# Body Typology of Lebanese Adults: Initial Cluster Cross-Selection Study

## Tipología Corporal de Adultos Libaneses: Estudio Inicial de Selección Cruzada de Grupos

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**SUMMARY:** This study aims to investigate body typologies based on a combination of basic anthropo-morphological characteristics and body composition measured by multichannel bioimpedance in a sample from the adult population of Lebanon. A total of 302 subjects (173 males and 129 females) without acute or chronic health disorders were included in the study. Body composition was measured by the multichannel bioelectrical impedance (BIA) method, using the i30 device (MEDIANA, Korea). The research used 10 variables, including three basic anthropo-morphological variables, three for assessing fat, three for assessing the muscle component, and one index variable. K-means cluster analysis was used to define five specific clusters (5D) of body types based on sex. In light of the results, the study established five distinct clusters representing five different body typologies among Lebanese adults, categorized by sex: Male sample, Group 1 – Obese Endomorph (15.61 %), Group 2 – Balanced Mesomorph (16.76 %), Group 3 – Short Endomorph (30.06 %), Group 4 – Short Mesomorph (34.10 %), and Group 5 – Pathological Obese Endomorph (3.47 %); Female sample, Group 1– Obese Endomorph (2.33 %), Group 2 – Short Endo/Mesomorph (28.68 %), Group 3 – Short Ectomorph (32.56 %), Group 4 – Endomorph (22.48 %), and Group 5 – Balanced Mesomorph (13.95 %). Furthermore, the results indicated that the primary factor contributing to the distinctions among the identified clusters in terms of sex is fat tissue. This leads to the conclusion that eating habits cause the given differences, rather than the level of physical activity, regardless of sex.

**KEY WORDS: Body composition; Adults; Muscle mass; Body fat; BIA.**

## INTRODUCTION

Suboptimal nutrition and an inactive lifestyle constitute significant preventable risk factors for numerous non-communicable diseases, such as obesity, being overweight, cardiovascular diseases, and type 2 diabetes mellitus (Ammar *et al*., 2023). Globally, an estimated 11 million deaths have been linked to dietary risk factors, with the disease burden further exacerbated by low physical activity levels across countries (GBD 2017 Diet Collaborators, 2019; Mansour *et al*., 2020). These factors are strongly associated with the development and urbanization of nations. Lebanon, a small middle-income country in the MENA region (Middle East and North Africa), has recently witnessed a concerning escalation in the burden of diseases (Naja *et al*., 2019). Remarkably, 91 % of all deaths in Lebanon are attributed to non-communicable diseases, reflecting a population that fails to meet recommended guidelines for dietary intake and physical activity (OECD, 2016).

Lebanon has been undergoing a marked nutrition transition characterized by a shift in dietary intake and food consumption behaviors towards more highly processed, 'westernized' dietary patterns along with increased sedentary behaviors (Mehio Sibai *et al*., 2011), which is placing the Lebanese population at risk of widespread metabolic and health consequences that threaten their health on the short and long-run (Nasreddine *et al*., 2014).

As urbanization and the nutrition transition unfold, there is a burgeoning interest among researchers to explore the physical characteristics of the Lebanese population.

This study aims to investigate body typologies based on a combination of basic anthropo-morphological characteristics and body composition measured by multichannel bioimpedance. The sample comprises Lebanese adults from different age groups residing in all regions of

Lebanon. The findings from this research are anticipated to contribute valuable insights into the evolving health landscape, paving the way for targeted interventions and public health strategies aimed at promoting pro-health lifestyle changes.

## MATERIAL AND METHOD

The study is organized as non-experimental, applied scientific research. Laboratory measurement was chosen as the main measurement method by using a random sample.

**Study Population.** A total of 302 subjects (173 men and 129 women) without acute or chronic health disorders were included in the study. The study targeted university students, as a young adult population, and employees, as a middle-aged adult and active working population (Rakic *et al.*, 2022; Fayyad *et al.*, 2023), affiliated with a private university in Lebanon, spanning two distinct regions and representing diverse socioeconomic backgrounds. Participants were recruited through convenience sampling, invitations, and word-of-mouth dissemination. The research was realized according to the regulations of the Declaration of Helsinki and with the permission of the Ethics Committee at the University of Belgrade Faculty of Sport and Physical Education (02 No. 484-2).

