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Effect of Age and Gender on Body Shape and Physical Activity

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Abstract

Research Question: What is the effect of ageing on body shape and physical activity between men and women?
Purpose: The purpose of the research is to study the different body shapes as well as activity levels against gender and age. The research value highlights the importance of Physical performance in maintaining a good shape and a good health especially for older people.
Method: A total quantitative meta-analysis was conducted on a pool of Lebanese adults (N=514), their body shapes were assessed individually and questions related to their weekly physical activity were analyzed accordingly. One-way Anova, Mann-Whitney and Kruskall-Walis tests were performed to seek the correlation and significance between the variables.
Results: Younger adults, in particular women, have a better body shape and BMI. Ageing has a direct impact on weight gain and in particular on abdominal fat deposit which enhance the apple shape. Older people have less activity level which is more perceived among women.
Organization: The study points on the importance to consider the body shape when assessing the health level in order to reduce health cost through preventive methods.
Society: Abdominal fat, which encourage the apple shape, has a negative impact on health and hide economic cost directly and indirectly. Prevention is highly recommended through exercise and a diet therapy to reduce the risk of associated problems and increase the life-span in general.
Originality: The impact of the study concerns the Lebanese society and reflects a part of their lifestyle and explains some questions regarding their health status.
Limitations / further research: The sample is randomly selected from Lebanese adults (age above 19 years old) for both genders. Pregnant and lactating women are not considered in the sample. Further research, including other cultures and regions is recommended, to make comparative analysis with the results.

Keywords: age, gender, BMI, body shape, activity level, health, abdominal fat, apple shape.

1 Introduction

Exercise is widely regarded as one of the most valuable components of behavior that can influence body weight and therefore help in the prevention and management of obesity (Blundell, Gibbons, Caudwell, Finlayson, & Hopkins, 2015). The role of physical activity in maintaining good health and preventing insulin resistance, type 2 diabetes mellitus, obesity,

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metabolic syndrome, atherosclerosis, and other cardiovascular complications is well recognized (Christiansen, Bruun, Madsen, & Richelsen, 2007).

Physical performance is worse with increasing age decade. Although men performed better than women across all ages, the decrement by age group was similar between genders (Hall et al., 2017).

Body size and shape change as people grow older and these changes differ substantially between men and women (Winkler et al., 2015). As women age, a decline in sex steroid hormones which coincides with menopause, affects their body shape and composition, resulting in a more android fat distribution (Kirchengast, 2010). When younger, women tend towards an hourglass body shape with gynoid fat distribution, storing proportionally more fat at thighs and hip than around the waist. At a later age, often after menopause, women's fat storage shifts more upwards around the waist (Kuk, Saunders, Davidson, & Ross, 2009). In men, changes in body fat distribution are subtler than in women, showing a slow but steady increase in waist circumference with age. Thus, after the menopause, the sex-differences in body shape between men and women decrease (Wells, 2007).

The current emphasis on the body's appearance or the aesthetic body can be linked to a range of social, cultural and economic factors, including the expansion of health, leisure, cosmetic, beauty and fitness industries since the 1980s; all of which are key areas of focus in the broad field of physical cultural studies (Coffey, 2017). Along with the invitation to care about the body's appearance and to consume products to aid in the aesthetic improvement, a growing emphasis on individual responsibility for health is also central in understanding the rise in a concern of the body's appearance in general (Featherstone, 2010).

Body shape has not only an aesthetic importance but also, scientific studies has shown that it is associated with medical conditions and health issues; in fact, ageing is associated with progressive changes in total and regional fat distribution that have negative health consequences (Kuk et al., 2009). Body size and shape are independent risk factors for morbidity and mortality (Canoy et al., 2007). Abdominal obesity is associated with insulin resistance and type II diabetes (Uijl et al., 2016). Waist circumference is a good surrogate marker of visceral fat accumulation which stores excess energy and buffers against hyperglycemia and hyperlipidemia causing dysregulation of various molecules that lead to chronic inflammation and cardiovascular diseases CVD (Kihara & Matsuzawa, 2015). In fact, studies have shown that persons with more fat around their abdominal region have a higher chance of developing CVD and other associated diseases, such as diabetes and hypertension, than those who store fat around their hips (Wang et al., 2015).

On the other hand, central fat distribution is related to greater psychological vulnerability to stress and cortisol reactivity. This may be especially true among lean women, who did not habituate to repeated stress. Cross-sectional findings support the hypothesis that stress-

induced cortisol secretion may contribute to central fat and demonstrate a link between psychological stress and risk for disease (Epel et al., 2000).

Furthermore, ageing is associated with increased fat content within bone marrow, which exposes the elderly to fracture risk beyond that associated with low bone mineral density alone (Kuk et al., 2009).

2 Theoretical framework

The most common diagnosis of obesity is based on body mass index (BMI) levels, which represents the weight in kilograms divided by the square of the body height in meters (kg/m^2). The World Health Organization classified underweight individuals as those with BMI less than 18.4 kg/m^2, non-obese with BMI from 18.5 to 24.9 kg/m^2, overweight with BMI between 25.0 and 29.9 kg/m^2 and obese for individuals with BMI over 30 kg/m^2, class I with BMI from 30 to 34.5 kg/m^2, class II with BMI from 35 to 39.9 kg/m^2 and obese class III (severe obesity) with BMI over 40 kg/m^2.

