

# AMERICAN UNIVERSITY OF ARMENIA

*Master of Public Health Program*

**Thesis Project**

ASSESSMENT OF THE KNOWLEDGE AND PRACTICE OF NON-INSULIN DIABETES PATIENTS LIVING IN DAVIDASHEN DISTRICT OF YEREVAN DURING 1999 ABOUT PREVENTION OF DIABETES COMPLICATIONS

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**YEREVAN 1999**

“Those who suffer losses due to diabetes are not just statistics on a chart. They are people whose talents and wisdom are needed and whose problems deserve our unified efforts. Together we can join to make life more just and more joyful for generations to come”.

David Satcher, MD, PhD, Director CDC and Prevention, 1993-1998

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Artashes Khachatryan

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## ABSTRACT

Davidashen is one of the districts of Yerevan, located in a suburban area. The population is about 50,000 people. It is a newly built district with population of people with different backgrounds.

Diabetes continues growing progressively all over the world. It is classified into two main types: type 1 and type 2. The most common, type 2 affects 90-95% of people with diabetes and usually appears after the age of 40. Diabetes is a major public health problem in Armenia and abroad. In 1995 the absolute number of deaths from diabetes was 917, in 1996 it was 1058, from 1988, the mortality rate increased from 11.72 per 100,000 population to 31.78 in 1998, or 1206 (2). The main risk factors to be considered are knowledge and practice about: physical inactivity, improper diet, and infrequent glucose monitoring

One key informant interview was conducted with the district endocrinologist to reveal insight into shortcomings that type 2 diabetes patients have. It helped also in preparing and designing the questionnaire. After the translation and pretesting of the questionnaire with five patients, some changes were made, and it was administered to, and completed by 68 type 2 diabetes patients out of 142. The list of type 2 diabetes patients who were diagnosed more than 1 year was obtained from the district endocrinologist. Before starting an actual interview, oral consent was obtained from the interviewees. The data were entered and analysed in Epi Info statistical program

Unemployment rate among interviewees was 84%. Many of them had higher education, others more than secondary; some studied less than 8 years. About seventy five percent of interviewed diabetes patients were females. The knowledge and practice of non-insulin dependent diabetes patients living in Davidashen about prevention of diabetes complications were poor. Most diabetes patients never tried to keep their weight under control. In contrast to the latter, more patients tried to follow a diet. Ninety percent of interviewed diabetes patients knew that they were at risk to develop complication. It is worth mentioning that interviewed diabetes patients had low knowledge about what carbohydrate, fat, and protein were. This was associated with education level. Based on the survey it was revealed that 34% of diabetes patients used pastas, potato, and meat frequently. Twenty one out of 68 monitored their blood glucose level at least once a month during the last year.

The following preliminary recommendations are suggested: more research is needed to reveal the attitude of diabetes patients about the risk factors; and to observe social, environmental, epidemiological, and behavioural factors of type 2 diabetes patients; there is a priority need to develop public health education for diabetes patients; different media should be used to reach diabetes patients; train health care providers; the availability and accessibility of health care services to the vulnerable population should be increased; the quality of health care services should be improved, and free drug and diet food distribution for diabetes patients needs to be organised.

## INTRODUCTION

Davidashen is one of the districts of Yerevan, located in a suburban area. The population is about 50,000 people. It is a newly built district and the population consists of people with different backgrounds. People here are poorer than in the centre of the city, and therefore are more susceptible to health problems. Furthermore, the situation is aggravated by poor communication in Davidashen. Hardly five to six people have telephones in a nine-storey building. The latter is another symptom of being in a lower socio-economic strata. The number of diabetes patients living in Davidashen is 250. The number of type 2 registered diabetes patients, diagnosed more than 1 year and living in Davidashen is 142.

Diabetes continues growing progressively all over the world. It is a chronic disorder characterised by a deficiency of insulin secretion and/or insulin effect, which causes hyperglycaemia, disturbances of carbohydrate, fat and protein metabolism, and a constellation of chronic complications (7). Diabetes is a complex, serious, costly and increasingly common disease (14, 15, and 16).

It is classified into two main types: type 1 and type 2. The most common, type 2 affects 90-95% of people with diabetes and usually appears after the age of 40. The other, type 1, affects 5-10% of those with diabetes and most often appears in childhood or the teenage years. Some women develop diabetes during pregnancy. Known as gestational diabetes, this condition occurs in 2-5% of all pregnancies. Other less common types of diabetes, which together may account for 1-2% of all diagnosed cases, result from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illness (1). The etiology of Type 2 diabetes is complex, with genetic, social, physical and environmental factors playing important roles.

Diabetes is a major public health problem in Armenia and abroad. Like other chronic illnesses diabetes also poses many problems for patients and their family members. These problems include hospitalisations, mental and physical disabilities, changes in lifestyle, a lot of resources to be spent.

The impact of diabetes on health status in developing countries has not been well documented but it is clear that there are high levels of acute illness from disorders of glycaemic control, long-term disability from blindness and limb amputation and premature mortality from stroke, coronary heart disease and renal disease. Some studies suggest that improving the quality of preventive services can be the most immediately productive approach to controlling health problems from diabetes.

Today there are more than 36,000 registered diabetic patients in Armenia (2). According to rough estimation the number of patients including not registered, and undiagnosed cases, is about 100,000. About sixteen million people in the United States (5.9% of the American population) have diabetes (13). By 2025, there will be 300 million people with diabetes world-wide. Most of this increase will occur in developing countries and among poorer people (3). In Asia and Africa, experts think the prevalence could double or even triple in the next 12 years (4). Although there is still

emigration from Armenia, the absolute number of deaths from diabetes is increasing. So, in 1995 the absolute number of deaths from diabetes was 917, in 1996 it was 1058, the mortality rate increased from 11.72 per 100,000 population in 1988 to 31.78 in 1998, or 1206 (2). Furthermore, studies indicate that diabetes is generally under-reported on death certificates, particularly in the cases of older persons with multiple chronic conditions such as heart disease and hypertension. Because of this, the toll of diabetes is believed to be much higher than officially reported.

Diabetes imposes a heavy economic burden each year. The American Diabetes Association estimates that the United States spent more than \$98 billion on diabetes in 1997 in direct and indirect costs. Diabetes with its complications kills one American every three minutes (10). Fifty percent of the mortality in the US can be attributed to behavioural or lifestyle causes (8). It is the leading cause of adult blindness, kidney failure, and non-traumatic amputation (5). Diabetes is the leading cause of new cases of blindness among adults aged 20-74 years: twenty five percent of adults with diabetes reported that they are visually impaired (7). Diabetes is a general risk factor for untimely death and makes a significant contribution to overall national death rates, particularly for circulatory disease (17). Persons with diabetes are at significant risk for lower extremity amputations; such procedures are 15 times more common among persons with diabetes than among those without diabetes. Yet if patients whose feet are particularly at risk are aggressively sought out and treated, up to 50% of amputation can be prevented (11).

The data obtained during this study can be used in further development of health educational programs for NIDDP, since the education is one of the key aspects of successful prevention of complication. For example, The Maine Diabetes Control Program arranged a diabetes outpatient education program in more than 30 hospitals and health centres throughout the state. In a 3-year period, this state education program resulted in a 32% reduction in hospital admissions related to diabetes - a savings of \$300 per participant. Or, The Michigan Diabetes Control Program's Upper Peninsula Diabetes Outreach Network established a diabetes care and education program with hospitals, health departments, and home care agencies. Participants in the program experienced a 45% lower rate of hospitalisations, a 31% lower rate of lower - extremity amputations and a 27% lower death rate than non-participants (1).

Being aware of the risk factors, modifying behaviour to prevent diabetes where possible may stem the tide of this disease (6). Assessment of the level of preventive care among persons with diabetes can assist in targeting public health efforts to reduce complication (23). Education is the cornerstone of diabetes management. Lack of education is as dangerous as lack of insulin (12). Training in self-management should be integral to the treatment of diabetes considering medical, psychosocial, and lifestyle issues. Regular exercise and learning new behaviours and attitudes can help facilitate long-term lifestyle changes (7). Not only exercise and diet but also blood glucose monitoring helps to manage effectively the disease.

Results from a recent study in the United Kingdom indicate that intensive treatment to control glucose levels in people with type 2 diabetes significantly reduces the risk of complications more than diet therapy alone. Since 90-95% of people with diabetes has type 2, these findings can help prevent many serious complications. That is why it is important to describe knowledge and behavioural factors, in future beliefs and attitudes which to some extent are changeable and later can be addressed in health education materials.

**PRECEDE** (Predisposing, Enabling, and Reinforcing factors) model will be used as a framework for analysing diabetes preventive behaviours such as changes in exercise, sweet and other food consumption, glucose monitoring, etc to focus on behaviour that is related to health.

There are many factors such as poverty, cultural misconceptions about diseases, scarce health resources, non-availability of drugs and their prohibitive cost which create an environment which is adverse to the optimal management of a chronic lifelong disease like diabetes mellitus.

Many other risk factors for non-insulin-dependent diabetes mellitus (NIDDM), such as obesity, physical inactivity, and high-fat and carbohydrate intake can potentially be modified. Furthermore, some of the metabolic abnormalities, such as insulin resistance and impaired glucose tolerance predict that diabetes can be improved by behaviour modification and drug treatment. Thus, at least to some extent, NIDDM may be preventable. Several small clinical trials have addressed the hypothesis that dietary modification, physical activity, or drug treatment can prevent NIDDM (21).

Behavioural diagnosis is directed toward specific behaviours, but health problems have non-behavioural causes, which also should be carefully considered. These include the personal factors that are least controllable by individual action. Among the least modifiable and controllable factors are genetic predisposition, age, gender, and existing disease, physical and mental impairment, and places of work and residence, which encompass various social and environmental factors beyond the control of the individual (22). Those are also considered to be as independent variables.

