

SHORT THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D.)

**ASSESSMENT OF CARDIOVASCULAR RISK AND THE PRACTICE OF GP'S
CONTINUOUS CARE IN CASE OF PATIENTS WITH HIGH CARDIOVASCULAR
RISK CONDITIONS**

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UNIVERSITY OF DEBRECEN
DOCTORAL SCHOOL OF HEALTH SCIENCES

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The Examination takes place at the Department of Family and Occupational
Medicine, Medical and Health Science Center, University of Debrecen
15. December, 2011. 11:00

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The Ph.D. Defense takes place at the Lecture Hall of the 1st Department of Medicine,
Institute for Internal Medicine, Medical and Health Science Center, University of
Debrecen
15. December, 2011. 13:00

1. Introduction

Atherosclerotic cardiovascular diseases are the head of the Hungarian and European mortality statistics. Thus the prevention of these diseases is a significant national health mission. Early diagnosis of risk factors and the introduction of necessary intervention are the basis of the prevention.

In the last decades considerable efforts have happened worldwide for the reducing of cardiovascular morbidity and mortality relying on the epidemiology and clinical studies.

As a result of the cooperation of international and national professional societies, professional resolutions have taken place. The resolutions outline recommendations in the scope of health preservation, primary cardiovascular prevention, recognition of risk factors, cardiovascular risk assessment, cardiovascular risk classification and treating of cardiovascular risk conditions. The resolutions embrace the complex tasks of primary care/basic health care in the course of implementation of cardiovascular prevention.

Cardiovascular risk assessment methods

The assessment of coronary heart disease's risk goes back to more decades. The first model was the *Framingham Score*, the framer of which created the assessment algorithm in the scope of Framingham Study by the processing of population data of the small American city. Combined effects of risk factors became assessable for the developing of coronary heart disease by the processing of data from the study and adopting of the statistical estimation. The currently applied description of the Framingham Score was published in 1998, than it spread world-wide while contradictions of its application also occurred. Criticism of the Framingham Score contributed to the development of the European risk assessment methods.

In 1994, three European medical societies (European Society of Cardiology, European Atherosclerosis Society, European Society of Hypertension) issued a common directive to the prevention of coronary heart disease in the clinical practice. The directive was firstly actualized in 1998. Both *Joint European Task Force*

directives based on the results of the Framingham study. The third recommendation (SCORE: Systematic Coronary Risk Evaluation) of Joint European Task Force was published in 2003 and it based on an autonomous European epidemiology database. The previous risk assessment method of the Joint European Task Force gives the probability of the coronary heart disease's development, but risk assessment chart of SCORE show the probability of the fatal cardiovascular event.

SCORE, similarly to the previous European recommendations, determines the priorities, fields, targets, objectives and methods of the intervention. Owing to these factors, cardiovascular prevention is significant in terms of its European approach and practice.

The fourth recommendation of Joint Task Force (published in 2007) is founded henceforward on the database of SCORE and principles drawn up in 2003.

The Hungarian Cardiovascular Consensus Conferences (HCCC) provide the harmonization of cardiovascular risk event's native diagnostics and treatment directives to the common European directives from time to time.

1.2 Functions of primary care in cardiovascular prevention

The first important function of the cardiovascular prevention is the preservation of patients's health. Health preservation includes training people for healthy lifestyle and giving advices to them in the primary care in health preservation's interest. Primary prevention of cardiovascular diseases contains furthermore the favouring of those efforts, which stem the development of this type of disease within the scope of popular prevention's strategy.

The second relevant task is the diagnosis of cardiovascular risk factors and the performance of risk assessment in the circle of healthy people. The third task is the influencing of diagnosed risk conditions, nursing of patients and reducing of risk for the sake of preventing the development of cardiovascular pathological conditions and complications. In the primary care the detailed tasks of care for this conditions are ordered by professional directives and in daily practice the HCCC provide help. These provide direction in relation to the choosing of treatment and the achieving of targets.

2. Objectives

2.1 Cardiovascular risk assessment in primary care

The basic objective of our studies is to assess the rate of cardiovascular risk among patients of general practices of the Northeast Hungarian region by applying a professional accepted risk assessment method compatible with the common European directive. The studies expand to the adult population not participating in continuous care because of cardiovascular risk factor(s) or disease.

Our aim is to study the incidence of cardiovascular risk factors, the connection between the factors and their effect on the development of cardiovascular exposure within the scope of GP practices' patients mentioned above.

The range of risk factors required to study are the follows: the gender and age, the smoking habits, the value of systolic blood pressure, the parameters of lipoprotein metabolism, the value of Body Mass Index (BMI) of patients initiated in the study and the rate of patients feeding healthy-unhealthy and following active-passive course in life.