Neverthless, BMI does not distinguish between fat locations, when central or abdominal fat deposition is thought to be particularly perilous (Lumeng & Saltiel, 2011). In a recent study it was found that central obesity carries more health risks compared with total obesity assessed by body mass index (BMI). It has therefore been suggested that waist circumference (WC), a proxy for central obesity, should be included with BMI in a 'matrix' to categorize health risk (Ashwell & Gibson, 2016). In fact, a number of studies have found that Waist circumference (WC) predicted mortality risk better than BMI. In this context, WC has emerged as a leading complement to BMI for indicating obesity risk (Petursson, Sigurdsson, Bengtsson, Nilsen, & Getz, 2011). Abdominal obesity was defined as a waist circumference greater than 102 cm in men and greater than 88 cm in women (Ford, Maynard, & Li, 2014).

A body type with a high waist circumference or elevated waist-to-hip ratio (WHR), known as the "apple" body type, represents central/visceral obesity and is considered as an additional indicator of health, and a risk of developing serious health conditions (Ashwell, Mayhew, Richardson, & Rickayzen, 2014). Previous literature suggests the use of pre-specified cut-off points for defining central obesity; WHR > 0.90 in men and > 0.85 in women, in order to standardize comparisons within and between populations (Bacopoulou, Efthymiou, Landis, Rentoumis, & Chrousos, 2015). Abdominal adiposity measured by an elevated WHR is associated with visceral fat accumulation and an adverse metabolic profile (Cerhan et al., 2014). It is accepted that having a pear-shaped body, namely, carrying more of your weight around the hips and having a narrower waist with most body fat deposited subcutaneously, puts a person at a lower risk of developing diabetes, heart disease and other complications of the metabolic syndrome (Sahakyan et al., 2015).

The analysis of a person's body shape can be used to determine current and even potential health risks pointed out that body health is not only determined by body fat percentage but

also by how that fat is distributed throughout the body (Wang et al., 2015). This distribution leads to different body shapes such as apple, pear, triangle, hourglass and rectangle. (Sooklal, Hosein, & Teelucksingh, 2016)

For the purpose of this study, the following hypothesis is set: Young people, in particular women, tend to have a better body shape than older people; as getting older, apple shape is more developed. Physical Activity which is less common among women, decreases consecutively with ageing.

3 Method

3.1 Data Collection and Model of the research

The suggested quantitative method is applied using a questionnaire which is targeting a pool of random population of Lebanese adults N=514 (requirement to be above 19 years old), of both genders.

Analysis framework of the collected data from respondents is implemented using Statistical Package for Social Sciences (IBM SPSS statistics 22) and Microsoft Excel 2016.

Assessing the Body type was identified using a measuring tape, to determine the ratio and the proportion between waist, hips and shoulders, in order to presume the body shape type. As for the BMI calculation, the weight using a balance in kilograms and the height in meter were measured for this purpose. The questionnaire includes some demographic information like the age, gender and home / work address as well as different forms of activities weekly assessed.

The Age was categorized into six groups: 19-27, 28-36, 37-45, 46-54, 55-63, >64. The frequency as well as the proportion are shown in the graphs below:

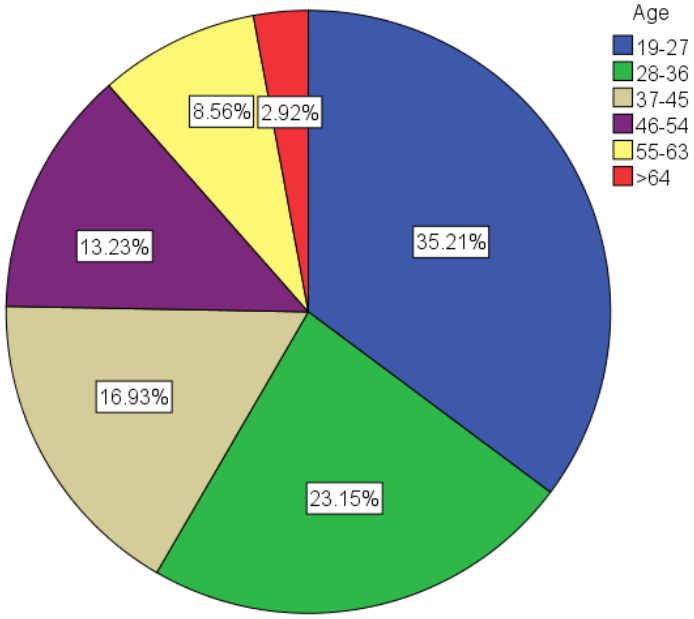


Figure 1. Percentage of Age ranges

Most of the respondents aged young between 19 and 36 years (58.36%) whereas 30.16% were between 37 and 54 years old and 11.48% were above 55 years old.

Among 514 respondents, 224 are male (43.6%) and 290 are female (56.4%).

The distribution between men and women is shown in the figure below where the main difference relies on the range of participants aging between 19 and 36 years' old for which we have 190 women versus 110 men.

