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**VALIDATION STUDY OF THE PATIENT  
FOLLOW-UP QUESTIONNAIRE AND THE  
OFFICIAL PRE-PUBLICATION SF-36,  
ARMENIAN VERSION AT NORK MARASH  
MEDICAL CENTER**

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**Yerevan, 2003**

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## Executive Summary

**Purpose.** This study was conducted to validate Patient Follow-up Questionnaire (PFQ) and the official, prepublication SF-36, Armenian version at Nork Marash Medical Center (NMMC). The aim of the study was to evaluate the reliability and validity of the PFQ and SF-36 Armenian version as a tool to assess health status of post-surgical patients. After the accuracy and validity of the PFQ are evaluated, a Patient Follow-up Center (PFUC) can be established at NMMC to monitor health care outcomes and patient lifestyle behavior over time, both generally and at the individual level. Moreover, data collected regularly on discharged patients' health status can be used to assess the quality of care provided at NMMC.

**Introduction.** Generally, standardized questionnaires are used as tools for surveillance of health condition and risk factors in general and/or specific target populations. This allows comparisons between similar populations and within the same population over time. A Feasibility Study for establishing Patient Follow-up Center at Nork Marash Medical Center was conducted in June 2001. It revealed that the percentage of post-surgical patients with unsatisfactory health status was rather high, which could be a result of misunderstanding of some survey questions by patients. A recommendation was made to conduct further research to validate the post-operative follow-up questionnaire used in this study and to ensure that it yields valid data on patient post-operative health status. In parallel with this, it was decided to conduct a validation study of the International Quality of Life Assessment Project (IQOLA) Armenian pre-publication SF-36 questionnaire. The intention was to use both questionnaires in the future Patient Follow-up Center to have complete and comparable data on both specific health problems and general quality of life characteristics of the target population.

**Methods.** The study was cross-sectional and data were collected prospectively. Study participants were adults who underwent cardiac surgery (heart valve surgery or coronary artery bypass grafting) at NMMC during 2000-2001 and had already completed a rehabilitation period of at least 6 months. They were selected from a list of 140 former surgical patients residing in Yerevan. Those patients whose contact information was incomplete were excluded from the study. Starting from December 2001, the study team performed two consecutive attempts to contact all eligible patients and obtain their verbal agreement to participate in the study, seeking a sample size of 70 patients, 35 patients in each diagnosis group. The first stage of the study was implementation of self-administered survey through mailing the questionnaires to former patients. Within a month after receiving completed questionnaires, the second stage of the study started, where patients were visited and interviewed at their homes using the same instruments and their health status evaluated by a cardiologist through a simple examination to confirm the accuracy of their responses to the items measuring their physical health. The comparability of data obtained during the first and second stages was then measured to validate the survey instruments.

**Sample.** The sample size of the study was determined using one-sample proportion formula in the STATA statistical software. The parameters were: 95% standard agreement, 85%, hypothesized agreement between the first and second stages, and the least difference of 10% desirable to detect. With 80% power and alpha error of 0.05, the sample size was equal to 53 patients. However, considering low response rate among surgical patients in the previous feasibility study, the sample size was increased to 70 patients.

**Results: Validation of the PFQ.** Data were analyzed in SPSS 10.0, STATA 7.0, and MS Excel statistical software. The response rate, percentage of study participants who successfully completed PFQ among all patients whom the PFQ was sent, was 60%. The agreement between self-administered and interviewer-administered questionnaires was 65%. The difference between actual and hypothesized agreement (85%) was statistically significant ( $p < .0004$ ). The analysis of each item in the PFQ revealed that post-operative angina, post-operative shortness of breath, post-operative arrhythmia, and current routine physical activity had the lowest percent agreement. A set of independent variables, such as patient diagnosis and primary cardiologist, were examined to detect possible differences in the mean concordance scores. However, the percent agreement was not statistically significant between diagnosis groups or among cardiologists. Validity analysis indicated that the PFQ is a valid tool to assess patient post-operative status with regard to high temperature, edema of low extremities and bleeding/bloody stool or urine. The other questions had either high sensitivity but low specificity or high specificity but low sensitivity.

**Pre-validation of the Armenian version of SF-36 questionnaire.** The percent agreement between self-administered and interviewer-administered SF-36 was 54.8%, which is statistically different from the hypothesized agreement ( $p < .000$ ). Kappa statistics showed that most of items had marginal or very marginal agreement. To conduct more accurate analysis of correlation, Spearman correlation coefficient was calculated for each item and was statistically significant for most items of SF-36 questionnaire. When data were compiled into quality of life profiles, the difference between self-administered and interviewer-administered scores was statistically significant for four domains (physical functioning, bodily pain, vitality, and social functioning). The difference in Physical Component Summary (PCS) and Mental Component Summary (MCS) between self-administered and interviewer-administered SF-36 was not statistically significant.

**Conclusions. Validation of the PFQ.** The study indicated good agreement between self-administered and interviewer-administered PFQs. Post-operative angina pectoris, shortness of breath, arrhythmia, and current routine physical activity had poor agreement, while the other items had either good or excellent agreement. All the items with poor agreement were intended to reveal some core symptoms in patients depending on their exertion level. Based on the study results, the PFQ was re-designed. The questions with poor agreement were substituted with other equivalent items providing equal extent of medical information without including the response options on different exertion levels. Some new items were introduced in the PFQ aimed to obtain more complete data on health conditions patients develop in late post-operative period. The latter will create a basis to approach this patient population as a cohort for designing/conducting different research/quality assurance activities at NMMC.

**Validation of the Armenian version of SF-36 questionnaire.** The study revealed poor agreement between self-administered and interviewer-administered SF-36 questionnaires. However, when 1-point absolute difference in selected response options for those scale questions that had 5 or more response options was considered acceptable taking into consideration factors other than the questionnaire itself that could affect the response choices, the agreement between surveys was improved considerably. Also, there was no statistically significant difference in the Physical Components Summary and Mental Components Summary measures between the two administrations. Thus, the further use of SF-36 at NMMC as a tool to measure the quality of life of post-surgical patients was considered reasonable.

## 1. Introduction

Standardized questionnaires are the key tools for collecting patient information to monitor their health outcomes, for quality assurance activities, and other purposes. In health care institutions standardized questionnaires are being in use to allow data collection on patient cohorts for monitoring health care outcomes over a long period of time and for conducting various research activities. However, before reliance on the data, collected through these instruments, it is desirable to evaluate their reliability and validity.

Standardized questionnaires have been used as tools for surveillance of behavioral or risk factors in general population [1]. The validation study of telephone-administered food frequency questionnaire conducted among general population of Wisconsin, Chicago, Arizona, and Augusta in 1995 indicated that this questionnaire was to detect substantial differences in fat intakes rather than for capturing small differences that should be accounted while drawing any conclusions [1]. Another study aimed to evaluate the validity of questionnaire on musculoskeletal pain indicated that the questionnaire was 95% sensitive and 88% specific to detect pain in neck and shoulders [2]. Randomized experimental study was conducted to evaluate the comparability of 12-item Health Status Questionnaire (HSQ) with the Medical Outcomes Study of 36-item short-form (SF-36) health survey [3]. It showed that shortened questionnaire suffered from attenuated discriminate validity, as well as floor and ceiling effects in seriously ill and healthy population [3]. A study conducted by the Research Institute of Cardiology, Saint Petersburg, Russia, assessed quality of life in patients with stable angina during two months of follow-up and estimated correlation between quality of life and clinical signs of the disease, and results of a stress test [4]. This study supported the use of the Russian version of SF-36 to assess the quality of life in patients with stable angina and proved to be sensitive to clinical changes and severity of the disease [4].

Nork Marash Medical Center (NMMC) strives to improve quality of care it provides through continuous comparisons of health care outcomes data both over time and between similar organizations. At NMMC, the first follow-up visit after cardiac surgery is scheduled on the second day after discharge. The consequent follow-up visits are scheduled within one week of the first follow-up visit, a month, 3 months, and 6 months. However, depending on patient health conditions, this schedule can vary. Currently, a significant number of patients is being lost from the follow-up within a year after heart surgery, which may partially be explained by the expiration of the term of medical insurance provided to its post-surgical patients by NMMC (within 6 months after the surgery NMMC provides them free of charge care). Meanwhile, annually collected comprehensive data on patient health status may serve as a basis for quality assurance (QA) activities and research purposes at NMMC. The absence of established processes to follow-up surgical patients within a long period of time hinders quality improvement activities at the individual level, as well as at the level of the hospital performance.

A feasibility study for a Patient Follow-up Center at Nork Marash Medical Center was conducted by the American University of Armenia (AUA) and AUA/NMMC Project (ANP) in June 2001. The Patient Follow-Up Questionnaire (PFQ) that is currently in use at the Starr Clinic in Portland, Oregon, was used to describe advantages and disadvantages of and recommendations for establishing a PFUC at NMMC. The study indicated that PFUC could be established at NMMC at the acceptable cost if it uses NMMC current employees or volunteers. The report on Feasibility Study for a Patient Follow-up Center at NMMC presented that surgical patients could misunderstand some questions related to their health

status, otherwise the percentage of patients with low health status could be unacceptably high. It was recommended conducting further research to validate the post-operative follow-up questionnaire and to ensure that it yields valid data on patient post-operative health status over time. The PFQ was redesigned based on the recommendations of Feasibility Study for a Patient Follow-up NMMC (Appendix 1).

It was decided also to conduct a small-scale validation study of the International Quality of Life Assessment Project (IQOLA) Armenian pre-publication SF-36 questionnaire to evaluate its validity. The intention was to use both questionnaires in the future Patient Follow-up Center to have a complete and comparable data on both specific health problems and general quality of life characteristics of the target population.

The research questions were as follows:

1. Is the Patient Follow-up Questionnaire valid to be used as a tool to assess post-surgical health status of patients over time?
2. Is the Armenian pre-publication version of SF-36 valid to assess general health status of surgical patients over time?

The specific aims of the study were:

1. To reveal the agreement percent between self- and interviewer-administered PFQs
2. To investigate the validity measures (sensitivity, specificity, and positive predictive value) of the PFQ
3. To determine the agreement level between self- and interviewer-administered SF-36 questionnaires per each question and domain
4. To elucidate recommendations to improve the PFQ
5. To recommend ways to increase response rate.

After the accuracy and validity of the PFQ are evaluated the Patient Follow-up Center (PFUC) can be established at NMMC and data on patient health status can be collected over time. It will be used to monitor health care outcomes and lifestyle/behavior of post-surgical patients over time both on individual and general level.

## **2. Methods**

### **2.1. Study design and sample size**

The study was descriptive cross-sectional and data were collected prospectively. The sample size of the study was determined using one-sample proportion formula in the STATA statistical software. It was assumed that the standard agreement is 95%, the hypothesized agreement between self-administered and interviewer-administered questionnaires is 85%, and the least difference desirable to detect is 10%. With 80% power and alpha error of 0.05, the sample size was equal to 53 patients. However, the Feasibility Study for a PFUC at NMMC conducted in June 2001 indicated 56% response rate among surgical patients residing in Yerevan and contacted via mail. Considering such a response rate, the sample size was increased to 70 patients.

## **2.2. Study population**

Study participants were adults who underwent cardiac surgery at NMMC during 2000-2001 and had already passed rehabilitation period (6 months). Patients were divided into two groups based on their diagnosis: Ischemic heart disease (IHD) and Valvular heart disease (VHD). They were selected from a comprehensive list of surgical patients who were performed coronary artery bypass grafting (CABG) or heart valve surgery. Information on 140 patients residing in Yerevan (name, residency addresses, telephone number, diagnosis, primary cardiologist, date of surgery, and age at the admission to NMMC) was provided by the Adult Cardiology Department (ACD). Those surgical patients whose contact information was incomplete (had no address and telephone number or this information was incomplete) were excluded.

The study team performed two consecutive attempts to contact all eligible patients starting from December 20, 2001 and through this effort, a sample size of 70 patients, 35 in each diagnosis group was generated. At the first attempt, patients were contacted at morning hours during weekdays. In the case of unsuccessful first attempt, second attempt to contact them was made including calls at evening hours and on weekends as well. Patients were informed about questionnaires to be mailed to them, and their verbal consent to participate in the study through filling in the questionnaires and sending those back in a provided envelope was obtained. In the mean time, their addresses of residency were confirmed for making the consecutive home visits.

## **2.3. Study instruments**

Two questionnaires were sent to the participants: PFQ and SF-36. The PFQ was developed based on similar questionnaire currently used in Starr Clinic in Portland, Oregon (see Appendix #2). Two additional questions regarding having post-operative angina were included in the PFQ to enable cardiologists to differentiate angina pectoris from other types of chest pain, e.g. post-surgical wound pain. Also, some questions aiming to detect other health conditions, such as stroke, heart failure, elevated/insufficient blood coagulation, were included into the questionnaire. The instrument was pre-tested on 10 patients who had undergone surgery at NMMC 6 or more months ago. The pre-test revealed problems with the questionnaire design rather than its content. After redesigning the PFQ it was again pre-tested, which did not indicate a need for changes in its content or design. The Armenian version of SF-36 questionnaire was already pre-tested, but its validity and reliability have never been evaluated.

## **2.4. Study implementation**

On the first, self-administered stage of the study, mail packages containing both questionnaires (PFU and SF-36) and an empty envelope with back address were mailed to the selected 70 participants. A total of 35 letters with completed questionnaires were received within two weeks after the first mailing. Those patients who did not respond were contacted for the second time via telephone and asked to complete questionnaires. It was found out that some of them did not receive questionnaires, while others did not complete them. After the second mailing, additional seven letters were received, increasing the total number of respondents to 42 (60%). However, only 40 participants were visited at the second stage of study, as 2 patients were withdrawn from the study (one patient refused to continue participating in the study and the other one was outside Yerevan).

To initiate the second, interviewer-administered/examination stage of the study, the respondents were contacted by phone again to arrange the day and time for the home visits. Home visits were made by a team of investigators consisted from two people: an interviewer and a cardiologist. Their task was interviewing patients using the same instruments and validating the accuracy of their responses through some additional questions and a simple physical examination. During the home visits a validation tool for PFQ was used. The Validation tool included all questions from PFQ and some additional questions to verify ischemic origin of chest pain, severity of post-operative angina, shortness of breath, and arrhythmia depending on exertion level. Current routine physical activity was verified by standard examples of physical activity, while blood pressure, motion or speech dysfunction, bleeding, arrhythmia, edema of low extremities, and administration of drugs were confirmed by the cardiologist through objective examination and observation.

During the home visits, the SF-36 questionnaire was administered first to reduce the influence of health problems discussion on answers to the items of this questionnaire. During the interview, the interviewer followed the instructions of SF-36 administration in person of the Health Assessment Lab (HAL).

### **2.5. Study protocol**

The self-administered and interviewer-administered questionnaires were considered concordant if both contained the same answer to a particular item. For each item a score of 0 or 1 was assigned interpreted as discordant or concordant respectively. For example, a patient had reported chest pain related to ordinary physical activity that was verified by the cardiologist during the home visit. In this case the item was considered concordant. Further, if a patient reported arrhythmia related to severe exertion, but during the cardiologist examination it was revealed that the patient has no irregular heart rhythm, the item was considered discordant. The same rule of scoring was applied to all other items in the PFQ and SF-36.

## **3. Study limitations**

The home visits were done within approximately a month after receiving letters at the first round. Within this time, some changes in physical and mental status could occur that might increase the inconsistency between self-administered and interviewer-administered questionnaires.

The way of validation of the responses conducted by a team consisted of an interviewer and a cardiologist created new circumstances during the second survey rather different from those during the first survey when the questionnaire was just self-administered.

