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Stres jako czynnik ryzyka choroby niedokrwiennej serca wśród uczestników Programu Profilaktyki i Wczesnego Wykrywania Chorób Układu Krążenia

Stress as a risk factor of ischaemic heart disease among participants of the Programme of Preventive Measures in an Early Detection of Circulatory System Diseases

Streszczenie

Wstęp. Stres został uznany za niezależny czynnik ryzyka chorób układu krążenia. Liczne badania epidemiologiczne potwierdzają rolę stresu w ryzyku zachorowania na chorobę niedokrwienną serca. Dodatkowe czynniki ryzyka, takie jak palenie tytoniu i podwyższone stężenie cholesterolu są powiązane z typem osobowości A, która wg Friedmana i Rosenmana wykazuje większe ryzyko występowania choroby wieńcowej i ostrego zawału mięśnia sercowego.

Cel. Celem pracy było określenie częstości występowania stresu wśród uczestników Programu Profilaktyki i Wczesnego Wykrywania Chorób Układu Krążenia.

Materiał i metody. Badanie zrealizowano w okresie od lutego do kwietnia 2008 roku wśród pacjentów niepublicznego zakładu opieki zdrowotnej, w wieku 35-55 lat. Zastosowanym narzędziem badania był kwestionariusz ankiety, składający się z pięciu bloków tematycznych, w tym z części poświęconej odczuciu stresu. Wszyscy uczestnicy mieli wykonane badania diagnostyczne obejmujące stężenie cholesterolu całkowitego, frakcji LDL i HDL, trójglicerydów oraz glukozy na czczo. Wykonano dwukrotny pomiar ciśnienia tętniczego krwi. Kryterium wykluczającym z udziału w Programie była wcześniej wykryta choroba układu krążenia i/lub cukrzyca. Dane poddano analizie statystycznej z wykorzystaniem testu Chi2.

Wyniki. 43,5% badanych była narażona na silny stres. Częściej stres odczuwały kobiety. Stres wpływał na samoocenę stanu zdrowia oraz na wybrane zachowania zdrowotne. Uczestnicy najczęściej doświadczali sytuacji stresowych w miejscu pracy. Osoby zestresowane rzadziej podejmowały aktywność fizyczną, częściej zaś sięgały po papierosy. Wykazano zależność pomiędzy subiektywnym odczuciem stresu a wysokością ciśnienia tętniczego krwi. Korelację o niewielkiej sile stwierdzono między narażeniem na stres a wybranymi parametrami gospodarki lipidowej.

Wnioski. Istnieje silna potrzeba wdrożenia działań profilaktycznych w kierunku niwelowania czynników spo-łeczno-psychologicznych sprzyjających chorobom układu krążenia.

Abstract

Introduction. Stress was assessed as one of the independent risk factors for cardiovascular diseases. Many epidemiological data confirm the leading role of stress in developing the ischemic heart disease. In addition certain coronary heart disease risk factors, including smoking and high cholesterol level are associated with type A behavior, which has been acknowledged by Friedman and Rosenmann for the higher risk of having the ischemic heart disease and acute myocardial infarction.

Aim. Aim of the research was to evaluate the prevalence of stress level amongst participants of Early Preventive cardiovascular Programme.

Material and methods. The study was conducted from February till March 2008 amongst patients of a randomly chosen outpatient clinic. The tool f the research was a questionnaire survey, consisting of five diverse blocks with one concerning the stress perception. Diagnostic investigation, including blood cholesterol level, LDL and HDL fractions, triglyceride and glucose level, was taken. Double measurement of blood pressure was carried out. Former cardiovascular disease and/or diabetes was the criteria that disqualify from the participation in Early Preventive Programme. Collected data were statistically elaborated with Chi2 test.

Results. High stress was found amongst 43.5% of participants. Women were more stressed than men. Stress influence the health self-assessment and particular health behavior. The place of work was the most stressful for all the participants. People who suffered from stress smoke cigarettes more frequently than relaxed ones. The correlation between stress and blood pressure and chosen parameters of lipids metabolism was verified.

Conclusions. There is a strong need of implementation of cardiovascular preventive programme which include the socio-psychological factors in pathogenesis of cardiovascular diseases.

Słowa kluczowe: choroba niedokrwienna serca, stres, program profilaktyczny, grupa wieku 35-55.

Key words: ischeamic heart disease, stress, prophylactic programme, age group 35-55.