2.2 Studying the continuous care of conditions accompanied with cardiovascular risk in primary care.

The second essential objective of our studies is the assessment of the practice and efficiency of continuous care in GP practices in three conditions associated with significant cardiovascular risk: hypertension, diabetes mellitus and dyslipidemia.

In the course of hypertension care of GP practices we have required to gain data about the circle of patients, the applied drug- and non-drug treatment and the successfulness of achieving target levels.

The aim of the study of diabetes care is to assess the prevalence of diabetes risk factors and the traceable macrovascular and microvascular complications, to investigate the applied treatments, to represent the results of the applied treatment, and to compare the results of care in 1TDM and 2TDM.

In the course of assessment of GP practices' dyslipidemia care we have required to study the lipoprotein-deviations needed treatment, the association of other cardiovascular risk factors, the co-morbidities influencing the development and treatment of dyslipidemia, the methods applied during the continuous care, the efficiency of methods and the successfulness of achieving target levels.

2.3 Study about the relation between body weight data in different ages and the development of hypertension or 2TDM.

The objective of our study directed to patients of primary care practices is to research that there is any relation between changes in body weight in different ages – that's dynamics - and the development of hypertension or 2TDM.

2.4 The assessment of the effect of intervention by nutritional counseling to patients with diabetes and it's follow-up

During this research we have analysed the effect of group- and individual nutritional counseling in case of patients with diabetes mellitus by determining the parameters of fasting blood-glucose level and HgA1c.

3. Methods and patients initiated in the study

3.1 Studying the cardiovascular risk in primary care practices

In the study directed to the assessment of cardiovascular risk among patients of 48 GP practices have taken part from North-East Hungary's four county at the DEOEC Department of Family Medicine invitation. There have been 20-40 patients by practices and totally 1320 patients participated in the study from the 18-60 year-old, complaint free population not treated/cared because of cardiovascular risk. Patients previously treated or cared in the practice because of cardiovascular risk factor(s) and/or cardiovascular disease(s) could not be initiated into the study. The method of sampling is that those take part in the study from patients meeting the criteria mentioned above who have registered for the so called „periodical” medical examination (stipulated by the relating law) needed to the renewing of medical record at their GP.

Within the scope of doctor-patient meeting risk-status survey (recording the anamnesis, the smoking and feeding habits, assessing the physical activity, physical examination, taking blood pressure, Body Mass Index – BMI) and prescribing of lab tests have happened in the GP's consulting room. Data of patients participated in the study have recorded on individual data sheets. The assessment of cardiovascular risk

and the further statistical data processing have been happened relying upon these findings.

The study applies the Joint European Coronary Risk Chart (Second Joint Task Force 1998) for the assessment of cardiovascular risk. Using this method we can determine the rate of coronary risk for the next 10 years. The chart requires six parameters: gender, age, diabetes history, smoking history, the total cholesterol level of plasma and the value of systolic blood pressure. In cognition of these parameters the cardiovascular risk can be determined for the next 10 years from the chart. Levels of risk can be the follows: low: <5%; mild: 5-10%; medium: 10-20%; high: 20-40%, extremely high: >40%.

3.2 Studying the continuous care in primary care practices

Hypertension. The study has been performed by the method of questionnaire survey in 39 GP practices operating in the primary area of DEOEC Department of Family Medicine.

20-25 by practices and totally 826 patients selected into the study from the population aged over 18-year and cared at least 1 year because of hypertension. During the study we apply the method of systematic selection: From the beginning of the study only patients with determined serial number can be participated in the study from patients met the criteria and appeared in the consulting room.

Questions in the questionnaires are the follows: personal data; the date when hypertension first appeared; the origin of hypertension and its seriousness; damages in target organs; the applied therapy methods (changing of lifestyle and drug therapy); the last three blood pressure value measured in the latter one year. Blood pressure values are recorded during the surgery in GP's office, and measured by standardized hydrargyric sphygmomanometer. We have taken the effective professional standard of the Hungarian Hypertension Society in the matters of diagnostics, treatment and care of hypertension.

Diabetes. 400 patients of totally 41 GP practices are selected into the study in accordance with the principles mentioned above. The following data are recorded: personal data, type of diabetes mellitus and the period of its standing, cardiovascular risk factors, the occurrence of macrovascular complications, the occurrence of

microvascular complications, the applied treatment methods, at most three results - FBG, ppBG and HbA_{1c} - of the studies last year. We have taken the effective professional standard of the Diabetes Commissions of Professional Board of Internal Medicine in the matters of diagnostics and treatment of diabetes mellitus.

