**Metabolically healthy and unhealthy obesity; metabolic health status rather than obesity is a more accurate prognostic marker for cardiovascular health**

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**Aims:** Obesity and the metabolic syndrome are both associated with an adverse cardiovascular risk profile. Nevertheless, the concept of ‘metabolically healthy’ obesity’ (MHO) has emerged and epidemiological data suggest that MHO bears a lower risk of cardiovascular disease (CVD) than being of healthy weight yet metabolically unhealthy. The aim of the current study is to explore the impact of obesity and metabolic health on endothelial function, an early barometer of CVD, by phenotyping participants according to obesity and metabolic health status.

**Methods:** Thirty-two participants were categorised for obesity status and the International Diabetes Federation (IDF) criteria of metabolic syndrome. Sixteen individuals were non-obese, of which 7 were classified ‘metabolically unhealthy’, and 16 individuals were obese, of which 8 were ‘metabolically unhealthy’. Habitual physical activity (SenseWear armband), cardio-respiratory fitness (VO2 peak), liver fat (MRS) and endothelial function (FMD) were determined. Statistical analysis was performed using between-group univariate general linear models.

**Results:** In comparison with their age-matched, healthy counterparts, metabolically unhealthy non-obese and obese individuals had a reduced FMD (p=0.04) and greater liver fat (p=0.02). Habitual physical activity was similar between all groups (p=0.80). However, VO2 peak was greatest in MHNO, similar in MUNO and MHO, and lowest in MUO (p=0.01).

**Conclusions:** Endothelial function appears to be related to metabolic health status, independent of obesity status. This study argues the importance of the exploration of obesity phenotyping in relation to co-morbidities and mortality, in particular, examination of the role of cardiorespiratory fitness.