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Assessment of risk factors of development of diabetes in respondents of the Karaganda region

We studied the frequency and structure of the risk factors of diabetes mellitus in 1453 respondents Karaganda region in the form of screening among urban and rural population using a scale FINDRISK. To identify factors shaping the development of the high risk of diabetes, was conducted the analysis of the socio-economic conditions, lifestyle factors, presence of chronic diseases, as well as a number of quantitative indicators such as: body mass index, waist circumference, measurement of glucose levels and blood cholesterol. The presence of high frequency (99,5 %) risk of developing diabetes among urban populations (46,3 %) and villages of the Karaganda region (53,6 %) in the age group from 45 to 60 years. It is revealed that a high risk of developing diabetes is higher by a factor of 1.2 in the urban population of Karaganda region than in rural areas. Risk factors that determine the high-risk group, as in the urban population, and in rural areas are lack of employment, presence of hypertension, angina, lack of physical activity, passive smoking, obesity, hyperglycemia, hypercholesterolemia.

Key words: diabetes mellitus, risk factors, the urban population of the village.

Introduction. Number of incidence of diabetes (D) is increased in every countries [1, 2] that is determined by aging of the population, prevalence of obesity and decrease in physical activity [3]. In half of cases diabetes is diagnosed more later real terms of its emergence and very often with developed complications. Primary prophylactic activity and optimization of mode of life of patients with prediabetes — is one of ways for to reduce social and economic consequences and to reduce risk developing of diabetes for 45–63 % [4–6]. The main tool of preventive programs and a key to management of health of the population is work with risk factors of a disease. In this regard studying of frequency and structure of risk factors of diabetes among city population and in rural areas of the Karaganda region is undertaken.

Research objective: to estimate the frequency and structure of risk factors of diabetes among inhabitants of city population and rural areas of the Karaganda region.

Material and methods. One-stage cross (cross-section) research in the form of screening among population city of Saran (54,000) and rural people (Osakarovsky area) of the Karaganda region is conducted. 1453 persons, from them 1082 women (74,4 %) and 372 men (25,6 %) are included in research. In the Osakarovsky area 544 women (69,7 %) and 237 men (30,3 %) are examined 781 persons, from them. In city of Saran examined 672 persons, from them 538 women (80,1 %) and 134 men (19,9 %).

The following criteria of respondents are formulated: 1) age of respondents of 18–65 years inclusive; 2) accommodation of families not less than one last year in the studied regions of the country; 3) absence at respondent at the time of research of an acute disease and relapse of chronic diseases; 4) knowledge of Russian and Kazakh languages; consent to participation in research. Criteria of an exception were: pregnant women, persons with a mental, serious neurologic illness.

For assessment of risk of development of diabetes during 10 previous years at adults the scale of FINDRISK (FINnish Diabetes Risk Score) [7] was used. For unification of method, calculation and submission of information results in the questionnaire of FINDRISK are subdivided for 2 classes: with low (< 7–11 points) and high risk of development of a disease (12–20 points). For identification of the factors forming development of high risk of diabetes the analysis of social and economic conditions, factors of a way of life, production and labor and extra work, relationship status, existence of chronic diseases, and also a number of quantitative indices was carried out: as body weight index, waist circle, measurement of level of glucose and level of cholesterol of blood, level of systolic and diastolic blood pressure. Statistical processing was carried out using of STATISTICA package. For comparison of frequency of occurrence of a qualitative sign in various independent sets the criterion a HY2 was used: statistical differences were considered statistically significant at $p < 0.05$. In the analysis of quantitative signs for each group were defined a median, the lower and top quartiles, the statistical importance of distinctions between groups was estimated by nonparametric criterion of Mang-Whitney, distinctions were considered statistically significant at $p < 0.05$.

