

Risk Factors of Developing Lumbar Disc Herniation in Armenia: a case-control study

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by

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Abstract

Background: Disc herniation is the protrusion of the disc beyond its natural borders. The most common symptom of the lumbar disc herniation is low back pain which could radiate into the leg. Low back pain is the second most common cause of disabilities and the leading cause of job related disability.

Objective: The main objective of the study was investigation of the risk factor of lumbar disc herniation.

Methods: Study had a retrospective unmatched case-control design. Data for the study was obtained through telephone interviews. The developed instrument was adopted from the validated MUSIC questionnaire used in Sweden for the MUSIC-Nortallje study. The study population was patients from Michaelyan Institute of Surgery who underwent surgery from January 1, 2007 to December 31, 2010. Simple and multiple logistic regressions were used for the analyses.

Results: The analysis of the data obtained through interview from 113 cases and 115 controls was done, and several risk factors for development of lumbar disc herniation were identified. The most important risk factors associated with the development of lumbar disc herniation were the family history, lumbar load, height, work tempo and satisfaction with the working time. The OR for the association between family history and development of lumbar disc herniation for the age group above 40 years old was 5.94 (95% CI: 1.04-34.10). For the lumbar load OR was 9.68 (95% CI: 2.91-32.18). Protective effect of moderate exercise and sleeping on the hard bed were confirmed by the OR of 0.44 (95% CI: 0.25-0.87) and 0.23 (95% CI: 0.07-0.78) respectively. In addition, the study identified that a low BMI and being an athlete can be potential risk factors for the early development of lumbar disc herniation.

Conclusions: Several factors associated with the development of lumbar disc herniation were identified including family history, lumbar load, sleeping on hard bed, work satisfaction and work tempo. Additional research is needed to investigate the specific aspects of work

conditions leading to lumbar disc herniation and its incidence and prevalence in different populations such as athletes and different age groups.

1. Introduction

A herniated disk, also called prolapsed, ruptured or slipped disk is a protrusion of the disc beyond its natural borders. The most common symptom of the lumbar disc herniation is the low back pain which is radiating into one leg [1-2]. After the headache, back pain is the second most common neurological disorder in the United States [3]. According to the Center of Disease Control (CDC) back problems are the second most common cause of disabilities (16.5% of all disabilities) after the arthritis and rheumatism (17.5% of all disabilities) in the USA [4]. For low back pain Americans spend \$50 billion each year. Back pain is considered as the leading cause of job-related disability [3]. A study held in 2004 showed that industrial accidents causing lumbar back strain are frequent and are of major causes of absenteeism in Tunis. These accidents most commonly occurred in the morning, often because of the handling of heavy loads. They cause lesions of variable importance, such as slipped disc hernia in 40% of cases. The average duration of absenteeism due to this problem was 237 days a year per patient in Tunis in 2004 [5]. Severe and durable lower back pain is a major source of sick leave, invalidity or loss of employment in France [6].

There are two approaches of treatment for the lumbar disc herniation. The first, conservative approach includes a bed rest (< 3 days), analgesics, anti-inflammatory drugs and physiotherapy [1]. A study showed that among patients with acute sciatica within one year one-third undergoes operation and only 29% of them fully recover [7]. Another type of the conservative treatment is the epidural nerve block [1]. A study that compared the epidural injection with the discectomy found that among patients with an epidural injection only 42%-56% had reduction of symptoms compared to 92-98% in the discectomy group [8]. The second approach of the treatment is the operative treatment [8]. There are several techniques for the surgical treatment such as the endoscopic discectomy and microdiscectomy. Complications from these surgeries include infections, nerve root injuries, cerebrospinal fluids leak and great vessel or intestinal injuries [1].

A qualitative study among the Norwegian general population showed that only a small part of the respondents had current knowledge of low back pain and their health consequences. Lack of education is the most important factor for the lack of knowledge. Development of effective methods to promote adequate self-care and treatment and also reduction of the risk of chronic low back pain in the lower-educated groups should be a top priority [9]. The problem of managing back pain might be reduced by public education through the promotion of appropriate health education messages. A study that evaluated the quality of internet information about lumbar disc herniation found that less than 10% of investigated web sites contained high-quality information. Majority of the sites did not include appropriate information and more than one-third provided information for secondary commercial gains. Professional education of general practitioners is also needed to update them in the most effective ways of back pain management [10].

Several studies investigated the associations between possible risk factors and the development of lumbar disc herniation in different countries (Appendix 1). The significant associations have been discovered between family history, lumbar load, hard-working, time urgency, age, smoking and lumbar disc herniation [11-15]. Other risk factor for this disease are aortic atherosclerosis and stenosis of the feeding arteries of the lumbar spine [16], as well as the shape of the vertebral body margin [17]. Some genetic factors such as vitamin D receptor gene and aggrecan gene are also found to be associated with lumbar herniation [18-19]. Physical exercises and sleeping on the hard bed could be protective factors against the development of lumbar disc herniation [12]. The MUSIC (Musculocutaneal Intervention Centre)-Nortallje cohort study conducted in the Sweden investigated several aspects of low back and neck pain including the psychosocial factors and the physical activity. One of the most important protective factors identified in the study was moderate physical activity. Validated instrument were used during that study [14-15, 20-29].

Rationale of the study

In Armenia there is no accurate data about the prevalence and incidence of the lumbar disc herniation, as well as data on associated absenteeism or disability. Furthermore, no study investigated the risk factors for developing lumbar disc herniation in Armenia. The aim of this study was the evaluation of the risk factors and effect modifiers of lumbar disk herniation in Armenia with the ultimate aim to reduce the incidence of lumbar disc herniation.

Research questions

1. What were the risk factors for developing lumbar disc herniation in Armenia?
2. What were the effect modifications between risk factors for developing lumbar disc herniation in Armenia?

2. Methods

Study design

The study had a retrospective case-control study design. The case-control method is relatively quick and relatively inexpensive [30-31]. In addition, this design requires fewer subjects than other studies and poses minimal to no risk to participants [30-31]. It gives an opportunity to study different potential causes or risk factors of a disease [30-31]. Limitations of the design is that information on the past exposure is used which sometimes is hard or almost impossible to validate [30-31]. The selection of the appropriate control group may be difficult for the case-control study method and should be done carefully [30-31]. The design does not allow to determine the prevalence of the disease by the exposure [30-31].

Study population

The target population was the patients who were admitted to the Department of Neurosurgery of the Michaelian Institute of Surgery from 2007 to 2010. **Cases** were patients with an established diagnosis of lumbar disc herniation. **Controls** were patients from the same hospital but without an established diagnosis of lumbar disc herniation.

Inclusion criteria (for cases):

- All patients from the Department of Neurosurgery of the Michaelian Institute of Surgery from 2007-2010 who had a surgery with the diagnosis of lumbar disc herniation

Exclusion criteria (for cases):

- Patients without appropriate contact information

Inclusion criteria (for controls):

- All patients from all departments from 2007-2010 of Michaelian Institute of Surgery without a diagnosis of lumbar disc herniation.

Exclusion criteria (for controls):

- Patients without appropriate contact information

Sampling frame

Medical records for the years 2007 to 2010 of Michaelian Institute of Surgery were used to obtain the list of patients and their contact information. The **study population** was selected through the simple random sampling from this list. Patients' names were entered into an Excel sheet and were selected randomly using a Random number generator (Add-on software in Microsoft Excel 2007). Data collection was started from the beginning of the list. If the participant refused to join the study, the next respondent was selected and contacted, until the desired number of sample was reached. For the sample size calculation the EpiInfo StatCalc was

used for the unmatched case-control study design [32]. Several studies showed that the family history is one of the most important risk factor for developing lumbar disc herniation [11-13]. Family history is defined as having a parent, brother, sister or a child with lumbar disc herniation. Therefore, this factor was selected as the main exposure of interest for the calculation of the sample size. The estimation of the exposure of interest (29.2% for cases and 10.3% for controls) was based on a single, large case-control study conducted in China [12]. The sample size was calculated considering 95% confidence interval, 80% power and 1:1 ratio of cases to controls and resulted in 158 patients in total (79 cases and 79 controls). Finally, considering the potential non-response rate of the telephone interviews (30%) the sample size was increased to 226 in total or 113 respondents for each group.

