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**A COMPARISON OF TYPE A BEHAVIOUR PATTERN
IN CARDIOVASCULAR HIGH RISK AND NORMAL ADOLESCENTS**

INTRODUCTION

Cardiovascular diseases constitute the principal causes of mortality in middle-aged men in most industrialised countries. Alongside the traditional risk factors such as elevated serum lipids and blood pressure, cigarette smoking, lack of physical activity, Type A behaviour pattern has been shown to be related to both coronary atherosclerosis (CAD) (Zyzanski et al., 1976; Blumenthal et al., 1978; Williams et al., 1980), and coronary heart disease (CHD), Haynes et al., 1980; Rosenman et al., 1975; Wrzeźniewski et al., 1979; Regland, Brand, 1988; Juczyński, 1989; Tylka, 1994; Wielgosz, Nolan, 2000; Bętkowska-Korpała, 2004).

The Type A behaviour pattern was first described and measured by M. Friedman and H. Rosenman (1959). This behaviour has been characterised by some of all of the following traits: competitiveness, an intense striving for achievement, impatience, easily provoked aggression and hostility, and a chronic sense of time urgency. There are a lot of studies indicating relationship between Type A behaviour and CHD (Rosenman et al., 1975; Taggart, Carruthers, 1977; Keltikangas-Jarvinen, Raikkonen, 1989; Harburg et al. 1991). These findings emerged from case-control, perspective and prospective studies in the United States and Europe. They indicate that fully developed Type A adults have higher level of cholesterol and fasting serum triglycerides than Type B (Friedman et al., 1964). Type A's also have higher diastolic blood pressure than Type B men (Rosenman et al., 1975). Some other studies have shown that Type A's have greater blood

pressure reactivity (Dembroski et al., 1975) and coronary artery damage (Blumenthal et al., 1978; Zyzanski et al., 1976; Frank et al., 1978).

Little research has attempted to relate CHD prone behaviour in children with the biochemical and biophysical risk factor variables usually found in adults, although it is known that the development of CHD may begin in childhood (Berenson, 1986; Wolf et al., 1981). It is also known that Type A behaviour pattern can be identified already in a 3-year children (Lundberg, 1983). If the relationship between Type A and elevated serum lipids, blood pressure and degree of CHD is present in adults, we might expect this relationship to be manifested early in life.

A part of comprehensive programme to assess cardiovascular risk factors in children, the Bogalusa Heart Study (Hunter et al., 1982) investigated relationship between Type A behaviour pattern and a number of biochemical and biophysical risk variables to CHD and essential hypertension in children. The obtained data indicated that Type A's related to higher level of total cholesterol and B and preB-cholesterol than their counterparts. Additionally, Type A white girls had higher diastolic pressure and Type A black boys had higher systolic blood pressure than Type B counterparts.

Developmental trends in Type A behaviour and somatic risk factors of CHD were studied in 842 healthy adolescents and young adults in Finland (Keltikangas-Jarvinen, Raikkonen, 1989). The somatic risk factors adopted were: serum total cholesterol, LDL, HDL-cholesterol, systolic and diastolic pressure, pulse frequency and body mass index. The obtained data indicated that Type A boys had an increased cholesterol level and that Type A behaviour predicted cross-sectionally a likelihood to be classified into the group where serum cholesterol increased according to age. Such dependence was not found in girls. The results of the study conducted by L. L. Hayman et al. (1988) reveal that the impatience-aggression component of TABP was associated with lower level of atherogenic lipids.

Research on biochemical and biophysical risk factor variables in children has suggested that individuals who have elevated levels of lipoproteins, cholesterol and blood pressure in childhood are potentially the same ones who experience these elevations later in life (Webber et al., 1980). It is therefore important to understand the relative contribution of both behavioural as well as standard risk factor variables for CHD.

The purpose of the study was to determine if adolescents with identified risk factors of CHD differed in level of TABP from the peers with no obvious CHD risk factors and to estimate the relationship between TABP and biological risk factors for CHD in the risk group.