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INTRODUCTION

Cardiovascular system diseases are the reason of almost half of the deceases in Poland. In 2007 proportional death rate because of cardiovascular diseases was 45.5%. In a class of circulatory system still the biggest importance has ischaemic heart disease. According to the current data, it caused 28.5% deceases of all diceases caused by heart and vascular diseases [1,2]. Numerous epidemic research results confirm that modified factors which have large impact on the ischaemic heart disease are long lasting arterial hypertension, sclerosis, lipids and carbohydrates disorders, addiction (smoking, alcohol abuse) or lack of physical activity. At the same time, more often the impact of socio-psychological factor is noticed as a conditioning factor in the development of ischaemic heart disease due to the influence on other determinants of health state. In the 50s of the 20th century Rosenman and Friedman created a conception of type A behavior pattern predisposing to the development of ischaemic heart disease [3,4]. Among the most important features of type A behaviour pattern there are: obstinacy and determination for achieving goals, life under constant time pressure, tendency to compete, desire to get a promotion and great sense of responsibility. People who lack the above-mentioned features are classified as type B personality [5]. People with type A personality are characterized by easier expression of aggression and lack of patience [4]. Assumptions of Friedman and Rosenman were confirmed also in the research carried out in our country. They claim that impatient people living in a constant hurry more often suffered from ischaemic heart disease. Groen has observed that people with type A personality are more devoted to their career; their job becomes the sense and the only respected value in their lives [3].

AIM

The aim of this work was to estimate the prevalence of stress-feeling among the participants of the Programme of Preventive Measures in an Early Detection of Circulatory System Diseases executed on the level of primary care and to estimate dependence between subjective stress-feeling and chosen elements of health condition of the participants.

MATERIAL AND METHODS

This research was carried out from February to April 2008 in a non-public health maintenance organization in Zgierz, Lodz Voivodeship, chosen at random. The research included 124 people, participants of the Programme of Preventive Measures in an Early Detection of Circulatory System Diseases, 75 women and 49 men. The Programme of Preventive Measures in an Early Detection Circulatory System Diseases is controlled by Narodowy Fundusz Zdrowia (National Health Fund) all over the country and it is directed to people between the ages of 35 to 55, on the condition that heart and vascular diseases and/or diabetes have been not diagnosed before. A questionnaire on risk factors in cardiovascular system diseases was used in this research. It contained 49 questions divided into thematic parts, issues connected with stress were included as well. In this part of the questionnaire respondents answered questions

on subjective stress-feeling, described the most frequent stressful situations and tried to explain how they release stress. In all the participants diagnostic research determining the entire cholesterol, LDL and HDL fractions, concentration of triglycerides and glucose was carried out. Additionally, the measurements of body mass, height and double arterial blood pressure were done. The achieved results were encoded in the data base Microsoft Excel and put to the statistical analysis. In order to determine dependence between features Chi2 test of independence was used. Dependence strength between the variables was determined thanks to Q-Yule's and C-Pearson's coefficient. The structure of the analysed variables is described with the usage of percentage (%) or fraction (f) – when the numbers were lower than 100.

RESULTS

Among 43.5% of participants said that they were stressed very much. Thirty one point four (31.4) % of participants suffered from slight stress, 20 participants (16.1%) claimed that they rather did not feel stress, only 11 out of 124 participants (8%) said that they felt no stress at all. More often women than men suffered from stress. Men claimed that they felt stress, but to a lesser degree. The structure of gender and stress self-esteem is presented Figure 1.

The feeling of stress influenced the self-esteem of respondents (Chi2 = 22.427; p = 0.05; C = 0.391). People who perceived their health state as bad or very bad very often claimed that the level of stress was very high. Detailed data are presented Figure 2.

To a large extent, feeling stress is revealed by people`s reactions to particular situations. In order to check the state-

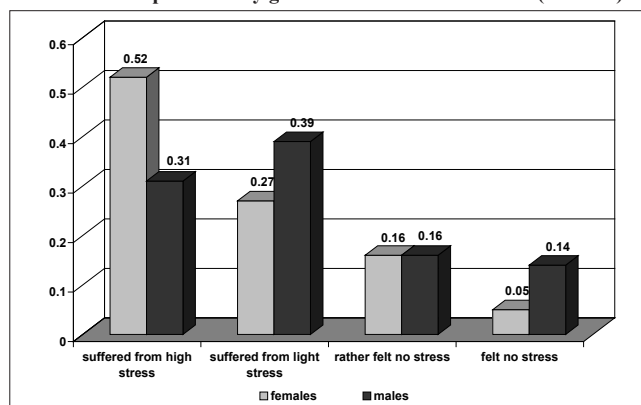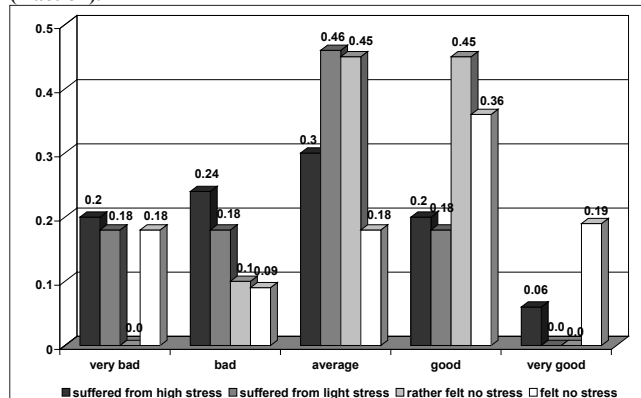**FIGURE 1. Respondents by gender and stress self-esteem (fraction).**

