The Role of Physician-Related Characteristics in Prescribing Practices for Secondary Prevention of Myocardial Infarction in Nork Marash Medical Center

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By

Arin A. Balalian, MD, MPH Candidate

Advisor: Robert McPherson, PhD

Reader: Anahit Demirchyan MD, MPH

College of Health Sciences

American University of Armenia

Yerevan, Armenia

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List of Abbreviations

ACE	Angiotensin converting enzyme
BMI	Body mass index
BP	Blood pressure
CAD	Coronary artery disease
CVD	Cardiovascular disease
CI	Confidence interval
Coef	Coefficient
ECG	Electro cardiogram
Eur A	European countries with very low child and very low adult mortality
Eur B	European countries with low child and low adult mortality
Eur C	European countries with very low child and high adult mortality

IHD	Ischemic heart disease
MI	Myocardial infarction
NMMC	Nork Marash Medical Center
SD	Standard Deviation
SE	Standard Error

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Abstract

Background: Cardiovascular diseases are considered to be a serious public health problem both in developing and developed countries. They account for 37% of deaths in the US and 50% of all deaths in Armenia. Myocardial infarction (MI) is a serious medical condition that is caused by a lack of oxygen and/or an inadequate supply of nutrition to the heart. Secondary complications that can occur after myocardial infarction include recurrence of MI which happens in 15-20% of cases; the overall risk of mortality within one year after a primary episode of MI is 25% for men and 38% for women. In order to prevent recurrence of MI after an initial episode, clinical practice guidelines suggest that antiplatelets, β-blockers, ACE inhibitors, and statins should be prescribed. The literature notes that factors including information overload, forgetfulness, poor documentation, and patient load can affect the prescription practices of physicians. The aim of the study was to measure the percentage of patients diagnosed with myocardial infarction that received all recommended drugs following their episode and to explore the effects of physicians' characteristics on their prescribing practices.

Methods: The study was based on two separate data collection activities. The first was a cross-sectional survey with all cardiologists that manage post-MI patients in the Nork Marash Medical Center in Yerevan. The second activity was a review of 364 patient records of MI patients that were managed by surveyed physicians. Simple linear regression was used in order to assess the associations between correct pharmaceutical management of these patients and selected physicians characteristics.

Results: Correct prescription rates across physicians for anti-platelets, ACE-inhibitors, β-blockers and statins were 92, 76, 85 and 65 percent, respectively. Fifty-two percent of post-MI patients received correct management for all four classes of pharmaceuticals. Rates of correct pharmaceutical management varied widely—from 10 to 75 percent —among individual physicians. Testing for associations between rate of correct pharmaceutical management and physicians' characteristics revealed (i) a negative association between correct pharmaceutical management of patients and physicians' positive attitude towards guidelines and (ii) a positive association between the correct prescription of statin and physicians' perceptions regarding the availability of statins to patients.

Conclusions: We found wide variation among physicians in the correct pharmaceutical management rate of post-MI patients. The low sample size limited our ability to detect meaningful associations between correct pharmaceutical management and physicians' characteristics.

Introduction:

Background and literature review

Myocardial infarction (MI) is the necrosis of the myocardium caused by ischemia (1). Atherosclerosis is the most common underlying disease of the myocardial infarction which can lead to occlusion of the coronary arteries and subsequently myocardial ischemia, injury or MI or all (2). Occlusion of the arteries occurs due to thrombus formation or emboli or spasm of coronary arteries and risk factors for it can be age, smoking, hyperlipidemia, diabetes mellitus, hypertension, etc. (1). The diagnosis of MI is confirmed based on combination of several factors including medical presentation, ECG, echocardiography and serum biochemical markers. From the listed, the most important and informative is usually ECG (3).

The main goal in treatment of MI is restoring the patency of coronary arteries to prevent further myocardial damage, the secondary prevention of recurrence of MI and finally reducing mortality. The treatment of MI in the first two hours following the episode is using thrombolytic therapy which is usually Streptokinase, Urokinase, and similar drugs (4).

Cardiovascular diseases are becoming a public health problem both in developing and developed countries. They account for 37% of all deaths and contribute to 58% of deaths in United States. It is estimated that cardiovascular diseases are going to be responsible for one half of all deaths in the United States and other developed countries and for one fourth of deaths in the developing world (1)**.**

More than 50% of all deaths in Armenia are caused by CVD diseases (5). It is visible in Figure 1 that although the proportion of deaths from cardiovascular diseases in Armenia is

approximately the same as the Eur-B+C countries average it is higher than Eur-A average (6), (Figure 1).

Patients who have survived MI have higher risk of recurrence of MI and thromboembolic events and sudden cardiac death. The risk of recurrence of MI is between 15-20% among patients who have had MI before (7). The mortality rate within one year after MI is 25% for men and 38% for women (8). The incidence of development of subsequent congestive heart failure is 22% for men and 46% for women (8). Therefore the secondary prevention of these events is crucial for post MI patients.

According to American Heart Association, there are several factors which play a role in the secondary prevention of myocardial infarction complications such as cardiac death, recurrent infarction or development of heart failure symptoms. These include cessation of smoking, blood pressure control, lipid management (diet, statins), physical activity, weight management, diabetes management, and taking anti-platelet agents and anticoagulants (aspirin, warfarin, and clopdiogrel), ACE inhibitors and β-blockers (9).

Several studies have proved the effectiveness of secondary prevention with above mentioned measures for all patients with coronary artery diseases (CAD). Many of them have proven the long term good prognosis of patients with CAD who were prescribed the above mentioned secondary preventive measures (10**;** 11).

There are several studies proving the effectiveness of anticoagulants and anti-platelet agents. In a meta-analysis in the year 2002 a total number of 20006 high risk patients were given anti platelet therapy for the mean duration of 27 months in 12 trials. Six of those twelve were a comparison of aspirin and placebo. The treatment resulted in 36 less vascular events per 1000 (SE 5) (12).

The effectiveness of β-blockers was also indicated in a meta-analysis of long term trials (6-48 months). The patients treated with β -blockers had reduced odds of death by 23% compared to those treated by placebo (12).

Although statin therapy was associated with reduction in mortality rate and recurrences of MI in many studies, according to different clinical studies, significant number of patients are not receiving this medicine after myocardial infarction (8). There is a significant reduction in all-cause mortality rate, CVD mortality rate, CVD mortality rate and fatal MI which proves the necessity of the use of statins (12).

According to above mentioned facts, the prescription of the anti-coagulants & anti-platelets, β-blockers, and statins is important in secondary prevention of the unfavorable outcomes of myocardial infarction.

As stated above the American Heart Association suggests a combination of changes in life style and medications in order to prevent secondary complications due to MI. The drug groups suggested by American Heart Association are antiplatelets, ACE inhibitors, β-blockers, and statins. These drugs should be prescribed to post myocardial infarction patients unless they have any contraindications to any group of them (4**;** 13).

According to a study done in 2004 in Nork Marash Medical Center (NMMC) in Yerevan to assess the rate of prescription of cardio protective drugs for secondary prevention of MI in post myocardial infarction patients, there was 96.1% prescription rate for aspirin, 60.2% for β-blockers, 60.8% for ACE inhibitors and 13.6% for statins (14). Considering 100% as an ideal rate of prescription, this shows an enormous treatment gap of 86.4% for prescription of statins followed by β-blockers (39.8%) and ACE inhibitors (39.2%). The smallest treatment gap

identified was for aspirin (3.9%). Another study done in 2003 in NMMC indicated that only 8 out of 160 patient's records contained a note prescribing statins (15). According to the same study, aspirin was prescribed in 74.4% of cases to patients with Ischemic Heart Disease (IHD).

There are many factors that may be responsible and/or associated with the under-prescription of the drugs. According to the literature, some of the physician related characteristics related to this include experience, age, attitude, retraining courses, having published researches, and patient load (16**;** 17**;** 18).

According to a study, some of the physicians' characteristics such as female gender, board certification and graduation from local universities were associated with higher quality of care (**16**). However the physicians' characteristics were associated more with the quality of health care when taking preventive measures. Another qualitative study suggested other factors that might influence the prescription of drugs for post-MI management such as perceived risk and benefits of each drug, and patients' characteristics as age, gender (17). Physicians' sex, specialty, medical school, years since graduation, practice location, practice volume were also found to be associated with their prescription habits (18).

Factors such as information overload, forgetfulness and poor documentation can contribute to the poor adherence to the guidelines (19).

Although there are international published guidelines for the secondary prevention of the patients with CAD (13), there can also be under treatment of some preventive drugs such as statins (20). The Nork Marash Medical Center (NMMC) is one of the largest cardiac hospitals in southern Caucasus. It was founded in 1992. This hospital used to only serve children younger than 15

years old at the beginning but later it expanded its services to adults as well in 1996 (21). The physicians are well trained; some of them graduated from medical schools in foreign countries. Not only are many studies conducted in the NMMC concerning the quality improvement and assurance but also a quality assurance project has been implemented in the NMMC since 2001 (22). The medical staff discusses different international or national research related to cardiology at least once a week; this type of activity is considered to be a key aspect of giving high quality medical services.