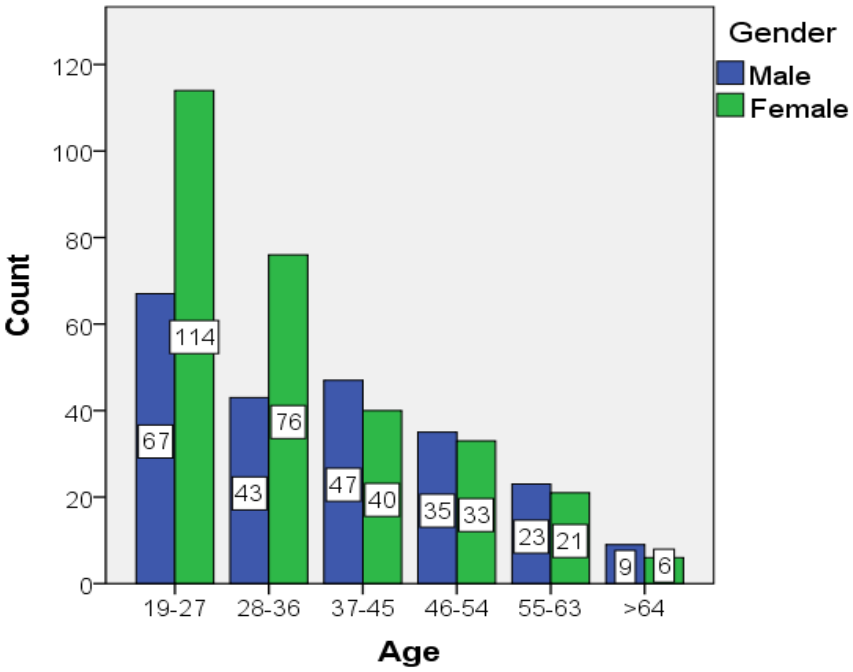


Figure 2. Frequency of Age Ranges relative to the Gender

Body Mass Index (BMI) was also categorized into five categories: Underweight (BMI ≤ 18.4 kg/m^2), Normal (18.5 ≤ BMI ≤ 24.9 kg/m^2), Overweight (25 ≤ BMI ≤ 29.9 kg/m^2), obese (30 ≤ BMI ≤ 34.9 kg/m^2) for the ones suffering from obesity class I, and those with obesity class II and III were merged into one category named "morbid obese" (BMI ≥ 35 kg/m^2).

Table 1. BMI Means and standard deviation (SD) of age categories between men and women

	Mean ± SD	
Age	**Male**	**Female**
19-27	2.33 ± 0.781 2.61 ± 0.797	2.16 ±0 .724
28-36	2.61 ± 0.894 3.00 ± 0.951	2.39±0.784
37-45	2.84 ± 0.819 3.17 ± 0.789	2.45±0.677
46-54	3.03 ± 0.88 3.34 ± 0.802	2.7±0.847
55-63	3.07 ± 0.9 3.39 ± 0.839	2.71±0.845
> 64	3.27 ± 1.1 2.89 ± 0.928	3.83±1.169
Total	2.66 ± 0.895 3.01 ± .878	2.4 ± .814

Table 2. BMI categories with gender and age

	Count of BMI				
Gender	**Underweight**	**Normal**	**Overweight**	**Obese**	**Morbid obese**
Female	5.86%	61.72%	21.38%	8.97%	2.07%
Male	1.34%	27.68%	45.98%	18.75%	6.25%
Age	**Underweight**	**Normal**	**Overweight**	**Obese**	**Morbid obese**
19-27	7.73%	62.43%	20.44%	8.29%	1.10%
28-36	3.36%	51.26%	31.09%	9.24%	5.04%
37-45	0.00%	40.23%	37.93%	19.54%	2.30%
46-54	1.47%	26.47%	45.59%	20.59%	5.88%
55-63	2.27%	22.73%	47.73%	20.45%	6.82%
>64	0.00%	26.67%	40.00%	13.33%	20.00%
Grand Total	**3.89%**	**46.89%**	**13.23%**	**32.10%**	**3.89%**

46.89% of the total population is normal, 13.23% are overweight, 32.12% are obese and the same percentage of 3.89% is for underweight and morbid obese. The majority of males are overweight (45.98%) whereas the majority of females are in the normal range (61.72%). In general, the proportion shows a maximum normal BMI at the younger age between 19 and 36 years. Afterwards, the proportion decrease to reach 22.73% at the age 55-63 years. Then it increases for the age above 64 years old.

Table 3. Age versus BMI categorized into two groups: normal (18.5 < BMI < 24.9 kg/m^2) and high (BMI >25.0 kg/m^2)

Age Range	Normal BMI	High-BMI
19-27	62.43%	29.83%
28-36	51.26%	45.38%
37-45	40.23%	59.77%
46-54	26.47%	72.06%
55-63	22.73%	75.00%
>64	26.67%	73.33%
Grand Total	**46.89%**	**49.22%**
Pearson r	**-0.932**	**0.932**
Sig (2-tailed)	**0.007**	**0.007**

After measuring and comparing the shoulders, waist and hips circumferences, the different body shape types were categorized into five:

- Apple / round shape: similar size of hips and shoulders, with broader waist circumference with slender legs.
- Pear shape: broader hips comparing to shoulders.
- Hourglass shape, similar sizes of hips and shoulders with a curved and slimmer waist.
- Rectangular shape: similar to the hourglass shape except that the curves are reduced.
- Inverted triangle: shoulders are broader than the hips.

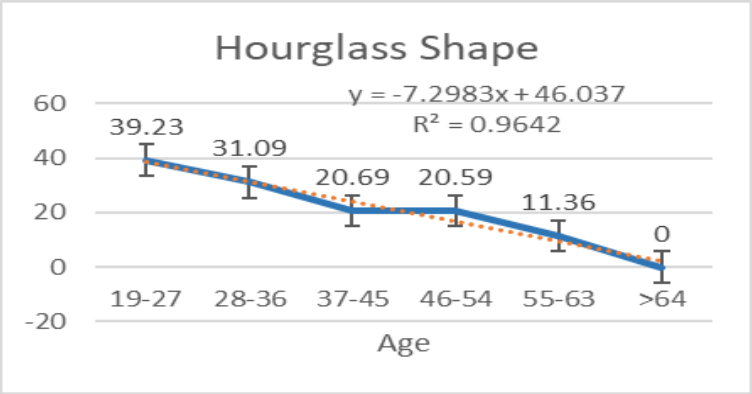
Table 4. Body Shape types with Gender

	Hourglass	Inverted triangle	Oval / Apple	Pear	Rectangular	Total
Male	4.5%	21.0%	25.4%	5.8%	43.3%	100.0%
Female	46.6%	5.9%	10.3%	21.7%	15.5%	100.0%

Men show a higher percentage of rectangular shape (43.3%), whereas, women express a better percentage of hourglass shape (46.6%).

