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Biomarker-Based Risk Stratification to Guide Targeted Counselling in a Lifestyle Obesity Programme

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Introduction:
Effective obesity management requires early identification of individuals at higher metabolic risk so that interventions can be targeted appropriately. Reliance on weight change alone may overlook important metabolic abnormalities. This study examined longitudinal trends in clinical biomarkers and their role in guiding risk-informed counselling within a lifestyle-based obesity programme.

Methods:
This longitudinal quantitative study analysed health screening data collected between January and June 2025 from participants enrolled in the *Commit to Fit* lifestyle programme. Serial assessments included fasting glucose, lipid profile, renal function (creatinine and estimated glomerular filtration rate), liver enzymes, and haemoglobin. Biomarkers were classified using standard clinical reference ranges. Changes over time were analysed using paired comparisons, and associations between selected metabolic markers were assessed using correlation analysis.

Results:
Most participants maintained stable glycaemic status, although pre-diabetes and diabetes were identified in a subgroup. Renal function improved significantly, with fewer participants demonstrating elevated creatinine or reduced eGFR *($p = 0.01$)*. Improvement in eGFR was inversely associated with fasting glucose *($r = -0.41$, $p < 0.01$)*. Dyslipidaemia persisted; while elevated low-density lipoprotein cholesterol declined *($p = 0.04$)*, high total cholesterol remained prevalent and was positively associated with fasting glucose *($r = 0.36$, $p = 0.02$)*. Aspartate aminotransferase improved *($p = 0.03$)*, whereas alanine aminotransferase, alkaline phosphatase, and haemoglobin showed no significant change.

Conclusions:
Longitudinal biomarker monitoring revealed heterogeneous metabolic trajectories within the obesity programme. Biomarker-based risk stratification supports targeted counselling and more precise obesity management beyond weight-centred approaches.