**Predisposing factors** relate to the motivation of an individual to act. Such factors can facilitate or hinder behaviour change and include personal sociodemographic, economic characteristics; preventive health practices, knowledge of risk factors, incidence, diagnostic measures, attitudes, beliefs about susceptibility to disease and the benefit of protective action, including control over health matters, attitudes toward treatment, and dependence on providers.

**Enabling factors** are the specific resources and skills necessary to initiate appropriate action, such as financial resources, skill instruction, and method of teaching, and conducive performance environment, less encouragement.

**Reinforcing factors** relate to the supportive environment for behaviour change, this includes the feedback and an influence one receives from others to encourage or discourage behaviour change, and encouragement from health care providers (9).

Not all factors will be addressed during this study given the objectives of the study, also time, human, and financial resources limitation.

### **Main risk factors to be considered**

#### **Knowledge and Practice about:**

- Physical inactivity
- Improper diet
- Infrequent glucose monitoring

The risk factors for non-insulin dependent diabetes mellitus (NIDDM) may be attenuated by modification of obesity, physical activity, and diet. Caloric restriction decreases hyperglycaemia dramatically. Increasing physical activity improves insulin sensitivity acutely and may also contribute to weight loss (27). Blood sugar control is recognized by the American Diabetes Association as the cornerstone for managing diabetes and preventing the serious complications associated with the disease such as heart disease, blindness, kidney failure and limb amputation.

#### **Obstacles to health behaviours:**

- Knowledge or skill deficit
- Other priorities
- Habitual behaviour patterns
- High cost of treatment
- Lack of social support
- Stress and emotion

#### **Assessment should concentrate on:**

- Complications
- Lifestyle, values
- Obstacles to change
- Focus on behaviours not outcomes, i.e. on eating not on weight
- Focus on knowledge

### **Research objectives**

- To determine the current knowledge of type 2 diabetes patients in Davidashen district about diet, glucose monitoring, and physical activity about prevention of diabetes complications

- To determine the current practice of type 2 diabetes patients in Davidashen district about diet, glucose monitoring, and physical activity regarding prevention of diabetes complications
- To assess their awareness about the risk factors of complications
- To determine the association between less educated and more educated patients' knowledge about risk factors of complications
- To make recommendations to researchers, individuals, governmental and non governmental organisations, and the district physician for future development of educational materials

### **The Research questions**

1. What is the base knowledge of type 2 diabetes patients living in Davidashen about prevention of diabetes complications and risk factors?
2. What is the practice of type 2 diabetes patients living in Davidashen regarding prevention of diabetes complications?
3. What is the understanding of type 2 diabetes patients living in Davidashen about controlling risk factors of diabetes complications development?
4. What is the behaviour of type 2 diabetes patients living in Davidashen regarding controlling risk factors of diabetes complication development?
5. Is there a difference between the knowledge of less educated and more educated diabetes patients about risk factors of diabetes complication
6. Is there a difference between behaviours of less educated and more educated diabetes patients about risk factors of diabetes complication

**Target/intervention population-** NIDDP in Davidashen district

**Sample frame-**the list of diabetes patients from the polyclinic

**Sample element/unit-**diabetes patient from whom data are collected

**Sample-**a subset of diabetes patients from whom data are collected

## **METHODOLOGY**

**Inclusion criteria-** people with type 2 diabetes who are diagnosed more than 1 year, 40 years and older, were in the list and living in Davidashen district

**Exclusion criteria-** who do not meet the inclusion criteria

**The study design** is cross-sectional, mainly descriptive.

There was **NO Sampling**, since all type 2 diabetes patients who were in the list and met inclusion criteria were included for face to face interview.

### **Dependent variables**

Knowledge (exposure to previous training), practices, diet, exercise, blood monitoring, smoking, visiting to a health facility. Measurement of dependent variables is relied only on self-reporting and is thereby subject to possible bias.

### **Independent variables**

Demographics (age, gender, location), income, other medical problems, education, employment.

### **Internal validity**

Testing- there was not any test administered before in the district, as verified the district endocrinologist; selection bias- this should not be a concern since there was no selection of groups or sampling; recall bias might have occurred, since the information obtained was mainly based on self-reporting; however, questions were designed so that they would retrieve the information very effectively. The content validity of the questionnaire is assured, since the overwhelming majority of the questions was used from the World Health Organisation standards, "Diabetes needs assessment, 1998, survey done by United Methodist Committee on Relief and Centre for Health Services Research of the American University of Armenia", and Diabetes Knowledge Test, Diabetes Care Profile, where test items were developed during a 1-day consensus conference for tests specific for type 1, type 2 using insulin, and type 2 not using insulin (24).

It would be ideal to test the reliability of the questionnaire, but since the study is mostly about knowledge which could change due to the nature of the questions and therefore make it harder to test the reliability of the questionnaire (i.e. when asked a question about a carbohydrate, an interviewee might go and ask someone to learn, and next time the answer would be different).

### **External validity**

The obtained data might be generalizable, since Davidashen district inhabitants represent a population consisting of people with diverse education backgrounds similar to other districts of Yerevan. Although Davidashen results could represent much of the poorer, less accessible, outlying region of Yerevan. A representative sample from Yerevan would have been preferable. However, this issue was

discussed above and due to limitations of financial, time, and human resources, it was not possible to conduct the study all over Armenia or Yerevan.

### ***Qualitative***

A key informant interview was conducted with the endocrinologist of Davidashen polyclinic, since efforts to improve the care of patients with diabetes need to recognise and address the problems identified by primary care physicians (19). Also it helped a lot during development of some questions in the questionnaire.

### ***Quantitative***

The reason for the quantitative study was to have representative data for future development of health education materials. The interviewer administered the questionnaires with diabetes patients from 16 August, 1999 to 4 September, 1999 in Davidashen district.

The questionnaire was made in English. After that it was translated into Armenian and pretested for some five type 2 diabetes patients in Davidashen for wording, phrasing, and content, Then, some changes were made.

The list of type 2 diabetes patients was obtained from the district endocrinologist.

Out of 142 only 68 face to face interviews were completed. There were 12 dead persons, who considered as ineligible, 36 moved, no forwarding address, 23 considered Not Available (NA), and 3 refusals.

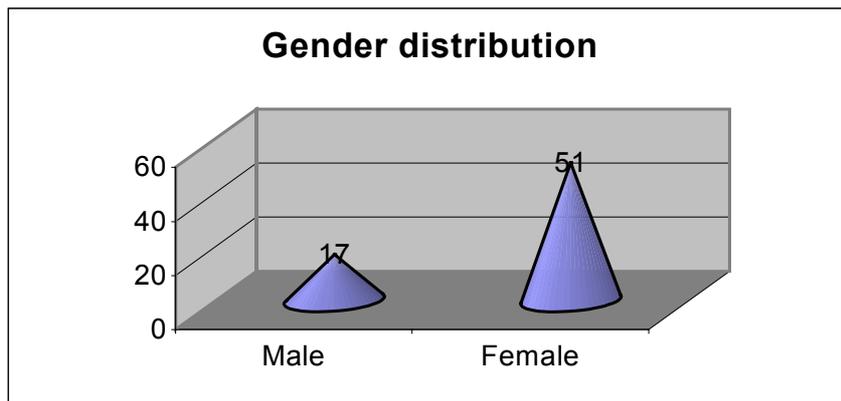
$$\text{RESPONSE RATE} = \frac{\text{\# of completed interviews}}{\text{\# of eligible units}} = \frac{68}{94} = 72\%$$

Those who were not available considered as not available after the second try. Oral consent was obtained from each interviewee before starting an actual interview. Those who were not interviewed for any reason (ineligibles, wrong addresses, refusals, etc) were 48 females and 27 males. The age distribution was almost the same.

Data were entered and analysed in Epi Info statistical program.

## **RESULTS**

It is interesting; however, the majority of interviewees were females. It was expected to have approximately half-female and half-male interviewees. Further analyses will be required to elucidate this issue.



The table below shows that there are less young diabetes patients than old ones. As seen, type 2 diabetes patients living in Davidashen were mainly at the age of around 60 and older.

#### **AGE DISTRIBUTION OF SURVEYED PATIENTS**

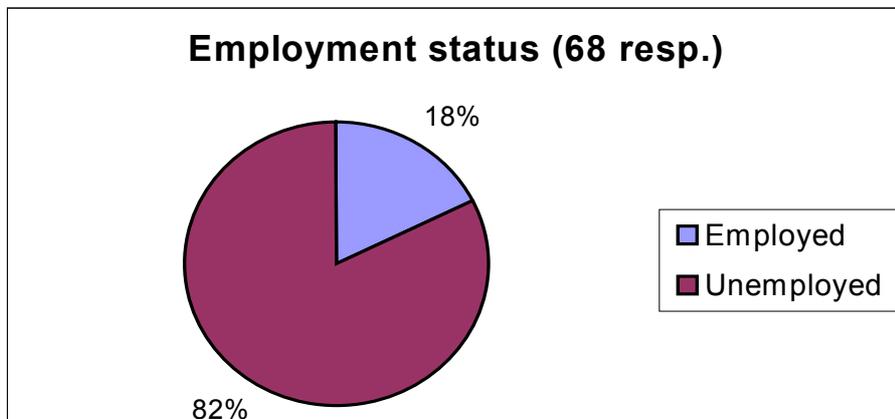
<b>Age distribution of interviewees</b>	<b>Frequency</b>
41-45	5
46-50	6
51-55	5
56-60	10
61-65	16
66-70	14
More than 71 years old	12

As the table below demonstrates there were more patients diagnosed earlier than recently. It could be because of available and accessible screenings before.