Results and discussion. Risk of development of diabetes in Karaganda region is revealed in 1447 persons (99,5 %) and number of persons with high risk of a disease of $n = 802$ (55,4 %) that is 1,2 times higher than with low risk of $n = 645$ (44,6 %) prevailed. The obtained data showed existence of a similar tendency in forecasts of growth of prevalence of DM in the world and expediency of carrying out preventive actions. In Osakarovsky district in 776 people (99,4 %) risk of diabetes are revealed, and the ratio of low and high risk was approximately identical: with low risk — 387 (49,8 %) and with high risk — 389 (50,1 %). In group with high risk of a disease there are prevalence of women — 290 (74,6 %) at men — 99 (25,4 %). The often highest risk of development of diabetes in group of 45–60 years (54,2 %) and prevalence of female persons (71 %) (Fig. 1).

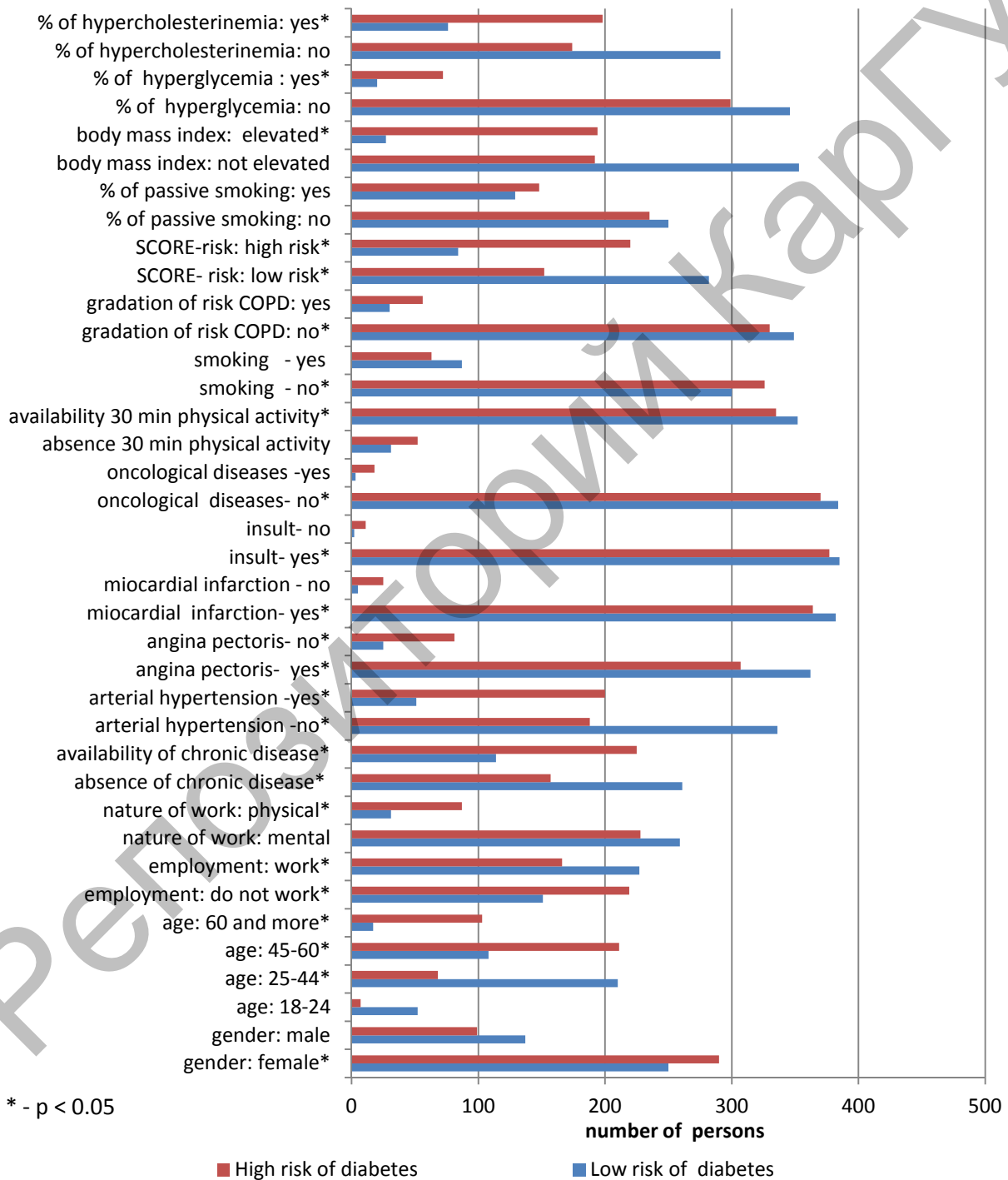


Figure 1. Evaluation of the factors of high and low risk of diabetes among respondents Osakarovsky area

In the city of Saran (population 54,000) the risk of development of diabetes made 671 — (46,3 %) with prevalence of respondents with high risk — 413 (61,5 %) comparatively with low risk — 258 (38,4 %). There are interrelation of high risk of development of diabetes in Saran in age group of 45–60 years (53,2 %) with prevalence of female persons (86,3 %) is traced (Fig. 2).

