*ORIGINAL ARTICLE*

# "*AMPE*" Exercise Programme Has Positive Effects on Anthropometric and Physiological Parameters of School Children: A Pilot Study

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*ABSTRACT*

***BACKGROUND:*** ***Projection of the effectiveness of house-hold physical activity may be a vital tool to improve active lifestyle. Although ampe is a common house-hold recreational physical activity among all population groups especially school children in Ghana, no empirical evidence of its effects on the anthropometric and physiological parameters of the children. This pilot study examined the effect of ampe exercise programme on the anthropometric and physiological parameters of school children.***

***METHODS:*** ***Purposive and stratified sampling techniques were applied to recruit 78 school children (ages of 9 to 12, mean age of 10.65±0.94 years). The participants attended 40 minutes of ampe exercise program three times per week, for four weeks consecutively. Body mass index, waist circumference, hip circumference, waist-to-hip ratio; % body fat, diastolic blood pressure, systolic blood pressure and heart rate were measured pre-post training.***

***RESULTS:*** ***Ampe exercise programme produced positive effects on all parameters. Body weight (0.31%) and body mass index (0.58%) decreased significantly (P<0.05). Systolic blood pressure (3.15%), diastolic blood pressure (1.92%) and heart rate (2.13) significantly improved (P<0.05). CONCLUSION: Ampe exercise programme is effective as paediatric obesity house-hold intervention to provide the impetus for active lifestyles of school children.***

***KEYWORDS:*** ***Ampe, Indigenous recreational activity, Anthropometric, Health, Physiological, Ghana (OS)***

## INTRODUCTION

High prevalence of physical inactivity among children population has been well reported (1-3). House-hold and community physical activity interventions have also been reiterated as changing agents in children's physical activity (4-6).

Ampe is a house-hold indigenous recreational activity among Ghanaians (7-8). Usually, two or more people (teams), identified as *Ohyiwa* and *Opare*, are involved in the performance of ampe. *Ohyiwa* scores a point when her/his left leg meets the right leg or right leg meets the left leg of *Opare* and vice versa. The first to get ten points

wins the game or contest. To start the game, two contestants at a time, one from each team start clapping their hands while singing and jumping vertically. As they land, each manipulates the legs and places one leg forward alternately. There is no referee but every team counts its scores as the activity progresses. The first to get ten points wins. A set of games is played and the higher scorer determines the winner.

Although *ampe* could be competitively played between several groups with low-moderate-high intensity, it is mostly used as recreational game/activity (9). In the "old days", crowds of spectators would come to watch ampe's tournament, which could go on for as long as two or three days (10). There was even a special dress code, designed to give enough room for jumping, flexion and extension of the limbs. *Ampe* is an energetic game that requires coordination, balance, speed, muscular endurance and efficient oxygen utilization coupled with critical thinking. *Ampe* involves a combination of good physical workout, social bonding and strategic patterns of play where opponent(s) is/are being studied in anticipation of the next move so as to make snap counter decisions with quick reflexes.

A recent report of Okine (11) reveals that Ghanaian sports officials, the Ministry of Youth & Sports, the National Sports Authority (NSA), the Women Sports Association of Ghana (WOSPAG) and the Ghana Olympic Committee (GOC) are considering the projecting *ampe* to the international sports world including the 2023 African Games which Ghana is hosting. Although the proposition is applauded, presenting empirical evidence of health values holds greater water of confidence in the entire world. To the best of the knowledge of the authors, this study, which examined the effect of "*ampe*" exercise programme on anthropometric and physiological parameters of school children, is the first of its kind in the field of sports science and leisure in Ghana.

## MATERIALS AND METHODS

**Participants**: Pretest-posttest experimental research design was used to determine the effects of *ampe* exercise programme on anthropometric and physiological parameters of school children. Purposive and stratified sampling techniques were applied to recruit 78 school children (ages of 9 to 12) from basic three to six. Participants were included if not involve in any active activities of the school (relatively sedentary), had informed consent form signed by parents, class teachers and schools, not with any diagnosed disability and asthmatic. The study received the approval of Kwame Nkrumah University of Science and Technology Ethical Committee (Committee on Human Research and Publication) (CHRPE/AP/304/19).

**Anthropometric measurements**: Anthropometric measurements include height, weight, waist girth and hip girth and body composition. Participants' age, gender and height were recorded. The values of height and weight measured were used to calculate body mass index in accordance with the standard protocol of the International Society for the Advancement of Kinanthropometry. Height (m) and body weight (kg) were measured with the Health-O-Meter (HY-RGZ160 weight & height measuring scale, China). Body mass index (BMI) was determined as the ratio of body weight (kg) value divided by the square value of height (m). Total body fat, visceral fat and muscles mass were measured using BIA multifrequencial four-phase bioimpedance (Body model 520, Biospace Co., Ltd., Seul, Korea) with a 250-kg capacity and 100-g precision has been documented (12-13). The measured waist circumference and hip circumference of the participants was used to calculate their WHRs, using the formula: WHR= waist circumference/hip circumference.

**Physiological measurements**: Blood pressure and heart rate were measured using the automatic blood pressure monitor, model: M2 Basic, HEM-7120-E (Omron Healthcare Co. Ltd, Kyoto, Japan). Measurement took place after participants were made to sit and rest for ten minutes.