Some difficulties rose when validating the responses on some health-status related questions. The presence of angina pectoris, shortness of breath, and arrhythmia in patients and the relation of these symptoms to different levels of physical exertion were verified through simple physical examination by the cardiologist. However, the severity of myocardial ischemia in relation to physical activity, as well as the arrhythmia type could be confirmed by sophisticated diagnostic methods, such as treadmill and holter tests. To deal with this limitation, probable presence of angina pectoris was confirmed by medical records review of those patients whose health status was doubtful.

In addition, the sample size was small to maintain power of the study at 80% level. Yet, it revealed valuable information regarding the validity and reliability of the PFQ to be routinely used at NMMC for monitoring post-operative outcomes.

#### **4. Data analysis**

Data was entered into SPSS 10.0 statistical software and data analysis was performed through SPSS 10.0, STATA 7.0, and MS Excel statistical software. To eliminate the possibility of additional errors, data cleaning was performed. Data analysis of the PFQ was performed considering the interviewer-administered questionnaire as “a gold standard”. The percent agreement between self-administered and interviewer-administered questionnaires, as well as the percent agreement per each item was calculated to detect the strength of agreement. Thereafter, analysis was carried out to reveal the most problematic options of multiple-choice questions. In addition, kappa statistics was calculated for SF-36 to find the agreement level between two administrations beyond of that expected by chance. Also, Spearman correlation coefficient was calculated to enable more accurate analysis of correlation between two ordinal variables in self-administered and interviewer-administered questionnaires. Finally, descriptive analysis of the interviewer-yield data was performed to reveal some late post-operative outcomes and quality of life characteristics in patients that could be of interest for NMMC clinicians.

#### **5. Results**

##### **5.1. Response Rate**

The response rate, being calculated as a percentage of those study participants who successfully completed the PFQ after giving their verbal consent to participate and being recruited in the first stage of the study (i.e. whom the questionnaire was mailed), was 60%. If the response rate is calculated among those 100 patients, who were selected from the list of 140 patients as being eligible for the study and whom an attempt was made to contact, the response rate will be equal to 42%. The reason of not recruiting all 100 patients was that 24 of them had incomplete contact information, 3 were outside Yerevan, and 3 others died. The questionnaires were sent to the remaining 70 surgical patients, and 42 letters with completed questionnaires were received.

However, a total of 40 patients participated in the second stage of the study, since 2 patients were withdrawn from the study for different reasons. Out of these 40 participants, 19 were Ischemic Heart Disease (IHD) patients (47.5%) and 21 were Ventricular Heart Disease (VHD) patients (52.5%). Based on the objective examination, a presence of post-operative angina in one of the VHD patients was suspected. However, medical records of coronarography performed to this patient before surgery indicated no pathological lesions in coronary arteries. The mean age of participants was 56.2 (sd=11.37) being similar in the IHD and VHD patients ( $p = 0.4$ ). Males constituted 60%, and females 40% of the sample.

## 5.2. Validation of Patient Follow-Up Questionnaire

### 5.2.1. Medical data obtained from the PFQ

Considering that the health status of surgical patients operated at NMMC within the last two years could be of interest to NMMC physicians, data analysis was performed to show the percentage of patients with post-operative angina, shortness of breath, and arrhythmia, as well as their smoking status, level of routine physical activity, etc. (Appendices 1 and 3). The interviewer-administered questionnaires were used as a source of data for this analysis, as these were considered more accurate (Tables 1 and 2).

**Table 1. Post-operative patient health status according to the interviewer-obtained data**

Post-surgical health status	% of patients (N = 40)
Post-operative angina	7.5
Post-operative shortness of breath	60
Post-operative arrhythmia	55.0
Hospital readmission for any heart-related problem	5.0

If patients having shortness of breath during strenuous physical activities were also included, the percentage of those having post-operative shortness of breath in this sample would increase up to 82.5%. However, shortness of breath during strenuous physical activities can be experienced by healthy people, thus the percentage of patients with shortness of breath due to pathological reasons was calculated based on those mentioning having the condition with ordinary or slightest exertion or at rest. Nevertheless, the revealed prevalence of this condition was 60%. The next condition in terms of frequency was post-operative arrhythmia revealed in 55% of participants.

Data analysis was performed to reveal the percentage of patients with symptoms of health status worsening, such as those who developed signs of infectious endocarditis, heart failure, ischemic complications, including stroke, and complications due to excessive dosage of anti-coagulation drugs (Table 2). Headaches/dizziness and arrhythmia were the most frequent conditions among study population revealed in 50.0% and 47.5% of cases respectively. The percentage of referrals to a hospital/physician for any of the symptoms (27.5%) was calculated among all study participants, whereas the percentage of referrals to a hospital/physician among those patients who had at least one of the above-mentioned symptoms was 37.9%.

**Table 2. Other clinical data obtained from interviewer-administered questionnaire**

Post-operative health status/behavior	% of patients (N = 40)
Current smoking status	7.5
Motion or speech dysfunction	7.5
High temperature or rigor	10.0
Bleeding, bodily stool or bodily urine	22.5
Edema of low extremities	22.5
Arrhythmia	47.5
Frequent headache or dizziness	50.0
Acute pain in any organ or bodily part	27.5
None of the symptoms	27.5
Referral to a hospital/physician for any symptom	27.5
Physician other than NMMC cardiologist providing FU care	25

Further, data were analyzed by patient diagnosis to detect possible differences in the health status between IHD and VHD patients. The only noticeable (yet, statistically insignificant due to small sample size) difference between these diagnosis groups was observed in the prevalence of the signs of Angina Pectoris. It was revealed that no one of the patients who had undergone heart valve surgery had post-operative angina pectoris. Among patients who had undergone coronary artery bypass grafting (CABG), 15.8% had post-operative angina pectoris (Table 3).

**Table 3. Post-surgical patient health status by diagnosis**

<b>Post-surgical health status</b>	<b>IHD (n=19)</b>	<b>VHD (n=21)</b>	<b>Chi-square test</b>
	<b>% of patients</b>	<b>% of patients</b>	<b>Sig. (2-sided)</b>
Having post-operative angina	15.8	0	.09
Having post-operative shortness of breath	84.5	80.9	.53
Having post-operative arrhythmia	42.1	66.7	.11
Routine physical activity (sedentary lifestyle)	10.5	9.5	.66
Currently smoking patients	10.5	5	.46
Hospitalized for any heart-related problem	5.3	4.8	.73

The prevalence of deterioration of health status within 1-2 years after cardiac surgery was also analyzed by diagnosis groups and chi-square test was performed to detect possible association between the diagnosis groups and detected conditions (Table 4).

**Table 4. Deterioration of patient health status by diagnosis**

<b>Post-surgical health status</b>	<b>IHD (n=19)</b>	<b>VHD (n=21)</b>	<b>Chi-square test</b>
	<b>% of patients</b>	<b>% of patients</b>	<b>Sig. (2-sided)</b>
Motion or speech dysfunction	0	14.3	.14
High temperature or rigor	10.5	9.5	.66
Bleeding, bodily stool or bodily urine	10.5	33.3	.09
Edema of low extremities	10.5	33.3	.09
Arrhythmia	31.6	61.9	.05
Frequent headache or dizziness	47.4	52.4	.50
Acute pain in any organ or bodily part	26.3	28.6	.58
None of the symptoms	31.6	23.8	.42
Referral to a hospital/physician for any symptom	26.3	28.6	.58
Physician other than NMMC cardiologist providing Follow-up care	26.3	23.8	.57

Although there was no statistically significant difference in responses to the PFQ between patients with IHD and VHD, the difference in the revealed prevalence of arrhythmia was marginally significant. Edema of lower extremities and bleeding, bodily stool or urine were also more frequently observed in VHD patients. However, the difference was statistically insignificant (possibly, due to small sample size). Data on similarity of pre-operative and post-operative angina and duration of post-operative angina attacks were not analyzed due to the small number (3) of patients in the sample experiencing post-operative angina pectoris.

### 5.2.2. Agreement between self-administered and interviewer-administered questionnaires

The mean concordance score was 11.70 (sd = 2.13) out of the maximum possible concordance score of 18 (excluding open-ended questions) (Table 5). Thus, overall percent agreement between interviewer-administered and self-administered questionnaires was 65%.

**Table 5. Mean score and percent agreement per case**

Minimum	Maximum	Mean	Std. Deviation	% Agreement
5	15	11.7	2.13	65

The study hypothesized that the agreement percent between interviewer-administered and self-administered questionnaires was 85%. The difference between actual and hypothesized agreements was statistically significant ( $p < 0.0004$ , 95% CI: 0.50; 0.79) (Table 6). The study had 71.7% power to detect 10% difference between standard and hypothesized agreement in PFQ responses.

**Table 6. The actual and hypothesized percent agreement and their mean difference with the 95% CI\***

# of patients	Actual mean (X)	Hypothesized mean (Y)	Mean difference (X-Y)	Std. deviation	Sig. level (2-tailed)	95% confidence interval	
						Lower bound	Upper bound
40	.65	.85	-.20	.08	.000	0.50	0.79

\* CI- confidence interval

Data analysis per each question indicated very poor agreement for current routine activity, while poor agreement was found for post-operative angina pectoris, post-operative shortness of breath, and post-operative arrhythmia. An excellent agreement was revealed for current smoking status, hospital readmissions for any heart related problem, and a physician other than NMMC cardiologist providing follow-up care (Table 7).

**Table 7. Percent agreement and strength of agreement for each question**

Question	Percent agreement (%)	Agreement value (%)	Strength of agreement
Post-operative angina	57.5	41-60	poor
Post-operative shortness of breath	45.0	41-60	poor
Post-operative arrhythmia	57.5	41-60	poor
Current routine physical activity	37.5	< or = 40	very poor
Current smoking status	92.3	81-100	excellent
Hospital readmission for any heart related problems	90.0	81-100	excellent
Physician other than NMMC cardiologist providing FUC	82.5	81-100	excellent

\*FUC – Follow-up care

Although the agreement percent for similarity of pre- and post-operative angina and duration of post-operative angina attack were calculated, the number of patients with post-operative angina pectoris was too small (3), which might artificially increase the agreement percentage. Thus, no conclusions could be drawn on this matter.

The analysis of concordance for each symptom in late post-operative period (question #9) indicated higher percent agreement between self- and interviewer-administered responses (Table 8).

**Table 8. Percent agreement and strength of agreement for symptoms of health status deterioration**

Question	Percent agreement (%)	Agreement value (%)	Strength of agreement
Motion or speech dysfunction	87.5	81-100	excellent
High temperature or rigor	82.5	81-100	excellent
Bleeding, bodily stool or bodily urine	82.5	81-100	excellent
Edema of low extremities	85.0	81-100	excellent
Arrhythmia	71.8	61-80	good
Frequent headache or dizziness	69.2	61-80	good
Acute pain in any organ or bodily part	74.4	61-80	good
None of the symptoms	76.9	61-80	good
Referral to a hospital/physician for any symptom	97.2	81-100	excellent

Statistically significant difference between the hypothesized and actual percent agreements was revealed for post-operative angina ( $p < .0005$ , 95% CI: .42; .73), post-operative shortness of breath ( $< .0005$ , 95% CI: .29; .60), post-operative arrhythmia ( $< .0005$ , 95% CI: .42; .73), current physical activity level ( $< .0005$ , 95% CI: .22; .53), and frequent headache or dizziness ( $< .0005$ , 95% CI: .55; .87). Data analysis was conducted to identify those response options that had the lowest concordance score for post-operative angina, shortness of breath, arrhythmia, and current routine physical activity (Appendix 4, Table 1).

In addition, the absolute difference between selected response options was calculated to detect the depth of inconsistency between self-administered and interviewer administered questions (Appendix 4, Table 2). The idea behind was that the lowest difference (of 1) between selected response options (e.g. shortness of breath “with slightest exertion” in one instance and “with ordinary exertion” in another, or “never” in one instance and “with severe exertion” in another) could be a result of factors different than inadequacy of the questionnaire, like time difference between self-administered and interviewer administered surveys, different circumstances during these surveys that might slightly change the way patients felt about given questions. Data analysis showed that the majority of discordant answers to the questions about post-operative shortness of breath and current routine physical activity level had only minimal absolute difference (of 1) in selected response options (61.9% and 64% of discordant answers respectively). However, for the item on post-operative arrhythmia this percentage was 41.2% and for post-operative angina only 23.5%. Meanwhile, 52.9% of discordant responses for post-operative arrhythmia and 35.3% of discordant responses for post-operative angina had 3 or more points of absolute difference in selected response options. However, if considering a minimal, 1-point difference acceptable for this type of questions, the agreement percentage for post-operative angina pectoris would increase to 67.5% (good), for post-operative shortness of breath 77.5% (good), for post-operative arrhythmia 75% (good), and for current routine physical activity level 77.5% (good).

It is worthy to mention that the percent agreement was calculated for the whole study population, including those having negative answers to some items so that the negative responses could artificially increase the revealed concordance levels. The percent agreement of questions that had lower than excellent agreement was analyzed by patient diagnosis (Table 9

and Appendix 5 for more details). It was presumed that the agreement percent between two administrations could be associated with patient diagnosis, as the IHD patients experiencing angina in the past could better differentiate angina pectoris from other types of chest pain. In addition, patient education conducted by cardiologists might influence patient knowledge of disease symptoms, signs that require referral to hospital, and other issues. Thus, understanding of the PFQ and agreement percent between self-administered and interviewer-administered questionnaires could be higher in patients receiving enhanced education from their cardiologists. The mean concordance score was not statistically significant among cardiologists ( $p=0.42$ ) and was marginally significant between IHD and VHD patients ( $p=0.046$ ). However, the small sample size in each diagnosis group and the number of patients managed by each cardiologist were small to obtain valid results. Nevertheless, these data can be considered as pilot and can be used while conducting further validation studies.

**Table 9. Percent agreement and strength of agreement for each question by admission diagnosis**

Question	IHD		VHD	
	% Agreement	Strength of agreement	% Agreement	Strength of agreement
Post-operative angina	73.7	good	42.9	poor
Post-operative shortness of breath	42.1	poor	44.44	poor
Post-operative arrhythmia	42.1	poor	76.2	good
Current routine physical activity	31.6	very poor	42.9	poor
Arrhythmia	66.7	good	76.2	good
Frequent headache or dizziness	55.6	poor	81.0	excellent
Acute pain in any organ or bodily part	72.2	good	76.2	good
None of the symptoms	50.0	poor	100	excellent

### 5.2.3. Validity measurements

Validity measurements were calculated to test potential use of PFQ as a tool of prospective data collection on patient health status after surgery. Sensitivity and specificity were calculated to have the percentage of true positive and true negative responses for each question. Positive predictive value (PPV) was computed to indicate the percentage of true positives among all positive responses (Table 10).

The PFQ was able to detect post-operative angina by 100%, but out of all patients who did not have this condition, 54.1% reported as having post-operative angina. The PFQ could predict that only 15% of those patients who reported post-operative angina actually had this condition. Further, 84.8% sensitivity and 57.1% specificity for post-operative shortness of breath mean that about 84.8% of patients having post-operative angina were correctly detected by the PFQ as having this symptom, but only 57.1% of patients were correctly identified as not having post-operative shortness of breath.

The PFQ was able to detect bleeding, bloody stool or bloody urine only by 33%, but all those patients who did not have this sing correctly reported as not having it (100% specificity). The PFQ could predict that 100% of those patients who reported having any type of bleeding actually had this condition. The same interpretation style can be applied to each question in the PFQ to get the meaning of its sensitivity, specificity, and PPV. As it is clear from the table, only one item included in the PFQ (edema of low extremities) had both high sensitivity and specificity.