At the present time NMMC has served more than 14000 patients and more than 800 surgeries are done each year and this number increases annually (23).

Since the prescription of antiplatelets, ACE inhibitors, β-blockers, and statins is crucial for secondary prevention of coronary artery occlusion unless there is any contraindication to any group of them, it was felt to be important to study the prescription rates of key drugs used for secondary prevention of MI at NMMC. On the other hand this study would help to explore the associations between physicians' characteristics and the prescription of these drugs.

Research questions of the study

1. How are physician-related characteristics associated with prescribing practices of cardio-protective drugs?
2. What are the unadjusted rates of prescription of cardio-protective drugs to post-myocardial infarction patients in NMMC?

Methods

Study design

In order to answer the research questions two instruments were used for data collection. A cross-sectional survey was administered among the physicians responsible for treatment of MI patients in NMMC and clinical records of their patients were reviewed to explore the association between physicians' characteristics and the prescription rate of cardio-protective drugs. Reviewing the records gave information about the drugs prescribed by the physicians to the patients, as well as possible contraindications that patient might have had to a certain drug group. On the other hand the survey with the physicians gave information about the characteristics of the physicians.

Study population

The study population for the patients' record reviews included all the patients whose primary diagnosis was MI and who were admitted to NMMC within the period of 1st January to 31st December 2010. All the physicians who were responsible for management of patients diagnosed with MI were included in the survey.

Exclusion Criteria

Overall 50 records of patients' were excluded from the study. The exclusion criteria were:

- The records of patients that passed away before getting discharged from hospital.
- The records of patients that were transferred to other hospitals.
- The records of patients that refused any treatment.
- The records of patients that were classified as MI by mistake but were not diagnosed with MI.
- The records of patients when no documents were present in the record file.

Sample size

The records were chosen randomly on the basis of stratified sampling method. Each physician served as a stratum since we wanted to see the effects of the physician-related characteristics on the prescribing habits.

The student investigator was provided with a list of the physicians and number of the patients they had during the year 2010.

The sample size needed per physician was calculated separately for each physician according to the number of patients they had during the year 2010 (Table2). The total sum of the samples was 364. The sample size was calculated using the formula which is available in different textbooks (24).

The formula is S= [ZxZ [P(1-P)]]/(DxD) which D is precision of the estimate (in our case 0.10), P is the proportion (prescription rate in our case 60.2%) and Z is 1.96 for the 95 % CI which gives a sample size for infinite population in order to adjust it for finite population the S is put in SS=S/[1+(S/ p)] formula in which p is the total number of patients per physician in year 2010. (Table 2)

In other words according to this formula the sample size for physician number 101 who had 101 patients would be calculated as following.

S= [ZxZ [P (1-P)]]/ (DxD) → S= [(1.96x1.96)/ (0.602x0.398)]/ (0.1x0.1) =92.043

In order to adjust this number which is a sample size for infinite population, we have to put it in following formula:

$SS=S/[1+(S/p)] \rightarrow SS= 92.043 / [1+ (92.043/101)] \approx 49$ which is the sample size needed for physician #101.

This process was done for all the physicians separately and the overall sample size was calculated afterwards summing up the sample sizes for each physician separately.

Ethical considerations

All the physicians, as well as the patients, were assigned IDs. The list of the names and the IDs were kept in student's personal drawer and only the research team had access to it. The list connecting names with IDs was destroyed at the end of the study.

The consent form written in Armenian was read aloud for the physicians participating in the study and if they wanted they were provided with a copy of the consent (Appendix1).
The study was approved by American University of Armenia institutional review board.

Data collection

The management of NMMC gave a permission to review the records of the patients with MI as well as to conduct a survey with the physicians responsible to manage them. The data collection was done in Nork Marash Medical Center after getting approval from the management of NMMC. The records per each physician (strata) were selected based on simple random sampling. The records of the selected patients were given to the student investigator, and necessary information was extracted from the patients' record by him. The record was included in the study if there was a written note in the record that the patient was diagnosed with MI.

The surveys with most of the physicians were also done in NMMC, mostly in the office of the physicians or any other place where it was convenient to do the survey.

A total of 364 records of patients were selected from all 923 cases of MI during the year 2010, and all of the physicians agreed to participate in the survey. However, due to illness it was not possible to conduct the survey with one of them.

Study Instrument

The instrument to assess the rates of prescription of the drugs was similar to the instrument used for assessing the rates of prescription in the previous cardio-protective drugs' study (**14**). There were more variables added to the instrument by the research team (Appendix 2). This was done to facilitate the comparison of previous rates of prescription of CPDs at NMMC with the current rates.

A questionnaire was developed by the research team based on the literature to assess the characteristics of the physicians (Appendix 3).

Instruments were pretested before collecting the data. The record review instrument was pretested on 10 records and the survey instrument was pretested with one of the physicians responsible for the management of patients. Based on the pretest, some changes were made in record review instrument.

Study Variables

The main outcome (dependent) variable was correct management (i.e., the correct prescription of cardio-protective drugs) of the patients - a continuous variable indicating the percentage of the MI patients managed correctly for the secondary prevention of MI. The other dependent variable was the correct prescription rate of statins - a continuous variable indicating the percentage of patients with correct prescription of statins for secondary prevention of MI (Table 3.2).

The independent variables are described in Tables 3.1 and 3.3.

There were also other variables measuring physicians' knowledge on the secondary prevention of MI that were not included in the analysis because of the absence of variability across physicians.

By collapsing some of the independent variables measuring the same domain, cumulative independent variables were created based on a scoring system. The values of the scores were decided by the study team, so that for each constituent item the most favorable answer received the highest score and the least favorable answer the lowest and then these scores were summed-up to create the cumulative scores (Table 3.3). The following cumulative items were created:

1. Guidelines availability (presence of CPGs in hospital, accessibility to CPGs in hospital, having a personal copy of CPGs, last time reviewed a CPG)
2. Attitude toward guidelines (usefulness of CPGs, CPGs are helpful tools CPGs do not contain errors, physicians should practice according to CPGs, CPGs do not limit physicians' freedom, I do need CPGs for my practice)
3. Availability of statins (cost of the drug, availability in local market, ease of drug administration, affordability by patients)
4. Indications of statins (side effects, indications by guidelines)
5. Advertisement (promotion by pharmaceutical company, advertisement by mass media, recommendation by colleagues)

The bigger the value of each score, the more favorable was the characteristic it measured: e.g., the higher availability of guidelines signified a more positive attitude towards guidelines. The

cumulative variables on statins' availability, statins' indications and advertisement were exceptions from this rule with higher scores indicating higher dependence of physicians on these factors when deciding whether to prescribe statins.

The correct management of a case was defined as when the physician prescribed the patient with all 4 groups of drugs (anti-platelets, β-blockers, ACE- inhibitors and statins) when a patient had no recorded contraindication (Table 1) to any of them, or was not prescribed the particular group(s) because the patient had contraindication to them. These rates for each physician were calculated separately for the cases s/he had managed.

Statin correct prescription rate was defined as when a physician prescribed statins to a patient because s/he had no contraindications (Table 1) to them or did not prescribe because the patient had recorded contraindications to them.

Data Management and Analysis

Data entry

The data entry was done in SPSS 16 software. Data were double-entered by the student-investigator in order to minimize mistakes. The data cleaning was done with the help of sorting. The data were transferred to the Stata software for further analysis.

Statistical methods

Descriptive statistics (means, standard deviations, frequencies, confidence intervals) were performed for both physicians' and patients' data. Dummy variables were created from categorical independent variables in order to investigate relationships with the dependent variables.

In order to analyze the relationship between the outcome variable and the independent variables, simple linear regression method was used. The statistically significant and borderline statistically significant factors were examined in order to find potential confounders or effect modificators.

The strength of the relationships between the outcome variables and the independent variables were explored calculating coefficients, standard errors, 95% confidence interval as well as p values.

Results

Record Review

Overall, 364 records were reviewed from the records present in NMMC. Reviewing the records provided us with the information on prescription of the drugs for secondary prevention of MI and the survey provided information about the characteristics of the physicians responsible for treatment of MI patients in NMMC.

Descriptive Statistics

The descriptive statistics of the patients is presented in the Table 4.1 and 4.2. Mean BMI of 29 indicates that the patients were overweight in average. The average age was almost 56 years which indicated that patients were in their middle ages in average. The mean BP of 133/78 indicates that mildly elevated blood pressure among patients. As it is visible in Table 4.2 the majority of patients were male.

Physicians survey

Response rate

The surveys were administered among 9 physicians responsible for management of the patients diagnosed with MI. The response rate of the survey with physicians was 90%. The student investigator was unable to interview one of the physicians because of the serious sickness of the physician.

Descriptive Statistics

The descriptive statistics of the physicians are presented in Table 5.

