# Original paper

# Does education degree affect the patient's attitude towards the treatment after myocardial infarction?

Jolita Badarienė [a,b], Vilma Dženkevičiūtė [a,b], Egidija Rinkūnienė [a,b], Živilė Girkantaitė [a,*], Dovilė Šilinskienė [a,b], Eglė Skiauterytė [a,b], Milda Kovaitė [a,b], Antanas Mainelis [c], Ligita Ryliškytė [a,b], Alma Čypienė [a,b], Jūratė Barysienė [a,b]

[a] *Faculty of Medicine, Vilnius University, Vilnius, Lithuania*
[b] *Center of Cardiology and Angiology, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania*
[c] *Faculty of Mathematics and Informatics, Vilnius University, Vilnius, Lithuania*

## Summary

***Objectives***. To assess the association between education degree and attitude towards the treatment after myocardial infarction (MI).

***Design and Methods***. The participants of this cross-sectional study were 191 (140 men and 51 women) outpatients in a period of 3 months – 5 years after acute MI (mean age $59 \pm 9.2$ years) from Vilnius University Hospital Santaros Klinikos. All patients were asked to complete two questionnaires: "Quality of Life and Treatment after Myocardial Infarction" and "Cholesterol-lowering Drugs Consumption Peculiarities". The data was analyzed using the SPSS software.

***Results***. The education degree (a higher (post-secondary education provided by a college or university) vs. a lower (secondary or vocational education) education degree) had similar influence on the patients' occasional concern (43.2%; $n = 35$ vs. 52.9%; $n = 55$, respectively; $p = 0.226$) and on the frequent concern (25.9%; $n = 21$ vs. 26.9%; $n = 28$, respectively; $p = 0.226$) about MI. Patients with a higher education degree were more likely to identify themselves as the main subjects in MI treatment in comparison with patients that had a lower education degree (30.5%; $n = 25$ vs. 15.2%; $n = 16$, respectively, $p = 0.033$). More educated patients found it easier to follow up the doctor's treatment plan than less educated patients (23.2%; $n = 19$ vs. 9.5%; $n = 10$, respectively; $p = 0.035$).

***Conclusions***. More educated patients are more likely to follow up the doctor's treatment plan and see it easier than less educated patients. Thus, more attention should be paid to less educated patients in order to increase their own impact on their post-MI treatment.

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*Keywords:* education degree, myocardial infarction, treatment

## Introduction

Myocardial infarction (MI) remains a leading cause of morbidity and mortality worldwide [1]. It also determines the impairment of quality of life for patients and their relatives [2]. Patients who survived a first acute MI face a substantial risk of further cardiovascular events, including recurrent MI, stroke, or cardiovascular death [3]. Several clinical studies showed that acute MI causes a decline in the social, physical and psychological functionality of affected patients [4]. In order to prevent these conditions patients have to implement lifestyle changes and adhere to medical treatment recommendations [5]. Patient's attitude towards treatment is a very important component of proper medication adherence and successful results in disease management. In developed countries, only about 50% of all patients treat their chronic diseases according to the instructions [6,7]. Moreover, healthcare professionals tend to overestimate patients' adherence in routine clinical practice [8,9]. This calls for new

* Corresponding address: Živilė Girkantaitė, Faculty of Medicine, Vilnius University, M. K. Čiurlionio Str. 21, LT-03101 Vilnius, Lithuania
E-mail: zivile.girkantaite@mf.stud.vu.lt.

ways to manage the care of patients with chronic diseases [10].

The role of patient in the healthcare system is changing. Previously, the patient was treated as a passive receiver of medicine prescriptions, but nowadays, more and more patients are involved in their own medical treatment management. Furthermore, a patient in partnership is often seen as a patient who responsibly follows treatment as prescribed [11], thus, doctor–patient partnership has a power to strengthen treatment adherence and empower patients to be more active participants in their treatment [8,12]. A doctor–patient partnership is strongly affected by patient's education degree, because education essentially helps to enhance patient's courage and willingness to ask questions and to participate in health care decision making [13]. Moreover, patient's attitude towards his/ her treatment may be determined by patient's attitude towards a doctor, but the research on this topic, as well as the information about education degree influence in post-MI patients' attitude towards treatment is insufficient [14].