METHOD

Participants

This study was conducted in two parts: Part I was the assessment and analysis of CHD risk factors and Part II was the assessment of TABP and analysis of TABP and CHD risk factors. Part I included 350 secondary school students (53% female) from Łódź, aged 15–18 years. This assessment resulted in the identification of 56 (16% of the total sample) students (55% female) who were identified with one or more elevated biological risk factors. An additional 52 (15% of the total sample) students (52% female) with no obvious biological risk factors were randomly selected from the remainder of the total sample as a comparison group.

Instruments

Biological CHD Risk Factors. Part I of the research concerned the assessment of biological risk factors in cooperation with the I Clinic of Childhood Diseases of the Institute of Pediatrics of Medical University in Łódź, Poland. Assessments were conducted by a female physician and a nurse and included cardiovascular disease family history, tobacco use, physical activity levels, anthropometric evaluation, blood pressure, and blood lipids. An interview was used to determine family history, tobacco use, and physical activity levels. Height and weight were measured with a physician's balance beam scale with stadiometer. Blood pressure measurement at rest was made with a standard mercury sphygmomanometer. Measurements were carried three times on each subject. Systolic BP was recorded to Korotkoff's first phase. Diastolic BP was measured both to Korotkoff's fourth and fifth phases. The same nurse took all the measurements. Blood total cholesterol, high density lipoprotein and low density lipoprotein cholesterol, and triglycerides were evaluated. Serum cholesterol and serum triglyceride concentrations were measured enzymatically.

Type A behaviour pattern. The assessment of TABP and its components was accomplished with the Polish adaptation of Hunter-Wolf A-B Rating Scale prepared by N. Ogińska-Bulik and Z. Juczyński (Ogińska-Bulik, Juczyński 1996; Ogińska-Bulik, 1998b, 2002). This scale measures three components of TABP: impatience-aggression, hurry and leadership. This method obtained good psychometric characteristics. Cronbach's alpha coefficient was 0.81 and test-retest correlation coefficient, assessed on a group of 216 adolescents aged 15–18 after six months, was 0.66.

Procedure

All measurements were conducted at the students' school site in a private room during the school day. In Part I, each participant was interviewed by the physician to obtain information about cardiovascular disease family history, smoking status, and physical activity levels. An adolescent was identified as having a positive family history when one or both parents had CHD. Smokers were identified as individuals who smoked five or more cigarettes a day for longer than one year. Dispensation from physical education classes for six months or more, and the lack of involvement in other physical activities, were the criteria for being classified as sedentary. Body mass (kg) was calculated with the formula, weight (kg) divided by height (m²), and then compared with a developmental percentile chart for classification as being over expected weight ($BMI = 25-30$), or obese ($BMI > 30$) (Wolański, Kozioł, 1987).

An average of three independent blood pressure measurements was compared with the percentile charts published by the *Report of the Second Task Force on Blood Pressure Control in Children* (1987). The individual was classified as hypertensive if the average was equal to or greater than the 95th percentile. Blood samples (6 ml) were taken at the students' school site and were transported from school to the Childhood Disease Clinic Laboratory at the Medical Military Academy in Łódź for analysis. Boundary values for serum lipids established according to R. Ellison et al. (1978) were used to identify elevated lipid levels: total blood cholesterol for girls ≥ 5.6 mmole/l and for boys ≥ 5.1 mmole/l; low density lipoprotein cholesterol for girls ≥ 3.76 mmole/l and for boys ≥ 3.25 mmole/l; and high density lipoprotein cholesterol for girls ≤ 1.1 mmole/l and for boys ≤ 0.9 mmole/l; and triglycerides > 1.3 mmole/l for girls and > 1.53 mmole/l for boys.

A psychologist administered the TABP. This administration took place after the biological risk assessment at the school site during the school day and in a private room where confidentiality was assured.

RESULTS

The study group ($N = 56$) resulting from part one biological assessment comprised 13 adolescents with one elevated risk factor, 16 with two, and 27 with three or more elevated risk factors. Numbers and percentages of adolescents with elevated biological risk factors presents Tab. 1. Because few students were smokers ($N = 3$), and such a low number of students with elevated triglycerides ($N = 3$) and low density lipoprotein cholesterol ($N = 4$) were found, that these categories were eliminated and the data re-analyzed.