Correct prescription rates of cardioprotective drugs

The results presented here for correct prescription rates reflect the fact that the presence of contraindications in a given patient may make it "correct" for the physician to not prescribe a certain class of drug. The adjusted correct prescription rate of antiplatelet drugs was 0.92 (95% CI 0.89-0.95), ACE inhibitors 0.76 (95% CI 0.72-0.80), β-blockers 0.85 (95% CI 0.82-0.89), and statins 0.65 (95% CI [0.60-0.70]) (Table 6).

Fifty-two percent of all patients were correctly prescribed all four classes of drugs. The overall rate of correct management of patients and correct management per physician were calculated (Table 7)

Statins were correctly prescribed to 65% of all the patients. The overall statin correct prescription rate as well as statins prescription rates per physicians were also calculated (Table 7).

These are the unweighted results for the total number of the patients that physicians managed during 2010. The study team also calculated the results weighted for the total number of the patients but since the difference was insignificant it is not reported in the study.

As it is visible in Figure 2, there is a very wide variation in performance among the physicians including some that have extremely low performance. It is also obvious that the distribution of correct management across physicians does not follow a normal curve, but instead forms three modes of high, medium and low performance. It should be noted that the two physicians with very low "correct management" scores also saw a very limited number of post-MI patients during 2010; one of the physicians saw seven post-MI patients and the other saw ten. We reviewed all available post-MI patient records for these two physicians.

Simple Linear Regression

The outcome variables were correct management rate per physician and correct statins prescription rate per physician (Table 7).

The results of simple linear regression for unadjusted associations between correct management of the patients and other independent variables with coefficients, 95% confidence intervals and p values are displayed in Table 8.

For every unit of increase in the score of attitude (more positive attitude) (Table 3.3) of the physicians towards CP guidelines, the correct management of the patients decreased by 0.11 (p=0.03).

For every unit of increase in the score of the reported influence of drug availability on a physician's decision to prescribe statins, the correct statins prescription rate increased by 0.05 (p=0.04).

We found marginally statistically significant results between correct management and participation in any retraining in cardiology (Coef. = -0.27; p=0.07), usage of internet (coef. = -0.07; p=0.05), number of research articles read by physician (coef. = -0.02; p=0.06), and availability of guidelines (Table 3.3) (coef. = -0.07; p=0.07).

We did not find statistically significant associations between correct management of the patients and doctors' work experience as a cardiologist (coef. = -0.18; p=0.12), total number of MI patients managed by the physician (coef.=0.00; p=0.19), duration of their postgraduate education (coef. = -0.003; p=0.403), studying cardiology in foreign countries (coef. = 0.26; p=0.15), and having research publications (coef. = 0.016; p=0.92).

We also did not find statistically significant associations between correct prescription of statins and influence of advertisement of statins on physicians score (coef. = 0.048; p=0.18), and the influence of indication of the statins on physicians score (coef. = 0.07; p=0.55).

As mentioned earlier, the knowledge score was 100% among all the physicians, which means that all of them correctly answered all the questions about their knowledge on cardioprotective drugs and their role for the secondary prevention of myocardial infarction.

Testing for confounders

In order to test for confounders we analyzed the relationships between different covariates and outcome variables in scatter plot matrixes and with simple linear regression. None of the independent variables seem to confound the relationship of the others. The statistically significant results from simple linear regression were checked for interactions but we were unable to find any interactions between the covariates.

DISCUSSION

Main Findings

The descriptive statistics showed that overall number of male patients was more than female patients. They also showed that the MI patients were generally overweight as evidenced by mean BMI which was approximately 29 (Table 4.1 and Table 4.2).

In general there was an increase in the correct prescription rate of all the four groups of the drugs compared to the previous study done in NMMC. The correct prescription rate of the statins was increased almost 5 times from 13.6% to 65.8%. The correct prescription rate of B-blockers was increased from 60.2% to 85.6%; and the correct prescription rate of the ACE inhibitors was increased from 60.8% to 76.5%. However there was a slight reduction in correct prescription of antiplatelet drugs from 96.1 % to 92.2%. This improvement in case management might be because of the continuous improvement of the quality of care in NMMC and the quality assurance program launched there in 2001. Care should be taken in the interpretation of these differences, as the study instruments were somewhat different and a full description of the study methods used in the previous study could not be found, making it impossible to verify that the same methods were used in the two studies.

A physician's positive attitude towards guidelines was a variable that was unexpectedly associated with decreased performance. In order to explain this unexpected result the study team discussed the results with the physicians trying to understand their opinions about the possible reasons for these findings.

The correct management of the patients was negatively associated with the positive attitude towards guidelines ($p = 0.03$). This might be explained by the presence of the response bias in

the self-reported data. This means that the respondents sometimes have a tendency to give answers that make them look good to the interviewer (25).

During a discussion of the results with physicians they suggested that these results might be confounded by the experience of the physicians or the workload, stating that the physicians who are having more patients and years of experience might perform better, despite their negative attitude towards guidelines.

On the other hand this hypothesis was rejected earlier when we tested the results for confounders. Ultimately, we were not able to find any explanation for the reason of negative association between positive attitude of the physicians towards guidelines and correct management of MI patients for secondary prevention of MI.

Although the study team was not able to find any confounding relationships between the covariates, this does not reject the possibility of unknown confounders in the relationship between the independent variables and the outcome variable.

Our study was not able to find any statistically significant results between correct management of patients and patients' characteristics which might influence physicians in prescribing drugs.

The associations were tested for factors such as patients' age, gender; BMI and residence of the patients but no statistically significant results were found.

Physician-related characteristics such as years of experience, information overload and forgetfulness that were suggested by the literature did not have statistically significant association with the correct management of the patients.

Because of the very limited sample size of doctors, the study did not have enough power to detect significant associations between the majority of the measured variables/scores and the outcome variables of correct management of cases and correct prescription of statins (Table 3.3).

Physicians' perceptions regarding the availability of statins seems is associated with their prescribing patterns. Statins prescription rate was positively associated with overall availability of drug (Table 3.3) to patients. This means that physicians who perceive that statins are more available to the patient are more likely to prescribe them.

This variable was a combination of factors such as cost, ease of administration, availability in local market and overall affordability. The higher the score of availability of the drug, the higher the perception of physicians regarding the availability of the drug to patients in Armenia.

Strengths

As far as we know, this is the first study of its kind in Armenia that investigates the association between the physicians' characteristics and their management of patients.

A second strength of the study is that we combined two different methods in order to answer our research questions. The instruments were developed manually by the study team with inclusion of different variables that were identified in the literature as influencing the correct management of patients by physicians. A final strength of the study is that we included all relevant physicians in NMMC in the study.

Study Limitations

Although the study included all of the physicians in NMMC, the total number of the physicians was extremely low which limited the power of the study and our ability to use statistical methods such as multivariate analysis.

Response bias may have affected the results of the study through self-reported incorrect information by the physicians. This happens when the respondents give socially desirable answers which they think make them look good to the interviewer.

Recall bias might be present especially for information provided by respondents regarding variables that include the number of patients managed by the physician in a week, the number of retrainings, and the number of hours spent on the internet per week.

The other limitation might be the possible poor documentation of the information in patients' records by the physicians because of poor record-keeping techniques.

Conclusions

Overall our results were not consistent with the literature, although the small sample size of physicians severely limited our ability to detect factors associated with correct management. Some of the factors suggested by the literature as positive appeared to be negatively associated with the prescription rate of the studied groups of drugs.

There was a wide variation in performance according to guidelines among the physicians. Overall, our finding that only fifty-two percent of post-MI patients were prescribed drugs correctly at a leading hospital such as NMMC suggests that there is still a need to strengthen the quality of care there.

As this study was done in only one setting with a limited number of subjects, the results are not generalizable. However, the methodology and the instruments developed by the study team can be used to perform further larger-scale research on the same topic in future.

Recommendations

Further research is needed among a larger population of physicians in order to test the validity of the results. It is necessary to include more precise questions about the nature of internet use for professional development and research publications among the physicians.

In order to minimize recall bias the survey instrument can be changed in order to obtain more precise data from physicians.

The study can be done in other specialized cardiology hospitals in Armenia in order to compare the performance of doctors from different settings.

Physicians should prescribe drugs regardless of the availability of drugs to patients.

We found wide variation in the performance of the physicians who participated in the study. Although the sample size was low, it appeared that there may be three groups of physicians: high, medium and low performers. The two low performers saw a very limited number of patients in 2010 suggesting a link between caseload of post-MI patients and correct prescription practice. These different groups may need to be worked with in different ways in order to improve their performance. The group with the lowest correct management rate should be targeted for special attention as a first step in improving the prescription of cardio-protective drugs to post-MI patients in Nork Marash Medical Center.