**Table 10. Sensitivity, specificity, and PPV\* for each question on patient health status**

<b>Variable name</b>	<b>Sensitivity</b>	<b>Specificity</b>	<b>PPV</b>
Post-operative angina	100	54.1	15
Post-operative shortness of breath	84.8	57.1	90.3
Post-operative arrhythmia	95.4	66.7	77.8
Current routine physical activity	83.3	50	93.8
Current smoking status	66.7	94.4	50
Hospital readmission for any heart related problems	0	97.3	0
Motion or speech dysfunction	66.7	94.3	40
High temperature or rigor	75	85.7	37.5
Bleeding, bloody stool or bloody urine	33.3	100	100
Edema of low extremities	88.9	86.7	66.7
Arrhythmia	63.2	80	75
Frequent headache or dizziness	57.9	80	73.3
Acute pain in any organ or bodily part	45.5	85.7	55.6
None of the symptoms	45.5	85.7	55.6
Referral to a hospital/physician for any symptom	0	5.9	0
Physician other than NMMC cardiologist providing FU care	40	96.7	80

\* *PPV – positive predictive value*

### **5.3. Validation of the official IQOLA pre-publication SF-36, Armenian version**

#### **5.3.1. Agreement between self- and interviewer-administered SF-36 responses**

Data analysis was carried out to determine the percentage of response options for each question in both self-administered and interviewer-administered SF-36 (Appendix 6). It was indicated that 65% of patients evaluated their general health as good, very good or excellent in self-administered questionnaire. This percentage increased to 70% in the questionnaire administered by interviewer. To the question if their general health or emotional problems interfere with normal social activities, 37.5% of respondents answered “not at all” in the self-administered questionnaire. The corresponding percentage of “not at all” answers in interviewer-administered questionnaire increased to 52.5%. In self-administered questionnaire, 35% of respondents rejected having a perception that their health is getting worse. In interviewer-administered questionnaire this percentage increased to 70%. In general, per question and per response option comparisons between self-administered and interviewer administered questionnaires showed that there was a tendency of responding more positively to the questions given by interviewer. Taking into consideration the fact that this tendency, in more or less extent, was observed throughout the whole questionnaire, one might conclude that the observed difference between self-administered and interviewer-administered questionnaires was partially due to the change in questionnaire administration mode.

The agreement between two methods of SF-36 administration was determined. The item was considered concordant if the response to it was the same in self-administered and interviewer-administered questionnaires. A score 1 was assigned to concordant items, while 0 score was given to discordant items (Table 11).

**Table 11. Agreement percent for each question of SF-36 questionnaire**

Question	Agreement percent (%)	Agreement value (%)	Strength of agreement
<b>1. In general, would you say your health is ...</b>	72.5	61-80	good
<b>2. Compared to one year ago, how would you rate your health in general now?</b>	60.0	41-60	poor
<b>3. Does your health now limit you in these activities? If so, how much?</b>			
a. Performance of vigorous activities	67.5	61-80	good
b. Performance of moderate activities	62.5	61-80	good
c. Lifting or carrying groceries	57.5	41-60	poor
d. Climbing several flights of stairs	55.3	41-60	poor
e. Climbing one flight of stairs	87.5	81-100	excellent
f. Bending, kneeling, or stooping	57.5	41-60	poor
g. Walking more than a mile	62.5	61-80	good
h. Walking several blocks	82.1	81-100	excellent
i. Walking one block	92.5	81-100	excellent
j. Bathing or dressing yourself	87.5	81-100	excellent
<b>4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?</b>			
a. Cutting down the amount of time spent on work/other activities	82.1	81-100	excellent
b. Accomplishing less than you would like	64.1	61-80	good
c. Were limited in the kind of work/other activities	60.0	41-60	poor
d. Had difficulty performing the work/other activities	65.0	61-80	good
<b>5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems?</b>			
a. Cut down the amount of time you spent on work or other activities	71.8	61-80	good
b. Accomplishes less than you would like	71.8	61-80	good
c. Didn't do work or other activities as carefully as usual	66.7	61-80	good
<b>6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family...</b>	52.5	41-60	poor
<b>7. How much bodily pain have you had during the past 4 weeks?</b>	43.6	41-60	poor
<b>8. During the past 4 weeks, how much did pain interfere with your normal work?</b>	50.0	41-60	poor
<b>9. How much of the time during the past 4 weeks ...</b>			
a. Did you feel full of pep?	47.4	41-60	poor
b. Have you been a very nervous person?	46.2	41-60	poor
c. Have you felt so down in the dumps that nothing could cheer you up?	35.9	<= 40	very poor
d. Have you felt calm and peaceful?	28.2	<= 40	very poor
e. Have you a lot of energy?	38.5	<= 40	very poor
f. Have you felt downhearted and blue?	28.2	<= 40	very poor
g. Did you feel worn out?	62.5	61-80	good
h. Have you been a happy person?	25.6	<= 40	very poor
i. Did you feel tired?	33.3	<= 40	very poor
<b>10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?</b>	47.5	41-60	poor

Question	Agreement percent (%)	Agreement value (%)	Strength of agreement
<b>11. How true or false is each of the following statements for you?</b>			
a. I seem to get sick a little easier than other people	38.5	<= 40	very poor
b. I am as healthy as anybody I know	33.3	<= 40	very poor
c. I expect that my health to get worse	30.0	<= 40	very poor
d. My health is excellent	30.8	<= 40	very poor

The mean concordance score between interviewer-administered and self-administered SF-36 was 19.73 (sd = 5.05) out of the maximum possible concordance score of 36. Thus, the overall percent agreement between two administrations was 54.81%. The study hypothesized that the agreement percent between interviewer-administered and self-administered questionnaires was 85%. Data analysis indicated that the actual agreement was by 30% lower the hypothesized one ( $p < .0004$ , 95% CI: 39, 70) (Table 12). The study had 71.7% power to detect 10% difference between the perfect and hypothesized agreement in PFQ responses.

**Table 12. The actual and hypothesized percent agreement and their difference**

# of patients	Actual agreement ( $p_1$ )	Hypothesized agreement ( $p_2$ )	Mean difference ( $p_1 - p_2$ )	Std. Error	Sig. Level (2-tailed)	95% confidence interval	
						Lower bound	Upper bound
40	.55	.85	.30	0.08	.000	0.39	.70

Data analysis of percent agreement was also carried out considering the absolute 1-point difference between response options as concordant, but only for those scale items that had at least 5 answer choices (q#1-2 and q#6-11). As it is shown in table 11, these were the questions with mainly poor or very poor percent agreement. This change in the approach of identifying concordance resulted in a significant improvement of the agreement percent per item. If with the first approach 10 items out of 19 (52.6%) had very poor agreement, 7 (36.9%) poor, and only 2 (10.5%) good, with the second approach 7 items (36.9%) had excellent agreement, 11 items (57.9%) good, and only 1 item (5.3%) very poor (Appendix 7).

If considering the absolute difference of one in the selected response options between two administrations acceptable for the above-mentioned items, the mean concordance score between interviewer-administered and self-administered SF-36 would increase to 26.55 (sd = 4.9) resulting in overall percent agreement of 73.75% between two administrations, which is in the range of good agreement (still, significantly different from the hypothesized agreement of 85%,  $p < .000$ ).

Kappa statistics was calculated to detect the agreement level between self-administered and interviewer-administered questionnaires beyond of that expected by chance (Table 13). As it is shown in the table, the majority of items had very marginal agreement, except for the items 1, 3a, 3b, 4a, 5a, and 5b that had good agreement.

**Table 13. Kappa statistics for each item of SF-36 questionnaire**

Question	K-statistics	K-statistics range	Strength of agreement
1. In general, would you say your health is ...	.51	.4 - .75	good
2. Compared to one year ago, how would you you're your health in general now?	.39	0 - .4	very marginal

Question	K-statistics	K-statistics range	Strength of agreement
<b>3. Does your health now limit you in these activities? If so, how much?</b>			
a. Performance of vigorous activities	.53	.4 - .75	good
b. Performance of moderate activities	.43	.4 - .75	good
c. Lifting or carrying groceries	.35	0 - .4	very marginal
d. Climbing several flights of stairs	.31	0 - .4	very marginal
e. Climbing one flight of stairs	.40	.4 - .75	good
f. Bending, kneeling, or stooping	.34	0 - .4	very marginal
g. Walking more than a mile	.15	0 - .4	very marginal
h. Walking several blocks	.30	0 - .4	very marginal
i. Walking one block	.36	0 - .4	very marginal
j. Bathing or dressing yourself	-		
<b>4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?</b>			
a. Cutting down the amount of time spent on work/other activities	.61	.4 - .75	good
b. Accomplishing less than you would like	.24	0 - .4	very marginal
c. Were limited in the kind of work/other activities	.19	0 - .4	very marginal
d. Had difficulty performing the work/other activities	.30	0 - .4	very marginal
<b>5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems?</b>			
a. Cut down the amount of time you spent on work or other activities	.46	.4 - .75	good
b. Accomplishes less that you would like	.45	.4 - .75	good
c. Didn't do work or other activities as carefully as usual	.33	0 - .4	very marginal
<b>6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family...</b>			
<b>7. How much bodily pain have you had during the past 4 weeks?</b>	.27	0 - .4	very marginal
<b>8. During the past 4 weeks, how much did pain interfere with your normal work?</b>	.32	0 - .4	very marginal
<b>9. How much of the time during the past 4 weeks ...</b>			
a. Did you feel full of pep?	.37	0 - .4	very marginal
b. Have you been a very nervous person?	.29	0 - .4	very marginal
c. Have you felt so down in the dumps that nothing could cheer you up?	-		
d. Have you felt calm and peaceful?	-		
e. Have you a lot of energy?	.23	0 - .4	very marginal
f. Have you felt downhearted and blue?	-		
g. Did you feel worn out?	-		
h. Have you been a happy person?	.12	0 - .4	very marginal
i. Did you feel tired?	.17	0 - .4	very marginal
<b>10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?</b>	.29	0 - .4	very marginal
<b>11. How true or false is each of the following statements for you?</b>			
a. I seem to get sick a little easier than other people	.18	0 - .4	very marginal
b. I am as healthy as anybody I know	.17	0 - .4	very marginal
c. I expect that my health to get worse	.16	0 - .4	very marginal
d. My health is excellent	.13	0 - .4	very marginal

Spearman coefficient was also calculated to detect correlations between the ordinal variables. According to this analysis, the correlation between self- and interviewer-administered questionnaires was statistically significant for the most of SF-36 items, except 4b-4d and 11b items (Appendix 8).

Further, data analysis was performed based on the guidelines developed by the HAL [6]. The items were recoded and collapsed into the following domains: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Physical functioning domain included questions (3a-3j) concerning the limitations in daily activities due to health status and capturing both the presence and extent of physical limitations (Appendix 2). Role-Physical domain (questions 4a-4d) reflected the presence of health-related limitations in the kind or amount of work or daily activities being applicable to retired people and those individuals who have more than one usual role. Bodily Pain domain intended to detect severity of bodily pain and its interference with work or daily activities within the past 4 weeks (questions #7 and #8). General Health domain (questions 11a-11d and #1) reflected perceived health status. Vitality domain captured energy level and fatigue that patients had during the last 4 weeks (questions #9a, 9e, 9g, and 9i). Social Functioning domain was aimed to reveal information about both the quantity and quality of social activities of patients (questions #6 and #10). Mental Health domain captured major mental health problems, such as anxiety, depression, loss of behavioral/emotional control, and psychological well-being (# 9b, 9c, 9d, 9f, and 9h). Role-Emotional domain evaluated emotional status of patients and its interference with work or daily activities (questions #5a-5c). Finally, Reported Health Transition assessed the amount of change in general health status over 1-year period prior to the administration of SF-36. The latter item is not used to calculate score for any of eight scales and can be treated as categorical variable or as ordinal-item and interval-item scale. The interpretation of the possible lowest and highest scores for each of the above-mentioned domains is provided in the Appendix 10.

Transformed scores for each profile were calculated and data analysis was performed to test the difference in mean scores between SF-36 self-administered and interviewer-administered (Table 14).

**Table 14. The mean difference of transformed scores between self-administered and interviewer-administered SF-36 questionnaire**

Scale	Self- adm. Mean score	Interv.- adm. Mean score	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)	Correl.
					Lower bound	Upper bound		
<b>1. Physical functioning</b>	67.25	75.5	<b>-8.25</b>	12.53	-12.26	-4.24	<b>.000</b>	.85
<b>2. Role-physical</b>	45.63	53.8	-8.13	40.19	-20.98	4.73	.209	.51
<b>3. Bodily pain</b>	71.16	61.55	<b>9.61</b>	22.11	2.54	16.68	<b>.009</b>	.68
<b>4. General health</b>	54.1	55.56	-1.48	19.62	-7.75	4.80	.637	.65
<b>5. Vitality</b>	55.63	61.75	<b>-6.13</b>	14.21	-10.67	-1.58	<b>.010</b>	.81
<b>6. Social functioning</b>	71.25	54.06	<b>17.19</b>	25.27	9.11	25.27	<b>.000</b>	.18
<b>7. Role-emotional</b>	44.44	58.97	<b>-14.53</b>	44.46	-28.94	-.12	<b>.048</b>	.47
<b>8. Mental health</b>	61.54	67.08	-5.54	20.47	-12.17	1.09	.099	.19

The mean difference was statistically not significant for role-physical, general health, mental health profiles and was marginally significant for the role-emotional profile. The difference in the transformed score means for physical functioning, bodily pain, vitality, and social functioning were found to be statistically significant ( $p < .05$ ). Although the differences in the

transformed scores for the domains that were statistically significant had no pattern depending on the administration type, the pattern of answering more positively to the interviewer-administered questionnaire still noticeable: in 6 out of 8 domains the scores obtained by interviewer-administered questionnaire are higher than those obtained by self-administered questionnaire (Table 14).

### 5.3.2. Quality of Life

Quality of life components in NMMC surgical patients were compared to the norms for the US general population. Generally, NMMC surgical patients had lower scores for quality of life components in comparison with the US general population [6] (Table 16). Statistically insignificant mean differences were observed for bodily pain and vitality domains ( $p = .33$  and  $p = .17$  respectively). The mean differences in transformed scores for physical functioning, role-physical, general health, social functioning, role-emotional, and mental health domains were significantly higher in US general population (Table 15).

