

The Effectiveness of Interventions to Increase Physical Activity among Elementary School Children in Okinawa, Japan

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Background

Recently, physical inactivity and decline in physical fitness are becoming common and serious problems among young Japanese people. There is a need to improve physical activity and reduce sedentary behavior in childhood and adolescence to prevent lifestyle-related diseases later in life.

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Purpose

The aim of this study was to determine improvements in the levels of physical activity and physical fitness of children by conducting various interventions, while taking into account the particularities of the designated area.

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Methods

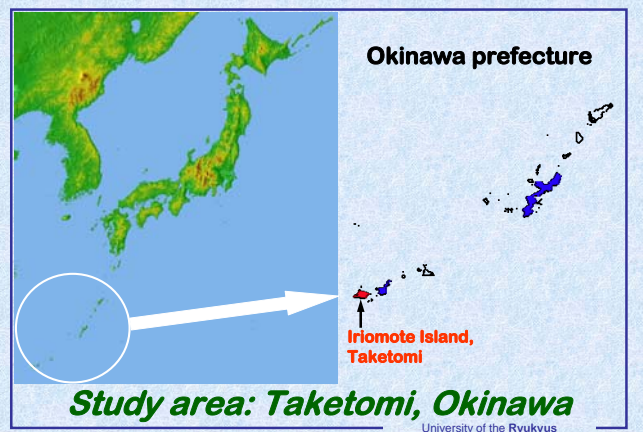
➤ Participants

- 2 elementary schools in the town of Taketomi of Okinawa, Japan
 - Experimental group (age 6-12)
47 students (25 boys, 22 girls)
 - Control group (age 6-12)
50 students (23 boys, 27 girls)

➤ Duration

- June-November 2005

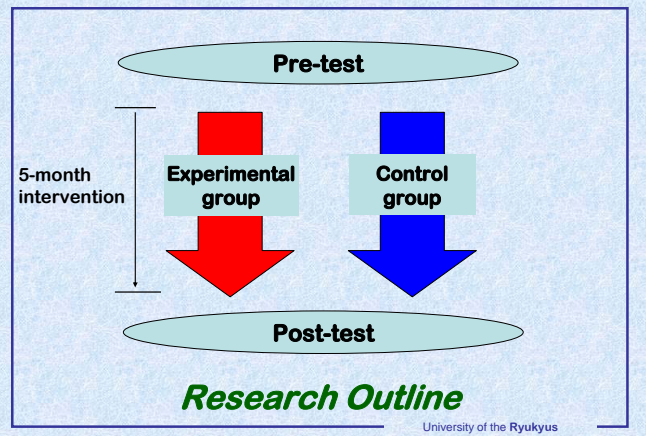
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Outcome measures

- **Physical fitness levels**
 - Total physical fitness score measured with the Japanese New Physical Fitness Test
- **Body fat percentage**
 - Measured with ultrasound instrument (Aloka SSD-900)
- **Physical activity levels**
 - Step counts, activity energy expenditure, and total energy expenditure during school hours measured for 8 continuous days by accelerometers (Suzuken Lifecorder EX)

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Existing view on intervention

It is inferred that in cases where adults, particularly parents, place value and importance on physical activity and encourage children to do so, that the child's level of participation in physical activities will increase (Sallis & Nader, 1988).



It is important to encourage physical activity not only in children, but also in other adults.

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Intervention Programs

1. Self-Management

- Issued accelerometers and log sheets, and had the participants record the amount of walking, exercise, and energy expenditure (Children and guardians).
- Had guardians report weekly by e-mail on physical activity, and provided them with information on ways to maintain and improve activity levels.

2. Evening Beach Walks

- Conducted walks on the beach every Wednesday and Saturday (Children, guardians, and teachers).

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3. School-based health education

- Conducted a lesson to help children recognize the importance of leading a physically active life during childhood (conducted once).

4. Recruitment of staff to play with children

- Had staff play with children between classes and after school in order to encourage them to spend time in the schoolyard (conducted for the first 3 weeks).

5. Recruitment of a snorkeling instructor and supply of swimming/snorkeling equipment (conducted for 1 month).

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Results

In the area of body fat percentage, there were no significant differences in the trends exhibited by the experimental and control groups.