In our study, we hypothesized that more educated patients, who have post-secondary education provided by a college or university, may have more positive attitude towards their treatment after MI than less educated patients, who have secondary or vocational education In regard to a need for greater attention to understanding in which ways education degree affects post-MI patients, we analyzed patients who survived MI and their attitude towards treatment and physicians.

## Methods

### Patients' selection

A two-year study was carried among 302 patients (226 men and 76 women), treated in Vilnius University Hospital Santaros Klinikos Preventive Cardiology department. The study included 35–80 year-old patients in a period of 3 months – 5 years after MI. Exclusion criteria were acute infections, oncological diseases, hematological diseases, thyroid dysfunction and thromboembolic complications.

### Questionnaires

All patients were asked to complete two questionnaires: "Quality of Life and Treatment after Myocardial Infarction" and "Cholesterol-lowering Drugs Consumption Peculiarities". All questions of these questionnaires were responded by 191 (140 men and 51 women) patients, therefore statistical analysis was performed only from their data. "Disease-Specific Quality of Life and Treatment after Myocardial Infarction" questionnaire consisted of 20 single or multiple choice closed-ended questions about social status (place of residence, marital status, education degree), attitude towards treatment and treatment of MI plan, patients' own contribution to treatment, evaluation of doctor's work and reliance and availability of information about MI. "Cholesterol-lowering Drugs Consumption Peculiarities" questionnaire comprised 8 single or multiple choice closed-ended questions about type and dose of drugs that patients were taking after MI, duration of the treatment and patients' satisfaction with the drugs usage. These questionnaires were compiled by the authors of the study.

### Ethical issues

The study conforms with the principles outlined in the Declaration of Helsinki. Permission No. 158200-15-804-316 was issued by the Vilnius Regional Biomedical Research Ethics Committee. The written informed consent was obtained from all participants before their inclusion in the study.

### Statistical analysis

Statistical analysis was performed using the SPSS 16.0 for Windows and Microsoft Excel programs. Continuous and normally distributed variables were presented as mean (SD), while continuous variables with asymmetric distribution were presented as median with range values (min–max). Categorical data were presented as frequencies and percentages. Continuous variables were compared using the T-test or the Mann–Whitney test. Categorical variables were compared using the *chi square* test. All *p*-values were two-tailed. A value of $p \leq 0.05$ considered to be statistically significant.

## Results

### Sociodemographic data

The majority of patients were men (73.3%; $n = 140$). The mean age of all subjects was $59 \pm 9.2$ years. More patients lived in the urban areas (80.1%; $n = 153$) and were married or had a cohabitant (76.4%; $n = 146$). Almost half of respondents had a higher education degree (42.4%; $n = 81$) (Table 1).

### Concern about the survived MI

In our study, we have found that most of the study participants (74.3%; $n = 142$) were concerned about the previous MI: 47.6% ($n = 91$) of

**Table 1.**
Demographic and social characteristics of study population

| **Demographic data** | | |
|---|---|---|
| Gender | Men | 140 (73.30) |
| | Women | 51 (26.7) |
| Age (years) | | 59 ± 9.2* |
| Age (interval) | | 35–80 |
| **Social data** | | |
| Place of residence | Urban areas | 153 (80.1) |
| | Rural areas | 38 (19.9) |
| Marital status | Married or have a cohabitant | 146 (76.4) |
| | Unmarried | 14 (7.3%) |
| | Divorced | 16 (8.4%) |
| | Widow/ widower | 15 (7.8%) |
| Education degree | Higher | 81 (42.4) |
| | Lower | 110 (57.6) |

