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A correlational study of the relationship between lifestyle knowledge and metabolic disorders

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Abstract

The expansion of educating people for a healthy lifestyle is the surest way to prevent the anticipated explosion of obesity, type II diabetes, metabolic syndrome and cardiovascular complications, which can be seen more and more in early adult stages of life. The purpose of this study is to highlight this by promoting therapeutic education programs, focused on the awareness of the beneficial effects of regular physical activity on overall health condition, which can increase the efficiency of prophylactic and therapeutic measures. A retrospective correlation study was conducted on a sample of adult subjects diagnosed with, or susceptible of metabolic syndrome. The results showed a reverse correlation between the level of general knowledge about healthy lifestyle and the presence of metabolic syndrome ($p < 0.01$). Most guides for intervention in obesity and associated metabolic complications focus on diet modification and increased level of physical activity; however the really valuable ones are those interventions which lead to a long-term change.

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1. Introduction

Since the first scientific evidence, more than 50 years ago, regarding the interconnection between the adipose tissue distribution (gynecoid/android) and the depreciation of metabolic profile, noted today is the growing interest on metabolic disorders and their intricacies with the evolution of cardiovascular disease (CVD), type II diabetes mellitus (T2DM), nonalcoholic fatty liver diseases (NAFLD), liver cancer (LC) and chronic kidney disease (CKD). The silent debut of hyperlipidemia is often neglected and turns into the cluster of interrelated

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problems, each, but more strongly in combination, representing a risk factor for the overwhelming morbidity by cardiovascular diseases among overweight and obese individuals.

Insulin resistance, central obesity, lipid alterations (high triglycerides and low levels of high-density lipoprotein [HDL] cholesterol) and hypertension are the results of a metabolic imbalance under the generic name of insulin resistance syndrome, metabolic syndrome (MS), or syndrome X [1].

First defined by Raven in 1988, MS's components were explored by the World Health Organization (1999) and received an operational definition from the National Cholesterol Education Program – Adult Treatment Panel III (NCEP–ATP III) as the co-existence of any three or more of the above referred abnormalities [2,3].

The burden of MS is expected to increase with the expansion of obesity rates among adults and children as well and recent studies pointed out that it may represent a more significant heart failure risk factor than obesity alone [4]. In the future MS might also take the leadership of smoking as heart diseases determinant [5]. Metabolic syndrome is also an important precursor of T2DM, as scientific evidences reveals. In 2010 more than 33 million people (6%) of the population, 20 to 79 years old had diabetes in EU countries and half of them were under 60 years. World-wide there are over 285 million people suffering from T2DM and the figures are expected to double within the next 20 years [6].

The expansion of educating people for a healthy lifestyle is the surest way to prevent the anticipated explosion of obesity and metabolic disorders, which can be seen more and more in early adult stages of life. Most of the metabolic risk factors are potentate by the reduced amount of physical activity, thus necessitating multidisciplinary interventions, including exercise and controlled diet in order to prevent or delay the evolution of metabolic complications.

Global visions of the individual, in terms of medical, educational and psychological therapeutic interventions, give consistency and increase the chances of success. Enthusiasm for therapeutic education has increased, more pregnant in recent years, along with the concern for improving the effectiveness of therapeutic intervention programs, through increasing the motivation of both the beneficiaries and specialists in health promotion and health status maintenance [7].

Because they require long term surveillance, the goal of caring plans in MS is self-management, for which the knowledge level about healthy lifestyle behaviors and their practical use is essential. In order to be sustainable, change must be gradual and progressive. Defeating the resistance to change is crucial and ambivalent when seeking for a new lifestyle choice and options should be measured, discussed and negotiated [8].

2. Purpose

The fact that MS is well represented in the general population (in average 15-30% of people all over the world have two or more risk factors for MS) underlines the scale of this clinical problem. For an overwhelming majority of cases, the western lifestyle and poor quality nutrition are the main causes for the epidemiological proportions of obesity, hypertension and dyslipidemia [9].

The purpose of this study was to highlight the fact that the promotion and achievement of therapeutic education programs, focused on the awareness of the beneficial effects of regular physical activity on overall health condition and particularly on the morpho-functional parameters, can increase the efficiency of prophylactic and therapeutic measures. Weight loss and equilibrated nutrition are also important features of the election treatment.

Self-care education for persons with chronic disease is not limited to information and training of individuals on an array of prescriptions, but is designed to facilitate internal motivation for change and ongoing maintenance of new skills [10]. Additionally, one need point out the important role that can be played by the specific training of intervention team members, training abilities and communication skills, supportive attitudes, along with the willingness to listen and negotiate.

3. Material and Methods

This study was designed with the assumption of therapeutic education's benefits in the field of quality of life, treatment adherence and reduced potential complications in people with overweight as a result of imbalance in the anabolic systems.

Lifestyle includes all the elements that define daily life: profession, family, friends, leisure, food, rest arrangements etc. A healthy lifestyle involves the strict implementation or keeping of principles regarding health promotion and its maintenance: practicing various forms of physical activity at least 30 minutes per day, a balanced diet in terms of quality and quantity, avoiding excessive alcohol, coffee or tobacco consumption, compliance with a regimen of rest, avoiding stress etc. In conclusion, an active lifestyle refers primarily to sedentary control and regular exercise practice.

In order to study the relationship between lifestyle knowledge and metabolic disorders we conducted a retrospective correlational study during ten months on a sample of adult subjects (N = 30, 18 women and 12 men, average age 56.4 years) diagnosed with, or susceptible of metabolic syndrome.

For achieving our proposed research objectives we used the following research methods: semi-structured interview, the somatometric measurements, clinical tests and statistical methods (SPSS version 15.0).