**Anthropometry Variables.** Physical assessments were carried out at the university's Laboratory of the 3S: Sport, Santé, Société (L3S), following standardized procedures (Dopsaj *et al.*, 2020; Rakic´ *et al.*, 2022; Dopsaj *et al.*, 2023). A qualified nutritionist conducted the physical measures, which included weight, height, and bioelectrical impedance analysis (BIA). Body mass was (BM) measured to the nearest 0.1 kg, with participants wearing light indoor clothing and being barefoot, using a BIA machine. Body height (BH), measured without shoes, was recorded to the nearest 0.1 cm using a portable digital height scale (Campry, China). Each measurement was taken twice, and the average of the two values was reported. Bioimpedance analysis

(i30, Mediana, Korea) was used to estimate body composition measures. Beside BM and BH, the variables analyzed in this research were: BMI - body mass index, expressed in kg/m2; BFM - body fat mass, and SMM - skeletal muscle mass, expressed in kg; PBF - percentage in body fat mass, and PSMM – percentage in skeletal muscle mass, expressed in %; BFMI - body fat mass index, and SMMI - skeletal muscle mass index, expressed in kg/m2; IBC – index of body composition, expressed in Index Units (Dopsaj *et al.*, 2020, 2023).

**Statistical analysis.** All data underwent a pre-analytical procedure to check for technical errors in data entry into the database. Row data's were analyzed using basic descriptive statistical procedures, where the following basic statistical parameters were calculated: Mean value (Mean), standard deviation (SD), and minimum and maximum value (MIN, MAX). K-means cluster analysis was used to define specific clusters of body types, while ANOVA was used to determine differences between defined groups. For the purposes of this research, and as an initial step in terms of the population of Lebanon, a five-part scale for defining classes (5D scale) was used. In other words, the measured sample was divided into 5 body types of structurally different groups using the centroid method as criteria (Hair *et al.*, 1998). All p-values less than 0.05 were considered significant, for a 95 % level of probability.

## RESULTS

Table I presents the basic descriptive data according to sex subsamples.

Tables II and III show the results of the defined clusters based on the body type of the examined sample of Lebanese adults according to sex.

Table IV. shows the results of the ANOVA cluster analysis of defined groups based on the body composition typology of the sample respondents according to sex.

Table I. Basic descriptive data according to sex subsamples.

| | Male (N = 173) | | Female (N = 129) | |
|---|---|---|---|---|
| | Mean ± SD | Min - Max | Mean ± SD | Min - Max |
| BH (cm) | 176.7 ± 6.7 | 158 - 198 | 163.4 ± 6.1 | 148 – 183 |
| BM (kg) | 83.8 ± 17.7 | 53.6 – 149.5 | 64.1 ± 12.4 | 39.4 – 113.4 |
| BMI (kg/m$^{2)}$ | 26.7 ± 5.1 | 16.92 – 48.26 | 24.0 ±4.3 | 16.0 – 39.7 |
| BFM (kg) | 19.2 ± 11.8 | 2.8 – 73.3 | 22.3 ± 8.8 | 6.6 – 57.2 |
| SMM (kg) | 36.2 ± 6.47 | 23.5 – 58.2 | 20.9 ± 4.6 | 11.0 – 33.0 |
| PSMM (%) | 44.0 ± 6.6 | 24.8 – 59.9 | 33.0 ± 5.7 | 20.8 – 50.0 |
| PBF(%) | 21.6 ± 9.0 | 3.3 – 51.8 | 33.8 ± 7.8 | 13.6 – 50.4 |
| BFMI (kg/m$^2$) | 6.2 ± 3.8 | 0.9 – 24.8 | 8.4 ± 3.3 | 2.6 – 20.0 |
| SMMI (kg/m$^2$) | 11.6 ± 1.7 | 7.8 – 17.0 | 7.8 ± 1.5 | 4.5 – 11.2 |
| IBC (AU) | 0.78 ± 0.24 | 0.12 – 1.36 | 1.40 ± 0.19 | 0.69 – 1.84 |