**Table 15. The mean difference of transformed scores between NMMC surgical patients\* and the US general population norms**

Scale	NMMC surgical patients*	US general population	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)
					Lower bound	Upper bound	
<b>1. Physical functioning</b>	67.25	84.15	-16.9	23.99	-24.57	-9.23	.000
<b>2. Role-physical</b>	45.63	80.96	-35.34	40.78	-48.38	-22.29	.000
<b>3. Bodily pain</b>	71.16	75.15					
<b>4. General health</b>	54.1	71.95	-17.85	21.76	-24.81	-10.89	.000
<b>5. Vitality</b>	55.63	60.86					
<b>6. Social functioning</b>	71.25	83.28	-12.03	23.72	-19.62	-4.44	.003
<b>7. Role-emotional</b>	44.44	81.26	-36.82	41.42	-50.24	-23.39	.000
<b>8. Mental health</b>	61.54	74.74	-13.20	12.26	-17.18	-9.23	.000

\* Transformed score means of self-administered survey

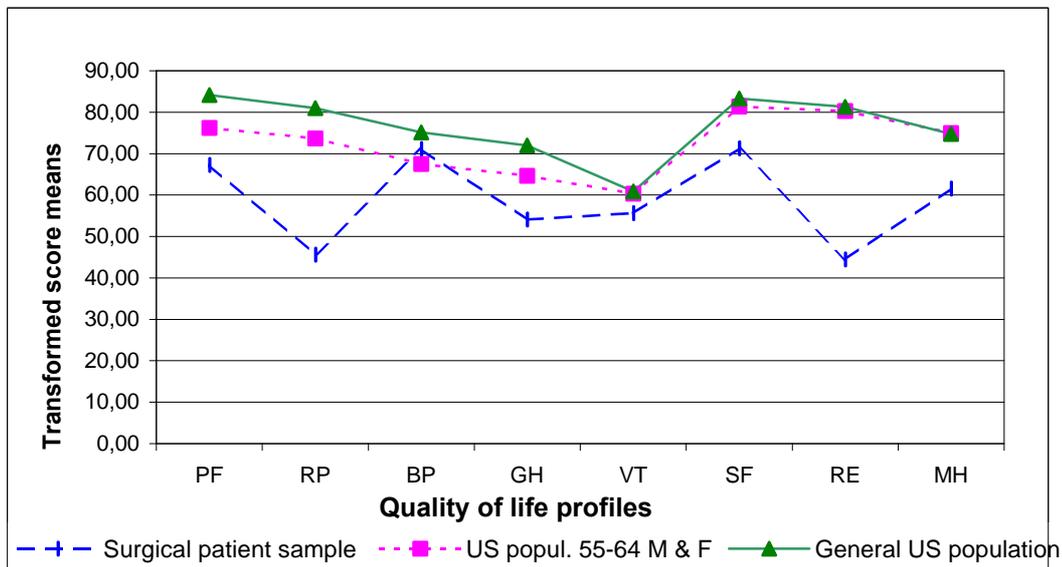
Assuming that NMMC surgical patients may be significantly different from the US general population, data on eight health profiles of NMMC patients were compared with the norms of 55-64 years old males and females combined, US population. In this case also NMMC surgical patients had significantly lower mean scores for most of Quality of Life profiles than did 55-64 years old US males and females. The only exceptions were bodily pain and vitality domains [6] (Table 16).

**Table 16. The mean difference of Quality of Life profiles between NMMC surgical patients and 55-64 years old US males and females**

Scale	NMMC surgical patients	55-64 years old males and females	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)
					Lower	Upper	
<b>1. Physical functioning</b>	67.25	76.24	<b>-8.99</b>	23.99	-16.66	-1.32	<b>.023</b>
<b>2. Role-physical</b>	45.63	73.66	<b>-28.04</b>	40.78	-41.08	-14.99	<b>.000</b>
<b>3. Bodily pain</b>	71.16	67.51	3.65	25.70	-4.57	11.87	.374
<b>4. General health</b>	54.10	64.62	<b>-10.52</b>	21.76	-17.48	-3.56	<b>.004</b>
<b>5. Vitality</b>	55.63	60.37	-4.75	23.51	-12.26	2.77	.209
<b>6. Social functioning</b>	71.25	81.37	<b>-10.12</b>	23.72	-17.71	-2.53	<b>.010</b>
<b>7. Role-emotional</b>	44.44	80.26	<b>-35.82</b>	41.42	-49.24	-22.39	<b>.000</b>
<b>8. Mental health</b>	61.54	75.01	<b>-13.47</b>	12.26	-17.45	-9.49	<b>.000</b>

Figure 1 presents graphical comparison between general US population 55-64 years old US males and females, and NMMC surgical patients. It is obvious that the largest difference in mean scores between NMMC patients and US general population or 55-64 years old males and females are observed in role-physical, general health, and role-emotional profiles.

**Figure 1. Comparative profiles of Quality of Life between NMMC surgical patients, US general population, and national norms of 55-64 years old males and females**



Further, Quality of Life profiles were compared between NMMC patients and US residents suffering from hypertension, who recently had experienced angina without myocardial infarction (MI) [6]. Statistically significant difference was observed in the mean scores for bodily pain, social functioning, role-emotional, and mental health domains (Table 17).

**Table 17. The mean difference in Quality of Life profiles between NMMC surgical patients and individuals with recent angina without MI\* and with hypertension, US population**

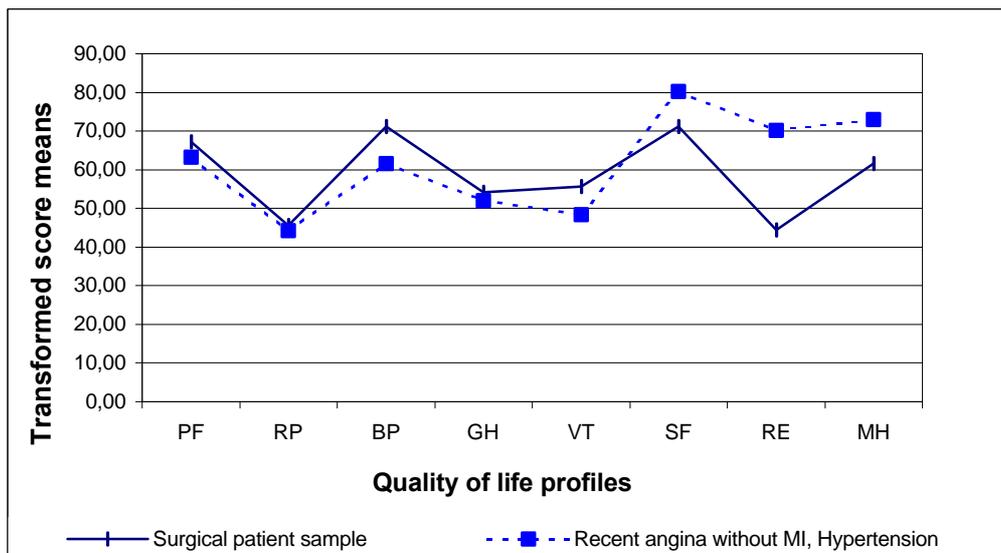
Scale	NMMC surgical patients	Recent angina without MI, with hypertension	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)
					Lower bound	Upper bound	
<b>1. Physical functioning</b>	67.25	63.24	4.01	23.99	-3.66	11.68	.297
<b>2. Role-physical</b>	45.63	44.22	1.41	40.78	-11.64	14.45	.829
<b>3. Bodily pain</b>	71.16	61.56	<b>9.60</b>	25.70	1.38	17.82	<b>.023</b>
<b>4. General health</b>	54.10	52	2.10	21.76	-4.86	9.06	.545
<b>5. Vitality</b>	55.63	48.45	7.18	23.51	-.344	14.69	.061
<b>6. Social functioning</b>	71.25	80.28	<b>-9.03</b>	23.72	-16.62	-1.44	<b>.021</b>
<b>7. Role-emotional</b>	44.44	70.16	<b>-25.72</b>	41.42	-39.14	-12.29	<b>.000</b>
<b>8. Mental health</b>	61.54	73.04	<b>-11.50</b>	12.26	-15.48	-7.53	<b>.000</b>

\* MI – myocardial infarction

The mean score for bodily pain in NMMC patients was by 9.60 higher than that in the US residents with recent angina and hypertension. For social functioning, mental health, and role-emotional profiles, the mean scores were significantly lower in NMMC patients than in this group. For the latter profile (RE), the difference in mean scores was as high as 25.72 points.

However, the individuals with recent angina without myocardial infarction and with hypertension had also some comorbid conditions, such as back pain/sciatica (50%), musculoskeletal complaints (29%), past MI (24%), dermatitis (21%), and osteoarthritis (18%). It might impact the mean scores for the PF, RP, BP, GH, and VT profiles, so that before making any comparison the similarity of groups should be accounted. However, data on comorbid conditions in NMMC surgical patients were not available for this study population.

**Figure #2. Comparative profiles of Quality of Life between NMMC surgical patients and the individuals with recent angina without MI\* and with hypertension**



\* MI – myocardial infarction

To reduce the SF-36 summary measures from the eight-scale profile to two summary measures without substantial loss of information, Physical Component Summary (PCS) and Mental Component Summary (MCS) measures were calculated for both administrations according to the HAL guidelines [7]. The mean differences in PCS and MCS between self-administered and interviewer-administered responses were not statistically significant ( $p=.988$  and  $p=.461$  respectively), so that **on the level of component summary measures two administrations yielded similar results.**

Thereafter, the PCS and MCS of surgical patients were compared to that of the US general population [7], and the difference for both measures was found to be statistically significant (Table 18).

**Table 18. The mean difference of transformed scores for the PCS and MCS between NMMC surgical patients and US general population, males and females combined**

Scale	NMMC patients	US general population	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)
					Lower bound	Upper bound	
PCS	43.93	51.05	-7.12	11.52	-10.81	-3.44	.000
MCS	43.04	50.73	-7.69	7.95	-10.24	-5.15	.000

Considering that the age can impact mean scores of the PCS and MCS, a comparison was conducted between the NMMC surgical patients (mean age: 56.2) and 55-64 years old females and males, US population [7]. Data analysis revealed statistically significant difference in the Mental Component Summary mean scores between 55-64 years old US population and NMMC surgical patients ( $p = .000$ ). NMMC patients had MCS score by 8.01 lower than this age group of US population (95% CI: -10.56, -5.46). The mean difference in Physical Components Summary score was not statistically significant between study participants and the US population aged 55-64 years ( $p = .285$ ).

Further data analysis showed that the PCS mean score was by 5.29 higher ( $p = .01$ , 95% CI: 1.61, 8.98) and the MCS mean score was by 7.39 lower in NMMC patients in comparison with the group having recent angina without myocardial infarction and with hypertension ( $p = .00$ , 95% CI: -9.94, -4.85) (Table 19). These findings do support the fact that surgery, both CABG and valve replacement/repair result in improvement of the quality of life of patients in terms of physical health.

**Table 19. The mean difference in transformed scores for PCS and MCS between NMMC surgical patients and the individuals with recent angina**

Scale	NMMC patients	Individuals with angina	Mean differ.	Std. Dev.	95% confidence interval		Sig. Level (2-tailed)
					Lower bound	Upper bound	
PCS	43.93	36.36	5.29	11.52	1.61	8.98	.006
MCS	43.04	48.04	-7.39	7.95	-9.9363	-4.85	.000

## 6. Discussion

### 6.1. Validation of the Post-surgical Follow-up Questionnaire

#### 6.1.1. Clinical findings

The revealed prevalence of post-operative shortness of breath in surgical patients was considered unsatisfactory by NMMC adult cardiologists. Several hypotheses were suggested by them to explain this finding. One explanation was that this could be due to the “aggressive strategy” of NMMC in terms of performing CABG in patients with myocardial enlargement. These patients experience shortness of breath prior to cardiac surgery, and the surgery cannot eliminate shortness of breath in such cases. Thus, the rate of this symptom in NMMC patients in late post-operative period can be higher than that in other similar health care institutions. Another possible explanation was that the majority of women over 60 years, as well as overweight people might normally have shortness of breath (personal communication with NMMC adult cardiologists). The sample of NMMC surgical patients included women with mean age of 57 years (ranging from 35 to 74) who might normally have shortness of breath. This may contribute to higher than expected percentage of patients with shortness of breath. Considering physiological nature of shortness of breath due to strenuous physical exercising, these cases were considered normal and excluded from the numerator. As a result, the prevalence of shortness of breath in the study sample decreased from 84.5% to 60%.

The percentage of post-operative arrhythmia was also higher than expected. The reason for that could be a broad definition for post-operative arrhythmia implied in this study, which includes all the types of arrhythmia such as tachycardia, bradycardia, paroxysmal

tachycardia, extrasystoles, etc. The types of post-operative arrhythmias that have pathological significance are paroxysmal tachycardia and extrasystoles (personal communication with NMMC adult cardiologists). Determination of these types of arrhythmias could be done through performing electrocardiography or holter monitoring that was beyond the scope of this study. Therefore, the rate of post-operative arrhythmia with pathological significance could be lower if the types of reported arrhythmias were determined using more sophisticated diagnostic methods. These concerns could be addressed through further research of health care outcomes in the hospital with implementation of current technologies.

The percentage of surgical patients, who reported smoking, was lower than expected, which may be due to underreporting of smoking status. Although the hospitalization rate for any heart related problem was considered acceptable by the adult cardiologists, it included all post-operative hospitalizations. NMMC has wide range of indications for post-operative hospitalization rather than re-operations only, e.g. hospitalisation for pleural or pericardial effusion, short-term treatment of surgical patients having extremely high blood pressure in late post-operative period. If only re-operations were counted, the percentage of post-operative readmissions at NMMC could be lower.

The percentage of surgical patients having edema of low extremities was higher than expected. Although this symptom was verified by examining edema indentation, cardiac or non-cardiac nature of edema was not differentiated. Moreover, examination of edema indentation could be supported by liver palpation to detect liver enlargement in surgical patients with heart failure, but this was not done. Thus, evaluation of heart failure as an indicator of patient outcomes at NMMC should be more carefully planned in further studies.

The presence of acute pain in any bodily part or organ in 27.5% of study participants was also considered unacceptably high (personal communication with NMMC adult cardiologists) if attributing to heart disease-related complications only. However, although this question was designed to capture the development of ischemic disease complications (thromboembolies) in the late post-operative period, it captured also any other type of severe pain in study population, e.g. endarteritis, osteochondrosis, arthritis, etc. Thus, 27.5% of acute pain in any bodily part or organ did not reflect the real percentage of thromboembolic complications in surgical patients in the late post-operative period.

It is also worthy to mention that the questionnaire was send to 70 patients, but only 40 of them were included in the second stage of the study, and the clinical findings reflect the health status of these 40 only. Meanwhile, the remaining 30 patients who were withdrawn from the study after giving their oral consent to participate might have some differences from those who remained. For some reason, these patients selected do not fill-in the questionnaire, and this reason could be somehow connected with their health status or degree of satisfaction from the services they received at NMMC. Thus, the general findings on health outcomes revealed through this study should be approached with caution.

### **6.1.2. Findings on agreement/validity of PFQ**

Prior to implementing the study it was hypothesized that the mean percent agreement between self-administered and interviewer-administered PFQ is 85%, while the actual agreement was found to be 65.0%. The actual agreement was by 20.0% (95% CI: .50; .79) lower than the hypothesized agreement. To predict the artificial increase in overall percent agreement, a conservative approach was implemented and the analysis of concordance was

carried out excluding agreement score for similarity of pre-operative and post-operative angina, as only 3 patients had post-operative angina.

Data analysis indicated that the mean percent agreements both for the whole PFQ and each question specifically were lower than acceptable. In terms of agreement percent, the weakest items of the PFQ were post-operative angina pectoris, shortness of breath, arrhythmia, and current routine physical activity that have the most importance for assessing the health care outcomes in cardiac patients. High discrepancy in responses to post-operative angina question between two administrations can be explained by the fact that patients might have difficulties in differentiating between angina pectoris and chest pain due to having post-operative wound. This impression was supported by a pattern of percent agreement for post-operative angina between IHD and VHD patients.

The questionnaire was aimed to reveal not only the existence of post-operative angina, shortness of breath, and arrhythmia, but also their severity depending on exertion level. High inconsistency between two administrations with regard to the level of physical activity can be explained by misinterpretation of different exertion levels by the patients. Therefore, either the definition of different exertion levels should be precisely provided in each question or the relation of a symptom to an exertion level should not be used. Taking into account that there was no statistically significant difference in the mean concordance scores between the IHD and VHD patients ( $p=.05$ ), the same PFQ can be used for both groups.

