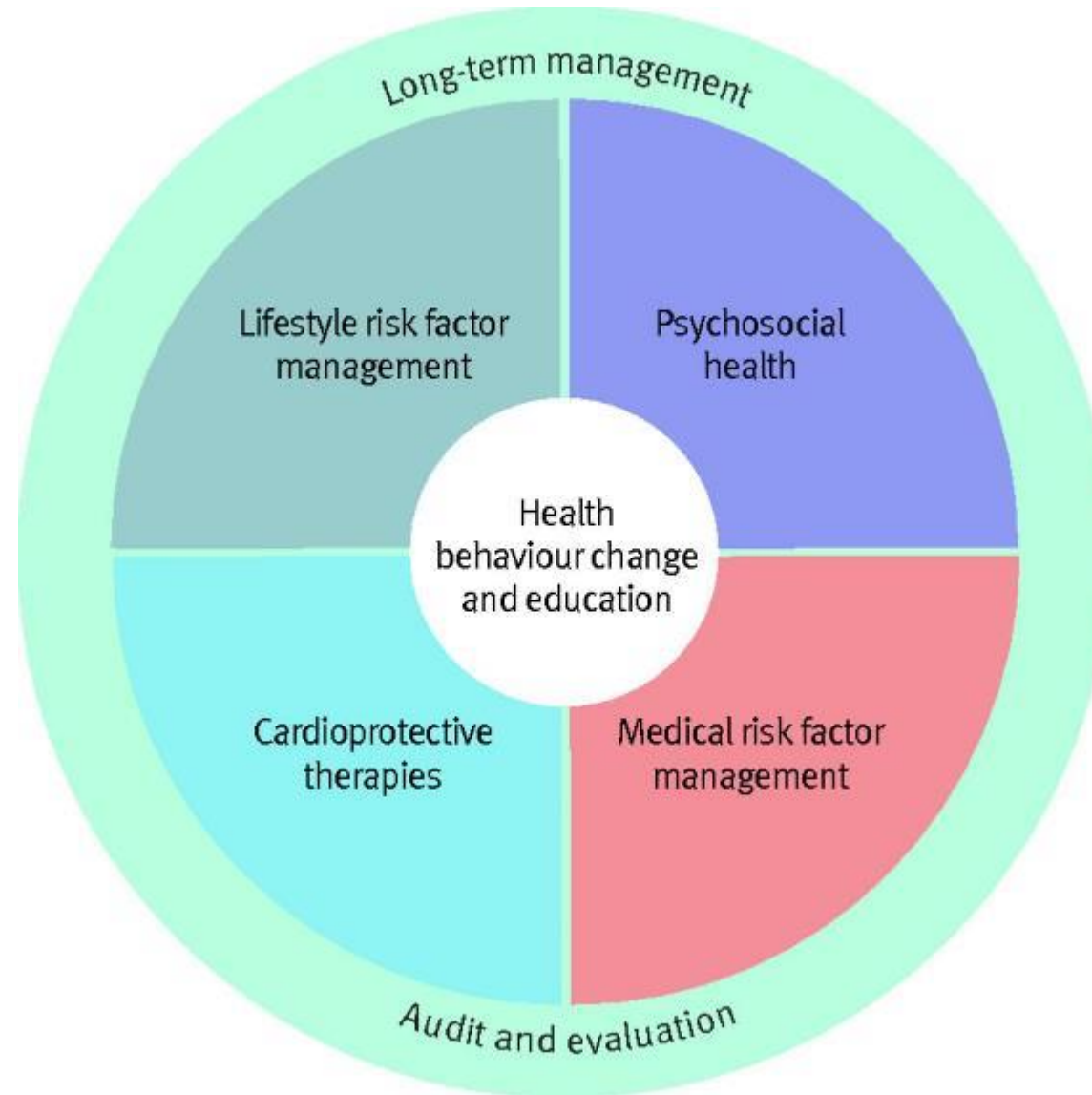
The approach adopted will address the differing needs of these groups

People with other presenting problems such as diabetes or multiple risk factors may also participate in CR- based on needs of core group listed above

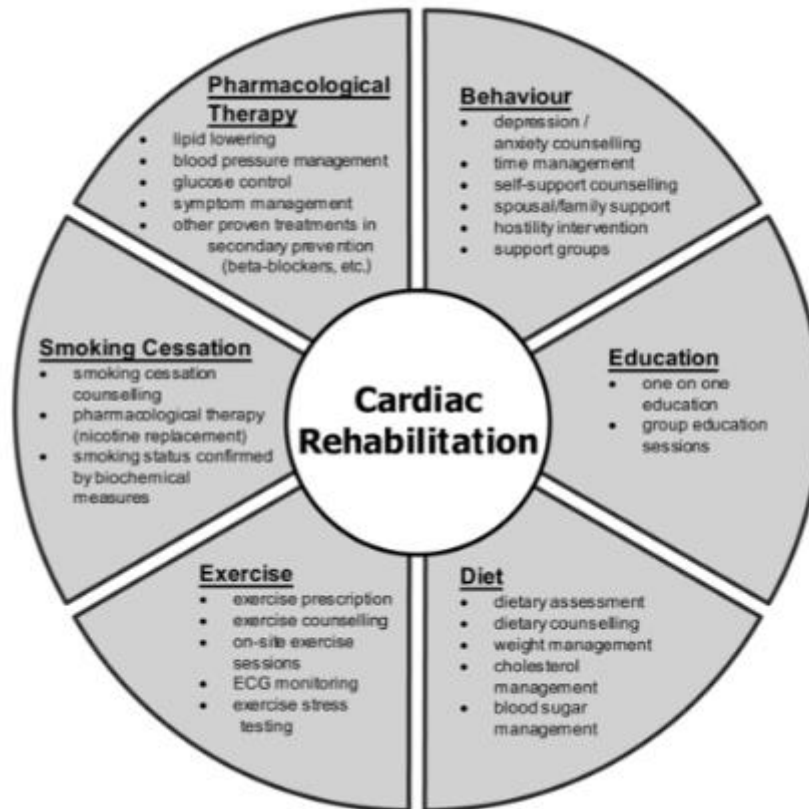
Goals of Cardiac Rehabilitation

Medical Goals	Social Goals	Psychological Goals	Behavioural Goals	Health Service Goals
Improve cardiac function	Return to work if appropriate and/or previous level of functional capacity	To restore self-confidence	To quit all forms of smoking	To directly reduce medical costs
Reduce risk of sudden death	To promote independence in ADLs for those who are compromised	Relieve anxiety and depression in patients and their carers	To make heart healthy dietary decisions	To reduce cardiac related hospital admission
Relieve symptoms e.g. SOB, angina		To relieve or manage stress	To be physically active	
Increase work capacity		To restore good sexual health	To adhere to medication regimes	
Prevent progression of underlying atherosclerosis				

Core components of cardiac rehabilitation.



Multidisciplinary Programs Involved



- ▶ Complex intervention offered to patients diagnosed with heart disease
- ▶ Health education
- ▶ Advice on cardiovascular risk reduction
- ▶ Physical exercise
- ▶ Stress management

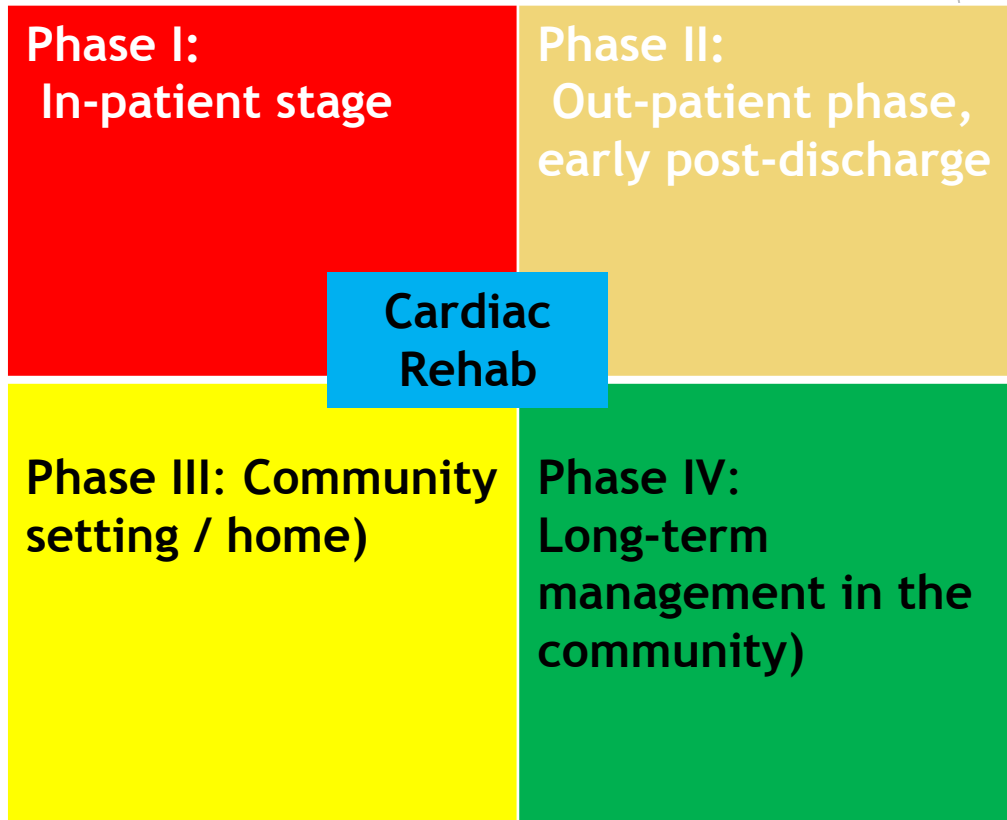
Multidisciplinary Team Members

- ▶ Cardiologist/ Physician and coordinator to lead CR
- ▶ Clinical nurse specialist
- ▶ Physiotherapist
- ▶ Clinical nutritionist/ Dietician
- ▶ Occupational therapist
- ▶ Pharmacist
- ▶ Clinical psychologist
- ▶ Social worker