Data are presented as number (percentage) and as mean ± SD*.

participants expressed an occasional concern (occurring infrequently and irregularly) and 26.7% ($n = 51$) of participants expressed a frequent concern (occurring many times at short intervals) about MI. Only 25.6% ($n = 49$) of participants were not concerned about their disease. We found that the education degree (a higher vs. a lower education degree) had a similar influence on the occasional concern (43.2%; $n = 35$ vs. 52.9%; $n = 55$, respectively; $p = 0.226$) and on the frequent concern (25.9%; $n = 21$ vs. 26.9%; $n = 28$, respectively; $p = 0.226$) about MI. In our study we analyzed the reasons for the concern about MI and it was shown that patients were most worried about their reduced work capacity (55.4%; $n = 106$), lifestyle changes (28.2%; $n = 54$), possible complications of MI (20.9%; $n = 40$), shorter life expectancy (20.4%; $n = 39$) and risk of becoming dependent on other people (18.3%; $n = 35$). Patients were less worried about nutrition changes (15.7%; $n = 30$), discrimination due to MI (4.71%; $n = 9$) and negative effect on relationships with other people (2.1%; $n = 4$). According to patients' subjective opinions, risk of bleeding after MI appeared to be statistically significantly more relevant for patients with a higher education degree in comparison with patients with a lower education degree (9.8%; $n = 8$ vs. 1.9%; $n = 2$, respectively; $p = 0.023$). All results are shown in the Table 2.

***Attitude towards the treatment of MI***

In our study we analyzed the attitude of patients towards their treatment of MI. The study revealed that 64.4% ($n = 123$) of patients claimed that both themselves and the doctor together play a major role in MI treatment. However, the rest of patients had different opinions: 21.9% ($n = 42$) of respondents claimed that only they themselves play a major role in MI treatment, whereas 13.6% ($n = 26$) of respondents claimed that the doctor is a main person in MI treatment. As expected, patients with a higher education degree felt more involved in their medication management and were more likely to identify themselves as the main subjects in MI treatment in comparison with patients with a lower education degree (30.5%; $n = 25$ vs. 15.2%; $n = 16$, respectively, $p = 0.033$). The greater involvement in MI treatment of more educated patients also confirmed the finding that patients with a higher education degree look for the information about the treatment of MI by themselves and search on the Internet more often than patients with a lower education degree (48.8%; $n = 40$ vs. 30.5%; $n = 32$, respectively, $p = 0.011$). However, the majority of all patients claimed that the most significant information source about the treatment of MI were doctors (91.6%; $n = 175$).

The analysis of satisfaction of doctor's and patient's contribution to the treatment of MI revealed that 42.9% ($n = 82$) of all subjects were very satisfied with the efforts in MI treatment made by doctors: a cardiologist (42.9%; $n = 82$), a hospitalist (84.2%; $n = 161$) and a general practitioner (30.8%; $n = 59$). However, only 10.4% ($n = 20$) of patients were very satisfied with their own efforts in MI treatment. According to the education degree, less educated patients evaluated cardiologist's work more favorably than more educated patients (median (interquartile range) 5 (4–5) vs. 4 (3–5), respectively; $p = 0.015$). However, there was no statistically significant difference in the assessment of the efforts in MI treatment made by a general practitioner, by a hospitalist and by the patients themselves, according to the patient's education degree.