Table 5. Body Shape types with Age

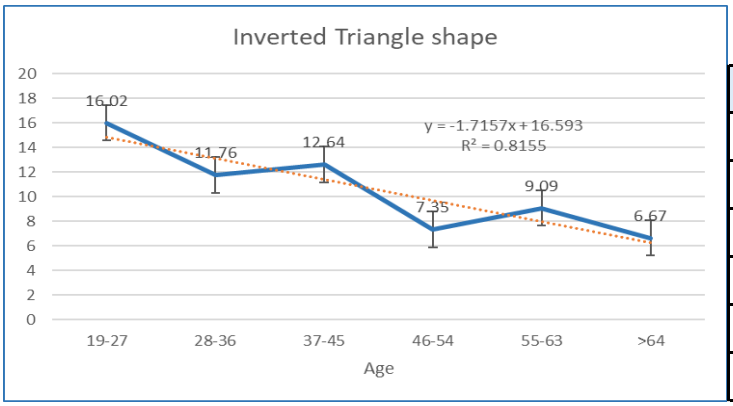
Age	Hourglass	Inverted triangle	oval / apple	Pear	Rectangular
19-27	39.23%	16.02%	3.31%	10.50%	30.94%
28-36	31.09%	11.76%	17.65%	18.49%	21.01%
37-45	20.69%	12.64%	22.99%	11.49%	32.18%
46-54	20.59%	7.35%	25.00%	22.06%	25.00%
55-63	11.36%	9.09%	34.09%	18.18%	27.27%
>64	0.00%	6.67%	53.33%	13.33%	26.67%
Grand Total	**28.21%**	**12.45%**	**16.93%**	**14.79%**	**27.63%**
Pearson R	**-.982**	**-.903**	**.960**	**.278**	**-.129**
R square	**.964**	**.815**	**.923**	**.077**	**.017**
Sig (2-tailed)	**.000**	**.014**	**.002**	**.594**	**.808**



Age	hourglass
19-27	39.23
28-36	31.09
37-45	20.69
46-54	20.59
55-63	11.36
>64	0

Figure 3. Age Range with Hourglass shape

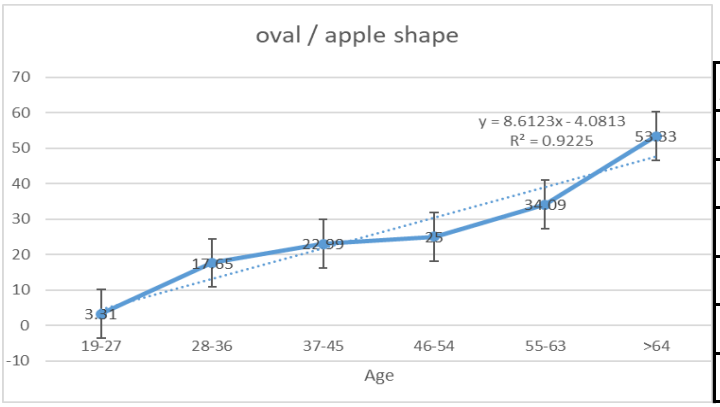
The hourglass shape decrease with ageing starting at 39.23% at the age 19-27 years ending at 11.36% at >64 years old. There is a linear regression with a high, yet negative correlation y = -7.2983x + 46.037



Age	Inverted triangle
19-27	16.02
28-36	11.76
37-45	12.64
46-54	7.35
55-63	9.09
>64	6.67

Figure 4. Age Range with inverted triangle shape

The inverted triangle shape decrease with ageing starting with 16.02% at the age 19-27 years ending with 6.67% at >64 years old. There is a linear regression with a high, yet negative correlation y = -1.7157x + 16.593



Age	oval / apple shape
19-27	3.31
28-36	17.65
37-45	22.99
46-54	25
55-63	34.09
>64	53.33

Figure 5. Age Range with apple shape

The oval or apple shape increase with ageing starting at the percentage of 3.31% at the age 19-27 years ending at 53.33% at an age above 64 years old. There is a linear regression with a high, positive correlation y = -1.7157x + 16.593

Table 6. Body shape types between gender compared with age ranges

		19 - 27	**28 - 36**	**37 - 45**	**46 - 54**	**55 – 63**	**> 64**
Most frequent	**Male**	Rectangular				Apple	
Mode	**Female**	Hourglass			Pear	Apple	

Men, ageing between 19 and 45 years old, show more tendency for a rectangular shape. Above this age, the most relevant shape becomes the oval or apple one. Whereas, women between 19 and 45 years present an hourglass shape, as for the ones aging 46 to 54, the shape becomes pear, then apple for the ones aging above 55 years old.