Dyslipidemia. 8-12 patients by practices and totally 390 patients selected into the study from the population aged over 18-year and cared at least 1 year because of dyslipidemia. The following data are recorded: personal data (gender, age, qualification, job) the reason of lipid/lipoprotein exploration, the period of dyslipidemia's standing, the occurrence of individual risk factors (anthropometric data, hypertension, carbohydrate metabolism disorder, smoking), the occurrence of diseases associated with dyslipidemia (cardio-, cerebrovascular, peripheral vascular, kidney diseases, hypothyreosis), cardiovascular occurrence in familial history, the applied therapy methods (changing lifestyle and drug treatment), value of lipidparameters measured in the latter one year (at most the three latest value). We have taken the effective professional standard of the Hungarian Arteriosclerosis Association in the describing of noticed lipidparameter deviations and in the matter of objectives.

3.3 Study about the relation between body weight data in different ages and the development of hypertension or 2TDM.

During the analysis of the relation between changes in body weight and development of hypertension or 2TDM we used data relating changes in body weight in case of patients - aged 60-75 – selected from GP practices by a consecutive method. We compared the results of patients with 2TDM and/or hypertension and patients free from these diseases.

3.4 The assessment of the effect of intervention by nutritional counseling to patients with diabetes and it's follow-up

From a primary care practice's 108 patients known to have diabetes mellitus 47 patients have registered to the free counseling. All of them took part in group nutritional counseling and 24 patients of them had individual consultation, too. We measured the fasting blood-glucose and HgA_{1c} levels before the consultations, one

month thereafter, finally a year later. We have analysed the development of lab parameters.

3.5 Methods of laboratory and instrument tests

The measuring of blood-glucose level, HbA1c level, microalbuminuria and creatinin level, total-cholesterol (T-C), HDL-cholesterol (HDL-C) and triglycerid (Tg) level has happened in accredited laboratories, and LDL-cholesterol (LDL-C) level has calculated by Friedewald equation. Blood pressure has been taken by hydrargyric sphygmomanometer in compliance with the profession standard of the Hungarian Hypertension Society. Body Mass Index (BMI) has been determined for the diagnosis of obesity.

3.6 Statistical processing of the results

We have applied the method of descriptive statistics for the data processing. The frequency of values have been compared by χ^2 -test in the studied group. The result of correlations is significant if $p < 0.05$.

4. Results

4.1 Cardiovascular risk factors and the estimated cardiovascular risk within the scope of patients not participating in continuous care.

4.1.1 Risk factors taken into consideration during the estimation of cardiovascular risk and the cardiovascular risk of examined patients

Increased systolic blood pressure can be observed at the 30% of examined poulation not participating in continuous care because of cardiovascular risk factors or diseases. Moderate hypertension can be observed at around 5% of patients and severe hypertension can be observed at 1.6 % of patients on the basis of systolic blood pressure measured. Study shows that there is higher rate of patients with systolic blood pressure above 140 Hgmm in case of men than in women ($p < 0.05$).

About 10 % of young patients have increased systolic blood pressure, this rate is 40 % in case of middle-aged patients ($p<0.01$).

The study highlights that increased T-C level can be observed at the 50 % of patients. There is a higher rate of patients with increased T-C level in case of man than in woman (55.2% vs. 47.6%; $p<0.01$). There is a significant difference in the rate of patients with T-C level above 5.2 mmol/l between middle-aged and young patients (60% vs. 30%; $p<0.001$).

Increased fasting blood glucose (FBG) level can be observed at the 11.4 % of examined patients, impaired glucose tolerance (IGT) at the 2.9 % of patients, diabetes mellitus (DM) at the 1% of patients. There is not a significant difference between genders in the rate of patients who have FBG level above 6.0 mmol/l. It is essential that every IGT and DM diagnosis has been occurred in the middle-aged patients.

In compliance with the results of smoking habits the 58.2% of the patients have never smoked and 30.3% of the patients smoke during the study. Men smoke in a higher rate than women (38.0% vs. 24.5%; $p<0.001$). There is not any difference in the rate of smokers in case of young and middle-aged patients. The rate of patients giving up smoking is higher in the group of middle-aged than in youngers.

The distribution of patients with different cardiovascular risk is the follow: low: 34.4%, mild: 24.1%, moderate: 29.1 %, high: 11.8%, extremely high: 0.6 %. The cardiovascular risk of patients regarding themselves healthy have proved low or mild in less than 60% of cases, moderate in the 30% of cases, high in more than 10% of cases and extremely high in few cases. The distribution of patients belong to different risk grades is unfavourable in case of men than in women, and it is unfavourable in case of middle-aged than in youngers ($p<0.001$ in both cases).

4.1.2 The connection between risk factors representing the basis of risk assessment and theirs effect on cardiovascular risk

Studying the connection between risk factors representing the basis of cardiovascular risk assessment the study shows that there is a significant difference between the distribution of patients belong to the various grades of systolic blood pressure in accordance with T-C and FBG level ($p<0.001$ in both cases), and there is no

difference in the distribution of blood pressure values of the three group with different smoking habits.

