# Facilitators and Barriers to Adherence in Myocardial Infarction Patients

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## Abstract

Cardiovascular diseases are the leading causes of death across the globe and coronary artery disease being the largest contributor among them. Myocardial infarction is a cardiac event that is a symptom of coronary artery disease. Secondary preventive measures are prescribed to MI patients to reduce the recurrence of cardiac events in future. However, the biggest challenge in MI patients is nonadherence to recommended secondary preventive measures. The aim of this paper is to identify facilitators and barriers to adherence in MI patients. Results showed that from psychological, sociodemographic, and clinical perspectives, cognitive factors, coping strategies, social support, socioeconomic status, patient-provider communication are some of the factors among others that play a crucial role in influencing adherence. Cardiac rehabilitation for MI patients is recommended.

*Keywords:* Myocardial Infarction, adherence, nonadherence, coping strategies, social support

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Cardiovascular diseases (CVDs) are the number one cause of death across the globe.According to WHO (2017), 17.9 million of the deaths around the world were due to CVDs and 85% of them were caused due to heart attack and stroke. As of 2019, in India, 15, 19,124 deaths were caused by CADs alone (Institute for Health Metrics and Evaluation, 2020). WHO had predicted a loss of $237 billion for India, due to CVDs because of loss of productivity and healthcare expenditure between 2005 and 2015 (Mendis et al., 2011). Therefore, it is important to reduce the burden of cardiovascular diseases in India and around the world. Heart attacks, medically known as Myocardial Infarction (MI) is a symptom of coronary artery disease (CAD). CAD refers to a condition where the arteries that supply blood to the heart have narrowed down due to plaque formation in them. MI is a cardiac event that occurs when there is a lack of proper flow of blood to a part of the heart and the heart muscle is damaged due to lack of oxygen (Lu et al., 2015).

A single cause behind MI is unknown, however, it is due to the culmination of several risk factors. Thus, in survivors, MI acts as a wakeup call to re-evaluate their lifestyle choices and make healthy changes. Risk factors of MI can be classified as modifiable (smoking, sedentary lifestyle, etc.) and non-modifiable (age, gender, family history of cardiovascular diseases, etc.). Hence, post MI, adhering to recommended secondary preventive measures doubles as management of risk factors as well.

The secondary preventive measures recommended for MI patients include – adherence to prescribed medication, including physical exercise and activity, adopting a healthy diet, and smoking cessation. According to Bosworth (2010), adherence is defined as “the extent to which a person’s behavior – taking medication, following a diet or executing lifestyle changes – corresponds with agreed recommendation from a healthcare provider.” Nonadherence to

medication can result in worsening of cardiac health, re-hospitalization, additional healthcare cost and even death. Yet less than 50% of CAD patients were reported to be adherent to medication (Desai & Choudary, 2013). It was found that 30% of coronary artery problems can be attributed to lack of physical activity (Hariharan, 2020). Ekblom et al. (2018), found that including physical activity for 1 year post MI was related to lowered mortality, which re-iterates the dominant role physical activity plays in post-MI patients.

When it comes to the importance of diet, it couldn't have been better explained than by the famous Hippocrates' quote – "Let thy food be thy medicine and thy medicine be thy food". Following a scheduled diet rich in vegetables has been found to be a significant protective factor against recurrence of MI (Scarano et al., 2019; Yogendra et al., 2004). Smoking kills millions of people and it significantly contributes to CVDs as well. Smoking cessation within a year in post-MI patients was associated with more than 50% reduction in cardiovascular and all-cause mortality (Biery et al., 2020). However, despite the large amount of research done on preventive measures, the biggest challenge in post- MI patients remains adhering to these measures over a long period.

This review looks at psychological, socio-demographic, and clinical factors that act as facilitators or barriers to adherence in MI patients.

### *Psychological Factors*

From a psychological perspective, patients' cognition about their condition, their personality, and the coping strategies they use to cope with stress influence adherence post MI. For example, self-reflection after MI was observed to induce patient readiness towards making healthy choices while witnessing positive physical changes after making these changes helped

patients adhere to secondary preventive measures in the long run (Nicolai et al., 2018). Free will, willpower, self-competency, and personal preferences emerged as additional cognitive factors that determined adherence. This finding is in line with self-determination theory proposed by Ryan and Deci (2000), which identifies inner determination as pivotal to make behavioral changes. Sense of competency was found to act as a catalyst to convert willpower into action. Cognitive factors such as "hypervigilance" and "insecurity about dose and progression of physical activity and exercise" were found to act as barriers to adherence to physical activity in post-MI patients (Bäck et al., 2020). Personal preferences of patients (such as food habits) in most cases were observed to create further barriers to adherence (Hanna et al., 2020).