Study variables

- Dependent variable was the presence of the lumbar disc herniation.
- Independent variables included demographic characteristics (age, gender, marital status, education), the family history, presence of a parent suffered a myocardial infarction before age of 60, body mass index, smoking history and alcohol use, physical activity levels, sleeping on a hard bed, lumbar load and factors related to the psychosocial work demand.

Data collection

Data was collected through the telephone interviews with the participants. The questionnaire for telephone interview is attached in the Appendix 2. The interview tool contained questions related to patient demographic factors (e.g., age, gender, marital status, education), potential risk factors identified through the literature search (e.g., family history of lumbar disk herniation, height, weight, smoking history, alcohol use) and questions related to current and past working (occupational) history, working conditions and psychosocial work demand – all adapted

from the MUSIC questionnaire, a validated questionnaire developed in Sweden [22-24, 27-29].

Data obtained from the interviews was entered into a computerized database.

Statistical analyses

All analyses were done using STATA computer software (version 10.1, StataCorp LP). Categorical variables were compared using chi-square test. For continuous variables assumptions of normality were checked and then the t-test was used. For other continuous variables that were not normally distributed, non-parametric Wilcoxon rank-sum (Mann-Whitney) test for independent samples were used to assess differences in the means across cases and controls. In order to measure the strength of associations between dependent and independent variables and to check for the potential effect modifications between the independent variables, multiple logistic regression analyses were applied. .

Ethical considerations

The project was reviewed and approved by the IRB committee of the American University of Armenia. The permission to use the MUSIC instrument for the study purposes has been obtained from the Nortallje study investigators at the Karolinska Institutet, Sweden. An oral consent form (Appendix 3) was used for obtaining agreements for the telephone interviews.

3. Results

Descriptive data

In the Department of Neurosurgery of the Michaelian Institute of Surgery 645 patients had operations for a lumbar disc herniation from January 1, 2007 through December 31, 2010 (n=171, 175, 138 and 161 operations in years 2007 to 2010 respectively). From the list of

patients with lumbar disc herniation obtained from the hospital archives, 147 persons were randomly selected as cases. For 32 patients the contact information was wrong or missing. For the remaining 115 patients, 113 completed interviews (2 refused to participate) was received resulting in a response rate of 77% among the cases. Using a similar procedure, 145 surgical patients (that did not have lumbar disc herniation) were randomly assigned to the control group. Out of those 145, 115 completed interviews were obtained (26 patients' contact information was wrong or missing; 4 patients were not alive during data collection). None of the controls subjects refused to participate, resulting in an overall response rate of 78%. All subsequent analyses were performed using complete interview data from 113 cases and 115 controls.

Unadjusted analysis of demographic, health and other characteristics

The comparisons of the characteristics of the study population between the cases and controls with the associated odds ratios are presented in Table 1a-c. The mean age of the total study population was 48 (SD=12.60) years with the range from 21 to 87 (borderline significant between the groups). About 60% of participants were male (63% of cases and 56% of controls). Mean height was 170cm (SD=8.47) among the cases and 168cm (SD=8.82) among the controls (p=0.03). Approximately 33% (76) of the study participants were current smokers from which 43 among cases (38%) and 33 among the controls (29%). Unadjusted analysis also showed that there is a statistically significant association between marital status and development of lumbar disc herniation (Table 1a). "Divorced" and "widowed" groups were collapsed because two groups were identical. The ORs for disc herniation comparing "single" and "married" groups to the divorced and widowed group were 4.19 (95% CI: 1.25-14.09) and 3.52 (95% CI: 1.43-8.65) respectively. Employed people (including farming and seasonal work) had a 4.66 times higher odds of developing lumbar disc herniation than those that are unemployed (95% CI: 2.29-9.48).

The odds of developing lumbar disc herniation among those who have family history (parent, brother, sister or child with lumbar disc herniation) was 4.39 times higher than among those who did not have family history (95% CI: 1.70-11.29). The crude OR for the association between development of lumbar disc herniation and taking part in sport competitions was 2.40 (95% CI: 1.07-5.35). The estimated OR for the association between moderate regular exercise and development of lumbar disc herniation was 0.46 (95% CI: 0.25-0.87), suggesting a protective effect of exercise. Statistically significant differences were found between the job tempo groups where the four groups of were identified as working with “low and constant tempo”, “modest and constant tempo”, “high and constant tempo” and “varying work tempo”. Using “Varying work tempo” as a reference group, the ORs were equal to 5.67 (95% CI: 1.84-17.49), 2.53 (95% CI: 1.08-5.95) and 5.89 (95% CI: 2.18-15.93) respectively for the groups from low to high tempo. Other variables significantly different between the groups included other work characteristics such as bending or turning in the same fashion during work and lumbar load of carrying object that weight 5-15 kilogram and more than 15 kilograms (Table 1a).

No significant differences were found in the psychosocial characteristics such as accommodation, household finances, housework, contact with friends and contact with relatives ($p>0.05$, Table 1b). Similarly, no significant differences were observed in the characteristics of work conditions such as satisfaction with working time, overtime work, break during the work, extra work, possibilities for change in work and possibilities to learn something new in work ($p>0.05$, Table 1c).

Q-norm plots showed that variables height, weight, BMI and age were approximately normally distributed. The Q-norm plot for height is provided in Figure 1. The Q-norm plots for variables weight, BMI and age were similar (data not shown). We used Lowess smoother for the variable of age and identified difference in development of lumbar disc herniation between populations below 40 years old and above 40 years old (Figure 2). Following this finding, all adjusted analyses were done for two categories (“40 years old and below” and “above 40 years

old”) separately. There were 63 patients were in the younger group (29 control and 34 cases) and 165 patients were in those above 40 (86 controls and 79 cases).

Statistically significant differences were found in means for variables height and age for patients above 40 years old. Having lower age and higher height ($p < 0.05$) was found to be a risk factors for developing lumbar disc herniation.

All variables that were identified as significantly different between the cases and controls (such as height, age, marital status etc.) and were logically related were tested for correlations to reduce the collinearity in the future multivariable logistic regression models. Patients reporting modest exercise 10 years ago also tended to report modest exercise 15 and 20 years ago (Pearson’s correlation coefficient was 0.85 between them). Thus, only modest exercise 10 years ago was considered for the inclusion into the logistic regression model.

Adjusted analysis

For adjusted analyses, all variables with p values less than 0.25 and all other potential confounders known from the literature were included into the multiple logistic regression model. As noted above, models were constructed for two age patient groups: those who were ≤ 40 and those > 40 years old at the time of interview. None of the potential risk factors were independent predictors of developing lumbar disk herniation in the group of patients who were ≤ 40 years old. For the age group above 40, factors independently associated with the development of lumbar disc herniation included the family history, lumbar load, work tempo, satisfaction with working time, age and sleeping on the hard bed (Table 2). The p-value of the Hosmer-Lemeshow goodness-of-fit test of the final model was 0.423. The highest OR was observed for different categories of work tempo, followed by lumbar load, family history and job satisfaction. After adjusting for other variables in the model, patients with a family history of lumbar disc herniation had about 6 times higher odds of developing lumbar disk herniation than those

without (OR= 5.94, 95% CI: 1.04-34.10). Crude OR for lumbar load (carrying objects more than 15kg) changed from 4.00 (95% CI: 2.10-7.60) to 9.68 (95% CI: 2.91-32.18) which means that people who had lumbar load have 9.68 times higher odds of developing lumbar disc herniation. Patients who were not satisfied with their working time have approximately 4 times higher odds of developing lumbar disc herniation (OR=4.09, 95% CI: 1.45-17.54) compared to those who were satisfied. For work tempo variable ORs were equal to 21.91 (95% CI: 3.22-149.03), 6.56 (95% CI: 1.34-32.07) and 18.43 (95% CI: 2.80-121.27) respectively for the groups from low to high tempo compared to those who were working in varying tempo. After adjusting for other variables in the model, sleeping on the hard bed (as opposed to soft bed) was identified as protective factor (OR=0.23, 95% CI: 0.07-0.78). The older age was also found to be a protective factor (OR = 0.98, 95% CI: 0.86-0.99).