A majority of respondents (90.5%, $n = 173$) stated that there are no difficulties to follow any doctor's treatment plan. However, the rest of patients (9.4%; $n = 18$) discovered some difficulties: short intervals between the drugs usage, which leads to forgetting to take medicine on time (72.2%; $n = 13$), high prices (22.2%; $n = 4$), side effect of drugs (16.6%; $n = 3$), lack of information about treatment (16.6%; $n = 3$) and low efficacy of drugs (5.5%; $n = 1$). As expected, patients with a higher education degree found it easier to follow up the doctor's treatment plan than patients with a lower education degree (23.2%; $n = 19$ vs. 9.5%; $n = 10$, respectively; $p = 0.035$). We also have found that patients with a higher education degree were more likely to follow the hospitalist's treatment recommendations comparing with patients who had a lower education degree

**Table 2.**
Causes of concern about myocardial infarction by education degree

| Causes of concern about myocardial infarction | All respondents ($n = 191$) | Respondents with a higher education degree ($n = 81$) | Respondents with a lower education degree ($n = 110$) | $p$-value |
|---|---|---|---|---|
| Reduced work capacity | 106 (55.4) | 40 (48.8) | 66 (62.9) | 0.074 |
| Lifestyle changes | 54 (28.2) | 26 (31.7) | 28 (26.7) | 0.45 |
| Complications of myocardial infarction (cardiovascular, nervous, etc.) | 40 (20.9) | 20 (24.4) | 20 (19.0) | 0.377 |
| Shorter life expectancy | 39 (20.4) | 15 (18.3) | 24 (22.9) | 0.446 |
| Risk of becoming dependent on other people | 35 (18.3) | 13 (15.9) | 22 (21.0) | 0.375 |
| Nutrition changes | 30 (15.7) | 9 (11.0) | 21 (20.0) | 0.095 |
| Risk of bleeding | 10 (5.2) | 8 (9.8) | 2 (1.9) | 0.023 |
| Discrimination due to myocardial infarction (e.g. employment) | 9 (4.7) | 1 (1.2) | 8 (7.6) | 0.08 |
| Negative effect on relationships with other people | 4 (2.1) | 3 (3.7) | 1 (1.0) | 0.321 |

Data are presented as number (percentage).

(31.7%; $n = 26$ vs. 17.1%; $n = 18$, respectively, $p = 0.02$).

### Medications for MI treatment

Our study showed that almost all patients (88.4%; $n = 137$) were satisfied with the recommended cholesterol-lowering medications. The satisfaction did not depend on patient's education degree (higher 84.5%; $n = 49$ vs. lower 90.1%; $n = 82$, respectively; $p = 0.304$). The majority of patients (both with a higher and a lower education degree) did not tend to stop taking the cholesterol-lowering medications (78.6; $n = 44$ vs. 75.3; $n = 58$, respectively, $p = 0.662$). Moreover, the study revealed that the patients had quite good knowledge about existence and purpose of usage of all MI medications: antithrombotic drugs (73.8%; $n = 141$), cholesterol-lowering drugs (65.4%; $n = 125$), beta blockers (61.7%; $n = 118$) and angiotensin-converting enzyme inhibitors (47.6%; $n = 91$).

In our study we analyzed various factors that may impact patients' better adherence to treatment of MI. We have found that understanding the drug's pharmacological action (41.8%; $n = 80$) and doctor's advice and recommendations (31.9%; $n = 61$) were the main factors that lead to better adherence to treatment for all patients. Although our results showed no statistically significant differences in naming factors of better adherence to treatment between patients with higher vs. lower education, we observed a tendency, that more patients with a lower education degree paid more attention to their friends or family experience than more educated patients, which preferred doctor's advice and recommendations (9.4% vs. 59.0%). All results are presented in the Table 3.

### Discussion

Our study revealed that many patients, regardless of education degree (a higher vs. a lower education degree), were equally concerned about their disease. Moreover, education degree had similar influence on patients' causes of concerns about their life changes after MI. This supports well known facts from literature that MI is unexpected and impactful event for all patients [15]. However, our study revealed that education degree has an impact on patients' attitude towards MI treatment. We found that patients with a higher education degree are more likely to identify themselves as the main subjects in MI treatment in comparison with patients with a lower education degree. It shows that more educated patients feel more involved in the treatment process and more responsible for it than less educated patients. This leads to a statement, that patients with a higher education degree are more likely to maintain a firm doctor–patient partnership, which has a power to strengthen adherence to treatment plan and empower patients to be