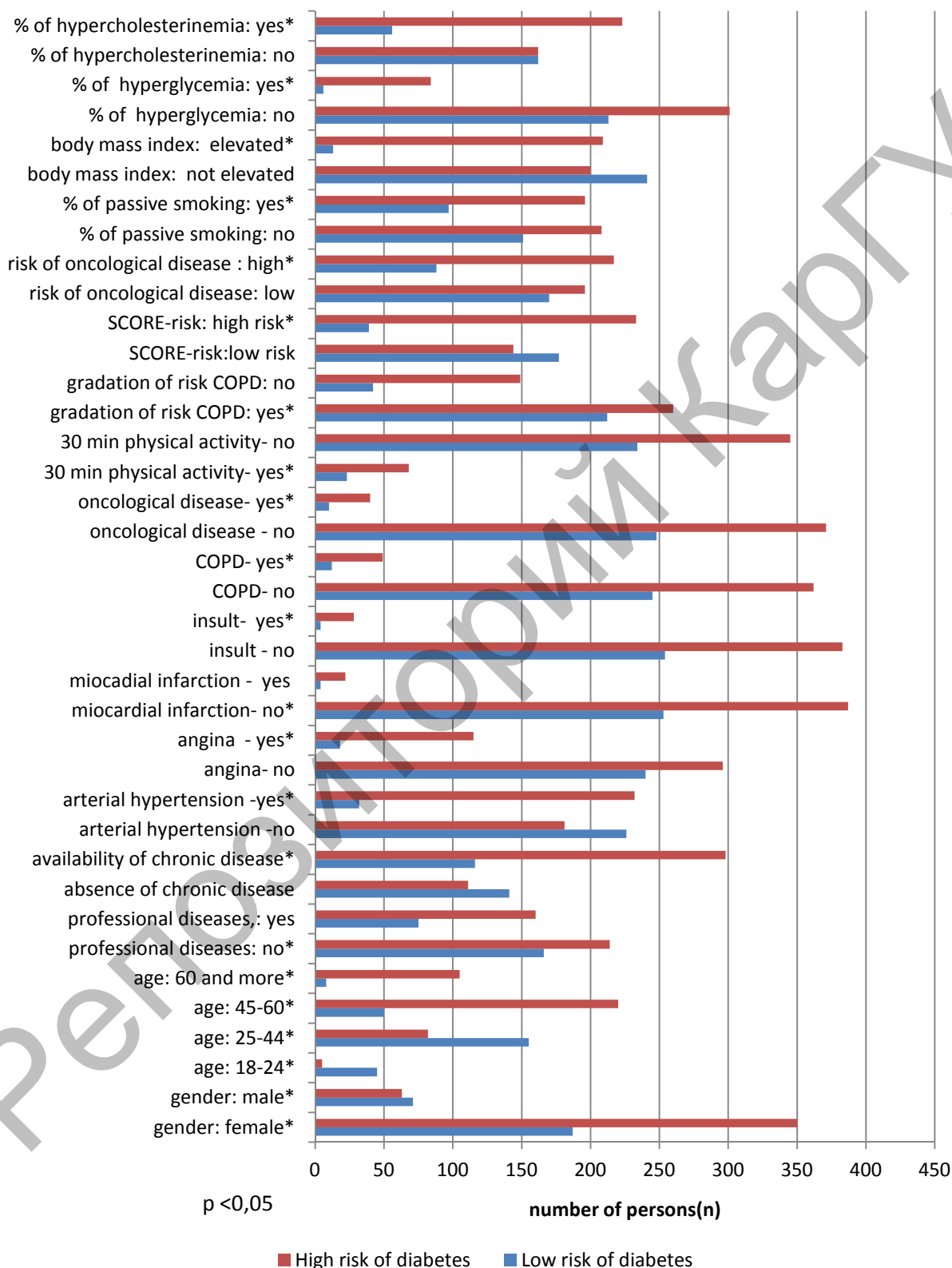


Figure 2. Evaluation of the factors of high and low risk of diabetes among respondents city of Saran

There are reliable prevalence of group with high risk of development of DM as in city as in rural area people it is reliable more high among women in age of 45–60 years that correspond to other author's data on increase of risk of diabetes with increase in age.

Thus, analysis of the obtained data demonstrated a prevalence of general risk of diabetes in rural areas over city however the high risk of development of a disease is higher for city population of the Karaganda region, than in rural areas that will be correspond to literary other author's data on the high frequency of risk of development of diabetes among urban population [8]. It is known that intensive transport traffic in city accompanied by high risk of diabetes [9].

The analysis of influence of social and economic conditions as factors of mode of life, production and work activity, relationship status, existence of chronic diseases in city population and rural areas was carried out. Results of research are shown on figure 1, 2.

In Osakarovsky area, among investigated respondents the unemployed — 219 (56,2 %) ($p=0,002$) in comparison with group of low risk of a disease — 151 met with high risk of diabetes by 1,4 times more often (38,8 %). In group of high risk of a disease of persons with physical nature of work is 1,1 times less ($p=0,01$), than in group of low risk of DM.

