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DETERMINATION AND ANALYSIS OF BODY COMPOSITION AT ADULT LEVEL

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Abstract: *The research hypothesis starts from the premise that the level of adult body fat positively influences the possibility of practising physical exercise by the adult population, by maintaining an optimal level of physical condition. The object of the research is the model of growth and development of the adult, FEFSM students from the final year. The purpose of the research is the model of growth and development by analysing the body fat of adults, FEFSM students in accordance with the ability to have an optimal level of the specific physical condition. The practical value of the research is given by the possibility of developing growth and development models for adults.*

Key words: *adipose tissue, normal weight, body fat, BMI.*

1. Introduction

Overweight is a chronic disease whose prevalence is on the rise and which causes the risk of developing diabetes, high blood pressure, and some heart diseases.

Overweight can be considered a consequence of the interaction between environmental factors and the individual genetic substrate. This leads to increased fat deposits when food is plentiful and energy consumption is low. Obesity is an 'excessive accumulation of fat in the body' [2] being 'associated to an increase in morbidity and mortality' [6].

Obesity is characterized, from an anthropometric point of view, by increasing a surplus by more than 20% of the ideal weight. Arion et al. [1] asserts about obesity that it is a 'nutrition disorder of the infant, child and adolescent, due to a discrepancy between the caloric intake and the energy consumption of the individual'.

The incidence of obesity varies depending on the geographical area, the socioeconomic level, the way of life of the individual as well as on the eating habits of the individual. Recent studies have shown that it manifests at all age groups. Nearly 20-25% of adolescent children are overweight or obese [2].

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Obesity prophylaxis aims at identifying individuals who are susceptible to becoming obese, overweight, by excessive weight gain at young ages. Prevention should begin by identifying parents at high risk for obesity. The measures that contribute to the prophylaxis of obesity are represented by ensuring mental balance, the promotion of physical activity and the consumption of a rational diet.

The normal weight of an individual is essential to obtain an optimal physical form [6]. **Body fat** begins to accumulate at normal parameters when the muscle mass begins to decrease due to fat mass, which begins to increase, as there is the risk of overweight [2, 3].

1.1. Analysis of body composition

The current assessment of body composition is divided into several distinct compartments: non-adipose mass (fat free) and adipose mass (fat).

Body fat begins to accumulate when the muscle mass decreases, thus increasing the likelihood for the appearance of overweight.

The percentage of body fat together with the percentage of active mass form the total body weight [9], [12], [14].

Measuring body fat percentage will permit us to obtain recommendations regarding the risk of developing serious chronic diseases such as diabetes, heart disease, much higher in people with higher levels of body fat [3], [9].

Improving body composition involves engaging subjects in specific exercise and nutrition programs [6, 7]. An important objective is to maintain the adipose tissue at a low level because obesity acquired during childhood is the most difficult to control, overweight children can become overweight adults.

2. Material and methods

The body needs a minimum amount of fat, necessary for the proper functioning of the body [1], [14]. Fats are needed in a higher percentage by 10% in women than in men of the same age, in order to support the hormonal function and the ability to support pregnancy [2], [11], [13].

To measure the percentage of body fat, the measurement of fat folds by using the calliper is used [16]. The fat folds to be measured are: subscapular, suprailiac, biceps, triceps and thigh [4]

Table 1

Typical fat percentage values [10]

Description	Women	Men
Essential fat	10–13%	2–5% =0
Athletes	14–20%	6–13% =2
Fitness	21–24%	14–17% =4
Average	25–31%	18–24% =14
Obese	32%+	25%+

The measurement was carried out throughout the research including measurements for the determination of somatic indicators: height and weight. We used the scale to measure weight and the graduated ruler [4] to determine the height.

The statistical-mathematical indicators that were used in the analysis of the data obtained by measurement were:

¯X-arithmetic average, Σ-standard deviation, W-amplitude, Cv- variability coefficient [5].

Body mass index helps determine obesity and it is defined by the ratio between weight (kg) and height (m²) [5], [11].

