



Updated Outpatient Cardiac Rehabilitation Delivery Formats Tailored to the Iranian Population

Dear Editor,

More than several decades have passed since the advent of cardiac rehabilitation (CR) programs; and throughout this time period, the programs have undergone many changes. CR began with a simple practice of monitoring and then evolved into a multidisciplinary program.¹ Although the early CR programs date back to the 1770s, earnest scientific activity in this field gathered momentum between the 1930s and 1950s with such activities as bed rest, chair therapy, and 3-5 minute daily walks in 4 weeks.¹ The importance of exercise in cardiac recovery was highlighted by Saltin et al.² in 1968, after which time exercise became an integral component of CR programs.

With the significance of exercising after a cardiac event having been highlighted, hospital-based and controlled delivery was brought into use for a limited number of patients. These programs were thereafter expanded over the following decades to allow more patients to benefit from CR.³ The initial traditional format was presented to patients in the form of a short-term program in a hospital or medical center.⁴ Since then, however, delivery formats have gradually evolved, so that home-based programs, remote and rural services for specific groups, hybrid CR programs, Internet-based delivery, telephone health services, exercise-based telehealth interventions, and telephone-focused interventions have been introduced.^{3, 5-9} In each delivery format, tailored to the needs and preferences of the recipients, the patients participate in a specific number of exercise sessions and training classes for the management of risk factors.⁵ By way of example, in the hospital-based delivery format, patients take 8 to 24 weeks of exercise (2-3 sessions per week);^{3, 6} while in the hybrid delivery format, patients exercise for 10 weeks under the supervision of CR specialists. In a hybrid program, patients are recommended to do aerobic exercises individually for 5 days a week.⁶

The obvious benefits for patients notwithstanding,¹⁰ the course of hospital-based delivery is far from smooth, which explains why it is looked upon with disfavor by a significant range of patients.^{11, 12} First and foremost, the fact that the service is provided to patients only in a health center or

hospital is considered to be a major problem by those who live in remote areas and villages, and it generally compels them to opt out.¹³ Patients' reluctance to attend these health centers is mainly due to transportation and road traffic and the resultant wastage of time.¹⁴ Also disinclined to benefit from traditional CR programs are patients without health insurance.^{14, 15}

It should come as no surprise that these challenges have prompted developed countries to devise and, indeed, utilize alternative formats. Recent studies have shown that CR programs are deemed far more acceptable if they are tailored to the needs and preferences of patients,⁵ with the result that the participation rate can increase from 20% to 70%.¹⁴ Meanwhile, in some formats such as hybrid delivery, treatment costs are reduced by 38%.⁶ Indubitably, a two-third reduction in costs will only further incentivize patients to partake in CR programs.¹⁶ It, therefore, appears that developing countries can also benefit from the design of delivery formats appropriate to their respective context and culture.¹⁷ Recent years have witnessed the incorporation of the hybrid format into the traditional delivery format in some Iranian cities such as Kermanshah, with acceptable outcomes.⁶ Nonetheless, hybrid CR is merely one of the abovementioned delivery formats and is not employed in all Iranian CR centers, hence the low participation rate (< 15%) of patients in CR programs.¹⁸ To make matters worse, even half of these patients are liable to withdraw from treatment, primarily as a result of traditional delivery constraints.¹²

The design of the aforementioned wide delivery formats requires the formulation of a strategic plan and the modification of infrastructure in some sources.¹⁴ For instance, one of the most urgent requirements for telephone delivery is the addition of several telehealth specialists to the CR team for the purposes of the daily follow-up of patients assuming that the latter do have access to computers, mobile phones, the Internet, and health applications. In many an instance, despite the availability of health applications, it is the patients who are simply incapable of making the most of them. Recent reports have highlighted the importance of educating patients about the use of health applications,^{19, 20} and it appears advisable that patients be tracked by health supervisors lest they fail to record the required information. Obviously, not only do the issues raised require extensive mechanisms but also delivery formats have need of their own infrastructure and contexts.²¹

In summary, the creation and provision of the requisite infrastructure to implement the above CR programs, in tandem with the training of skilled personnel, can be extremely challenging in developing countries such as Iran. Any alteration, albeit small, to the current system, and not to mention new designs, will impose a substantial financial



burden on the country's health system. Given the status quo in Iran, the country cannot be realistically expected to keep abreast of all novel CR formats and their delivery to target patients in developed countries. The current impediments deprive substantial numbers of patients of safe services tailored to their needs. Nevertheless, the acquisition of information from several silent CR programs in various cities of Iran and an investigation into the benefits and limitations of these programs can be helpful in designing alternative delivery formats. In the coming years, plans and strategies devised by the country's health policymakers can determine the delivery pathway of the services for chronic diseases.