The rate of increased T-C values is significantly higher in patients with abnormal systolic blood pressure than in patients with normal systolic blood pressure. There is a similar deviation in case of FBG categories ($p<0.001$ in both cases), but in group of smokers and non-smokers there is no difference between the rate of normal and increased T-C values.

The distribution of patients' FBG levels is unfavourable in the group with increased T-C level than in case of normal T-C values, and the distribution of patients is also unfavourable in the group with increased systolic blood pressure than in normotonic patients ($p<0.001$ in both cases), but there is not any difference in the distribution of FBG categories in case of smokers and non-smokers.

There is not any difference in the distribution of smoking habits considering the grades of systolic blood pressure and T-C values, the rate of smokers and non-smokers is not differ considering the FBG categories, but the rate of patients giving up smoking is higher in case of patients with increased FBG values than in patients with normal FBG level.

The distribution of cardiovascular risk's grades is more unfavourable in the categories of systolic blood pressure, the distribution is more unfavourable also in case of patients with increased T-C value than in patients with normal T-C values. The distribution of risk grades differs in groups created by various smoking habits ($p<0.01$ in both cases).

4.1.3 The occurrence of risk factors ignored during the risk assessment, theirs connection and effect on cardiovascular risk

The study proves 42.1 % of patients have increased LDL-C level, 39.1 % have increased Tg level and 5.1 % of patients have increased HDL-C level in the course of studying the further lipoprotein parameters left out of consideration during the cardiovascular risk assessment.

The rate of increased LDL-C and increased Tg level is significantly higher in case of men and middle-aged patients than in women and middle-aged patients ($p<0.05$ and

$p < 0.001$), but there is not any difference between age-groups and genders considering the frequency of decreased HDL-C values.

The study researches the relation between the pathological LDL-C, Tg and HDL-C results and the frequency of other examined risk factors. It is proved that the rate of patients with increased LDL-C level differs significantly ($p < 0.05$, $P < 0.001$ and $p < 0.05$) in accordance with the categories of feeding. The rate of patients with increased Tg level shows significant difference ($p < 0.001$, $p < 0.01$, $p < 0.05$, $p < 0.001$, $p < 0.01$ and $p < 0.001$) in compliance with systolic blood pressure, FBG value, smoking, BMI, feeding and physical activity.

In case of HDL-C results there is not such a connection.

The distribution of patients with different cardiovascular risk is unfavourable in the group with increased LDL-C level and increased Tg value than in group with normal LDL-C and Tg levels ($p < 0.001$ in both cases), but there is not any connection between the HDL-C levels and the distribution of cardiovascular risk grades.

The study proves that BMI value has reached or exceeded the value of 27 kg/m^2 in case of 38% of patients, feeding is unhealthy in case of 34% of patients and physical activity is not adequate in case of 52% of patients. The rate of men with increased BMI and feeding unhealthy is significantly higher than rate of women with similar parameters ($p < 0.001$ in both cases), adequate physical activity is more frequent in case of men ($p < 0.05$). Increased BMI values and not adequating physical activity are more frequent in the middle-aged group than in case of young ($p < 0.001$ and $p < 0.05$), but there is not any difference between age-groups in accordance with the frequency of unhealthy feeding.

We studied the connection between BMI value, unhealthy feeding, not adequating physical activity and the frequency of other examined risk factors. It is proved that pathological systolic blood pressure, total cholesterol level and FBG level is significantly frequent in case of patients with increased BMI value than in patients with normal BMI value ($p < 0.001$ in all cases). Unhealthy feeding and not adequate physical activity are in significant relation to pathological systolic blood pressure ($p < 0.001$), increased T-C level ($p < 0.01$) and increased BMI values ($p < 0.01$).

The distribution of patients with different cardiovascular risk is more unfavourable in group with increased BMI values and feeding unhealthy, than in group with normal BMI and feeding healthy ($p < 0.001$ in both cases). There is not any significant connection between physical activity and cardiovascular risk grades.

4.2 Continuous care of conditions with cardiovascular risk in GP practices

4.2.1 Hypertension

Evaluating the clinical parameters of 826 patients cared in GP practices because of hypertension, it is proved that the 60 % of patients are women and the 40 % of patients are men; at the beginning of the research the half of patients have moderate hypertension, around third part of patients have severe hypertension and only little part of patients have mild hypertension; The distribution of hypertension grades is unfavourable in case of men than in women; cardiovascular , cerebrovascular and retinal risks are considerable and there are connection with the seriousness of hypertension.