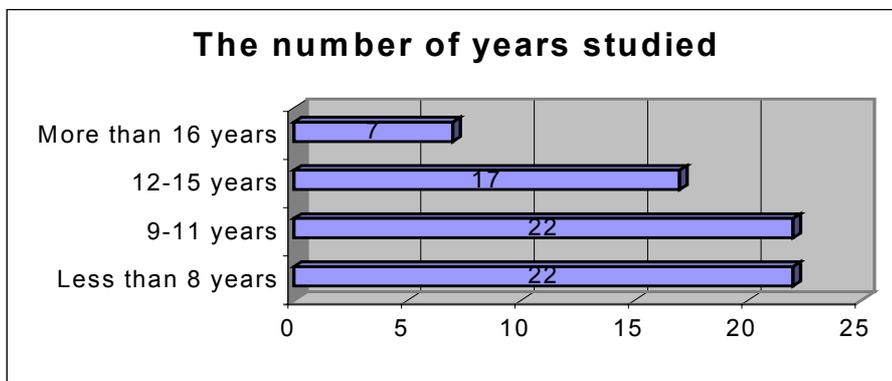
#### **THE NUMBER OF YEARS BEING DIAGNOSED**

<b>The number of years being diagnosed</b>	<b>Frequency</b>
1-5	17
6-10	18
11-15	25
16-20	8

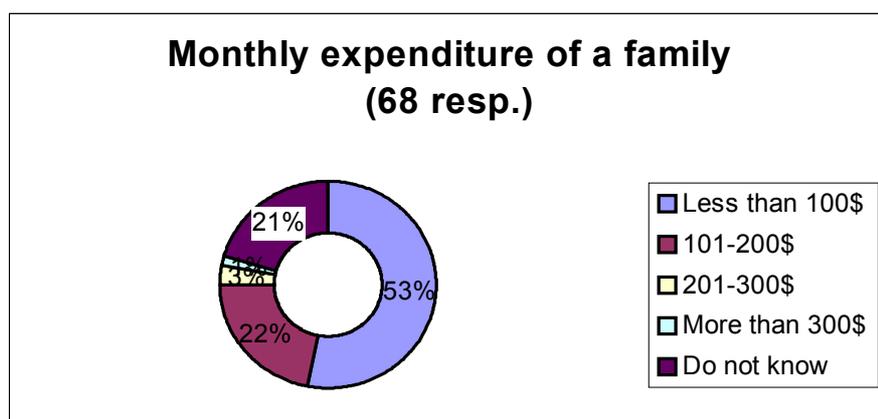
Unemployment rate was very high among interviewed diabetes patients (82%). It can be explained by different factors as age, quality of life, and disability. During the key informant interview with district endocrinologist, the latter said that only about 5% was employed.



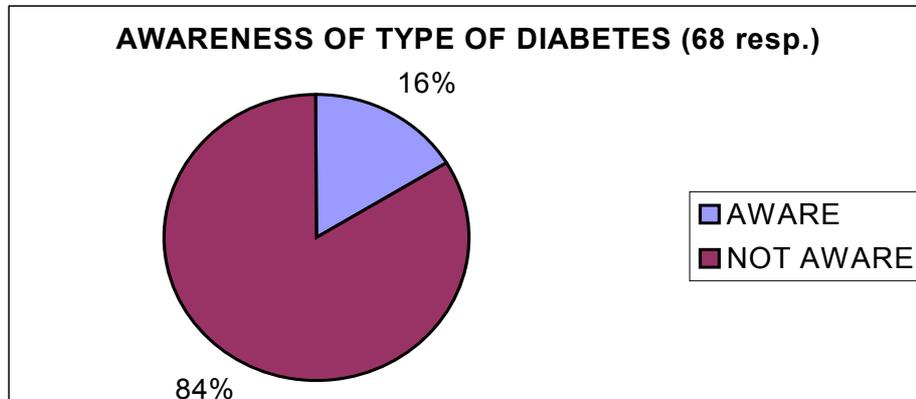
The figure below demonstrates the number of years studied of surveyed diabetes patients. As seen, 22 patients had less than 8 years of education, 22 had from 9 to 11 years of education, and others had more than 12 years of education. Therefore, it means the vast majority of surveyed patients was literate, and could receive health education about diabetes. The endocrinologist said that the type 2 diabetes patients represented a population with different education background.



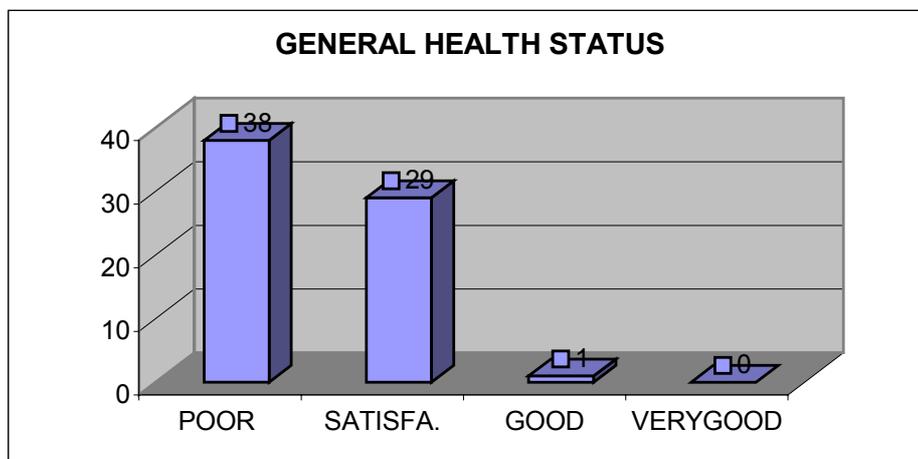
The figure below shows that more than fifty percent of interviewed diabetes patients spent less than 100USD per month, only 22% spent from 101 to 200USD per month. “If there be no medication given to patients, there will be an epidemic of hyperglycaemic comas, they are in very bad socio-economic situation”, said the district endocrinologist.



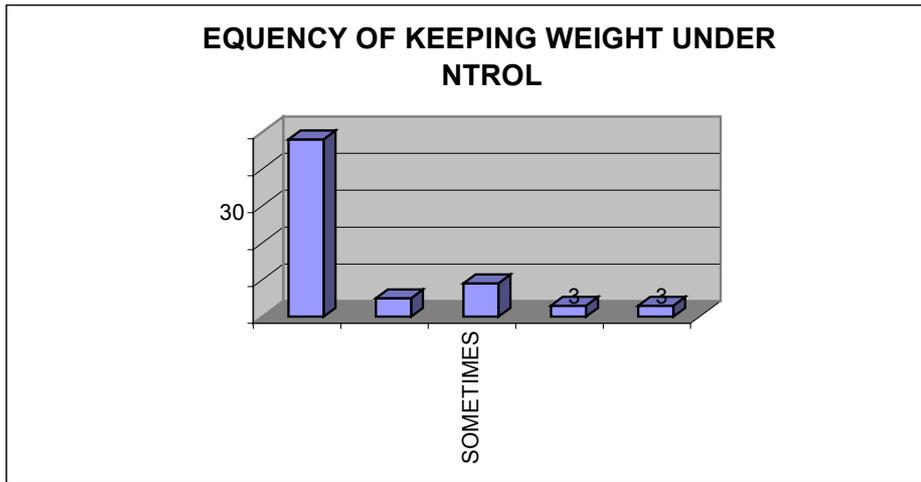
As expected, the figure below demonstrates that only 16% knew what type of diabetes they had. The other part did not even know what does “type” mean. This is another type of knowledge question which aimed at testing whether diabetes patients were interested to know more about their disease or not.



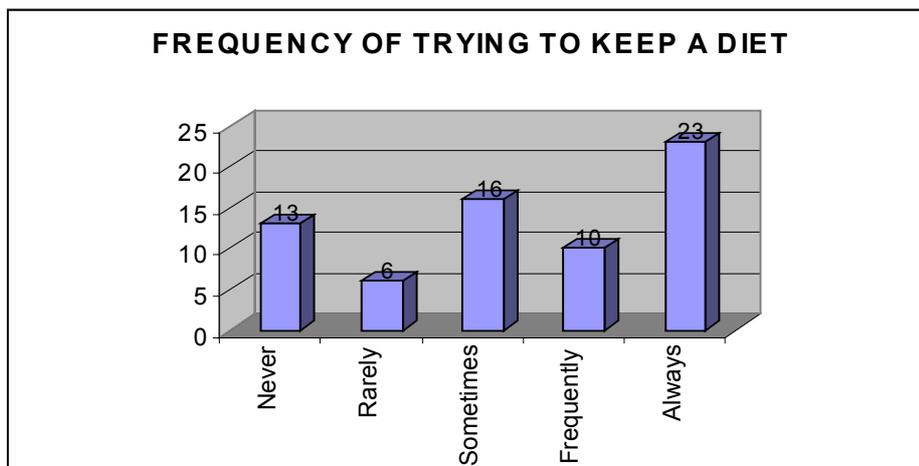
It is interesting; however, that thirty-eight surveyed patients rated their health as poor, 29 rated as satisfactory and only 2 stated his health status as good. Although, some diabetes patients had some difficulties to differentiate their health status between poor and satisfactory.



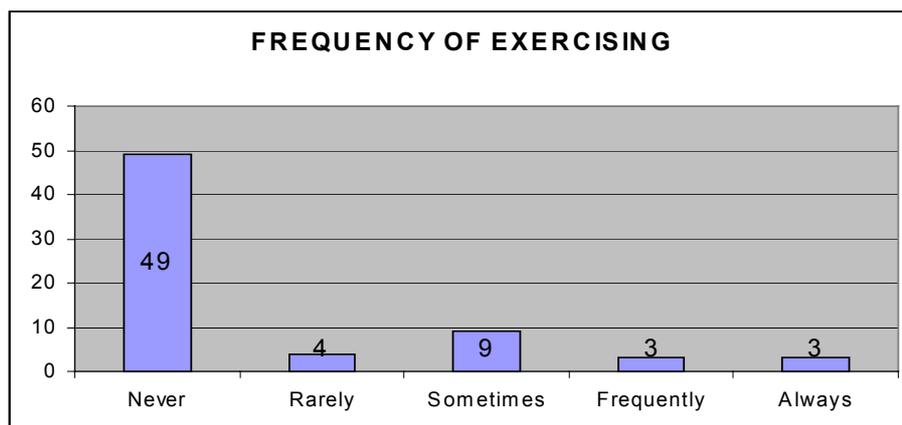
As seen from the figure below, 48 out of 68 surveyed diabetes patients never tried to keep their weight under control that only six patients did it frequently or always. Anyway, it was expected that diabetes patients should be informed about that and should practice it more frequently than it is. This might be one of the worst parts of diabetes patients’ practice. The district endocrinologist mentioned not proper diet and hypodinaemia as major risk factors for diabetes complications development.