The volume of examinations conducted within this work for people with metabolic syndrome includes:

- Lifestyle knowledge measurement – using a semi-structured interview with representative questions for five domains referring to healthy lifestyle: healthy behavior, free time physical activity, vigorous physical activity, health and wellbeing, nutrition.
- Weight measurement – in the morning, with an empty stomach, using an electronic scale.
- Height measurement – measured between vertex and the sole of the foot level using a height meter.
- Measuring body mass index – based on height and weight the body mass index was measured ($BMI = W/H^2$) which is, according to certain assessment and diagnosis protocols, one of the criterion for MS diagnosis.
- Measuring abdominal circumference – using the metric tape at the mid-distance between lower edge of the ribs and the iliac crest, horizontally.
- Measuring the gluteus circumference (gluteal perimeter).
- Measuring the abdominal and gluteal circumference index. This index was calculated based on the ratio between abdominal circumference and the gluteal one.
- Determining basal glycaemia – capillary puncture using Betachek visual tests to measure the capillary blood glucose, with numerical reading on a color comparison chart.
- Measuring cholesterol – total cholesterol level was measured by using self-reading strip tests.
- Measuring blood pressure – maximum or systolic blood pressure and minimum or diastolic blood pressure were measured.

Regarding the statistical research methods descriptive indicators (average, standard deviation, coefficient of variance) were used, as well as inferential statistics for parametric and non-parametric variables (Pearson and Kendall correlation coefficients).

4. Findings and Results

With regard to the descriptive statistics of the subjects, 12 were male (40%) and 18 were women (60%). We were interested in the sociodemographic background of the subjects and we found that 23 (76.7%) of them are living in urban areas and 7 (23.3%) in rural. The age-group studied ranged between 30 and 60 years, with an average of 56.4 (standard deviation 5.61). Subjects' height varied between 1.55 m and 1.80 m, with an average of 1.67 m (standard deviation 0.06). Regarding the diseases related to lifestyle there are risk factors identified as the

category that can be influenced (obesity, dyslipidemia, hypertension, impaired glucose tolerance, physical activity, behavioral factors) and the category of those that cannot be altered by various types of intervention (age, gender, heredity).

The following tables present the general description of our study group highlighting the most important criteria for susceptibility and diagnosis of metabolic disorders.

Table 1. Anthropometric and clinical characteristics of the subjects

Characteristics	Minimum	Maximum	Average	Standard deviation
Height (m)	1.55	1.8	1.67	0.06
Weight (kg)	71	108	89.9	9.17
BMI (kg/m^2)	29.07	34.48	32.15	1.68
Abdominal circumference (cm)	91	122	101.86	9.21
Gluteus circumference (cm)	94	110	105.07	4.52
Abdominal/gluteus index	0.86	1.15	0.97	0.09
Basal glycaemia (mg/dL)	100	119	112.56	5.03
Total cholesterol (mg/dL)	220	260	245.83	11.22
Systolic blood pressure (mmHg)	150	180	164.7	6.51
Diastolic blood pressure (mmHg)	95	110	102.26	3.46
Total number of subjects N=30				

Regarding the knowledge about the healthy lifestyle we found that components of healthy behavior were the best known comparative with wellbeing or physical activity, as it can be observed in table 2.

Table 2. Subjects' lifestyle knowledge considering the answers of a semi-structured interview

Lifestyle domain	Minimum	Maximum	Average
Healthy behavior	6	62	37.5
Free time physical activity	10	40	23.2
Vigorous physical activity	10	42	26.3
Health and wellbeing	12	44	27.2
Nutrition	4	22	9.9

To define the standard to which we reported the data from the questionnaire the final score was calculated for each dimension and then five classes of intensity were defined. Comparing the average scores of the study subjects to the test standard score it is noted that "lifestyle", "free time physical activity", "vigorous physical activity", "health and wellbeing" and "nutrition" show a relatively low intensity of manifestation.

Considering lifestyle knowledge and the presence of two, three or more metabolic risk factors, the results showed a reverse correlation between the level of general knowledge about healthy lifestyle and the presence of metabolic syndrome ($r= 0,48$, $p < 0,01$). Also, people who were more physically active had lower values of metabolic syndrome scores.

5. Conclusions and recommendations

The research associated with the implementation of the present work allowed the retention of general and specific conclusive elements. An important feature of transition in developing countries is the rapid urbanization and the change in the living environment that also results in or attracts changes in peoples' lifestyles.

Identifying the weak areas of healthy lifestyles can be the starting point in building the necessary interventions based on therapeutic education.

Since most disorders caused by lifestyle have common risk factors, therapeutic education addressed according to each individual's needs and/or community needs is an effective action presuming allocation of minimum resources, but which gets a maximum result.

The objectives of the interventions are designed so that each individual may choose his/her own strategies for a higher effectiveness of the therapeutic education program. The most important aspect in obtaining maximum benefits is the implication in any type of moderate or intense physical effort.

One need reiterate that the application of therapeutic education programs is associated with the optimization of the health status operationalized by physiological variables (body weight, blood pressure, glycaemia, cholesterol and the effort capacity).

Preventive care represents not only the present, but especially the future of healthcare interventions. Most guides for interventions regarding obesity and associated metabolic complications (diabetes type II) are focused on diet modification and increased level of physical activity, but what is really valuable here are those interventions which lead to a long-term change.

Nomenclature

CVD	cardiovascular disease
T2DM	type 2 diabetes mellitus
NAFLD	nonalcoholic fatty liver diseases
LC	liver cancer
CKD	kidney disease
HDL	high-density lipoprotein cholesterol
MS	metabolic syndrome
NCEP–ATP III	National Cholesterol Education Program – Adult Treatment Panel III
EU	European Union
BMI	body mass index
W	weight
H	height

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