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Interconnection of A Physical Activity of Mature Males with Their Diet.

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ABSTRACT

The article is devoted to the anthropometric indices, physical activity and factors of male adults' diet that are available for the public studies. In the course of studies it was found out that the height and weight indices deviate from the norm by $0,92\text{kg}/\text{m}^2$. A general physical activity during the week is 2154,68 MET which is a medium index for this age group. Direct and indirect interconnections of a physical activity of males with the peculiarities of their diet have been defined. In general, eating factors influence a physical activity of males in many ways but it depends on its intensity.

Keywords: physical activity, MET, intensity of a physical activity, peculiar features of a diet, mature males.

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INTRODUCTION

A physical activity and a rational diet play a very important role for the life and health of a person. There are many scientific researchers about the interdependence of a person's physical activity and his physical state, health, quality and length of life (Bergieretal. 2014, Myczkan, Fedynyak 2014, Pavlova 2012). A role of a diet in sports, health preservation, prevention of a number of contagious diseases has been actively studied as well (Coulston etal. 2013, Bergieretal. 2015, Mariscal-Arcas etal. 2007, Tsiosetal. 2014). At the same time the research of the influence of a diet on the physical activity of people of different ages are not widely spread due to the complicacy of the control and evaluation of food products.

Modern methods of researching diet are mainly concentrated on the energy value of the products, on macro- and micronutrients which a person consumes together with food, their relative indices of weight, and on their biochemical influence on a person's body (Foltran 2010, Haubrock etal. 2010). Such researches are, by all means, fundamental but they require laboratory conditions and professional specialists and these factor slim it their application in massive studies.

Quite a lot of methods for the studies of a diet of various social classes have been worked out recently. Among them there is the Framingham Food Habit Questionnaire (Willett, Renolds 1987), a questionnaire for teenagers HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) (Ottevaere et al. 2011). An evaluative system MSM (Multiple Source Method), which enables the researchers to analyze a person's diet by the consumed energy in kilocalories and in the received percentages of the energy from different nutrients (carbohydrates, saccharoses, polisaccharoses, proteins, fats, simple non-saturated fat acids)(Haubrock et al. 2010). A questionnaire with an on-line computer evaluation of the food allowance (Forster et al. 2014) is also aimed at dividing the consumed products into micronutrients by approximate standards. Unfortunately, in all these popular methods there are a number of drawbacks such as a low informational content which is caused by a high level of subjectivity of the respondents, insufficient accuracy in the groups of products and the absence of the available recommendations and planning.

There were a lot of researches of the interdependence between a diet and physical activity of various levels of the population but they do not give clear results. Some researches (CF Diet 2003, Elder 2007, Willett et al. 1988) prove that more physically active people stick to a healthier diet. Other studies did not prove the connection between a healthy diet and a high level of a physical activity (Ottevaere et al. 2011), though there were found the differences in the consumption of some groups of products and the amount of the consumed nourishing substances with the level of a physical activity of males.

That is why the search for available and informational factors necessary for the diet evaluation and their connections with a physical activity of mature males are topical questions now.

The purpose of the article is to justify and ground the informational indices of the influence of a diet on the physical activity of mature males.

MATERIALS AND METHODS

A physical activity (PA) of males was studied with the help of our modified method (Pryshva 2013) of an international questionnaire IPAQ (International Physical Activity Questionnaire) (The International 2005), in accordance with the Global recommendations on physical activity for health WHO (A guide 2007). We studied the number of minutes per week in every zone of intensity and a total PA in the figures of MET (metabolic equivalent of task) – an index that reflects the energy usage during the physical work.

While studying the peculiar features of a diet we paid our attention to the indices that did not require an expertise of food done by experts and that could be easily defined with the help of a questionnaire given to a vast number of people (Coulston et al. 2013, Mariscal-Arcas et al. 1999). The following factors were taken into consideration: a number of meals per day (with at who our interval); an amount of portions of the consumed products among which we distinguished between food of animal origin, plant/vegetable food (natural and raw), fat food; a number of times per day when natural water was drunk; a number of portions of the food that contained sugar, salt and харчові домішки (colorings, conservatives, flavour intensifiers and

others), and a number of portions of non-natural products (alcohol drinks, energizers, sweets, sauces, mousses, mayonnaise, etc.).

