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The influence of education on the cardiovascular risk

For many years ischaemic heart disease has been regarded as the disease of men of high position with a good economic and professional status. In the populations of Western Europe and the USA the cardiovascular risk has shown a reverse dependence on the economic and professional status since the middle of the last century. In Poland such tendencies began to appear at the end of the last century (7, 14, 15).

The aim of the work was to compare the incidence and kinds of risk factors as well as the global cardiovascular risk depending on the level of education in the population of Lublin.

MATERIAL AND METHODS

Patients were informed by the local press of the opportunity to be examined at the Outpatients' Clinic for the Prophylaxis of Cardiovascular Diseases as part of the programme for cardiovascular diseases prophylaxis.

The studies were carried out in 1,201 people aged 30–60 (average age 47.6), including 898 women (W) and 303 men (M). In the studied population there were 397 people (33.1% of the population) with higher education (H) (average age 47.11 ±7.52), 593 people (49.5%) with secondary education (S) (average age 47.62±7.08), 211 people (18.4%) with primary or vocational education (P/V) (average age 48.54±7.30).

The patients' medical history and physical examinations were registered in standardized questionnaires. ECGs, systolic (RRs) and diastolic (RRd) blood pressure examinations were done in all the patients. Total cholesterol (TCh), LDL-cholesterol (LDL), HDL-cholesterol (HDL) and triglycerides (TG) levels were determined in 804 patients after 12 hours of starvation by enzymatic method, using Bio-Merieux kits. Risk factors were estimated according to the criteria of Polish Cardiological Society from the year 2000. The material was statistically worked out using Statistica 5.0 computer programme.

RESULTS

Positive family history was found in 148 patients (37.28%) in H group, in 206 (34.74%) in S group, in 61 (29.19%) in P/V group. In the studied population prediagnosed cardiovascular disease occurred in 14 patients (3.75%) in H group, in 16 (3.17%) in S group, in 10 (5.59%) in P/V group. Arterial hypertension was treated earlier in 77 patients (20.64%) in H group, in 111 (21.94%) in S group, in 50 (7.93%) in P/V group. Glycaemia was not measured and the presence of diabetes was determined on the basis of medical history. Prediagnosed diabetes occurred in 9 patients (2.41%) in H group, in 20 (3.96%) in S group and in 4 (2.23%) in P/V group.

Up to 20 cigarettes daily were smoked by 88 patients (22.22%) in H group, 181 (30.52%) in S group, and 64 (30.62%) in P/V group. Over 20 cigarettes daily were smoked by 14 (3.54%) in H group, 22 (3.71%) in S group, and 12 (5.74%) in P/V group.

Non-smokers (294) made up 74.24% in H group, 390–65.77% in S group, 133–63.64% in P/V group. The differences were statistically significant. The comparison of cigarette smoking incidence in patients with higher, secondary or vocational education is shown in Figure 1.
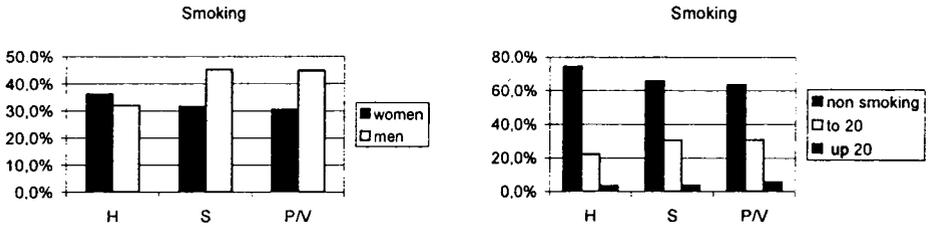

Fig. 1. The incidence of smoking habit and number of smoked cigarettes depending on education level in H, S and P/V groups

Body mass index (BMI) was determined on the basis of height and weight. BMI in group H of patients was 26.10± 4.20, in S group – 26.49 ±4.33, in P/V group – 27.13 ± 4.71 on the average. Mean BMI values in P/V group were significantly higher statistically compared with those in H group (P<0.05). BMI between 25 and 29.9 was found in 145 patients (36.99%) in W group, in 249 (42.35%) in S group, in 79 (38.16%) in P/V group. BMI > 30 was in 74 patients (18.88%) in H group, in 115 (19.56%) in S group , in 55 (26.57%) in P/V group.

