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Research Article

# Visceral adiposity in Obese Diabetic Subjects: Influence of Age and Sex

**Larbaoui K and Ghouini A***

*Laboratory of Physiology, Faculty of Medicine/CHU Blida, Algeria*

***Corresponding author:** Laboratory of Physiology-Faculty of Medicine/CHU Blida, Algeria

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## Abstract

The distribution of body fat is actually more important than the total amount of fat mass when it comes to cardio-metabolic risk. Abdominal visceral fat is just one low share of fat mass, since the majority of fat is subcutaneous (80% in men, 90% in women), but seems to play a more important role than the rest of the adipose tissue. Indeed, the fatty tissue has 2 compartments with characteristics different metabolisms. In our work, we investigated the influence of age and sex on the propensity for the development of visceral fat in a target population such as obese diabetics. At the end of our study, it clearly appears that age is a risk factor for increased visceral adipose tissue and that men are more exposed than women, although the BMI is higher in the latter.

**Keywords:** Obesity; Visceral Adiposity; BMI; Age; Sex; Cardio; Metabolic Risk

## Introduction

Obesity is a public health problem. The prevalence of obesity is increasing in all industrialized countries. Android obesity is associated with excess cardiovascular mortality and type 2 diabetes, which justifies early management of this disease [1]. Visceral adipose tissue, via portal drainage, could be an important source of free fatty acids with complex metabolic effects: participation in hepatic lipogenesis, increase in hepatic neoglucogenic flux, decrease in metabolic clearance of insulin and participation in Peripheral insulin resistance via a Randle-type substrate competition phenomenon [2]. These phenomena increase the risk of cardiovascular diseases, cancers and major metabolic disorders [3]. To this end, we want to research the risk factors likely to favor the development of visceral adiposity and the unfavorable repercussions on the cardio-metabolic level.

## Patients and Methods

### Characteristics of the population

During this study we collected 55 obese diabetic adult patients of both sexes followed in consultation for metabolic diseases at the EPSP of Blida and the Physiology department of the N. Hamoud hospital of Hussein Dey grouped into three classes according to the level of visceral adiposity (Tables 1 & 2) (Figures 1 & 2). Anthropometric measurements for the calculation of body mass index (BMI) and impedance measurements to assess the level of visceral fat using the BF 508 type OMRON body composition monitor were undertaken (Table 3) (Figures 3 & 4). The variables associated with the level of visceral fat were researched by Statistical analysis was performed with SPSS software version 25 (IBM SPSS). The qualitative variable (sex) is described in numbers (percentage), the continuous variables (quantitative) are presented in the form of means +/- standard deviations. Student's t test and anova test were used to compare quantitative variables. A p-value less than 0.05 is assumed to be statistically significant (Tables 4 & 5) (Figures 5 & 6).

**Table 1:** Distribution of patients according to level of visceral fat.

| Level visceral adiposity | Normal (1 - 9) | High (10 – 14) | Very high (15 – 30) | Overall |
|---|---|---|---|---|
| Effective (N) | 4 | 32 | 19 | 55 |
| Percentage (%) | 7.28 | 58.18 | 34.54 | 100 |

**Table 2:** Distribution of patients by gender.

| Gender | Man | Woman | Overall |
|---|---|---|---|
| Effective (N) | 14 | 41 | 55 |
| Percentage (%) | 25.45 | 74.55 | 100 |

**Table 3:** Comparison of levels of visceral adiposity according to age

| Level visceral adiposity | Normal (1 - 9) | High (10 – 14) | Very high (15 – 30) | p |
|---|---|---|---|---|
| Average age | 38.5 +/- 5.802 | 54.91 +/- 7.613 | 56.26+/- 6.732 | < 0.0001 |

**Table 4:** Comparison of visceral adiposity levels according to sex.

| Gender | Man | Woman | |
|---|---|---|---|
| Average visceral adiposity | 16.86 +/- 1.875 | 11.83 +/- 2.096 | p< 0.0001 |
| Visceral adiposity level | Very high | High | |

**Table 5:** Comparison of BMI by gender.

| Gender | Man | Woman | p |
|---|---|---|---|
| The average BMI | 31.85 +/-1.423 | 34.48 +/- 3.257 | < 0.0006 |