Overviewing the treatment practice it is proved that the most frequently used antihypertensive preparations are ACE-inhibitors, Ca-antagonists and beta-blockers; the rate of monotherapy and combined drug treatment shows connection with the seriousness of hypertension, although monotherapy is also used in case of severe hypertension.

The results furthermore show normal blood pressure and adequate distribution of mild, moderate and severe hypertension(45%, 8% and 1%) in case of the 46% of cared patients; the rate of achieving target values depends on the starting blood pressure values and this rate is 40% even in case of patients with onset severe hypertension.

4.2.2 Diabetes mellitus

Evaluating the clinical parameters of 400 patients (351 2TDM, 49 TDM) cared in GP practices because of diabetes mellitus, it is proved that the distribution of women, men, middle-aged and old patients is not differ; the occurrence of cardiovascular risk, hypertension and dyslipidemia is more frequent in cases of 2TDM, and the occurrence of smoking, microalbuminuria and microvascular complications is more frequent in cases of 1TDM.

Overviewing the treatment methods it is proved that the rate of conservative intensive care and conventional insulin therapy is around 70%:30% in case of 1TDM; the rate of the applied treatment methods in 2TDM is the follow: dietary treatment only – 8%, oral antidiabetic treatment – 78%, oral antidiabetic and insulin treatment - 7%, insulin treatment – 7%.

The rate of patients with three exploration results at least is not adequate in the last year of the reserch (FBG: 50%, ppBG: 30%, HbA1c: 10%). The accessing rate of target values indicating the result of researching is low both in 1TDM and 2TDM (FBG: 27 % and 14%, ppBG: 26% and 18%, HbA1c: 29% and 34%), the rate of patients under the category of poor risk is high (FBG: 59 % and 68%, ppBG: 54% and 53%, HbA1c: 4% and 24%).

4.2.3 Dyslipidemia

Evaluating the clinical parameters of around 390 patients cared in GP practices because of dyslipidemia, it is proved that the rate of women and men is balanced; hypertension can be detected in the three-quarter part of patients, carbohydrate metabolism disorder and increased BMI can be detected in 40-40% of patients; the rate of cardiovascular, cerebrovascular and peripheral vascular risk of patients is meaningful.

The rate of pharmacotherapy in patients with dyslipidemia is high (88%), predominant part of them get statin treatment. The rate of patients getting fibrat treatment is also significant and a minor part of patients get combined statin-fibrat treatment.

The rate of T-C level above 5.2 mmol/l has decreased by 13% and the rate of Tg concentrations has decreased by 6,6% owing to the treatment. Evaluating the achievement of target values in accordance with risk groups the study shows that only 1,7% of patients reach the target value in case of high cardiovascular risk, 15,1 % in case of medium risk and 67% in case of mild risk.

4.3 Study about the relation between body weight data in different ages and the development of hypertension or 2TDM.

Weight gain was the most pronounced in the decade before diagnosis and in case of men in the third age decade and in case of women in the fourth age decade in patients with 2TDM. Similar but not so characteristic tendency was also observable in patients suffering in hypertension only.

4.4 The assessment of the effect of intervention by nutritional counseling to patients with diabetes and it's follow-up

After nutritional counseling the parameters of carbohydrate-metabolism have been improved in all groups, but this improvement is statistically significant only in case of fasting blood-glucose level in men and those who have taken part only in group consultation. It is probably that negligence was the most significant in these groups with regard to the medical advices. Data registered one year later show that there is a further decrease in both parameters in case of patients taken part in individual consultation, while the value of parameters are getting worse and nearly return to the starting stage in case of patients taken part only in group consultation.

5. Discussion

5.1 Studying cardiovascular risk factors and cardiovascular risk in primary care practices .

The results of studies in adult population not in continuous care because of cardiovascular risk factors or diseases are evaluated by three aspects: the occurrence of risk factors, the connection between risk factors and their effect on cardiovascular risk.

5.1.1 The occurrence of cardiovascular risk factors

The frequency of cardiovascular risk factors has been proved high in the examined population. Systolic blood pressure has been proved high in the 31% of patients, in

the 35% of men, in the 27% of women, in the 10% of young patients, in the 40% of middle-aged patients. Data clearly show that the screening of hypertension needs further efforts and more frequent preventive doctor-patient meetings in the primary care.

The study shows that more than half of the patients has a T-C level exceeding the 5.2 mmol/l limit value. This rate is 55% in case of men, 48% in case of women, 30% in case of young patients and 60% in case of middle-aged patients. In accordance with the data the rate of patients with higher T-C level is increased by age in one respect and cardiovascular risk of every third young patient will rising by increased T-C level on the other hand. During the study of further lipoprotein parameters increased LDL-C level has been diagnosed in the 42% of patients, increased Tg level has been diagnosed in the 39% of patients and decreased HDL-C level has been diagnosed in the 5% of patients. The rate of increased LDL-C and Tg level in men and middle-aged patients exceeds this rate in women and middle-aged patients.