References

- Mampuya WM. Cardiac rehabilitation past, present and future: an overview. *Cardiovasc Diagn Ther* 2012;2:38-49.
- Saltin B, Blomqvist G, Mitchell JH, Johnson RL, Jr, Wildenthal K, Chapman CB. Response to exercise after bed rest and after training. *Circulation* 1968;38(5 Suppl):VIII-78.
- Price KJ, Gordon BA, Bird SR, Benson AC. A review of guidelines for cardiac rehabilitation exercise programmes: Is there an international consensus? *Eur J Prev Cardiol* 2016;23:1715-1733.
- Lear SA, Ignaszewski A. Cardiac rehabilitation: a comprehensive review. *Curr Control Trials Cardiovasc Med* 2001;2:221-232.
- Clark RA, Conway A, Poulsen V, Keech W, Tirimacco R, Tideman. Alternative models of cardiac rehabilitation: a systematic review. *Eur J Prev Cardiol* 2015;22:35-74.
- Saeidi M, Soroush A, Komasi S, Singh P. A hybrid cardiac rehabilitation is as effective as a hospital-based program in reducing chest pain intensity and discomfort. *Korean J Pain* 2017;30:265-271.
- Dunn SL, Dunn LM, Buursma MP, Clark JA, Vander Berg L, DeVon HA, Tintle NL. Home- and hospital-based cardiac rehabilitation exercise: the important role of physician recommendation. *West J Nurs Res* 2017;39:214-233.
- Rawstorn JC, Gant N. Telehealth exercise-based cardiac rehabilitation: a systematic review and meta-analysis. *Heart* 2016;102:1183-1192.
- Brough C, Boyce S, Houchen-Wolloff L, Sewell L, Singh S. Evaluating the interactive web-based program, activate your heart, for cardiac rehabilitation patients: a pilot study. *J Med Internet Res* 2014;16:e242.
- Komasi S, Saeidi M. What is role of sex and age differences in marital conflict and stress of patients under Cardiac Rehabilitation Program? *ARYA Atheroscler* 2016;12:138-145.
- Im HW, Baek S. Barriers to outpatient hospital-based cardiac rehabilitation in Korean patients with acute coronary syndrome. *Ann Rehabil Med* 2018;42:154-165.
- Heydarpour B, Saeidi M, Ezzati P, Soroush A, Komasi S. Sociodemographic predictors in failure to complete outpatient cardiac rehabilitation. *Ann Rehabil Med* 2015;39:863-871.
- Shanmugasagaram S, Oh P, Reid RD, McCumber T, Grace SL. Cardiac rehabilitation barriers by rurality and socioeconomic status: a cross-sectional study. *Int J Equity Health* 2013;12:72.
- Ades PA, Keteyian SJ, Wright JS, Hamm LF, Lui K, Newlin K, Shepard DS, Thomas RJ. Increasing cardiac rehabilitation participation from 20% to 70%: a road map from the million hearts cardiac rehabilitation collaborative. *Mayo Clin proc* 2017;92:234-242.
- Heydarpour B, Saeidi M, Soroush A, Komasi S. What is the most serious obstacle to participation in outpatient cardiac rehabilitation programs among Iranian patients? *Iran J Nurs Mid Res* 2018; 24:158.
- Neubeck L, Freedman SB, Clark AM, Briffa T, Bauman A, Redfern J. Participating in cardiac rehabilitation: a systematic review and meta-synthesis of qualitative data. *Eur J Prev Cardiol* 2012;19:494-503.
- Oldridge NB, Pakosh MT, Thomas RJ. Cardiac rehabilitation in low- and middle-income countries: a review on cost and cost-effectiveness. *Int health* 2016;8:77-82.
- Moradi B, Maleki M, Esmaeilzadeh M, Abkenar HB. Physician-related factors affecting cardiac rehabilitation referral. *J Teh Univ Heart Ctr* 2011;6:187-192.
- Cho MJ, Sim JL, Hwang SY. Development of smartphone educational application for patients with coronary artery disease. *Healthc Inform Res* 2014;20:117-124.
- Mosa ASM, Yoo I, Sheets L. A systematic review of healthcare applications for smartphones. *BMC Med Inform Decis Mak* 2012;12:67.
- Dove JT, Weaver WD, Lewin J. Health care delivery system reform: accountable care organizations. *J Am College Cardiol* 2009;54:985-988.

Saeid Komasi, MSc*

Lifestyle Modification Research Center,
Imam Reza Hospital,
Kermanshah University of Medical Sciences,
Zakarya Razi Boulevard,
Kermanshah,
Iran.
6742775333.
Tel: +98 83 34276299.
Fax: +98 83 34276299.
E-mail: s_komasi63@yahoo.com.

Angelo Compare, PhD

Associate Professor of Psychology,
Department of Human and Social Sciences,
University of Bergamo,
Bergamo,
Italy.
Tel: +39 0352052916.
Fax: +39 0352052916.
E-mail: compare.angelo@gmail.com.