Data analysis was carried out to detect how sensitive, specific and predictive the PFQ was to assess post-operative health status of patients and to detect various late post-operative complications. The questions about having high temperature or rigor (chill) and edema of low extremities within the past two weeks had both sensitivity and specificity equal or exceeded 70%, so that they yielded valid responses. Other questions had either high sensitivity or high specificity. The study indicated that the PFQ was sensitive to reveal post-operative angina pectoris, shortness of breath, and arrhythmia, current routine physical activity, high temperature, and edema of low extremities. It was revealed that the questions about current smoking status, motion or speech dysfunction, high temperature or rigor, bleeding, bodily stool or bodily urine, edema of low extremities, arrhythmia, frequent headache or dizziness, acute pain in any organ or bodily part, none of the symptoms, and physician providing follow-up care other than NMMC cardiologist had high specificity. Besides, the PFQ was able to correctly predict true existence of post-operative shortness of breath and arrhythmia, current routine physical activity, bleeding, bloodily stool or bloodily urine, frequent headache or dizziness, and follow-up care provided by a physician other than NMMC cardiologist.

However, an instrument can be considered as a valid tool to assess patient health status when both sensitivity and specificity are 70% or above. Thus, the post-operative questionnaire was a valid tool only for detecting high temperature/rigor and edema of low extremities in patients in late post-operative period.

## **6.2. Validation of the official IQOLA pre-publication SF-36 Armenian version**

The data analysis indicated that the overall percent agreement between self-administered and interviewer-administered SF-36 was poor and lower than expected. The worst agreement was found for items about emotional status (question #9) and perceived health (question #11). This can be explained by the fact that population in Armenia is not used to fill in questionnaires, especially about their emotional status and perceptions. Another interesting

finding was that the study population showed a tendency of responding more positively to the questions given by interviewer, rather than to the self-administered questions, and this tendency was consistent for the majority of items included in the questionnaire. Thus, the observed difference between self-administered and interviewer-administered questionnaires could partially be due to the change in questionnaire administration style.

None of the items in SH-36 had acceptable validity and the actual agreement was either good or very marginal, while the agreement across administrations to the same individuals requires high reliability (value > 0.90). However, during home visits it was observed that family members in some instances actively participated in the interviews, probably, influencing patients' responses. It is also possible that the mailed questionnaires were completed by patients with help of their family members. This might also have an impact on the agreement level between two types of the questionnaire administration.

Also, when considering the one-point absolute difference in the selected response options for those scale questions having 5 or more response choices acceptable, the percentage of items with excellent or good agreement increased considerably. Since the minimal difference in selected response choices for these questions could be due to time difference between two administrations (approximately 1 month), influence of family members, or change in the administration style, and had no principal significance in evaluating the whole picture, this approach can be applied to better judge about the usefulness of the questionnaire. The fact that the two summary measures (PCS and MCS) were not different between self- and interviewer-administered surveys supports the reasonability of this approach.

Rather high proportion (35%) of surveyed patients assessed their health as unfavorable, i.e. poor or fair. The proportion of those being limited in performing physical activities was also rather high. The data analysis indicated that NMMC surgical patients consistently had lower transformed score means for quality of life profiles in comparison with the US general population and 55-64 years old males and females. When the quality of life of the study participants was compared to that of US residents with one or more chronic health conditions, NMMC patients had lower quality of life summary scores in Social Functioning, Role-emotional, and Mental Health domains, but higher score the Bodily Pain domain.

The comparison of the PCS and MCS mean scores between NMMC patients and the US general population showed that both PCS and MCS in cardiac patients were lower than that of the US general population and 55-64 years old females and males, US population. However, when comparing with the US population having recent angina without myocardial infarction and with hypertension, the Physical Components Summary mean score was higher in NMMC patients, while the Mental Components Summary mean score was lower. These findings indicate that the surgical treatment provided at NMMC results in improvement of the quality of life of patients in terms of their physical health. Also, it suggests a need for establishing a kind of psychological support/structured rehabilitation program at NMMC to help patients to recover psychologically after such a major surgery.

## **7. Conclusions and recommendations**

### **7.1. Validation of the Patient Follow-up Questionnaire**

The study indicated the following strengths and weaknesses of the PFQ:

- Good agreement between self- and interviewer-administered questionnaires
- Poor agreement for questions about post-operative angina pectoris, shortness of breath, arrhythmia, and current routine physical activity, possibly because of low understanding of exertion level and characteristics of chest pain among patients
- Good agreement for questions about arrhythmia, frequent headache or dizziness, acute pain in any organ or bodily part, and none of the symptoms related to the late post-operative complications
- Excellent agreement for current smoking status, hospital readmission for any heart related problem, physician providing follow-up care other than NMMC cardiologist, motion or speech dysfunction, high temperature or rigor, bleeding and bloodily stool or urine, edema of low extremities, and referral to a hospital for late post-operative complications
- Valid information with respect to high temperature or rigor and edema of low extremities in patients

Considering the importance of the standardized PFQ, it was redesigned based on the findings of this study (Appendix 9). More detailed questions were added to determine the characteristics of chest pain, its relation to breathing movements or changing body position, pulse rate, frequency of arrhythmia, and its alleviation/worsening due to physical activity. This may enable adult cardiologists to differentiate pathological signs and symptoms from perceived worsening of health status.

Due to misunderstanding of physical activity levels and the possibility to determine degree of physical limitations through SF-36, this question was excluded from the PFQ. The question about acute pain in any organ or bodily part was redesigned to detect ischemic type of pain more specifically. Taking into account that most surgical patients are prescribed aspirin or some other anti-coagulation drugs that may lead to gastric ulcer development or its aggravation, a question about having symptoms of gastric ulcer was added. In addition, some questions to identify demographic characteristics of patients and those comorbid conditions they develop in the late post-operative period were added to the PFQ. The latter change provides a potential of gathering wide spectrum of information on a cohort of NMMC patients and conducting various research activities at NMMC.

### **7.2. Validation of the Armenian version of SF-36 questionnaire**

The attempt to validate the Armenian version of SF-36 questionnaire revealed the following:

- Poor agreement between self-administered and interviewer-administered questionnaires
- Low validity (poor or very marginal kappa statistics) and correlation between two methods of SF-36 administrations
- Statistically significant difference in transformed score means for physical functioning, bodily pain, vitality, and social functioning domains
- Statistically insignificant difference between the Physical Component Summary and Mental Component Summary measures between two methods of administration.

It is possible that the time elapse between the first and second administration of SF-36 to surgical patients, as well as the change in questionnaire implementation style have some impact on these results. Although the correlation between two methods of SF-36 administration was lower than acceptable, the aggregated level mean scores for physical and mental functioning (PCS and MCS) were not significantly different. Considering aforementioned, as well as the importance of quality of life assessment as an indicator of the quality of care provided at the hospital, it is recommended to use the SF-36 during further patient follow-up efforts. The data on quality of life can be used for quality assurance and research purposes at NMMC and can be compared with that of similar health care institutions.

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## Appendix 1.

### ՀԵՏՎԻՐԱՅԱՏԱԿԱՆ ՀԱՐՑՈՒՄ

Հարգ ելի պարոն/տիկին \_\_\_\_\_

Դուք վիրահատվել եք Նորք Մարաշ Բժշկական Կենտրոնում սրտի հիվանդության կապակցությամբ: Մենք կուզենայինք իմանալ, թե ինչպես եք Ձեզ զգ ում ներկայումս:

Հարցերին պատասխանեք՝ մուգ գ ընդլ կամ մատիտով նշելով (Օ ) այն պատասխանի համարը, որին համաձայն եք: Եթե նշել եք այն պատասխանը, որի դիմաց սլաք կա՝ հետևեք սլաքին հաջորդող ցուցմանը: ԽՆԴՐՈՒՄ ԵՆՔ ԴԱՏԱՍԽԱՆԵԼ ԲՈԼՈՐ ՀԱՐՑԵՐԻՆ:

Հարցաթերթիկի լրացման ամսաթիվը \_\_\_\_\_ / \_\_\_\_\_ / 200 թ.

1. Դուք ունե՞ք ցավեր կրծքավանդակում, որոնք կարող են տարածվել դեպի ուսերը, ձեռքերը, թիակը, կոկորդը կամ ծնոտը:  
 1. Ոչ  $\longrightarrow$  Անցեք 4-րդ հարցին  
 2. Մեծ ծանրաբեռնվածության ժամանակ  
 3. Սովորական ծանրաբեռնվածության ժամանակ  
 4. Փոքր ծանրաբեռնվածության ժամանակ
2. Արդյոք նմա՞ն են այդ ցավերը նախավիրահատական ցավերին:  
 1. Ոչ  
 2. Այո
3. Սովորաբար ինչքա՞ն են տևում այդ ցավերը:  
 1. Մինչև 30 րոպե  
 2. 30 րոպեից ավելի
4. Ե՞րբ եք ունենում հևոց, օդի պակասի զգացում:  
 1. Երբեք  
 2. Մեծ ծանրաբեռնվածության ժամանակ  
 3. Սովորական ծանրաբեռնվածության ժամանակ  
 4. Փոքր ծանրաբեռնվածության ժամանակ  
 5. Հանգ ստի վիճակում (անկախ ծանրաբեռնվածությունից)
5. Ունենու՞մ եք սրտի անկանոն աշխատանք (արիթմիա):  
 1. Ոչ  
 2. Մեծ ծանրաբեռնվածության ժամանակ  
 3. Սովորական ծանրաբեռնվածության ժամանակ  
 4. Փոքր ծանրաբեռնվածության ժամանակ  
 5. Հանգ ստի վիճակում (անկախ ծանրաբեռնվածությունից)
6. Դուք ծխու՞մ եք:  
 1. Այո  $\longrightarrow$  Օրեկան քանի՞ սիգարետ (միջինում) \_\_\_\_\_  
 2. Ոչ

7. Ի՞նչ աստիճանի ֆիզիկական լարում պահանջող գ ործ եք հեշտությամբ կատարում:
- 1. Ծանր (օրինակ՝ ծանրություն բարձրացնել, վազել, զբաղվել ակտիվ սպորտաձևով)
  - 2. Միջին ծանրության (ծեռքով լվացք անել, փոշեծծիչով տուն մաքրել)
  - 3. Թեթև (աստիճաններով բաժրանալ մեկ-երկու հարկ, բակում զբոսնել)
  - 4. Խնայող (կարդալ, գ ըել, հեռուստացույց դիտել)

8. Վիրահատությունից ի վեր պառկե՞լ եք հիվանդանոց սրտի հիվանդության պատճառով:
- 1. Ոչ
  - 2. Այո —————> **Խնդրում ենք նշել հետևյալը.**

Հիվանդանոցի անունը	գ տնվելու վայրը (քաղաք, շրջան)	պառկելու ամիսը, տարին

9. Վերջին 4 շաբաթվա ընթացքում ունեցե՞լ եք հետևյալ ախտանիշներից մեկը կամ մի քանիսը (Նշեք բոլոր այն ախտանիշները, որոնք ունեցել եք:)
- 1. շարժողության խանգ արում կամ խոսակցության դժվարացում
  - 2. ջերմություն (37° C կամ ավելի բարձր) կամ սարսուռ
  - 3. արյունահոսություն, կապտուկներ, մուգ կղանք կամ արյունախառն մեզ
  - 4. ստորին վերջույթների այտուց
  - 5. սրտի անկանոն աշխատանք
  - 6. հաճախակի գ լիսացավեր կամ գ լիսապտույտներ
  - 7. սուր ցավեր մարմնի որևէ մասում
  - 8. վերը նշվածից ոչ մեկը չեմ ունեցել—————> **Անցեք 11-րդ հարցին**

10. Այդ ախտանիշ(ներ)ի պատճառով դիմե՞լ եք բժշկի կամ պառկե՞լ եք հիվանդանոց:
- 1. Ոչ
  - 2. Այո —————> **Խնդրում ենք նշել հետևյալը.**

Հիվանդանոցի անունը	գ տնվելու վայրը (քաղաք, շրջան)	պառկելու ամիսը, տարին

11. Խնդրում ենք թվել, թե ինչ դեղորայք եք օգ տագ ործում ներկայումս.

Դեղի անունը	Դեղաչափը	Օրեկան քանի՞ անգ ամ
1.		
2.		
3.		
4.		

12. Բացի Նորք Մարաշ Բժշկական Կենտրոնի սրտաբանից, գտնվում էք արդյոք որևէ այլ բժշկի հսկողության տակ:

1. Ոչ

2. Այո —> Նշեք Ձեզ հսկող բժշկի անուն-ազգ անունը և աշխատավայրը.

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Եթե մտադիր եք փոխել Ձեր բնակավայրը, խնդրում ենք վաղօրոք զանգահարել 65-58-20 հեռախոսահամարով և հայտնել ձեր նոր հասցեն կամ նշել այն ստորև՝ հիվանդանոցի կապը Ձեզ հետ պահպանելու նպատակով:  
Նոր հասցե՝

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**ԽՆԴՐՈՒՄ ԵՆՔ ՀԱՐՑԱԹԵՐԹԻԿՆ ՈՒՂԱՐԿԵԼ ՄԵՁ ԿՑՎԱԾ ԾՐԱՐՈՎ ՈՐՔԱՆ  
ՀՆԱՐԱՎՈՐ Է ԿԱՐՃ ԺԱՄԿԵՏՈՒՄ ԾՐԱՐԻ ՎՐԱ ՆՇՎԱԾ ՀԱՍՑԵՈՎ:  
ՇՆՈՐՀԱԿԱԼՈՒԹՅՈՒՆ ՀԱՍԳՈՐԾԱԿՑՈՒԹՅԱՆ ՀԱՄԱՐ:**

## POST-SURGICAL FOLLOW-UP SURVEY

Dear Mr./Mrs. \_\_\_\_\_

You had a cardiac surgery in the Nork Marsh Medical Center. We would like to know your heart condition now. Please fill in the following questionnaire and send it back in the given envelope.

**PLEASE ANSWER EVERY QUESTION BY CHECKING THE BOX (  ) OF THE RESPONSE THAT BEST DESCRIBES YOUR CURRENT CONDITION. PLEASE USE DARK PEN OR PENCIL.**

Date (dd/mm/year) \_\_\_\_/\_\_\_\_/200\_\_

1. Do you have angina pectoris (chest pain, discomfort or tightness occasionally spreading to arms or jaw)?
  - 1. Never **—————▶ Go to question #4**
  - 2. With sever exertion
  - 3. With ordinary exertion
  - 4. With the slightest activity
  
2. Is this chest pain similar to angina pectoris that you have had before surgery?
  - 1. Yes
  - 2. No
  
3. How long does chest pain/angina pectoris last?
  - 1. Less than 30 minutes
  - 2. More than 30 minutes
  
4. Under what conditions do you experience shortness of breath?
  - 1. Never
  - 2. With severe exertion
  - 3. With ordinary exertion
  - 4. With slightest activity
  - 5. At rest
  
5. Do you have irregular heart rhythm (arrhythmia)?
  - 1. Never
  - 2. With sever exertion
  - 3. With ordinary exertion
  - 4. With the slightest activity
  - 5. At rest
  
6. Do you currently smoke?
  - 1. Yes (# of cigarettes per day \_\_\_\_\_)
  - 2. No
  
7. Which of the following best describes your current routine physical activity level?
  - 1. Strenuous (lifting heavy things, jogging, heavy housework, active sport activities)
  - 2. Moderate (hand washing, vacuum cleaning, playing table tennis)
  - 3. Mild (light housework, walking, light gardening)
  - 4. Sedentary, no physical effort (reading, writing, watching TV)

8. During the past year, have you been admitted to a hospital for any heart-related events?  
 1. No  
 2. Yes —————▶ ***Please indicate the following:***

Name of the hospital	Location (city, region)	Admission date (month, year)

8. **During the past 2 weeks** have you had one (or more) of the following symptoms:  
*(Check all applicable answers)*

- 1. Motion or speech dysfunction
- 2. Bleeding, bloody stool or urine
- 3. Temperature (37° C or over) or rigor
- 4. Edema of low extremities
- 5. Irregular heart rhythm
- 6. Frequent headaches or dizziness
- 7. Acute pain in any organ
- 8. None —————▶ ***Skip to the question #9***

9. For the above reason(s) have you been admitted to a hospital or refer to a physician?

- 1. No
- 2. Yes —————▶ ***Please indicate the following:***

Name of the hospital	Location (city, region)	Admission date (month, year)

10. Please list all medications you are currently taking on a regular basis:

Name	Dosage	Frequency
1.		
2.		
3.		
4.		