While organizing our research and calculating the consumed products we were following the recommendations from the previous studies (Bondia-Pons et al. 2010, Mariscal-Arcas et al. 2007). The medium results were calculated for a week and were specified for an average day.

The general results were processed with the help of the methods of non-parametric statistics; a coefficient of a range correlation was calculated according to Spearman. The programs EXEL and Statgraphics 16 were used as well.

RESULTS AND DISCUSSION

Anthropometric indices of mature males, an average age of whom was 43 years (IP: 28-55), meet their age norm with the body height of 177,41 cm, and weight of 81,69 kg(see Table. 1). A height-and-weight index is on the level of 29, 92 kg/m²(IP: 23,29-28,56) which deviates from the norm by 0,92kg/m²(Freedson et al. 1998).

Table 1: Anthropometric Indices of Mature Males

No	Index	n	Me	(95%IP)
1	An average age (years)	196	42,69	(28,28;55,45)
2	Body height (cm)	196	177,41	(173,02;181,89)
3	Body weight (kg)	196	81,69	(76,32;87,05)
	Index of a body mass(kg/m ²)	196	25,92	(23,29; 28,56)

A physical activity of mature males (Table 2) was being studied during a week in the zones of high, medium and low activity by minutes, and it was also measured by figures of MET. PA of a high intensity was in general 73,98 min/week which is approximately 11 min per day. The research proved that, according to the earlier studies (Centers for 2014, U.S. Department 2008), such indices meet the recommended norms that are 75 min per week for the people of such age.

Table 2: A Physical Activity of Males per Week

No	Physical Activity	n	Me	(95%IP)
3	Highintensity (min/week)	195	73,98	(41,46; 106,49)
4	Medium intensity (min/week)	195	135,91	(97,56;174,25)
5	Lowintensity (min/week)	195	323,77	(277,42;370,11)
	Total (MET)	195	2154,68	(1890,11;2419,24)

A medium PA is 135,91 min/week(IP: 97,56;174,25), which is 20 min a day. A low intensity PA is in general 323, 77 min/week (IP: 277,42;370,11), which is 46 min. According to the researchers (U.S. Department 2008, Yngve et al. 2003), it is enough for this age category.

A total PA per week is 2154, 68 MET (IP: 1890, 11; 2419, 24), which is 46 min per day. According to the researchers (Pryshva 2013, Centers for 2003), it is an average index for this age group.

The studies of the diet of mature males (Table 3) were conducted during the week and showed that a number of meals per day (with the intervals of not less than two hours) was in general 4,57 times (IP:2,56;6,56), which is a relative norm for the mature males (Dodatok do nakazu 1999, Bondia-Pons et al. 2010).

An amount of food of the animal origin consumed during a day is 2, 75 portions (IP: 1,42;4,07), vegetable food - 3,18 (portions) (IP: 2,86;3,49), raw vegetable food - 3,18 (portions) (IP: 1,76;4,50). Men drank natural water, in general, 4, 32 portions a day (IP: 2,95;5,68).

Table 3: Peculiar Features of Diet of Mature Males

No	Number	N	Me	(95%IP)
1	Meals per day (times)	188	4,57	(2,56;6,56)
	Products of animal origin (portions)	184	2,75	(1,42;4,07)
	Plant/vegetable products (portions)	184	3,88	(2,86;4,89)
	Raw vegetable products (portions)	184	3,13	(1,76;4,50)
	Raw water (portions)	184	3,32	(1,95;4,68)
	Products containing sugar (portions)	184	3,05	(1,70;4,41)
	Products containing salt (portions)	184	1,86	(0,65;3,07)
	Fat food (portions)	184	1,59	(1,02;2,14)
	Products with nutritive admixtures (portions)	182	2,64	(1,18;4,12)
	Non natural products (portions)	180	3,05	(0,89;5,22)

