

Metabolic and Psychological Outcomes of Exercise Intervention for Adolescent and Young Adult Survivors of Oncology-Related Cranial Insult

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BACKGROUND

Survivors of childhood cancer are at increased risk of metabolic and psychosocial dysfunction later in life. Several studies have attempted to investigate the impact of exercise on physical and psychosocial parameters in this population, however most involved exercise durations of less than 12 weeks and none specifically investigate the subgroup who have been exposed to cerebral insult in relation to their disease or its treatment. This group is likely to be at increased risk of complications so establishing effective early intervention is important.

OBJECTIVES

To expose 20 adolescent and young adult (AYA) survivors of cerebral insult due to brain tumour or cancer therapy, to a supervised, tailored exercise program of six months duration in order to determine whether it (1) is safe and tolerable, (2) has an impact on their metabolic profile and (3) affects their psycho-social well-being.

METHODS

Twenty AYAs aged 15-23 with a past history of brain tumour or cranial irradiation, were recruited from the PMH Oncology database. Baseline testing included auxology, body composition using DXA, oral glucose tolerance testing, lipid and hormone profiling. Psychological assessment was performed over a two hour period using the Wechsler Abbreviated Scale of Intelligence (WASI) for cognitive function, the Adaptive Behaviour Assessment Scale, 3rd Edition (ABAS-III) for analysis of adaptive function and the the Achenbach System of Empirical Behaviour Assessment (ASEBA) for mental health measures. The six month intervention then commenced, consisting of thrice weekly small-group, tailored exercise sessions (combining aerobic and resistance work), supervised by trained exercise physiologists and adapted to individual needs and progress. All tests were repeated upon completion of intervention although one participant did not have repeat psychological assessment.

RESULTS

- 20 out of 87 possible candidates consented to the study. All were eligible and underwent baseline testing.
- 19/20 were enrolled in either secondary or tertiary education, pointing to their high level of function.
- 6 withdrew early in the program due to other commitments. 4 chose home-based programs. 10 completed the program.
- Of the 10, 9 participated in more than 20 exercise sessions, 3 of whom participated in more than 40 sessions.
- 9/10 indicated that they enjoyed the program and would consider participating in further tailored programs.
- During the intervention, there was one fall and no other adverse events.
- 2-hr blood glucose levels improved significantly, with a trend to improvement across most metabolic parameters. (Fig 1)
- Central adiposity generally improved. (Fig 2)
- Psychological testing identified problems with adaptive function and mental health, both of which improved post intervention. (Fig 3)

Figure 1. Percentage of participants in the normal range for metabolic parameters