4. Discussion

The study identified several risk factors associated with the development of lumbar disc herniation in Armenia. The results supported previous studies performed in other countries such as Japan, China and Croatia identifying for example the family history as one of the most important risk factors [12, 33-35]. The differences between the ORs from different studies are most likely due to the adjustment by different factors and characteristics of baseline populations. A case-control study by Matsui et al. conducted in Japan among 18 years old and below identified that the OR of developing lumbar disc herniation was 5.61 for people who had family history [34]. A case-control study in China conducted by Zhang et al. identified that patients who were 30-55 years old and had the family history had 5 times higher odds of developing lumbar disk herniation, than those without [12]. Although the current study did not investigate any genetic factor, past studies showed that the genetic polymorphisms of vitamin D receptor and interleukin-1 are associated with the disc degeneration [18, 36-37]. Inheritance is involving multiple genes and have complex mode [38-39]. This fact may also explain the observed

differences between the risk factors and their magnitude among studies conducted in different countries.

Other important risk factor identified in the current study was the lumbar load or carrying objects that weight >15 kilograms (OR = 9.68) which was consistent with other studies. Lumbar load is the increasing pressure within the intervertebral disc and on annulus fibrosus. This pressure can weaken annulus fibrosus, resulting disc herniation. In the study conducted by Zhang et al. and Sun et al. OR of developing lumbar disc herniation among patients with lumbar load were 2.13 [12, 35]. After adjusting by age in those studies ORs were 1.98 for the group 30-50 years old and 2.90 for the people above 55 years [12]. The differences between the magnitudes can be explained by the differences in the definition of ‘lumbar load’, working conditions as well as type of adjusted factors in various studies.

The present study identified that sleeping on the hard bed was preventive factor for lumbar disk herniation – a finding consistent with other studies. For example, in the study by Zhang et al., sleeping on the hard bed was a protective factor for the group who were above 55 years old [12]. Sleeping on a hard bed may provide greater form support for the spine, reducing localized pressure on intervertebral discs. This could reduce the risk of the development of lumbar disc herniation.

Several factors that were identified as significant in univariable analyses were not found to be significant in multivariable analyses – a finding that can be due to a relatively small sample size. However, these factors also warrant more investigations. For example, the current study found that the moderate exercise 10 years ago was associated with almost 55% reduction of probability of developing lumbar disk herniation in the total sample in each age group separately. A similar result was observed for the total population of in the case-control study conducted in China where, however, the probability was varied from 80 and 50% age groups below 30 and 30-50 respectively [12]. Moderate physical exercise could strengthen spine muscles. This can reduce pressure on disc and prevent from protrusion of the disc.

Hard exercise was not found to be important as a predictive factor. Furthermore, conducted survival analysis showed that people who participated in sport competitions were undergoing surgery in younger age as compared to those who were not into competitive sports (data not shown). There was no any information regarding this in the reviewed literature. However, it can be contemplated that strenuous, repetitive exercises put spine under the pressure and lead to the injuries of the discs and earlier development of disc herniation. In the univariable analyses the number of injuries in the past was increasingly associated with the development of lumbar disk herniation.

Limitations

One of the potential limitations of this study could be the non-differential misclassification – asymptomatic cases could be included in the control group shifting the measures of associations towards the null. Other potential limitation of this study could be the recall bias as cases were asked about the events around the time of surgery and some questions in all respondents were asking about events up to 20 year ago. Patients whose contact information was missing could be different from those who participated but it is unclear how difference could impact the differences between the cases and controls, if any.

Conclusions and recommendations

The study identified several important factors associated with the development of lumbar disk herniation in Armenia. Among patients who were above 40 years old, these factors included the family history, lumbar load, sleeping on hard bed, work satisfaction and work tempo. Additional research is needed to investigate the specific aspects of work conditions leading to lumbar disc herniation and its incidence and prevalence in different populations such as athletes and different age groups.

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Table 1a. Demographic, anthropometric and health characteristics of the study population

Characteristics		Cases N = 113	Controls N = 115	Odds ratio	P value
Gender	Male*	71	65	1.00	
	Female	42	50	0.77	0.332
Age	Mean \pm SD	46.18 \pm 10.97	49.43 \pm 13.88	0.98	0.053
Height	Mean \pm SD	170.36 \pm 8.47	167.88 \pm 8.82	1.03	0.033
Weight	Mean \pm SD	79.56 \pm 15.33	78.36 \pm 15.32	1.00	0.550
BMI	Mean \pm SD	26.74 \pm 4.83	27.76 \pm 4.79	0.97	0.111
Marital status	Divorced/widowed*	7	22	1.00	
	Married	94	84	3.52	0.006
	Single	12	9	4.19	0.021
Education	\leq 10 years*	44	34	1.00	
	> 10 years	69	81	0.66	0.137
Employed	No*	12	41	1.00	
	Yes	101	74	4.66	< 0.001
Smoking	No*	54	64	1.00	
	Yes	59	51	1.37	0.235
Alcohol use	Never*	28	29	1.00	
	Monthly or less	42	50	0.87	0.680
	2-4 per month	27	23	1.22	0.615
	2-3 per week	8	6	1.38	0.592
	>3 per week	8	7	1.18	0.772
Diabetes	No*	103	103	1.00	
	Yes	10	12	0.83	0.686
Hypertension	No*	72	61	1.00	
	Yes	41	54	0.64	0.103
Heart condition	No*	84	87	1.00	
	Yes	29	28	1.07	0.819
Parent had infarction before 60 years old	No*	87	97	1.00	
	Yes	26	18	1.61	0.161
Family history	No*	91	109	1.00	
	Yes	22	6	4.39	0.002
Taking part in sport competitions	No*	92	105	1.00	
	Yes	21	10	2.40	0.033
Moderate exercise 10 years ago	No*	92	77	1.00	
	Yes	20	36	0.46	0.016
Hard exercise 10 years ago	No*	108	105	1.00	
	Yes	5	10	0.49	0.201
Difficulty in sleeping or waking up	Almost never*	82	60	1.00	
	Sometimes	7	30	0.17	< 0.001
	Often	24	25	0.70	0.288
Sleeping on a hard bed	No*	85	97	1.00	
	Yes	28	18	0.41	0.001

Injury with pain (at least 7 days)	No*	35	105	1.00	
	Yes	78	10	9.09	< 0.001
Number of injuries in the past	0*	35	106	1.00	
	1	28	4	21.00	< 0.001
	2	8	4	6.00	0.005
	3	9	2	13.50	0.001
	4 and more	33	0	perfect	

* reference group

Table 1b. Psychosocial characteristics of the study population

Characteristics		Cases N = 113	Controls N = 115	Odds ratio	P value
Accommodation	Bad*	16	18	1.00	
	Not bad not good	38	39	1.09	0.824
	Good	59	58	1.14	0.730
Household finances	Bad*	47	45	1.00	
	Not bad not good	29	38	0.73	0.330
	Good	37	32	1.11	0.750
Housework	Bad*	41	18	1.00	
	Not bad not good	32	30	0.47	0.046
	Good	40	67	0.26	< 0.001
Contact with friends	Bad*	19	16	1.00	
	Not bad not good	39	16	2.05	0.111
	Good	55	83	0.56	0.126
Contact with relatives	Bad*	11	10	1.00	
	Not bad not good	38	16	2.16	0.146
	Good	64	89	0.65	0.362

* reference group

Table 1c. Characteristics of work conditions of participants

Characteristics		Cases N = 113	Controls N = 115	Odds ratio	P value
Satisfied with working time	No	29	14	1.73	0.139
	Yes*	72	60	1.00	
Working overtime	Almost never*	59	40	1.00	
	Sometimes	11	13	0.57	0.225
	Often	31	21	1.00	0.998
Had a break during work	No	9	1	7.14	0.065
	Yes*	92	73	1.00	
Had extra work during last 3 years alongside current job	No	77	65	0.44	0.057
	Yes*	24	9	1.00	
Possibilities for change in work	Yes to large extent*	15	7	1.00	
	To a certain extent	40	37	0.50	0.181
	To a small extent	10	5	0.93	0.923
	Not at all	36	25	0.67	0.450