Table 7. Percentage of Weekly Physical Activity and its distribution between men and women

	Indoor	**Outdoor**	**Gardening**
None	62.8	49.8	73.7
1-2 times	15.4	29.8	15.2
3-4 times	13.6	11.7	5.8
5-6 times	5.8	4.7	1.9
7 times	2.3	4.1	3.3

Gender * Physical Activity per week

	indoor physical activity per week					
	none	1-2 times	3-4 times	5-6 times	7 times	Total
% within Male	59.4%	14.7%	11.6%	10.3%	4.0%	100.0%
% within Female	65.5%	15.9%	15.2%	2.4%	1.0%	100.0%
	Outdoor physical activity per week					Total
% within Male	52.7%	24.1%	11.6%	6.3%	5.4%	100.0%
% within Female	47.6%	34.1%	11.7%	3.4%	3.1%	100.0%
	Gardeing activity per week					Total
% within Male	67.0%	17.9%	6.3%	3.6%	5.4%	100.0%
% within Female	79.0%	13.1%	5.5%	.7%	1.7%	100.0%

62.8% of the respondents don't make any indoor physical activity, 49.8% have no outdoor activities and 73.7% don't work outside like doing gardening for example. The ratio decreases gradually as the frequency of weekly activity increases. The same pattern is expressed when comparing male and female toward their weekly physical activity with a difference between the genders.

Table 8. Mean ± SD (Standard Deviation) of the different Physical activities (Indoor, outdoor, gardening), categorized into five depending on their weekly frequency, with Age categories

Age	Indoor	Outdoor	Gardening
19 - 27 (n = 181)	1.87 ± 1.15	2.04 ± 1.137	1.41 ± 0.843
28 - 36 (n = 119)	1.82 ± 1.03	1.71 ± 0.903	1.24 ± 0.563
37 - 45 (n = 87)	1.64 ± 1.011	1.78 ± 1.115	1.55 ± 1.076
46 - 54 (n = 68)	1.38 ± 0.947	1.72 ± 1.118	1.59 ± 1.011
55 - 63 (n = 44)	1.36 ± 0.892	1.7 ± 1.047	1.61 ± 1.224
> 64 (n = 15)	1.2 ± 0.561	1.53 ± 0.743	2.2 ± 1.612
Total (n = 514)	1.69 ± 1.057	1.83 ± 1.07	1.46 ± 0.938

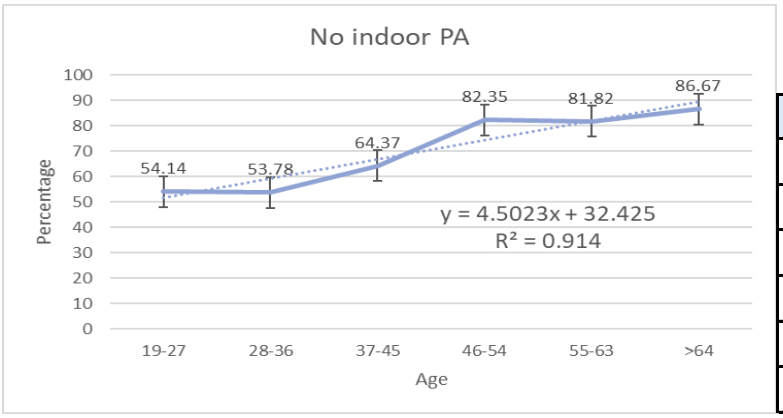
The total weekly Physical Activity (N=514) has an average of: 1.69 ± 1.057 for the indoor activity with a highest mean at the age 19-27 years, 1.83 ± 1.07 for the outdoor activity with the highest mean reached also at the age 19-27 years as well and 1.46 ± .938 for the gardening activity with a highest mean for the elderly respondents (above 64 years).

Table 9. Percentage of working outside versus the population's address of home and work

Home address / work address	work outside per week (gardening)				
	none	1-2 times	3-4 times	5-6 times	7 times
mountain / mountain	56.8%	10.8%	10.8%	2.7%	18.9%
mountain / city	70.9%	15.2%	2.5%	3.8%	7.6%
village/ village	62.9%	25.7%	8.6%	0.0%	2.9%
village / city	69.2%	16.5%	9.9%	3.3%	1.1%
city / city	82.3%	12.2%	3.8%	1.3%	.4%

Table 10. Absence of Physical Activity with Age

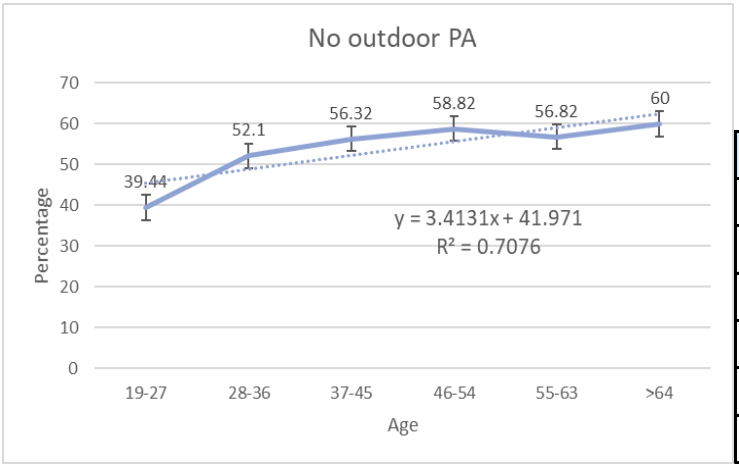
Age	Absence of indoor PA	Absence of outdoor PA	Absence of Gardening
19-27	54.14 %	39.44 %	74.03 %
28-36	53.78 %	52.10 %	82.35 %
37-45	64.37 %	56.32 %	72.41 %
46-54	82.35 %	58.82 %	64.71 %
55-63	81.82 %	56.82 %	72.73 %
>64	86.67 %	60.00 %	53.33 %
Pearson R	**.948**	**.839**	**-.758**
R square	**.914**	**.704**	**.574**
Sig (2-tailed)	**.004**	**.037**	**.081**



Age	No Indoor PA
19-27	54.14
28-36	53.78
37-45	64.37
46-54	82.35
55-63	81.82
>64	86.67

Figure 6. Absence of Indoor Physical Activity with Age

Around 54% from respondents aging between 19 and 36 years old present no activity whereas the percentage increases to reach 64% from the age 37-45 years old and 82% for the range 46-63 years old and finally, the percentage goes up to 87% for the respondents that are over 64 years' old with a positive linear regression y=4.5023x + 32.425.



