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Optimism During Hospitalization for First Acute Myocardial Infarction and Long-Term Mortality Risk: A Prospective Cohort Study

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Abstract

Objective: To assess the association between dispositional optimism, defined as generalized positive expectations about the future, and long-term mortality in young survivors of myocardial infarction (MI).

Patients and Methods: A subcohort of 664 patients 65 years and younger, drawn from the longitudinal Israel Study of First Acute Myocardial Infarction, completed an adapted Life Orientation Test (LOT) questionnaire during their index hospitalization between February 15, 1992, and February 15, 1993. Additional sociodemographic, clinical, and psychosocial variables were assessed at baseline; mortality follow-up lasted through December 31, 2015. Cox proportional hazards regression models were fit to assess the hazard ratios for mortality associated with LOT-derived optimism.

Results: The mean age of the participants was 52.4±8.6 years; 98 (15%) were women. The median follow-up period was 22.4 years (25th-75th percentiles, 16.1-22.8 years), during which 284 patients (43%) had died. The mean LOT score was 16.5±4.1. Incidence density rates for mortality in increasing optimism tertiles were 25.4, 25.8, and 16.0 per 1000 person-years, respectively ($P<.01$). With sequential adjustment for sociodemographic, clinical, and psychosocial variables, a decreased mortality was associated with the upper tertile (adjusted hazard ratio, 0.67; 95% CI, 0.47-0.95). A nonlinear inverse relationship was observed using spline analysis, with the slope increasing sharply beyond the median LOT score.

Conclusion: Higher levels of optimism during hospitalization for MI were associated with reduced mortality over a 2-decade follow-up period. Optimism training and positive psychology should be examined as part of psychosocial interventions and rehabilitation after MI.

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With the emergence of a biopsychosocial approach toward understanding health and disease in recent years, a number of factors related to one's psychological well-being have been identified as health predictors. An example of such a factor is optimism, an important construct within the field of positive psychology,[1] which has previously been associated with mortality and other adverse health outcomes both in the general population and in selected patient cohorts.[2-4] Optimism is primarily conceptualized either as optimistic explanatory style or as dispositional optimism—the first signifying how people explain events that happen to them[5] and the second representing a general expectation that good things will happen in the future.[6] Several ways in which both models may affect one's health via physiological[7-10] and psychosocial[11-14] mechanisms have been considered. Moreover, it was recently suggested that psychological interventions may increase the level of optimism,[15,16] highlighting the potential clinical implications, with (lack of) optimism as a modifiable risk factor.

A number of studies specifically evaluated the role of dispositional optimism in cardiovascular morbidity and mortality,[17-20] reporting an inverse association with coronary heart disease,[20] stroke,[21] and heart failure[22] incidence. Dispositional optimism has also been associated with recovery from cardiovascular disease (CVD),[23,24] as exhibited by lower rates of cardiac readmission and better physical and emotional health after acute coronary syndrome,[25,26] lower risk of rehospitalization after bypass surgery,[24] higher quality of life after heart transplant,[27] and generally a lower risk

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of cardiovascular mortality.[19,20] These findings place dispositional optimism—a relatively stable trait over time[19]—within a broader framework of behavioral cardiology.[28] However, although previous studies indicate the role of dispositional optimism in enhancing recovery after a cardiac event, many of them feature relatively short periods of follow-up (6 months, 12 months, etc) and therefore are limited in understanding the potential longitudinal role of dispositional optimism in cardiac and general health in this population.

We previously reported the importance of psychosocial factors such as depression and social support in long-term prognosis after first myocardial infarction (MI).[29,30] The present study aimed to expand on the current conception of psychosocial constructs in the context of cardiac health and rehabilitation. Specifically, we sought to assess the role of dispositional optimism measured shortly after acute MI in predicting mortality risk during a follow-up period lasting more than 20 years.

PATIENTS AND METHODS

Study Design

Data were drawn from the Israel Study of First Acute Myocardial Infarction (ISFAMI), a longitudinal prospective study of 1626 patients with first MI 65 years and younger who were admitted to 8 medical centers in central Israel between February 15, 1992, and February 15, 1993. Of these patients, 81 died during hospitalization and an additional 24 withdrew consent from participation, leaving a sample of 1521 patients who agreed to participate in the study. The methods of the ISFAMI have been described previously.[31-33] All aspects of the ISFAMI were approved by the respective institutional review boards of the collaborating medical centers.

Myocardial infarction diagnosis was based on the presence of at least 2 of the following criteria: (1) chest pain lasting at least 20 minutes; (2) electrocardiographic changes compatible with Q-wave or non–Q-wave MI; and (3) creatine kinase elevation greater than or equal to 1.5 times the upper limit of normal or creatine kinase MB fraction more than 5% when simultaneous reference creatine kinase levels exceeded the upper limit of normal.

Patients were followed-up longitudinally after the first MI. Data at study entry and during post-MI follow-up were obtained through structured interviews, psychosocial questionnaires, and review of patients' medical records; all clinical data were verified by a senior cardiologist. Optimism and other clinical and sociodemographic variables were assessed at baseline (during the week after the index MI), and a complete mortality follow-up lasted through December 31, 2015.

Optimism data were available for 664 patients (44%); data for the remaining participants were unavailable because of time constraints resulting from multiple medical examinations during a short hospital stay, exhaustion after extensive personal interviews, or lack of Hebrew proficiency, as previously described in detail.[32]

Exposure Variable: Optimism. *Dispositional optimism*, defined as the general expectation that good things will happen in the future, was measured using an adapted version of the original Life Orientation Test (LOT).[6] The questionnaire used in this study consisted of 6 items—3 positive (optimism) and 3 negative (pessimism)—used in the original questionnaire, which comprised 8 items and 4 filler items. Respondents rated each of the 6 items on a 5-point Likert scale (0-4), and a total score was computed by summing the responses across all items after reversing pessimism items. Scores for the separate optimism and pessimism subscales were computed as well. The questionnaire was found to have a moderate-to-high level of reliability (Cronbach α= 0.75; 95% CI, 0.72-0.78).

Outcome Measure: All-Cause Mortality. Mortality was assessed through various sources, including the Israeli Population Registry, participants' medical records, death certificates, family physicians, and family members; follow-up lasted through December 31, 2015. The Israeli Population Registry has complete ascertainment of death.[34]

Covariates. Covariates were assessed at study entry. Sociodemographic factors included age, sex, education (years of schooling completed), pre-MI employment status (full-time or