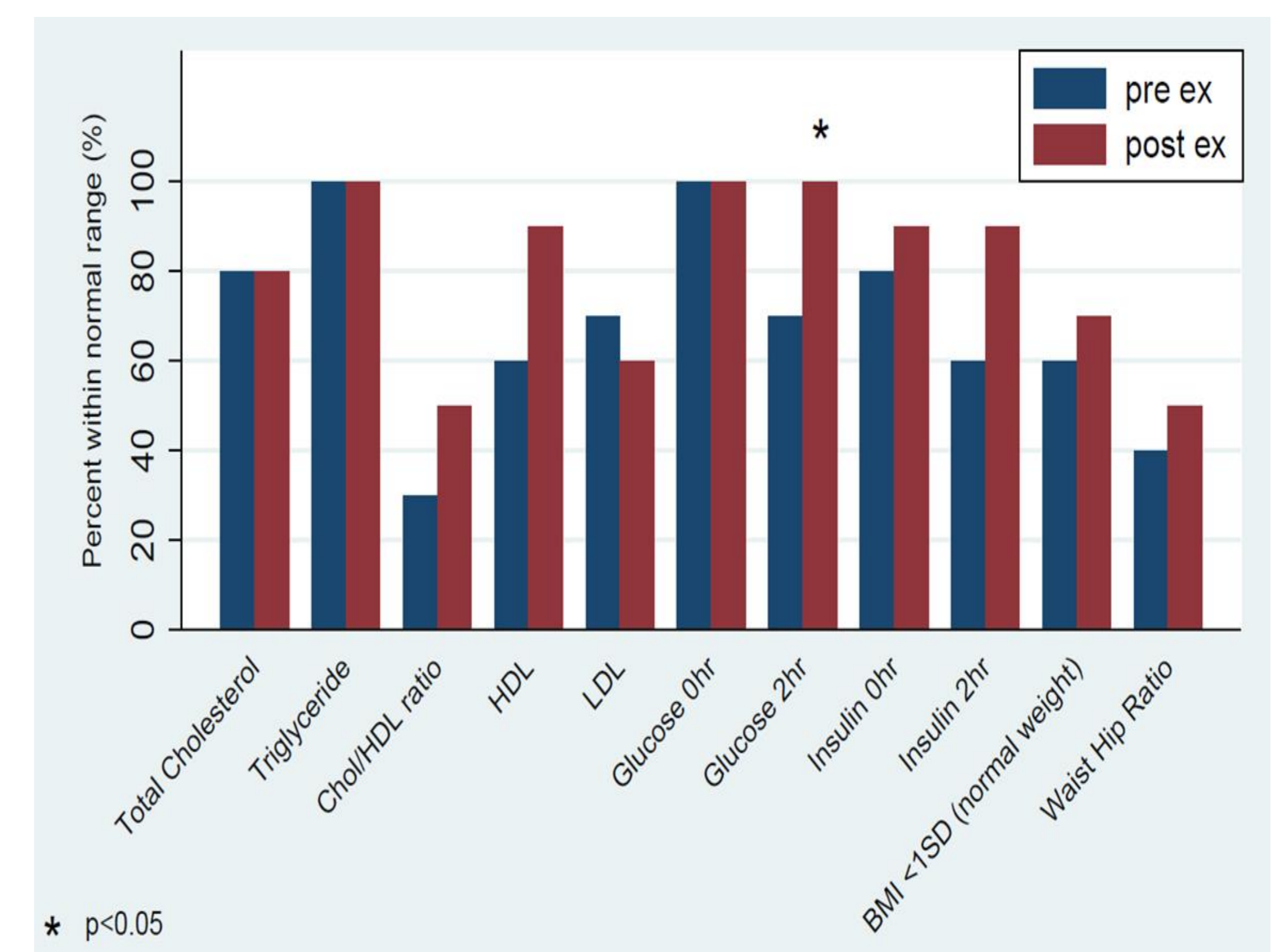


Figure 2. Trunk:total mass ratio (central adiposity)