The comparison of occurrence of high BMI values (BMI>25) in the studied groups using chi--square test showed statistically significant differences (P<0.05). Mean BMI values in the studied groups depending on education are shown in Figure 2.
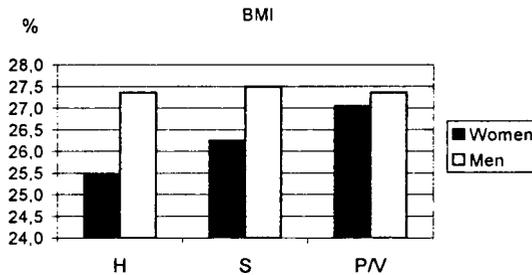

Fig. 2. The comparison of BMI values depending on education

Table 1 shows mean values of TCh, LDL, HDL, TG, RRs, RRd in the studied groups, depending on education. On the average, TCh, LDL, HDL, TG, RRs, RRd values did not differ in the statistically significant way in the studied groups of patients, however, significantly higher TG values were observed in patients with vocational education compared with groups with higher and secondary education (P<0.05).

LDL cholesterol > 100mg% was in 183 (69.58%) patients in H group, in 285 patients (70.54%) in S group, in 99 patients (72.26%) in P/V group. The differences were not statistically significant. HDL cholesterol <40 was in 21 patients (7.98%) in H group, in 25 (6.18%) in S group, in 8 (5.84%) in P/V group. The differences were not statistically significant.

Table 1. Mean values of TCh, LDL, HDL, TG, RRs, RRd in H,S and P/V groups

	H	Ś	P/V
TCh(mg%)	198.11±32.48	201.05±32.80	200.91±32.32
LDL(mg%)	114.68±28.08	117.73±29.63	115.46±25.45
HDL(mg%)	61.51±16.77	60.78±16.38	60.14±15.43
TG(mg%)	198.11±32.48	201.05±32.80	200.91±32.32
RRs (mmHg)	131.05±19.42	131.86 ±21.50	132.32.±22.42
RRr (mmHg)	83.47±11.68	84.26±13.14	84.72±12.76

In our studies arterial hypertension occurred the least frequently (37.79%) in group H patients, more frequently (42.33%) in S group and the most frequently (45.49%) in P/V group. The differences were not statistically significant. In patients nontreated earlier for hypertension raised blood pressure values (RRs >=140 and/or RRd >=90 mm Hg) occurred in 82 cases (27.70%) in H group, in 122 cases (30.89%) in S group, in 38 cases (29.46%) in P/V group. In patients with earlier treated hypertension, wrongly controlled hypertension (RRs>=140 and /or RRd>=90 mm Hg) occurred in 56 cases (72.73%) in group H, in 86 cases (77.48%) in S group, in 37 cases (74.00%) in P/V group. The differences were not statistically significant.

In the population of women 451 (50.17%) of them were before and 434 (48.28%) after menopause. Hormone replacement therapy (HRT) was used in 52 women (19.40%) in H group, 89 women (18.82%) in S group and 21 women (14.38%) in P/V group. The differences were not statistically significant.

Four categories of cardiovascular risk were distinguished: low, moderate, high and very high according to the criteria of Polish Cardiological Society from the year 2000 (4). A very high risk of cardiovascular episode concerned 59 (14.86%) patients in H group, 89 patients (15.01%) in S group, 32 patients (15.17%) in P/V group. A high risk occurred in 43 patients (10.83%) in H group, 88 patients (14.84%) in S group, 32 patients (15.17%) in P/V group. A moderate risk concerned 107 patients (26.95%) in H group, 182 patients (30.69%) in S group, 67 patients (31.75%) in P/V group. A low risk occurred in 66 (16.62%) in group H, 78 (13.15%) in S group, in 36 (17.06%) in P/V group. There was no risk in 122 patients (30.73%) in H group, in 156 patients (26.31%) in S group, in 44 patients (20.85%) in P/V group.

A tendency for a more frequent occurrence of all risk groups was observed in the patients with vocational education. The comparison of incidence of cardiovascular risk categories depending on education is shown in Figure 3.
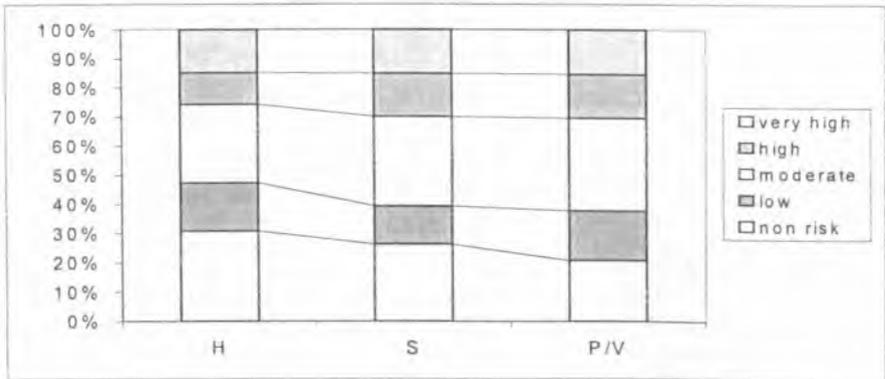