**Table 3.**
Factors leading better adherence to treatment

| Factors leading better adherence to treatment | All respondents ($n = 191$) | Respondents with a higher education degree ($n = 81$) | Respondents with a lower education degree ($n = 110$) | $p$-value |
|---|---|---|---|---|
| Understanding the drug's pharmacological action | 80 (41.8) | 39 (61.9) | 41 (49.4) | 0.317 |
| Doctor's advice and recommendations | 61 (31.9) | 36 (59.0) | 25 (42.4) | 0.177 |
| A clear understanding about the disease | 52 (27.2) | 27 (50.0) | 25 (41.8) | 0.645 |
| Responsibility for success of the treatment | 52 (27.2) | 26 (47.3) | 26 (47.3) | >0.999 |
| Medicines were used by someone from acquaintances | 5 (2.6) | 2 (6.5) | 3 (9.4) | >0.826 |

Data are presented as number (percentage).

more active in their disease management [8,12]. As it is known, patients participation in decision making in health care and treatment is associated with improved outcomes of the disease [13].

The study also showed that patients with a higher education degree tend to follow the doctor's treatment plan and see less difficulty in it than patients with a lower education degree. Moreover, we found that patients with a higher education degree were more likely to follow the hospitalist's treatment recommendations comparing with patients who had a lower education. These results are not compared with results from other researches, because there are no studies on this topic presented yet. There was one study, organized by Gaalema et al., showing that patients with a lower socioeconomic status are less likely to make needed behavioral risk factors' changes after MI [16]. This leads to the assumption that such people would also not tend to follow the treatment plan properly. Moreover, we found one particular study by Consuegra-Sánchez et al., which revealed an inverse and independent relationship between education degree and long-term mortality in patients that had MI [17]. According to these facts, attention should be paid on secondary MI prevention strategies, which should be strengthened in patients with a lower education degree [18], mainly by trying to educate patients about coronary heart disease and improve patients' health literacy, which is defined as the capacity to seek, understand and act on health information [19].

Our study showed that only a small number of patients are very satisfied with their own efforts in MI treatment, although the majority of our patients are satisfied with their doctors' work.

We found that the cardiologist's work is even more favorably evaluated by less educated patients. Since patients trust their doctor, professionals have to be very supportive, spend enough time with the patient to create a therapeutic relationship, acknowledge the patient's personal view of his/her disease, encourage expression of concerns, involve the patient in selecting the most appropriate strategies for changes, make sure that the patient has understood the advice and offer regular follow-up contacts [5]. In this case, the patient would have a chance to feel how doctor–physician relationship becomes a true partnership and to feel more satisfied with their own efforts in their illness treatment.

Furthermore, our study demonstrated that the majority of patients still consider doctors to be the most significant source of information about MI treatment. On the one hand, it shows that patients trust their doctors, but this also reveals that there is a lack of trust in the other health care providers, such as nurses, or other information sources, for example, the Internet. Our study revealed that more educated patients tend to use the Internet more often than less educated patients for this purpose. Thus, there is a need to increase the credibility of the other sources. In this case, doctors have to involve other healthcare staff whenever possible. Combining the knowledge and skills of physicians, nurses, psychologists and other caregivers, and trying to make sure information on the Internet is as reliable as possible, would help to achieve greater treatment results [5].

## Conclusions

In conclusion, MI is a concern for a majority of both more educated and less educated patients. Patients with a higher education degree are more likely to follow the doctor's treatment plan and find it easier to follow than patients with a lower education degree. Thus, more attention should be paid to less educated patients by expanding their knowledge about their disease and subsequent changes of their lifestyle, the awareness about their own importance to follow the treatment plan and building a stronger patient-physician relationship.

## Acknowledgement

## Limitations

The present study is limited because of its relatively small number of participants. In addition, there is a lack of literature that is related to our study topic.