11. Is the follow-up care provided by a physician other than a cardiologist of NMMC

- 1. No
- 2. Yes —————▶ ***Please, indicate his/her name and the hospital:***

\_\_\_\_\_

**If you are going to change your home address, please, call 65-58-20 and inform NMMC staff about your new address to ensure continuity of care**

\_\_\_\_\_  
 \_\_\_\_\_

**PLEASE SEND QUESTIONNAIRE BACK AS EARLY AS POSSIBLE.  
 THANK YOU FOR COLLABORATION!**

## ПОСЛЕОПЕРАЦИОННЫЙ ОПРОС

Уважаемый(ая) \_\_\_\_\_

Вы оперировались в Норк Мараш Медицинском Центре по поводу заболевания сердца. Мы бы хотели знать о состоянии Вашего здоровья в настоящее время. Просим Вас темной ручкой или карандашом отметить которым Вы согласны. Если Вы отметили тот ответ, рядом с которым поставлена стрелка, следуйте указаниям, отмеченным после стрелки. Просим Вас ответить на все вопросы.

Дата заполнения вопросника (день/месяц/год) \_\_\_\_/\_\_\_\_/200\_\_

1. Есть ли у Вас сжимающие или давящие боли в области груди, которые могут распространяться в область плеча, руки, лопатки, горла или нижней челюсти?  
 1. Нет —————▶ **Переходите к 4-ому вопросу**  
 2. При значительных физических нагрузках  
 3. При обычных физических нагрузках  
 4. При малых физических нагрузках  
 5. В состоянии покоя (вне зависимости от физической нагрузки)
2. Похожи ли эти боли на дооперационные боли?  
 1. Да  
 2. Нет
3. Обычно сколько времени длятся эти боли?  
 1. До 30 минут  
 2. Более 30 минут
4. Когда у Вас бывает одышка, чувство нехватки воздуха?  
 1. Никогда  
 2. При значительных физических нагрузках  
 3. При обычных физических нагрузках  
 4. При малых физических нагрузках  
 5. В состоянии покоя (вне зависимости от физической нагрузки)
5. Бывают ли у Вас нарушения ритма сердца (аритмии)?  
 1. Нет  
 2. При значительных физических нагрузках  
 3. При обычных физических нагрузках  
 4. При малых физических нагрузках  
 5. В состоянии покоя (вне зависимости от физической нагрузки)
6. Физическую работу какой степени тяжести Вы можете выполнять без затруднения?  
 1. Тяжелую (поднимать тяжесть, бегать, активно заниматься спортом)  
 2. Средней тяжести (делать стирку вручную, убирать квартиру пылесосом, играть в настольный теннис)

- 3. Легкую (подниматься по лестнице 1-2 этажа, гулять в парке)
- 4. Щадящую (читать, писать, смотреть телевизор)

7. Вы курите?

- 1. Да → В среднем, сколько сигарет в день? \_\_\_\_\_
- 2. Нет

8. После операции на сердце лежали ли Вы в больнице по поводу заболевания сердца?

- 1. Нет
- 2. Да → Просим отметить следующее:

Наименование больницы	Адрес (город, область)	Дата (месяц, год)

9. За последние 4 недели имели ли Вы один или несколько из ниже перечисленных симптомов (отметьте все те симптомы, которые у Вас были)

- 1. Нарушения движения или речи
- 2. Температура (37° С и выше) или озноб
- 3. Кровоизлияния, кровотечения, потемнение мочи или кала
- 4. Отек нижних конечностей
- 5. Нарушения ритма сердца
- 6. Частые головные боли или головокружения
- 7. Острые боли в какой-либо части тела
- 8. Ни один из вышеперечисленных → Переходите к 11-ому вопросу

10. Обращались ли Вы к врачу или лежали ли Вы в больнице по поводу этого/этих симптомов?

- 1. Нет
- 2. Да → Просим отметить следующее:

Наименование больницы	Адрес (город, область)	Дата (месяц, год)

11. Просим перечислить те лекарства, которые Вы принимаете в настоящее время.

Наименование	Разовая доза	Сколько раз в день

12. Находитесь ли Вы под наблюдением какого-нибудь другого врача, кроме кардиолога НММЦ?

- 1. Нет
- 2. Да → Напишите, пожалуйста, имя и фамилию этого врача и место его работы.

\_\_\_\_\_

В случае перемены места жительства, просим Вас позвонить по телефону 65 58 20 и сообщить Ваш новый адрес или отметить его ниже.  
Новый адрес:

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ПРОСИМ ПЕРЕСЛАТЬ НАМ ЭТОТ ОПРОСНИК ПО АДРЕСУ, УКАЗАННОМУ  
НА ПРИЛОЖЕННОМ КОНВЕРТЕ КАК МОЖНО БЫСТРЕЕ. СПАСИБО ЗА  
СОТРУДНИЧЕСТВО!

Appendix 2.

ԱՌՈՂՋԱՊԱՅԱԿԱՆ ՀԱՐՑՈՒՄ SF-36

ՑՈՒՑՈՒՄՆԵՐ: Այս հարցման նպատակն է պարզել Ձեր կարծիքը Ձեր առողջության վերաբերյալ: Դա հնարավորություն կտա տեղեկանալու այն մասին, թե ինչպես եք Ձեզ զգում և որքանով եք ի վիճակի կատարել Ձեր առօրյա գործերը:

Պատասխանեք բոլոր հարցերին՝ նշելով Ձեր ընտրած պատասխանն այնպես, ինչպես նշված է փակագծերում տրված ցուցումներում: Եթե դուք վստահ չեք, թե որ պատասխանն ընտրել, ընտրեք այն պատասխանը, որն ամենից ավելի մոտ է Ձեր կարծիքին:

1. Ինչպե՞ս կգնահատեիք Ձեր առողջությունն ընդհանուր առմամբ:

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

Գերազանց .....	1
Շատ լավ .....	2
Լավ .....	3
Ոչ այնքան լավ .....	4
Վատ .....	5

2. Ինչպե՞ս կգնահատեիք Ձեր առողջությունն այժմ՝ համեմատած մեկ տարի առաջվա հետ:

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

Շատ ավելի լավ այժմ, քան մեկ տարի առաջ .....	1
Որոշ չափով ավելի լավ այժմ, քան մեկ տարի առաջ .....	2
Այժմ գրեթե նույնը, ինչ մեկ տարի առաջ .....	3
Որոշ չափով ավելի վատ այժմ, քան մեկ տարի առաջ .....	4
Շատ ավելի վատ այժմ, քան մեկ տարի առաջ .....	5

3. Ստորև թվարկված են մի քանի առօրյա գործողություններ: Արդյո՞ք Ձեր ներկայիս առողջական վիճակը խանգարում է Ձեզ` կատարել այդ գործողությունները: Եթե այո, որքանո՞վ:

(շրջանակի մեջ վերցրեք մեկ թիվ՝ յուրաքանչյուր տողում)

<u>ԳՈՐԾՈՂՈՒԹՅՈՒՆՆԵՐ</u>	Այո, շատ է խանգարում	Այո, քիչ է խանգարում	Ոչ, ամենևին էլ խանգարում
ա. Ակտիվ գործողություններ, օրինակ՝ վազել, ծանրություն բարձրացնել, զբաղվել ակտիվ սպորտաձևերով	1	2	3
բ. Միջին ակտիվության գործողություններ, օրինակ՝ սեղան տեղաշարժել, փոշեծփչով մաքրել, սեղանի թեմիս խաղալ կամ պարտեզում աշխատել	1	2	3
գ. Մթերքով պայուսակը բարձրացնել կամ տանել	1	2	3
դ. Աստիճաններով բարձրանալ մի քանի հարկ	1	2	3
ե. Աստիճաններով բարձրանալ մի հարկ	1	2	3
զ. Կքանստել, կռանալ կամ ծնկի գալ	1	2	3
է. Քայլել մոտ մեկ կիլոմետր	1	2	3
ը. Քայլել մի քանի հարյուր մետր	1	2	3
թ. Քայլել հարյուր մետր	1	2	3
ժ. Ինքնուրույն լողանալ կամ հագ մվել	1	2	3

4. Արդյո՞ք վերջին 4 շաբաթվա ընթացքում ունեցել եք Ձեր աշխատանքի կամ ամենօրյա այլ գործերի հետ կապված հետևյալ դժվարություններից որևէ մեկը կամ մի քանիսը՝ Ձեր առողջական վիճակի հետևանքով:

(շրջանակի մեջ վերցրեք մեկ թիվ՝ յուրաքանչյուր տողում)

	ԱՅՈ	ՈՉ
ա. Կրճատել եք աշխատանքի կամ այլ գործերի վրա ծախսած ժամանակը	1	2
բ. Կատարել եք ավելի քիչ, քան կցանկանայիք	1	2
գ. Ի վիճակի չեք եղել կատարել որոշակի տիպի աշխատանք կամ այլ գործեր	1	2
դ. Դժվարությամբ եք կատարել աշխատանքը կամ այլ գործեր (օրինակ՝ պահանջվել են լրացուցիչ ջանքեր)	1	2

5. Արդյո՞ք վերջին 4 շաբաթվա ընթացքում ունեցել եք Ձեր աշխատանքի կամ ամենօրյա այլ գործերի հետ կապված հետևյալ դժվարություններից որևէ մեկը կամ մի քանիսը՝ որևէ հուզական վիճակի (օրինակ՝ ընկճվածության կամ մտահոգ վաճության) հետևանքով:

(շրջանակի մեջ վերցրեք մեկ թիվ՝ յուրաքանչյուր տողում)

	ԱՅՈ	ՈՉ
ա. Կրճատել եք աշխատանքի կամ այլ գործերի վրա ծախսած ժամանակը	1	2
բ. Կատարել եք ավելի քիչ, քան կցանկանայիք	1	2
գ. Սովորականից պակաս ուշադրությամբ եք կատարել աշխատանքը կամ այլ գործեր	1	2

6. Վերջին 4 շաբաթվա ընթացքում Ձեր առողջական կամ հուզական վիճակը որքանո՞վ է խանգարել Ձեր առօրյա շփումներին ընտանիքի, ընկերների, հարևանների կամ այլոց հետ:

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

Ամենևին .....	1
Թեթևակի.....	2
Չափավոր .....	3
Բավականին .....	4
Չափազանց .....	5

7. Վերջին 4 շաբաթվա ընթացքում որքա՞ն ֆիզիկական ցավ եք զգացել:

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

Ոչ մի .....	1
Շատ թույլ.....	2
Թույլ .....	3
Չափավոր .....	4
Ուժեղ.....	5
Շատ ուժեղ.....	6

8. Վերջին 4 շաբաթվա ընթացքում որքանով է զավր խանգ արել Ձեր նորմալ աշխատանքին (ինչպես տանը, այնպես էլ տնից դուրս):

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

Ամենևին .....	1
Թեթևակի.....	2
Չափավոր .....	3
Բավականին .....	4
Չափազանց .....	5

9. Հետևյալ հարցերը վերաբերում են Ձեր ինքնագզացողությանը վերջին 4 շաբաթվա ընթացքում: Խնդրում ենք յուրաքանչյուր հարցի համար ընտրել այն միակ պատասխանը, որն ամենից մոտ է Ձեր զգացածին:

Վերջին 4 շաբաթվա ընթացքում որքան ժամանակ եք Դուք...

(շրջանակի մեջ վերցրեք մեկ թիվ՝ յուրաքանչյուր տողում)

	Ամբողջ ժամանակ	Ժամանակի մեծ մասը	Ժամանակի զգալի մասը	Ժամանակի որոշ մասը	Ժամանակի փոքր մասը	Ոչ մի ժամանակ
ա. զգացել Ձեզ եռանդով լի	1	2	3	4	5	6
բ. եղել շատ նյարդայնացած	1	2	3	4	5	6
գ. զգացել այնքան ընկճված, որ ոչինչ չէր կարող Ձեզ ուրախացնել	1	2	3	4	5	6
դ. զգացել հանգիստ ու խաղաղ	1	2	3	4	5	6
ե. եղել շատ առույգ	1	2	3	4	5	6
զ. եղել սրտնեղած ու տխուր	1	2	3	4	5	6
է. զգացել լրիվ ուժասպառ	1	2	3	4	5	6
ը. եղել երջանիկ	1	2	3	4	5	6
թ. զգացել հոգնած	1	2	3	4	5	6

10. **Վերջին 4 շաբաթվա** ընթացքում **Ձեր առողջական կամ հուզական խնդիրները** որքա՞ն ժամանակ են խանգ արել **Ձեր** շփումներին շրջապատի հետ (օրինակ՝ չեք կարողացել այցելել ընկերներին, բարեկամներին և այլն):

(շրջանակի մեջ վերցրեք միայն մեկ թիվ)

- Ամբողջ ժամանակ..... 1
- Ժամանակի մեծ մասը.....2
- Ժամանակի որոշ մասը .....3
- Ժամանակի փոքր մասը.....4
- Ոչ մի ժամանակ .....5

11. Ըստ Ձեզ, որքանո՞վ է ճԻՇՏ կամ ՍԽԱԼ հետևյալ պնդումներից **յուրաքանչյուրը**:

(շրջանակի մեջ վերցրեք մեկ թիվ՝ **յուրաքանչյուր տողում**)

	Լիովին ճիշտ է	Չիմնականում ճիշտ է	Չգիտեմ	Չիմնականում սխալ է	Լիովին սխալ է
ա. Կարծես թե՛ ես ավելի հեշտ եմ հիվանդանում, քան ուրիշները	1	2	3	4	5
բ. Ես նույնքան առողջ եմ, որքան իմ ճանաչած մարդիկ	1	2	3	4	5
գ. Ես կարծում եմ, որ իմ առողջությունը կվատանա	1	2	3	4	5
դ. Իմ առողջությունը գ երազանց է	1	2	3	4	5

**Appendix 3.**  
**Responses to the Patient Follow-Up Questionnaire**

**Table 1. Health status and behavior of surgical patients**

Question	Response	Self-admin. questionnaire		Interviewer-admin. questionnaire	
		# of patients	% of patients	# of patients	% of patients
1. Do you have angina pectoris?	Never	20	50	37	92.5
	With severe exertion	4	10	0	0
	With ordinary exertion	8	20	1	2.5
	With slightest exertion	8	20	2	5.0
	Totals	40	100	40	100
4. Do you have shortness of breath?	Never	9	22.5	7	17.5
	With severe exertion	9	22.5	9	22.5
	With ordinary exertion	8	20.0	15	37.5
	With slightest exertion	5	12.5	4	10.0
	At rest	9	22.5	5	12.5
	Totals	40	100	40	100
5. Do you have irregular heart rhythm?	Never	13	32.5	18	45.0
	With severe exertion	6	15.0	2	5.0
	With ordinary exertion	1	2.5	1	2.5
	With slightest exertion	2	5.0	2	5.0
	At rest	18	45.0	17	42.5
	Totals	40	100	40	100
6. Do you currently smoke?	Yes	4	10.3	3	7.5
	No	35	89.7	37	92.5
	Totals	39	100	40	100
7. Which of the followings best describes you current routine physical activity?	Strenuous	3	7.5	10	25.0
	Moderate	11	27.5	14	35.0
	Mild	18	45.0	12	30.0
	Sedentary	8	20.0	4	10.0
	Totals	40	100	40	100
8. Have you been readmitted to a hospital for any heart related problem?	Yes	1	2.5	2	5.0
	No	39	97.5	38	95.0
	Totals	40	100	40	100