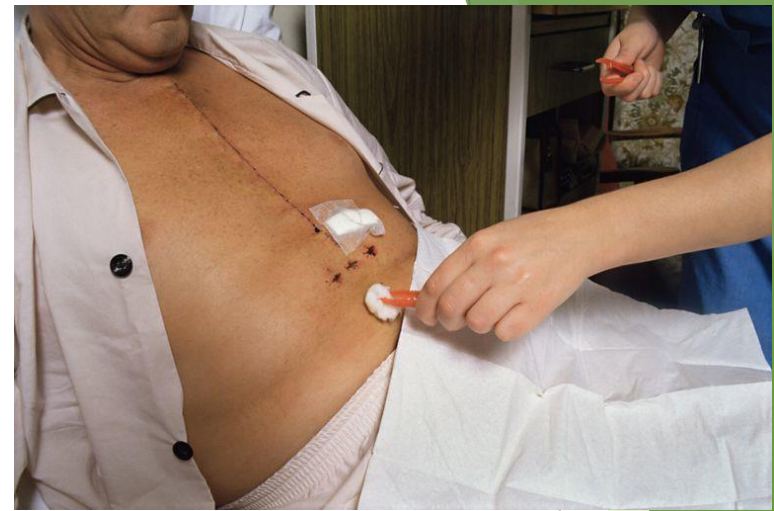
Four Phases of Cardiac Rehab

- ▶ **Phase I: (In-patient stage)**
 - ▶ Post MI as in-patient
 - ▶ Post open heart surgery in ICU
- ▶ **Phase II: Out-patient phase, early post-discharge**
- ▶ **Phase III: Community setting / home)**
- ▶ **Phase IV: Long-term management in the community)**



Goals of Phase 1 CRP

- ▶ Assess mobility and effects that basic functional mobility has on cardiovascular system
- ▶ Close working with doctors, nurses and other therapists to ensure appropriate discharging planning
- ▶ Prescribe safe exercises to help improve mobility and to improve cardiac fitness
- ▶ Help maintain sternal precaution in post open heart surgery
- ▶ Address any risk factors that may need to cardiac events
- ▶ Prescribe appropriate assistive device such as walker or walking stick to ensure moving around safely
- ▶ Work with patient and family/ carer to provide education about the condition and the expected benefits and risks associated with a CR program
- ▶ Once significant recovery has taken place, patient may be discharged home to begin phase II cardiac rehab



Education sessions with information:

- 1. The cardiac event*
- 2. Psychological reactions to the event*
- 3. Cardiac pain/ symptom management*
- 4. Correction of cardiac misconceptions*

Phase II: Out-patient phase, early post-discharge

- ▶ Better understanding of how to keep the heart healthy is emphasized
- ▶ Check patient's medical status and continuing recovery; offer reassurance as patient regains health and strength
- ▶ Structured program
- ▶ Supervised exercise
- ▶ Counseling and reinforcement of the knowledge and lifestyle modification for secondary prevention
- ▶ Structured patient empowerment / Self-help program

Objectives of Phase II CRP

1. To provide education for both patient and family members regarding cardiovascular disease and to continue appropriate steps for modification of risk factors.
2. To prevent the deleterious effect of deconditioning and to restore an exercise capacity that is appropriate to their clinical status, lifestyle and occupation.
3. To adopt a proper exercise technique & progress in a safety manner.
4. To meet with the psychological needs of patients and families, restore confidence and reduce anxiety and depression due to disease.

Objectives of Phase II CRP

5. To deliver up-to-date information on the effectiveness of medication in coping with the cardiovascular symptoms and the recovery process.
6. To assist in the gradual resumption of patient's previous occupational and vocational activities.
7. To improve the individual's quality of life.

Main Elements of Outpatient CR

Assessment, review and FU

- ▶ Individual assessment and regular review
- ▶ Referral to appropriate health professionals and services as required
- ▶ Communications sent to primary care doctor and cardiologist

Low or moderate intensity physical activity

- ▶ Can include a supervised group or individual program, including warm-up and cool down, catering to individual needs and capacities of each patient
- ▶ Resistance training as appropriate
- ▶ Written guidelines for resumption of daily activities

Education, Discussion and Counseling

- ▶ Basic anatomy and physiology of heart
- ▶ Effects of heart disease, healing process, recovery and prognosis:
- ▶ Smoking cessation, physical activity, diet, control of blood lipids, weight, BP and diabetes)
- ▶ Risk factors for heart disease and their modification for ongoing prevention
- ▶ Support skill development to enable behavior change and maintenance
- ▶ Resumption of daily activity : e.g. return to work is the general rule for people previously employed
- ▶ Psychological issues: mood, emotions, sleep disturbance
- ▶ Social factors: e.g. family and personal relationships, social support/ isolation
- ▶ Management of symptoms e.g. chest pain, breathlessness, palpitations
- ▶ Development of an action plan by patient and carer to ensure early response to symptoms of possible heart attack
- ▶ Medications e.g. indications, side effects, importance of compliance
- ▶ Investigations and procedures
- ▶ Cardiac health beliefs and misconceptions
- ▶ Importance of FU by specialists, primary care provider

Education Program/ Talk

- ▶ Conducted by doctors, nurses, physiotherapists, dietitian, pharmacist, medical social worker, community support association etc.
- ▶ The health talks conducted by nurse include:
 - Medication
- ▶ The health talks conducted by Physiotherapist include:
 - Exercise Principles
 - Physical Activity
 - Obesity

Education Program/ Talk

- ▶ The health talks conducted by Occupational Therapist include:
 - Daily activities advice
 - Stress coping strategies
 - Psychosocial well-being
- ▶ The health talks conducted by dietitian include:
 - Low Cholesterol / Warfarin Diet
- ▶ The health talks by community organization include:
 - Introduce of patients self help groups and community services

Exercise Prescription



METS: measures energy requirement for basal homeostasis, when subject is in resting position (METS=3.5:4ml of O₂/kg/min)
 Most inpatient programs begin with activities 2-3 METS and progress to 5 METS before discharge

Classification of physical activity intensity

Endurance type exercise						Strength type exercise*		
		Relative intensity				Absolute intensity in healthy adults (age) METs ‡		Relative intensity
Intensity	Respiratory descriptions	VO _{2 max} , %	HR _{max} , % ^	Beats above HR _{rest} ^	RPE†	Middle aged (40-64)	Older (65- 79)	Max voluntary contraction, %
Low	↑ Breath rate	20 – 39	35 – 54	10 – 25	10 – 11	2.0 – 3.9	1.6 – 3.1	30 – 49
Moderate	Breathe harder	40 – 59	55 – 69	20 – 35	12 – 13	4.0 – 5.9	3.2 – 4.7	50 – 69
Hard	Puff and pant	60 – 84	70 – 89	30 – 55	14 – 16	6.0 – 8.4	4.8 – 6.7	70 – 84

* Based on 8 to12 repetitions for persons <50-60 years old and 10 to 15 repetitions for persons ≥50-60 years

^ Absolute heart rate measures should not be used in the presence of beta-blockers

† Borg rating of Relative Perceived Exertion (RPE), 6-20 scale

‡ Maximum values are mean values achieved during maximum exercise by healthy adults. Absolute intensity values are approximate mean values for men. Mean values for women and patients with heart disease are likely to be lower than those for men

Adapted from Fletcher GT et al. Circulation 2001; 104:1694-1700.