Results of interviewing evidently confirm increase in risk of development of diabetes in the presence of chronic diseases (57,8 %) especially more often at women. Arterial hypertension in group of respondents with high risk observed in 200 persons that is more often for 38 %, stenocardia at 81 that is for 14,3 % more often ($p=0,04$), a myocardial infarction at 25 that is 5,2 % more often ($p=0,01$) comparatively with group of low risk.

Physical activity is important factor for prevention of development of diabetes, In this regard existence 30 minute physical activity was analyzed. It is established that in group with high risk development of disease physical activity (existence of 30 min. physical activity) was available at 328 (84,3 %) the respondents that is 5,4 % lower ($p=0,01$) in comparison with the persons having low risk of a disease — 349 people (90,1 %).

Among the examined persons with high risk of development of diabetes the percent of smokers made 63 (16,2 %) that is 6,3 % lower than among persons with low risk have diseases 87 (22,5 %). However it is necessary to note that the percent of the passively smoking was 4,6 % higher in group of high risk at 148 respondents.

A gender distinctions in group of respondents with high risk of a disease the factor of active smoking was higher at men (86,8 %) than at women — (47,8 %), however the factor of daily smoking was higher at women, than men have 36,2 % and 6,0 % respectively.

At respondents of the Osakarovsky region with high risk of DM it isn't established to reliable interrelation with professional activity, material level of life, relationship status, disability, existence of heart attack, a stroke, oncological diseases at relatives. Also it isn't revealed reliable interrelations with alcohol intake, level of depression and alarm.