	Yes to large extent*	14	18	1.00	
Possibilities to learn something new in work	To a certain extent	44	34	1.66	0.229
	To a small extent	13	5	3.34	0.058
	Not at all	30	17	2.27	0.080
Carry out each work each day	Similar way*	49	38	1.00	
	Certain variation	42	29	1.12	0.720
	Large variation	10	7	1.11	0.849
Work tempo	Varying*	11	23	1.00	
	Low	19	7	5.89	< 0.001
	Modest	40	33	2.53	0.033
	High	31	11	5.67	0.003
Pressure in work	Whole time*	2	1	1.00	
	Often	14	4	1.75	0.678
	Sometimes	33	25	0.66	0.740
	Never	52	44	0.59	0.672
Work requires to work fast	No*	53	37	1.00	
	Yes	48	35	0.96	0.888
Work requires to work hard	No*	56	41	1.00	
	Yes	45	31	1.06	0.845
Work requires large work effort	No*	57	41	1.00	
	Yes	44	31	1.02	0.947
Have sufficient time to keep up with work	No*	7	2	1.00	
	Yes	94	70	0.38	0.241
How physically strenuous was work 5 years ago	Easy*	23	16	1.00	
	Somewhat trying	21	25	0.58	0.222
	Trying	33	27	0.85	0.697
	Very trying	32	22	1.01	0.978
Working time	Sat down during work	Less than half*	71	44	1.00
		More than half	41	46	0.55
	Work at screen	Less than half*	104	80	1.00
		More than half	8	8	0.77
	Vibrating floor	Less than half*	103	84	1.00
		More than half	10	5	1.63
Vibrating hand-held machinery	Less than half*	109	88	1.00	
	More than half	4	1	3.23	0.298
Bending or turning in the same fashion during work	No*	55	63	1.00	
	Yes	58	27	2.46	0.002
Lumbar load (carrying objects that weight 5-15kg)	No*	58	76	1.00	
	Yes	55	18	4.00	0.000
Lumbar load (carrying objects that weight >15kg)	No*	60	77	1.00	
	Yes	53	17	4.00	< 0.001

* reference group

Table 2. Multiple logistic regression of developing lumbar disk herniation among patients more than 40 years old (n = 112)*

Predictors		Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p value
Sleeping on a hard bed	No*	1.00	1.00	0.018
	Yes	0.41 (0.24-0.72)	0.23 (0.07-0.78)	
Family history	No*	1.00	1.00	0.046
	Yes	4.39 (1.70-11.29)	5.94 (1.04-34.10)	
Satisfied with working time	No	1.73 (0.84-3.56)	4.09 (1.13-14.77)	0.031
	Yes*	1.00	1.00	
Lumbar load (carrying objects that weight >15kg)	No*	1.00	1.00	< 0.001
	Yes	4.00 (2.10-7.60)	9.68 (2.91-32.18)	
Work tempo	Varying*	1.00	1.00	0.002
	Low	5.89 (2.18-15.93)	21.91 (3.22-149.03)	
	Modest	2.53 (1.08-5.95)	6.56 (1.34-32.07)	
	High	5.67 (1.84-17.49)	18.43 (2.80-121.27)	
Age		0.98 (0.96-1.00)	0.92 (0.86-0.99)	0.031

*Hosmer-Lemeshow goodness-of-fit test p value is 0.423 for the model.

Figure 1: Q-norm plot of height (cm)

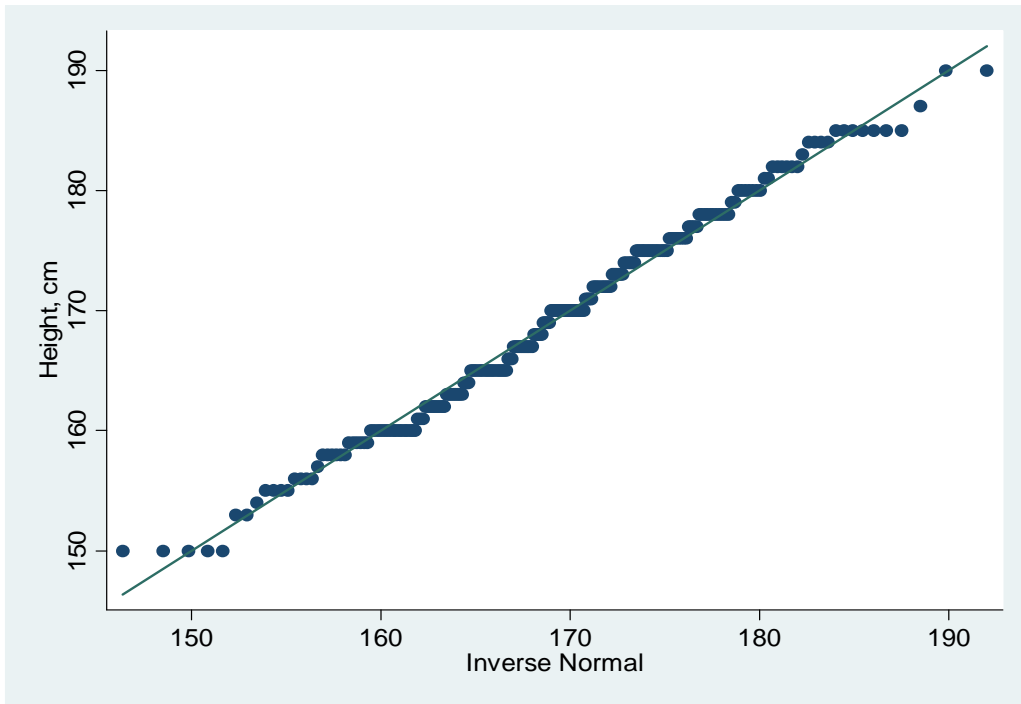
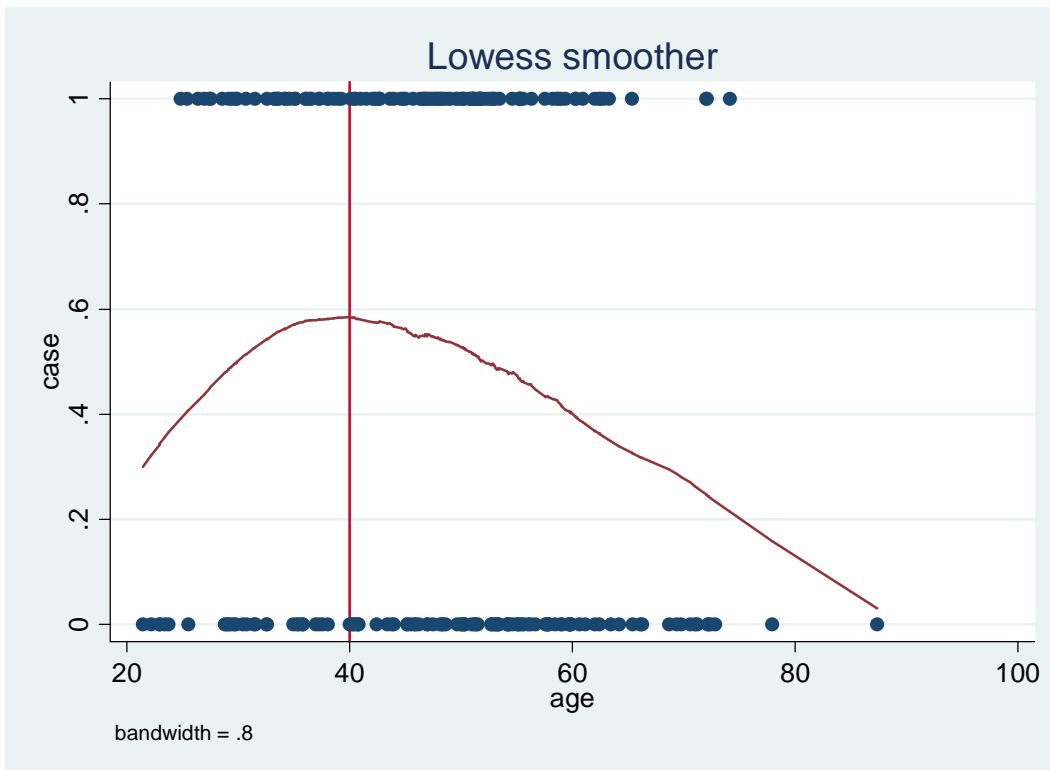


Figure 2: Lowess smoother for age (years)



Appendices

Appendix 1. Risk factors of development of lumbar disc herniation from different studies