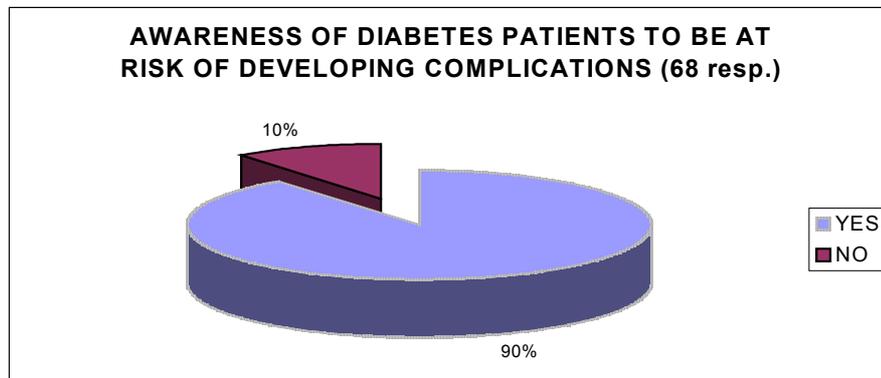
It is worth of mentioning that in comparison to trying to keep weight under control, here more surveyed patients tried to keep a diet. During the survey there was an impression that it is the most important factor for diabetes treatment. Apparently, they tried to keep a diet for a treatment not for keeping weight under control.



As during the question of keeping weight under control, in the figure below, as expected, the vast majority of surveyed diabetes patients never exercised, only few patients exercised frequently or always.



As seen from the table, 90% of surveyed diabetes patients knew that they were at risk to develop complications.



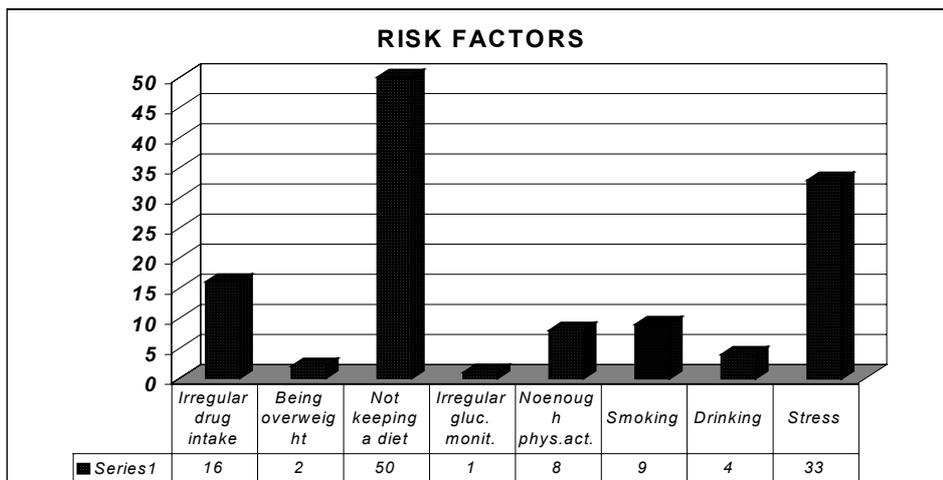
It was decided to assess the awareness of diabetes patients living in Davidashen district of Yerevan about complications to observe whether diabetes patients understand that diabetes is a disease, which needs an extensive care. The table below shows that the most frequent complications to the best of diabetes patient's knowledge were problems with vision and angiopathies. Then come problems with gastro-intestinal, musculo-skeleton disorders, and cardio-vascular diseases. Obviously, many of them had those diseases, they just did not even think that they might be due to their disease. Intentionally, the interviewer did not read this question; patients needed to enumerate complications. Probably, it was due to a recall bias that they did not mention other complications. However, it was expected that they should have enough knowledge about diabetes complications.

<b>COMPLICATIONS (awareness)</b>	<b>FREQUENCY</b>
Problems with vision	29
Cardio-vascular diseases	13
Atherosclerosis	2
Problems with gastro-intestinal system	15
Problems with uro-genital system	14
Angiopathy (foot complications)	33
Musculo-skeleton disorders (i.e. arthritis)	16
Problems with nervous system	9
Other	5

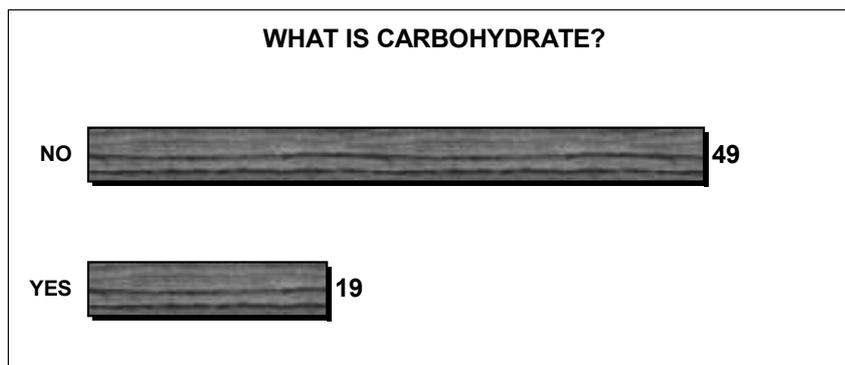
It was revealed that out of 68 surveyed diabetes patients, 66 had some type of complications to the best of their knowledge and experience. The table below demonstrates that the most frequent complications were angiopathies, musculo-skeleton disorders, problems with vision, cardio-vascular diseases, and problems with nervous system.

<b>COMPLICATIONS (experiencing)</b>	<b>FREQUENCY</b>
Problems with vision	43
Cardio-vascular diseases	42
Atherosclerosis	33
Problems with gastro-intestinal system	34
Problems with uro-genital system	27
Angiopathy (foot complications)	48
Musculo-skeleton disorders (I.e.arthritis)	47
Problems with nervous system	42
Other	18

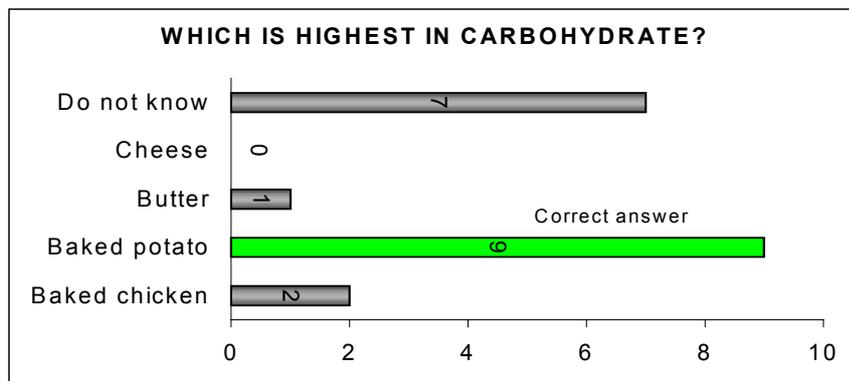
The knowledge about risk factors varies from one risk factor to another. The figure below demonstrates that the majority of respondents reported mostly not keeping a diet and stress as risk factors for developing complications. It is interesting, however, that very few interviewees mentioned being overweight, irregular fasting (blood) glucose monitoring, and not enough physical activity as risk factors. “Diabetes patients understand that only drug treatment will prevent from complications, they also try to keep a diet, but they do not exercise at all”, said the district endocrinologist.



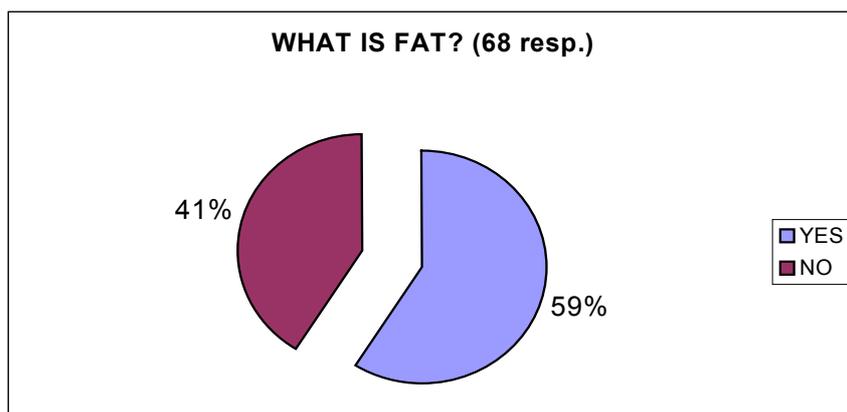
The vast majority (49 out of 68) of respondents did not know what carbohydrate was. Those who knew what carbohydrate were, only half could correctly answer which food was highest in carbohydrates.