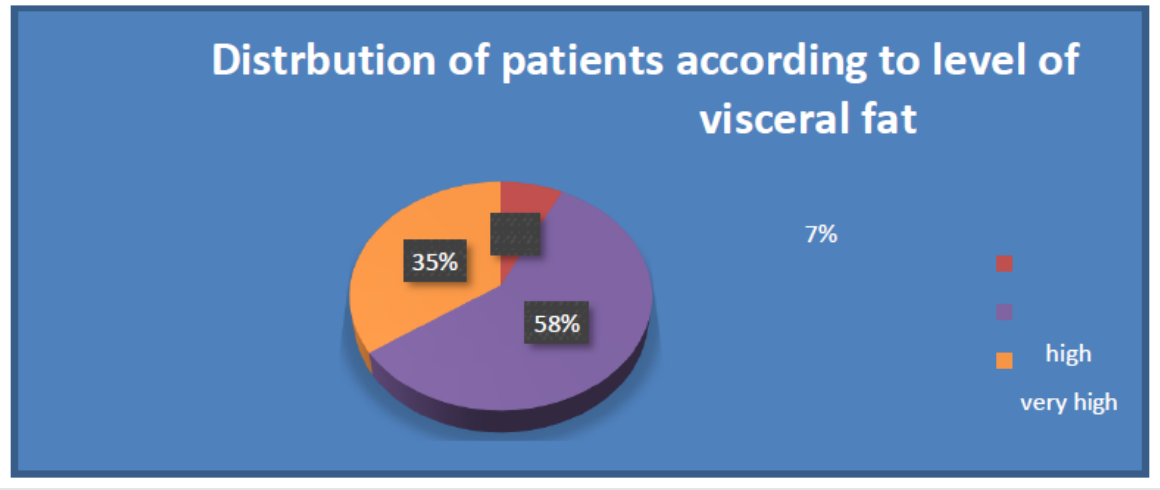


**Figure 1:** More than 50% of the population has a high level of visceral adiposity and less than 10% has a normal level.

