

# Pandemic effect on body composition. Single center analysis of 2.771 cases

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**Background:** The COVID-19 pandemic has led to a dramatic increase in the levels of sedentary lifestyle and unhealthy dietary habits. A worsening in populational obesity levels and body composition (BC) is strongly awaited but so far not documented.

**Objective:** To compare BC profile measured by bioelectrical impedance analysis (BIA) between pre-pandemic (P1-03/15th/2017 to 03/16th/2020) and pandemic (P2-3/17th/2020 to 3/10th/2021) period.

## Materials and Methods:

BIA were grouped according to the time it was performed. Two comparisons were done: an independent sample comparison (ISC) and a paired sample comparison (PSC) considering patients with at least one BIA in P1 and P2 (figure 1). Age, height, gender, weight, body mass index (BMI), body fat mass (BFM), free fat mass (FFM), skeletal muscle mass (SMM), percentage of body fat (PBF), visceral fat area (VFA) were compared. Statistical significance level was defined for a p value<0.05.

**Results:** A total of 3.358 BIA were performed, and 2.771 and 112 were selected for IS and PS, respectively. In ISC, despite an unchanged weight, BFM, FFM, PBF and VFA increased and SSM decreased on P2(p<0.015 for all). PBF was 26.7±10.9 and 28.9±10.4% for P1 and P2 respectively (table 1). A multivariate linear regression, model using PBF as dependent variable showed P2 as an independent predictor ( $\beta=0.38$  95%CI 0.19 to 0.56) for higher values of PBF after adjustment for age, gender, BMI and SMM (table 2). In the PSC (table 3), PBF was 24.59±10.34 and 25.58±9.89%, respectively for P1 to P2 (p=0.015).

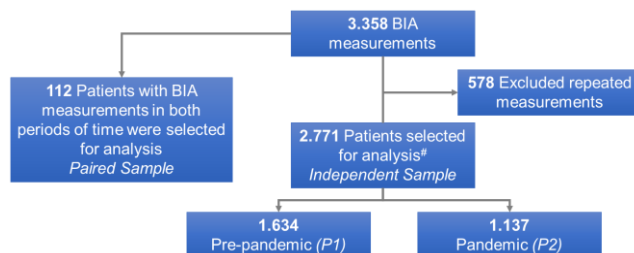


Figure 1 - Flowchart of patients included #Patients with more than one measurements only the first one was considered

Table 1 - Univariate analysis comparing pre-pandemic (P1) with pandemic(P2) periods of time

	P1 (N=1634)	P2 (N=1137)	Cohen's d (95%CI)	p value
Period	03/15 <sup>th</sup> /17 to 03/16 <sup>th</sup> /20	03/17 <sup>th</sup> /20 to 03/10 <sup>th</sup> /21		
Age	46.3±18.6	46.7±18.4	0.02 (-0.05 to 0.10)	0.521
Male Gender	1051 (64.3%)	718(63.1%)		0.528
Weight (kg)	74.5±17.5	75.1±17.9	0.03 (-0.04 to 0.10)	0.442
Height (cm)	173.1±69.3	170.1±11.3	-0.05 (-0.13 to 0.02)	0.145
BMI (Kg/m <sup>2</sup> )	25.5±4.9	25.7±4.9	0.18 (0.05 to -0.02)	0.208
BFM (Kg)	20.5±11	22.3±11.2	0.16 (0.09 to 0.24)	<0.001
FFM (Kg)	54.1±12.9	52.8±12.7	-0.10 (-0.17 to -0.02)	0.009
SMM (Kg)	30±7.8	29.3±7.7	-0.09 (-0.17 to -0.02)	0.012
PBF (%)	26.7±10.9	28.9±10.4	0.21 (0.13 to 0.28)	<0.001
VFA (cm <sup>2</sup> )	94.2±57.5	103.7±57.4	0.16 (0.08 to 0.24)	<0.001

BMI=body mass index; BFM= body fat mass; FFM= free fat mass; SMM=Skeletal muscle mass; PBF= percentage of body fat; VFA= visceral fat area

Table 2- Linear multivariate regression analysis. SSM=Skeletal muscle mass

	$\beta$	95%CI	p value
Age	0.040	0.035 to 0.046	<0.001
Gender	2.12	1.85 to 2.39	<0.001
Weight	0.80	0.79 to 0.81	<0.001
Height	-0.03	-0.03 to -0.029	<0.001
SMM	-1.75	-1.78 to -1.73	<0.001
Pandemic	0.38	0.19 to 0.56	<0.001

Table 3-Pairwise comparison of the 112 individuals with BIA in both time frames (N=112)

	P1	P2	Cohen's d (95%CI)	p value
Age (Years)	42.27±16.7	43.46±16.7	1.76 (1.48 to 2.05)	<0.001
BMI (kg/cm <sup>2</sup> )	25.59±4.48	25.82±4.58	0.10 (-0.07 to 0.29)	0.264
FFM (kg)	57.53±12.35	57.51±11.91	-0.01 (-0.19 to 0.17)	0.948
SMM (kg)	32.27±7.52	32.2±7.27	-0.03 (-0.21 to 0.15)	0.722
BFM (Kg)	19.47±10.64	20.34±11.05	0.16 (-0.02 to 0.35)	0.077
PBF (%)	24.59±10.34	25.58±9.89	0.23 (0.04 to 0.42)	0.015
VFA (cm <sup>2</sup> )	86.9±53.68	90.5±52.69	0.16 (-0.02 to 0.34)	0.093

BMI=body mass index; BFM= body fat mass; FFM= free fat mass; SMM= skeletal muscle mass; PBF= percentage body fat; VFA= visceral fat area.

## Conclusion

To our knowledge this is the first documentation of worsening BC after pandemic. Health authorities should be alert for this phenomenon and their clinical consequences in the days to come.



### References

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