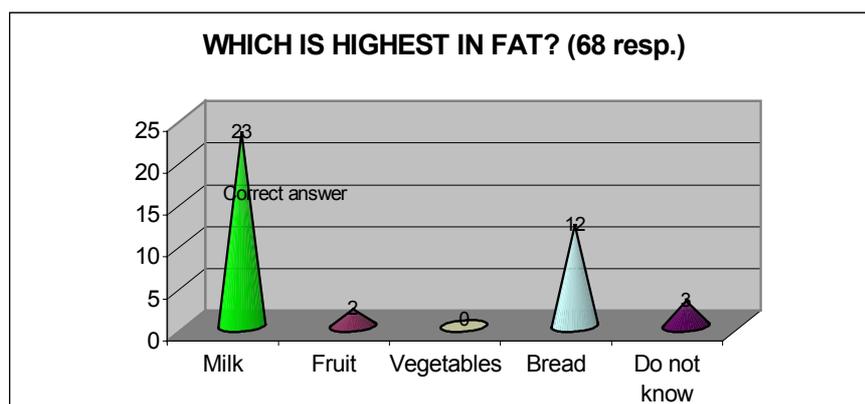
As the table below shows, out of 19 only nine knew correctly that baked potato is highest in carbohydrates.



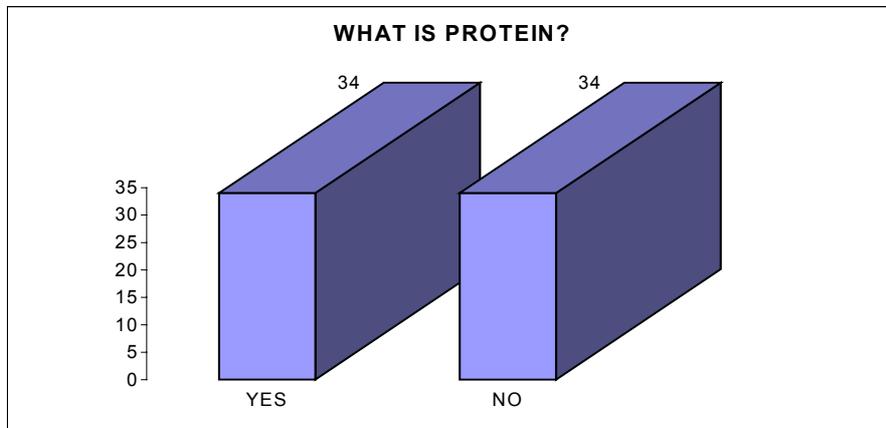
In comparison to the knowledge about carbohydrate, many patients knew what fat was. As seen from the figure below, fifty nine percent of respondents answered “yes” to the question of what fat was.



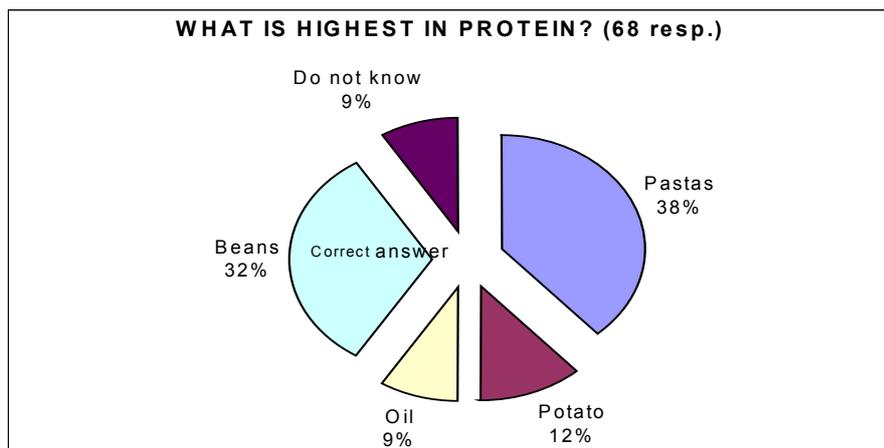
Here, as the figure below demonstrates, many patients answered correctly which food was highest in fat. It was expected that many people would answer to this question correctly, since fat is widely used in our life and the term is very familiar to the population. However, surprisingly enough, some respondents mentioned bread to be highest in fat.



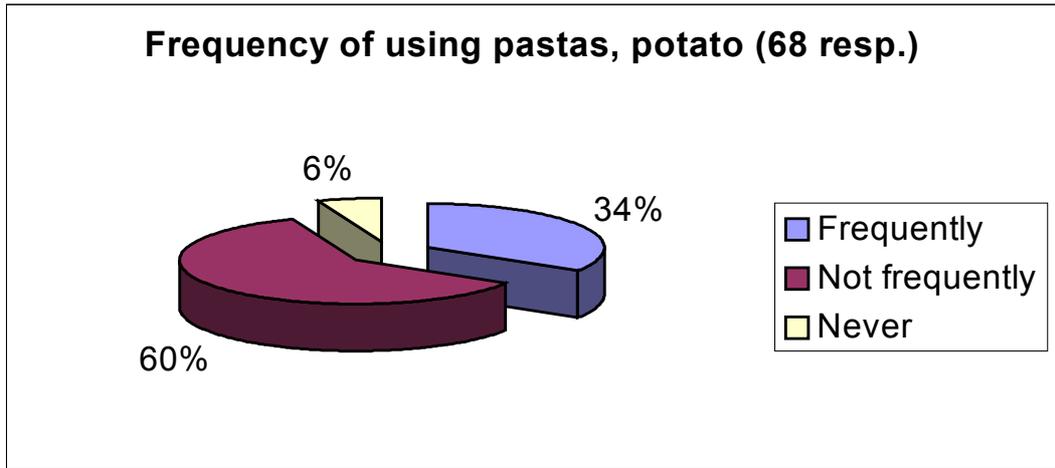
Half of the interviewed diabetes patients knew what protein was, and again, they seemed to find a relationship with egg's protein.



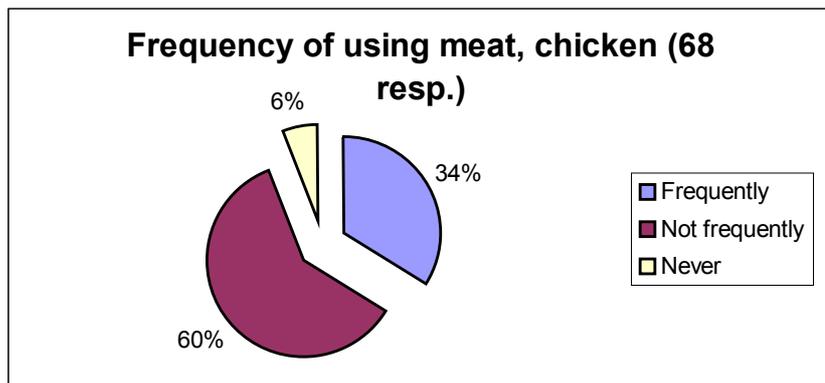
It is interesting that only 32% of respondents answered correctly which food was highest in protein. The figure below supports the fact that they knew the name connected with using it in everyday life. Moreover, many of them mentioned that pastas and potato was highest in protein.



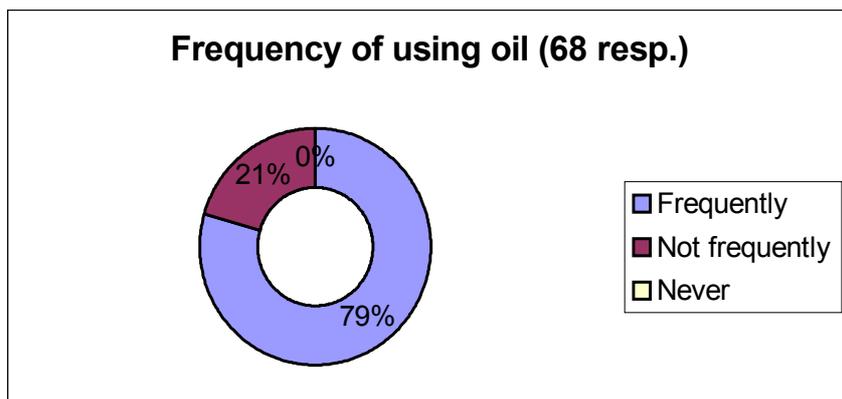
Because of socio-economic situation in Armenia, and taking into consideration traditional peculiarities of Armenian nation, it was expected that many respondents would use pastas and potato frequently. However, only 34% of surveyed diabetes patients used them frequently.



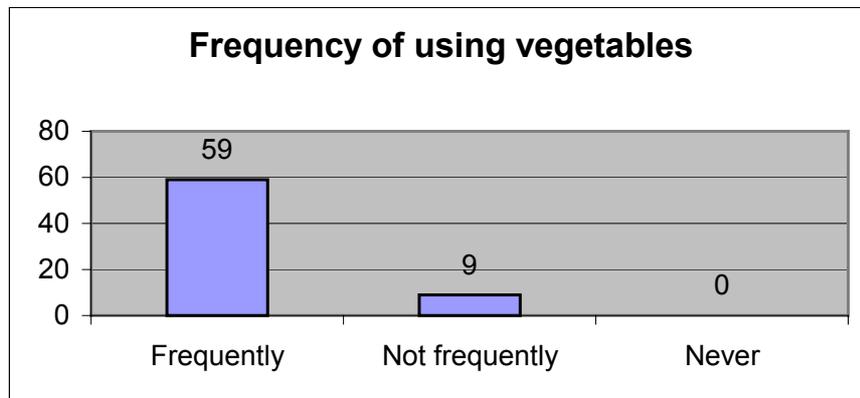
Surprisingly, exactly the same distribution was for the frequency of using meat and chicken. It was expected that the frequency of using meat and chicken would be less than it is of using pastas and potato.