Table II. Body typology of Lebanese men.

| Sex and Body type | Male Group (n=173) | | | | |
|---|---|---|---|---|---|
| Body composition parameters | 1 Group (Obese Endomorph) (n=27; 15.61 %) | 2 Group (Balanced Mesomorph) (n=29; 16.76 %) | 3 Group (Short Endomorph) (n=52; 30.06 %) | 4 Group (Short Mesomorph) (n= 59; 34.10 %) | 5 Group (Pathological obese Endomorph) (n=6; 3.47 %) |
| | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD |
| BH (cm) | 180.6 ± 5.3 | 183.4 ± 4.8 | 173.1 ± 5.5 | 174.7 ± 5.8 | 179.3 ± 4.8 |
| BM (kg) | 106.1 ± 8.5 | 86.3 ± 7.9 | 81.1 ± 6.3 | 69.0 ± 6.4 | 139.1 ± 8.8 |
| BMI (kg/m$^{2)}$) | 32.53 ± 2.01 | 25.7 ± 2.5 | 27.1 ± 2.4 | 22.66 ± 2.2 | 43.4 ± 3.9 |
| BFM (kg) | 32.5 ± 5.1 | 12.4 ± 4.7 | 21.8 ± 4.5 | 10.2 ± 3.5 | 58.6 ± 9.6 |
| SMM (kg) | 41.3 ±5.3 | 43.1 ± 4.6 | 32.0 ± 3.5 | 33.3 ± 3.9 | 46.3 ± 6.6 |
| PSMM (%) | 39.0 ± 4.3 | 50.0 ± 3.8 | 39.6 ± 4.1 | 48.4 ± 4.1 | 33.3 ± 4.0 |
| PBF(%) | 30.6 ± 3.8 | 14.2 ± 4.9 | 26.8 ± 4.3 | 14.6 ± 4.6 | 42.3 ± 5.8 |
| BFMI (kg/m$^2$) | 9.97 ± 1.6 | 3.7 ± 1.4 | 7.3 ± 1.7 | 3.4 ± 1.2 | 18.4 ± 4.0 |
| SMMI (kg/m$^2$) | 12.7 ± 1.4 | 12.8 ± 1.3 | 10.7 ± 1.1 | 10.9 ± 1.2 | 14.4 ± 1.5 |
| IBC | 0.94 ± 0.1 | 0.55 ± 0.1 | 0.99 ± 0.1 | 0.64 ± 0.1 | 0.97 ± 0.1 |

Table III. Clustered body typology of Lebanese women.