In addition to these, numerous aspects of patients' personality interact with each other to determine adherence. Sense of Coherence (SOC), measures personality resources useful to cope with stress and it was found to be a strong predictor of lowered BMI, adherence to healthy diet as well as to medication (Nachshol et al., 2020). Self-efficacy was found to be another significant personality facilitator of adherence in MI patients (Polsook et al., 2016). Type D personality was found to act as a barrier as the interaction between negative affectivity and social inhibition aspects of this personality type was seen to play a role in poor clinical outcomes (Williams et al., 2011).

MI is a stressful event and the period immediately post MI remains stressful. Thus, the coping strategies these patients use significantly influences adherence. Wasson et al. (2018), found that patients with MI induced PTSD were likely to be nonadherent to medication as prescribed medications act as aversive, day to day reminders, exacerbating avoidance behavior typical of PTSD. However, not all patients suffer from MI induced PTSD, though heightened stress and anxiety are common after MI. Kuhl et al. (2009), found that overall anxiety worsened

stress levels, acting as a barrier to adherence to smoking cessation as well as physical activity. Chaotic lifestyles describe overall variability in daily regimen (Crowley et al., 2015;Ganasegeran& Rashid, 2017) and it was found that an increase of 1 unit in life-chaos score was associated with 10% increase in the chances of being nonadherent to medication.

More than half of the MI patients were observed to be using emotion-focused coping strategies and 60% of these patients suffered from very high levels of stress demonstrating that those with higher levels of stress may be using inefficient coping mechanisms such as avoidance coping (Bafghi et al., 2018). Denial as a coping mechanism was found to be damaging as every 1 unit increase in denial-of-illness rating was seen to be associated with a 20% increase in the chances of being nonadherent (Ganasegeran& Rashid, 2017). When it came to gender differences in coping strategies, women were seen to be using more avoidance and supportive coping strategies compared to men post MI and additionally reported that they found it more difficult to manage the psychological aspects of MI than men (Kristofferzon et al., 2005). However, no conclusive results can be identified with respect to gender as it was observed that in most studies, women were underrepresented and more research specific to women needs to be conducted.

***Socio-demographic Factors***

Socio-demographic factors are external aspects of patients' life that greatly impact adherence post MI. Demographic factors such as age, gender, and socio-economic status (SES) cannot be changed and thus patients must adapt accordingly post MI to reduce the risk of recurrence. MI patients between 56 to 65 years were found to be more adherent to medication than their younger counterparts (Gonarkar & Dhande, 2016). Younger age patients may passively forget taking medication due to longer working hours, higher social commitments or

they may intentionally tend avoid due to the side effects certain medication (beta blockers which are prescribed can cause fatigue or erectile dysfunction) can have (Crowley et al., 2015; Ganasegeran & Rashid, 2017; Gonarkar & Dhande, 2016). However, this was in contrast with the findings of Kosobucka et al. (2018), which suggested that younger patients (below 65 years) were more adherent to medication than elderly patients as the latter have limited cognitive abilities which may make it difficult to internalize new information and remember to take their medication.

Socio-economic status (SES) was identified to have direct and indirect impact on adherence in MI patients. Patients from lower SES i.e., monthly household income is 20,000 INR or lower, were poorly adherent to medication as medical expenses increased their financial burden (Gaalema et al., 2017; Gonarkar & Dhande, 2016). MI patients with graduate and higher levels of education (who are often from the affluent section of the society) were found to be more adherent to medication (Gonarkar & Dhande, 2016). Additionally, it was found that for each year of education beyond high school there was an increased chance of smoking cessation after having an MI (Wray et al., 1998). It was also found that every 1 kilometer increase in distance between the patient's house and the hospital predicted a 10% increase in non-adherence to medication (Ganasegeran & Rashid, 2017).

Social support was found to be a dominant facilitator in helping MI patients adhere to lifestyle changes. In most cases, spouses provided instrumental support to their post MI partners along with emotional support which these patients greatly relied on to adhere to recommended changes (Hanna et al., 2020; Leong et al., 2004; Nachshol et al., 2020; Nicolai et al., 2018). On the downside, peer pressure or social pressure was observed among patients who continued to

smoke after MI (Nicolai et al., 2018). From these studies, the role of patients' social network is evident, and it needs to be kept in mind while designing secondary preventive programs.