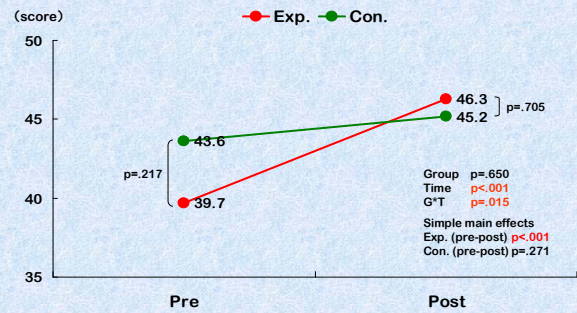
However, the experimental group showed a significant increase in physical fitness score, as well as all three areas of physical activity; total step counts, activity energy expenditure, and total energy expenditure, while the control group showed no significant changes.

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Discussion

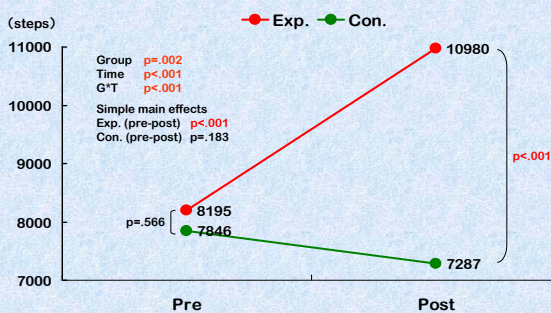
In the area of body fat percentage, both groups showed higher results in the post-test than in the pre-test. It is possible that this result may be attributed to the subtropical climate of the region in which the test was performed. The pre-test period was marked by high temperatures and humidity, which may have decreased the appetites of the subjects, resulting in a lower body fat percentage. When the post-test was conducted, temperatures and humidity were lower, possibly resulting in increased appetites and body fat percentage.

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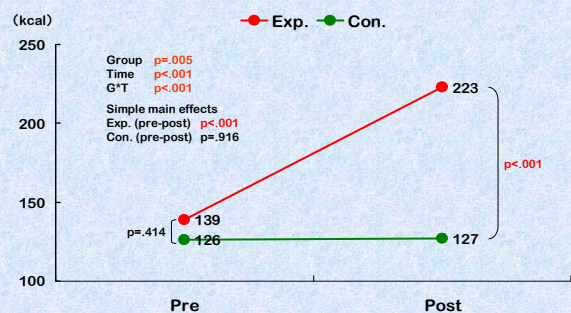
Means of physical fitness score at pre- and post-test (repeated measures ANOVA)

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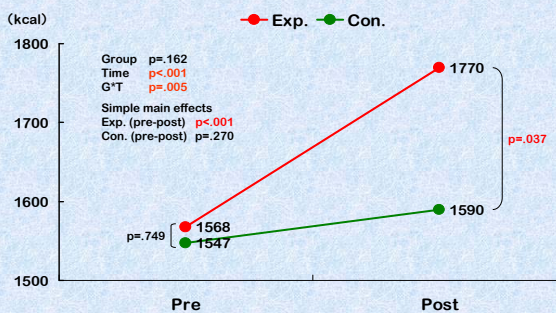
Means of total step counts at pre- and post-test (repeated measures ANOVA)

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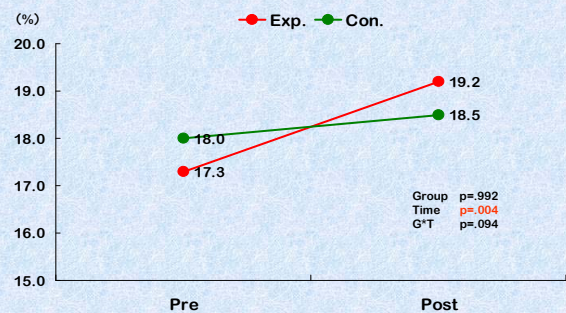
Means of activity energy expenditure at pre- and post-test (repeated measures ANOVA)

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Means of total energy expenditure at pre- and post-test (repeated measures ANOVA)

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Means of body fat percentage at pre- and post-test (repeated measures ANOVA)

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Conclusion & Issues for further study

This study shows that conducting various interventions involving adults, such as parents, can contribute to an improvement in the physical activity levels and physical fitness scores of children.

In future studies, it would be useful to conduct interventions in various different regions, as well as improve the design of the study, for example by designing the study period so that the pre-test and post-test would be less affected by climatic differences.

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Evening Beach Walks



Health Education



Children playing in the schoolyard



Snorkeling Practice