| Sex and Body type | Female Group (n= 129) | | | | |
|---|---|---|---|---|---|
| Body composition parameters | 1 Group (n=3) Obese Endomorph **2.33 %** | 2 (n= 37) (Short Endo-meso) **28.68 %** | 3 (n= 42) (short Ectomorph) **32.56 %** | 4 (n= 29) Endomorph **22.48 %** | 5 (n=18) balanced Mesomorph **13.95 %** |
| | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD |
| BH (cm) | 170.2 ± 4.0 | 161.5 ± 5.9 | 161.4 ± 4.8 | 164.2 ± 5.4 | 169.6 ± 5.2 |
| BM (kg) | 104.3 ± 8.5 | 63.7 ± 3.5 | 51.7 ±4.7 | 77.8 ± 5.6 | 65.1 ± 5.6 |
| BMI (kg/m$^{2)}$) | 36.11 ± 4.1 | 24.4 ± 1.8 | 19.8 ± 1.6 | 28.9 ± 2.6 | 22.67 ± 2.0 |
| BFM (kg) | 49.9 ± 6.6 | 23.9 ± 3.0 | 14.4 ± 3.0 | 32.2 ± 4.7 | 17.1 ± 3.9 |
| SMM (kg) | 28.5 ± 4.5 | 19.7 ± 2.7 | 17.5 ± 3.6 | 23.6 ± 3.4 | 26.0 ± 3.3 |
| PSMM (%) | 27.3 ± 2.8 | 30.9 ± 4.0 | 33.8 ± 5.9 | 30.4 ± 4.5 | 39.9 ± 3.6 |
| PBF(%) | 47.9 ± 2.3 | 37.4 ± 3.9 | 27.6 ± 4.5 | 41.3 ± 4.3 | 26.2 ± 5.1 |
| BFMI (kg/m$^2$) | 17.4 ± 2.7 | 9.2 ± 1.4 | 5.5 ± 1.2 | 12.0 ± 2.1 | 6.0 ± 1.4 |
| SMMI (kg/m$^2$) | 9.9 ± 1.9 | 7.5 ± 1.0 | 6.7 ± 1.38 | 8.7 ± 1.2 | 9.0 ± 0.9 |
| IBC (AU) | 1.33 ± 0.1 | 1.53 ± 0.1 | 1.39 ± 0.1 | 1.43 ± 0.1 | 1.15 ± 0.22 |

Table IV. ANOVA of defined body typology groups of Lebanese male and female samples.

| | ANOVA | | | | | |
|---|---|---|---|---|---|---|
| | Male: Cluster Differences | | | Female: Cluster Differences | | |
| | Mean Square | F value | p sig. | Mean Square | F value | p sig. |
| BH (cm) | 673.9 | 22.37 | .000 | 288.6 | 9.95 | .000 |
| BM (kg) | 11321.8 | 223.15 | .000 | 4220.7 | 176.8 | .000 |
| BMI (kg/m$^{2)}$) | 898.32 | 161.32 | .000 | 481.6 | 113.9 | .000 |
| BFM (kg) | 5143.7 | 241.17 | .000 | 2091.3 | 152.7 | .000 |
| SMM (kg) | 1029.06 | 56.0 | .000 | 342.8 | 30.8 | .000 |
| PSMM (%) | 1139.9 | 66.8 | .000 | 336.2 | 14.6 | .000 |
| PBF(%) | 2659.2 | 128.0 | .000 | 1339.5 | 68.7 | .000 |
| BFMI (kg/m$^2$) | 500.05 | 185.39 | .000 | 274.8 | 105.8 | .000 |
| SMMI (kg/m$^2$) | 47.52 | 27.88 | .000 | 28.9 | 19.6 | .000 |
| IBC (AU) | 1.46 | 60.51 | .000 | 0.441 | 16.9 | .000 |

## DISCUSSION

The current theory of the three main body types is based on: endomorph, mesomorph and ectomorph body types. Generally speaking, Endomorphs are characterized by a tall stature, featuring a large and round body, which is also generally soft, because endomorphs tend to gain fat very easily. Typical Mesomorphs have a muscular physique, large bone structure, visibly toned muscles, and natural strength, which makes them an ideal foundation for achieving an athletic body, i.e. perfect for sports. The Ectomorph body type is characterized by a slim physique, often referred to as "a typical skinny guy", with a long body shape, long limbs and minimal fat or/and muscles. Naturally, there are also different combinations of body types, so in most cases people have, more or less, a combination of two body types (Simenko, 2018; Gutiérrez-Leyton *et al.*, 2020).

In general, the results showed that, on average, Lebanese men had the following basic anthropometric and body composition characteristics: they were 176.7±6.7 cm tall (BH), weighed 83.8±17.7 kg (BM), with a nutritional level of 26.7±5.1 kg/m2 (BMI), and a percentage of 44.0±6.6 % (PSMM) muscle in the body, i.e. a percentage of body fat of 21.6±9.0 % (PBF). As for Lebanese women: they were 163.4±6.1 cm tall, weighed 64.1±12.4 kg, with a nutritional level of 24.0±4.3 kg/m$^2$, and a percentage of muscle in the body of 33.0±5.7 %, i.e. a percentage of body fat of 33.8±7.8 % (Table I). According to data from an already published epidemiological study from other countries, it can be concluded that men from Lebanon are similar in body height to Italian men, but exhibit higher body mass and an equivalent nutritional level (Bertuccioli *et al.*, 2022), BH = 175.5 ± 7.9 kg, BM = 79.2 ± 17.2 cm, BMI = 26.4 ±6.4 kg/m$^2$. This additional weight in Lebanese males probably comes from fat, because the average body fat percentage for Italian adult men was 15.4 %, while the PBF of Lebanese adult men was 21.6 %.

