

## **A preliminary Investigation of the relationship between pain sensitivity, body fat distribution and blood levels of IL-6, CRP, TNF- $\alpha$ and leptin.**

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### **Abstract**

**Background and aims:** Obese individuals have increased concentrations of pro-inflammatory cytokines and some other markers of inflammation and an increased risk of metabolic disorders. The relationship between obesity, pro-inflammatory cytokines and pain sensitivity response is not fully understood. **Aim of the Study:** To investigate associations between body fat distribution, C reactive protein (CRP), interleukin 6 (IL-6), tumour necrosis factor alpha (TNF- $\alpha$ ), leptin and pain sensitivity in adults.

**Methods:** 38 adults (n=18 women) were grouped as normal weight (n=22) or obese (n=16), based on body mass index (BMI). Measurements of pressure pain and cold pressor pain sensitivity response, biomarkers (venous blood), and body composition (dual X-ray absorptiometry) were evaluated for each participant.

**Results:** Pressure pain threshold was significantly lower in obese (mean $\pm$ SD=340.93 $\pm$ 93.58 kpa) compared to the normal weight group (447.45 $\pm$ 203.72 kpa, p=0.039, t-test). Forward regression suggested that high gynoid fat (g) was associated with lower pressure pain thresholds ( $\beta$ =-0.383, p=0.028), high lower limb fat (g) was associated with lower cold pain thresholds ( $\beta$ =-0.495, p=0.003) and high IL-6 predicted higher cold pain tolerance ( $\beta$ =0.345, p=0.049). Women were more sensitive to pressure pain (P=0.03).

**Conclusion:** Gynoid and lower limb fat content correlated with pain sensitivity response in adults, whereby those with greater fat content were more sensitive to pain. However, this may be a reflection of the sex differences in pain sensitivity as women have greater gynoid and leg fat contents.