Health and Safety

- ▶ Patient should not exercise if they are generally unwell, symptomatic or clinically unstable on arrival:
 - ▶ Fever/ acute systemic illness
 - ▶ Unresolved/ unstable angina
 - ▶ Resting BP systolic >200mmHg and diastolic >110mmHg
 - ▶ Significant drop in BP or symptomatic hypotension
 - ▶ Resting/ uncontrolled tachycardia (>100bpm)
 - ▶ Uncontrolled atrial or ventricular arrhythmias
 - ▶ New/ recurrent symptoms of breathlessness, lethargy, palpitation, dizziness
 - ▶ Unstable heart failure
 - ▶ Unstable/ uncontrolled diabetes

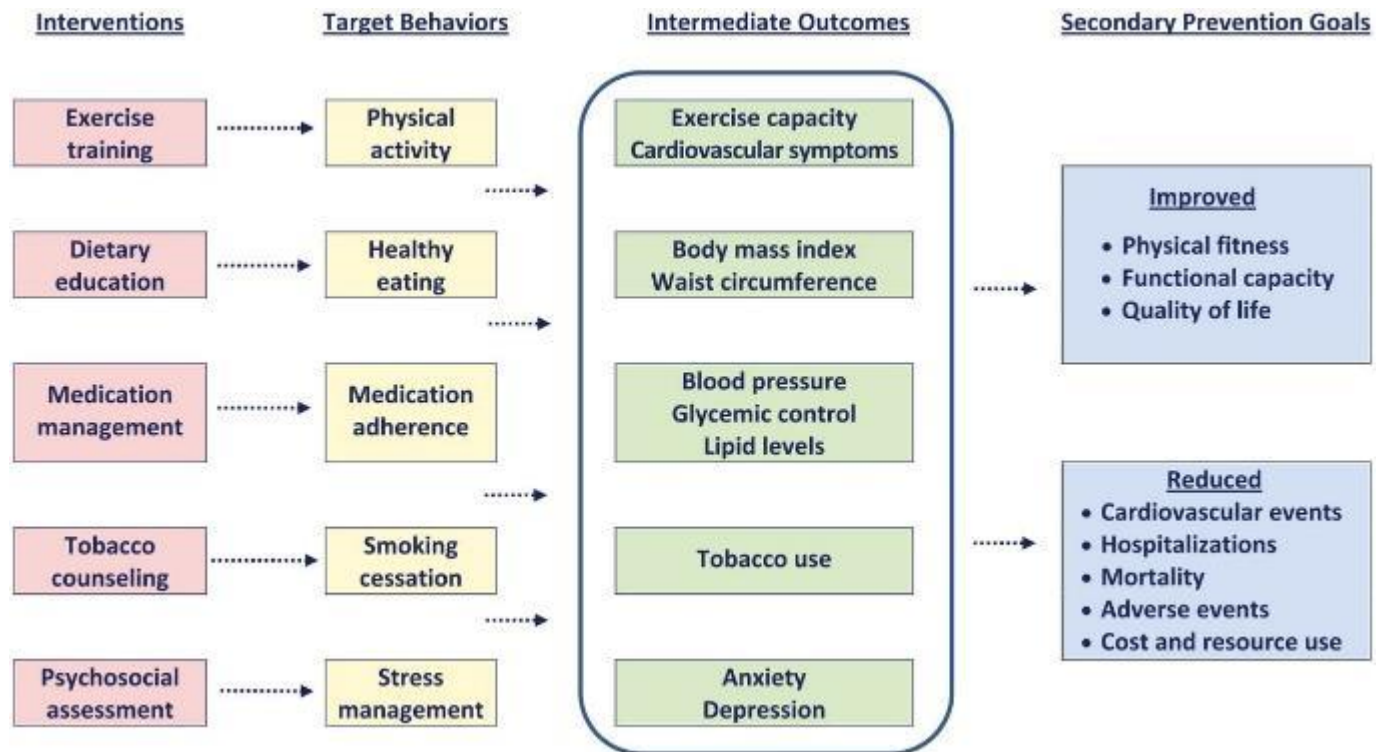
Phase III (Community setting / home)

- ▶ Psychological support
- ▶ Menu-based approach
- ▶ Education and training
- ▶ Smoking cessation
- ▶ Regular exercise
- ▶ Weight management
- ▶ Vocational rehabilitation
- ▶ Peer support

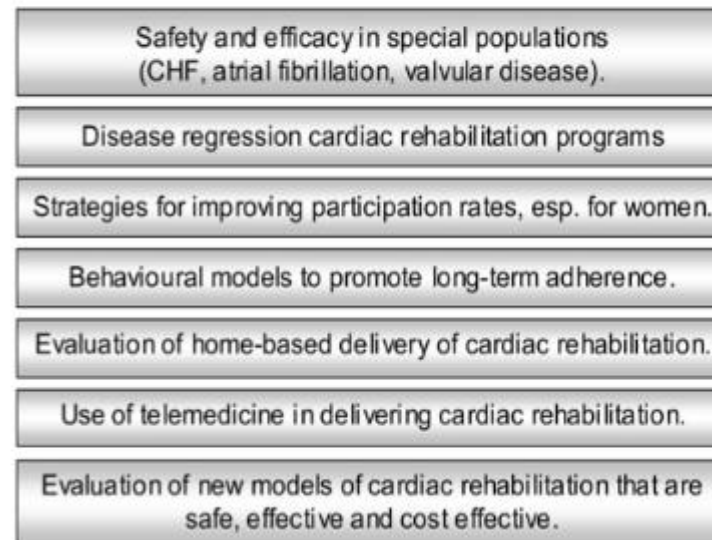
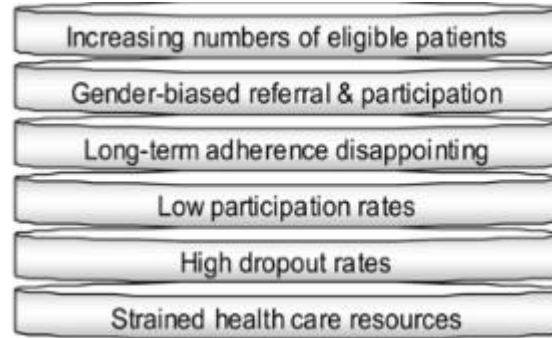
Phase IV: Maintenance

- ▶ Goal: facilitate long term maintenance of lifestyle changes, monitoring risk factor changes and secondary prevention
- ▶ Options:
 - ▶ Educational sessions
 - ▶ Support groups
 - ▶ Telephone follow-up
 - ▶ Review in clinics
 - ▶ Outreach programs
 - ▶ Phase IV exercise program organized by community groups (e.g. NGO)
 - ▶ Links with GP and primary health care team
 - ▶ Ongoing involvement of partners/ spouses/ family

Cardiac Rehab



Challenges and Looking Ahead



Home-based Cardiac Tele-rehabilitation during COVID-19:

Early Preliminary Experience for
Post Cardiac Surgery Patients in
Hong Kong

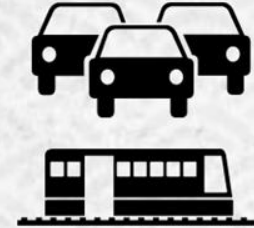


BACKGROUND

Different **barriers** may have hindered patients from doing center-based rehabilitation:

01

Long Travel Distance



02

Conflict with Work



03

Family Obligation



Pandemic!