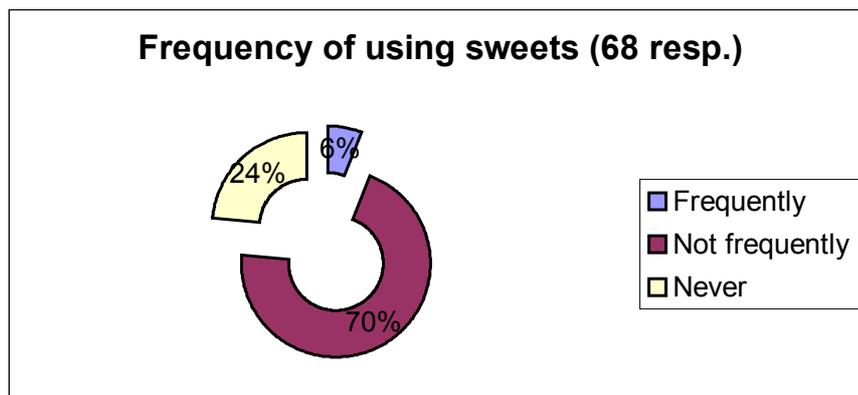
The misunderstanding about oil that it is healthy and good for health still exists in the Armenian population. As seen from the figure below, 79% of respondents used oil frequently. The majority cited that they used vegetable oil stating that the latter is healthier than the animal one. This can be considered as one of the worst practice they have.



The survey, as expected, revealed high rate of vegetable use, the table below shows that 59 out of 68 used vegetables.



The figure below demonstrates that only 6% of respondents used sweets frequently, the majority of them used either not frequently or never. They knew, as they sometimes cited, that the most dangerous part of food is sweet.



It seems that interviewed diabetes patients took care of their fasting glucose level monitoring partially. However, 21 out of 68 monitored their blood glucose level at least once a month during the last year, 28 did at least once per three month, and the other part measured their blood glucose level once a year or never.

### Frequency of measuring blood glucose level during the last year

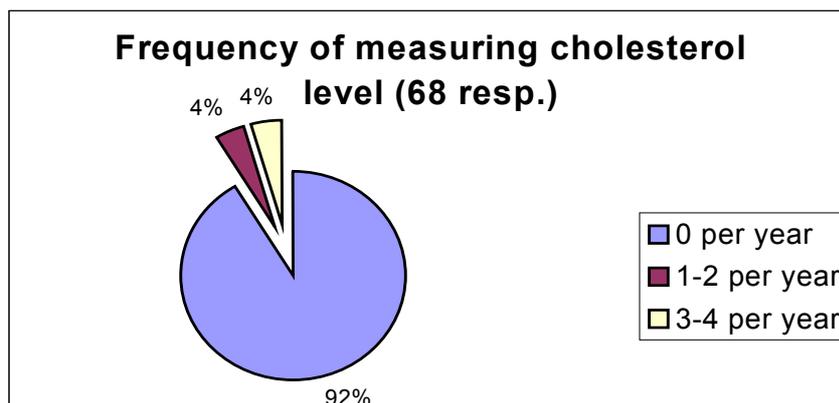
At least once a week	3
At least once a month	21
At least once per three month	28
At least once a year	12
Have Not measured	4

To the question of whether diabetes patients knew how frequently to measure blood glucose level, 37 answered “yes”. The table below summarises the knowledge about the frequency to monitor blood glucose level. Apparently, there was a lack of knowledge about it.

***Knowledge about the frequency to monitor blood glucose level***

At least once a week	5
At least once a month	23
At least once per three month	5
At least once a year	4

To the question of what cholesterol was, as expected, only 23 knew about that. Oil consumption was high among interviewees, as they reported. Moreover, of those who knew what cholesterol was, only 8% had their cholesterol level measured. Obviously, diabetes patients, and probably not only them, did not know that cholesterol level is connected with development of complications. It would have been better if there was a question in the questionnaire testing whether diabetes patients knew that oils contained cholesterol or not.



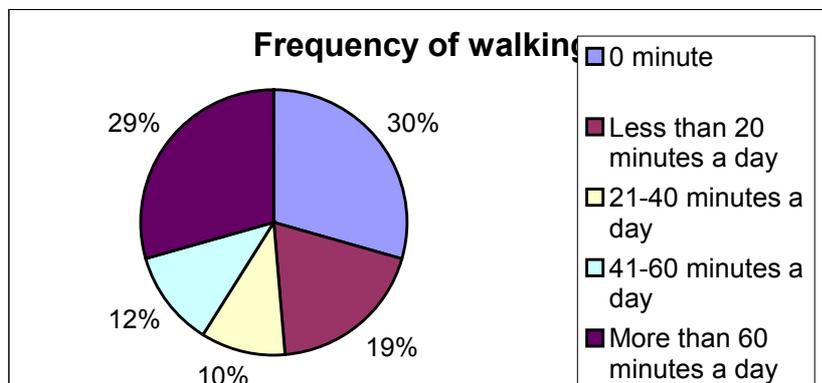
The lack of knowledge about risk factors such as exercising and blood glucose monitoring for developing complications comes also from health providers. As the table below demonstrates, only 37 diabetes patients, out of 68 studied, received advice from a doctor or nurse about exercising. Thus, taking into consideration the low knowledge and practice of surveyed diabetes patients, it might be implied that the main source of information for diabetes patients about their disease are health care providers. It is worth mentioning that surveyed diabetes patients expressed dissatisfaction toward health care providers and health care services.

**Received advice from the doctor or nurse**

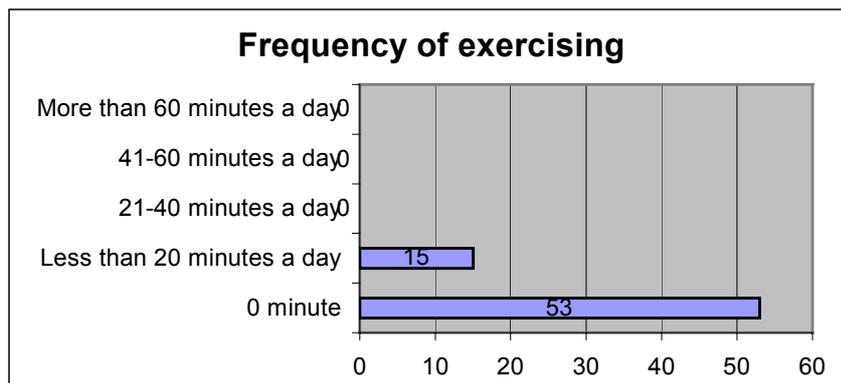
	YES	NO
<b>EXERCISE</b>	31	37
<b>BLOOD, URINE GLUCOSE MONITORING</b>	54	14
<b>DIET</b>	58	10

The knowledge and practice of interviewed patients about physical activity were the worst. Unfortunately, 30% of respondents did not hike and 19% walked less than 20 minutes per day.

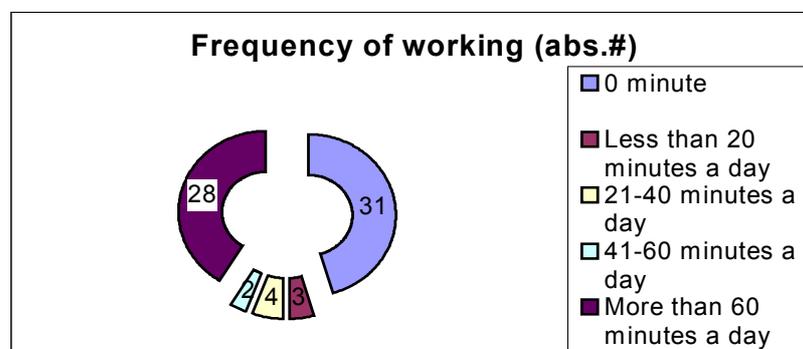
Walking was considered as going outside of home and walking in the street or park. It is worth mentioning that 29% walked more than 60 minutes a day.



The table below shows that only 15 diabetes patients, out of 68 studied, exercised. Even though they exercised less than 20 minutes per day. The others did not exercise at all. So, there is a big potential of improvement in this respect.

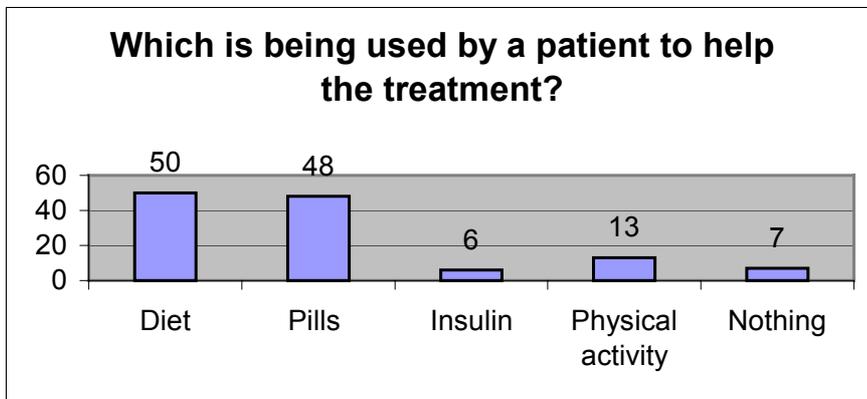


Working in a house or in a garden was considered as having a job. Again, the vast majority of interviewed patients did not have a job, or work in a house or garden requiring physical activity.

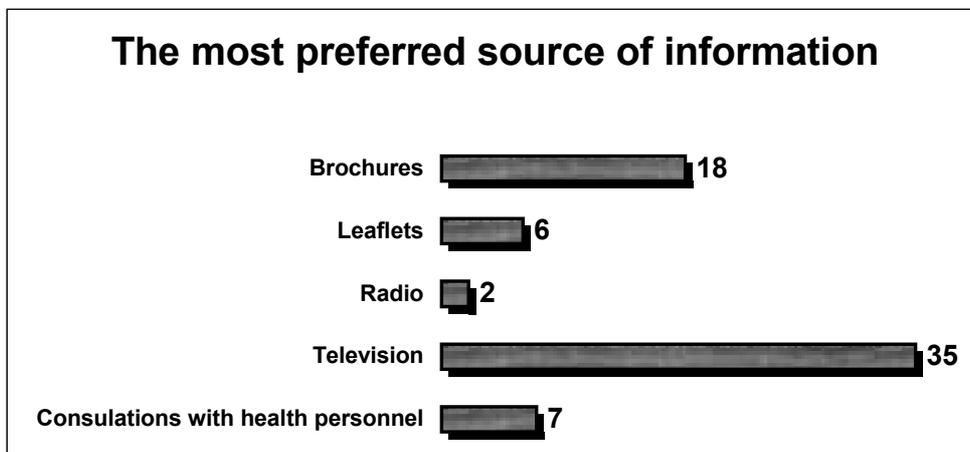


The figure below examines the means, which were obtained from the district endocrinologist and the literature, and which surveyed diabetes patients used to help to the treatment of their disease. As seen,

mainly diet and pills were used to help the treatment of diabetes. Diet and pills have been reported almost always by patients to be as major useful components for diabetes treatment. It seems that physical activity was out of the context.