Fig. 3. The comparison of incidence of very high, high, moderate and low cardiovascular risk depending on education level

DISCUSSION

In the studied population the percentage of patients with higher education was larger than in general population (in general population – 13.7% according to GUS – Central Office for Statistics), which may result from the group selection and more frequent voluntary reports of people with higher education for prophylactic examinations. Nevertheless, the incidence of particular risk factors in the studied groups was very similar to other population studies, e.g. to the data obtained in POL MONICA Study (8).

The particular groups (H, S, P/V) differed in the incidence of some risk factors. The most frequent of them were obesity and overweight and their greatest incidence was in patients in P/V group (64.73%), somewhat lower in S group (61.91%), the lowest in H group (55.87%). BMI values were also the highest in P/V group.

A similar influence of the social status on the body fat distribution was shown in the paper of Gronkiewicz (3). Examining patients aged 40–49 she pointed out a gradient relation between abdominal adiposis and education – the lower the education the greater the abdominal adiposis, which is also confirmed by other authors (2, 12).

Recently, stress has beeen recognized as one of obesity reasons. On the basis of studies of George et al. in the USA, the authors put forward a hypothesis that obesity and body fat distribution depend in a linear way on social stress and low socioeconomic status (3, 10, 11). Beside obesity cigarette smoking is regarded as an effect of social stress (6, 7, 8). The studies of Łódź inhabitants can be taken as a proof of the relation of stress with cigarette smoking. Among the studied men 70% of them felt constant emotional tension; when comparing smokers and nonsmokers the tension in smokers occurred significantly more frequently than in nonsmokers (4).

In our studies a questionnaire survey was not conducted, however, the incidence of smoking habit was the highest in people with vocational education (36.36% – in 66), a little lower in those with secondary education (34.23% – in 203), the least popular among patients with higher education (25.74% – in 102) and the differences were statistically significant. An inversely proportional relation: smoking–income–education was demonstrated in many studies (1, 7, 14). Misiuna (5) analyzing the results of 4 large-scale POL MONICA research studies found that in the population of Warsaw the differences in cigarette smoking were significant and depended on education. In the years 1984–2001 the smoking habit was significantly more frequently observed in the people with low education and similarly, those people smoked more cigarettes daily. The lower incidence of cigarette smoking habit in people of higher social status and better educated can be connected with their greater awareness of the infavourable influence of smoking on the state of health, better understanding of educational programmes in this part of the society.

The fact that cigarette smoking and obesity depend on the socioeconomic status poses the question about the coexistence of the two risk factors. The occurrence of cigarette smoking habit together with obesity was demonstrated by some authors (Gronkiewicz; Wojtyniak et al.) (3). In our paper the incidence of the two risk factors showed a tendency of changes towards their more frequent occurrence in the people with low education.

However, a simultaneous occurrence of both cigarette smoking habit and obesity in the studies on Łódź inhabitants carried out as part of international epidemiological research named "Bridging the East-West Health Gap" did not point out the differences in the body mass index of smokers and nonsmokers, but the incidence of obesity and overweight was characteristically lower among male smokers and ex-smokers, which was not observed in women (4).

Similarly, from the studies on the inhabitants of right-bank Warsaw published by Pardo (9) it appears that the percentage of correct body mass in male smokers was higher than that in nonsmokers.

The majority of reports present unanimous conclusions about the dependence of cardiovascular risk on education. Our observations concerning the differences in the incidence of cardiovascular risk categories depending on education and tendencies for a more frequent occurrence of higher groups of cardiovascular risk in patients with vocational education are similar to the observations and trends in many European countries where a reverse phenomenon has been observed of the

relation of cardiovascular disease and a high standard of living, towards its more frequent occurrence in lower social classes, with lower socioeconomic status (13). A low socioeconomic status has been acknowledged as a cardiovascular risk factor by AHA. In Poland such tendencies have appeared only recently and our studies confirm that phenomenon in Lublin.

CONCLUSIONS

In the studied population a higher incidence of risk factors and a more frequent occurrence of higher categories of cardiovascular risk have been observed in patients with primary/vocational education compared to patients with university education.