Obesity, hypercholesterolemia, hyperglycemia are belong to main factors of risk of DM, especially obesity. Epidemiological researches testify to higher prevalence of DM among persons with obesity than without it. Among respondents of the Osakarovsky region with high risk of development of diabetes the high percent of persons 194 (49,8 %) with body weight index as 30 kg/sq.m ($p=0,0000$) is revealed that by 7,1 times exceeds this indicator in group of low risk 27 (6,9 %). High risk of DM was revealed in patients with hyperglycemia-72 prevailed (18,5 %) than-20 without hyperglycemia (5,2 %) and are 3,6 times higher ($p=0,0000$) than in group of low risk. In 198 (50,9 %) respondents with high risk of DM the percent of a hypercholesterolemia is 2,6 times higher ($p=0,0000$), than in group of low risk 76 (19,6 %) respondents.

Also in group of high risk it is established that at 100 % of respondents the waist circle was increased as result of obesity. The similar tendency is noted at respondents of both floors, with prevalence of percent of female. More high percent of raised index of body weight as of hyperglycemia and hypercholesterolemia was observed at women and also in the general age group of 44–59 years.

Thus, the risk factors determined group of high risk in rural areas are: unemployment, intensive physical of work, chronic diseases as arterial hypertension, stenocardia, myocardial infarction, insufficient physical activity, passive smoking, obesity, hyperglycemia, hypercholesterolemia.

The analysis of risk factors of diabetes is carried out to city Saran, for establishment of influence of the studied factors in city conditions. In Saran, among the interrogated respondents with high risk of development of diabetes less persons with the higher education ($p=0,01$) were reliable, (is 1,2 times lower, than persons with low risk). In city population the high risk of development of diabetes 3,1 times more often was

observed at jobless persons comparatively with group of low risk of diabetes. However thus, in group of respondents with high risk of a disease the ratio working and the unemployed had no sharp distinctions (53,7 % and 45,3 % respectively). The analysis of the obtained data established that the group of high risk of diabetes is formed by the persons who are married which number is 1,7 times higher, than in group with low risk of a disease. The number of not married persons was lower in group with high risk of a disease ($p=0,0051$).

Among the factors influencing on high risk of development of diabetes in Saran existence of chronic diseases (72,3 %) that is 2,5 times higher ($p=0,0000$), than in group of respondents with low risk of diabetes is established. In the analysis of gender distinctions the percent of the women having chronic diseases was slightly higher than at men. Among chronic diseases in group of high risk of DM, in comparison with group of low risk, 7 times more often arterial hypertension ($p=0,0000$) was observed, stenocardia ($p=0,0043$) is 6,3 times more often. In the analysis of indicators, depending on a sex, it isn't established a reliable difference between men and women in the frequency of the specified diseases.

In group with high risk of a disease, though it is doubtful, such diseases as a myocardial infarction, a stroke, a chronic obstructive pulmonary disease, oncological diseases and hereditary predisposition to oncological diseases were more often observed. In group with high risk of diabetes more persons with a high oncology risk ($p=0,0019$) were observed. Follows from the above that comorbid states increase risk of development of diabetes. It should be noted that the number of the interrogated persons with existence of chronic diseases is higher in the city, than in the rural area that is explains by more higher risk of diabetes among city population.

Unlike of residents of rural areas among respondents of city Saran the number of the persons having existence 30 min. daily physical activities was authentically 7,5 % higher ($p=0,01$) in group with high risk of a disease. The percent of the persons having the excess body weight and obesity was 46 % higher ($p<0,01$) in group of high risk (an index of body weight 30), than respondents with low risk have diseases (an index of body weight 23). The analysis showed that the frequency of obesity is higher at women by 7 times, in comparison with men. Results of research indicate higher frequency of obesity (by 1,3 times) among female urban population, in comparison with the village.

At respondents with high risk of development of diabetes in Saran prevalence of smokers is established, and the percent of the passively smoking was authentically 9,4 % higher ($p=0,023$), than in group with low risk of a disease. It should be noted that among female persons passive smoking (39,3 % higher, than at males), is widespread in age group of 25–44 and 44–59 years. With high degree of reliability in group of high risk persons with a hyperglycemia (14 times higher, than in group of low risk) prevailed ($p=0,0000$), a hypercholesterolemia (is 3,9 times higher, than in group of low risk.) ($p=0,0000$) and the increased waist circle (is 1,2 times higher, than in group with low risk). The specified tendency is traced at persons of both floors, however is more often at women at the age of 45–59 years.