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Tables

Table 1 Contraindications for cardio protective drugs

Drug Group	Contraindications
Antiplatelet **Aspirin-Clopdiogrel**	Any bleeding disorders (hemophilia, intracranial bleeding, peptic ulcers, on Will brand's disease, thrombocytopenia) , Allergy, Patients with Reye's syndrome and with severe liver disease
ACE Inhibitors	Allergies, angioedema connected with ACEI, anuric renal failure due to ACE inhibitor, pregnancy, aortic stenosis moderate /severe
β -Blockers	Severe asthma, Sinus bradycardia <=60 bpm, history of Class IV heart failure, II° or III ° AV block, low systolic blood pressure <90, COPD
Statins	liver disease or persistent elevations of liver enzymes, high alcohol consumption, pregnancy and lactation

Table 2 Total and sampled number of the patients by physician

Assigned ID	Number of patients in 2010	Sample# collected
101	101	49
102	204	63
103	137	63
104	4	4
105	7	7
106	198	63
107	10	10
108	36	36
109	222	65
110	4	4
	923 total number of patients with MI in 2010	364

Table 3.1 Study Independent Variables

Independent Variable	Type
Work Experience as a cardiologist per years	Continuous
Duration of studying cardiology by months	Continuous
Studying cardiology in foreign country	
Number of MI patients managed in a week by physicians	Continuous
Forgetting to prescribe any drug	Scale
Number of retraining in cardiology	Continuous
Time passed from the last retraining in years	Continuous
Number of hours of usage of internet per week	Continuous
Number of research articles read by the physicians in the last month	Continuous
number of events dedicated to professional development in the hospital that the physician attended	Continuous
Cost of the statins	Scale
Statins availability	Scale
Statins administration ease	Scale
Side effects of the statins	Scale
Promotion of the statins by pharmaceutical company	Scale
Advertisement of the statins	Scale
Indication of the statins by guidelines,	Scale
Statins recommendation by colleagues	Scale
Affordability of the statins by patient	Scale
Accessibility of the guidelines	Scale
Usefulness of guidelines for daily practice	Scale
Frequency of discussion of guidelines with peers	Scale
Last time that the physician reviewed a guideline	Scale
Guidelines are helpful	Scale
Guidelines may contain errors	Scale
Physicians should practice according to guidelines,	Scale
Physicians' negative attitude towards guidelines.	Scale
guidelines do no limit physicians freedom	Scale

Table 3.2 Study Dependent Variables

Dependent Variable	Type
Rate of correct management of a case	Continuous
Rate of statins correct prescription	Continuous

Table 3.3 Collapsed newly created independent variables

Newly created Variables	Independent Variables					
Statins availability[1]	Cost	Availability in local market	Ease of drug's administration	Affordability of the drug by the patient	__	__
Statins indications[2]	Side effects	Recommendation by a recent guideline	__	__	__	__
Statins advertisement[3]	Promotion by pharmaceutical company	Advertisement by mass media	Recommendation by colleagues	__	__	__
Guidelines availability[4]	Presence of guidelines in hospital	Accessibility of guidelines to physicians	Whether the physician has reviewed guideline ever	Whether the physician has a personal copy of the guidelines	Last time the physician reviewed a guideline	___
Attitude towards guidelines[5]	Usefulness of guidelines for daily practice	CPGs are helpful tools	CPGs do not contain errors	Physicians should practice according to CPGs	CPGs do not limit physicians' freedom	I do need CPGs for my practice

[1] The score could range from 0-12; where 0 is the most unfavorable score and 12 most favorable score.
[2] The score could range from 0-6; where 0 is the most unfavorable score and 6 most favorable score.

[3] The score could range from 0-9; where 0 is the most unfavorable score and 9 most favorable score.

[4] The score could range from 0-15; where 0 is the most unfavorable score and 15 most favorable score.

[5] The score could range from 0-18; where 0 is the most unfavorable score and 18 most favorable score.

Table 4.1 Patients' Descriptive Statistics

Descriptive Statistics of the patients					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
BMI	330	15	65	29.3	5.6
Patient age	358	25	88	56	9.1
Systolic Blood pressure	345	60	200	133	22
Diastolic Blood pressure	345	50	120	78.6	11.7
Pulse	359	42	195	78.4	16.6
Weight	346	45	137	83.6	15.4
Height	331	110	192	169.1	8.5

Table 4.2 Patients' Descriptive Statistics

	Proportion	Standard error	95% Confidence Interval
Females	0.1	0.01	0.0 - 0.1
Males	0.8	0.01	0.8 - 0.9

Table 5 Physicians' descriptive characteristics

	Mean	Standard deviation	95% Confidence Interval
Years working as cardiologist	12.9	0.4	12.1 - 13.7
Duration of residency(months)	50.6	2.1	46.3 - 54.8
Duration of retraining(months)	3.9	0.5	2.8 - 5
Time passed since the last retraining (years)	3.2	0.1	2.8 - 3.5
Time spend on internet for professional development (hours)	4.8	0.1	4.4 - 5.1
# of research articles read in last month	13.2	0.2	12.6 - 13.7
# of scientific events attended during last month	22.8	1.7	19.4 - 26.3
# of MI patients managed in week	22	1.3	19.3 - 24.6

Table 6 Correct prescription rate

	Proportion	Standard Error	95% confidence interval
Anti-platelets	0.92	0.014	0.89 - 0.95
ACE inhibitors	0.76	0.02	0.72 - 0.80
β-blockers	0.85	0.01	0.82 - 0.89
Statins	0.65	0.02	0.60- 0.70

Table 7 Correct management rate per physician and overall

Physicians Ids	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**	Overall
Correct Management Rate%	42%	57%	46%	75%	16%	74%	10%	47%	52%	50%	52%
Anti-platelets Prescription rate %	77%	96%	90%	100%	100%	98%	80%	94%	93%	100%	92%
ACE-inhibitors Prescription rate %	61%	80%	65%	75%	83%	95%	60%	66%	86%	50%	76%
β-blockers Prescription rate %	71%	87%	74%	75%	83%	95%	80%	88%	95%	100%	85%
Statins Prescription rate %	48%	73%	66%	100%	50%	77%	50%	63%	61%	75%	65%

Table 8 Statistically significant and marginally statistically significant coefficients for associations between the physicians' characteristics and the rate of correct management of patients

Independent Variable	**Coefficient**	**95% CI**		**p – value**
Participation in retrainings in cardiology	-0.27	-0.589	0.03	0.07
Number of hours spent on internet per week for professional development	-0.07	-0.142	0.001	0.05
Number of research articles read by physician in the last month	-0.02	-0.05	0.00	0.06
Availability of the clinical practice guidelines for the physicians	- 0.07	-0.14	0.00	0.07
Attitude towards clinical practice guidelines	- 0.11	-0.20	-0.01	0.03

Table 9 Statistically significant coefficients for associations between different factors and the rate of correct prescription of Statins

Independent Variable	Coefficient	95% CI		p – value
Drug availability[1]	0.05	0.002	0.106	0.04

[1] The score could range from 0-12; where 0 is the most unfavorable score and 12 most favorable score

Figures

Figure 1 Proportion of deaths from different causes in Armenia with Eur-A and Eur-B+C countries (6)