Risk factors	RR (95% CI)	OR (95% CI)
Family history		3.6 (1.93-6.53)
High triglycerides		1.92 (1.04-3.55)
High blood pressure	1.25 (1.11-1.41)	
High cholesterol	1.26 (1.10-1.44)	2.28 (1.14-4.55)
High LDL cholesterol		2.12 (1.11-4.05)
Increased carotid intima-media thickness		1.6 (1.10-2.30)
Diabetes	1.52 (1.17-1.98)	
Having a parent who suffered a myocardial infarction before age of 60	1.13 (1.02-1.26)	
Physical exercise and sport (protective)		0.5 (0.24-0.77)
Hard bed (protective)		0.4 (0.21-0.63)
Lumbar load		2.1 (1.72-2.64)
Smoking	1.1 (1.00-1.20)	
References: [11-15]		

Appendix 2. Interview instruments (English and Armenian versions)

English Version	questionnaire # _____	ID# _____	Case <input type="checkbox"/> Control <input type="checkbox"/>
Date of interview _____ (dd/mm /yy)			
Beginning of interview _____ (hh/mm) end of interview _____ (hh/mm)			
ONLY for CASES			
Date of surgery _____ (dd/mm /yy)			

1. What is your date of birth? ____/____/____ 99. Refused to answer

2. Circle gender of respondent (*Ask only if unable to identify.*)

0. Male 1. Female

3. What is your level of education?

1. Incomplete secondary (up to 8 years)

2. Complete secondary (up to 10 years)

3. College (2 years)

4. Institute/ university (5-6)

5. Postgraduate

6. Other (please, specify) -----

88. Don't know

99. Refused to answer

4. What is your marital status?

1. Single

2. Married

3. Divorced

4. Widowed

99. Refused to answer

5. How many people live in your family, including you?

.....

1. 99. Refusal

6. What is your average weight in kg?

.....

88. Don't know

99. Refusal

6a. What is your average weight before diagnosis?

.....

88. Don't know

99. Refusal (FOR CASES ONLY)

7. What is your average height in cm?

.....

88. Don't know 99. Refusal

8. Did any of your parents, brothers or sisters or children ever have problem of spine (lumbar disc herniation).

1. Yes 0. No 88. Don't know 99. Refused to answer

9. Did any of your parents suffer a myocardial infarction before age of 60?

1. Yes 0. No 88. Don't know 99. Refused to answer

10. Have you ever been diagnosed with diabetes?

1. Yes 0. No 88. Don't know 99. Refused to answer

11. Have you ever been diagnosed with high blood pressure?

1. Yes 0. No 88. Don't know 99. Refused to answer

12. Have you ever been diagnosed with any heart condition (angina, infarct)?

1. Yes 0. No 88. Don't know 99. Refused to answer

13. Have you ever injured your lower back due to an accident or similar and as a consequence had pain which has continued for at least seven days?

1. Yes If yes, then how many times? _____
2. No
99. Refused to answer

In the following questions, we ask you to pick one number from 1 to 7, that best describes your situation, where 1 is very bad and 7 is very good

Overall, what do you think about (14-20) Very bad Very good

	1	2	3	4	5	6	7
14. Your accommodation							
15. Household finances							
16. Housework							
17. Contact with friends							
18. Contact with relatives							

19. Who is your current employer (before diagnosis FOR CASES)? (If Not working then go to question 36)

0. Not working
1. Government authority
2. Private company/organization
3. Self-employed (including farming and seasonal work)
4. Other: _____
99. Refused to answer

20. What is your occupation?

- 99. Refused to answer

21. What are your normal working hours in your present job (before diagnosis FOR CASES)?

1. Day work (between 6:00 to 18:00)
2. Evening work (between 18:00 to 22:00)
3. Night work (between 22:00 to 6:00)
4. Other: _____
99. Refused to answer

22. How many hours per week you are working (before diagnosis FOR CASES)?

- _____
99. Refused to answer

23. Are you satisfied with your current working time (before diagnosis FOR CASES)?

1. Yes
2. No
99. Refused to answer

24. Do you ever work overtime in your current job (before diagnosis FOR CASES)?

1. Never or seldom work overtime
2. Work overtime a few times per month
3. Often work overtime
99. Refused to answer

25. Do you have any breaks during your work time (before diagnosis FOR CASES)?

1. Yes
2. No
99. Refused to answer

26. Have you at any time during the last 3 years had any extra work alongside your current job (employment) (preceding diagnosis FOR CASES)?

1. Yes
2. No
99. Refused to answer

27. Do possibilities exist at work for changes in your work, e.g. swapping work tasks with a colleague or some form of job rotation (before diagnosis FOR CASES)?

1. Yes, to a large extent
2. To a certain extent
3. To a small extent
4. No, not at all
99. Refused to answer

28. Does work give you the possibility to learn something new and to develop in your occupation (before diagnosis FOR CASES)?

1. Yes, to a large extent
2. To a certain extent
3. To a small extent
4. No, not at all
99. Refused to answer

29. How do you carry out your work tasks each day (before diagnosis FOR CASES)?

1. In a similar way each day
2. With certain variations in work tasks from day to day
3. With large variations in work tasks from day to day
99. Refused to answer

30. What is typical tempo in your present job on a normal work day (before diagnosis FOR CASES)?

1. A high and constant work tempo throughout the whole day
2. A modest and even work tempo throughout the whole day
3. A low and constant work tempo throughout the whole day
4. A varying work tempo with certain periods of high tempo, and others with modest and low tempo during work days
5. Other: _____

99. Refused to answer

31. Do you have such time pressure in your work that makes it difficult to keep up with your work tasks (before diagnosis FOR CASES)?

- 1. Almost the whole time
- 2. Often
- 3. Sometimes
- 4. Never
- 99. Refused to answer

	1. Yes, often	2. Yes, sometimes	3. No, seldom	4. No, almost never	99. Refused to answer
32. Does your job require that you work very fast (before diagnosis FOR CASES)?	1	2	3	4	99
33. Does your job require that you work very hard (before diagnosis FOR CASES)?	1	2	3	4	99
34. Does your job require too large a work effort (before diagnosis FOR CASES)?	1	2	3	4	99
35. Do you have sufficient time to be able to keep up with your work tasks (before diagnosis FOR CASES)?	1	2	3	4	99

36. How physically strenuous did/do you normally find your work to be at present, 5, 10, 15 and 20 years ago? Please pick one number from 6 to 20, that best describes your situation, where 6 means no effort at all, e.g. lying on a bed and 20 is maximum effort, e.g. running as fast as you can for a longer distance.

	At present	5 years ago	10 years ago	15 years ago	20 years ago
_ Not working	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>
6	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>
7 Very, very easy	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>
8	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>
9 Very easy	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>
10	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>
11 Quite easy	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>
12	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>
13 Somewhat trying	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>
14	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>
15 Trying	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>
16	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>
17 Very trying	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>
18	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>
19 Very, very trying	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>
20	20 <input type="checkbox"/>	20 <input type="checkbox"/>	20 <input type="checkbox"/>	20 <input type="checkbox"/>	20 <input type="checkbox"/>
Refused to answer	99 <input type="checkbox"/>	99 <input type="checkbox"/>	99 <input type="checkbox"/>	99 <input type="checkbox"/>	99 <input type="checkbox"/>

Next few questions are about your work conditions at present, 5, 10, 15 and 20 years ago.