Thus, results showed that risk factors of development of diabetes among urban population in Central Kazakhstan is the following: are low level of education of respondents, the highest number of unemployed, the presence of chronic diseases such as hypertension, angina pectoris, passive smoking, obesity, hyperglycemia, and hypercholesterolemia. Urban residents have a higher percentage of chronic diseases than rural residents, but the percentage of persons with 30 minute physical activity was higher among the urban population.

Conclusions

1. The presence of high-frequency risk of diabetes (99.5 %) among residents of the Karaganda region; in the urban population (46.3 %), rural (53.6 %) in the age group 45–60 years.
2. High risk of developing diabetes is 1.2 times higher than in the urban population of the Karaganda region than in the countryside.
3. Risk factors that determine the high-risk group, both in urban populations, and in the village are the lack of employment, the presence of chronic diseases such as hypertension, angina, lack of physical activity, passive smoking, obesity, hyperglycemia, hypercholesterolemia.
4. Urban residents at high risk of diabetes had a higher percentage of chronic diseases, low level of education than rural residents.

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Қарағанды облысының респонденттерінде диабеттің даму қауіпі факторларын бағалау

Қарағанды облысының 1453 респонденттерінде FINDRISK шкаласының көмегімен қала және ауыл тұрғындары арасында скрининг түрінде диабеттің қауіп факторларының жиілігі мен құрылымы зерттелді. Диабеттің жоғары қауіпінің дамуын қалыптастыратын факторларды анықтау үшін әлеуметтік-экономикалық жағдайлардың, өмір салты факторларының, созылмалы аурулар болуының, сонымен қатар бірқатар сандық көрсеткіштердің: дене салмағы индексінің, бел өлшемінің, қандағы глюкоза мен холестерин деңгейлерінің сараптамасы жүргізілді. Қарағанды облысының қала (46,3 %) және ауыл (53,6 %) популяциясы тұрғындарының 45–60 жас аралығындағы тобында диабет дамуының жоғары қауіпінің (99,5 %) болуы дәлелденді. Қарағанды облысының қала популяциясында ауылды жермен салыстырғанда 1,2 есе диабет дамуының жоғары қауіпі анықталды. Сонымен қатар қала, ауыл популяциясында жоғарғы қауіп тобын анықтайтын факторлар: жұмыстың болмауы, артериалды гипертензия, стенокардия тәрізді созылмалы аурулардың болуы, физикалық белсенділіктің жеткіліксіздігі, пассивті темекі шегу, семіздік, гипергликемия, гиперхолестеринемия болып табылады.

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Оценка факторов риска развития сахарного диабета у респондентов Карагандинской области

Изучена частота и структура факторов риска сахарного диабета у 1453 респондентов Карагандинской области в виде скрининга среди городского и сельского населения с помощью шкалы FINDRISK. Для выявления факторов, формирующих развитие высокого риска сахарного диабета, проводился анализ социально-экономических условий, факторов образа жизни, наличия хронических заболеваний, а также ряда количественных показателей, таких как индекс массы тела, окружность талии, уровень глюкозы и холестерина крови. Установлено наличие высокой частоты (99,5 %) риска развития сахарного диабета среди жителей городской популяции (46,3 %) и сел Карагандинской области (53,6 %) в возрастной группе от 45 до 60 лет. Выявлено, что высокий риск развития сахарного диабета выше в 1,2 раза в городской популяции Карагандинской области, чем в сельской местности. Факторами риска, определяющими группу высокого риска, как в городской популяции, так и в селе, являются отсутствие занятости, наличие артериальной гипертензии, стенокардии, недостаточная физическая активность, пассивное курение, ожирение, гипергликемия, гиперхолестеринемия.