Age	No Outdoor PA
19-27	39.44
28-36	52.1
37-45	56.32
46-54	58.82
55-63	56.82
>64	60

Figure 7. Absence of Outdoor Physical Activity with Age

39.44% from respondents aging between 19 and 27 years old lack activity whereas the percentage increases to reach 60% for the respondents that are over 64 years' old with a positive linear regression y=3.4131x + 41.971.

3.2 Data Analysis

3.2.1 Effect of Age and Gender on BMI

Table 1 shows the age ranges between male and female against their BMI in terms of mean and standard deviation. The mean of BMI increases with age starting 2.33±.781 at the youngest age (19-27 years) to reach 3.27±1.100 for the age above 64 years. In the same context, the trend of BMI in mean increases when men and women age but with a slide difference between them; women have a lower mean of BMI than men at all age ranges except for the age > 64 years where men have a lower mean of BMI than women.

As shown in Table 2, females have better normal BMI than males (61.72% to 27.68%) and in general, almost half of the population has a normal BMI. This ratio is distributed between the age ranges in a display, where 62.43% of the young adults (19-27 years) have the higher percentage of normal BMI. This percentage decreases continuously with age, inversely, the percentage of obesity and overweight increases with age. Results indicate an inverse relationship between Age and normal BMI and a positive relationship between age and high-BMI; which means that when age increases, normal BMI level decreases and inversely, high BMI increases. The correlation between these two variables in table 3 was found statistically significant ($|r|$ (6) = 0.932, p <0.01, two-tailed).

3.2.2 Effect of Age and Gender on Body shape type

Effect of Gender: Table 4 shows the distribution of body shape types against gender; Although men have higher percentage in rectangular form (43.3%), the inverted triangle and apple shapes for men are high when compared with females, (21% to 5.9%) and (25.4% to 10.3%) respectively. Similarly, the percentage in hourglass shape (46.6% to 4.5%) and pear shape (21.7% to 5.8%) is dominant for females when compared with males.

Effect of Age: The analysis in Table 5 shows clearly that the younger population (19-27 years old) have better body shape type since it has a greater percentage for the hourglass and rectangular shapes. The other range of age has a well distributed proportion among the different body shapes, but it is obviously clear that the apple shape which is considered as the least recommended shape due to its negative effect on health, is strongly highlighted after 55 years old for both genders. When comparing the age of the respondents to their body shape; it was found that oval / round or apple shape increases when ageing with a strong Pearson correlation of r (6) = +.960, p < 0.01, one-tailed. Whereas each of the hourglass and inverted triangle shapes has an inverse relationship with age respectively r (6) = -.982, p < .001, two-tailed and r (6) = -.903, p < .05, two-tailed. As for the correlations between both variables, pear and rectangular shapes with age was found not significant r (6) = .278, p=.594 and r (6) = -.129, p=.808 respectively.

From table 6, one can assume that, men show a rectangular shape when they are young, and apple shape when they get older. Similar for women, who start with an hourglass shape then pear shape to have finally an apple shape which is a common shape for the advanced age for both men and women.

3.2.3 Effect of Age and Gender on Physical Activity

The physical activity rates within the pool of respondents show a general low activity level (Table 7), These proportions indicate a favorable sedentary lifestyle in the general population.

Effect of Gender:

As for the difference between men and women, for the indoor as well as the outdoor physical activity, women present higher percentage than men when it comes to moderate weekly exercise, but the percentage compared to men becomes lower when facing a more intensive one. As for the gardening activity the percentage are lower for women than men.

In addition, it was also found that the percentage of women who don't practice at all, for both indoor and gardening, is much greater than men (65.5% to 59.4%) and (78% to 67%), respectively. On the other side, in the outdoor activities, this percentage is less for women than men (47.6% to 52.7%).

Effect of Age:

The results presented in Table 8 show clearly that the most popular sports stand for the outdoor one which attracts basically the youngest (19-27 years old) with an average of 2.04±1.14 and the less popular one is the indoor physical activity for older people (>64 years) reaching an average of 1.2 ± .57. Inversely, for the same age group, we found the highest average in weekly gardening with a value of 2.2 ±1.61 although this type of Physical activity is the less popular one among all ages especially the youngest (19-27 years old) with an average of 1.41 ±.84; the reason might be attributed to the fact that most respondents live in the city where it's not common to have gardens. In this context a comparison was followed between respondents' address with weekly gardening (Table 9). The results showed that 82.3% of the ones who live and work in the city have no interest in gardening whereas around 56.8% of the ones living and working in the mountains show interest in gardening.

The relationship between absence of activity and age in Table 10 shows a gradual increase in the lack of both indoor and outdoor activities from 54.1% to 86.7% and 39.4% to 60% respectively. When assessing the percentage of respondents regarding absence of indoor and outdoor physical activities against age (fig. 6 and 7), Pearson correlation was found significant [r (6) = 0.952, $p < .001$, two-tailed] and [r (6) = 0.841, $p < .05$, two-tailed] respectively. Whereas when assessing the percentage of respondents regarding the absence of outside physical activity like gardening (Table 10), the correlation was found not significant r (6) = -0.758, p=0.081.