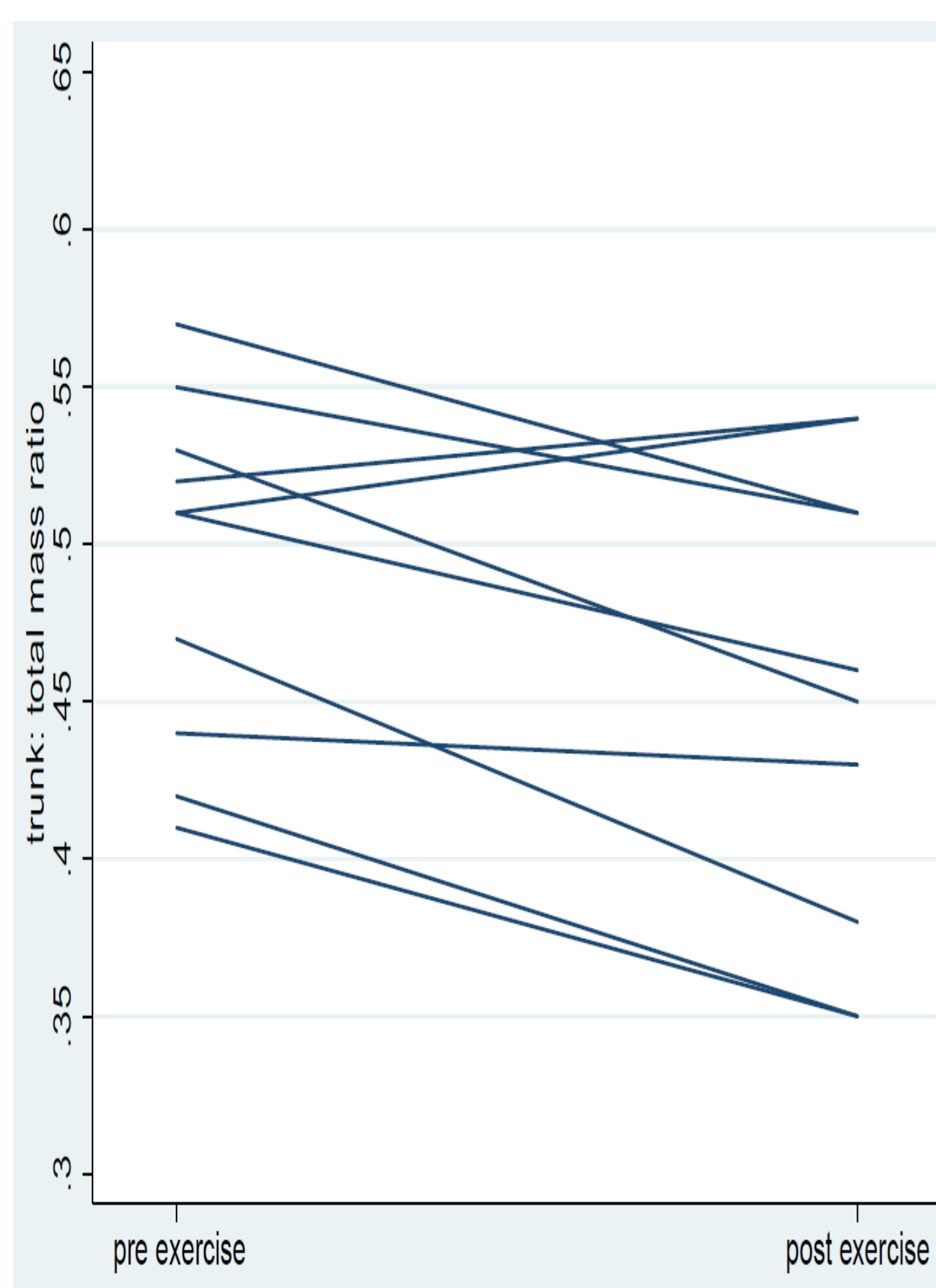
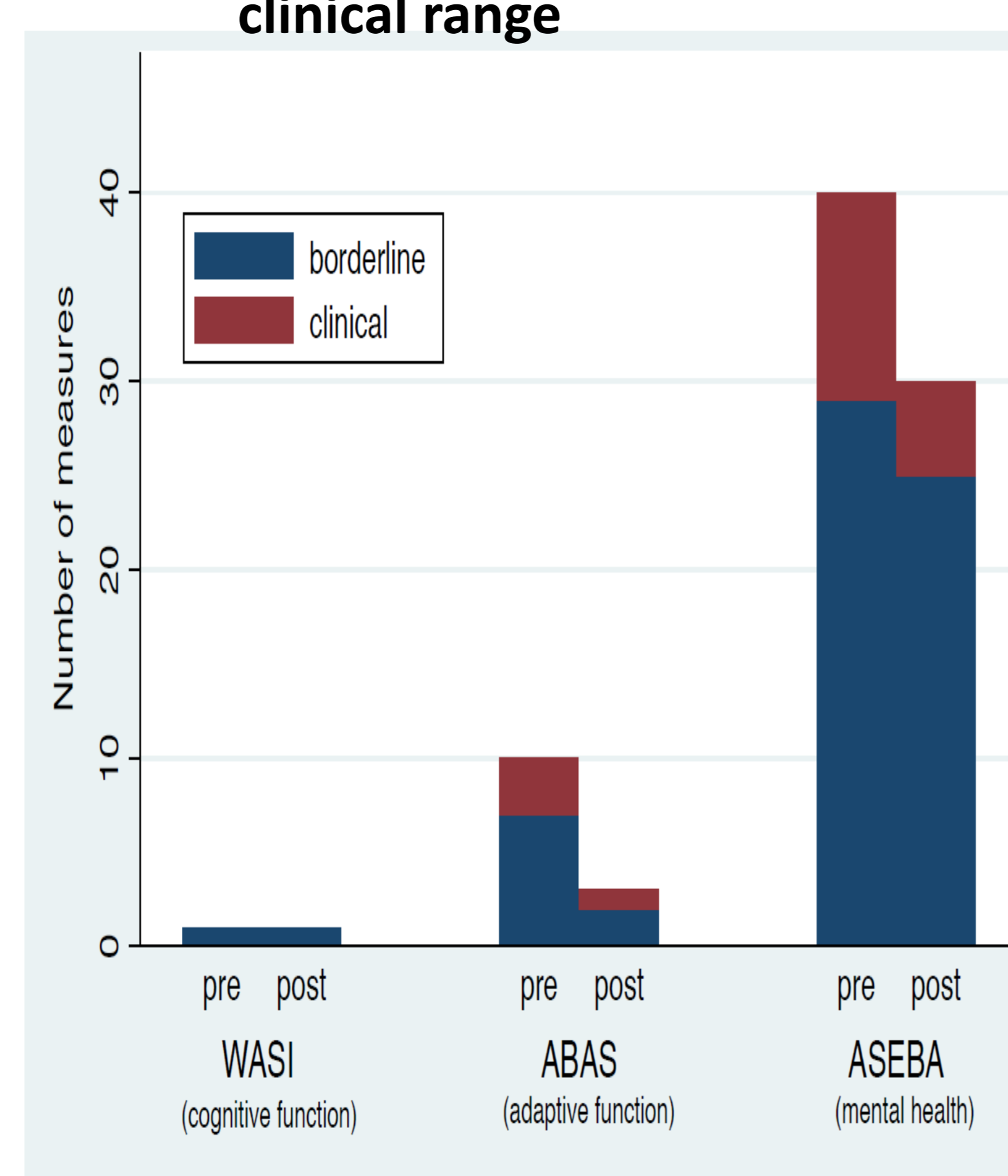


Figure 3. Number of psychological measures in the borderline or clinical range



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DISCUSSION

AYA survivors of cancer are at double the risk of cardiovascular morbidity and mortality in later life and have high rates of psychosocial dysfunction. In this study we identified a group of high functioning, motivated AYAs and provided them with an intensive exercise regimen. Although half the group were not able to persist with the program, those who did, demonstrated metabolic and psychological improvement.

This cohort of patients is easily overlooked because of their high level of function however their future risk of physical and psychological morbidity justifies early intervention.

CONCLUSION

Small-group based exercise is safe and enjoyable for AYA survivors of childhood cancer although program adherence may be difficult. Participants are likely to benefit metabolically and psychologically from such programs but larger numbers are required to confirm this. Participants' enthusiasm for the program and desire to continue exercising, indicate that this form of intervention may be sustainable in the long term.