When the results of this study were compared with the Swedish population (Larsson *et al.*, 2014) it was noted that Lebanese adult men have a lower BH compared to Swedish adult men (179.0 ± 6.2 cm) but have higher BM (81.12 ±10.98 kg) and a higher nutritional level (BMI = 25.24 ± 2.96 kg/m$^2$). Comparing to the Serbian population (Dopsaj *et al.*, 2020) we can have concluded that Serbian adult men are bigger (BM = 87.3±14.5 kg, BMI = 26.28±3.98 kg/m$^2$) and taller (BH = 182.2 ± 7.3 cm) with approximately the same PSMM and PBF (43.38 % and 22.37 %) which indicates a significantly different body type in the population of adult men from Serbia compared to adult men from Lebanon.

Previously published data showed that Italian women are heavier than Lebanese women but have a lower percentage of body fat, although their height is almost the same as Lebanese women (Bertuccioli *et al.*, 2022). Very similar data were also found among Czechs (Gaba & Pridalova, 2013), which showed that Czech women are also slightly taller, with a very similar body mass and BMI, but with a lower percentage of body fat (164.6±7.2 cm, 65.5±11.1 kg, 24.2±4.3 kg/m$^2$, and 30.7±5.42 %, respectively). Based on this data, it can be concluded that Italian and Czech adult females have a healthier body composition than Lebanese adult females. In addition, published data shows that Swedish and Serbian (Larsson *et al.*, 2014; Dopsaj *et al.*, 2020) adult women are taller and bigger, than Lebanese women, but have a similar nutritional level, and better skeletal muscle mass and body fat percentage (Swedish: BH – 166.0±74 cm, BM - 67.44 ±11.04 kg, BMI - 24.58±3.78 kg/m$^2$, PSMM - 33.0±4.4 %, and PBF - 33.7±7.8 %; Serbian: BH - 168.7±7.4 cm, BM - 68.4±13.2 kg, BMI - 23.74±4.81 kg/m$^2$, PSMM - 36.48 %, and PBF - 30.8 %). Based on this data it can be concluded that Swedish and Serbian females have different body types and anthropo-morphological characteristics than Lebanese women in general.

According to the 5D classification criteria used by Cluster analysis, five different body typologies of Lebanese adults were defined by sex (Tables II and III). As for the male sample, the defined groups had the following distribution of subjects: Group 1 – 15.61 %, Group 2– 16.76 %, Group 3 – 30.06 %, Group 4 – 34.10 %, and Group 5 – 3.47 %. In terms of structure (Table II), the largest portion of the sample fell within Group 4 (n=59, 34.10 %), followed by Group 3 (n=52, 30.06 %), with the smallest proportion in Group 5 (n=6, 3.47 %).

On the one hand, the anthropo-morphological and body structure characteristics of Lebanese men most represented in the sample (both hypothetically and in the population living in Lebanon) are individuals within the average height range of the overall male sample, but possessing below-average body mass, a lower than average BMI, generally higher muscle percentage (48.4±4.1 %) and a very low body fat percentage (14.6±4.6 %). On the other hand, the other sub-population represented are subjects from cluster Group 3, who are very similar in height to respondents from cluster 4, but with a higher body mass (81.1±6.3 kg), a BMI value in the overweight class (27.1±2.4 kg/m2), with a below-average percentage of muscle in the body (39.6±4.1 %), and an above-average percentage of body fat mass (26.8±4.3 %). These two groups can be classified as under-average height (low/short) mesomorphs and under-average height (low/short) endomorphs, respectively.