Table 1

Numbers and percentages of adolescents with elevated biological risk factors ($N = 56$)

Coronary Heart Disease Risk Factor	<i>N</i>	%
Positive Family History	12	21
Cigarette Smoking	3	5
Sedentary Lifestyle	20	35
Overweight or obesity	22	39
Systolic Blood Pressure	12	21
Diastolic Blood Pressure	8	14
Blood Total Cholesterol	12	21
Low Density Lipoprotein Cholesterol	4	7
High Density Lipoprotein Cholesterol	27	48
Triglycerides	3	5

Table 2 presents TABP and its components means and standard deviations for the remaining risk factor categories. The results show that a significantly higher proneness to Type A behaviour pattern, especially to impatience-aggression, in comparison with the control group, is manifested by adolescents with the sedentary lifestyle, overweight or obesity and increased total cholesterol level. There are no differences in remaining factors of TABP (hurry and leadership) between adolescents with risk factors and from the control group. The lower level of TABP is observed in teenagers with positive family history.

Table 2

Means and standard deviations of TAPB and its factors in risk and control group

Biological risk factors	TABP		Impatience-aggression		Hurry		Leadership	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family history	68.55*	11.60	24.90*	6.90	7.54	3.29	12.18	4.02
Sedentary lifestyle	80.00*	13.35	32.47*	7.40	7.65	3.08	14.58	3.39
Overweight or obesity	81.10*	15.23	32.85*	8.04	7.95	3.12	15.70	2.95
Systolic BP	72.27	12.65	26.63	6.67	7.63	3.41	14.45	2.87
Diastolic BP	73.71	8.65	29.71	3.63	6.71	2.69	13.71	3.03
Total cholesterol	82.09**	15.35	33.45**	7.76	7.39	3.18	14.60	2.07
HDL cholesterol	77.66	14.49	31.65	7.82	8.34	2.69	15.19	3.17
Control group	75.11	13.35	28.45	6.76	7.39	3.18	15.90	3.30

** $p < 0.01$, * $p < 0.05$.

Pearson correlation coefficients for the risk group were calculated (Tab. 3). They indicated that TABP, mainly impatience-aggression was positively associated with sedentary lifestyle, overweight or obesity and total cholesterol level. Family history correlates in negative way with TABP and its factors. However the results from the present study should be interpreted very carefully because of the small numbers of individuals in particular factor groups.

Table 3

Correlation coefficients between biological risk factors and Type A behaviour pattern and its factors

Biological risk factors	TABP	Impatience-aggression	Hurry	Leadership
Family history	-0.34*	-0.30*	-0.26*	-0.36*
Sedentary lifestyle	0.36*	0.08	-0.05	0.02
Overweight/obesity	0.28*	0.27*	-0.02	0.26*
Systolic BP	-0.19	0.07	0.14	0.09
Diastolic BP	-0.10	-0.12	0.04	-0.01
Total cholesterol	0.25*	0.26*	0.39*	-0.08
HDL cholesterol	0.25	0.16	0.35*	-0.12

* $p < 0.05$.

DISCUSSION

The obtained results show that Type A behaviour pattern, especially the component of impatience-aggression, is associated with some biological risk factors of CHD in adolescents, such as sedentary lifestyle, overweight or obesity, and enhanced level of total cholesterol. Only few studies (Hunter et al. 1982; Siegel, Leitch, 1981; Weidner et al., 1986; Keltikangas-Jarvinen, Raikonen, 1989) have examined the relationship between Type A behaviour and other coronary risk factors in paediatric samples, and they show consistently that components of Type A behaviour are related to high risk level of plasma lipids, lipoproteins and body mass.