Products containing sugar were consumed in 3,05 portions (IP: 1,70;4,41), and the ones with salt – in 1,86 portions (IP: 0,65;3,07), with nutritive admixtures – in 2,64 portions (IP: 1,18;4,12). Fat food was consumed by males in 1,59 portions per day (IP: 1,02;2,14). Non natural products (alcohol, energizers, sweets, mayonnaise, mousses, sauces and others) were consumed by men in 3,05 portions per day (IP: 0,89;5,22). According to some studies (Dodatok do nakazu 1999, Wendy 2003), a number of the consumed portions of food do not deviate from the physiological hygienic norms and recommendations on a healthy diet.

The analysis of the correlation of the PA of mature males with their diet (Table 4) has shown the existence of a real direct as well as reverse connection of the middle and weak intensity that was also proved by other researchers (cf Diet 2003, Elder, Roberts 2007). So, a total number of meals consumed per day is directly connected with a high intensity PA of males ($r=0,451$). At the same time, the correlation with the PA of a medium and low intensity has not been traced. Also, weak inter relations ($r=0,279$) of general PA of males (calculated in the numbers of MET) with the number of meals were pointed out.

Table 4: Tightness of the connection between a physical activity of males with their diet

No	Number of portions	Physical activity			
		High intensity	Medium intensity	Low intensity	Total
	Total number of meals	0,451	0,195	-0,014	0,279
	Food of animal origin	-0,377	0,154	0,343	0,340
	Vegetable food	-0,342	-0,276	-0,150	-0,293
	Raw vegetable food	0,461	0,258	-0,068	0,289
	Raw water	0,358	0,279	0,340	0,328
	Containing sugar	-0,136	-0,231	0,255	0,155
	Containing salt	0,282	0,259	-0,252	0,184
	Fat food	-0,274	-0,077	0,373	0,067
	Containing nutritive admixtures	-0,255	-0,274	0,508	0,191
	Non natural products	-0,461	-0,348	0,240	-0,327

**the correlation with the accuracy of $p < 0,05$ is written in bold print.*

Men’s consumption of a certain number of portions of the food of animal origin has weak reverse connection with their PA of a high intensity ($r=-0,377$). A verified connection with the men’s physical activity of medium intensity was not found. At the same time, we observe a direct weak connection ($r=0,343$) with men’s physical activity of low intensity. There is also a direct weak interconnection with the general PA ($r=0,340$). It affirms a bigger number of portions of the food of animal origin consumed by males with a low and general PA and a smaller number of the portions of the food of animal origin consumed by the males whose PA is mainly highly intensive.

A number of the portions of the vegetable food consumed by males has a weak reverse connection with the PA of high intensity ($r=-0,342$), medium intensity ($r=-0,276$), and insufficient tightness with a low intensity. A weak reverse connection ($r=-0,293$) with a general PA has been traced.

Absolutely opposite connections we observe in the case of males consuming a lot of portions of raw vegetable food a day. It was noticed that there is a medium direct connection with a high PA of males which was proved by previous researches (Pryshva 2013). There is a weak direct connection with a PA of medium intensity ($r=0,258$) also. At the same time a visible connection with a PA of a low intensity was not traced. A weak direct connection ($r=0,289$) exists with a generalized PA.

A consumption of water by males has a weak direct connection with all types of PA: with a PA of high intensity ($r=0,358$); with a PA of medium intensity ($r=0,279$); with a PA of low intensity ($r=0,340$); with a general PA ($r=0,328$).

A number of portions of food containing sugar consumed by males has a weak direct connection only with a PA of low intensity ($r=0,255$). According to other researchers (Ottevaere et al. 2011), there is no connection between a sugar consumption and a PA of teenagers.