**Table 2. Health status of surgical patients in late post-operative period**

Question	Self-administered		Interviewer-administered	
	# of patients (n=39)	% of patients	# of patients (n=40)	% of patients
During the past 2 weeks have you had one (or more) of these symptoms?				
Motion or speech dysfunction	5	12.8	3	7.5
High temperature (37° and higher)	8	20.5	4	10.0
Bleeding, bloody stool or urine	3	7.7	9	22.5
Edema of low extremities	12	30.8	9	22.5
Irregular heart rhythm	16	41.0	19	47.5
Frequent headache or dizziness	15	38.5	20	50.0
Acute pain in any organ	9	23.1	11	27.5
None of the symptoms	9	23.1	10	27.5

#### Appendix 4.

**Table 1. Agreement percent for each option of post-operative angina pectoris, shortness of breathe, arrhythmia, and current routine physical activity**

Item	Response	Concordance between self- and interviewer-administered questionnaires	
		# of concordant cases	Agreement percent
Post-operative angina	Never	23	57.5
	With severe exertion	36	90
	With ordinary exertion	33	82.5
	With slightest exertion	33	82.5
Post-operative shortness of breath	Never	32	80
	With severe exertion	32	80
	With ordinary exertion	25	62.5
	With slightest exertion	33	82.5
	At rest	34	85
Post-operative arrhythmia	Never	33	82.5
	With severe exertion	32	80
	With ordinary exertion	38	95
	With slightest exertion	36	90
	At rest	27	67.5
Current routine physical activity level	Strenuous	30	75
	Moderate	25	62.5
	Mild	25	62.5
	Sedentary	31	77.5
<b>Totals</b>		<b>40</b>	<b>100</b>

**Table 2. The absolute difference in response options between self-administered and interview-administered PFQ**

Item	Absolute difference in response options	# of cases	% of cases
Post-operative angina	0	23	57.5
	1	4	10
	2	7	17.5
	3	6	15.0
Post-operative shortness of breath	0	18	45.0
	1	13	32.5
	2	8	20.0
	3	0	0
	4	1	2.5
Post-operative arrhythmia	0	23	57.5
	1	7	17.5
	2	1	2.5
	3	5	12.5
	4	4	10.0
Current routine physical activity level	0	15	37.5
	1	16	40.0
	2	8	20.0
	3	1	2.5
<b>Totals</b>		<b>40</b>	<b>100</b>

## Appendix 5.

### Responses from interviewer-administered questionnaire by diagnosis

Item	Response	IHD		VHD	
		# of patients (n=19)	% of patients	# of patients (n=21)	% of patients
Post-operative angina	Never	16	84.2	21	100
	With severe exertion	0	0	0	0
	With ordinary exertion	1	5.3	0	0
	With slightest exertion	2	10.5	0	0
Post-operative shortness of breath	Never	3	15.8	4	19.0
	With severe exertion	5	26.3	4	19.0
	With ordinary exertion	5	26.3	10	47.7
	With slightest exertion	3	15.8	1	4.8
	At rest	3	15.8	2	9.5
Post-operative arrhythmia	Never	11	57.9	7	33.3
	With severe exertion	1	5.3	1	4.8
	With ordinary exertion	1	5.3	0	0
	With slightest exertion	1	5.3	1	4.8
	At rest	5	26.3	12	57.1
Current routine physical activity level	Strenuous	5	27.78	5	23.81
	Moderate	5	27.78	8	38.09
	Mild	6	33.33	6	28.57
	Sedentary	2	11.11	2	9.53
Totals		19	100	21	100

Item	IHD		VHD	
	# of patients	% of patients	# of patients	% of patients
Current smoking status	2	10.5	1	7.5
Hospital readmission for any heart related problem			1	4.8
Motion or speech dysfunction	0	0	3	7.5
High temperature (37° and higher)	2	10.5	2	9.5
Bleeding, bloody stool or urine	2	10.5	7	33.3
Edema of low extremities	2	10.5	7	33.3
Irregular heart rhythm	6	31.6	13	61.9
Frequent headache or dizziness	9	47.4	11	52.4
Acute pain in any organ	5	26.3	6	28.6
None of the symptoms	6	31.6	5	27.5

\* NUMBER OF IHD PATIENTS IS 19

\*\* Number of VHD patients is 21

## Appendix 6.

### Percentage of responses to SF-36 in self-administered and interviewer-administered questionnaires

Question	Self-administered	Interviewer-administered
<b>1. Health evaluation in general</b>		
Poor	7.5	2.5
Fair	27.5	27.5
Good	57.5	62.5
Very good	2.5	5.0
Excellent	5.0	2.5
<b>2. Health in general now compared to one year ago?</b>		
Much better now than one year ago	37.5	30.0
Somewhat better now than one year ago	42.5	52.5
About the same as one year ago	15.0	2.5
Somewhat worse now than one year ago	5.0	15.0
Much worse now than one year ago	0	0

Physical activity level	Self-administered		Interviewer-administered	
	Limited a lot	Limited a little	Limited a lot	Limited a little
a. Performance of vigorous activities	59.5	35.1	55.0	20.0
b. Performance of moderate activities	25.0	37.5	25.0	25.0
c. Lifting or carrying groceries	30.0	32.5	12.5	30.0
d. Climbing several flights of stairs	21.1	52.6	27.5	40.0
e. Climbing one flight of stairs	2.5	12.5	5.0	2.5
f. Bending, kneeling, or stooping	25.0	32.5	22.5	27.5
g. Walking more than a mile	12.5	22.5	7.5	12.5
h. Walking several blocks	7.7	12.8	2.5	7.5
i. Walking one block	7.5	0	5.0	0
j. Bathing or dressing yourself	5.0	5.0	5.0	0

4. Problems with work/daily activities as a result of health	Self-administered*	Interviewer-administered*
a. Cutting down the amount of time spent on work/other activities	41.0	30.0
b. Accomplishing less than desirable	64.1	60.0
c. Limitations in some kind of work/other activities	55.0	55.0
d. Difficulty in performing the work/other activities	50.0	40.0
<b>5. Problems with work/daily activities as a result of emotional problems</b>		
a. Cut down the amount of time spent on work or other activities	56.4	32.5
b. Accomplishes less than desirable	64.1	45.0
c. Working less carefully as usual	46.2	42.5

\* the percentage represents positive responses

<b>6. Interference of physical health or emotional problems interfered with normal social activities</b>	<b>Self-administered</b>	<b>Interviewer-administered</b>
Extremely	0	2.5
Quite a bit	15.0	7.5
Moderately	17.5	15.0
Slightly	30.0	22.5
Not at all	37.5	52.5

<b>7. Severity of bodily pain</b>	<b>Self-administered</b>	<b>Interviewer-administered</b>
Severe	5.1	10.0
Moderate	28.2	25.0
Mild	20.5	32.5
Very mild	17.9	5.0
None	28.2	27.5
<b>8. Interference of pain with normal work?</b>		
Extremely	2.5	15.0
Quite a bit	7.5	7.5
Moderately	20.0	17.5
Slightly	30.0	20.0
Not at all	40.0	40.0

<b>9. Emotional status</b>	<b>Self-administered</b>	<b>Interviewer-administered</b>
<b>a. Feeling full of pep</b>		
None of the time	10.5	20.0
A little of the time	21.1	15.0
Some of the time	15.8	15.0
A good bit of the time	26.3	22.5
Most of the time	15.8	12.5
All of the time	10.5	15.0
<b>b. Being a very nervous person</b>		
All of the time	5.1	2.5
Most of the time	10.3	10.0
A good bit of the time	7.7	7.5
Some of the time	25.6	22.5
A little of the time	38.5	37.5
None of the time	12.8	20.0
<b>c. Feeling so down in the dumps that nothing could cheer up</b>		
All of the time	5.1	2.5
Most of the time	5.1	5.0
A good bit of the time	0	5.0
Some of the time	20.5	10.0
A little of the time	33.3	25.0
None of the time	35.9	52.5
<b>d. Feeling calm and peaceful</b>		
None of the time	10.3	0
A little of the time	12.8	12.5
Some of the time	17.9	20.0
A good bit of the time	28.2	25.0
Most of the time	20.5	30.0
All of the time	10.3	12.5

<b>e. Having a lot of energy</b>	<b>Self-administered</b>	<b>Interviewer-administered</b>
None of the time	12.8	12.5
A little of the time	35.9	27.5
Some of the time	17.9	20.0
A good bit of the time	17.9	7.5
Most of the time	12.8	22.5
All of the time	2.6	10.0
<b>f. Being downhearted and blue</b>		
All of the time	2.6	0
Most of the time	5.1	12.5
A good bit of the time	23.1	7.5
Some of the time	17.9	20.0
A little of the time	46.2	37.5
None of the time	5.1	22.5
<b>g. Feeling feel worn out</b>		
All of the time	2.5	0
Most of the time	2.5	2.5
A good bit of the time	2.5	0
Some of the time	5.0	0
A little of the time	25.0	27.5
None of the time	62.5	70.0
<b>h. Being a happy person</b>		
None of the time	7.7	20.0
A little of the time	38.5	15.0
Some of the time	15.4	17.5
A good bit of the time	17.9	7.5
Most of the time	15.4	27.5
All of the time	5.1	12.5
<b>i. Feeling tired</b>		
All of the time	10.3	5.0
Most of the time	10.3	17.5
A good bit of the time	12.8	10.0
Some of the time	41.0	25.0
A little of the time	17.9	20.0
None of the time	7.7	22.5

<b>11. Perceived health</b>	<b>Self-administered</b>	<b>Interviewer-administered</b>
<b>a. Getting sick a little easier than other people</b>		
Definitely true	5.1	7.5
Mostly true	7.7	15.0
Don't know	43.6	22.5
Mostly false	12.8	17.5
Definitely false	30.8	37.5
<b>b. Being as healthy as anybody else</b>		
Definitely true	2.6	20.0
Mostly true	23.1	22.5
Don't know	41.0	15.0
Mostly false	17.9	22.5
Definitely false	15.4	20.0
<b>c. Expectations of getting worse</b>		
Definitely true	5.0	7.5

Mostly true	5.0	17.5
Don't know	55.0	5.0
Mostly false	17.5	27.5
Definitely false	17.5	42.5
<b>d. Perceiving health as excellent</b>		
Definitely true	17.9	17.5
Mostly true	20.5	37.5
Don't know	20.5	12.5
Mostly false	38.5	17.5
Definitely false	2.6	15.0

## Appendix 7.

### Agreement percent for multiple-scale questions of SF-36

Question	Agreement Percent (%) <sup>*</sup>	Strength of agreement	Agreement Percent (%) <sup>**</sup>	Strength of agreement
<b>1. In general, would you say your health is ...</b>	72.5	61-80 (good)	92.5	81-100 (excellent)
<b>2. Compared to one year ago, how would you rate your health in general now?</b>	60.0	41-60 (poor)	90.0	81-100 (excellent)
<b>6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family...</b>	52.5	41-60 (poor)	90.0	81-100 (excellent)
<b>7. How much bodily pain have you had during the past 4 weeks?</b>	43.6	41-60 (poor)	82.1	81-100 (excellent)
<b>8. During the past 4 weeks, how much did pain interfere with your normal work?</b>	50.0	41-60 (poor)	85.0	81-100 (excellent)
<b>9. How much of the time during the past 4 weeks ...</b>				
a. Did you feel full of pep?	47.4	41-60 (poor)	76.3	61-80 (good)
b. Have you been a very nervous person?	46.2	41-60 (poor)	77.0	61-80 (good)
c. Have you felt so down in the dumps that nothing could cheer you up?	35.9	<= 40 (very poor)	79.5	61-80 (good)
d. Have you felt calm and peaceful?	28.2	<= 40 (very poor)	71.8	61-80 (good)
e. Have you a lot of energy?	38.5	<= 40 (very poor)	77.0	61-80 (good)
f. Have you felt downhearted and blue?	28.2	<= 40 (very poor)	74.4	61-80 (good)
g. Did you feel worn out?	62.5	61-80 (good)	95.0	81-100 (excellent)
h. Have you been a happy person?	25.6	<= 40 (very poor)	66.6	61-80 (good)
i. Did you feel tired?	33.3	<= 40 (very poor)	76.9	61-80 (good)
<b>10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?</b>	47.5	41-60 (poor)	82.5	81-100 (excellent)
<b>11. How true or false is each of the following statements for you?</b>				
a. I seem to get sick a little easier than other people	38.5	<= 40 (very poor)	66.7	61-80 (good)
b. I am as healthy as anybody I know	33.3	<= 40 (very poor)	34.1	<= 40 (very poor)
c. I expect that my health to get worse	30.0	<= 40 (very poor)	77.5	61-80 (good)
d. My health is excellent	30.8	<= 40 (very poor)	74.4	61-80 (good)

<sup>\*</sup> Agreement percent is calculated considering 1-point difference in response options as discordant

<sup>\*\*</sup> Agreement percent is calculated considering 1-point difference in response options as concordant

## Appendix 8.

### Spearman correlation per item between two administrations of SF-36 questionnaire

Question	Spearman coefficient	Sig. (2-tailed)	Strength of agreement (according to K-statistics)
<b>1. In general, would you say your health is ...</b>	.471	.002	good
<b>2. Compared to one year ago, how would you you're your health in general now?</b>	.596	.000	very marginal
<b>3. Does your health now limit you in these activities? If so, how much?</b>			
a. Performance of vigorous activities	.736	.000	good
b. Performance of moderate activities	.719	.000	good
c. Lifting or carrying groceries	.617	.000	very marginal
d. Climbing several flights of stairs	.587	.000	very marginal
e. Climbing one flight of stairs	.432	.005	good
f. Bending, kneeling, or stooping	.604	.000	very marginal
g. Walking more than a mile	.428	.006	very marginal
h. Walking several blocks	.655	.000	very marginal
i. Walking one block	.370	.019	very marginal
j. Bathing or dressing yourself	.325	.041	
<b>4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?</b>			
a. Cutting down the amount of time spent on work/other activities	.636	.000	good
b. Accomplishing less than you would like	.245	.132*	very marginal
c. Were limited in the kind of work/other activities	.192	.235*	very marginal
d. Had difficulty performing the work/other activities	.306	.055*	very marginal
<b>5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems?</b>			
a. Cut down the amount of time you spent on work or other activities	.512	.042	good
b. Accomplishes less that you would like	.478	.000	good
c. Didn't do work or other activities as carefully as usual	.327	.000	very marginal
<b>6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family...</b>			
.605			
<b>7. How much bodily pain have you had during the past 4 weeks?</b>			
.535			
<b>8. During the past 4 weeks, how much did pain interfere with your normal work?</b>			
.528			
<b>9. How much of the time during the past 4 weeks ...</b>			
a. Did you feel full of pep?	.616	.000	very marginal
b. Have you been a very nervous person?	.422	.007	very marginal
c. Have you felt so down in the dumps that nothing could cheer you up?	.330	.033	
d. Have you felt calm and peaceful?	.426	.007	
e. Have you a lot of energy?	.630	.000	very marginal
f. Have you felt downhearted and blue?	.446	.004	
g. Did you feel worn out?	.444	.004	
h. Have you been a happy person?	.458	.003	very marginal
i. Did you feel tired?	.463	.003	very marginal

Question	Spearman coefficient	Sig. (2-tailed)	Strength of agreement (according to K-statistics)
<b>10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities?</b>	.405	.010	very marginal
<b>11. How true or false is each of the following statements for you?</b>			
a. I seem to get sick a little easier than other people	.371	.020	very marginal
b. I am as healthy as anybody I know	.285	<b>.079*</b>	very marginal
c. I expect that my health to get worse	.618	.000	very marginal
d. My health is excellent	.477	.002	very marginal

\* the correlation between self-administered and interview-administered questionnaires was insignificant

## Appendix 9.

### ՀԵՏՎԻՐԱՅԱՏԱԿԱՆ ՀԱՐՑՈՒՄ

Հիվանդի ԱՅ \_\_\_\_\_

Հարցաթերթիկի լրացման ամսաթիվը \_\_\_\_/\_\_\_\_/\_\_\_\_թ.