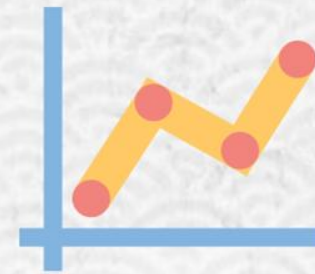
Home-Based Cardiac Rehabilitation

Patients **monitor** their vital signs **on their own** during home exercise

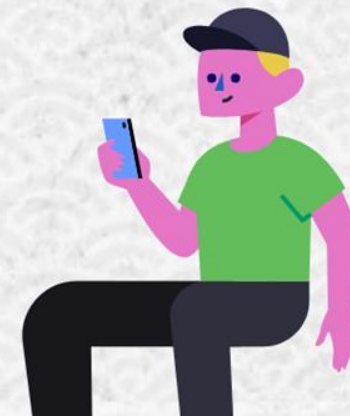


1) Record data with wearable sensors e.g. **Smart Watch**

2) **Upload data** for analysis



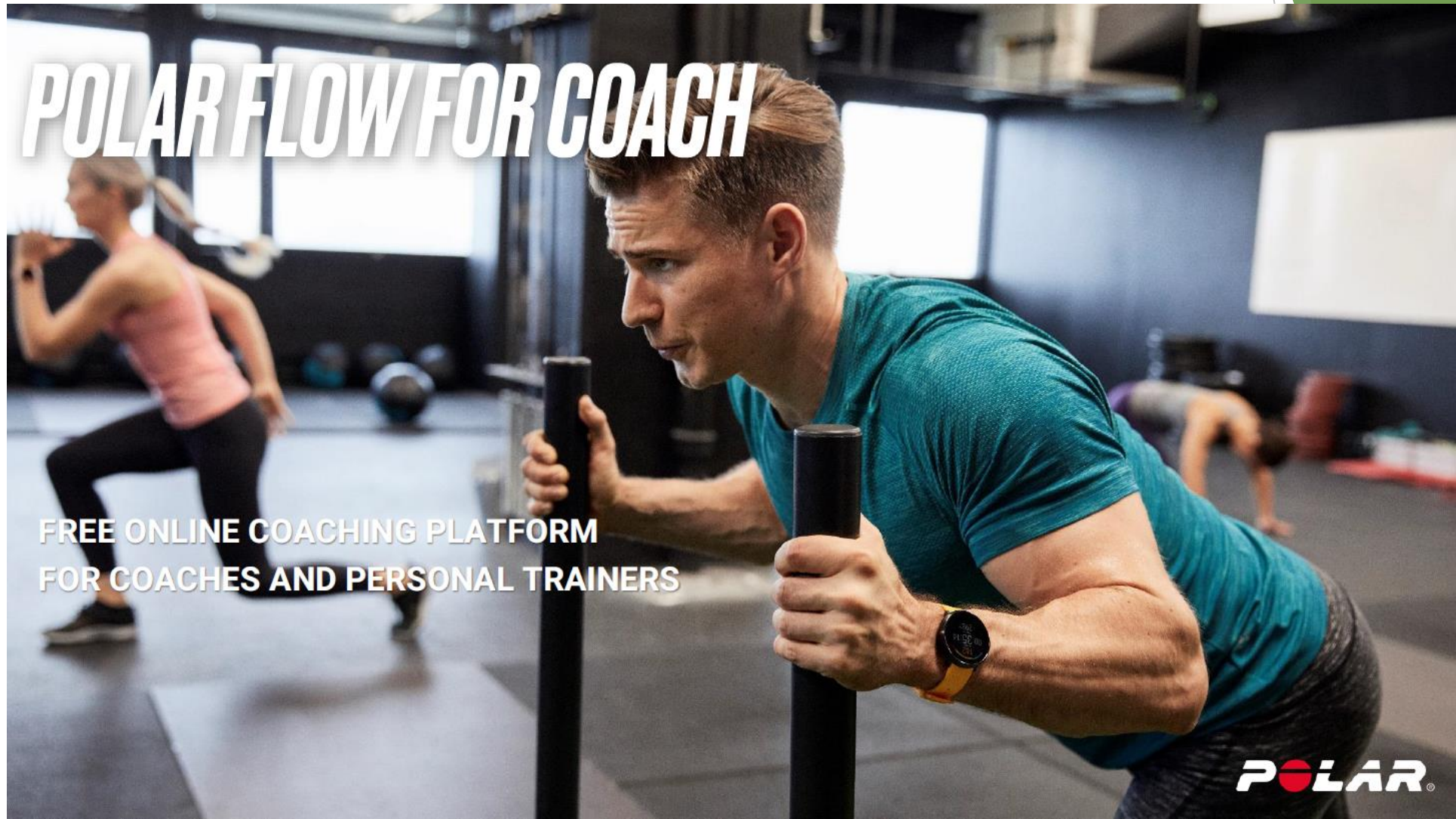
3) Follow up patients with **Phone Calls or Video Live Chat**



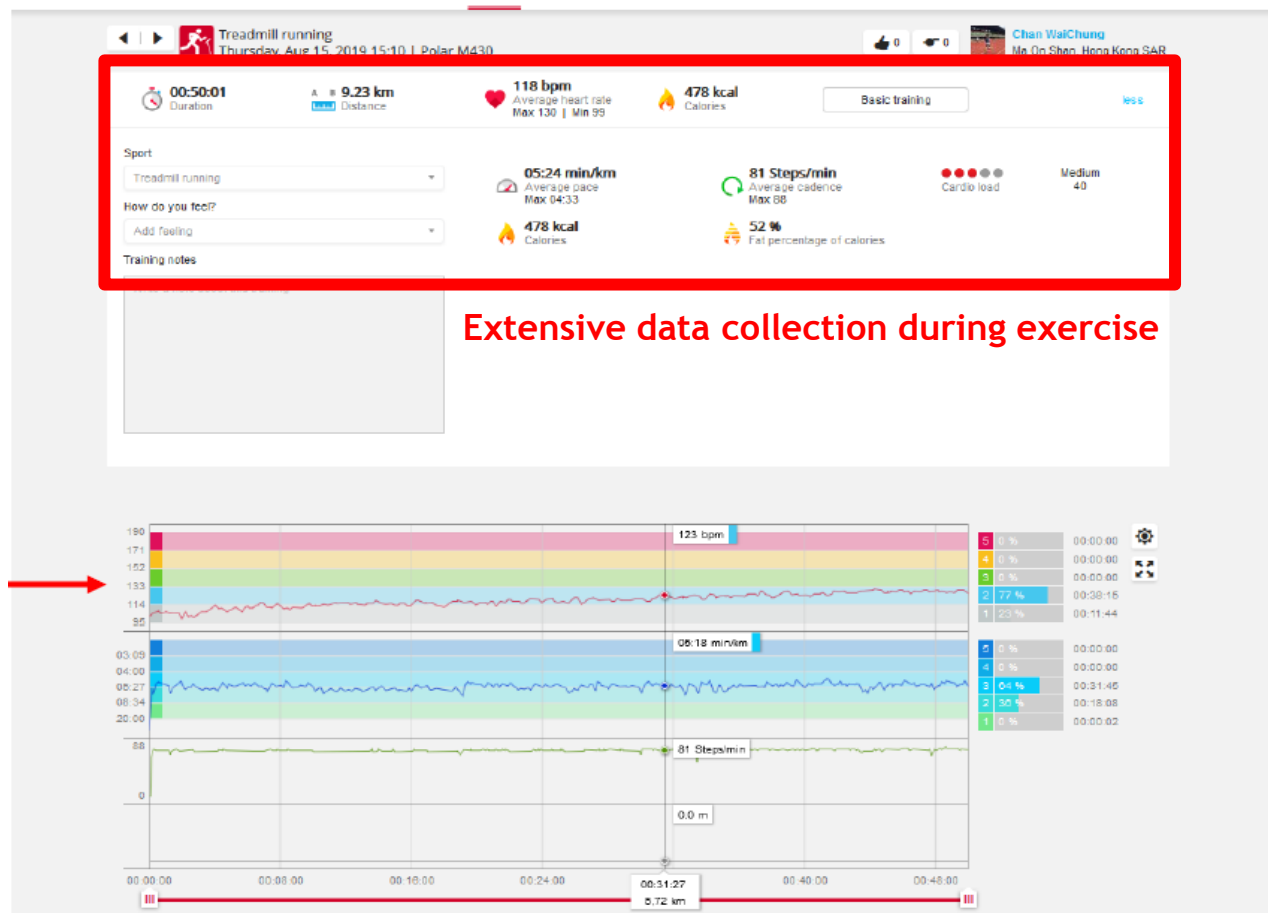
POLAR FLOW FOR COACH

**FREE ONLINE COACHING PLATFORM
FOR COACHES AND PERSONAL TRAINERS**

POLAR®



WORKOUT DETAILS



Heart rate variation during workout

Self-monitoring online

record/feedback
Allows patient to record vital signs and exercise types after each training at home



心臟復康運動 - 自我監察紀錄

每次運動後，請將各種測量後的數據記錄下來，以便我們對閣下的復康進度作出準確的評估!

*必填

姓名 *

您的答案

性別

男

女

日期

日期



Target Patients

Cardiac patients with **low to moderate risk**¹ who can **self-monitor** body condition during home exercise



1. Home-based Cardiac Rehabilitation: Scientific Statement from AACPR, AHA & ACC, Thomas RJ et al. Circulation 2019;140:e69-e-89