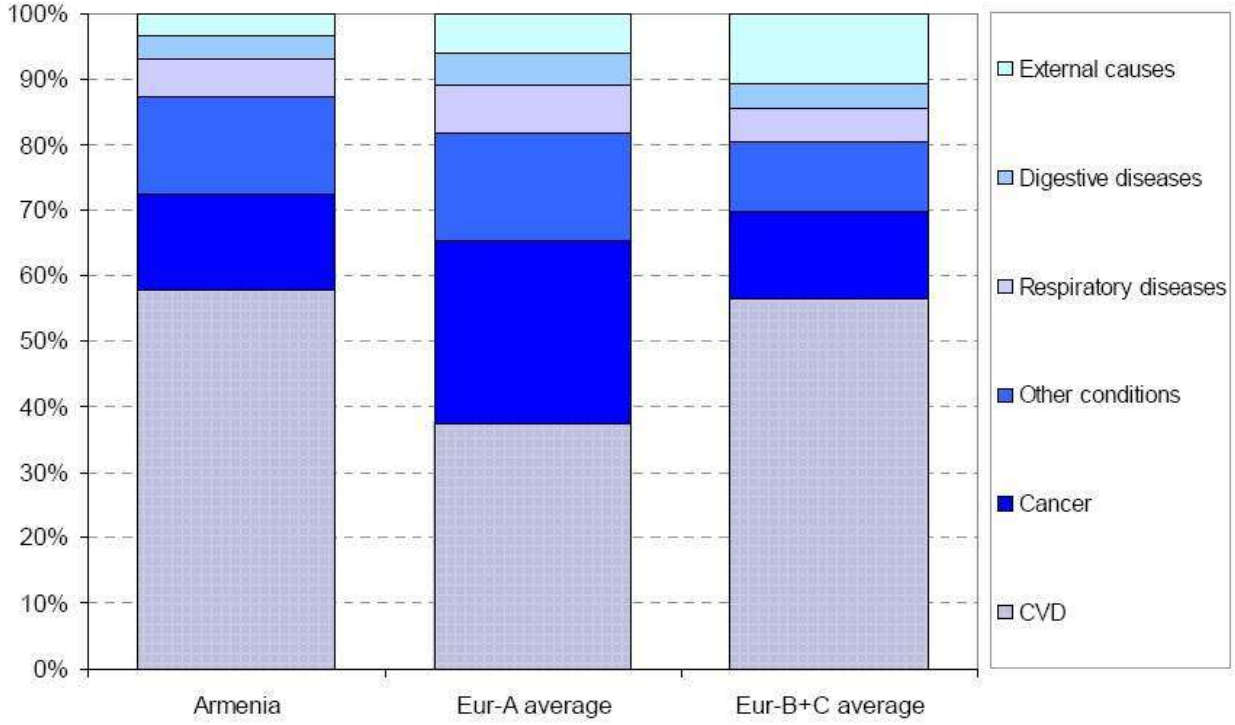
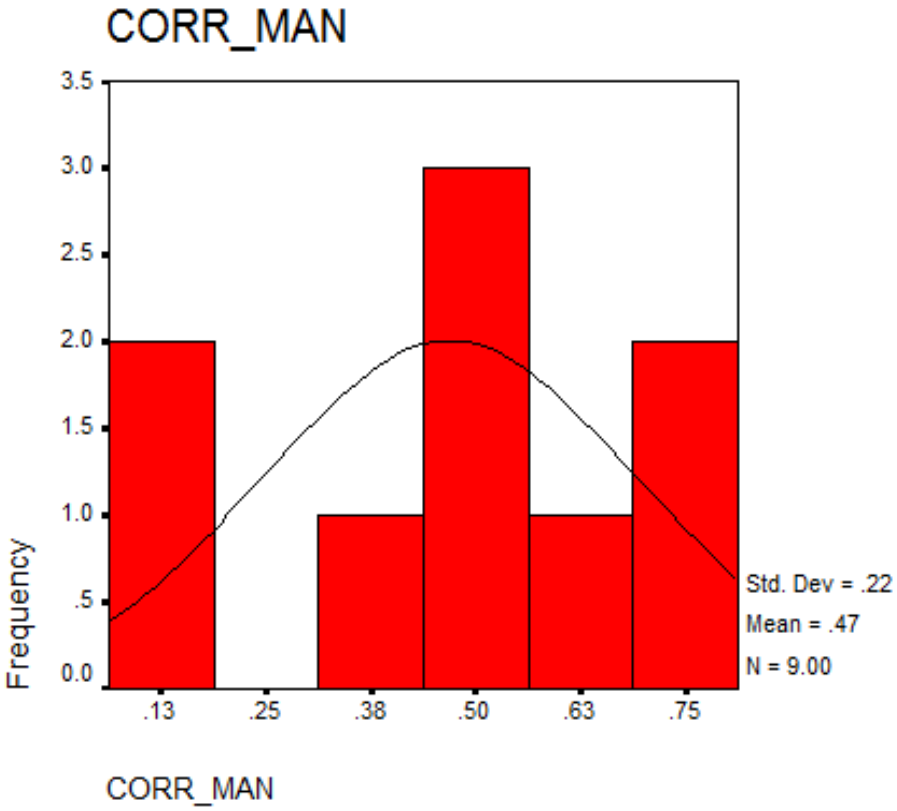


Figure 2-Correct management of cases with MI



APPENDICES

Appendix 1 -Consent form

Physician-Related Characteristics and Prescribing Practices for secondary prevention of Myocardial Infarction in Nork Marash Medical Center

Consent form

Hello, my name is Arin Balalian. I am a physician and a graduate student of public health at AUA. The College of Health sciences is conducting a study on association between physicians' characteristics and the cardioprotective drug prescription practices for secondary prevention of Myocardial Infarction in patients of Nork Marash Medical Center. You are asked to participate in the study because you are a cardiologist working at NMMC.

The interview will take 10-15 minutes.

Your participation in the interview is voluntary. You may refuse to answer any question or stop the interview at any time without any consequences. There is no financial compensation or other personal benefits from participating in the assessment, except contributing to the research project.

Your name and the information you provide will be kept confidential and the questionnaire will not have your name and position on it only the general findings will be presented in the report/presentation.

In case of any questions about the study you can contact Dr. Anahit Demirchyan, who is one of the scientific advisors of the study at AUA calling 512562.
If you feel you have not been treated fairly or think you have been hurt by joining this study, please contact Dr. Hripsime Martirosyan, AUA Human Subjects Administrator at (374 1) 51 25 61.

If you agree to participate could we continue?

Բժիշկների մասնագիտական հատկանիշները և սրտամկանի ինֆարկտի երկրորդային կանխարգելմանն ուղղված նշանակումները՝

Նորք Մարաշ բժշկական կենտրոնում

Համաձայնագիր

Բարև Ձեզ

Իմ Անունը Արին Բալալյան է: Ես բժիշկ եմ և Հայաստանի Ամերիկյան համալսարանի (ՀԱՀ) Հանրային առողջապահության մագիստրատուրիայի (ՀԱՄ) ավարտական կուրսի ուսանող եմ: Առողջապահական գիտությունների դպրոցն իրականացնում է հետազոտություն բժիշկների մասնագիտական հատկանիշները և սրտամկանի ինֆարկտի երկրորդային կանխարգելմանն ուղղված նշանակումները՝ Նորք Մարաշ բժշկական կենտրոնում պարզելու նպատակով: Դուք ընդգրկված եք մասնակցելու այս հետազոտությանը, որովհետև Դուք աշխատում եք Նորք Մարաշ բժշկական կենտրոնում: Հարցազրույցը կտևի 10-15 րոպե:

Ձեր մասնակցությունը այս հարցմանը կամավոր է: Դուք կարող եք հրաժարվել պատասխանելու ցանկացած հարցի կամ ընդհատել հարցազրույցը ցանկացած պահի: Հարցազրույցին մասնակցելուց հրաժարվելու դեպքում Ձեզ կամ Ձեր աշխատանքի վրա ոչ մի բացասական հետևանք չի լինի: Այս հարցմանը մասնակցելու դեպքում Դուք որևէ պարգևատրում չեք ստանա: Դուք պարզապես կնպաստեք հետազոտության իրականացմանը Ձեր մասնակցությամբ:Ձեր անունը և բոլոր այն տեղեկությունները, որ Դուք տրամադրում եք կպահպանվեն գաղտնի և հարցաթերթիկի վրա չեն նշվի Ձեր անունը և պաշտոնը: Միայն ընդհանրացված տվյալները կներկայացվեն զեկույցի/ներկայացման մեջ:

Ուսումնասիրության վերաբերյալ ցանկացած հարցի դեպքում կարող եք զանգահարել 512562 համարով Դոկտոր՝ Անահիտ Դեմիրճյանին որ հանդիսանում է հետազոտության գիտական խորհրդատուներից մեկը:

Եթե Դուք կարծում եք որ Ձեզ հետ լավ չեն վերաբերվել կամ այս հետազոտությանը, մասնակցելով Ձեզ վնաս է հասցվել խնդրում ենք զանգահարել հետևյալ համարով՝

51 25 61 Հռիփսիմե Մարտիրոսյանին, որ հանդիսանում է ՀԱՀ-ի էթիկայի հանձնաժողովի քարտուղարը:

Եթե համաձայն եք մասնակցել թույլ կտա՞ք շարունակել:

Appendix 2 record review form

#	ITEM	Patient # 1	Patient#2	Patient #3
A1	Note patient's ID (after getting the list of the patients each of them will be assigned a number)	___ ___ ___	___ ___ ___	___ ___ ___
A2	Note physician's ID (Each physician will be assigned a number)	___ ___ ___	___ ___ ___	___ ___ ___
A3	Birth date of patient: [day / month / year]	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___
A4	Does the patient live in Yerevan?	1) …….Yes 0) …….No 9)……..Not mentioned	1) …….Yes 0) …….No 9)……..Not mentioned	1) …….Yes 0) …….No 9)……..Not mentioned
A5	Note patient's gender (Skip to A8 if male)	1) …….Male 0) …….Female	1) …….Male 0) …….Female	1) …….Male 0) …….Female
A6	Is it mentioned in the record that the patient is **pregnant**? *(Note that having this condition is a contraindication for ACE inhibitors and Statins.)*	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No
A7	Is it mentioned in the record that the patient is **lactating**? *(Note that having this condition is a contraindication for statins.)*	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No
A8	What is the **Date of admission**? [day / month / year]			