***Ampe* exercise programme**: Participants attended ampe exercise programme for total duration of 40 minutes per day, three times per week for four weeks consecutively. Ampe exercise programme consisted of varied combinations of partners (2*2, 3*3, 4*4, and 5*5) per session in a circuit form in three sets till exhaustion. Each session combined moderate to high intensity aerobic movements with intermittent active rest patterns of one minute between sets. Each session started and ended with warm up and cool down for 10 minutes.

**Statistical analysis**: The data was sorted out manually and entered into IBM SPSS Statistics ver. 23.0 (IBM Co., Armonk, NY, USA). Descriptive analysis of mean and standard deviation as well as inferential statistics of paired t-test was presented in Table 1.Level of significance was accepted at 0.05.

## RESULTS

This study had a total number of 78 participants, ages from 9 to 12 years. The participants had a mean age of 10.65±0.94 years with a height of 147.87±6.85 cm. Body weight slightly decreased from 53.82±8.11kg to 53.65±8.23 kg and BMI from 24.56±2.81 kg/m$^2$ to

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24.41±2.84 kg/m$^2$. There was a decrease in waist circumference form 72.59±7.45cm to 72.35±10.27cm, hip circumference from 85.43±5.76cm to 85.00±9.96 cm, waist-to-hip ratio from 0.85 ±0.06 to 0.84 ±0.06, percent body fat from 31.79±6.19 to 30.12±6.08, systolic blood pressure from 116.38±11.28 (mmHg) to 110.94±11.14 (mmHg), diastolic blood pressure 71.50±9.26(mmHg) to 70.30±9.14 (mmHg) and heart rate from 93.21±14.04 (bpm) to 89.11±10.28(bpm) at rest.

The observed changes however occurred significantly on body weight, BMI, systolic blood pressure, diastolic blood pressure and heart rate.

**T**able 1: Summary of Paired t-test Results on Pre-Posttest

| Variables | Pre | Post | %Change | 95% CI | Pvalue |
|---|---|---|---|---|---|
| Age (years) | | | 10.65±0.94 | | |
| Height (cm) | | | 147.87±6.85 | | |
| Weight (kg) | 53.81±8.11 | 53.06±8.52 | 0.31 | 0.0258, 0.3178 | .022* |
| BMI (kg/m$^2$) | 24.55±2.52 | 24.01±2.88 | 0.58 | 0.0307, 0.2558 | .013* |
| Waist Circumference (cm) | 72.59±7.45 | 72.35±10.27 | 0.33 | -24.570, 9.070 | .362 |
| Hip Circumference (cm) | 85.43±5.76 | 85.00±9.96 | 0.36 | -26.544, 9.595 | .353 |
| Waist-to-hip ratio | 0.85 ±0.06 | 0.84 ±0.06 | 0.31 | -0.006, 0.0117 | .556 |
| %Body fat | 31.79±6.19 | 30.12±6.08 | 0.65 | -0.1607, 0.5761 | .265 |
| Systolic Blood Pressure (mmHg) | 116.38±11.28 | 110.94±11.14 | 3.15 | 2.479, 4.855 | .000* |
| Diastolic Blood Pressure (mmHg) | 71.50±9.26 | 70.30±9.14 | 1.92 | 0.692, 2.052 | .000* |
| Heart Rate (bpm) | 93.21±14.04 | 89.11±10.28 | 2.13 | 1.114, 2.860 | .000* |

BMI: Body Mass Index; Values are presented as mean ± standard deviation; *P<0.05, significant difference

## DISCUSSIONS

This pilot study examined the effect of *ampe* exercise program on the anthropometric and physiological parameters of school children. The difference between pre and post data after only four weeks of *ampe* intervention reveals improvement in all measured variables although not significant. Specifically, body weight, BMI, systolic blood pressure, diastolic blood pressure and heart rate were significantly improved with *ampe* exercise programme. These findings suggest that the incidence of obesity in pediatric populations that has increased over the past two decades (14) can reduce with ampe exercise program. If the duration of *ampe* exercise training is extended, the intervention is capable of meeting the recommendation of WHO on lifestyle interventions of 5–10% reduction in body weight as expressed as the primary preventive and management strategy for overweight and obesity (15).

It has been reiterated that reducing visceral adipose tissue improves cardiovascular and metabolic risk (16). Hence, adoption of *ampe* exercise aerobically for the prevention and treatment of obesity, insulin resistance (IR) and type 2 diabetes (T2D) would lessen the CVD burdens, reduce body weight and adiposity (17), improve insulin sensitivity and glucose uptake in the skeletal muscle (18). The study showed a significant reduction in the post blood pressure and heart rate in line with the finding of Larsen et al.(19). Larsen et al. (19) made the children undergo a 10-month school-based physical activity while this study was based on a 4-week school-based *ampe*. This suggests that *ampe* exercise could enhance positive change in physiological characteristics of children in short duration as compared to longer period. The potential to cause significant reduction in blood pressure of children positioned *ampe* exercise as prominent intervention to attenuate hypercholesterolemia, obesity, and blood pressure that could linger into adulthood.

Studies have reported significant reduction in body weight, BMI, percentage body fat, waist circumference, blood pressure and heart rate as a result of active intervention over a period of 6-weeks (17-18, 20). We believe that children health risk conditions would have reduced majorly if *ampe* exercise training had gone on beyond the 4-week schedule. The findings of this study suggest that *ampe* exercise programme potentiates health improvement and supports the notion for a longer period of *ampe*. The short duration of the intervention could be a limitation. Participants' lifestyles like diet and energy expenditure were not monitored, this may affect the study. Therefore, this research is presented as a pilot study which needs to be repeated on a larger sample to sustain our claims.

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