FIGURE 2. Respondents by health self esteem and stress self esteem (fraction).

ment mentioned above the participants answered questions assessing their response to stressful situations. In the question concerning waiting in a queue, most of the participants said that when they see a long queue or a crowded street they give up doing shopping or choose another way. Such answers were typical of 1/3 of participants though these were men who gave such answers more often (25 out of 49). One fourth (¼) of participants replied that they wait patiently for their turn, whereas the fourth part of responders claimed that waiting for longer than 5 minutes makes them impatient. Seventeen point seven (17.7) % of participants declared feeling stress in this situation. Women were more patient, for ¼ of them the longer waiting the more impatient they get. Fourteen in 75 respondents answered that such a situation is stressful for them, 1/5 avoided such situations. Only 5 in 49 the persons tested waited patiently in a queue or at the crossroad. Diversity of behaviours and different sex show completely different attitude to stress. It has been proved that there is moderate dependence between sex and reaction to stress in the described situation (Chi2 = 15.187; p = 0.01; C = 0.330).

Most of the participants (61.2%) pointed out that the most stressful place for them is their workplace. Twenty-nine point eight (29.8) % of the questioned said that they suffered from stress at home. Eleven respondents (8.8%) experienced stress outside home, especially while shopping. The structure of responses when gender is taken into account did not differ so much. Both women and men claimed that the place where they deal with the biggest stress is their work. Home took the second place, shopping the third. Detailed results are presented in Figure 3.

FIGURE 3. Respondents by gender and place of stress experiencing (fraction).
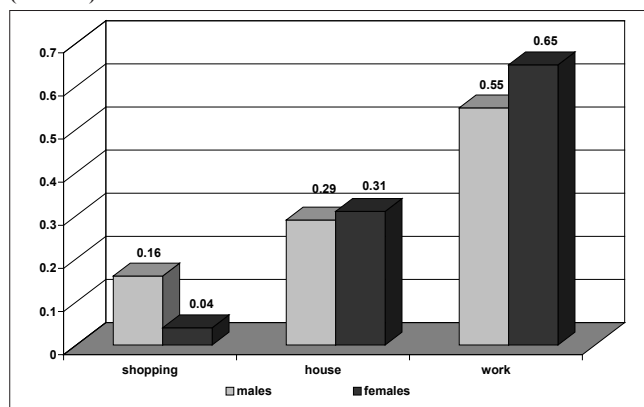
Most of the respondents when asked about the way they release stress said that they usually smother anger inside and try not to reveal it to others. Such an answer was typical of 29.0% of persons and was the most common answer for both sexes. There is moderate dependence between the way people release stress and sex (Chi2 = 13.299; p = 0.01; C = 0.311).

To a large extent stress correlates with particular behaviours. Stressed people rarely do physical exercises. According to the results, 26 in the group of 54 people being under huge stress confirm that they lead a sedentary lifestyle and do no physical exercises. Only 3 people in the whole group declared doing physical activity more often than twice a week. An additional factor contributing to cardiovascular diseases are stimulants which are indispensably connected

with stress. In the group of tested patients half of them smoked cigarettes. Among the smokers most of them were strongly stressed; more than half of them smoked over 20 cigarettes a day. Most smokers admitted that smoking significantly decreases the level of stress. Drinking alcohol was slightly connected with stress. In the group of people drinking several times per week the most frequent answer concerned strong feeling of stress. People who were not under stress or were under slight stress gave such an answer very seldom.

Moderate dependence was shown also between arterial blood pressure and the level of stress (Chi2 = 17.032; p = 0.05; C = 0.355). Among the people suffering from arterial hypertension more than half admitted to experiencing heavy stress in everyday life. However, the respondents who had appropriate results most often replied that they are rather not in the stressed group. Figure 1 shows the results.