1. Not at all
2. 1/4 of the time
3. 1/2 of the time
4. 3/4 of the time
5. Whole time
6. Not working
99. Refused to answer

37. How large a part of your working day has/had been working where you sat down to do your job?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
38. How large a part of your day do/did you work at screen (e.g. a computer screen or similar)?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
39. How large a part of your day do/did you work on a floor or seat that vibrates/vibrated (e.g. car, boat, flying, tractor, and truck)?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
40. How large of your working day do/did you work with hand-held machinery that vibrates/vibrated or shakes/shook (e.g. drilling machine, grinder, rivet gun etc.)?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99

For Q# 41-43

1. Almost never/never
2. 1-3 days per month
3. 1 day per week
4. 2-4 days per week
5. Every working day
6. Not working

For Q# 44 & 45

1. Almost never/never
2. 1-3 days per month
3. 1 day per week
4. 2-4 days per week
5. 5 days or more per week
99. Refused to answer

99. Refused to answer 0. Not addressed

41. In your work, do/did you have to bend or turn round in the same fashion for a number of times each hour?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
42. Do/did you lift or carry objects that weigh roughly 5-15 kg?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
43. Do/did you lift or carry objects that weigh more than 15 kg?	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
To what extent have you undertaken the following activities at the following time points? 44. Regular modest exercise? Modest exercise is considered to be sport, fitness training or strenuous spare-time activities for at least 15-20 minutes at a time, so that you get a little warm (e.g. jogging, cycling, gymnastics, dancing, tennis, riding or similar)	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
45. Regular hard exercise? Hard exercise is considered to be fitness training or physically strenuous spare-time activities for at least 15-20 minutes at a time, so that you become breathless (e.g. jogging, cycling, gymnastics, football, handball running or similar)	At present	5 years ago	10 years ago	15 years ago	20 years ago
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
		0	0	0	

46. Do/did you take part in sports competitions?

- 1. Yes
- 2. No
- 99. Refused to answer

Type(s) _____

When

- Now
- 5 years ago
- 10 years ago
- 15 years ago
- 20 years ago

47. Do you have difficulty in sleeping or waking up?

- 1. Never
- 2. Seldom / a few times a year
- 3. Sometimes / a few times a month
- 4. Quite often / a few times a week
- 5. The whole time / every day
- 99. Refused to answer

48. Did you sleep on the hard surface before diagnosis (now for controls)?

- 1. Yes
- 0. No
- 99. Refused to answer

49. How often do you have a drink containing alcohol?

- 1. Never
- 2. Monthly or less
- 3. 2 or 4 times a month
- 4. 2 or 3 times per week
- 5. 3 or more times per week

50. On the days that you drink, about how many drinks do you usually have each day?

- 1. One, e.g. 1 cup of wine, or 1 bottle of beer or 1 little cup of cognac, vodka or liquor
- 2. Two
- 3. 3-5
- 4. 6-9
- 5. 10 and more

51. Are you a current or former smoker?

- 0. No
- 1. Yes, Current
- 2. Yes, Former

How many cigarettes per day _____

Duration _____ years

Thank you for your participation!

Armenian Version Հարցաթերթիկ # _____ SՀ# _____ Պարագա Վկա

Հարցման ամսաթիվը _____ (օր/ամիս/տարի)

Հարցման սկիզբ _____ (ժամ/րոպե) Հարցման ավարտ _____
(ժամ/րոպե)

Միայն պարագաների համար

Վերահատույթի ամսաթիվը _____ (օր/ամիս/տարի)

1. Ձեր ծննդյան ամսաթիվը ____/____/____ 99. Մերժում

2. Ձեր սեռը (*հարցնել միայն չհայտնաբերելու դեպքում*)

0. Արական 1. Իգական

3. Ո՞րն է Ձեր կրթության մակարդակը:

1. թերի միջնակարգ (10 տարուց պակաս)

2. միջնակարգ (10 տարի)

3. միջին մասնագիտական (12 տարի)

4. ինստիտուտ/ համալսարան (15-16 տարի)

5. հետդիպլոմային (գիտ. Թեկնածու)

6. այլ (խնդրում եմ, որ նշեք) -----

88. Չգիտեմ

99. Մերժում

4. Նշեք ձեր ամուսնական կարգավիճակը:

1. միայնակ

2. ամուսնացած

3. ամուսնալուծված

4. այրի/ ամուրի

99. Մերժում

5. Ձեր հետ միասին քանի՞ մարդ է ապրում ձեր ընտանիքում:

.....

99. Մերժում

6. Ձեր միջին քաշը:

.....

88. Չգիտեմ

99. Մերժում

6a. Ձեր միջին քաշը ախտորոշումից առաջ
(ՄԻԱՅՆ ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ):

.....

88. Չգիտեմ

99. Մերժում

7. Ձեր միջին հասակը:

.....

88. Չգիտեմ 99. Մերժում

8. Ձեր ծնողներից, եղբայր և քույրերից, կամ երեխաներից որևէ մեկը ունեցե՞լ է ողնաշարի խնդիրները (գոտկային հատվածի ճողվածք):

1. Այո 0. Ոչ 88. Չգիտեմ 99. Մերժում

9. Ձեր ծնողներից որևէ մեկը ունեցե՞լ է սրտամկանի ինֆարկտ մինչև 60 տարեկան հասակը:

1. Այո 0. Ոչ 88. Չգիտեմ 99. Մերժում

10. Դուք երբևէ ունեցե՞լ եք շաքարային դիաբետ:

1. Այո 0. Ոչ 88. Չգիտեմ 99. Մերժում

11. Դուք երբևէ ունեցե՞լ եք բարձր զարկերակային ճնշում:

1. Այո 0. Ոչ 88. Չգիտեմ 99. Մերժում

12. Դուք երբևէ ունեցե՞լ եք որևէ սրտային հիվանդություն (ստենոկարդիա,ինֆարկտ):

1. Այո 0. Ոչ 88. Չգիտեմ 99. Մերժում

13. Դուք երբևէ վնասե՞լ եք Ձեր մեջքի ստորին հատվածը, որի հետևանքով ունեցել եք ցավեր որոնք շարունակվել են ամենաքիչը 7 օր:

1. Այո Եթե այո, ապա քանի անգամ? _____
2. Ոչ
99. Մերժում

Հետևյալ հարցերում Ձեզ կխնդրեմ ընտրել 1-ից 7 թվերից մեկը, որը ամենաճիշտ ձևով կբնորոշի Ձեր իրավիճակը, որտեղ 1-ը «շատ վատ»-ն է, իսկ 7-ը «շատ լավ»-ը
Ընդհանուր առմամբ, դուք ինչ կարծիք ունեք(14-20)

	Շատ վատ				Շատ լավ			
14. Ձեր բնակարանային պայմանների մասին	1	2	3	4	5	6	7	
15. Ընտանեկան բյուջեի մասին	1	2	3	4	5	6	7	
16. Տանը կատարվող աշխատանքների մասին	1	2	3	4	5	6	7	
17. Ընկերների հետ շփվելու մասին	1	2	3	4	5	6	7	
18. Բարեկամների հետ շփվելու մասին	1	2	3	4	5	6	7	

19. Ո՞վ է հիմա Ձեր գործատուն (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):
(Եթե Ձեմ աշխատում ապա անցնել 36 հարցին)

0. Չեմ աշխատում
1. Պետական մարմինները
2. Սեփական կազմակերպություն (օր. ՄՊԸ)
3. Սեփական գործ (ներառյալ հողագործությունը և սեզոնային աշխատանքը)
4. Ուրիշ: _____
99. Մերժում

20. Ի՞նչ եք դուք աշխատում:

-
99. մերժում

21. Որո՞նք են Ձեր աշխատանքային ժամերը (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

1. Ցերեկային աշխատանք (6:00-ից 18:00)
2. Երեկոյան աշխատանք (18:00-ից 22:00)
3. Գիշերային աշխատանք (22:00-ից 6:00)
4. Ուրիշ: _____
99. Մերժում

22. Շաբաթական քանի՞ ժամ եք դուք աշխատում (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ): _____

23. Դուք բավարարվա՞ծ եք ձեր ներկայիս աշխատանքային ժամերով (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

1. Այո
2. Ոչ
99. Մերժում

24. Դուք երբևէ արտաժամ աշխատու՞մ եք Ձեր ներկայիս աշխատանքում (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Երբեք կամ հազվադեպ
- 2. Ամիսը մի քանի անգամ
- 3. Հաճախ
- 99. Մերժում

25. Ձեր աշխատանքի ընթացքում ընդմիջումներ ունե՞ք (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Այո
- 2. Ոչ
- 99. Մերժում

26. Վերջին 3 տարվա ընթացքում Ձեր աշխատանքին զուգահեռ ունեցե՞լ եք հավելյալ աշխատանք (ախտորոշումից առաջ ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ):

- 1. Այո
- 2. Ոչ
- 99. Մերժում

27. Ձեր աշխատանքում կա՞ն փոփոխությունների հնարավորություններ, օր. հանձնարարության փոխանակում աշխատակցի հետ (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Այո, շատ են հնարավորությունները
- 2. Որոշ հնարավորություն կա
- 3. Քիչ են հնարավորությունները
- 4. Ոչ, այդպիսի հնարավորություն չկա
- 99. Մերժում

28. Ձեր աշխատանքը հնարավորությու՞ն տալիս է նոր բաներ սովորել և առաջ գնալ մասնագիտության մեջ (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Այո, շատ են հնարավորությունները
- 2. Որոշ հնարավորություն կա
- 3. Քիչ են հնարավորությունները
- 4. Ոչ, այդպիսի հնարավորություն չկա
- 99. Մերժում