The calculation and interpretation of BMI necessitated:

-accurately obtaining height and weight data

-determination of BMI, current weight (kg) / waist² (m²)

-interpretation of BMI

Table 2

Subjects participating in the study on the determination of adipose (1)

Crt. No.	SURNAME NAME	SEX	AGE	ANTHROPOMETRIC DATA		
				H(m)	W(kg)	BMI
1	R.A	M	22+	1.70	77,5	26.60
2	D.M	M	22+	1.78	75,6	23.92
3	E.V	M	22+	1.61	51	19,69
4	R.V	M	22+	1.68	70.4	24,94
5	A.D	M	22+	1.77	72	23.00
6	B.B	M	22+	1.78	80	25.31
7	I.N	M	22+	1.68	74	26.24
8	G.G	M	22+	1.84	105	31.30
9	V.M	M	22+	1.78	77	24.36
10	C.G	M	22+	1.82	73	22.05
11	B.M	M	22+	1.74	81	26.82
12	L.M	M	22+	1.84	102	30.17
13	T.D	M	22+	1.65	51	18.75
14	B.R	M	22+	1.72	105	35.69
15	C.A	M	22+	1.79	80	25.00
16	A.M	M	22+	1.84	80	23.68
17	M.A	M	22+	1.85	103	30.11
18	S.B	M	22+	1.70	68	23.52
19	N.O	M	22+	1.82	73	22.05
20	P.A	M	22+	1.85	85	25.67
arithmetic mean			¯X	35.24	1583	46.58
standard deviation			σ	176	79.17	23.39
amplitude			w	24	54	11.44
variable coefficient			Cv	3.65	0.18	0.13

Subjects participating in the study on the determination of adipose (2) Table 2

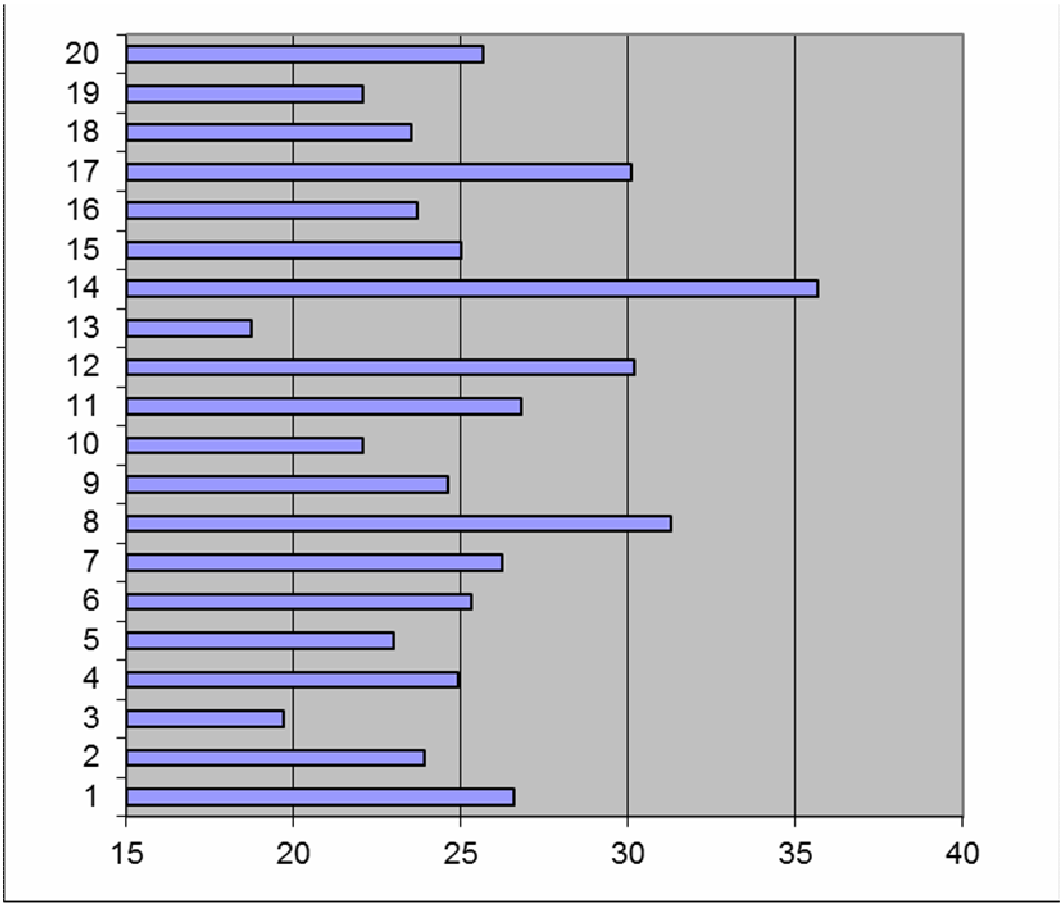
ADIPOSE TISSUE									
SSC fat fold (mm)	SIL fat fold (mm)	TRI fat fold (mm)	BIC fat fold (mm)	COAP fat fold (mm)	Folds (mm)	Corporal surface (m)	Adipose tissue (kg)	Adipose tissue (%)	Active mass (kg)
8	14	8	4	15	49	1.87	14.22	1.102	63.28
12	10	10	4	15	41	1.93	13.88	1.049	61.72
10	10	8	4	10	42	1.52	13.62	694.62	37.38
10	8	8	4	18	48	1.79	14.94	1.051	55.46
10	4	8	3	12	37	1.88	13.93	951.84	58.77
12	10	12	6	10	50	1.98	10.06	804.8	69.74
14	18	18	6	12	58	1.83	11.11	822.14	62.89
20	16	10	6	20	72	2.27	13.65	1.433	91.35
10	20	10	6	8	64	1.94	12.12	938.24	64.88
8	13	7	3	13	44	1.93	9.11	665.03	63.89
15	15	14	6	10	60	1.95	11.53	933.93	69.47
20	20	20	6	20	86	2.24	15.74	1.603	86.28
8	8	8	4	8	36	1.54	7.52	428.64	43.48
30	30	24	16	20	120	2.16	20.74	2.177	84.26
30	30	25	15	10	110	1.98	19.06	1.568	60.94
10	20	10	6	14	60	2.02	11.06	884.8	68.94
20	30	10	8	18	86	2.26	15.35	1.581	87.65
15	20	28	6	8	77	1.78	13.91	945.88	54.09
10	30	10	4	10	64	1.93	12.11	140.89	60.89
15	30	12	8	16	79	2.09	14.52	1.268	70.46
287	353	260	125	267	1283	38.87	268.68		1315.59
14.35	17.65	13.0	6.25	13.35	64.15	1.94	13.43		65.77
22	26	17	12	12	79	1.55	12.88		53.97
0.14	0.39	0.43	0.85	0.44	0.28	0.24	0.26		0.21