4 Results

BMI and Body shape:

In the Data analysis of the pool of population investigated, it was found that, women present a lower BMI than men. BMI is positively related to age; as ageing follows the weight increase for both genders leading to an increase in BMI while the distribution of fat is more relevant in the abdominal area leading to a more developed apple shape form, which is the least accepted body shape. Inversely, the ideal body shape for women (hourglass) and the inverted triangle shape for men, both decrease in percentage when age increases. The apple shape, which is

more predominant for women at an advanced age (after 55 years old), can be linked to the hormonal imbalance that follows menopause, as many researches had already proven.

Physical Activity and Age:

One-way Anova test was conducted to compare the means of the three forms of physical activity against age. There is a significant effect of age on indoor activity and gardening at the p <.001 [F (5,508) = 4.264, p = .001] and [F (5,508) = 4.093, p = .001] respectively. Instead, there is no significant effect of age on outdoor physical activity [F (5,508) = 2.210, p = .052]

Table 11. One-way ANOVA test

		Sum of Squares	df	Mean Square	F	Sig.
indoor physical activity per week	Between Age Groups	23.079	5	4.616	4.264	.001
	Within Age Groups	549.966	508	1.083		
	Total	573.045	513			
outdoor sports activity	Between Age Groups	12.494	5	2.499	2.210	.052
	Within Age Groups	574.449	508	1.131		
	Total	586.944	513			
work outside	Between Age Groups	17.488	5	3.498	4.093	.001
	Within Age Groups	434.154	508	.855		
	Total	451.642	513			

Note. df = degrees of freedom, F= F-test, Sig = significance

A Kruskal-Wallis H test showed that there is a statistically significant difference in body shape scores between both gender and age, ($\chi^2(4) = 176.230$, $p = 0.000$) and ($\chi^2(4) = 65.092$, $p = 0.000$) respectively with a mean rank for gender and age scores of 201.12 to 354.84 for oval shape, 325.54 to 284.57 for pear shape, 351.78 to 205.92 for hourglass shape, 193.94 to 251.24 for rectangular shape, 180.77 to 223.77 for inverted triangle shape.

Table 12. Kruskal-Wallis H test

	Body shape	N	Mean Rank
Gender	oval / apple shape	87	201.12
	Pear shape	76	325.54
	hourglass shape	145	351.78
	rectangular	142	193.94
	Inverted triangle	64	180.77
	Total	514	
Age	oval / apple shape	87	354.84
	Pear shape	76	284.57
	hourglass shape	145	205.92
	rectangular	142	251.24
	Inverted triangle	64	223.77
	Total	514	

Test Statistics[a,b]

	Gender	Age
Chi-Square	176.230	65.092
Df	4	4
Asymp. Sig.	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: body shape

Note. N= Numerous, df = degrees of freedom, Asymp. Sig = Asymptotic significance

Physical Activity and Gender:

Non-parametric Mann-Whitney U test was conducted to determine whether there was a difference in physical activities between men and women. Results of that analysis indicated that indoor Physical activity as well as gardening were statistically significantly greater for men than for women [(z = -2.087, p = .037) and (z = -3.250, p = .001)] respectively.

Table 13. Mann-Whitney U test

Ranks

Gender		N	Mean Rank	Sum of Ranks
indoor physical activity per week	Male	224	270.93	60689.00
	Female	290	247.12	71666.00
	Total	514		
outdoor sports activity	Male	224	256.08	57361.00
	Female	290	258.60	74994.00
	Total	514		
work outside	Male	224	276.19	61867.00
	Female	290	243.06	70488.00
	Total	514		

Test Statistics[a]

	indoor physical activity per week	outdoor sports activity	work outside
Mann-Whitney U	29471.000	32161.000	28293.000
Wilcoxon W	71666.000	57361.000	70488.000
Z	-2.087	-.207	-3.250
Asymp. Sig. (2-tailed)	.037	.836	.001

a. Grouping Variable: Gender

Note. N= Numerous, Z = Z-test, Asymp. Sig = Asymptotic significance

On the other side, the outdoor physical activity between men and women was not found significant (z = -.207, *p* = .836)

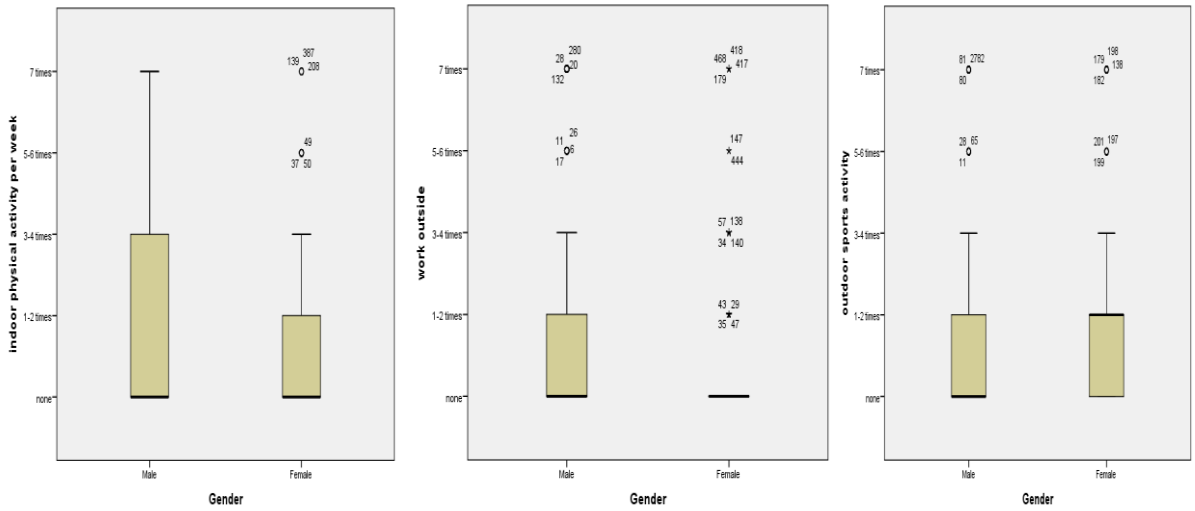


Figure 8. Comparison between men and women in different Physical Activities (Indoor, Gardening, outdoor)