In terms of the structural representation criterion, the other three male groups are: Group 2 - with 16.76 %, Group 1 - with 15.61 %, and finally Group 5 - with only 3.47 % of the tested population of respondents (Table II). Members of cluster 2 (n=29) represent the tallest individuals in the entire sample (BH=183.4±4.8 cm), but with the highest percentage of muscle in the body (50.0±3.8 %), that is the lowest percentage of fat (14.2±4.9 %). It is evident that the subjects in this cluster belong entirely to the category of extremely balanced mesomorphic persons, i.e. the class of individuals with an athletic physique. On the other hand, respondents from clusters 1 (n=27) and 5 (n=6) fall into the category of individuals with above average height, but who belong to the obese nutrition category (BMI on average 32.53±2.01 kg/m$^2$), and pathological obese category (obese class III, BMI at the level of 43.4±3.9 kg/m$^2$). In terms of fat percentage, it measured 30.6±3.8 % and 42.3±5.8 %, while the percentage of muscle was 39.0±4.3 % and 33.3±4.0 % only, respectively. Respondents from these two clusters belong to the category of obese Endomorphs (Cluster 1), as well as, pathologically obese Endomorphs (Cluster 5).

As for the female sample, the defined groups exhibited the following distribution of subjects: Group 1– 2.33 %, Group 2 – 28.68 %, Group 3– 32.56 %, Group 4– 22.48 %, and Group 5 – 13.95 %.

Structurally (Table III), the largest proportion of the female subjects belonged to Group 3 (n=42, 32.56 %), followed by Group 2 (n=37, 28.68 %), with the smallest proportion in Group 1 (n=3, 2.33 %). Anthropo-morphological and body structure characteristics of the Lebanese women most represented in the sample are individuals who fall within the average height range of the overall female sample, but exhibit below-average body mass, below-average BMI, an average percentage of muscle (33.8±5.9 %) and a low percentage of body fat (27.6±4.6 %). However, the other sub-population represented are subjects from cluster Group 2, who are very similar in height to respondents from cluster 3, but with a higher body mass (63.7±3.5 kg), a BMI value at the upper limit of the normal nutrition class (24.4±1.8 kg/m$^2$), with a below-average percentage of muscle in the body (30.9±4.0 %), and an overweight level considering the percentage of body fat mass (37.4±3.9 %). These two groups can be classified as under-average height (low/short) ectomorph and under-average height (low/short) endomorphs-mesomorph, respectively.

In terms of the structural representation criterion, the other three groups of females are: Group 1- with only 2.33 %, Group 4 - with 22.48 %, and finally Group 5 - with 13.95 % of the tested population of respondents (Table III). Members of cluster 5 (n=18) represent tall female persons

(BH = 169.6±5.2 cm), with the highest percentage of muscle in the body (39.9±3.6 %), i.e. the lowest percentage of fat in the body (26.2±5.1 %). It is obvious that the subjects from this cluster belong entirely to the category of extremely balanced mesomorphic persons, who are individuals with an athletic physique. Nevertheless, respondents from Cluster 1 (n = 3) representing the tallest average population, along with Group 5 in the entire sample, (BH = 170.2±4.0 cm) and respondents from Group 4 (n = 29) belong to the class of above- average height persons. Regarding Group 1, they belong to the pathological obese nutrition category (obese class II, BMI at the level of 36.11 kg/m$^2$). As for Group 4, they belong to the overweight category (BMI on average 28.9±2.6 kg/m$^2$). Regarding fat percentage, it measured 47.9±2.3 % and 41.3±4.3 %, while the muscle percentage was at 27.3±2.8 % and 30.4±4.5 %, respectively. Respondents from these two clusters belong to the category of pathologically obese Endomorphs (Cluster 1), as well as Endomorphs (Cluster 4).

