Effects of aerobic interval training (AIT) on metabolic complications in young adults with psychotic disorders

Abdel-Baki, Amal1,3, Marois, Francis1, Fankam, Njoungo Cedine2, Karelis, Antoine3
1Université de Montréal, Department of psychiatry, 2CHUM- Hôpital Notre-Dame, 3CRCHUM, Department of kinesiology UQAM, Montreal, Quebec, Canada

BACKGROUND

Patients with mental illnesses have:
- Two to three times more obesity and physical inactivity 
- Higher risk of early death

Schizophrenia patients’ life expectancy is reduced by 20 to 25 years, partly because of premature cardiovascular disease secondary to a higher prevalence of metabolic syndrome (M) > 50%.

60% of mortality in patients with schizophrenia can be assigned to metabolic health complications.

A multi modal intervention study including continuous cardiovascular workout has shown that a exercising is effective in reducing metabolic syndrome in patients with schizophrenia.

Studies have shown that aerobic interval training (AIT) is effective in improving metabolic complications such as waist circumference (WC) and in enhancing cardiorespiratory fitness in the general population. However, there are no studies that have examined the effect of AIT on metabolic complications in first episode psychosis (FEP).

OBJECTIVES AND HYPOTHESES

The aim of the study is:
- To measure the impact of AIT on metabolic outcomes in young adults with psychotic disorders taking antipsychotics
- To test the feasibility of implementing AIT in FEP program with the purpose of reducing metabolic complications secondary to antipsychotic drugs.

Hypotheses:
The AIT in young adults with psychotic disorders taking antipsychotics, will improve the metabolic profile:
- WC (primary assumption),
- Body composition, glucose and insulin resistance, VO2 Max (nascent capacity) (secondary assumptions)

FEPA patients will be able to complete an AIT program integrated within a FEP clinic.

METHODOLOGY

Open clinical study measuring the impact of AIT of 14 weeks (2 sessions of 30 min per week) on the early evolution of the metabolic disorders in young adults with psychotic illnesses.

Inclusion criteria:
- No psychiatric hospitalization in the past 2 years
- No other medical condition that could influence the metabolic profile

Exclusion criteria:
- Subjects must not have a history of evidence of AIT (cardiovascular disease, obesity, diabetes, etc) or any medication that could affect metabolic function or cardiac health

Measures:
- Subjects are assessed at the beginning and at the end of the 14 week training program for metabolic variables (18-19) and psychological assessments (see table 3).
- Body composition was measured using bioimpedance (Omron HBF-306C, USA).
- VO2max was assessed using the protocol of Ebellin et al. 1991.
- Waist circumference was measured using a non-stretchable tape to the nearest 0.5 cm.

Training protocols:
- AIT consists of a walking/running on a treadmill *2 times/week for 14 weeks. Each 30 min session included a warm up for 5 min at low intensity before performing 10 intervals of 30s (running) at 80 to 95% of maximal heart rate, with 30s active recovery (walking) at 50 to 60% of maximal heart frequency between intervals, and ended with a 5min active cool down period. The training intensity was increased according to the tolerance of each patient throughout the study.
- Statistical analyses were performed with SPSS software. T-test were performed to compare means before and after treatment.

REFERENCES

CONCLUSION

This study confirms the feasibility and efficiency in implementing AIT within FEP programs to reduce metabolic complications of AP medication. A RCT of longer duration is warranted to determine if the impact of AIT as measured in this pilot study could be reproduced and if longer treatment is associated with better results.

AIT over a relatively short period (14 weeks) can improve metabolic complications of antipsychotic medications as shown by:
- significant decrease of the waist circumference (-4.3 cm)
- the resting heart rate,
- increase of the VO2max

Our study showed greater WC reduction (4.3 vs 1.3 cm) and similar weight loss (1.2 vs 0.6 vs 2.3) compared to the studies of Poulin et al 2007, Litrell et al 2003 and Heggelund et al 2011 respectively, suggesting that AIT induces more rapid WC reduction than regular exercising in psychiatric population as it has been demonstrated in the general population.

Tjonna and al.2009 have even shown a greater reduction of 5 and 7.2 cm, respectively at 14 and 16 weeks with AIT, in a non-psychiatric adult population (mean age 52 years) with metabolic syndrome, not taking antipsychotic medication. It could be possible that the waist circumference reduction is less rapid or of smaller amplitude partially because of the medication in our population.

It is possible that without our intervention, patients would have gained weight as suggested by: a) a 1.3 cm increase of the VO2max b) a significant decrease of the waist circumference (- 4.3cm)

The high adaptation to training intensity suggests that it is likely that if the intensity of intervals required to induce a significant reduction of WC.

There were no significant changes in blood pressure, the lipid profile and glucose metabolism before and after AIT, nor on psychiatric disorder severity and functioning scales (SOFAS, GFI, CGI, Rosenberg).

DISCUSSION

Antipsychotics and health - the impact on metabolic complications

- A recent systematic review of 31 randomized controlled trials reported that antipsychotic medications were associated with a significant increase in waist circumference, body mass index, and body weight.

- Studies have shown that antipsychotic medication is associated with a higher risk of obesity and metabolic syndrome in patients with schizophrenia.

- Antipsychotics are known to alter glucose homeostasis, insulin resistance, dyslipidemia, and obesity.

- Antipsychotic medications may affect body composition, glucose and insulin resistance, and VO2 Max.

- AIT may improve metabolic profile by reducing waist circumference and body mass index in patients with metabolic syndrome.

- AIT may be a promising intervention for improving metabolic outcomes in patients with schizophrenia.

- Future research is needed to further investigate the long-term effects of AIT on metabolic outcomes in patients with schizophrenia.


discussion

effects of aerobic interval training on metabolic syndrome in young adults with psychiatric disorders


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