	99 / 99 / 99 = not mentioned	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___
A9	What is the **Date of discharge**? [day / month / year] 99 / 99 / 99 = not mentioned	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___	___ ___ / ___ ___ / ___ ___
A10	Was the patient admitted **within 36 hours** of the onset of MI?	1) …….Yes 0) …….No 9)……..Nothing mentioned	1) …….Yes 0) …….No 9)……..Nothing mentioned	1) …….Yes 0) …….No 9)……..Nothing mentioned
A11	Was the patient admitted from **other hospital** for the current episode of care?	1) …….Yes 0) …….No 9)……..Nothing mentioned	1) …….Yes 0) …….No 9)……..Nothing mentioned	1) …….Yes 0) …….No 9)……..Nothing mentioned
A12	What is the **Weight** of the patient? 999 = not mentioned	___ ___ ___ kg	___ ___ ___kg	___ ___ ___ kg
A13	What is the **Height** of the patient? 999 = not mentioned	___ ___ ___ cm	___ ___ ___cm	___ ___ ___cm
A14	What is documented in the patient record regarding patient's history of alcohol **abuse**? *(Note: High alcohol consumption is contraindication for statins)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented

B1	What type of **acute care intervention** did the patient undergo as recorded in the patient record? *(Circle all that apply multiple responses are possible)*	1)…….PCI 2)…....CABG 3)…….Medical 4)…….Other(specify) _____ 9) ……No procedure mentioned	1)…….PCI 2)…....CABG 3)…….Medical 4)…….Other(specify) _____ 9) ……No procedure mentioned	1)…….PCI 2)…....CABG 3)…….Medical 4)…….Other(specify) _____ 9) ……No procedure mentioned
B2	What does the record mention about the patient's heart failure **score based on the New York heart Association (NYHA)** scoring system? *Note that the β –blockers are contraindicated if the patient is having 4th degree heart failure based on NYHA score)*	1……I 2……II 3……III 4……IV 9……not mentioned)	1……I 2……II 3……III 4……IV 9……not mentioned)	1……I 2……II 3……III 4……IV 9……not mentioned)
B3	What is the last **BP** recorded in the patient record prior to discharge? *(Note that the β –blockers are contraindicated in bradycardia when systolic BP is lower than 90mmHg)*	Systolic___ ___ ___ Diastolic___ ___ ___ 999……Not mentioned	Systolic___ ___ ___ Diastolic___ ___ ___ 999)……Not mentioned	Systolic___ ___ ___ Diastolic___ ___ ___ 999)……Not mentioned
B4	What is the last **pulse rate** recorded in the patient record prior to discharge?*(Note that the β –blockers are contraindicated in bradycardia when HR is lower than 50bpm)*	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned
B5	What is documented in the patient's record regarding **arrhythmia** during the hospitalization period for the current episode of care?	1 ….. + history sust. VT/VF 2 ….. + history Atrial Fib/Flutter 3……+ history heart block 4…….- history 9 ….. Nothing documented	1 ….. + history sust. VT/VF 2 ….. + history Atrial Fib/Flutter 3……+ history heart block 4…….- history 9 ….. Nothing documented	1 ….. + history sust. VT/VF 2 ….. + history Atrial Fib/Flutter 3……+ history heart block 4…….- history 9 ….. Nothing documented

B6	What does the record mention regarding whether the patient has any kind of heart **Atrio-Ventricular node blocks**? *(Note that having II or III degree of heart block is a contraindication for β –blockers)*	0 …… None 1 ……. First degree 2 ……. Second degree 3 ……. Third degree 9 ……. Not mentioned	1 ……. First degree 2 ……. Second degree 3 ……. Third degree 9 ……. Not mentioned	1 ……. First degree 2 ……. Second degree 3 ……. Third degree 9 ……. Not mentioned
B7	Was it mentioned in the record that the patient had previous **history of cardiac intervention?** *(if Its negative or not mentioned =>Skip to B9)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B8	How many times has the patient had **cardiac intervention**?	___ ___ ___ 999……Not mentioned	___ ___ ___ 999……Not mentioned	___ ___ ___ 999……Not mentioned
B9	What is documented in the record regarding the **patient's ejection fraction**?	1……Good (>=50%) 2……Fair (30-49%) 3……Poor (<30%)	1……Good (>=50%) 2……Fair (30-49%) 3……Poor (<30%)	1……Good (>=50%) 2……Fair (30-49%) 3……Poor (<30%)
B10	What is documented in the patient record regarding patient's history of **Asthma?** *(Note that this condition is contraindication for β –blockers.)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B11	What is documented in the patient record regarding patient's history of **COPD?** *(Note that this condition is contraindication for β –blockers.)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B12	What is documented in the patient record regarding patient's history of **aortic stenosis**?	1 ….. Documented: + history	1 ….. Documented: + history	1 ….. Documented: + history

	(Note that having this condition is a contraindication for ACE inhibitors)	2 ….. Documented: - history 9 ….. Nothing documented	2 ….. Documented: - history 9 ….. Nothing documented	2 ….. Documented: - history 9 ….. Nothing documented
B13	What is documented in the patient record regarding patient's history of **anuric renal failure connected with ACE inhibitors**? *(Note that having this condition is a contraindication for ACE inhibitors)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B14	What is the last **ALT Value** recorded in the patient record prior to discharge? *(Note: Elevated liver enzymes are contraindication for statins and for antiplatelets)*	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned
B15	What is the last **AST Value** recorded in the patient record prior to discharge? *(Note: Elevated liver enzymes are contraindication for statins and antiplatelets)*	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned
B16	What is the last **Cholesterol Value** recorded in the patient record prior to discharge?	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned	___ ___ ___ 999)……Not mentioned
B17	Is it noted in the records that patient has positive history of **allergies** to any kind of specific drug groups? **MULTIPLE RESPONSES ALLOWED, CIRCLE ALL THAT APPLY**	1)…..Antiplatelet agents 2)….. ACE inhibitors 3)….. β –blockers 4)…...Statins 5)…...Other (_____) 6)…...No allergies noted	1)…..Antiplatelet agents 2)….. ACE inhibitors 3)….. β –blockers 4)…...Statins 5)…...Other (_____) 6)…...No allergies noted	1)…..Antiplatelet agents 2)….. ACE inhibitors 3)….. β –blockers 4)…...Statins 5)…...Other (_____) 6)…...No allergies noted
B18	What is documented in the patient record regarding patient's history of any **bleeding disorders(hemophilia, intracranial bleeding, peptic ulcers, on Will brand's disease, thrombocytopenia)**? *(Note: Antiplatelets are contraindicated in patients who have allergies to them)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B19	What is documented in the patient record regarding patient's any history of **Reye's syndrome**? *(Note: Antiplatelets are contraindicated in patients with this condition)*	1 ….. Documented: + history	1 ….. Documented: + history	1 ….. Documented: + history

		2 ….. Documented: - history 9 ….. Nothing documented	2 ….. Documented: - history 9 ….. Nothing documented	2 ….. Documented: - history 9 ….. Nothing documented
B 20	What is documented in the patient record regarding patient's any history of **liver disease**? *(Note: Elevated liver enzymes are contraindication for statins and for antiplatelets)*	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented	1 ….. Documented: + history 2 ….. Documented: - history 9 ….. Nothing documented
B21	Was it mentioned in patient's record that the patient **had in hospital complications** for the current episode of MI ? *(If no or not mentioned skip to B23)*	1) …….Hypotension 2) …….Arrhythmias-heart blocks 3)……. Acute mitral regurgitation 4)……..Pericarditis 5)……..Cardiogenic shock 6)……..Aneurysm 7)…...…Ventricular septal rupture 8)……..other (specify) __________________________ 9)……..No complications mentioned	1) …….Hypotension 2) …….Arrhythmias-heart blocks 3)……. Acute mitral regurgitation 4)……..Pericarditis 5)……..Cardiogenic shock 6)……..Aneurysm 7)…...…Ventricular septal rupture 8)……..other (specify) __________________________ 9)……..No complications mentioned	1) …….Hypotension 2) …….Arrhythmias-heart blocks 3)……. Acute mitral regurgitation 4)……..Pericarditis 5)……..Cardiogenic shock 6)……..Aneurysm 7)…...…Ventricular septal rupture 8)……..other (specify) __________________________ 9)……..No complications mentioned
B22	What is mentioned in the records about the name of coronary artery occluded due to MI?	1)…….Left Coronary artery 2)…….Left circumflex artery 3)…….Left marginal artery 4)…….Left anterior descending	1)…….Left Coronary artery 2)…….Left circumflex artery 3)…….Left marginal artery 4)…….Left anterior descending	1)…….Left Coronary artery 2)…….Left circumflex artery 3)…….Left marginal artery 4)…….Left anterior descending

		5) ……Right Coronary Artery 6)…….Posterior descnending artery 7)…….Right marginal artery 8)…….Other(specify) _____ 9)……..Not mentioned	5) ……Right Coronary Artery 6)…….Posterior descnending artery 7)…….Right marginal artery 8)…….Other(specify) _____ 9)……..Not mentioned	5) ……Right Coronary Artery 6)…….Posterior descnending artery 7)…….Right marginal artery 8)…….Other(specify) _____ 9)……..Not mentioned
C	**Prescription Records**			
C1	Is there any documentation in patient's records about **any prescription of any antiplatelet agent**?	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No
C2	Is there any documentation in patient's records about **any prescription of any ACE inhibitor**?	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No
C3	Is there any documentation in patient's records about **any prescription of any β – blockers**?	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No
C4	Is there any documentation in patient's records about **any prescription of any statin agent**?	1) …….Yes 0) …….No	1) …….Yes 0) …….No	1) …….Yes 0) …….No