Many people during the survey reported that the most preferable source of information about diabetes was TV and printed materials, particularly brochures. Few answers were for leaflets and meeting with health personnel. Those who preferred TV, stated that the reason was problem with vision. Nevertheless, different media should be used. Only 7.4% of surveyed received any type of formal education about diabetes.



**Chi square** statistical test was used to see whether there was an association (statistically significant) between education (the number of years studied) and other dependent variables. Analysis results revealed the following findings:

1. there was no association between education level and the awareness about the risk factors to develop complications, particularly, for irregular medication intake; being overweight; irregular glucose monitoring; not enough physical activity; smoking; and drinking,
2. there was an association between education level and the knowledge about what carbohydrate was, ( $p=0.00010895$ ,  $CI=95\%$ ), those who studied more knew more what carbohydrate was, however, there was no statistically significant association between those who knew what carbohydrate was and those who knew correctly what food was highest in carbohydrates ( $p=0.16568756$ ),
3. there was no association between education level and using physical activity to help in the treatment of diabetes ( $p=0.38962612$ ), although those who studied more tended to use physical activity more to help in the treatment of the disease

It could be also appropriate to conduct a Fisher's Exact test, since in some cases during Chi Square analyses there were cells with less than 5.

## DISCUSSION

This report presents the findings of the study done in Davidashen district of Yerevan to assess the knowledge and practice of non-insulin dependent diabetes patients regarding prevention of diabetes complications during the summer of 1999. This study is a part of Master of Public Health program at the American University of Armenia. This study suggests recommendations to researchers, individuals, governmental and non-governmental organizations, and district physicians.

More than 40 years old type 2 diabetes patients were included in the study who were diagnosed as diabetics more than one year ago. This was done to avoid confounding, because those who were diagnosed diabetics for a long time might have had the opportunity to learn more about the disease than those who were diagnosed recently. The list of those patients was obtained from the district polyclinic. Polyclinic administration and district endocrinologist were informed about the study to be undertaken. Also, an oral consent was obtained from each interviewee before starting the real interview.

It is worth mentioning that this study, along with strengths, has some limitations. First, the study area chosen was only one district of Yerevan, which might not be representative. This was done taking into consideration given time, financial and human resources. However, it was thought that the study population might be representative, in terms of education, since people living in Davidashen came from diverse districts from Yerevan. It is a newly built district, and the population is a little bit younger here than in other districts. Also, it was interesting to study Davidashen because people living here are considered to be poorer than in other districts. Many of the inhabitants do not have access to telephone.

Second, due to scarce financial, time, and human resources, it was not possible to have a big sample size. Instead of Davidashen a bigger sample might have been chosen from other districts. Because of that some associations were not statistically significant.

Third, there were difficulties with Epi Info statistical program. It would have been better to have had more time to re-enter the data in Epi Info program, because there were some minor inconsistencies.

Unemployment rate was very high (84%), although a similar situation exist throughout Armenia. Many interviewees had higher education, the other more than secondary; some studied less than 8 years. About seventy five percent of interviewed diabetes patients were females. Those who were not interviewed for any reason (ineligibles, wrong addresses, refusals, etc) were 48 females and 27 males. Again the proportion of males is less than females'. It might be due to unrepresentativeness of the sample population at the national level. Those who were not interviewed had almost the same age distribution as those with whom interviews were completed. It is interesting, however, that women in the USA have a slightly higher prevalence of diabetes than men (55% vs. 45%,

respectively), which is more readily observed at a national level compared to smaller community data bases (25). The latter concerned to the US population.

The knowledge and practice of non-insulin dependent diabetes patients living in Davidashen about prevention of diabetes complications are poor. Eighty four percent of surveyed diabetes patients did not even know what type of diabetes they had. Most diabetes patients never tried to keep their weight under control. This is a common phenomenon in Armenia that people do not exercise regularly, which again supports the idea that they might not see exercising as means to keep weight under control. Also, they do not see that not keeping weight under control is a problem for the development of complications. Contrary to the latter, more patients tried to keep a diet. More research is needed to examine the food intake of diabetes patients, since this study was mainly based on self-reporting of interviewed diabetes patients. Ninety percent of interviewed patients knew that they were at risk to develop complications. It might mean that they do not know how to, and do not possess the tools to struggle, against the disease. However, surveyed diabetes patients enumerated less diabetes complications than was expected, probably they did not recall them. Interestingly enough, only two patients mentioned being overweight as a risk factor for complication development, and only one mentioned irregular glucose monitoring as a risk factor. Fortunately, 50 out of 68 stated not following a diet as a risk factor for diabetes complications development. It is worth mentioning that interviewed diabetes patients had low knowledge about what carbohydrate, fat, and protein were. This was associated with their education level. Nevertheless, among those who knew what they were, few correctly answered which food was highest in what nutrients. Based on the survey it was revealed that 34% of diabetes patients used pastas, potato, and meat frequently. Moreover, about 79% of them used oil frequently. Vegetable intake was high among respondents, but it should be taken into consideration that the survey was carried out in summertime, when a lot of cheap vegetables were available in the market. The situation might be vice versa in wintertime. Anyway, more research is needed to examine the food intake of diabetes patients. Approximately half of the diabetes patients did not know how frequently to monitor their blood glucose level. Of those who knew, the majority reported at least once a month. As revealed, the vast majority of respondents measured their blood glucose level once a month or once per quarter during the last year. Overall, 83% of persons with diabetes reported that they performed self-monitoring of blood glucose, and it was more common among persons treated with insulin than among persons not treated with insulin (94% versus 76%, p value less than 0.05) (23). Since the majority of insulin users are type 1 diabetes patients, therefore their knowledge expected to be higher. This idea was supported also by the Davidashen district endocrinologist.

As expected, 92% of those interviewed reported they did not know what cholesterol was. As also mentioned by the district endocrinologist, for diabetes patients mainly drugs and less diet were known to prevent complications.

The lack of knowledge about risk factors, such as not exercising and not monitoring blood glucose comes also from health care providers. There was a similarity between the knowledge interviewees had about diet, exercising and glucose monitoring and the advice they obtained from health care providers about these risk factors. As seen from the results, usually there was very little time devoted to exercising and physical activity. Many of the interviewed patients did not even know that physical activity helped in the treatment of their disease; only 15 diabetes patients out of 68 exercised.

Generally, patients expressed their dissatisfaction toward health care services and said that one of the major reasons for not visiting the polyclinic is the mistrust of doctors. They also mentioned lack of drugs, and diet food distribution, to be reasons for not attending health care facilities more frequently.

Only 7.4% of surveyed diabetes patients received any type of education about their disease. The most preferred source of health education for diabetes patients were television and brochures. Those who preferred TV mentioned that the reason was vision problems. Some also preferred to learn from health care providers.

Taking into consideration all the above mentioned, the following recommendations are suggested:

1. More research is needed to reveal the attitude of diabetes patients about risk factors for development of complications for development of health education.
2. More research is needed to observe social, environmental, epidemiological, and behavioral factors of non-insulin dependent diabetes patients.
3. There is a priority need to develop public health education for diabetes patients. It might include such important issues as diet nutrition intake, physical activity, regular glucose monitoring, etc.
4. Different media should be used to reach diabetes patients, taking into consideration the disabilities they may have due to diabetes.
5. Health care providers need to be trained, increase their knowledge in secondary prevention of diabetes, since currently the primary source of information for diabetes patients are health care providers.
6. The availability and accessibility of health care services to the vulnerable population should be increased.
7. The quality of health care services should be improved.
8. Free drug and diet food distribution for diabetes patients needs to be organised.

## REFERENCE

1. Diabetes: Is a serious Public Health Problem, CDC, USA, 1999
2. Republican Health Information Analytic Center, Yearly statistical book, 1998, Ministry of Health, Yerevan, Armenia
3. CDC and Prevention, National Diabetes Fact Sheet, 1998, USA
4. Diabetic Medicine, Paul Zimmet, 1999, <http://www.diabetes.com>
5. Joslin Diabetes Foundation, Public Service Announcements, 1999, USA
6. The Facts about diabetes, At risk of Diabetes?, Diabetes-Australia, Queensland
7. Center for Disease Control and Prevention, USA, 1998
8. Behavioral and environmental diagnosis, Lecture 4, Social and Behavioral Sciences in Public Health, American University of Armenia, 1998
9. Green LW, Kreuter MW, Deeds SG, Partridge KB, Health education planning: a diagnostic approach, Mayfield Publishing Company, 1980
10. The Juvenile Diabetes Foundation, Public Service Announcement, USA, 1999
11. The Prevention and Treatment of Complications of Diabetes Mellitus: A Guide for Primary Care Practitioners, CDC Guidelines, 01/01/1991, USA
12. Prof. Jak Jarvell & Ms Elizabeth Hansen, No. 1/September, 1995, World Diabetes, A Newsletter from the World Health Organization
13. National Diabetes Fact Sheet, November 1, 1998, USA
14. Carter Center of Emory University. Closing the gap: the problem of diabetes mellitus in the US. *Diabetes Care* 1985;8:391-406
15. American Diabetes Association. Direct and indirect costs of diabetes in the US in 1992. Alexandria, Virginia, 1993
16. Javit JC, Chiang YP. Economic Impact of diabetes. In: Harris MI, Cowie CC, Stern MP, Boyko EJ, Reiber GE, Bennett PH. *Diabetes in America*. 2nd ed. Washington, DC: U.S. Department of Health and Human Services, NIH, 1995, DHHS publication no. 95-1468
17. Seppo V.P. Koskinen, MD, Antti R. S. Reunanen, MD, Tuija P. Martelin, PhD, and Tapani Valkonen, PhD, Mortality in a Large Population-Based Cohort of Patients with Drug-Treated Diabetes Mellitus, *American Journal of Public Health*. 1998;88:765-770
18. Famuyiwa OO, Important considerations in the care of diabetic patients in a developing country (Nigeria), *Diabet Med* 1990, Dec; 7(10): 927-30
19. Jacques CH, Jones RL, Problems encountered by primary care physicians in the care of patients with diabetes, *Arch Fam Med* 1993 July; 2(7):739-41