Thus screening of dyslipidemia in compliance with the relating professional recommendation is essential in primary care.

Using the described algorithm study shows increased FBG level in the 11% of patients, IGT in the 3% of patients, 2TDM in the 1% of patients. Based on the results, it is necessary to emphasize the importance of diabetes check-up in case of population with diabetes risk but considering themselves healthy (age over 40, patients with positive familial history or other cardiovascular risk factor).

The 30% of patients has confessed themselves smoker in the study. The rate is 38% in case of men, 25% in case of women and almost equal in case of young and middle-aged patients.

Since smoking is to blame for the half of preventable death, the results show that it is necessary to increase efforts directed to the prevention of smoking and the giving up of smoking.

The rate of 66% in case of patients aspiring to healthy diet is lower than the desirable. Women feed appropriate in a higher rate than men, and the rate of patients feeding healthy is not differs in case of youngs and middle-aged. Striving after physical activity is not adequate, only the 48% of the participants belong to the group of actives. Men are more active than women and youngers are more active than older patients. BMI has reached or exceeded the value of 27 kg/m² in the 38% of patients. The rate is higher in case of men than in women, similarly in case of middle-aged

than in youngers. Results highlight that it is necessary to increase the activity of primary care within the scope of training people for healthy lifestyle in every age-groups, mainly in case of the youngs.

5.1.2 Connections between cardiovascular risk factors

In the study, blood pressure distribution of patients with increased T-C value is proved more unfavourable than in case of normal T-C value; the rate of increased T-C values is higher in case of patients with high systolic blood pressure than in patients with normal systolic blood pressure. There is a similar connection in the rate of patients with increased LDL-C, Tg and increased systolic blood pressure. Collective occurrence of increased T-C, LDL-C, Tg levels and hypertension appears mainly in the existence of metabolic syndrome, when obesity and carbohydrate metabolism disorder is also observable. Hyperinsulinemia – the basis of the syndrome – stimulates the hepatic cholesterol synthesis, contributes to the development of dyslipidemia and bears a part in development of hypertension.

There is a meaningful difference in the blood pressure distribution of patients with increased FBG level compared to patients with normal FBG level; the rate of patients with pathological FBG level differs significantly in case of group with normal and increased systolic blood pressure. Consequently, hypertension can often develop in carbohydrate-metabolism disorder with IFG, and glucoregulation disorders can often develop in case of hypertension.

The prevalence of T-C concentration is higher in case of patients with increased FBG level than in patients with normal FBG level; the rate of pathological FBG level is higher in case of increased T-C level. In compliance with the bibliographical data hypercholesterinaemia is more frequent already in case of IFG. There are complex occurrences in the background. Increased FBG, free fatty acid and insulin level collectively intensify the VLDL-cholesterol (VLDL-C) developing in the liver, besides the activity of lipoprotein-lipase decreases. Hypertriglyceridemia, the increasing of small dense LDL-C and the decreasing of HDL-C level occur. The modified LDL-C stimulates the intracellular cholesterol synthesis, because inhibition of HMG-CoA-reductase induced by HDL does not recur, which causes the increasing of T-C level.

In line with the fact mentioned above systolic pathological blood pressure, increased T-C, LDL-C, Tg concentration and increased FBG level are more frequent in patients with higher BMI level. Increased blood pressure, carbohydrate-metabolism disorders and dyslipidemia related to overweight/obesity result endothel-disfunction, which intensifies the acceleration of atherosclerosis.

Smoking is one of the factors of cardiovascular risk assessment from risk factors relating to the lifestyle. Bibliography highlights the systolic blood pressure increasing effect of smoking and the advantage of giving up smoking. According to this study, there is not any significant difference in the blood pressure of patients smoking never, patients smoking currently and patients giving up smoking. The rate of patients with increased T-C level and pathological FBG level does not differ between the smokers and non-smokers, the rate of increased Tg levels is higher in case of smokers. It is remarkable that the increased T-C value is frequent in case of non-smokers, the distribution of FBG levels is unfavourable which is explainable with the higher BMI value of non-smokers.

The distribution of patients with different systolic blood pressure differs significantly in case of patients striving and not striving for healthy diet, and there is a meaningful difference in the occurrence of increased T-C levels. Considering the increased BMI values it is remarkable that there is a significant difference between patients feeding healthy and patients feeding unhealthy, since the connection between unhealthy feeding and the increasing risk of obesity is proved. The study does not show connection between the quality of feeding and the frequency of carbohydrate-metabolism deviations in the examined population.

