Using the Internet to Determine Fatal Cardiovascular Risk in the Polish Population

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Abstract: We present the first program in Poland to determine the cardiovascular disease (CVD) risk of individuals, called *Ryzyko*. The program is freely available at www.ryzyko.amg.gda.pl. Our program, partially based on the European SCORECARD program, takes into account parameters such as age, sex, systolic blood pressure, total cholesterol concentration and cigarette smoking, and enables internet users to observe themselves to determine the degree of their CVD risk.

Keywords: cardiovascular disease, internet, risk stratification

The cardiovascular disease (CVD) is one of the most common fatal conditions in the EU countries. In 1998 the mortality caused by coronary artery disease and stroke reached a level of 41.7% of all cases [1]. Despite the various CVD-related programs that have been introduced since the time of the Framingham Heart Study, mortality due to CVD is still on the increase. The programs have been focused on determining the risk of cardiovascular incidents and on clinical applications of the results. The PRECARD [2] program, started in the 1970's, was followed by its successor SCORECARD [3], which evaluated the risk of CV mortality. Europe was divided into high and low risk countries. Thanks to this program, the CV mortality risk of asymptomatic individuals can be assessed in advance for a 10-year period. This allows primary medical prevention to be introduced for people who belong to the high CV risk group. Risk assessment with the SCORE algorithm test is now recommended by the European Guidelines on Cardiovascular Decease [4]. Education of the public can be considered as the first step in CVD prevention.

Even though improvement in the professional competence of family doctors has become a reality and the SCORECARD system to detect high CV risk individuals has come into use, a patient's initial visit at the doctor's remains the prerequisite of any medical reaction. A large section of the Polish population does not visit a doctor's surgery at all as long as they do not feel ill or even as long as their condition is tolerable. The reasons for this can be traced to the country's period of political and social changes, in which a hard-working person has no time to visit a doctor. The already established work-car-home-TV lifestyle favours an increase in CVD incidence. However, the development of information technology and general access to the Internet have contributed to the society's self-education. Our *Ryzyko* program is also based on this idea: it enables self-observation of internet users to determine their degree of risk.

The *Ryzyko* program is partly based on SCORECARD. It is available free of charge at www.ryzyko.amg.gda.pl and between February and April 2004 there were over 1600 registered users of the program (see Table 1). The following parameters are collected: age, sex, systolic blood pressure, total cholesterol concentration and whether or not the user smokes tobacco. The algorithm of the SCORE project (as published in [3]) is used to assess the risk of CVD. The results are collected in a MySQL database on the server of the Medical University of Gdańsk. Each internet user of the program can see their graphic and numerical results after entering his or her personal data required by the program. A special service for doctors has been introduced which allows them to retrieve, with their personal password, the results of other users following their visit.

Table 1. Clinical characteristics of internet users who have taken part in self-assessment of individual risk of CV mortality by the *Ryzyko* program

Number of assessments	1606
Age [years]	49.2 ± 14.4
Sex M/W	53%/47%
Total cholesterol [mmol/L]	5.6 ± 1.55
Systolic blood pressure [mm Hg]	134 ± 21.5
Smokers	29.8%

Figure 1 illustrates the possibility of the *Ryzyko* program to collect epidemiological data. The program can carry out various statistical calculations. Everybody with access to the Internet have the opportunity to test the threat posed to them by CVD and to prevent it by visiting a physician to be prescribed the appropriate advance medical treatment. The graphical form in which the results are presented makes them easy to understand.

By monitoring patients' interviews in the *doctor service* section of the program it is possi-

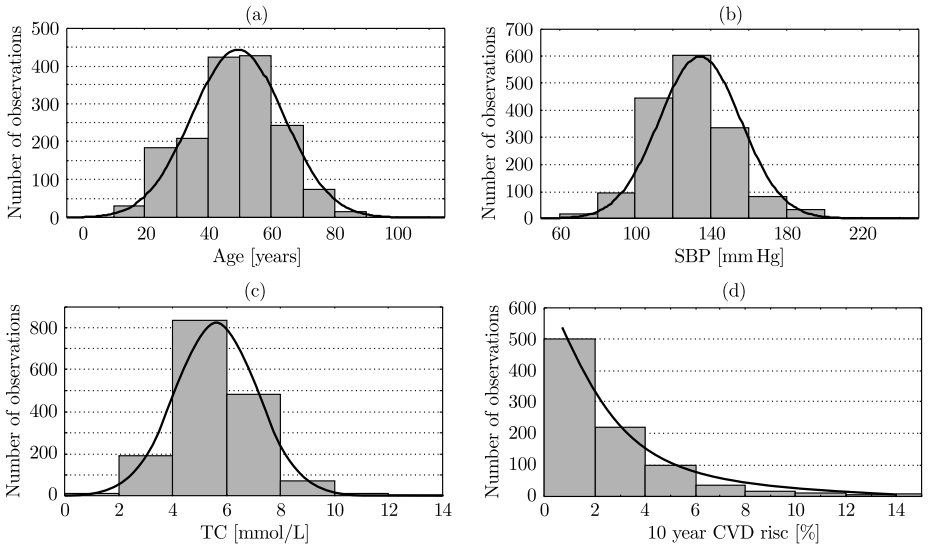

Figure 1. Statistics *Ryzyko* program users: (a) age distribution, (b) systolic blood pressure, (c) total cholesterol, (d) CVD risk of population aged 45–60

ble to observe the developing risk of each patient and, at the same time, to register the outcome of the applied therapy. By means of this general approach, the *Ryzyko* program may be used to select for preventive treatment those individuals who require it.

One of the practical advantages of the program is that it is free of charge and thus accessible for a large section of the population. Every internet user can assess his/her risk several times, according to how often the required data is updated. By doing so, the user can observe how the risk of his/her death in a 10-year period may by reduced by taking appropriate action, such as *e.g.* giving up smoking.

All the obtained results should only be treated as guidance for preventive purposes. Disease prevention is the main aim of the program and then it can be thoroughly analysed by physicians in their *doctor service* section of the program. Unfortunately, the program has not yet received enough attention from physicians, which is attributable to the still limited use of computers and the Internet general practitioners in Poland. Another reason may be simply lack of publicity in the medical press. Nevertheless, 1600 internet visits at the *Ryzyko* program website within the relatively short time of its establishment demonstrate that it has been received with general interest and meets the public's expectation for self-assessment of their health through the Internet, which these days has partly replaced reference books as a source of medical information. Furthermore, it is easier and more convenient to search the Internet and find the required information there than to make an appointment with a doctor and wait for a visit. The average age of internet visitors to the program's website (49.2 ± 14.4) suggests that they were looking for means of checking their health, rather than being young people who accessed the program for entertainment.

Concluding, we can say that the *Ryzyko* program has been received with a satisfactory level of interest by Internet users. During the first 3 months of its existence there were 1606 registered visitors to the program's website. The majority of these visitors were advised to pay a visit to the doctor's surgery for a health check. The program makes it also possible to conduct epidemiological research. The program is expected to gain in popularity quickly, which should contribute to the preventive action within the nation's health program.

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