Abstract: Prognostic role of educational attainment after exercise-based cardiac rehabilitation

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Topic(s): Secondary Prevention

Introduction: There is consistent evidence showing a relation between educational attainment, cardiovascular (CV) risk factors and CV mortality. However, in patients undergoing cardiac rehabilitation program (CRP) after myocardial revascularization and/or cardiac valve surgery, the long-term prognostic value of educational attainment is not well established.

Purpose: to evaluate the long-term prognostic role of educational attainment levels after exercise-based cardiac rehabilitation program (CRP).

Methods: The study included 2042 patients with available educational attainment and follow-up data. Three levels of education have been defined: low (primary school), intermediate (secondary education) and high (tertiary or research education). Mean age was 68 ± 11 years and male gender was prevalent (72%); 48% of patients underwent coronary artery bypass graft (CABG), 2% percutaneous myocardial revascularization, 35% cardiac valve surgery and 15% valve-plus-CABG surgery. Primary endpoints were overall and CV mortality while secondary endpoints were combined MACCEs (CV death, acute coronary syndrome, stroke and heart failure).

Results: Low educational attainment levels were found in 44%, intermediate in 47% and high in 9% of patients. Mean follow-up was 46 ± 16 months and mortality, CV mortality and MACCEs rate were 11%, 6% and 14% respectively. Patients with low educational attainment levels were significantly older (72±8 vs 64±12 vs 65±13 years; p=<0.001), had higher prevalence of female gender (37% vs 21% vs 19%; p=<0.001), arterial hypertension (AHT) (84% vs 75% vs 73%; p<0.001) and diabetes (30% vs 23% vs 21%; p=0.001). Moreover, a lower glomerular filtration rate (GFR) (68±24 vs 83±32 vs 83±33 ml/min; p=<0.001) as well as higher left ventricular mass index (125±41 vs 116±36 vs 103±29 g/m2; p=<0.001) and end-diastolic volume index (63±28 vs 64±27 vs 53±17 ml/m2; p=0.031) were found in patients with low educational attainment levels. On the other hand, no differences in type of cardiac surgery and in left ventricular ejection fraction (LV-EF) (51±10 vs 51±10 vs 53±9 %; p=0.274) were found between groups. Kaplan-Meier analysis showed worse survival free from death (log rank=0.001), CV death (log rank=<0.001) and MACCEs (log rank=0.034) in patients with low educational attainment levels (figure). Overall mortality (HR=2.0, CI 95% 1.1-3.7; p=0.019), CV mortality (HR=3.6, CI 95% 1.3-9.7; p=0.013) and MACCEs rate (HR=1.6, CI 95% 0.9-2.6; p=0.036) were significantly higher in patients with low educational attainment levels, even after adjustment for age, AHT, diabetes, type of intervention, GFR and LVEF.

Conclusions: educational attainment is an independent predictor of overall, CV mortality and MACCEs in patients undergoing CRP after myocardial revascularization and/or cardiac valve surgery.
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Survival curve according to levels of educational attainment

Cumulative survival free from CV death

Time (months)

Log rank p<0.001