Appendix 3 Questionnaire

1. Interviewee code: _____

2. Date of interview: _____/ _____/2011

3. Time of interview start: _____

Demographic characteristics

4. Gender: [ ]1.Male [ ]2.Female

5. How many years have you been working as a physician? _____ years

6. How many years have you been working as a cardiologist? _____ years

7. How many years have you been working as a cardiologist in this hospital? _____ years

8. Where did you get your specialization as a cardiologist? _____ (name of the school/institution)

9. How long have you studied to get your specialization as a cardiologist? _____ (months)

10. Have you ever studied cardiology abroad? [ ]Yes [ ]No→ Go to Q.11

    10.1 If yes, in what country? _____

    10.2. How many months did you study? _____ (months)

Experience and trainings related to profession

11. After becoming a cardiologist, have you ever been re-trained in cardiology (*please, do not mention the re-trainings lasting less than three days*)? [ ]Yes [ ]No(Go to Q.12)

11.1. How many retrainings in cardiology have you participated in? _____

11.2 What is the total duration of all of the retrainings that you have participated in? _____

11.3. How long ago did you undergo your last re-training? _____ (years, months)

12. Do you have any research publication (article, book section, reports…) in cardiology?

[ ] Yes [ ] No (Go to Q.13)

12.1. If yes, how many research publications do you have? _____

13. Do you use internet for your professional development?

[ ] Yes [ ] No (Go to Q.14)

13.1. How many hours per week do you use internet for professional development?

_____hours

14. Have you read research articles related to your profession during the last month?

[ ] Yes [ ] No (Go to Q.15)

14.1.How many research articles related to your profession have you read during last month?

_____

15. During the last three months have you attended to any events at your hospital devoted to professional development of the staff (For example, a case discussion, report on a cardiology topic, research article discussion, etc.)?

[ ] Yes [ ] No (Go to Q.16)

15.1. How many events have you attended? _____

15.2. What type of events have you attended?

1. case discussion,
2. report on a cardiology topic,
3. research article discussion,
4. other_____

Knowledge, Practice & Attitude

16. How many MI patients do you usually see per week? _____

17. Have you ever forgotten to prescribe a needed drug because of being overwhelmed with work?

17.1. How often does it happen?

[ ] Often [ ]Sometimes [ ]Rarely [ ]Never

18. Could you, please, list the groups of drugs that should be prescribed to MI patients (with no complications) for secondary prevention of the MI? *(Record all mentioned, after each one is mentioned, ask "are there any others?")*

1. _____

2. _____

3. _____

4. _____

5. _____

19. Please, mention up to three important indications for prescribing anticoagulants:

[ ] Myocardial infarction

[ ] Other: _____

20. Please, mention up to three important indications for prescribing ACE inhibitors:

[ ] Myocardial infarction

[ ] Other: _____

21. Please, mention up to three important indications for prescribing β-blockers:

[ ] Myocardial infarction

[ ] Other: _____

22. Please, mention up to three important indications for prescribing statins:

[ ] Myocardial infarction

[ ] Other: _____

23. Using a four-point scale, please, rate, how much the following factors influence your decision whether to prescribe Statins to a MI patient at discharge or not (1=Very much, 2=Somewhat, 3=Slightly, 4=Not at all):

NOTE: Read aloud responses to respondent after stating each question.

Question	1. Very much	2.Somewhat	3.Slightly	4.Not at all
1.The cost of the drug				
2.The availability of the drug in the local market				
3.The ease of drug's administration				
4.Side effects of the drug				
5.Whether the drug is promoted by the pharmaceutical company				
6.Whether the drug is advertized via mass media				
7.Whether the drug is recommended by the recent guideline you had access to				
8.Whether the drug is recommended by your colleagues/peers				
9.Whether the patient can afford the drug				

Read aloud: As you know clinical practice guidelines (CPG)s are systematically developed statements designed to assist practitioner make decisions about appropriate health care for specific clinical circumstances.

24. Are there any written drug prescription guidelines in your hospital for secondary prevention of MI?

1-Yes 2-No (Go to 28) 3-Not sure (Go to 28)

25. How accessible are CPGs on treatment of post-MI patients for you? (Read the responses aloud)
    1. Always accessible
    2. Mostly accessible
    3. Sometimes accessible
    4. Rarely/never accessible

26. How useful are CPGs for your daily practice? (Read the responses aloud)

    1. Very useful
    2. Useful
    3. Somewhat useful
    4. Useless

27. How frequently are CPGs discussed by you and your colleagues? (Read the responses aloud)

    1. Daily
    2. Several times a week
    3. Several times a month
    4. Several times a year
    5. Rarely/Never

28. Have you ever reviewed a CPG on treatment of post-MI patient?
    1. Yes
    2. No → No(Go to Q.31)
    3. Not sure → No(Go to Q.31)

29. Do you have a personal copy of it?
    1. Yes
    2. No
    3. Not sure

30. When is the last time you reviewed a CPG on how to manage post-MI patients?
    1. In the last week
    2. In the last month
    3. In the last year
    4. In the last 3 years
    5. More than 3 years ago

31. I would like to know your opinion about following statements based on your agreement with them. I am going to read four statements, one-by-one. After each statement I will ask you if you strongly agree, agree, disagree, or strongly disagree. Please choose the one answer that best describes your opinion.

Statement	1=Strongly agree	2=Agree	3=Disagree	4=Strongly disagree
1. A clinical practice guideline can be a helpful tool that physicians can use to improve how they practice medicine.				
2. CPGs often contain errors or are not based on fact or research evidence.				
3. Physicians in my department should practice according to CPGs that are widely accepted and based on research evidence.				
4. CPGs do not limit physicians' freedom to prescribe drugs that may be necessary for the patient.				
5. I know how to take care of my patients and I don't need guidelines to tell me how to practice medicine.				

32. Time of interview end: __ __: __ __

Բժիշկների հետ հարցազրույցի հարցաթերթիկ

1. Մասնակցի կոդը. _____

2. Հարցազրույցի ամսաթիվ. / _____/2011

3. Հարցազրույցը սկսելու ժամը. _ _ : _ _

Ժողովրդագրական տվյալներ

4. Սեռը. [ ]Արական [ ]Իգական

5. Քանի՞ տարի է, որ աշխատում եք որպես բժիշկ: _____ տարի

6. Քանի՞ տարի է, որ աշխատում եք որպես սրտաբան: _____ տարի

7. Քանի՞ տարի է, որ աշխատում եք որպես սրտաբան այս հիվանդանոցում:

   _____ տարի

8. Որտե՞ղ եք Դուք ստացել Ձեր մասնագիտությունը՝ որպես սրտաբան:

   _____(ուսումնական հաստատության անունը)

9. Որքա՞ն ժամանակ եք սովորել սրտաբանի մասնագիտացում ստանալու համար:

   _____ ամիս

10. Դուք երբևէ ուսանե՞լ եք սրտաբանություն արտասահմանում:

    [ ]Այո [ ]Ոչ (Անցնել 11րդ հարցին)

    10.1 Եթե այո՝ ո՞ր երկրում: _____

    10.2 Քանի՞ ամիս էր ուսման տևողությունը: _____

Մասնագիտական փորձը և վերապատրաստումները

11. Սրտաբան դառնալուց հետո երբևէ մասնակցե՞լ եք սրտաբանության վերաբերյալ վերապատրաստումների (խնդրում եմ չնշել այն վերապատրաստումները, որոնք տևել են 3 օրից պակաս):

[ ]Այո [ ]Ոչ (*Անցնել 12-րդ հարցին*)

11.1. Քանի՞ վերապատրաստման եք մասնակցել: _____

11.2. Որքա՞ն է բոլոր այդ վերապատրաստումների ընդհանուր տևողությունը: _____ տարի

11.3. Որքա՞ն ժամանակ է անցել Ձեր վերջին վերապատրաստումից: _____ տարի

12. Դուք ունե՞ք որևէ հրատարակված աշխատություն սրտաբանության վերաբերյալ:

[ ]Այո [ ]Ոչ (Անցնել 13-րդ հարցին)

12.1. Եթե այո, քանի՞ հրատարակված աշխատություն ունեք: _____

13. Դուք օգտվու՞մ եք ինտերնետից մասնագիտական զարգացման համար:

[ ]Այո [ ]Ոչ (Անցնել 14-րդ հարցին)

13.1.Շաբաթական քանի՞ ժամ եք օգտվում ինտերնետից՝ մասնագիտական զարգացման համար: _____

14. Դու՞ք կարդացել եք գիտական հոդված անցած ամսվա ընտացքում Ձեր մասնագիտության վերաբերյալ:

[ ]Այո [ ]Ոչ (Անցնել 15-րդ հարցին)

14.1.Անցած ամսվա ընթացքում քանի՞ գիտական հոդված եք կարդացել Ձեր մասնագիտության վերաբերյալ: _____

15. Դու՞ք մասկացել եք բուժանձնակազմի մասնագիտական զարգացմանն ուղղված որևէ միջոցառման անցած երեք ամսվա ընթացքում Ձեր հիվանդանոցում:

[ ]Այո [ ]Ոչ (Անցնել 16-րդ հարցին)

15.1. Քանի՞ միջոցառման եք մասնակցել (դեպքի քննարկում, զեկույց սրտաբանական թեմաներով, գիտական հոդվածի քննարկում և այլն):

_____

15.2. Ի՞նչ տիպի միջոցառման եք մասնակցել:

1. դեպքի քննարկում
2. զեկույց սրտաբանական թեմաներով
3. գիտական հոդվածի քննարկում
4. այլ _____

Գիտելիքները, մոտեցումները և գործելակերպը

16. Սովորաբար, շաբաթական քանի՞ սրտամկանի ինֆարկտով հիվանդ եք վարում:

_____

17. Դու՞ք երբևէ մոռացել եք նշանակել որևէ դեղ՝ գերծանրաբեռնվածության պատճառով:

[ ]Այո [ ]Ոչ (Անցնել 18-րդ հարցին)

17.1.Որքա՞ն հաճախ է դա պատահում: *(Կարդացեք պատասխանները բարձրաձայն:)*

[ ]Հաճախ [ ]Երբեմն [ ]Հազվադեպ [ ]Երբեք

18. Նշեք, խնդրեմ, թե ինչ խմբի դեղամիջոցներ պետք է նշանակվեն սրտամկանի ինֆակտի երկրորդային կանխարգելման համար՝ բարդություններ չունեցող հիվանդներին (*Գրանցել բոլոր նշածները, յուրաքանչյուր նշումից հետո հարցնել՝ կան արդյոք այլ խմբի դեղեր*);

*1.*_____

*2.*_____

*3.*_____

*4.*_____

*5.*_____

19. Խնդրում եմ նշել երեք կարևոր ցուցումներ՝ հակակոագուլանտների նշանակման համար:

[ ]Սրտամկանի ինֆարկտ [ ]Այլ_____

20. Խնդրում եմ նշել երեք կարևոր ցուցումներ՝ ԱՓՖ (Անգիոտենզին Փոխակերպող Ֆերմենտի) ինհիբիտորների նշանակման համար:

[ ]Սրտամկանի ինֆարկտ [ ]Այլ_____

21. Խնդրում եմ նշել երեք կարևոր ցուցումներ բետա բլոկատորների (պաշարիչների) նշանակման համար:

[ ]Սրտամկանի ինֆարկտ [ ]Այլ_____

22. Խնդրում եմ նշել երեք կարևոր ցուցումներ՝ ստատինների նշանակման համար:

[ ]Սրտամկանի ինֆարկտ [ ]Այլ_____

23. Օգտագործելով չորս բալանոց սանդղակ, խնդրում եմ նշել, թե որքանո՞վ է ազդում հետևյալ գործոններից յուրաքանչյուրը սրտամկանի ինֆարկտով հիվանդներին Ստատիններ նշանակելու Ձեր որոշման վրա: (1=Շատ, 2= Զգալիորեն, 3=Փոքր-ինչ, 4=Ամենևին)

(Նշում՝ կարդալ պատասխանները բարձրաձայն ամեն հարցից հետո)

Հարց	1.Շատ	2.Զգալի-որեն	3.Փոքր-ինչ	4.Ամենևին
1.Դեղամիջոցի գինը				
2.Դեղի առկայությունը տեղական շուկայում				
3.Արդյոք հիվանդը ի վիճակի է գնել տվյալ դեղը				
4.Դեղի օգտագործման հեշտ լինելը				
5.Դեղի կողմնակի ազդեցությունները				
6.Դեղի խրախուսումը դեղագործական ընկերության կողմից				
7.Դեղի գովազդը զանգվածային լրատվամիջոցներով				
8.Դեղի առաջարկվելը կլինիկական գործունեության վերջերս հրատարակված ուղեցույցում				
9.Դեղի առաջարկվելը Ձեր գործընկերների կողմից				

(Կարդալ բարձրաձայն)՝ **Ինչպես գիտեք, կլինիկական գործունեության ուղեցույցները (ԿԳՈՒ) հատուկ մշակված ձեռնարկներ են, որոնց նպատակն է աջակցել բժիշկներին՝ կայացնելու արագ և ճիշտ որոշումներ՝ որոշակի ախտաբանությամբ հիվանդների վարման վերաբերյալ:**

24. Ձեր հիվանդանոցում կա՞ն արդյոք դեղերի նշանակման ուղեցույցներ՝ սրտամկանի ինֆարկտի երկրորդային կանխարգելման համար:

[ ]Այո [ ]Ոչ (*Անցնել 28-րդ հարցին*) [ ]Համոզված չեմ (*Անցնել 28-րդ հարցին*)

25. Որքանո՞վ են Ձեզ հասանելի սրտամկանի ինֆարկտի երկրորդային կանխարգելման ԿԳՈՒ-ները : *(Կարդացեք պատասխանները բարձրաձայն:)*

1.[ ]Մշտապես

2.[ ]Մեծ մասամբ

3.[ ]Երբեմն

4.[ ]Հազվադեպ/Երբեք

26. Որքանո՞վ են օգտակար ԿԳՈՒ-ները Ձեր ամենօրյա պրակտիկայի համար: *(Կարդացեք պատասխանները բարձրաձայն:)*

1.[ ]շատ օգտակար

2.[ ]օգտակար

3.[ ]որոշ չափով օգտակար

4.[ ]անօգուտ

27. Որքա՞ն հաճախ եք քննարկում ԿԳՈՒ-ները Ձեր գործընկերների հետ: (Կարդացեք պատասխանները *բարձրաձայն:)*

1.[ ]ամեն օր

2.[ ] շաբաթական մի քանի անգամ

3.[ ] ամսական մի քանի անգամ

4.[ ] տարեկան մի քանի անգամ

5.[ ] հազվադեպ/ Երբեք

28. Դուք երբևէ կարդացե՞լ եք որևէ ԿԳՈՒ՝ հետ-ինֆարկտային բուժման վերաբերյալ:

[ ]Այո [ ]Ոչ (*Անցնել 31-րդ հարցին*) [ ]Համոզված չեմ (*Անցնել 31-րդ հարցին*)

29. Դուք ունե՞ք այդ ուղեցույցների Ձեր անձնական օրինակները:

[ ]Այո [ ]Ոչ [ ]Համոզված չեմ

30. Ե՞րբ եք վերջին անգամ կարդացել բուժման ուղեցույց՝ սրտամկանի Ինֆակտի երկրորդային կանխարգելման վերաբերյալ: *(Կարդացեք պատասխանները բարձրաձայն:)*

1.[ ]Անցած շաբաթվա ընթացքում

2.[ ]Անցած ամսվա ընթացքում

3.[ ] Անցած տարվա ընթացքում

4.[ ] Անցած երեք տարվա ընթացքում

5.[ ] Ավելի քան երեք տարի առաջ

31. Այժմ խնդրում եմ, ասացեք, թե որքանո՞վ եք համաձայն հետևյալ պնդումներից յուրաքանչյուրի հետ (լիովին համաձայն եք, համաձայն եք, համաձայն չեք կամ ամենևին համաձայն չեք): Խնդրում եմ ընտրել այն պատասխանը, որը լավագույնս կարտահայտի Ձեր կարծիքը:

(Նշում՝ կարդալ պատասխանները բարձրաձայն ամեն հարցից հետո)

Պնդում	1=Լիովին համաձայն եմ	2=համա-ձայն եմ	3=համա-ձայն չեմ	4=Ամենևին համաձայն չեմ
1.ԿԳՈւ-ները կարող են օգտակար միջոց լինել բժիշկների համար՝ բարելավելու իրենց կլինիկական գործունեությունը:				
2.Ուղեցույցները հաճախ պարունակում են սխալներ կամ չեն հիմնված փաստերի կամ գիտական ապացույցների վրա:				
3.Մեր բաժանմունքի բժիշկները պետք է աշխատեն ըստ այն ուղեցույցների, որոնք ընդունված են և հիմնված գիտական փաստերի վրա:				
4.Ուղեցույցները չեն սահմանափակում բժիշկների ազատությունը՝ նշանակել այն դեղերը, որոնք անհրաժեշտ են հիվանդներին:				
5.Ես գիտեմ, թե ինչպես պիտի հոգ տանեմ իմ հիվանդների մասին և ուղեցույցների կարիք չեմ զգում իմ բժշկական գործունեության համար:				

Շնորհակալություն

Հարցազրույցն ավարտելու ժամը: _ _ : _ _