The results from the present study indicate that some aspects of Type A behaviour such as impatience and aggression are probably more important than others in mediating an association between this behaviour pattern and CHD. The combination of 'aggression-impatience-competitiveness' as a risk behaviour finds more support from literature. The results of K. A. Matthews et al. (1977) indicate that among the components of Type A behaviour only two factors, namely *competitive drive and impatience*, were associated with the later onset of CHD. T. M. Dembroski et al. (1985)

suggested that anger and hostility may be the critical aspects of the Type A pattern in predisposing individuals to the risk of CHD. T. M. Dembroski and P. T. Costa (1987) found that the most significant psychological risk factor related to CHD was a high level of hostility combined with expression of anger. Data obtained by the author (Ogińska-Bulik, 1998a) indicated that anger was positively related to risk factors of coronary heart disease, such as overweight, hypertension and enhanced total cholesterol level. The study conducted by N. Ogińska-Bulik and C. Johnson (1999) demonstrated a positive relationship between anger-out and blood total cholesterol in teenagers. J. M. Siegel (1984) observed that adolescents characterized by frequent anger-out tended to have elevated blood pressure and a relatively sedentary life style, especially during leisure time. Similarly, data reported by K. A. Matthews et al. (1986) showed that adolescents who were frequently angry and expressed anger outwardly displayed elevated level of diastolic blood pressure.

Others also emphasized that aggression, irritability, and competitiveness are the risk elements of Type A behaviour associated with CHD (Harburg et al., 1991; Vógele, Steptoe, 1993).

The enhanced level of cholesterol, sedentary lifestyle and obesity in Type A adolescents may increase coronary heart disease risk in adults. It means that there is a necessity to modify Type A behaviour in young people in order to reduce this risk in adulthood, although there is as yet no evidence confirming that Type A children and adolescents develop into Type A adults.

Type A modification programme for adolescents (aged 15–19) was designed and implemented (Ogińska-Bulik, 2002). It was based on cognitive behavioural approach, where changes of attitudes and beliefs were considered. It consisted of eight workshops devoted to reducing TABP, especially aggression and anger. The programme was also designed to help teenagers acquire skills concerning coping with stress, enhancing the persons' feeling of self esteem and self-efficacy. Various techniques were used in the programme, among them brainstorming, playing roles, discussion, mini-lecture, and also relaxation and visualisation techniques.

The implementation of the programme caused significant reduction of TABP, especially the component of impatience-aggression and level of anger expressed outwardly. Nonsignificant decrease in level of aggression was observed.

Greater decrease in intensity of TABP, was recorded in individuals with high level of self efficacy and active coping with stress. It means that these variables are very important in Type A behaviour modification.

Efforts to modify Type A behaviour in adolescents that have been undertaken brought promising results and confirmed the necessity of such activity, but further studies in larger samples are needed in order to examine the long-term impact on morbidity due to CHD.

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PORÓWNANIE NASILENIA WZORU ZACHOWANIA A U MŁODZIEŻY Z CZYNNIKAMI RYZYKA CHOROÓB SERCOWO-NACZYNIOWYCH I BEZ TAKICH CZYNNIKÓW

Celem podjętych badań było ustalenie czy młodzież z rozpoznanymi czynnikami ryzyka niedokrwiennej choroby serca różni się od młodzieży bez takich czynników w zakresie nasilenia zachowań typu A oraz ustalenie związku między wzorem zachowania A a tymi czynnikami w grupie ryzyka. Badaniami objęto młodzież w wieku 15–18 lat. Część pierwszą badań mającą na celu wykrycie biologicznych czynników ryzyka choroby niedokrwiennej serca przeprowadzono wśród 350 nastolatków. Część drugą obejmującą pomiar nasilenia wzoru zachowania A przeprowadzono wśród tych nastolatków, którzy zostali zakwalifikowani do grupy ryzyka ($N = 56$) oraz losowo wybranych 52 nastolatków bez czynników ryzyka, stanowiących grupę porównawczą. Do pomiaru nasilenia zachowań Typu A zastosowano skalę Hunter-Wolf A-B Rating Scale w polskiej modyfikacji N. Ogińskiej-Bulik i Z. Juczyńskiego. Uzyskane wyniki badań wykazały, że skłonność do zachowań Typu A, a szczególnie wyrażania niecierpliwości-agresji, jest przejawiana przede wszystkim przez młodzież, którą charakteryzuje występowanie czynników ryzyka chorób sercowo-naczyniowych, tj. siedzący tryb życia, nadwaga oraz podwyższony poziom cholesterolu.

Słowa kluczowe: wzór zachowania typu A, choroby sercowo-naczyniowe, młodzież.