### *Clinical Factors*

Clinical factors such as being co-morbid or having any kind of physical discomfort was seen to act as a barrier to adherence in post MI patients (Nicolai et al., 2018). A study conducted by Kosobucka et al. (2018), showed that prior hospitalization due to CADs, re-vascularization, etc. lowered adherence to treatment post MI, which is a cause for concern since being hospitalized for these conditions, one can expect to understand the importance of adherence to treatment better. Nonadherence to medication was found to be higher among patients who preferred traditional medication, who lacked information about their condition, who have a complex treatment (higher pill count) and those with fear of side effects Bäck et al., 2020;Ganasegeran, and Rashid, 2017).

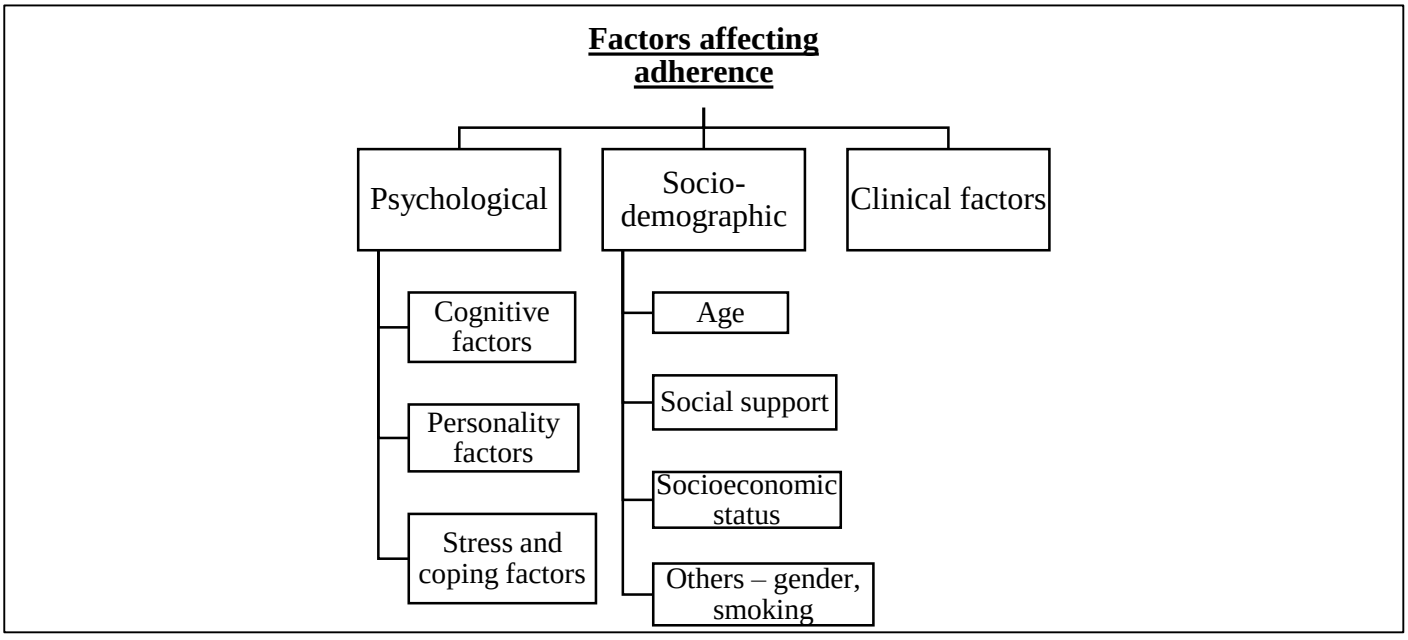


*Figure* 1*:* Factors affecting adherence in post-MI patients

Since post MI management of risk factors is part of primary treatment, it is important to improve adherence in these patients as it is evident from above that nonadherence among MI patients is rampant and it is a cumulative result of various psychosocial factors. There is a need for secondary preventive programs such as Cardiac Rehabilitation (CR) to closely monitor these patients by having routine checkups (Park et al., 2020). Cardiac rehabilitation is a multi-layered intervention offered to heart disease patients, which encompasses elements of health literacy, guidance on cardiovascular risk reduction, stress management and physical exercise (Dalal et al., 2015).