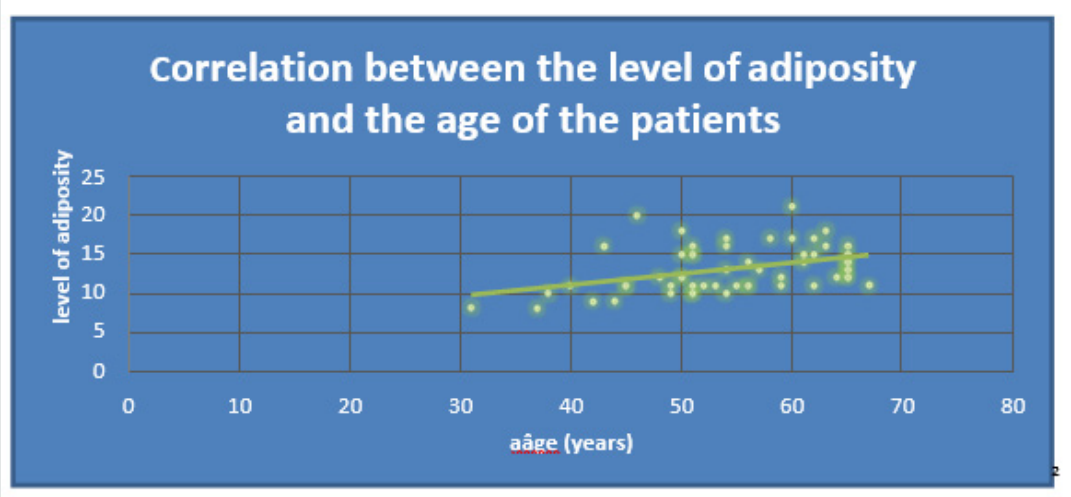


**Figure 2:** There is a strong correlation between the level of adiposity and the age of the patients.

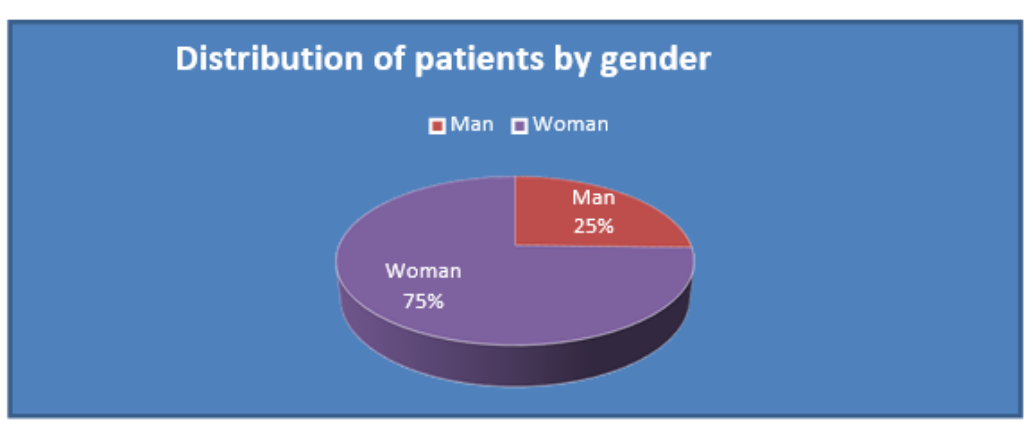


**Figure 3:** The distribution of patients by gender shows a clear female.

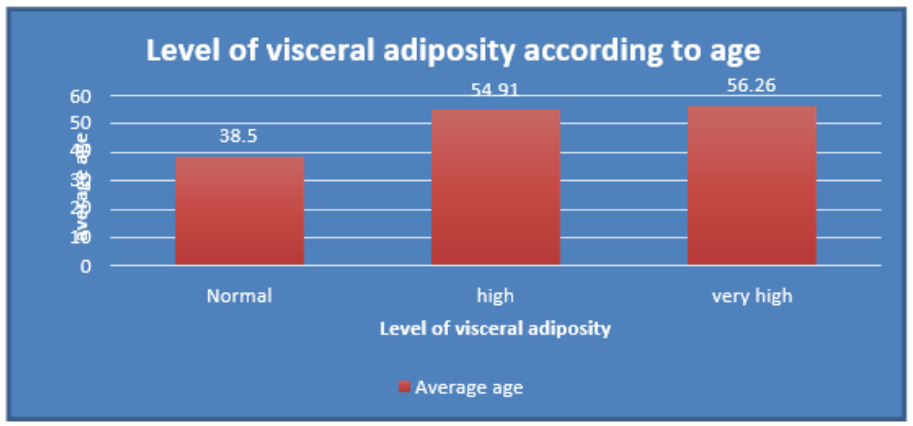


**Figure 4:** The patients with a very high level of visceral adiposity (15 -30) were very significantly older ($p < 0.0001$).

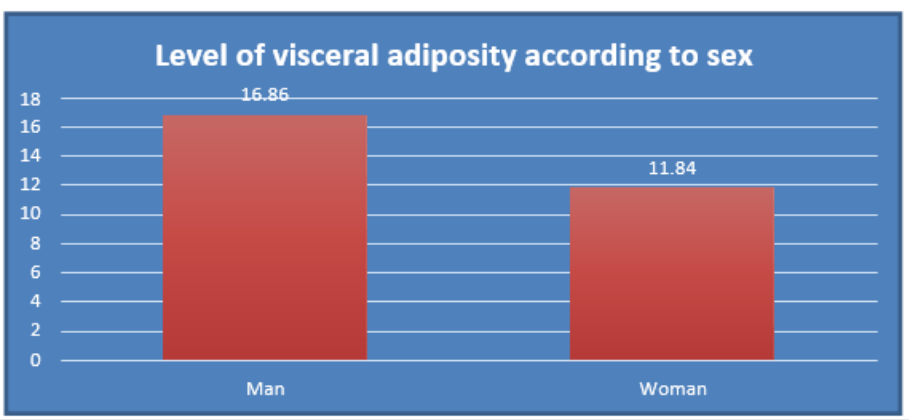


**Figure 5:** The average visceral adiposity was very significantly higher in men than in women ($p < 0.0001$) and corresponds to a high level in women and very high in men.