## Funding

## References

[1] Roger VL. Epidemiology of myocardial infarction. Med Clin North Am 2007;91(4):537–ix.

[2] Thompson DR, Lewin, R. J. P. Coronary disease: management of the post-myocardial infarction patient: rehabilitation and cardiac neurosis. Heart 2000;84(1):101–5.

[3] Abu-Assi E, López-López A, González-Salvado V, Redondo-Diéguez A, Peña-Gil C, Bouzas-Cruz N, et al. The risk of cardiovascular events after an acute coronary event remains high, especially during the first year, despite revascularization. Rev Esp Cardiol Engl Ed 2016;69(1):11–8.

[4] Simpson E, Pilote L. Quality of life after acute myocardial infarction: A comparison of diabetic versus non-diabetic acute myocardial infarction patients in Quebec acute care hospitals. Health Qual Life Outcomes 2005;3:80.

[5] Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J 2016;37(29):2315–81.

[6] Naderi SH, Bestwick JP, Wald DS. Adherence to drugs that prevent cardiovascular disease: meta-analysis on 376,162 patients. Am J Med 2012;125(9):882-887.e1.

[7] Brown MT, Bussell JK. Medication Adherence: WHO Cares? Mayo Clin Proc 2011;86(4):304–14.

[8] Kvarnström K, Airaksinen M, Liira H. Barriers and facilitators to medication adherence: a qualitative study with general practitioners. BMJ Open 2018;8(1):e015332.

[9] Kekäle M, Talvensaari K, Koskenvesa P, Porkka K, Airaksinen M. Chronic myeloid leukemia patients' adherence to peroral tyrosine kinase inhibitors compared with adherence as estimated by their physicians. Patient Prefer Adherence 2014;8:1619–27.

[10] Karazivan P, Dumez V, Flora L, Pomey M-P, Del Grande C, Ghadiri DP, et al. The patient-as-partner approach in health care: a conceptual framework for a necessary transition. Acad Med 2015;90(4):437.

[11] Pomey M-P, Ghadiri DP, Karazivan P, Fernandez N, Clavel N. Patients as Partners: A Qualitative Study of Patients' Engagement in Their Health Care. PLoS One 2015;10(4):e0122499.

[12] Menichetti J, Libreri C, Lozza E, Graffigna G. Giving patients a starring role in their own care: a bibliometric analysis of the on-going literature debate. Health Expect 2016;19(3):516–26.

[13] Vahdat S, Hamzehgardeshi L, Hessam S, Hamzehgardeshi Z. Patient involvement in health care decision making: a review. Iran Red Crescent Med J 2014;16(1):e12454.

[14] Ware JE, Snyder MK. Dimensions of patient attitudes regarding doctors and medical care services. Med Care 1975;13(8):669–82.

[15] Smolderen KG. Coping after an acute myocardial infarction: the role of depression and anxiety. American College of Cardiology; 2017.

[16] Gaalema DE, Elliott RJ, Morford ZH, Higgins ST, Ades PA. Effect of socioeconomic status on propensity to change risk behaviors following myocardial infarction: implications for healthy lifestyle medicine. Prog Cardiovasc Dis 2017;60(1):159–68.

[17] Consuegra-Sánchez L, Melgarejo-Moreno A, Galcerá-Tomás J, Alonso-Fernández N, Díaz-Pastor Á, Escudero-García G, et al. Educational level and long-term mortality in patients with acute myocardial infarction. Rev Esp Cardiol 2015;68(11):935–42.

[18] Mackenbach JP, Stirbu I, Roskam A-JR, Schaap MM, Menvielle G, Leinsalu M, et al. Socioeconomic inequalities in health in 22 European countries. N Engl J Med 2008;358(23):2468–81.

[19] Paterick TE, Patel N, Tajik AJ, Chandrasekaran K. Improving health outcomes through patient education and partnerships with patients. Proc Bayl Univ Med Cent 2017;30(1):112–3.