It has also been assessed in the research whether the level of stress can influence lipid management. Among the participants under heavy stress the concentration of total cholesterol over 250 mg/dl was discovered in 16 people and only in 1 person who declared lack of stress. In the case of LDL cholesterol fraction, increased concentration was discovered in 28 out of 54 people exposed to heavy stress. The results regarding the concentration of triglycerides and stress-feeling were not so diverse.

DISCUSSION

Stress was acknowledged as an independent factor of ischaemic heart disease. As numerous epidemic tests, such as Framingham Heart Study or Western Collaborative Group Study show that exposure to long lasting stress increases several times the risk of development of ischaemic heart disease and intensifies the possibility of acute heart attack [6,7].

Long lasting high blood pressure can lead to constant arterial hypertension in a very short time. Scientists from *Specialist Medical Review Council* from Australia described stress as an independent factor of development of arterial hypertension disease [4,8,9]. Stress is also a typical source of arterial hypertension described as "white gown hypertension". It is defined as a difference between arterial hypertension measured at hospital and measured outside it. Usually this difference is about 20 mmHg for diastolic pressure and 10 mmHg for systolic pressure [10]. Patients of a health maintenance organization, where this parameter is measured, are especially exposed to this type of arterial hypertension. According to the test carried out in a health maintenance organization, 40% patients suffered from arterial hypertension. Among 49 questioned persons with the diagnosed arterial hypertension, 28 claimed that they feel a lot of stress. Only 3 people did not feel much stress in their life. This fact confirms dependences between stress and arterial blood pressure. Moreover, it is said that men more often feel stress because of a visit at the doctor`s; almost 1/3 participants of the test have arterial hypertension [10]. It is worth mentioning that similar results were received in the WOBASZ test in which half of the respondents with arterial hypertension declared strong exposure to stressful stimuli [11].

Among patients chosen from a health maintenance organization feeling of heavy stress was shown at workplace. Japanese tests present that long lasting stress at work together with insufficient time to relax increase the risk of development of arterial hypertension among tested participants [12]. The CARDIA (*Coronary Artery Risk Development in Young Adults*) study describes a bigger risk of development of ischaemic heart disease among people with a high level of impatience who live under time pressure and in a constant hurry [13]. Similar dependence was noticed in our own test. One third of the tested people revealed a high level of impatience in stressful situations. However, it is worth noticing that women demonstrated bigger composure than men, but simultaneously they more often described their stress level as high.

A lot of tests show that long lasting exposure to mental stress can in consequence result in the development of numerous disorders connected with functioning of the cardiovascular system. Apart from arterial hypertension irregularity of blood coagulation system occurs, such as intensified aggression of thrombocytes, stress stimulates also the immune system. Concentration of inflammatory factors, such as interferon and interleukin increases [6]. This increase caused by the long lasting exposure to stress is conductive to faster development of sclerosis changes. Stimulation of the sympathetic nervous system by stressful impulses has effect on cramp of peripheral vessels and increase of peripheral resistance. Influence of stress on a human body is connected with stimulation of the sympathetic nervous system, the hypothalamic - pituitary axis and the renin-angiotensin system. During stressful situations production of hormones of the adrenal medulla, adrenaline and nor-adrenaline increases. Because of them arterial blood pressure goes up [10].

Authors of numerous tests tried to show that total cholesterol concentration, especially low molecular weight LDL fraction, is connected with type A personality. A.Schwertner et al. proved in his research that people with ischemic heart disease and type A personality are characterised by higher values of LDL fraction in comparison to those who suffered from ChNS type B personality. Similar results were received while the test was carried out by Weidner [14]. Moreover, psychological stress influences glucose metabolism in the body, contributing to diabetes type 2 [15].

Results of the tests presented above interchangeably point out that prophylaxis of cardiovascular system diseases in Poland should not concentrate only on activities concerning diet, physical activity or smoking [10]. Strong exposure to stress among participants tested in Programme of Preventive Measures in an Early Detection of Circulatory System Diseases is especially alarming with regard to the fact that these people were qualified to the group with higher risk of cardiovascular system diseases. Stress is also a factor of anti-healthy behaviour such as smoking and alcohol abuse. People under the influence of stress rarely do exercises, they use unhealthy diet which affects lipid and carbohydrates profile.

CONCLUSIONS

1. The level of stress-feeling correlated with chosen parameters of health state and behaviour of the participants of the Programme of Preventive Measures in an Early Detection Circulatory System Diseases.

2. There is necessity to inure and popularize appropriate preventive measures and activities in primary care directed towards fighting stress as a risk factor of cardiovascular system diseases.

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