Additionally, it focuses on early hierarchical classification of risk factors, and begins treatment to stall the progression of CAD, to improve quality of life, increase functional ability and prevent recurrence of MI (Perk et al., 2012). CR programs were observed to increase overall health related quality of life at-up to 12 months post MI (Hurdus et al., 2020) and reduce one-year risk of cardiovascular events among aged MI survivors (Bush et al., 2020). As part of CR, assessments of patients' protective and risk factors must be done to ensure that the rehabilitation is customized according to everyone. To increase the accessibility of such programs, it is important that the government and health policy makers provide CR to MI patients in hospitals where they go for their routine health checkups at affordable costs.

## References

Bäck, M., Caldenius, V., Svensson, L., & Lundberg, M. (2020). Perceptions of Kinesiophobia in Relation to Physical Activity and Exercise After Myocardial Infarction: A Qualitative Study. *Physical Therapy*, *100*(12), 2110-2119.

Bafghi, S. M. S., Ahmadi, N., Ardekani, S. M. Y., Jafari, L., Ardekani, B. B., Heydari, R., ... &Faraji, R. (2018). A Survey of Coping Strategies With Stress in Patients With Acute Myocardial Infarction and Individuals Without a History of Fixed Myocardial Infarction. *Cardiology Research*, *9*(1), 35.

Biery, D. W., Berman, A. N., Singh, A., Divakaran, S., DeFilippis, E. M., Collins, B. L., ... & Hainer, J. (2020). Association of smoking cessation and survival among young adults with myocardial infarction in the partners YOUNG-MI Registry. *JAMA network open*, *3*(7), e209649-e209649.

Bosworth, H. (Ed.). (2010). *Improving patient treatment adherence: A clinician's guide*. Springer Science & Business Media.

Bush, M., Kucharska-Newton, A., Simpson Jr, R. J., Fang, G., Stürmer, T., & Brookhart, M. A. (2020). Effect of Initiating Cardiac Rehabilitation After Myocardial Infarction on Subsequent Hospitalization in Older Adults. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *40*(2), 87-93.

Crowley, M. J., Zullig, L. L., Shah, B. R., Shaw, R. J., Lindquist, J. H., Peterson, E. D., & Bosworth, H. B. (2015). Medication non-adherence after myocardial infarction: an exploration of modifying factors. *Journal of general internal medicine*, *30*(1), 83-90.

Dalal, H. M., Doherty, P., & Taylor, R. S. (2015). Cardiac rehabilitation. *Bmj*, *351*.

Desai, N. R., & Choudhry, N. K. (2013). Impediments to adherence to post myocardial infarction medications. *Current cardiology reports*, *15*(1), 322.

Ekblom, O., Ek, A., Cider, Å., Hambraeus, K., &Börjesson, M. (2018). Increased physical activity post–myocardial infarction is related to reduced mortality: results From the SWEDEHEART Registry. *Journal of the American Heart Association*, *7*(24), e010108.

Gaalema, D. E., Elliott, R. J., Morford, Z. H., Higgins, S. T., & Ades, P. A. (2017). Effect of socioeconomic status on propensity to change risk behaviors following myocardial infarction: implications for healthy lifestyle medicine. *Progress in cardiovascular diseases*, *60*(1), 159-168.

Ganasegeran, K., & Rashid, A. (2017). The prevalence of medication nonadherence in post-myocardial infarction survivors and its perceived barriers and psychological correlates: a cross-sectional study in a cardiac health facility in Malaysia. *Patient preference and adherence*, *11*, 1975.

Gonarkar, S. B., &Dhande, P. P. (2016). Medication adherence and its determinants in myocardial infarction patients: An Indian scenario. *Journal of Clinical and Preventive Cardiology*, *5*(1), 2.

Hanna, A., Yael, E. M., Hadassa, L., Iris, E., Eugenia, N., Lior, G., ... &Liora, O. (2020). ``It's up to me with a little support"–Adherence after myocardial infarction: A qualitative study. *International journal of nursing studies*, *101*, 103416.

Hariharan, M. (2020). *Health Psychology. Theory, Practice and Research*. SAGE Publications India.