5 Discussion

5.1 Short description of the results

The questionnaire was made among Lebanese people, so the results might reflect a uniformed culture in the context of the subject to be tackled. The data that was collected from Lebanese adult people reflects the sedentary lifestyle that is common nowadays. Even though the BMI, which stands for the body mass index, is normal for half of the population, especially among women, which most of them present also a defined hourglass shape, the level of physical activity in all forms is low and gets lower while aging as the apple body shape develops and increase accordingly. The lack of activity level increases significantly with age for the indoor

and gardening activities. In general, the proportion of active men is much greater than women especially in the gym and gardening activities which is emphasized for respondents living in rural regions.

The effect of age and gender against outdoor activities like hiking, jogging, climbing and cycling was not found significant, so there was no significant difference in the proportion between men and women for the outdoor activities in a general point of view, but the proportion is still greater for women when the physical activity is moderate and less than men, when the workout is intensive, on a weekly basis. The proportion of gardening activities was statistically greater for men than for women, whereas in the indoor activities, men are significantly more than women, nevertheless, women proportion is greater when the indoor activities are moderate on a weekly basis.

5.2 Discussing the results

Hypothesis regarding the effect of age on body shape was accepted. There is a difference in body shape between men and women, such difference is not significant at an advanced age as both genders showed a tendency for a common apple shape.

As for the hypothesis related to the physical activity, it was only rejected for the outdoor sports activity; Gardening and indoor physical activity level were inversely related to ageing.

In addition, Females show a better body shape especially when they are young although their level of activity is low in general and much lower than males; this outcome may be due to their eating pattern and other factors such as stress and medical conditions, which are not discussed in this study; in this context, further researches adding other aspects, that may influence the problems related to body shape and low physical activity are to be followed.

6 Conclusion

In conclusion, the research shows a pattern that reflects an unhealthy lifestyle in the context of physical activity, which is one of the factors that may contribute to the fat deposition and distribution in the body. Sports culture in Lebanon should be more spread and encouraged especially among females, and one can consider youth and children for the reason of the continuity of this lifestyle through ages, starting with the schools' programs that are to be assessed to include more activities in this perspective.

In order to maintain a good well-being and prevent problems in health, one should pay attention to his body shape and increase his physical activity especially when getting older.

The contribution of this study emphasize the community to maintain and enhance a healthy lifestyle and consider the ecosystem by caring more to environment and preserving it.

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Povzetek:
Vpliv starosti in spola na telesno obliko in fizično aktivnost

Raziskovalno vprašanje: kakšen je učinek staranja na tip postave ter na telesno aktivnost moških in žensk?
Namen: Namen raziskave je razumevanje različnih postav in telesne aktivnosti v razmerju do spola in starosti.. Raziskava osvetljuje pomen telesne aktivnosti za potrebe ohranjanja telesne podobe in zdravja, posebno pri starejših.
Metoda: celostna kvantitativna meta analiza je bila izvedena na vzorcu odraslih Libanoncev (N=514). Telesna podoba posameznikov je bila ocenjena za vsakega posameznika, ki je sočasno izpolnil tudi vprašalnik o tedenski telesni aktivnosti. Z namenom iskanja korelacij med posameznimi spremenljivkami so bili izvedeni sledeči statistični testi; One-way Anova, Mann-Whitney in Kruskall-Walisov test.
Rezultati: Mlajši odrasli, posebno ženske imajo boljšo telesno podobo in indeks telesne mase. Staranje ima neposreden učinek na pridobivanje teže, še posebno na področju trebuha, kar povzroča povečanje deleža posameznikov s telesno obliko jabolka. Starejši ljudje, posebno ženske so manj telesno aktivni.
Organizacija: Študija opozarja na pomen telesne oblike v razmerju do zdravstvenega stanja z namenom nižanja zdravstvenih stroškov s preventivnimi metodami.
Družba: trebušna maščoba, ki rezultira v jabolčni telesni obliki ima negativen vpliv na zdravje in skrite neposredne in posredne ekonomske stroške. Priporočena oblika ukrepanja so preventivne dejavnosti v smislu telesne aktivnosti in ustrezne prehrane z namenom zmanjševanja problemov vezanih na debelost in splošnim povečevanjem življenjske dobe.
Originalnost: vpliv študije je vezan na Libanonsko družbo in odraža del njihovega življenjskega sloga ter odgovarja na nekatera vprašanja njihovega zdravja.
Omejitve/nadaljnje raziskovanje: Vzorec je naključno izbran med odraslimi Libanonci (nad 19 let) obeh spolov. Noseče in doječe matere niso vključene. Nadaljnjo raziskovanje se priporoča v smeri primerjave z drugimi kulturami in regijami za potrebe primerjalne analize rezultatov.

Ključne besede: starost, spol, indeks telesne mase, telesna oblika, aktivnost, zdravje, trebušna maščoba, jabolčna oblika.

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