A consumption of food containing salt by males has a weak multidirectional connection with a PA. There is a weak direct connection ($r=0,282$), ($r=0,259$) with a PA of high and medium intensity. A connection with a PA of low intensity is weak and reverse ($r=-0,252$). There was not enough evidence for the tightness of the connection with a general PA.

A consumption of fat food by males has a weak multidirectional connection with a PA of men. There is a weak reverse connection with a PA of high intensity ($r=-0,274$). A connection with a PA of low intensity is weak and direct ($r=0,373$) while with other types of PA it has not been traced.

A consumption of food containing nutritive admixtures (colorings, conservatives, flavour intensifiers) by males has a medium and weak multidirectional connection with a PA. A weak reverse connection ($r=-0,255$), ($r=-0,274$) with a PA of high and medium intensity has been observed. A connection with a PA of low intensity is medium and direct ($r=0,508$) while with a general PA it has not been traced.

An amount of non natural food (alcohol, energizers, sweets, mayonnaise, mousses, sauces etc.) consumed by males has a medium and weak reverse connection with a PA of men. A medium reverse connection ($r=-0,461$) has been observed with a PA of high intensity. A weak reverse connection ($r=-0,348$) with a PA of medium intensity has been observed. There was no verification of the tightness of the connection with a PA of low and general intensity.

Depending upon the intensity of a physical activity, we can observe the dynamics of changes of the correlation coefficients from the positive ones to the opposite. This process may prove that such factors of a diet influence a PA of males in many directions depending upon its intensity.

CONCLUSIONS

The obtained results have proved the existence of certain inter connections between a physical activity and peculiar features of a diet of mature males. At the same time it is necessary to be aware of the fact that these connections can be direct and indirect as well. A physical activity of a person may depend a lot on a person's health which can enable him to be either physically active or physically inactive, and it depends on his diet.

The found informative connections are available for a wide circle of mature males. They give an opportunity to have a more complex approach to the process planning of a physical activity and giving recommendations on a diet in a definite period of time.