Hurdus, B., Munyombwe, T., Dondo, T. B., Aktaa, S., Oliver, G., Hall, M., ... & Gale, C. P. (2020). Association of cardiac rehabilitation and health-related quality of life following acute myocardial infarction. *Heart*, *106*(22), 1726-1731. http://dx.doi.org/10.1136/heartjnl-2020-316920

Institute for Health Metrics and Evaluation (IHME). GBD Compare. Seattle, WA: IHME, University of Washington, 2020. Retrieved from http://vizhub.healthdata.org/gbd-compare. Accessed December 16, 2020.

Kosobucka, A., Michalski, P., Pietrzykowski, Ł., Kasprzak, M., Obońska, K., Fabiszak, T., ... & Kubica, A. (2018). Adherence to treatment assessed with the Adherence in Chronic Diseases Scale in patients after myocardial infarction. *Patient preference and adherence*, *12*, 333.

Kristofferzon, M. L., Löfmark, R., & Carlsson, M. (2005). Perceived coping, social support, and quality of life 1 month after myocardial infarction: a comparison between Swedish women and men. *Heart & Lung*, *34*(1), 39-50

Kuhl, E. A., Fauerbach, J. A., Bush, D. E., &Ziegelstein, R. C. (2009). Relation of anxiety and adherence to risk-reducing recommendations following myocardial infarction. *The American journal of cardiology*, *103*(12), 1629-1634.

Lu, L., Liu, M., Sun, R., Zheng, Y., & Zhang, P. (2015). Myocardial Infarction: Symptoms and Treatments. *Cell BiochemBiophys*. doi: 10.1007/s12013-015-0553-4

Mendis, S., Puska, P., Norrving, B., & World Health Organization. (2011). *Global atlas on cardiovascular disease prevention and control*. World Health Organization.

Nachshol, M., Lurie, I., Benyamini, Y., Goldbourt, U., & Gerber, Y. (2020). Role of psychosocial factors in long-term adherence to secondary prevention measures after myocardial infarction: a longitudinal analysis. *Annals of Epidemiology*, *52*, 35-41.

Nicolai, J., Müller, N., Noest, S., Wilke, S., Schultz, J. H., Gleißner, C. A., ... & Bieber, C. (2018). To change or not to change–That is the question: A qualitative study of lifestyle changes following acute myocardial infarction. *Chronic illness*, *14*(1), 25-41.

Park, Y., Park, Y. H., & Park, K. S. (2020). Determinants of Non-Adherences to Long-Term Medical Therapy after Myocardial Infarction: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, *17*(10), 3585.

Perk, J., De Backer, G., Gohlke, H., Graham, I., Reiner, Ž., ... &Cifkova, R. (2012). European Guidelines on cardiovascular disease prevention in clinical practice (version 2012) The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts) Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). *European heart journal*, *33*(13), 1635-1701.

Polsook, R., Aungsuroch, Y., &Thongvichean, T. (2016). The effect of self-efficacy enhancement program on medication adherence among post-acute myocardial infarction. *Applied Nursing Research*, *32*, 67-72.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, *55*(1), 68.

Scarano, P., Magnoni, M., Vergani, V., Berteotti, M., Cristell, N., Maseri, A., &Cianflone, D. (2019). Effect of adherence to Mediterranean diet on first ST-elevation myocardial infarction: Insights from multiethnic case-control study. *Nutrition*, *65*, 185-190.

Wasson, L. T., Shaffer, J. A., Edmondson, D., Bring, R., Brondolo, E., Falzon, L., ... &Kronish, I. M. (2018). Posttraumatic stress disorder and nonadherence to medications prescribed for chronic medical conditions: A meta-analysis. *Journal of psychiatric research*, *102*, 102-109.

Williams, L., O'Connor, R. C., Grubb, N., & O'Carroll, R. (2011). Type D personality predicts poor medication adherence in myocardial infarction patients. *Psychology & health*, *26*(6), 703-712.

World Health Organization (2017). *Cardiovascular diseases*. Retrieved from World Health Organnization: https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)Wray, L. A., Herzog, A. R., Willis, R. J., & Wallace, R. B. (1998). The impact of education and heart attack on smoking cessation among middle-aged adults. *Journal of Health and Social Behavior*, 271-294.

Yogendra, J., Yogendra, H., Ambardekar, S., Leie, R., Shetty, S., & Dave, M. (2004). Beneficial effects of yoga lifestyle on reversibility of ischaemic heart disease: caring heart project of International Board of Yoga. *JAPI*, *52*, 283-9.