3. Results

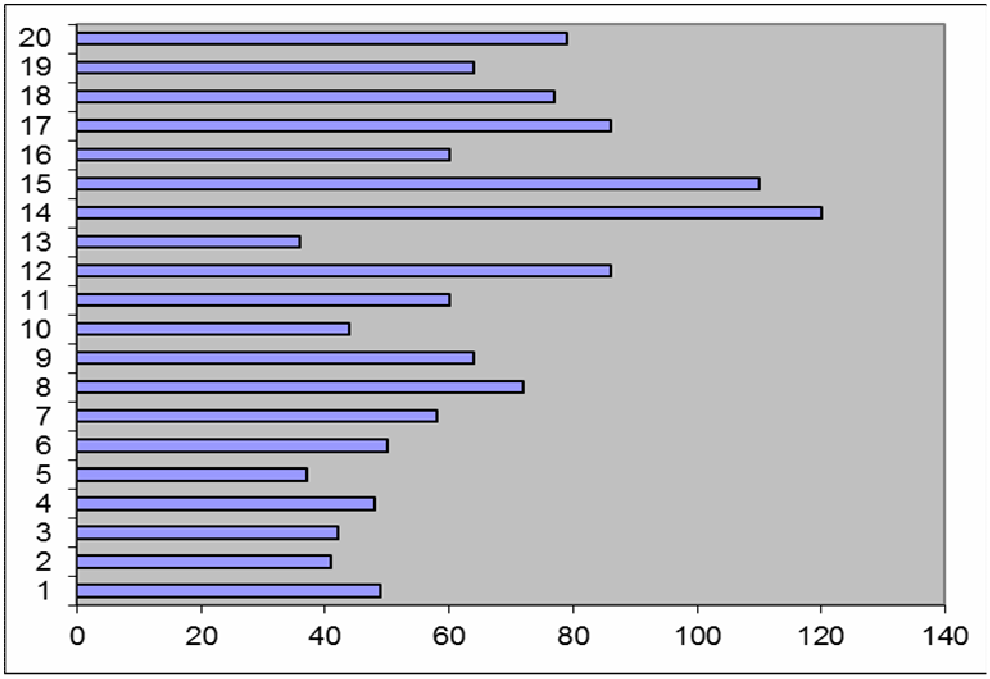
Classification and frequency of body mass index in subjects (kg / m^2) Table 3

CLASSIFICATION		BMI -(kg/m^2),	FREQUENCY
Underweight <18.50	severe	<16.00	0
	moderate	16.00-16.99	0
	weak	17.00-18.40	0
Normal 18.50-24.99		18.50-22.99	4 25.00%
		23.00-24.99	6 33.33%
Overweight >_25.00	Pre-obese 25-29.99	25.00-27.49	6 33.33%
		27.50-29.99	
Obese >_30	Rank I 30.00-34.99	30.00-32-49	3 6.00%
		32.50-34.99	
	Rank II 35.00-39.99	35.00-37.49	1 2.00%
		37.50-39.99	0
	Rank III >_40	>_40	0