Based on the results the relations between cardiovascular risk factors can be summarized as the follows: overweight/obesity developing in consequence of unhealthy lifestyle leads to the development of hypertension and the deviations of carbohydrate- and lipoprotein-metabolism meaning the components of metabolic syndrome, while smoking stimulates the cardiovascular risk by means of its endothel-damaging effect.

5.1.3 The effect of cardiovascular risk factors on the development of estimated cardiovascular risk

The study shows an unfavourable distribution of risk grades in case of adult patients thinking themselves healthy and not in continuous care by the applied risk assessment method. The distribution of grades is more unfavourable in the categories of systolic blood pressure, the distribution is more unfavourable in case of patients with increased T-C value than in case of normal T-C values and the distribution also differs in groups formed by smoking habits. These results highlight that systolic blood pressure, T-C level and smoking/non-smoking are part of the risk factors evaluated during the risk assessment treatment.

We studied the relation between risk factors ignored from risk assessment with the development of assessed cardiovascular risk.

The results show that the distribution of assessed cardiovascular risk grades is more unfavourable in parallel with the different categories of FBG level. The process, in the course of which pathogenesis of diabetes progresses on the ground of metabolic syndrome, seems to be reflected in the increasing of risk. It is particularly meaningful that a higher cardiovascular risk is expected even in case of FBG values equivalent with IFG. IFG is not included to the evaluated aspects of the applied risk assessment, therefore higher evaluated cardiovascular risk noticed in case of the occurrence of FBG values equivalent with IFG is caused by risk factors, which are part of the risk assessment treatment and relating to the IFG (increased systolic blood pressure and total-cholesterol level).

The distribution of patients with different cardiovascular risk grades is proved more unfavourable in group of increased LDL-C level and increased TG value, than in group of normal LDL-C and Tg levels.

The distribution of patients with different cardiovascular risk is more unfavourable in the group with increased BMI value and feeding unhealthy than in the group with normal BMI value and feeding healthy. More frequent increased T-C level, carbohydrate-metabolism disorder and increased systolic blood pressure of this patient group can be the background of the higher cardiovascular risk connected with overweight. The same effects occur in case of patients feeding unhealthy derive from the body weight increasing.

The study shows that the connection between physical activity and the distribution of cardiovascular risk is not significant, besides physical activity through its favourable effect on other cardiovascular risk factors is an important lifestyle factor in terms of preventing cardiovascular diseases.

5.2.Evaluation of the care in GP practices

5.2.1. Hypertension

At the beginning of care women had a significantly lower tension value than in case of men, but the difference has vanished during the treatment. In parallel with age the rate of patients reaching the normotension decreases significantly, this rate is only 40% in case of patients over 60. In parallel with the seriousness of hypertension the rate of patients with normotension or patients classed in a mildest seriousness category than earlier decreases. The available data of foreign analyses show that the rate of patients with hypertension –who are on target level - is 33% in France, 25% in Belgium, 24% in the USA, 16% in Canada and only 6% in England. In Hungary, the study of Farsang et al. show that the rate of patients with a blood pressure under 140/90 Hgmm is 27,8%. What can be the reason of the relatively favourable data of the Hungarian and international study? The methodological approaches of the studies mentioned above are not uniform and they differ from our study in more aspect. While in our study just patients treated at least for a year can participate, but this is not a criteria in the studies mentioned above. The current study uses the data documented in the electronic health records of GP colleagues volunteered for the participation. The study takes the last three tension value of the cares last year into consideration, while the evaluation from the mentioned researches based on measurement/measurements performed by ad hoc method and by foreign person – consequently in a certain stress-situation – during a sole treatment. On the basis of our experiences it can be ascertained that early diagnosis of hypertension in case of young and men patients is necessary to intensify and the treatment of patients with hypertension is necessary to improve. Hereby the mitigating of cardiovascular risk and morbidity can be more successful.

5.2.2 Diabetes

The control inspections directed by the professional recommendations (FBG, HbA_{1c}, ppBG) with the required frequency did not occure in case of patients with diabetes.

The target values - determined by the Hungarian professional standard - to be achieved in favour of assuring the optimal glycemic control during the care of diabetes mellitus create two additional risk categories. Belonging to these categories means the increasing chance of the developing of complications. In the study, low risk target values are achieved in a minor part of patients (FBG level: 16%, ppBG: 19%, HbA_{1c}: 34%), but the rate of patients of the most unfavourable risk category (FBG level: 67%, ppBG: 53 %, HbA_{1c}: 29 %) is significant simultaneously. For this reason the glycemic control of patients is not reckoned adequate. The distribution of patients from ppBG and HbA_{1c} categories is the most favourable in case of patients treating with diet and oral antidiabetic monotherapy. It strengthens the fact that efforts directed to attaining the optimal glycaemic control is necessary to intensify mainly in case of patients whose target value is not achieved by diet and oral antidiabetic monotherapy.