29. Ինչպե՞ս եք իրականացնում Ձեր աշխատանքային հանձնարարությունները ամեն օր (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Իրար նման ամեն օր
- 2. Որոշակի տարբերություններով օրից օր
- 3. Մեծ տարբերություններով օրից օր
- 99. Մերժում

30. Նորմալ աշխատանքային օրվա ընթացքում ինչպիսի՞ն է Ձեր աշխատանքի տեմպը (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Բարձր և հաստատուն տեմպ ամբողջ օրը
- 2. Միջին և հավասար տեմպ օրվա ընթացքում
- 3. Ցածր և հաստատուն տեմպ ամբողջ օրը
- 4. Փոփոխվող տեմպ, արագ, միջին և ցածր տեմպ օրվա ընթացքում
- 5. Ուրիշ: _____
- 99. Մերժում

31. Ձեր աշխատանքում առկա՞ է այնպիսի ժամանակի ճնշում /ժամանակի սահմանափակումներ/, որ դժվարացնում է Ձեր պարտականությունների կատարումը (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):

- 1. Համարյա անընդհատ
- 2. Հաճախ
- 3. Երբեմն
- 4. Երբեք
- 99. Մերժում

	1. Այո, հաճախ	2. Այո, երբեմն	3. Ոչ, հազվադեպ	4. Ոչ, համարյա երբեք	99. Մերժում
32. Ձեր աշխատանքը պահանջու՞մ է, որ Դուք աշխատեք շատ արագ (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):	1	2	3	4	99
33. Ձեր աշխատանքը պահանջու՞մ է որ Դուք աշխատեք շատ եռանդուն (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):	1	2	3	4	99
34. Ձեր աշխատանքը շա՞տ ջանք է պահանջում (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):	1	2	3	4	99
35. Դուք բավարար ժամանակ ունե՞ք Ձեր աշխատանքը կատարելու համար (ՊԱՐԱԳԱՆԵՐԻ ՀԱՄԱՐ ախտորոշումից առաջ):	1	2	3	4	99

36. Ինչքա՞ն էք ֆիզիկապես ակտիվ համարում Ձեր աշխատանքը ներկայումս, 5, 10, 15 և 20 տարի առաջ: Խնդրում եմ ընտրեք 6-ից 20 թվերից մեկը, որը ամենաճիշտ ձևով կբնորոշի Ձեր իրավիճակը, որտեղ 6-ը ակտիվության բացակայությունն է, օր. Հանգիստ պատկերը, իսկ 20-ը մաքսիմալ ջանքերը, օր. արագ վազքը երկար տարածություն:

	Ներկայումս	5 տարի առաջ	10 տարի առաջ	15 տարի առաջ	20 տարի առաջ
_ Չի աշխատում	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>	0 <input type="checkbox"/>
6	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>
7 Շատ, շատ հեշտ	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>
8	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>	8 <input type="checkbox"/>
9 շատ հեշտ	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>	9 <input type="checkbox"/>
10	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>	10 <input type="checkbox"/>
11 Բավականին հեշտ	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>	11 <input type="checkbox"/>
12	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>	12 <input type="checkbox"/>
13 Որոշ չափով դժվար	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>	13 <input type="checkbox"/>
14	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>	14 <input type="checkbox"/>
15 Դժվար	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>	15 <input type="checkbox"/>
16	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>	16 <input type="checkbox"/>
17 Շատ դժվար	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>	17 <input type="checkbox"/>
18	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>	18 <input type="checkbox"/>
19 Շատ, շատ դժվար	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>	19 <input type="checkbox"/>

20	20 □	20 □	20 □	20 □	20 □
Մերժում	99 □	99 □	99 □	99 □	99 □

Հաջորդ մի քանի հարցերը Ձեր աշխատանքի միջավայրի մասին են ներկայումս, 5, 10, 15 և 20 տարի առաջ:

1. Ամեննից ոչ
2. Ժամանակի 1/4 մասը
3. Ժամանակի 1/2 մասը
4. Ժամանակի 3/4 մասը
5. Ամբողջ ժամանակը
6. Չի աշխատում
99. □ Մերժում

37. Ձեր աշխատանքային օրվա ^օ n ր մասն եք նստած աշխատում:	Ներկայումս	5 տարի առաջ	10 տարի առաջ	15 տարի առաջ	20 տարի առաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
38. Ձեր աշխատանքային օրվա ^օ n ր մասն եք աշխատում էկրանի մոտ (օր. համակարգչի էկրան):	Ներկայումս	5 տարի առաջ	10 տարի առաջ	15 տարի առաջ	20 տարի առաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
39. Ձեր աշխատանքային օրվա ^օ n ր մասն եք աշխատում տատանվող մակերեսի վրա (օր. մեքենայում, նավում և այլն):	Ներկայումս	5 տարի առաջ	10 տարի առաջ	15 տարի առաջ	20 տարի առաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99
40. Ձեր աշխատանքային օրվա ^օ n ր մասն եք աշխատում ձեռքի տատանվող կամ ցցնցվող մեխանիզմներով (օր. Հորատման մեքենա և այլն):	Ներկայումս	5 տարի առաջ	10 տարի առաջ	15 տարի առաջ	20 տարի առաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	99	99	99	99	99

41-43 հարցեր

1. Համարյա երբեք
2. Ամսում 1-3 օր

44 և 45 հարցեր

1. Համարյա երբեք
2. Ամսում 1-3 օր

- 3. Շաբաթը 1 օր
- 4. Շաբաթը 2-4 օր
- 5. Ամեն աշխ. օր
- 6. Չի աշխատում
- 99. Մերժում

- 3. Շաբաթը 1 օր
- 4. Շաբաթը 2-4 օր
- 5. Շաբաթը 5 օր և ավել
- 99. Մերժում
- 0. Չի վերաբերվում

41. Ձեր աշխատանքում Դուք նույն ձևով թերվում կամ կռանու՞մ եք մի քանի անգամ մեկ ժամում:	Ներկայումս	5 տարի անաջ	10 տարի անաջ	15 տարի անաջ	20 տարի անաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
42. Դուք բարձրացնում կամ կրո՞ւմ եք բեռներ որոնք կշռում են 5-15 կգ:	Ներկայումս	5 տարի անաջ	10 տարի անաջ	15 տարի անաջ	20 տարի անաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
43. Դուք բարձրացնում կամ կրո՞ւմ եք բեռներ որոնք կշռում են ավելի քան 15 կգ:	Ներկայումս	5 տարի անաջ	10 տարի անաջ	15 տարի անաջ	20 տարի անաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
Որքա՞ն եք կատարել հետևյալ վարժությունները նշված ժամանակաշրջաններում: 44. Կանոնավոր չափավոր վարժություն: Չափավոր մարմնամարզություն է համարվում սպորտային, ֆիտնես մարզումները կամ եռանդուն գործողությունները կատարված ամենաքիչը 15-20 րոպե անընդմեջ, այնպես որ թեթև շոգեք (օր. վազք, հեծանվավազք, մարմնամարզություն, պար, թենիս և այլն նման գործողություններ)	Ներկայումս	5 տարի անաջ	10 տարի անաջ	15 տարի անաջ	20 տարի անաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99
45. Կանոնավոր ծանր վարժություն: Ծանր մարմնամարզություն է համարվում սպորտային, ֆիտնես մարզումները կամ եռանդուն գործողությունները կատարված ամենաքիչը 15-20 րոպե անընդմեջ, այնպես որ Ձեր շունչը կտրվի (օր. Վազք, Հեծանիվ քշելը, մարմնամարզության, ֆուտբոլ խաղալը և այլն նման	Ներկայումս	5 տարի անաջ	10 տարի անաջ	15 տարի անաջ	20 տարի անաջ
	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	99	99	99	99	99

սպորտաձևեր)			0	0	0
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46. Մասնակցե՞լ եք սպորտային մրցությունների:

- 1. Այո
- 2. Ոչ
- 99. Մերժում

Տեսակ(ներ)ը, _____
է՞րբ

- այժմ
- 5 տարի առաջ
- 10 տարի առաջ
- 15 տարի առաջ
- 20 տարի առաջ

47. Դուք ունեցե՞լ եք դժվարություններ քնելու կամ արթնանալու հետ կապված:

- 1. Երբեք
- 2. Հազվադեպ / տարին մի քանի անգամ
- 3. Երբեմն / ամիսը մի քանի անգամ
- 4. Հաճախ / շաբաթը մի քանի անգամ
- 5. Անընդհատ / ամեն օր
- 88. Չգիտեմ
- 99. Մերժում

48. Դուք կոշտ մակերեսի վրա՞ եք քնել ախտորոշումից առաջ (վկաների համար հիմա):

- 1. Այո
- 0. Ոչ
- 99. Մերժում

49. Ի՞նչ հաճախականությամբ եք դուք օգտագործում խմիչք որը պարունակում է ալկոհոլ:

- 1. Երբեք
- 2. Ամիսը մեկ կամ ավելի քիչ
- 3. Ամիսը 2-4 անգամ
- 4. Շաբաթը 2-3 անգամ
- 5. Շաբաթը 3 կամ ավելի անգամ
- 99. Մերժում

50. Ալկոհոլ օգտագործելիս, քանի՞ բաժին ոգելից խմիչք եք Դուք սովորաբար խմում:

- 1. 1 օր.՝ 1 բաժակ գինի, կամ 1 շիշ գարեջուր, կամ 1 փոքր բաժակ կոնյակ, օղի կամ լիկյոր
- 2. 2
- 3. 3-5
- 4. 6-9
- 5. 10 կ ավելի
- 99. Մերժում

51. Դուք ներկայումս կամ նախկինում ծխե՞լ եք:

- 0. Ոչ Այո 1. Ներկայումս 2. Նախկին

Քանի՞ սիգարետ օրական _____

Որքան ժամանակ _____ տարի

Շնորհակալություն մասնակցության համար!

Appendix 3. Oral consent forms (English and Armenian versions)

Oral consent form for telephone interview

Title of Research Project:

Risk factors of developing lumbar disc herniation in Armenia

Explanation of Research Project:

Dear ___ Mr /Ms_____, my name is Hayk Davtyan. I am a graduate student in the Master of Public Health Program at the American University of Armenia and graduate student in the Department of General Medicine at the Yerevan State Medical University. I am asking you to take part in a research study that College of Health Sciences at AUA is conducting to identify the risk factors of developing lumbar disc herniation. The aim of this research is finding ways to reduce the rates of lumbar disc herniation. The research is conducted under the supervision of faculty at the American University of Armenia. You have been included in the project since you are one of the randomly selected patients, who are registered in the Michaelyan Institute of Surgery. Your name was obtained from the records maintained by this hospital. The administration of Michaelyan Institute of Surgery agreed to support this project. Your participation would be highly valuable for us. The interview will take approximately 20 minutes of your time.

Risk/Benefits:

This study does not involve any kind of risks. Participation or refusal will not affect the medical care you receive. You will not receive any incentives, financial or other direct benefits. However, the obtained information will help us to explore the risk factors for developing lumbar disc herniation in Armenia, and develop prevention programs.

Confidentiality:

The information that you share will be confidential. Please, be assured that your name and phone number will not be related to the information you provide. Only I have access to the list of names and phone numbers of the study participants and this information is kept locked; this list will be destroyed as soon as I finish data collection. Your name and address will not be presented in the questionnaire. Any information that you provide will be kept confidential and only aggregated data will be presented in the final report.

Voluntariness:

Your participation is absolutely voluntary. You can stop participating in the interview any time you want, or you can skip any questions you want. You can freely express any opinion. Participation or refusal will not affect the medical care you receive and will not have any other consequences.

Whom to contact:

If you need more information about the study, please do not hesitate to contact Dr. Varduhi Petrosyan, Associate Dean, College of Health Sciences: tel. (010) 51 25 92, e-mail: vpetrosi@aua.am . If you feel that you were not treated fairly or harmed due to this study please call Dr. Hripsime Martirosyan, The Human Research Administrator at AUA: tel. (010) 51 25 61 Thank you in advance.

Oral consent form for telephone interview (Armenian version)

Հետազոտության անվանումը՝

Գոտկային հատվածի ողնաշարի ճողվածքի զարգացման ռիսկի գործոնները
Հայաստանում

Հետազոտության բացատրությունը՝

Բարև Ձեզ, Իմ անունն է Հայկ Դավթյան: Ես Հայաստանի ամերիկյան համալսարանի Հանրային առողջապահության մագիստրոսի ծրագրի ավարտական կուրսի ուսանող եմ, ինչպես նաև սովորում եմ Երևանի պետական բժշկական համալսարանի ավարտական կուրսում: Դիմում եմ Ձեզ այս հետազոտությանը մասնակցելու խնդրանքով, (որը Հայաստանի ամերիկյան համալսարանի առողջապահական գիտությունների ֆակուլտետը իրականացնում է հայտնաբերելու ողնաշարի ճողվածքի զարգացման ռիսկի գործոնները Հայաստանում ինչպես նաև հայտնաբերել հիվանդության զարգացման կանխարգելելու միջոցներ: Ձեր անունը պատահականորեն ընտրվել է Երևանի <<Միքայելյան>> վիրաբուժական ինստիտուտի բուժված հիվանդների ցուցակից՝ <<Միքայելյան>> վիրաբուժական ինստիտուտի ղեկավարության կողմից թույլտվություն ստանալուց հետո: Ձեր անունը և հեռախոսահամարը վերցված է այդ հիվանդանոցի արխիվից: Ձեր մասնակցությունը շատ արժեքավոր է մեր համար: Հարցազրույցը կտևի մոտ 20 րոպե:

Ռիսկ/Շահույթ՝

Այս հետազոտությանը մասնակցելով՝ Դուք որևէ ռիսկի չեք դիմում: Մասնակցությունը կամ հրաժարվելը որևէ ձևով չի անդրադառնա Ձեր կամ Ձեր բուժման վրա: Հետազոտությանը մասնակցելու դեպքում Դուք որևէ անձնական շահ չունեք սակայն, հավաքագրված ինֆորմացիան կօգնի մեզ բացահայտել ողնաշարի ճողվածքի զարգացման նպաստող գործոնները Հայաստանում, ինչը կօգնի կանխարգելիչ ծրագրերի զարգացմանը:

Գաղտնիություն՝

Մեզ տրամադրված ինֆորմացիան կպահպանվի գաղտնի: Խնդրում եմ, եղեք վստահ, որ Ձեր անունը և հեռախոսի համարը չի կցվի այն ինֆորմացիային, որը Դուք կտրամադրեք: Միայն հետազոտական թիմին հասանելի կլինի մասնակիցների անունների և հեռախոսահամարների ցանկը, որը կպահպանվի գաղտնի, և կոչնչացվի հետազոտության ավարտից անմիջապես հետո: Ձեր անունը և հասցեն չեն նշվի հարցաթերթիկում, իսկ տրամադրված ինֆորմացիան գաղտնի կպահվի և միայն ընդհանրացված արդյունքները կներկայացվեն զեկույցում:

Մասնակցության իրավունք՝

Ձեր մասնակցությունը ամբողջությամբ կամավոր է: Ցանկացած պահի դուք կարող եք ընդհատել հարցազրույցը կամ հրաժարվել պատասխանել ցանկացած հարց, որին չեք ուզում պատասխանել, որը ոչ մի բացասական հետևանք չի ունենա Ձեր կամ Ձեր բուժման վրա: Դուք կարող եք ազատ արտահայտել Ձեր կարծիքը:

Ում դիմել՝

Եթե դուք ավելի շատ տեղեկատվության կարիք ունեք կապված հետազոտության հետ, կարող եք դիմել Վարդուհի Պետրոսյանին՝ առողջապահական գիտությունների քոլեջի փոխդեկանին, հեռ. (010) 51 25 92: Ինչպես նաև եթե կարծում եք, որ հետազոտության ընթացքում Ձեզ հետ լավ չեն վերաբերվել և/կամ հետազոտությունը Ձեզ վնաս է հասցրել կարող եք զանգահարել Հայաստանի ամերիկյան համալսարան,

Հոփսիմէ Մարտիրոսյանին հետևյալ հեռախոսահամարով՝ (010) 51 25 61; նա հանդիսանում է ՀԱՀ-ի Էթիկայի հանձնաժողովի անդինիստրատորը:

Նախապես շնորհակալություն