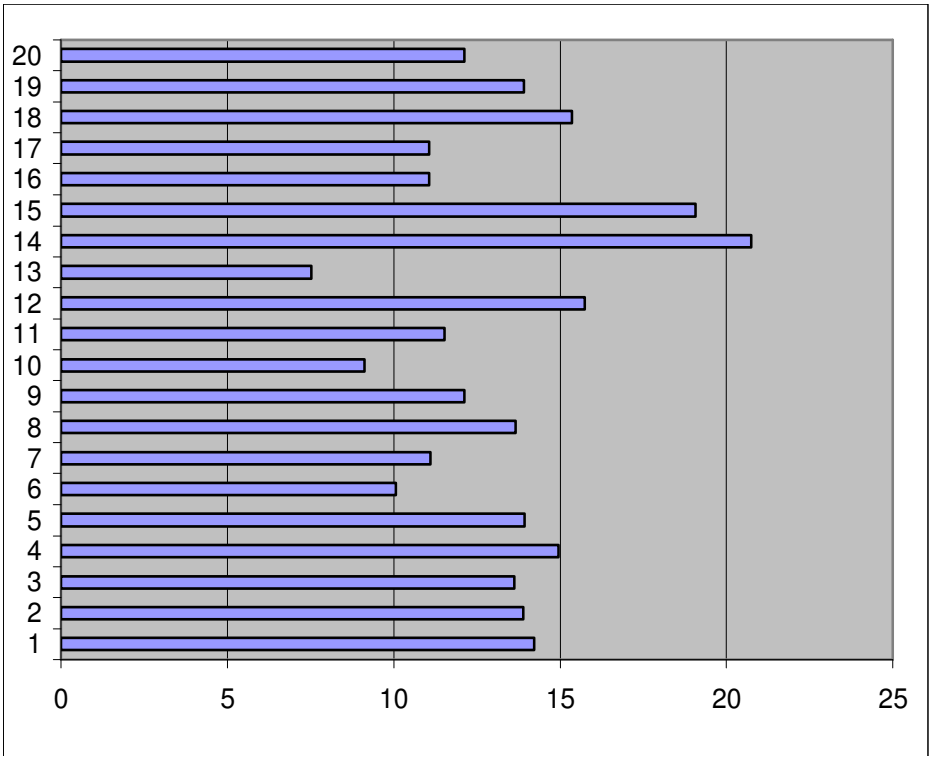
From the analysis of the recorded data as for the BMI determination (Table 3), it results that out of the total of 20 subjects 58.33% fall within the normal limits of the classification, 18.50-22.99 (kg / m²), and 23.00-24.99 (kg / m²). 33.33% of the subjects fall in the interval 25.00-27.49 (kg / m²), and they are classified as pre-obese. As for 3 subjects 6%, they classify as Rank I and Rank II obese, when measuring fat folds: subject 8 = 72mm, subject 12 = 86mm, subject 14 = 120mm and subject 17 = 86



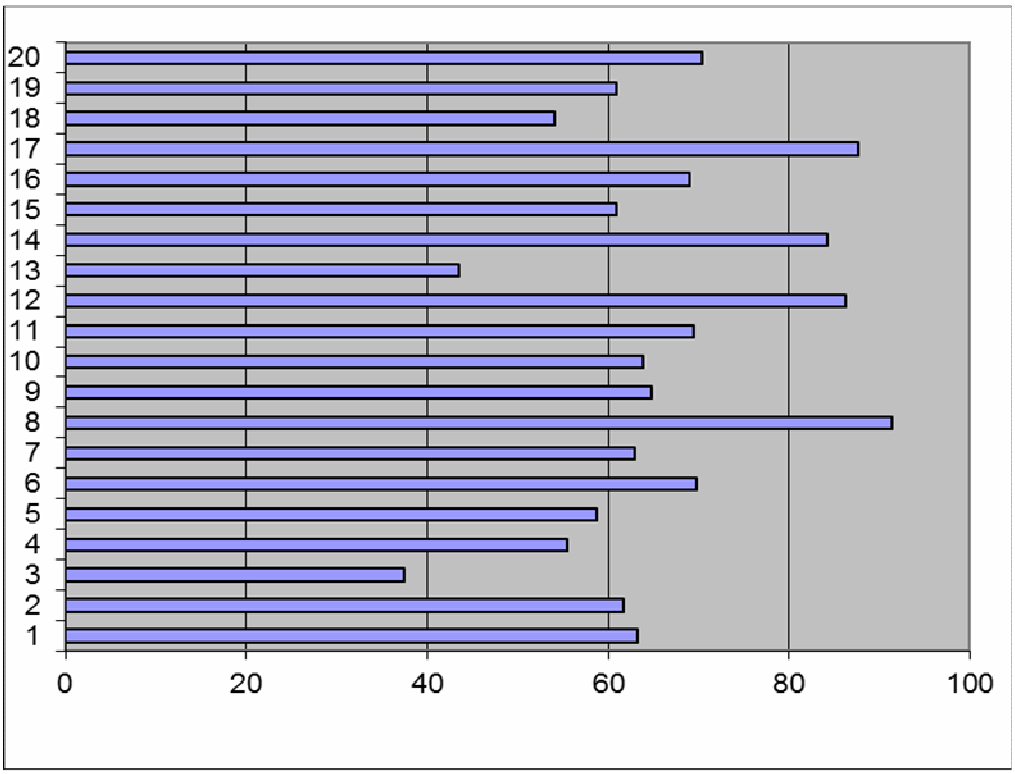
Graph 1. *Body mass index values* (kg / m^2)