REFERENCES

- [1] A guide for population-based approaches to increasing levels of physical activity: implementation of the WHO Global Strategy on Diet, Physical Activity and Health. Geneva, World Health Organization, 2007.
- [2] Bergier B, Tsos A, Bergier J. (2014) Factors determining physical activity of Ukrainian students. *Ann Agric Environ Med.* 21(3): 613–616. doi: 10.5604/12321966.1120612
- [3] Bergier J., Bergier B., Tsos A. (2015), Physical activity and eating habits among female students from Ukraine. *Health Problems of Civilization*, 2 (9), p. 5-12.
- [4] Bondia-Pons I., Mayneris-Perxachs J., Serra-Majem L., Castellote A., Marine A., Lopez-Sabater M. (2010), Diet quality of a population sample from coastal north-east Spain evaluated by a Mediterranean adaptation of the diet quality index.(DQI).*Public Health Nutr*, 13(1):12-24.
- [5] Centers for Disease Control and Prevention. State Indicator Report on Physical Activity (2014), Atlanta, GA: U.S. Department of Health and Human Services.
- [6] CF Diet, Nutrition and the Prevention of Chronic Diseases, Report of a Joint WHO/FAO Expert Consultation, 2003.
- [7] Coulston Ann M., Boushey Carol J., Ferruzzi Hi., Mario G. (2013), Nutrition in uterine in the prevention and treatment of disease. Third edition. Elsevier Inc. 525 B Street, Suite 1800, San Diego, CA 92101-4495, USA. http://appliedresearch.cancer.gov/diet/adi/thompson_subar_dietary_assessment_methodology.pdf.
- [8] Dodatok do nakazu Ministerstva oxorony zdorov'ya Ukrayiny` vid 18.11.99 N272. Normy fiziologichny`x potreb naseleण्या Ukrayiny v osnovnyx xarchovyx rehovynax ta energiyi <http://zakon.rada.gov.ua/cgiin/laws/main.cgi?nreg=z0834-99>.
- [9] Elder S.J., Roberts S.B. (2007), The effects of exercise on food intake and body fatness: A summary of published studies. *Nutr Rev*, p. 1-19.
- [10] Foltran F. (2010), Nutritional Profiles in a Public Health Perspective: A Critical Review *Journal of International Medical Research*, 38, p. 318-385.
- [11] Forster H., Fallaize R., Gallagher C. et al.(2014), Online dietary intake estimation: the Food4Me food frequency questionnaire. *J Med Internet Res.* 2014 Aug; 16(8): p. 190.
- [12] Freedson P.S, Melanson E., Sirard J. (1998), Calibration of the Computer Science and Applications, Inc. accelerometer. *Medicine and Science in Sports and Exercise*; 30:777–81.
- [13] Haubrock J., Harttig U., Souverein O., Boeing H. (2010): An improved statistical tool for estimating usual intake distributions: the Multiple Source Method (MSM). *Archives of public Health*, 68:14-15. https://msm.dife.de/static/MSM_UserGuide.pdf .
- [14] Mariscal-Arcas M., Romaguera D., Rivas A., Feriche B., Pons A., Tur J.A, Olea-Serrano F (2007): Diet quality of young people in southern Spain evaluated by a Mediterranean adaptation of the Diet Quality Index-International (DQI-I).*Br J Nutr*, 98(6), p. 1267-1273.
- [15] Myczkan B., Fedy`nyak N. (2014), Obgruntuvannya revitalizaciyi organizmu osib «tretogo viku» zasobamy` fizychnogo vyxovannya. *Pedagogika, psy`xologiya ta medyko-biologichni problemy` fizychnogo vyxovannya i sportu //Naukovyj zhurnal. – Xarkiv, XOVNOKU-XDADM, 2014. - № 10. S. 18-23.*
- [16] Ottevaere et al. (2011), Relationship between self-reported dietary intake and physical activity levels among adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, 2011, 8:8.
- [17] Pavlova Y.O. (2012)Yakist zhyttya ta fizychna aktyvnist` yak pokaznyky zdorov'yazberezhnoyi kompetencyi pedagogiv . *Pedagogika, psy`xologiya ta medyko-biologichni problemy fizychnogo vyxovannya i sportu //naukovyj zhurnal. – Xarkiv, XOVNOKU-XDADM, 2012. – № 3, S. 85-91.*
- [18] Pryshva O. B. Osobly`vosti fizychnoyi aktyvnosti cholovikiv zrilogo viku (2013) //*Molodizhnyj naukovyj visnyk Volyns`kogo nacionalnogo universytetu imeni Lesi Ukrayinky. Fizychno vyxovannya i sport: zhurnal.- Luczk: VNU im. Lesi Ukrayinky, 2013. Vy`p. 10. – S. 59-63* <http://esnuir.eenu.edu.ua/handle/123456789/2958>.
- [19] The International Physical Activity Questionnaire (2005), <http://www.ipaq.ki.se/>.
- [20] Tsos A., Bergier B., Bergier J. (2014), Physical activity, physical development and eating habits within the lifestyle of students from Ukraine. *Health Problems of Civilization*, 4 (8), p. 46-53.
- [21] U.S. Department of Health and Human Services (2008), Physical Activity Guidelines for Americans. In: U.S. Department of Health and Human Services, editor. Hyattsville, MD.
- [22] Willett W.C., Renolds R.D., Hoehner-Cottrell, Sampson L., Browne M.L. (1987) Validation of a semi-quantitative food frequency questionnaire: comparison with a 1-year diet record. *J Am Diet Assoc.*- p. 43-7.



- [23] Willett W.C, Sampson L., Browne M.L., et al. (1988), The use of a self-administered questionnaire to assess diet four years in the past. *Am J Epidemiol* 1988;127 – p. 188-9.
- [24] Yngve A., Nilsson A., Sjostrom M., Ekelund U.(2003), Effect of monitor placement and of activity setting on the MTI accelerometer output. *Medicine and Science in Sports and Exercise*, 35: 320–6.