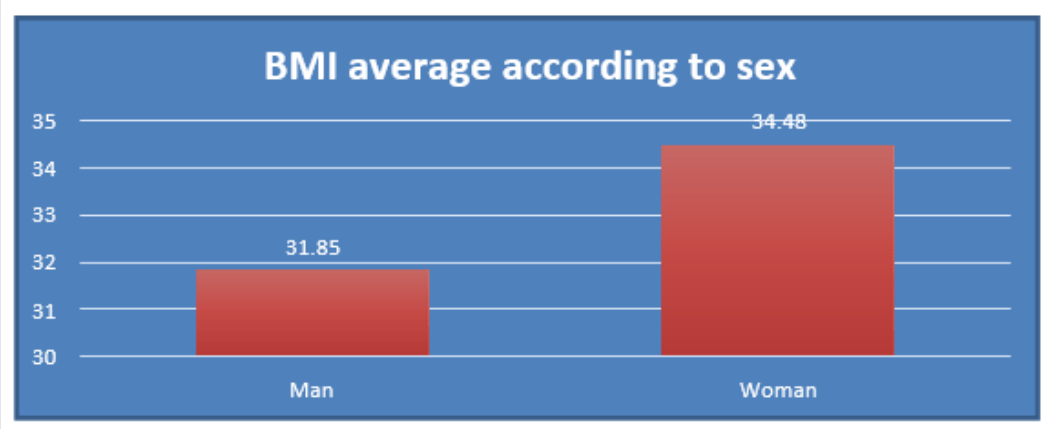


**Figure 6:** Female patients had a very significantly elevated BMI ($p<0.0006$).

## Results

Demographic data: There is a strong correlation between the level of visceral adiposity and the age of patients with an average age of 54.18 +/- 8.38 years.

## Discussion

The importance of the regional distribution of adipose tissue as a factor closely associated with dyslipoproteinaemia and cardiovascular disease and type 2 diabetes has been highlighted by the scientific community interested in obesity and its complications [4]. Moreover, multivariate analyzes revealed that the amount of visceral adipose tissue measured by axial tomography was the variable most strongly correlated with different ratios of parameters used in the prediction of the risk of metabolic disorders [5,6]. Our results plead in favor of a relationship between age and the importance of visceral adiposity that may implicate sedentary lifestyle and the drop in the level of energy expenditure consistent with the current environment, which corroborates the data from the literature. However, the comparison of the BMI of the two sexes shows that there is no relationship between this index and the level of visceral fat due to the significant particularity of this visceral adipose tissue which may be present in subjects with an index of normal body weight and who may still be exposed to the metabolic and cardiovascular risks of obesity [7].

In contrast, there are a small number of android obese patients without increased visceral fat (1 in 3 cases) [8]. Moreover, contrary to generally accepted ideas, the subcutaneous adipose tissue also participates in the pool of easily mobilized free fatty acids in the obese [9]. Thus, the links between obesity and metabolic diseases could go through the facilitated availability of fatty acids from adipose tissue (visceral and subcutaneous) in otherwise genetically predisposed subjects [10].

## Conclusion

This study clearly shows the role of age in the expansion of visceral adipose tissue; this trend is more marked in men than in women who generally have a higher BMI. Visceral fat exposes to more cardiometabolic risk than subcutaneous fat which, nevertheless, has a relative deleterious potential.

## References


1. Ziegler O, Trebea A, Tourpe D, Böhme P, Quilliot D, et al. (2007) Tissu adipeux viscéral: rôle majeur dans le syndrome métabolique. Cah Nutr Diet 42(2): 85-89.
2. Björntorp P (2000) Différence métabolique entre graisse viscérale et graisse abdominale sous- cutanée. Diabetes 26(3): 10.
3. Direk K, Cecelja M, Astle W, Chowienczyk P, Spector TD, et al. (2013) The relationship between DXA-based and anthropometric measures of visceral fat and morbidity in women. BMC Cardiovasc Disord 13: 1-13.
4. Kuk JL, Church TS, Blair SN, Ross R (2010) Measurement Site and the Association Between Visceral and Abdominal Subcutaneous Adipose Tissue with Metabolic Risk in Women. Obesity 18(7): 1336-1340.
5. Katzmarzyk PT, Greenway FL, Heymsfield SB, Bouchard C (2013) Clinical Utility and Reproducibility of Visceral Adipose Tissue Measurements Derived from Dual-energy Xray Absorptiometry in White and African American Adults. Obes Silver Spring 21(11): 2221-2224.
6. Machann J, Thamer C, Schnoedt B, Haap M, Haring H-U, et al. (2005) Standardized assessment of whole-body adipose tissue topography by MRI. J Magn Reson Imaging JMRI 21(4): 455-462.
7. Sert C (1994) Obésité viscérale ou être obèse et de poids normal. Endocrinologie-Nutrition.
8. Thomas EL, Saeed N, Hajnal JV, Brynes A, Goldstone AP, et al. (1998) Magnetic resonance imaging of total body fat. J Appl Physiol Bethesda 85(5): 1778-1785.
9. Smith SR, Lovejoy JC, Greenway F, Ryan D, deJonge L, et al. (2001) Contributions of total body fat, abdominal subcutaneous adipose tissue compartments, and visceral adipose tissue to the metabolic complications of obesity. Metabolism 50(4): 425-435.
10. Despres J P, Lesage M, Lemieux S, Prud'homme D (1995) Groupement de facteurs derisque pour les maladies cardio-vasculaires dans l'obésité viscérale. Implications thérapeutiques. Annales d'endocrinologie 56(2): 101-105.




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