Graph 2. *Values of adipose tissue in envelopes*



Graph 3. *Fat tissue values* (kg)



Graph 4. *Active mass values in subjects* (kg)

3. Conclusions

By analysing the BMI values obtained from measurements, it is observed that at the subject's level 58.33% are not underweight, they are normal, and 33.33% are pre-obese (Table 3, Graph 1). Analysing the values of excess weight based on the ideal weight, 8% obese boys have been identified (Table 3, Graph 1). The inexistence of some programs by which the young people at this age should raise awareness about the negative effects of an inappropriate lifestyle, as well as about the methods of eliminating them, specific to this age, lead to an increase in the number of overweight and obese.

The evaluation regarding the level of growth and development of the youth body should correlate with the level of somatic indicators and with that of environmental and social factors. When cases of overweight and obese young people are identified, they will be integrated into training groups in order to eliminate the negative effects of the factors that have generated this situation. In order to obtain objective results, the body composition will be calculated by using the fat fold test and specific medical analyses will be carried out, at the recommendation of the specialist doctor.

References

1. Arion C, Dragomir D, Popescu V.: *Obezitatea la sugar, copil și adolescent (Obesity in infants, children and*

adolescents). Bucureşti, Ed. Medicală, 1983.
2. Beers, M., H., et al.: *Manualul Merk.,- diagnostic și tratament (The Merk. Manual - diagnosis and treatment)*. București, Ed a-XVII-a, Editura All, 2006.
3. Donald, D.: *Clinica mazo-despre menținerea unei greutăți sănătoase (The mazo clinic - about maintaining a healthy weight).* București, Editura All, 2002.
4. Epuran, M.: *Metodologia cercetării activităților corporale (Methodology for researching bodily activities).*, second edition. București, FEST, 2005.
5. Ifrim, M.: *Antropologie motrică (Motric Anthropology).* București, Editura Științifică și Enciclopedică, 1986.
6. Paveliu, F.S.: *Supraponderalitatea și obezitatea de la prevenție la tratament (Overweight and obesity from prevention to treatment).* București, Editura infomedica, 2002.
7. Roșca, D, Roșca, R. *Ajutor în lupta cu kilogramele (Help in the fight with kilograms).* Craiova, Editura Aius, 1997.
8. https://doc.ro/indice-de-masa-corporala (10.10**.** 2019)
9. https://www.nivea.ro/nou-de-la-nivea/calculator-imc(10.10. 2019)
10. https://www.google.com/search?q=tabel+greutatea+ideala&tbm=isch&source=univ&client=firefox(10.10. 2019)
11. https://doc.ro/indice-de-masa-corporala#alternative-indice-de-masa-corporala(10.10. 2019)
12. http://nutriblog.ro/1981/ce-este-compozitia-corporala.html(10.10. 2019)
13. https://pregatirefizica.wordpress.com/tag/compozitia-corporala/(10.10.2019)
14. www.divahair.ro/sanatate/cata-grasime-este-normal-sa-ai-in-funcie-de-(10.10. 2019)
15. https://www.qbebe.ro/mama/sanatate/legatura_dintre_exercitiu_fizic_si_functionarea_creierul. (10.10. 2019)
16. www.divahair.ro/sanatate/cata-grasime-este-normal-sa-ai-in-functie-de-greutate(10.10. 2019)