20. Pham DT, Fortin F, Thibaudeau MF, The role of the Health Belief Model in amputees' self-evaluation of adherence to diabetes self-care behaviours, *Diabetes Education* 1996 Mar-Apr;22(2):126-32
21. Knowler-WC, Narayan-KM, Hanson-RL, Nelson-RG, Bennett-PH, Tuomilehto-J, Preventing non-insulin-dependent diabetes, National Institute of Diabetes and Digestive and Kidney Diseases, Phoenix, Arizona, USA, : *Diabetes*. 1995 May; 44(5): 483-8
22. A Bell, PhD, K Passaro, PhD, et al, Diabetes Control Program, North Carolina Department of Health and Human Services, Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, CDC
23. Diabetes Care Profile, Diabetes Knowledge Test, Development and Validation of the Diabetes Care Profile, James T. Fitzgerald, Ph.D. et al, *Diabetes Care*, Volume 21, #5, May 1998
24. Patient Involvement: A powerful tool to Help People with type 2 diabetes Obtain Proper Health Care, Steven V. Edelman, MD, & Kenneth Factor, MD, MBA, JD, <http://www.tcoyd.com/articles/article1.html>
25. Designing and Conducting Health Surveys, Lu Ann Aday, 1989, pp. 121-124, calculation of response rate
26. Perspectives in Diabetes, Preventing Non-Insulin-Dependent Diabetes, William C. Knowler, K.M.V. Narayan, et al, pp.180-185, *Diabetes*, VOL. 44, May 1995

## **TABLES AND FIGURES**

**Please see them incorporated in the text of the “RESULT” section.**

## **LIST OF APPROPRIATE JOURNALS WHERE THIS WORK MIGHT BE PUBLISHED**

1. American Journal of Public Health
2. Journal of American Diabetes Association
3. “Aroxjapahutiun”, Armenia

**Questionnaire for assessing KP of type 2 diabetes patients living in Davidashen district of Yerevan**

Questionnaire ID \_\_\_\_\_

Patient's name \_\_\_\_\_

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Good afternoon! I am Artashes Khachatryan from the American University of Armenia, Master of Public Health Program. As a part of my study, I conduct a survey with type 2 diabetes patients living in Davidashen district to assess their knowledge and practice about prevention of complications of diabetes. In the future, the results of the study might be used to prepare health education materials for you. Your participation and experience will be highly valuable for us. The district endocrinologist gave us your name. All the information given by you will be confidential.

The interview is going to last about 20 minutes.

Would you like to participate in the study?

Yes

No

*If No, thank him/her and leave.*

*If Yes, continue the interview.*

What type of diabetes you have? \_\_\_\_\_

*If the answer is type 1 (IDD), thank the patient and leave*

---

What year were you first told you had diabetes? 19\_\_\_\_\_

Overall, how would you rate your health? (*Read the responses!*)

*Circle only one as appropriate Q.2-Q.5!*

**Poor   Satisfactory   Good   Very good**

1                      2                      3                      4

3. How frequently do you try to keep your weight under control? (*Read the responses!*)

**Never   Rarely   Sometimes   Frequently   Always**  
1                      2                      3                      4                      5

4. How frequently do you exercise? (*Read the responses!*)

**Never   Rarely   Sometimes   Frequently   Always**  
1                      2                      3                      4                      5

5. How frequently do you try to keep a diet? (*Read the responses!*)

<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Always</b>
1	2	3	4	5

6. Do you know that diabetes patients are at risk to develop complications?

1. Yes
2. No

7. What are the most common complications suffered by people with Diabetes?

1. Problems with vision *Circle as many as appropriate!*
2. Cardio-vascular diseases
3. Atherosclerosis
4. Problems with gastro-intestinal system
5. Problems with uro-genital system
6. Angiopathy (regarding foot complications)
7. Arthritis (musculo-skeleton disorders)
8. Problems with nervous system
9. Do not know
10. Other \_\_\_\_\_

8. Do you have any complications related to diabetes?

1. Yes
2. No *If No, go to #10.*

9. Which of the following complications you have? (*Read the responses!*)

1. Problems with vision *Circle as many as appropriate!*
2. Cardio-vascular diseases
3. Atherosclerosis
4. Problems with gastro-intestinal system
5. Problems with uro-genital system
6. Angiopathy (regarding foot complications)
7. Arthritis (musculo-skeleton disorders)
8. Problems with nervous system
9. Do not know
10. Other \_\_\_\_\_

10. Which are the risk factors for diabetes patients to develop complications?

1. Not taking medications regularly
2. Being overweight *Circle as many as appropriate!*
3. Not keeping a diet
4. Irregular blood glucose monitoring in blood, urine
1. Not enough physical activity

2. Smoking
3. Drinking
4. Stress
5. Do not know
6. Other \_\_\_\_\_

11. Do you know what carbohydrate is?

1. Yes
2. No *If No, skip to #13.*

12. Which of the following is highest in carbohydrate?

1. Baked chicken
2. Baked potato
3. Butter
4. Cheese
5. Do not know

13. Do you know what fat is?

1. Yes
2. No *If No, skip to #15.*

14. Which of the following is highest in fat?

1. Milk
2. Fruit
3. Vegetables
4. Bread
5. Do not know

15. Do you know what protein is?

1. Yes
2. No *If No, skip to #17.*

16. Which of the following is highest in proteins?

1. Pastas
2. Potato
3. Oil
4. Beans
5. Do not know

17. How frequently do you use each of the following products? (*Read the questions and responses!*)

1. Pastas, potato
  - 1.1 Frequently
  - 1.2 Not frequently
  - 1.3 Never*Circle only one as appropriate!*

- 2. Meat, chicken
  - 2.1 Frequently
  - 2.2 Not frequently
  - 2.3 Never
  
- 3. Oil
  - 3.1 Frequently
  - 3.2 Not frequently
  - 3.3 Never
  
- 4. Vegetables
  - 4.1 Frequently
  - 4.2 Not frequently
  - 4.3 Never
  
- 5. Sweets (cakes, honey, etc)
  - 5.1 Frequently
  - 5.2 Not frequently
  - 5.3 Never

18. How frequently have you measured your blood glucose level during the last year?

- 1. At least once a week
- 2. At least once a month
- 3. At least once per three month
- 4. At least once a year
- 5. Have not measured

19. Do you know how frequently to monitor blood glucose level?

- 1. Yes, how many \_\_\_\_\_
- 2. No

20. Do you know what cholesterol is?

- 1. Yes
- 2. No *If NO, skip to #22.*

21. How frequently is your cholesterol level measured?

- 1. 0 per year
- 2. 1-2 per year
- 3. 3-4 per year
- 4. More than 5 times per year

22. During the last two months how many times you have visited to a polyclinic, hospital?

\_\_\_\_\_

23. What hinders you to visit health care facilities more?

\_\_\_\_\_

\_\_\_\_\_

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24. Do you smoke?

1. Yes
2. No

25. Have you ever received advice from your doctor or nurse about: ?

25.1. Exercise

1. Yes
2. No

25.2 Blood, urine glucose monitoring frequency

1. Yes
2. No

25.3 Diet

1. Yes
2. No

26. How and how much are you busy with physical activity ? (*Read the questions and responses!*)

1. Hiking

- 1.1 0 minutes
- 1.2 Less than 20 minutes a day
- 1.3 21-40 minutes a day
- 1.4 41-60 minutes a day
- 1.5 More than 60 minutes a day

*Circle only one as*

*appropriate!*

2. Exercises

- 2.1 0 minutes
- 2.2 Less than 20 minutes a day
- 2.3 21-40 minutes a day
- 2.4 41-60 minutes a day
- 2.5 More than 60 minutes a day

*Circle only one as*

*appropriate!*

3. Work in a house or garden

- 3.1 0 minutes
- 3.2 Less than 20 minutes a day
- 3.3 21-40 minutes a day
- 3.4 41-60 minutes a day
- 3.5 More than 60 minutes a day

*Circle only one as*

*appropriate!*

27. Which of the following do you use to help to the treatment of your diabetes?

1. Diet

2. Pills *Circle as many as appropriate!*
3. Insulin
4. Physical activity
5. Nothing

28. Have you ever received diabetes education or materials?

1. Yes
2. No

29. What is the most preferable source of information for you to receive health education about diabetes?

1. Brochures *Circle only one as appropriate!*
2. Leaflets
3. Radio
4. Television
5. Consultations with health personnel
6. Other \_\_\_\_\_

30. Are you currently employed?

1. Yes
2. No

31. How many years have you studied including schools, collages, Universities, post graduate study?

1. Less than 8 years
2. 9-11 years *Circle only one as appropriate!*
3. 12-15 years
4. More than 16 years

32. How many people do live with you?

\_\_\_\_\_

33. How much approximately do your family spend per month?

1. Less than 100\$
2. 101-200\$
3. 201-300\$
4. More than 300\$
5. Do not know

34. Gender

1. F
2. M

35. Birth date \_\_\_\_\_ (Year)

36. What would you like to add or suggest?

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Thank you very much for your assistance and support!