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Engagement as Intervention: Early Outcomes of a Co-Created Neurobehavioral Obesity Care Model in Rural Primary Care

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Introduction:
Obesity is increasingly recognised as a chronic, relapsing neurobehavioral disease requiring holistic management beyond conventional brief counselling. In Malaysia, where prevalence has reached 54.4%, rural communities face additional structural and psychosocial barriers that sustain metabolic risk. Community-embedded, co-created models may address behavioural drivers of obesity while enhancing engagement within primary care. This study evaluates the 3-month interim outcomes of FIT FelBers, a co-created obesity intervention integrated within rural primary care.

Methods:
This prospective hybrid effectiveness-implementation study was developed using the UK Medical Research Council framework. Adults with overweight or obesity participated in twice- weekly structured exercise, nutritional input and behavioural support co-designed with community stakeholders. Matched-pair comparisons between baseline and 3 months were analysed using Wilcoxon signed-rank tests ($p<0.05$). Outcomes included anthropometry, blood pressure, functional fitness and five patient-reported outcome measure (PROM) domains.

Results:
Thirty-seven participants (91.9% female; mean age 50.5 years; mean BMI 31.2 kg/m²) enrolled. At 3 months, weight and BMI showed no significant change. However, central adiposity decreased significantly: waist circumference (median -7 cm, $p=0.009$) and visceral fat ($p<0.001$). Cardiovascular parameters improved, with significant reductions in systolic blood pressure (median -8 mmHg, $p<0.001$) and diastolic blood pressure (median -5.5 mmHg, $p=0.002$). Functional endurance improved markedly, particularly in push-ups (+200%, $p<0.001$) and sit-to-stand repetitions ($p<0.001$). All PROM domains improved significantly, with the largest effect observed in social functioning ($r=0.82$, $p<0.001$).

Conclusion:
A co-created rural primary care intervention was associated with significant reductions in central adiposity and blood pressure, alongside marked functional and psychosocial improvements despite minimal total weight loss. These interim findings support the framing of obesity as a chronic, relapsing neurobehavioral condition in which early therapeutic gains emerge through behavioural activation, social connectedness, and contextual engagement rather than weight reduction alone. Embedding engagement within care delivery may represent a scalable strategy for holistic obesity management in resource-constrained settings.

Keywords: Obesity; Primary Health Care; Community-Based Participatory Research; Rural Health; Implementation Science