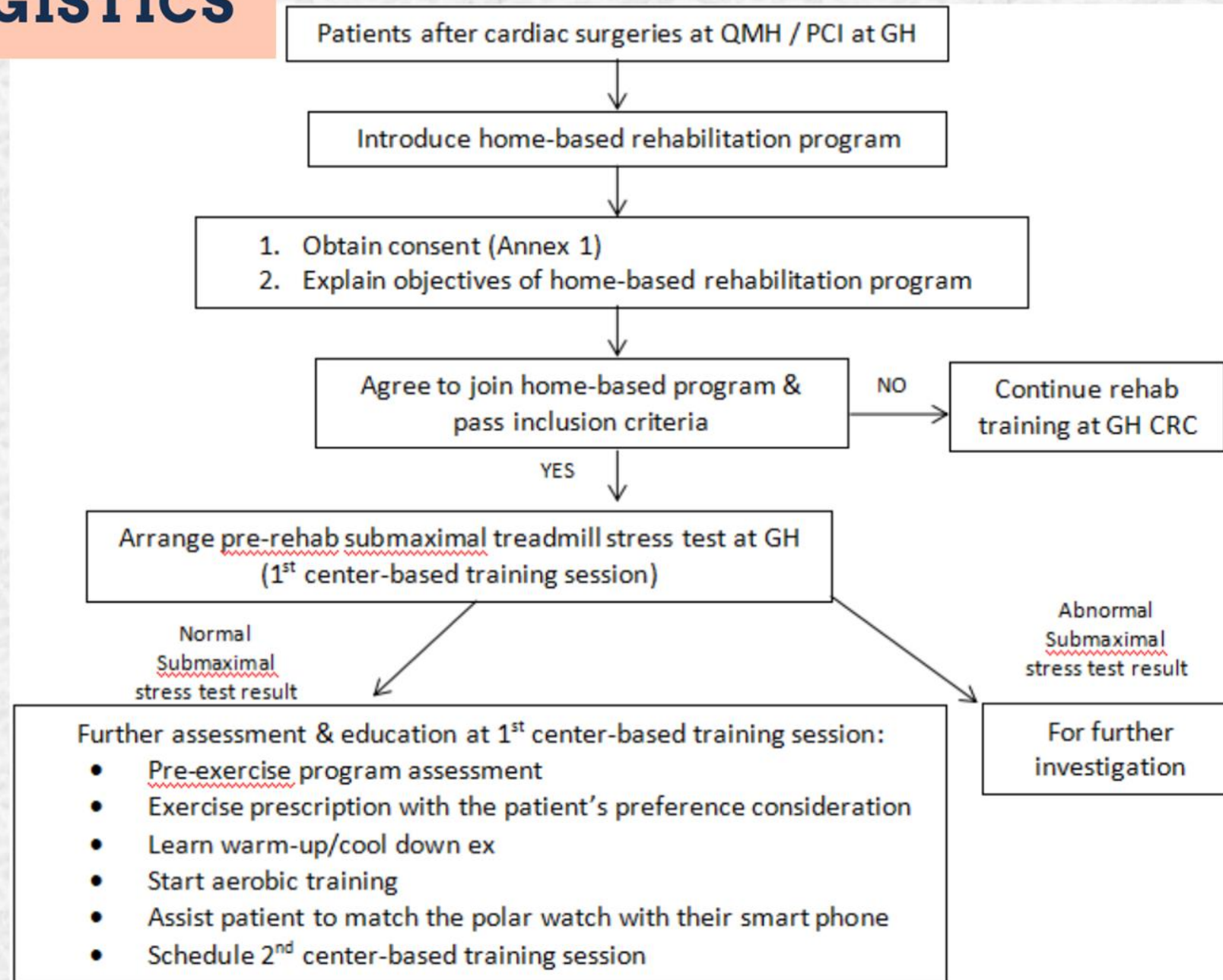
Inclusion Criteria



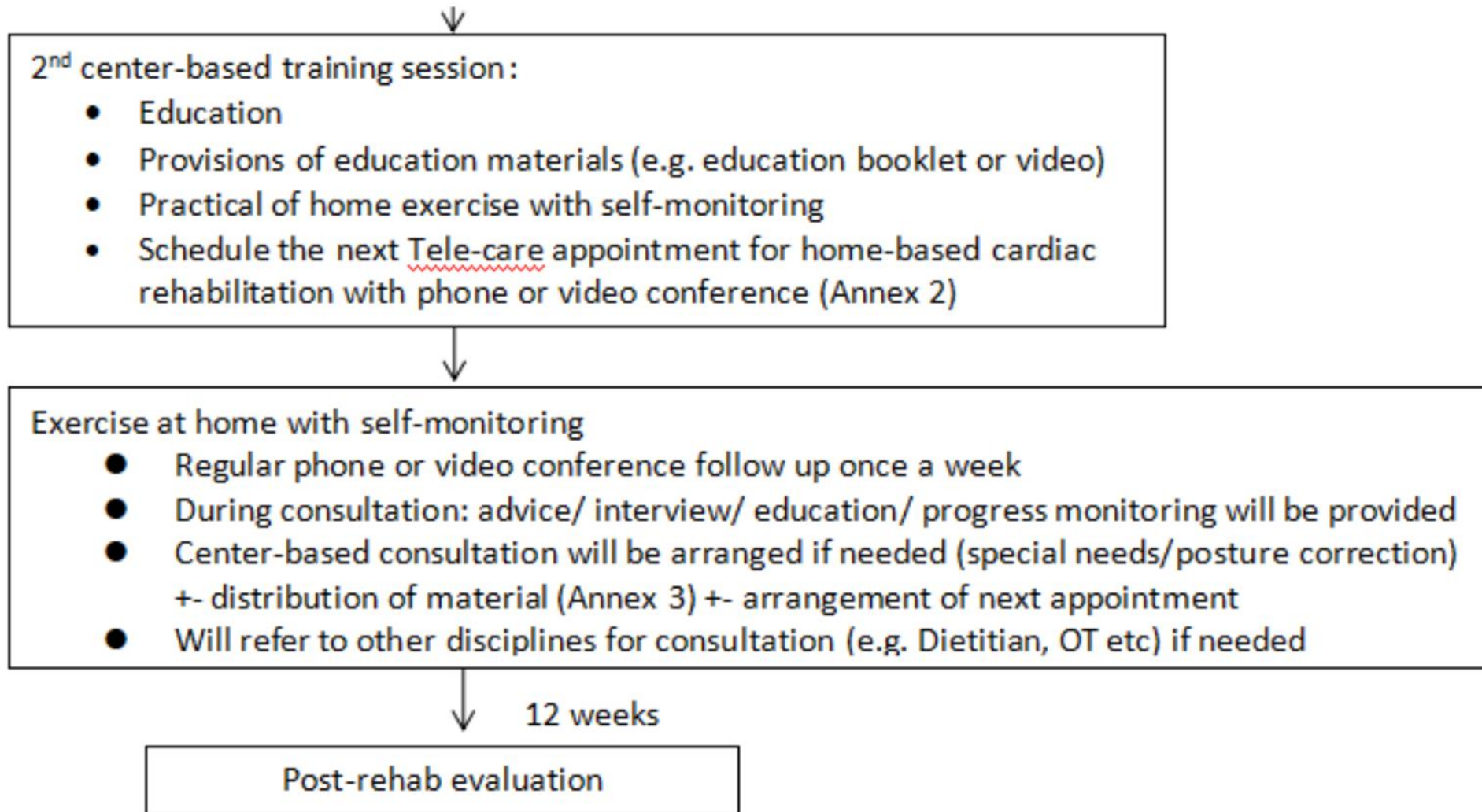
- Post-cardiac surgeries
- Post PCI at GH
- Stable HF
- **Normal** submaximal treadmill stress test result
- Possess a **smartphone**
- **Smartphone/smart watch literate**



LOGISTICS



LOGISTICS

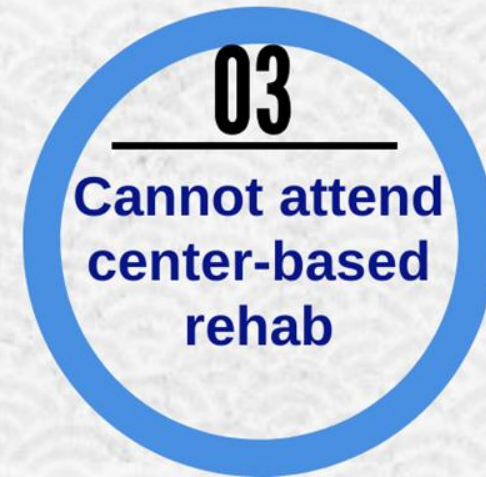


Home-Based Cardiac Rehabilitation: Hybrid Model

① Eligible CR patients



② CR intake assessment visit



Home-Based Cardiac Rehabilitation: Hybrid Model



Home-based rehab
program as self
management tool

improve compliance
& outcomes






Fewer on-site
sessions,
augmented with
home-based
rehab program





Receive
complete
home-
based rehab
program

GH Home-based Cardiac Rehabilitation Program (Early 4 weeks' experience)

Participants:	 x 8  x 4
Mean age:	52.6±9.7
Disease Type:	5 Post-HTx; 6 post-cardiac surgery; 1 post-PCI 
Method:	Self-monitored home exercise → upload data → feedback & advice

GH Home-based Cardiac Rehabilitation Program

(Early 4 weeks' experience)

Equipment Used:	Polar A370 Fitness Tracker 
Data Collection Method:	Polar Flow Coach online platform & online self-monitor survey (Google form) 
Duration:	12 weeks in total (data collected at 4 weeks into the program)

GH Home-based Cardiac Rehabilitation Program (Early 4 weeks' experience)

Goals:

①

SAFETY



(observe for abnormal
BP, HR or **RPE** recorded)

②

EFFECTIVENESS



(build exercise habit
[**150min/week**] &
meet **60-80%** of
target heart rate)