It is very important to note that the ANOVA results (Table IV) indicated that the primary factor contributing to the differences among the identified clusters in terms of sex overall, is body fat tissue (BFM for males = F value – 241.17, p = 0.000, and BFM for females = F value – 152.7, p = 0.000, etc.), compared with the skeletal muscle varia-bles (SMM for males = F value – 56.0, p = 0.000 and females = F value – 30.8, p = 0.000, etc. is not as pronounced as observed in the case of body fat.) This leads to the conclusion that eating habits are the cause of the given results, not the level of physical activity, specifically physical exercise, regardless of sex.

**CONCLUSION**

In accordance with the results, the following clusters of five different body typologies of Lebanese adults were defined according to sex: male sample, Group 1 – Obese Endomorph (15.61 %), Group 2 – Balanced Mesomorph (16.76 %), Group 3 – Short Endomorph (30.06 %), Group 4– Short Mesomorph (34.10 %), and Group 5 – Pathological Obese Endomorph (3.47 %); Female sample, Group 1 – Obese Endomorph (2.33 %), Group 2 – Short Endo/ Mesomorph (28.68 %), Group 3 – Short Ectomorph (32.56 %), Group 4 – Endomorph (22.48 %), and Group 5 – Balanced Mesomorph (13.95 %). In summary, the most represented body type in males is Mesomorph (50.87 %), followed by Endomorphs (49.13 %), while the most represented type in females is Endomorph (53.49 %), followed by Ectomorph (32.56 %), and Mesomorph (13.95 %). Additionally, the results indicate that the primary factor contributing to the differences between the defined clusters based on sex is fat tissue. This leads to the conclusion that

eating habits are the cause of the observed differences, rather than the level of physical activity, regardless of sex. The results of this study will certainly provide valid initial scientific data regarding the research of body structure and typology in the adult Lebanese population of both sexes.

**ANDRAOS, Z.; DAGHER, M.; RICHA, C. & DOPSAJ, M.** Tipología corporal de adultos libaneses: estudio inicial de selección cruzada de grupos. *Int. J. Morphol., 42(3)*:561-566, 2024.

**RESUMEN:** Este estudio ttuvo como objetivo investigar tipologías corporales basadas en una combinación de características antropomorfológicas básicas y composición corporal, medidas por bioimpedancia multicanal, en una muestra de la población adulta del Líbano. Se incluyeron en el estudio un total de 302 sujetos (173 hombres y 129 mujeres) sin trastornos de salud agudos o crónicos. La composición corporal se midió mediante el método de impedancia bioeléctrica multicanal (BIA), utilizando el dispositivo i30 (MEDIANA, Corea). La investigación utilizó 10 variables, incluidas tres variables antropomorfológicas básicas, tres para evaluar la grasa, tres para evaluar el componente muscular y una variable índice. Se utilizó el análisis de conglomerados de K-medias para definir cinco conglomerados específicos (5D) de tipos de cuerpo según el sexo. En base a los resultados, el estudio estableció cinco grupos distintos que representan cinco tipologías corporales diferentes entre los adultos libaneses, categorizados por sexo: muestra masculina, grupo 1: endomorfo obeso (15,61 %), grupo 2: mesomorfo equilibrado (16,76 %), grupo 3 – Endomorfo Corto (30,06 %), Grupo 4 – Mesomorfo Corto (34,10 %), y Grupo 5 – Endomorfo Obeso Patológico (3,47 %); Muestra femenina, Grupo 1: Endomorfo obeso (2,33 %), Grupo 2: Endo/mesomorfo corto (28,68 %), Grupo 3: Ectomorfo corto (32,56 %), Grupo 4: Endomorfo (22,48 %) y Grupo 5: Mesomorfo equilibrado (13,95 %). Además, los resultados indicaron que el factor principal que contribuye a las distinciones entre los grupos identificados en términos de sexo es el tejido adiposo. Esto lleva a la conclusión de que las diferencias dadas son causadas por los hábitos alimentarios, más que por el nivel de actividad física, independientemente del sexo.

**PALABRAS CLAVE: Composición corporal; Adultos; Masa muscular; Grasa corporal; BIA.**

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