5.2.3 Dyslipidemia

T-C target value of $\leq 4,0$ mmol/l determined by the actual standard is achieved in the 1,7% of the high risk group of dyslipidemic patients. The target value is achieved in the 15,1% of the medium risk group, while the desired target value in compliance with the group is achieved in more than 66.7% of the patients from low risk category. These rates indicate the varying efficiency of the treatment, and the result seems to particularly inconsiderable in case of patients exposed to the higher cardiovascular risk.

In a French study reserching a high number of patients the T-C target values are achieved in the 26% of patients suffering from coronary heart disease (CHD) or CHD equivalent condition. In a relating Hungarian survey the achievement of T-C values is 21% in case of patients with high cardiovascular risk. According to the data of EUROASPIRE II. the T-C target value is achieved in the 40% of patients suffering from CHD, got hospital treatment. Data reflect that the rate of T-C target value achievement is quite low. Improving the effectiveness of the dyslipidaemic patients' treatment is an urgent mission for the future.

5.3 Study about the relation between body weight data in different ages and the development of hypertension or 2TDM.

Our results corroborate that unchanged body weight and slow weight gain have a preventive role in development of 2TDM.

5.4 The assessment of the effect of intervention by nutritional counseling to patients with diabetes and it's follow-up

The nutritional intervention of primary care can improve the objective parameters of carbohydrate metabolism significantly, but maintaining the positive change needs further, repeated intervention. Statistical demonstration of positive trends needs researches on a greatest population.

6. Summary, new results

Cardiovascular diseases are the head of the Hungarian mortality statistics, therefore the diagnosis of cardiovascular risk factors and the assessment of cardiovascular risk are very important, because the intervention to be introduced are the function of these. The study investigates the occurrence of risk factors, theirs connections and the rate of cardiovascular risk by applying the Joint European Coronary Risk Chart in case of the adult population not in continuous care because of cardiovascular risk or disease. High systolic blood pressure can be observed in the 30% of patients thinking themselves healthy, increased T-C value in the 50%, increased LDL-C and Tg values in the 40-40%, and increased FBG level in the 11%. The 30% of patients is smoking, the 34 % is feeding unhealthy, the physical activity is not adequate in the 52% of patients and increased BMI can be observed in the 38% of patients. The distribution of patients classed into different cardiovascular risk categories is the follow: low – 34%, mild – 24%, moderate – 29%, high – 12%, extremely high – 0.6%. The occurrence of risk factors and the rate of patients classed into difeferent risk grades are more unfavourable in case of men and middle-aged patients, than in women and youngs. According to the results, relations between certain risk factors is equal with the connection between the components of metabolic syndrome. Risk factors ignored from the cardiovascular risk assessment can influence the development of cardiovascular risk through their connection with factors, which are the basis of the risk assessment.

Studying the practice of continuous care of hypertension, diabetes and dyslipidemia we can make the following findings: the most frequently used preparations during the hypertension treatment are ACE-inhibitors, Ca-antagonists and beta-blockers. Normal blood pressure can be observed in the 46% of patients in the course of evaluation.

The distribution of treatment methods and the applied therapy in 2TDM are adequate under the care of diabetes. However, the frequency of follow up visits falls short of the professional standard, the achievement rate of target values is low (FBG level: 16%, ppBG:19%, HbA_{1c}: 34%), the major part of the results indicates high (macrovascular) risk (FBG: 67%, ppBG: 53%, HbA_{1c}: 29%).

The rate of drug therapy is 88% in case of dyslipidaemic patients. The rate of increased T-C values has decreased with 13% as a result of the treatment. The achievement rate of T-C values is 1.7% in case of high risk, 15.1% in case of medium risk and 66.7% in case of mild risk. It is necessary to improve the diabetes- and dyslipidemia care.

Gain in weight in patients aged between 20-40 can have an important role in the development of 2TDM, while loss of weight or maintaining weight are proved to be preventive.

Specific nutritional counseling in primary care practice can provide greater comfort and more help to patients with 2TDM, but it's financial background has to be established under the health insurance system.

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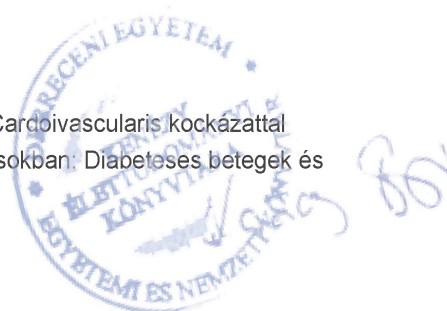
Candidate: Zoltán Jancsó

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