RPE = Rate of Perceived Exertion

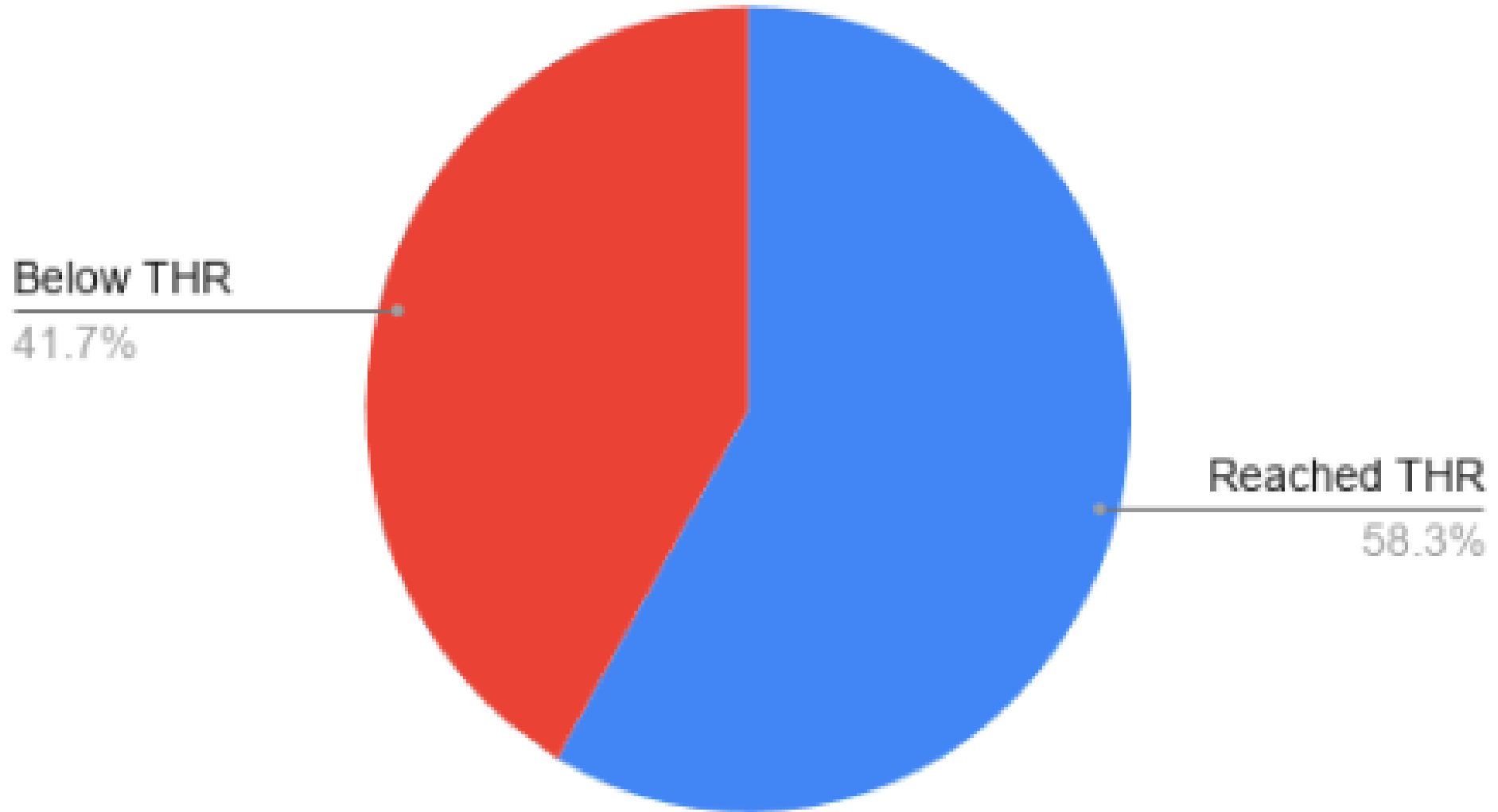
GH Home-based Cardiac Rehabilitation Program

(Early 4 weeks' experience)

Results:

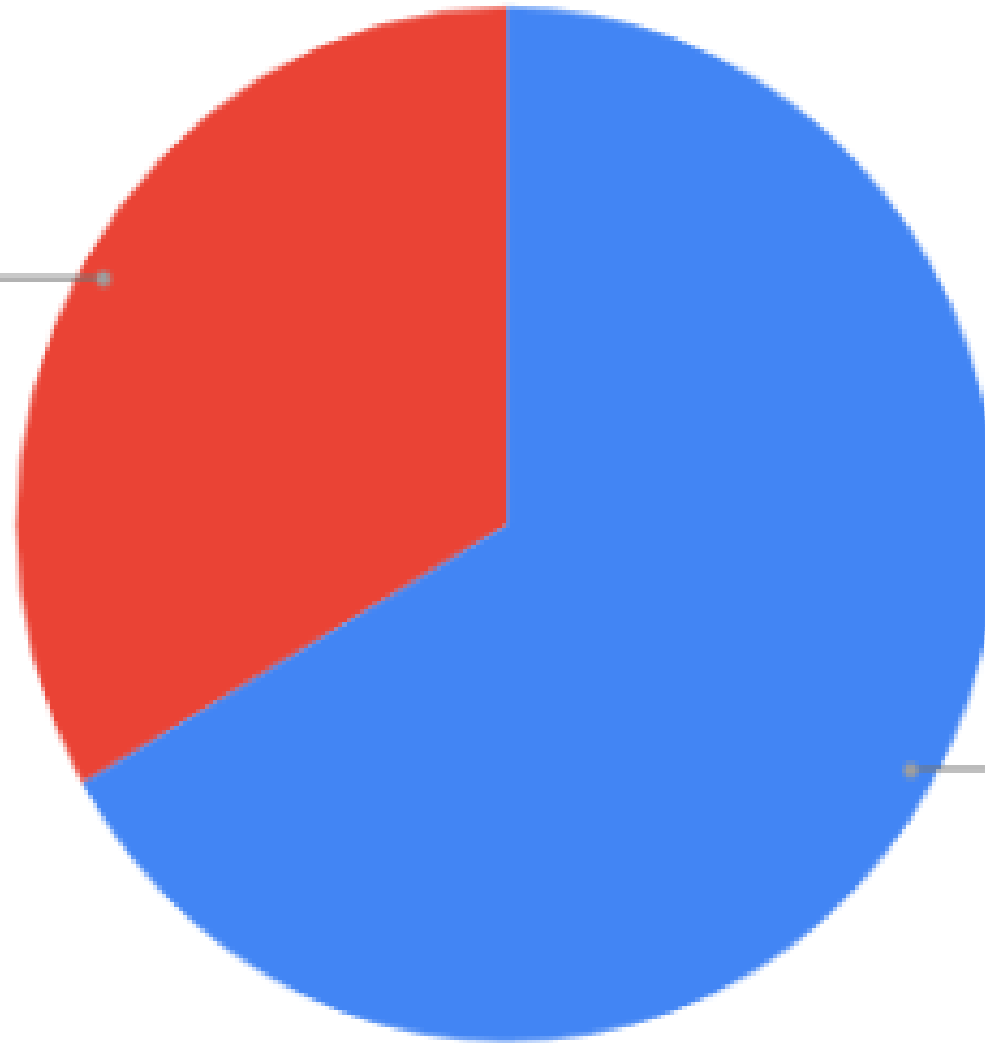
Data upload:	100% successful
Submitted Online Self-monitor Survey (after each exercise session)	75%
Weekly Exercise Time	330min/week (median)
Meet Target Heart Rate	58% (mean)
Meet weekly Exercise Target	67%
Overall BP reported	118±10mmHg (mean)
Overall RPE reported	11±1.7
Adverse Event or Emergency Hospitalization	NONE

