**Polyunsaturated Fats and Metabolic Syndrome**

**Introduction**

The metabolic syndrome (MetS) is an outcome of compounding interactions among many risk factors including pro-inflammatory and prothrombotic state, impaired glucose tolerance, abdominal obesity, hyperinsulinemia, and insulin resistance with no single etiology can be linked to it.1 Understanding the metabolic syndrome pathophysiology provides substantial claims in identifying patients at risks of developing type 2 diabetes (T2DM) and cardiovascular disease (CVD).1

MetS affects about a quarter of the global population possibly due to the global obesity epidemics, increased insulin resistance and ageing population.1 in Australia, MetS affects approximately 19.3%-29.1% adult population but it can as well affect adolescents and children, though aging and increased BMI remain primary contributors to MetS development.2 Further, since obesity is a known global epidemic, MetS is the main contributory factor to the increasing health problems commonly diagnosed in primary health-care settings3.  This is important because, with increased MetS cases, there is a possibility of type 2 diabetes (T2DM) increase five times more and 2 times chances of cardiovascular disease (CVD) development in the next 5-10 years.4

MetS is a progressive health state involving a broad aspect of disorders with unique metabolic abnormalities occurring at different times in one person. Serum biomarkers can be used to detect and monitor these abnormalities. Such biomarkers in MetS include: elevated levels of prothrombic factors, (PAI-1), pro-oxidant status (uric acid, OxLDL) markers, and pro-inflammatory cytokines (IL-6, TNF-α) concentrations. Further, concentration of leptin is likely to be elevated in MetS cases due to resistance of leptin. While on the other hand, concentrations of antioxidant factors (PON-1) adiponectin, ghrelin and anti-inflammatory cytokines are decreased in MetS cases. The decrease is further linked with specific disorders associated with MetS cluster.5

In treatment and management of MetS, a recommended lifestyle requires replacing monosaccharides and saturated fats (SFAs) with unsaturated fats5, simple life modification early in the stage of the MetS development like regular exercises and weight reduction decrease the insulin resistance effect or the use of drug treatment is a sure modality of reducing the chances of T2DM and CVD risk factors.1  Focusing on the diet intake, polyunsaturated fatty acids (PUFAs) ingestion is highly recommended in management of various chronic diseases such as T2DM and CVD.1-7 Research shows that, omega-3(n-3) PUFAs offer substantial protection against coronary heart disease and atherosclerosis biomarkers.7 Subsequently, in obesity management, the quantity and type of dietary fat is important. Intake of dietary fatty acid is stronger within plasma concentration than in erythrocytes and the n-3 PUFA plasma have a negative correlation with MetS. On the other hand, higher n-3 PUFA concentration in the plasma are positively correlated with reduced risk of obesity.7

Metabolic syndrome possess a great burden in healthcare setting.1 However, various research agree that although metabolic syndrome is classified as a compounding factor for other risk factors its definitions and pathophysiology lack clarity.1 Most definitions on MetS focus on insulin resistance to a greater extend which is examined using hyperinsulinemic-euglycemic clamp and glucose tolerance test. The method is labor intensive and is fundamentally applied in research work.4 Additionally, many research recommend the use of n-3 PUFAS in combination with n-6 PUFAS in MetS management. However, some Research show that only n-3 PUFAS positively address MetS while n-6 PUFAS tend to escalate the problem.4-7This research will therefore work to address the gaps existing in the treatment and management of MetS while addressing the study aim.

**Aim:** This study aims at assessing short-term effect of a high polyunsaturated fat diet on body weight, fat mass, and metabolic indicators of inflammation, insulin sensitivity and cardiovascular health of individuals with pre-diabetes.

**References**

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