Ժամը` \_\_\_\_:\_\_\_\_

Հարգ ելի պարոն/տիկին \_\_\_\_\_

Դուք վիրահատվել եք Նորք Մարաշ Բժշկական Կենտրոնում սրտի իշեմիկ կամ/և փականի հիվանդության կապակցությամբ: Մենք կուզենայինք իմանալ, թե ինչպես եք Ձեզ գգ ում ներկայումս:

Հարցերին պատասխանեք՝ մուգ մատիտով կամ գ թիչով նշելով (Ö) այն պատասխանի համարը, որին համաձայն եք: ԽՆԴՐՈՒՄ ԵՆՔ ՊԱՏԱՍԽԱՆԵԼ ԲՈԼՈՐ ՀԱՐՑԵՐԻՆ: Եթե նշել եք այն պատասխանը, որի դիմաց սլաք կա՝ հետևեք սլաքին հաջորդող ցուցմանը:

1. Դուք ունենո՞ւմ եք արդյոք ցավեր կրծքավանդակում:

1. Ոչ  Անցեք 7-րդ հարցին  
 2. Այո

2. Ի՞նչ բնույթի են այդ ցավերը:

1. Սեղմող, ճմշող կամ այրող ցավեր  
 2. Ծակոցանման ցավեր կրծքավանդակի որևէ կետում  
 3. Այլ բնույթի ցավեր  
(նկարագրեք \_\_\_\_\_)

3. Սովորաբար ի՞նչ են տևողություն ունեն այդ ցավերը:

1. Մի քանի վայրկյան  
 2. Մինչև 30 րոպե  
 3. 30 րոպեից ավելի

4. Կապվա՞ծ են արդյոք այդ ցավերը ֆիզիկական ծանրաբեռնվածության հետ (օրինակ՝ ուժեղանում են արագ քայլելիս կամ աստիճաններով բարձրանալիս):

1. Ոչ  
 2. Այո

5. Փոխվու՞մ են արդյոք այդ ցավերը խորը շնչելիս կամ մարմնի դիրքը փոխելիս:

1. Ոչ  
 2. Այո

6. Արդյոք ունենում եք շչարգ ելություն (հևու՞մ եք) արագ քայլելուց կամ 1-2 հարկ բարձրանալուց:

1. Ոչ  
 2. Այո

7. Ունենում եք արդյոք շնչարգ ելութուն (հևոց) հանգ ստի վիճակում:
- 1. Ոչ
  - 2. Այո
8. Նշեք Ձեր պուլսի հաճախականությունը մեկ րոպեում (հանգ իստ նստած վիճակում):
- 1. Մինչև 90
  - 2. 90-140
  - 3. 140-ից բարձր
9. Ունենում եք արդյոք սրտի անկանոն աշխատանք (առիթմիա):
- 1. Ոչ —————▶ Անցեք 12-րդ հարցին
  - 2. Այո
10. Եթե Այո, ի՞նչ բնույթի է սրտի անկանոն աշխատանքը:
- 1. Մշտական
  - 2. Նոպայաձև (ժամանակ առ ժամանակ)
  - 3. Գիշերային ժամերին
11. Ինչպե՞ս է փոխվում սրտի անկանոն աշխատանքը ֆիզիկական ծանրաբեռնվածության ժամանակ (օրինակ՝ արագ քայլելիս):
- 1. Ուժեղանում է
  - 2. Թուլանում է
  - 3. Մնում է անփոփոխ
  - 4. Չեմ կարող ասել
12. Վիրահատությունից ի վեր պառկե՞լ եք հիվանդանոց սրտի հիվանդության պատճառով:
- 1. Ոչ
  - 2. Այո —————▶ Խնդրում ենք նշել հետևյալը.

Չիվանդանոցի անունը	գ տնվելու վայրը (քաղաք, շրջան)	պառկելու ամիսը, տարին
1.		
2.		

13. Դուք ծխում եք:
- 1. Այո —————▶ Օրեկան քանի՞ սիգ արետ (միջինում) \_\_\_\_\_ հատ
  - 2. Ոչ
14. **Վերջին 4 շաբաթվա** ընթացքում ունեցե՞լ եք հետևյալ ախտանիշներից մեկը կամ մի քանիսը. (Նշեք բոլոր այն ախտանիշները, որոնք ունեցել եք:)
- 1. մարմնի որևէ մասի անցողիկ կաթված կամ զգացողության խանգարում
  - 2. ջերմություն (37° C կամ ավելի բարձր) կամ սարսուռ

- 3. արյունահոսություն, կապտուկներ մարմնի որևէ մասում, մուգ կղանք կամ արյունախառն մեզ
- 4. ստորին վերջույթների այտուց, որը չի անցնում գ իշերային քնից հետո
- 5. ցավեր կամ այրոցի զգացում ստամոքսի շրջանում
- 6. հաճախակի գ լխացավեր կամ գ լխապտույտներ
- 7. ոտքերի ցավեր քայլելու ժամանակ (անցնում են կանգ նելիս)
- 8. զարկերակային ճնշման բարձրացում մինչև 150/ 90 և ավելի
- 9. վերը նշվածից ոչ մեկը չեն ունեցել —————▶ Անցեք 16-րդ հարցին

15. Այդ ախտանիշ(ներ)ի պատճառով դիմե՞լ եք բժշկի կամ պառկե՞լ եք հիվանդանոց:

- 1. Ոչ
- 2. Այո

16. Խնդրում ենք թվել, թե ի՞նչ դեղորայք եք օգտագործում ներկայումս՝ նշելով դեղաչափը.

Դեղի անունը	Մեկ ընդունման դեղաչափը	Օրեկան անգամ	քանի՞
1.			
2.			
3.			
4.			
5.			

17. Նշեք, թե հետևյալ հիվանդություններից որո՞նք են ի հայտ եկել Ձեզ մոտ վերջին մեկ տարվա ընթացքում (նշեք այն բոլորը, որոնք նախկինում չեք ունեցել):

- 1. հիպերտոնիա (արյան ճնշման բարձրացում մինչև 150/90 և ավելի)
- 2. սրտամկանի ինֆարկտ
- 3. կաթված (ինսուլտ)
- 4. երակների վարիկոզ լայնացում կամ տրոմբոֆլեբիտ
- 5. քաղցկեղ (եթե Այո, նշեք թե ո՞ր օրգանի \_\_\_\_\_)
- 6. ստամոքսի կամ 12-մատնյա աղիքի խոցային հիվանդություն
- 7. լյարդի բորբոքում (հեպատիտ)
- 8. շաքարային դիաբետ (շաքարախտ)
- 9. թոքաբորբ կամ պլևրիտ
- 10. բրոնխիալ ասթմա
- 11. երիկամների հիվանդություն (միզաքարային, բորբոքային և այլն)
- 12. հոգեկան խանգարումներ (դեպրեսիա, վախեր և այլն)
- 13. անքնություն
- 14. ներոզներ
- 15. հղիության կամ պտղի ախտաբանություն (եթե Այո, նշեք, թե ինչպիսի՞նք \_\_\_\_\_)
- 16. սակավարյունություն
- 17. ալերգիա (ի՞նչ բնույթի \_\_\_\_\_)
- 18. տեսողության խանգարում

18. Բացի Նորք Մարաշ Բժշկական Կենտրոնի սրտաբանից, գ տնվում եք արդյոք որևէ այլ բժշկի հսկողության տակ:

1. Ոչ

2. Այո → Նշեք Ձեզ հսկող բժշկի անուն-ազգ անունը և աշխատավայրը.

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Եթե մտադիր եք փոխել Ձեր բնակավայրը, խնդրում ենք վաղօրոք զանգահարել 65-58-20 հեռախոսահամարով և հայտնել ձեր նոր հասցեն կամ նշել այն ստորև՝ հիվանդանոցի կապը Ձեզ հետ պահպանելու նպատակով: Նոր հասցե՝

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19. Խնդրում ենք նշել Ձեր անուսնական վիճակը.

1. Չանուսնացած

2. Անուսնացած

3. Ամուրի

4. Բաժանված

20. Խնդրում ենք նշել երեխաների թիվը.

1. Երեխա չունեն

2. \_\_\_\_\_

21. Դուք աշխատում եք .

1. Ոչ

2. Այո → Խնդրում ենք նշել Ձեր աշխատանքը

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**ԽՆԴՐՈՒՄ ԵՆՔ ՀԱՐՑԱԹԵՐԹԻԿՆ ՈՒՂԱՐԿԵԼ ՄԵՁ ԿՑՎԱԾ ԾՐԱՐՈՎ ՈՐՔԱՆ  
ՀՆԱՐԱՎՈՐ Է ԿԱՐՃ ԺԱՄԿԵՏՈՒՄ ԾՐԱՐԻ ՎՐԱ ՆՇՎԱԾ ՀԱՍՑԵՈՎ:**

**ՇՆՈՐՀԱԿԱԼՈՒԹՅՈՒՆ ՀԱՄԳՈՐԾԱԿՑՈՒԹՅԱՆ ՀԱՄԱՐ:**

## PATIENT FOLLOW-UP QUESTIONNAIRE

Patient ID \_\_\_\_\_

Date \_\_\_\_/\_\_\_\_/\_\_\_\_y.

Time \_\_\_\_:\_\_\_\_

Dear Mr./Mrs. \_\_\_\_\_

**You had a cardiac surgery in the Nork Marsh Medical Center. We would like to know your heart condition now. Please fill in the following questionnaire and send it back in the given envelope.**

**PLEASE ANSWER EVERY QUESTION BY CHECKING THE BOX ( Ö )  
OF THE RESPONSE THAT BEST DESCRIBES YOUR CURRENT CONDITION.  
PLEASE USE DARK PEN OR PENCIL.**

1. Do you have chest pain?  
 1. No      **—————▶ Go to question #6**  
 2. Yes
  
2. What is the character of chest pain that you have?  
 1. Pressing, burning, compressing  
 2. Acute pain in point of your chest pain  
 3. Other character  
(Please, describe \_\_\_\_\_)
  
3. In general, how long does this pain last?  
 1. several seconds  
 2. up to 30 minutes  
 3. more than 30 minutes
  
4. Is this chest pain related to physical activity (e.g. increases while fast walking or climbing flights of stairs):  
 1. No  
 2. Yes
  
5. Does the chest pain changes during a deep inhale or depending on a body position  
 1. No  
 2. Yes
  
6. Do you have shortness of breath during fast walking or climbing 1-2 flights of stairs?  
 1. No  
 2. Yes
  
7. Do you have shortness of breath at rest?  
 1. No  
 2. Yes

8. Please, specify your pulse rate per minute (at rest)?
- 1. up to 90
  - 2. 90-140
  - 3. above 140
9. Do you have irregular heart rhythm (arrhythmia)?
- 1. No —————▶ **Go to the question #12**
  - 2. Yes
10. If Yes, what is a character/frequency of this irregular rhythm?
- 1. Permanent
  - 2. Periodical (from time to time)
  - 3. At night
11. How does the arrhythmia change during physical activity (e.g. while walking)?
- 1. Severity increases
  - 2. Severity decreases
  - 3. Doesn't change
  - 4. Can't say
12. Have been readmitted to a hospital for any heart related problem after cardiac surgery?
- 1. No
  - 2. Yes —————▶ **Please, specify the following.**

Name of the hospital	location (city, region)	Month and year of readmission
1.		
2.		

13. Do you currently smoke?
- 1. Yes —————▶ How many cigarettes per day (*on average*)? \_\_\_\_\_
  - 2. No
14. **During the past 4 weeks** have you had one or more of the following symptoms (**Check all that apply**):
- 1. temporary paralysis or sensitivity disorder in any bodily part
  - 2. temperature (37° C and above) or chill
  - 3. bleeding, bloodily stool or urine
  - 4. edema of low extremities that doesn't alleviate after night
  - 5. pain or burning in stomach area
  - 6. frequent headache or dizziness
  - 7. pain in low extremities while walking ( alleviate after stopping)
  - 8. blood pressure increase up to 150/ 90 and over
  - 9. none of the above symptoms —————▶ **Go to the question #16**

15. Did you refer to a physician or were admitted to a hospital for any of these symptoms?

- 1. No
- 2. Yes

16. Please, list the drugs and their dosage that you are currently taking.

Drug name	Single dose	Frequency (times per day)
1.		
2.		
3.		
4.		
5.		

17. Please, check all those diseases/pathologies that you have acquired within the last year (check all that apply):

- 1. hypertension ( blood pressure increase up to 150/90 mm Hg and over)
- 2. myocardial infarction
- 3. stroke
- 4. vein varicosities or thrombophlebitis
- 5. cancer (if yes, specify the organ \_\_\_\_\_)
- 6. gastric or duodenum ulcer
- 7. hepatitis
- 8. diabetes mellitus
- 9. pneumonia or pleuritis
- 10. bronchial asthma
- 11. kidney diseases (միզաքարային, inflammatory and others)
- 12. mental disorders (depression, phobias and others)
- 13. insomnia
- 14. neurosis
- 15. pregnancy or fetal pathologies ( if yes, describe: \_\_\_\_\_ )
- 16. anemia
- 17. allergy (specify the reason \_\_\_\_\_)
- 18. vision disorders

18. Does a physician other than NMMC cardiologist provide your follow-up care?

- 1. No
- 2. Yes —> *Please, specify the name and workplace of this physician:*

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**If you are going to change your home address, please, call 65-58-20 and inform NMMC staff about your new address to ensure continuity of care.**

**New address:**

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19. Please, specify your marital status.

- 1. Married
- 2. Single
- 3. Divorced
- 4. Widowed

20. How many children do you have?

- 1. I don't have children
- 2. \_\_\_\_\_

21. Are you working?

- 1. No
- 2. Yes     $\longrightarrow$     *Please, specify your occupation*

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**PLEASE SEND THE QUESTIONNAIRE AS EARLY AS POSSIBLE**

**THANK YOU FOR COLLABORATION!**

## Appendix 10.

### Descriptions of lowest and highest scale scores\*

4.1. Concepts	Meaning of scores	
	Lowest possible (Floor)	Highest possible (Ceiling)
Physical Functioning	Limited a lot in performing all physical activities including bathing or dressing due to health	Performs all types of physical activities including the most vigorous without limitations due to health
Role-Physical	Problems with work or other daily activities as a result of physical health	No problems with work or other daily activities as a result of physical health
Bodily Pain	Very severe and extremely limiting pain	No pain or limitations due to pain
General Health	Evaluates personal health as poor and believes it is likely to get worse	Evaluates personal health as excellent
Vitality	Feels tired and worn out all of the time	Feels full of pep and energy all of the time
Social Functioning	Extreme and frequent interference with normal social activities due to physical or emotional problems	Performs normal social activities without interference with normal social activities due to physical or emotional problems
Role-Emotional	Problems with work or other daily activities as a result of emotional problems	No problems with work or other daily activities as a result of emotional problems
Mental Health	Feeling of nervousness and depression all of the time	Feels peacefully, happy and calm all of the time

\* source: Ware J.E., Snow K.K., Kosinski M., and Gandek B. SF-36 Health Survey manual and interpretation guide. The Health Assessment Lab, Boston, Massachusetts: QualityMetric Inc., Lincoln, Rhode Island; 2000