Aerobic Exercise Training Effectiveness



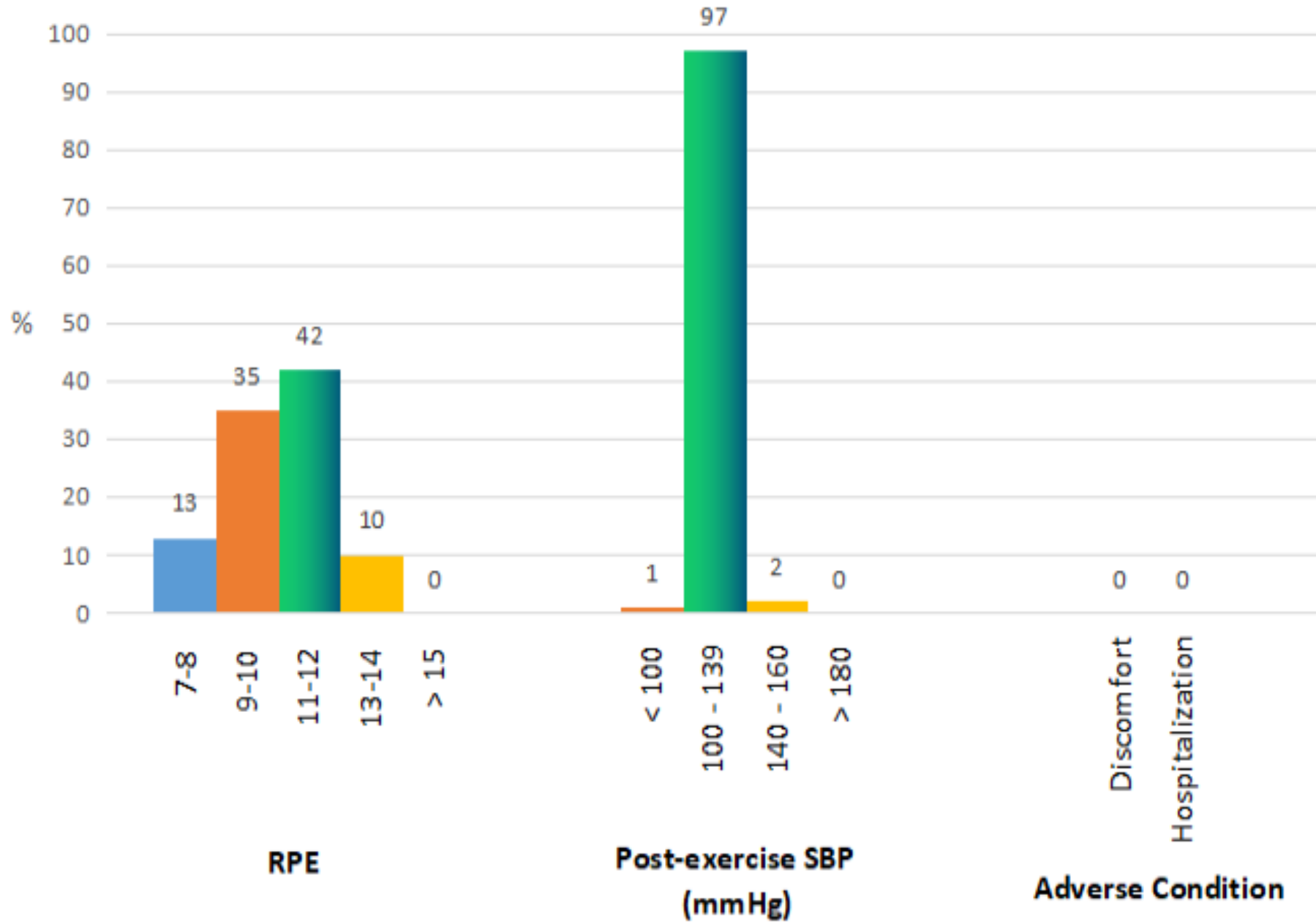
Weekly Aerobic Exercise Fulfillment

<150 min/week
33.3%

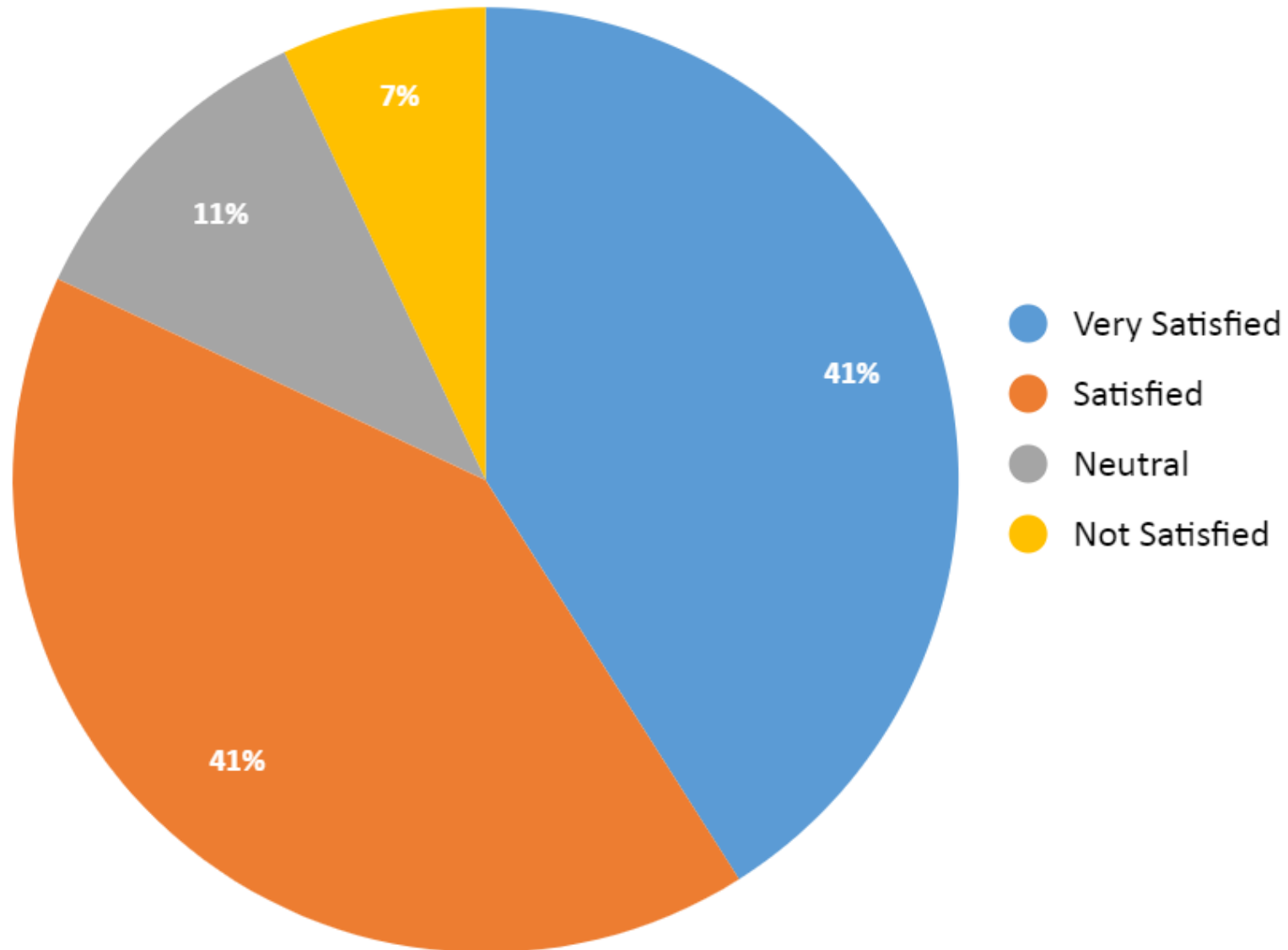


>150 min/week
66.7%

Self-reporting Online Survey Result

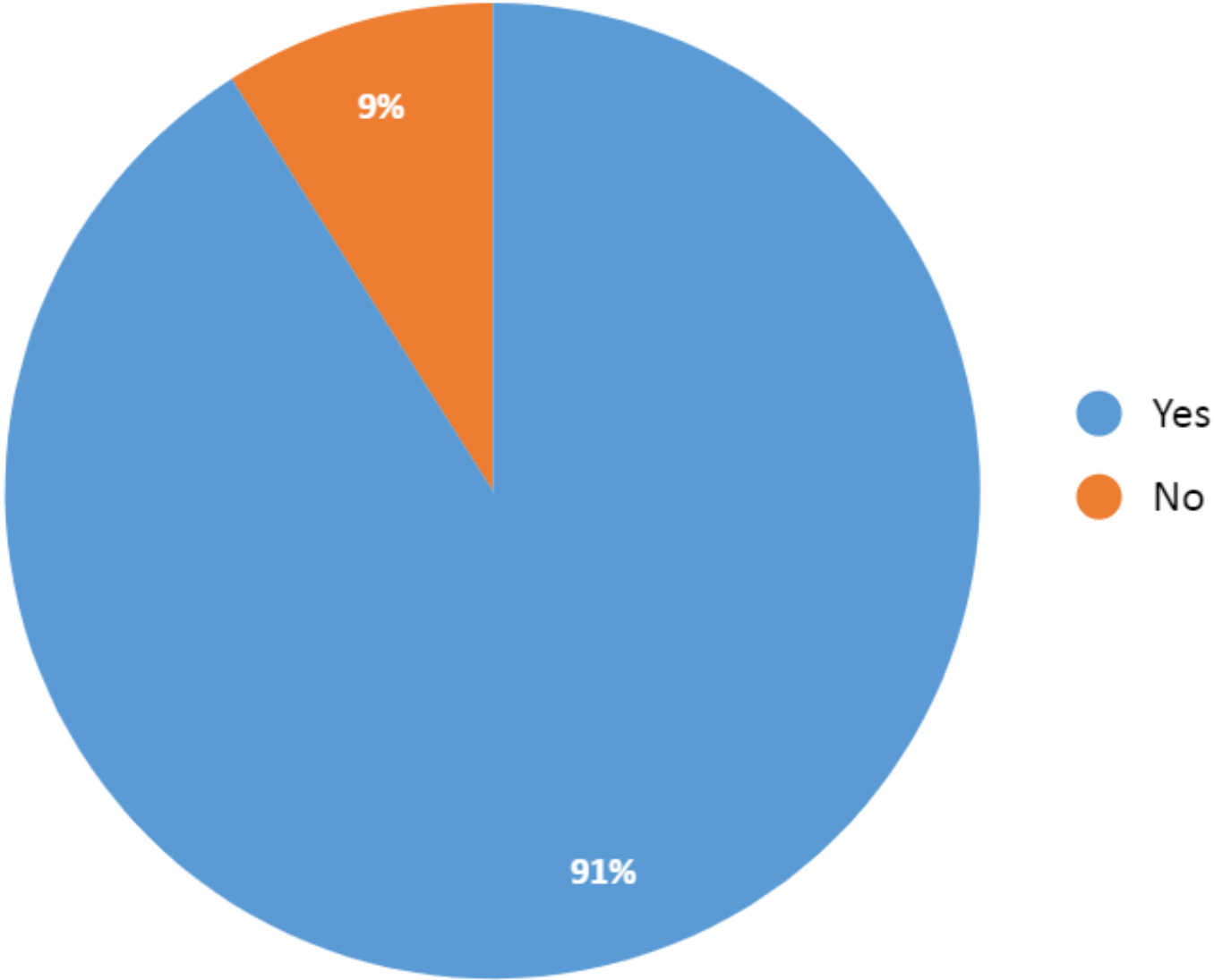


Overall HBCR Satisfactory Level

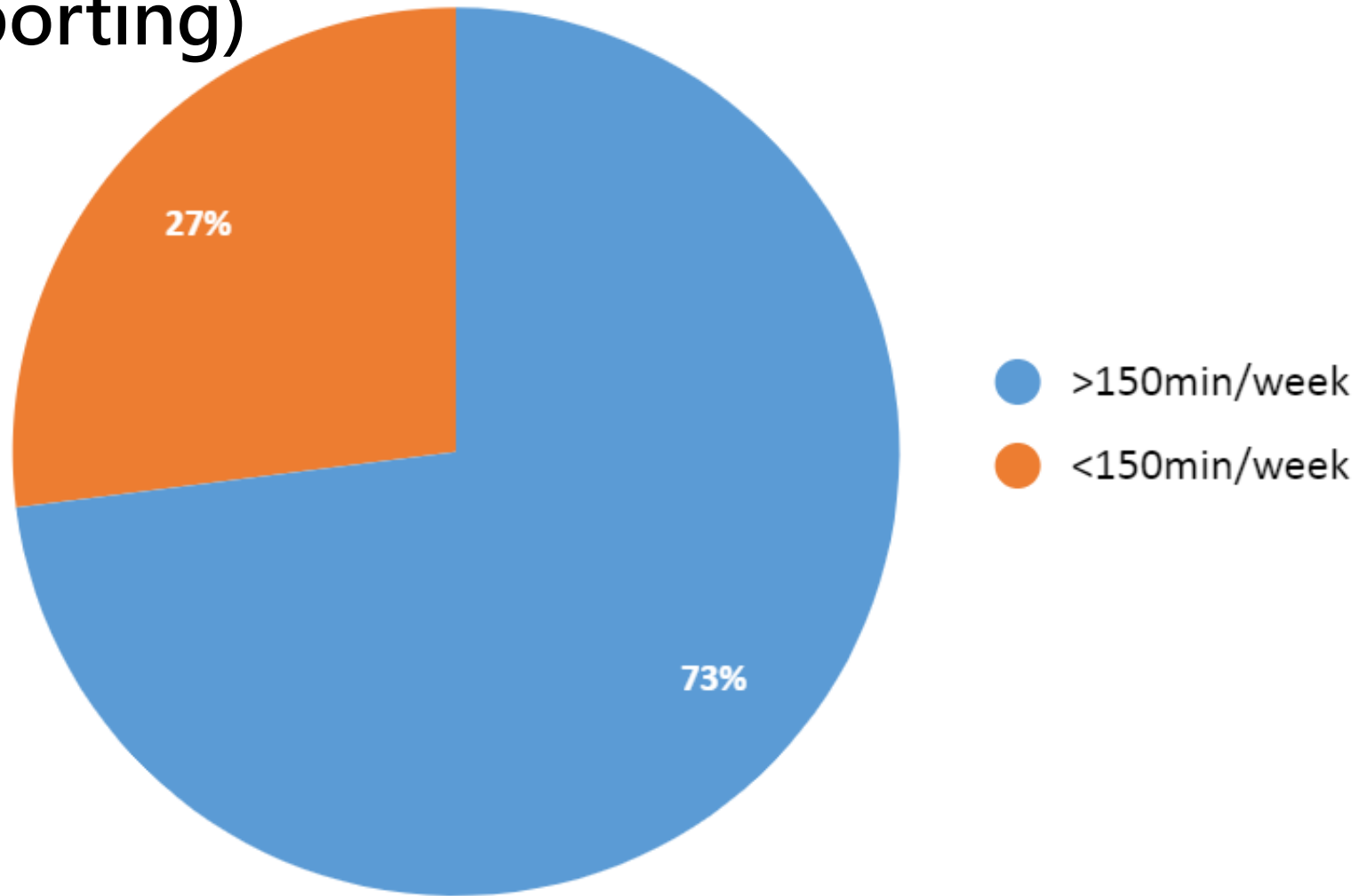


****Reason for dissatisfaction: Smartwatch disconnection problem, unsuccessful data upload, and non user-friendly interface**

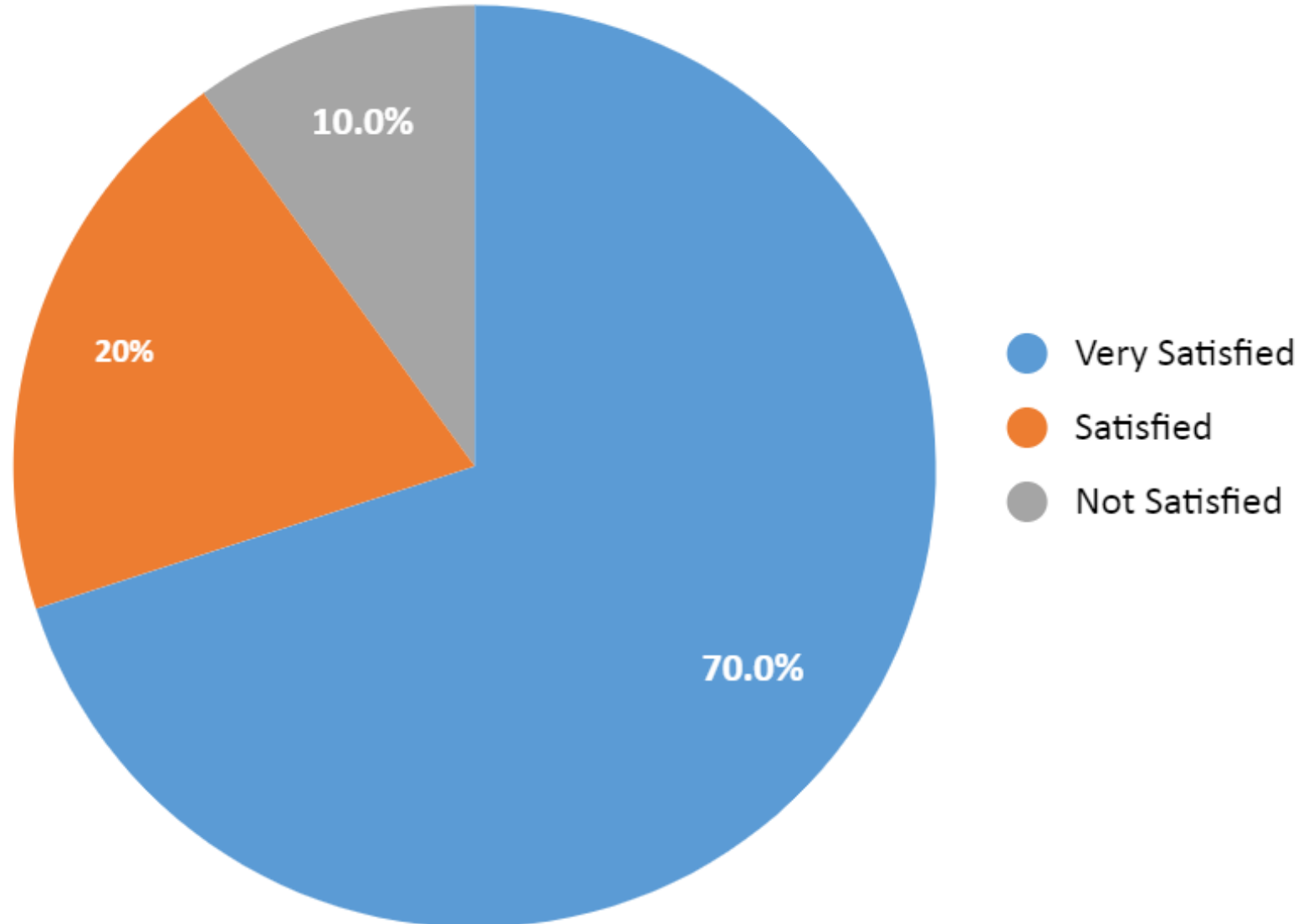
Developed Exercise Habit



Weekly Exercise Goal Fulfilment (Self reporting)



Overall Satisfactory Level on Training Result



Conclusion

- ▶ Cardiac rehabilitation is important part of long term management for patients with cardiovascular diseases
- ▶ In the era of COVID-19, physical attendance to hospital may be restricted. Tele-rehab may be a future direction in future

Thank you

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a modern, layered effect against the white background.