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SUMMARY

The aim of the work was to estimate the incidence of cardiovascular risk factors depending on the level of education. 1,201 patients aged 30–60 were examined as part of the programme for the circulatory disease prophylaxis. A questionnaire concerning risk factors was used, physical examination was done, body mass index (BMI) and lipidiogram were determined. In the studied population there were 397 people (33.1%) with higher (university) education (H) (average age – 47.11), 593 people (49.5%) with secondary education (S) (average age – 47.62), 211 people (18.4%) with primary or vocational education (P/V) (average age – 48.54). Obesity and overweight most frequently occurred in people with vocational education (V – 64.73%, S – 61.91%, H – 55.87%) (P<0.05). Statistically significant differences concern average BMI values (H – 26.10, S – 34.36, P – 27.13). Cigarette smoking habit most frequently occurred in patients with primary education (H – 25.76%, S – 34.23%, V – 36.36%) (P<0.05). The studied groups did not significantly differ in the incidence of positive family history (H – 37.28%, S – 34.74%, V – 29.19%), diabetes (H – 2.41%, S3.96%, V – 2,23%), average LDL cholesterol levels (H – 114.68 mg%, S – 117.73 mg%, V – 115.46 mg%) and average values of systolic (H – 131.05 mmHg, S –131.86 mmHg, V – 132.32 mmHg) and diastolic (H – 83.47 mmHg, S – 84.26 mmHg, V – 84.72 mmHg) blood pressure. Four categories of cardiovascular risk were distinguished according to the criteria of Polish Cardiological Society from the year 2000. Very high risk (H – 14.86 %, S – 15.01%, V – 17.17%), high risk (H – 10.83%, S – 14.84%, V – 15.17%) moderate risk (H – 26.95%, S – 30.69%, V – 31.75%) low risk (H – 16.62%, S – 13.15%, V – 17.06%). A significantly more frequent occurrence of higher risk groups was observed in patients with lower education. In the studied population a greater incidence of risk factors and more frequent occurrence of higher cardiovascular risk categories were observed in patients with primary and vocational education compared to those with higher education.

Poziom wykształcenia a ryzyko choroby niedokrwiennej serca

Celem pracy była ocena rozpowszechnienia czynników ryzyka choroby niedokrwiennej serca zależnie od wykształcenia. Zbadano1201 pacjentów w wieku od 30 do 60 lat w ramach programu profilaktyki chorób układu krążenia Posługiwano się kwestionariuszem uwzględniając informacje dotyczące czynników ryzyka, przeprowadzono badanie fizykalne, obliczono BMI, oznaczono lipidogram. W badanej populacji było 397 osób (33,1% populacji) z wykształceniem wyższym – – W (średnia wieku 47,11), 593 (49,5% populacji) z wykształceniem średnim – S (średnia wieku 47,62), 211 (18,4% populacji) z wykształceniem podstawowym lub zawodowym Z (średnia wieku 48,54). Otyłość i nadwaga najczęściej występowały u pacjentów z wykształceniem zawodowym (Z64,73%, S 61,91%, W – 55,87%) (P<0,05,). Istotne statystycznie różnice dotyczą średniej wartości BMI (W – 26,10, S – 26,49, P – 27,13). Nałóg palenia papierosów najczęściej dotyczył chorych z wykształceniem podstawowym (W – 25,76%, S – 34,23%, Z – 36,36%) (P<0,05). Badane grupy nie różniły się istotnie częstością występowania obciążającego wywiadu rodzinnego (W – 37,28%, S – 34,74%, Z – 29,19%), cukrzycy (W – 2,41%, S – 3,96%, Z – 2,23%), średnim poziomem LDL-cholesterolu (W – 114,68 mg%%, S – 117,73 mg%, Z – 115,46 mg%) i średnimi wartościami ciśnienia skurczowego (W – 131,05 mmHg, S – 131,86 mmHg, Z – 132,32 mmHg i rozkurczowego (W – 83,47 mmHg, S – 84,26 mmHg Z – 84,72 mmHg). Wydzielono 4 kategorie ryzyka wieńcowego wg kryteriów podanych przez PTK w r. 2000: ryzyko bardzo duże (W – 14,86%, S – 15,01%, Z – 15,17%) duże (W – 10.83%, S – 14,84%, Z – 15,17%) umiarkowane (W – 26,95%, S – 30,69%, Z – 31,75%). łagodne (W – 16,62%, S – 13,15%, Z – 17,06%). Obserwowano istotnie częstsze występowanie wyższych grup ryzyka u pacjentów z niższym wykształceniem. Wnioski: W badanej populacji obserwowano większe rozpowszechnienie czynników ryzyka oraz częstsze występowanie wyższych kategorii ryzyka wieńcowego u osób z wykształceniem zawodowym w porównaniu z osobami z wykształceniem wyższym.