

PITFALLS OF PHYSICAL INACTIVITY AND INNOVATIVE INTERVENTION PROGRAMMES TO REDUCE PHYSICAL INACTIVITY AND INCREASE PHYSICAL ACTIVITY AMONG SINGAPORE YOUTHS

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Review paper

Abstract

Concerns about childhood obesity are universal concerns around the world and resonate with many governments as health care costs that are associated with impairments caused by childhood and adult obesity escalate and threaten to spiral out of control. A key determinant of juvenile obesity is physical inactivity, which has multiple consequences for the health and development of young people. In Singapore, the consequences of physical inactivity include youth obesity rate of about 10%, one of the highest rates of childhood myopia and adult-onset type II diabetics in the world, afflictions of eating disorders, and some evidence of concentration and memory recall deficiencies among overweight students. Innovative and potentially successful programmes to reduce physical inactivity and increase physical activity in Singapore are elucidated.

Key words: *Inactive lifestyles, youth, consequences, innovative activity programmes*

Introduction

Physical activity is the natural inclination of all young people, regardless of race, language or religion in Singapore. Physical activity is the capstone for the growth and development of toddlers, children, adolescents and young adults. Among adolescent and young adults, physical activity through sports and games provide opportunities to build a sport-loving culture, for social inter-course, for stress-release and for the pursuit of a healthy lifestyle. However, there is a compelling attractiveness in embracing lives of convenience and sedentary forms of entertainment with the advancement of technology and innovation. In Singapore, young people are at a very young age 'socialised' into study, transport and leisure habits and activities that require minimal amounts of physical exertion and energy expenditure (Chia, 2007). This is exacerbated by the ease high-calorie convenience foods via food delivery services and lifestyle choices for study, work and leisure that are mostly sedentary. Indeed physical inactivity appears to be better tracked over time than physical activity from childhood to adolescence to adulthood (Kimm & Obarzanek, 2002). This means that it is easier for sedentary habits or the cycle of very little physical activity in daily life to be entrenched than it is for active physical activity habits to take root. Extended periods of physical inactivity once entrenched as a daily habit may result in adult ailments like cardiovascular disease and altered glucose metabolism, which are documented to begin in infancy and childhood (Williams et al., 2002).

Consequences of physical activity insufficiency and associated conditions

Other paediatric conditions arising from severe physical activity insufficiency include obesity, sometimes orthopaedic problems such as joint pains in the feet, knees and hip, which are exacerbated by excessive body weight, and disrupted sleep due to obstruction of the airflow because of too much fat around the neck (Williams et al., 2002). Obese and overweight children, including those in pre-schools (Chia, 2006) experience weight-teasing by peers and they are bothered by the teasing episodes. Weight-teasing in schools is associated with disordered eating behaviours that may place overweight children at risk for weight gain. In a survey of 4746 young people in the USA, 63% of the very overweight girls and 58% of the very overweight boys reported being teased by their peers, while weight teasing by family members was reported by 47% by these girls and 34% by these boys (Neumark-Sztainer et al., 2002). In an eight-year retrospective prevalence study on eating disorders (anorexia nervosa) in Singapore, Lee et al (2005) reported a six-fold increase in patient referrals, between 1994 and 2002, to the Child Guidance Eating Disorder Clinic at the Institute of Mental Health. The following results are instructive: the mean age of onset of the disorder was at 15.5±3.9 years; 91% were female, 94% were Chinese and 74% of the patients were of school-going age with 47% coming from all-girl schools; the mean BMI at diagnosis was 15.56; 25.4% suffered from depression and the 26.9 % identified the triggers as weight teasing.

And comments from others, with 11.1% having been members of the Trim and Fit (TAF) Scheme in schools. These results highlighted that perceived weight teasing was significantly associated with disordered eating behaviours among overweight and non-overweight boys and girls (Neumark-Sztainer et al., 2002), echoing in the Straits Times on eating disorders in all-girl-school in Singapore (Davie, 2006). Apart from health and physical ailments, other mental, social and emotional and disciplinary deficiencies are also likely to accrue, as the opportunities and outlets for stress-alleviation through exercise and physical play become limited. For example, unpublished data from the Physical Education and Sports Science laboratory showed that cognitive function, assessed by a recall of a series of simple words among normal weight and overweight youths from top elite schools in Singapore was significantly different, with normal weight students performing better in these cognitive function tests. However, whether these results can be extrapolated to more complex modes of cognitive function requires further research and validation among Singaporean youths. This is a fertile area for future research. In Singapore, paediatric growth charts had to be revised in the late 1990s to take into account the increased body mass of children aged 1 to 6 years, where there was an average increase of half a kilogram in of body mass for all ages without any corresponding increase in stature. These changes were attributed to increased energy storage because of better nutrition but equally could be attributed to reduced energy expenditure at the paediatric ages. Research informs that at least in the USA, young people within the 95% percentile for BMI are likely to remain obese and overweight in adulthood and also suffer from obesity-related ailments (Williams et al., 2002). Therefore it seems prudent to monitor young people's BMI when they appear to be on an upward trend so as to ameliorate large groups of young people become overweight and obese in adulthood. Another indirect consequence of the lack of activity in childhood is also one of the highest incidence rates of adult-onset diabetes in the world among Singaporeans. Since the 1990s, heart disease and stroke continues to be the leading cause of premature death in adults (Singap. Heart Foundation, 2006). Yet, against this backdrop, regular physical activity in youth has a strong and effective preventative role in the onset of Type II diabetes (Chia, 2002). Singapore apparently also has one of the highest rates of childhood and juvenile myopia in the world and many youths suffer from myopia at a younger age than before. In 2001, 34% of Primary 1 students were myopic. This increased to 66% for Primary 6 students and 68% for Secondary 4 students (Teo, 2001).

There are cogent data that suggest that negative relationship between the rates of myopia and the amounts of physical activity, sports and outdoor activity. In a longitudinal study of 514 children from 1989 to 2001, the authors reported that the chances of children with parents without myopia becoming myopic were lowest in the children with the largest amounts of sports and outdoor activities (Jones et al., 2007). These health conditions among young Singaporeans are a wake-up call for action that much more needs to be done to motivate our young towards an active lifestyle of activity. Research data in the Singaporean context are urgently needed to verify if these observations are also valid in our youths.

Trim and Fit (TAF) and CHERISH programmes

The TAF scheme was launched in 1992 and was successful in reducing national school rates of overweight from about 15% in 1991 to about 10% in 1998 and has largely stayed about 10% since year 2000 (Chia via personal communication with MOE, PE Unit 2007). Chia (1998) in his published discourse on rethinking TAF programme strategies raised concerns about some of the deleterious effects that the programme may have on some vulnerable school students. Sceptics and cynics argue that the programme stigmatizes overweight children and that the programmes spelt 'FAT' in mirror image. Chia also provided suggestions about engaging overweight youths with forms of physical activity and exercise that are more suited and personalised to the conditions of overweight youths. In 2003, Chia & Wang published survey results among primary school children that showed that a sizeable proportion of children of normal body weight voiced the intention to lose body weight, rather than to gain body weight. In the study that involved 518 pupils in a primary school in Singapore, where the relationships between weight-for-height classifications, body weight satisfaction, perceived physical self-worth and physical fitness among 275 boys and 243 girls aged 9 - 13 years were examined, results revealed that across the three weight-for-height classifications, more pupils intended to want to lose body weight than to gain body weight. Underweight pupils were the most satisfied with their body weight, were the most physically fit and had the highest rating for perceived physical self-worth than the healthy weight and overweight groupings. It is noteworthy that girls and boys had similar ratings for perceived physical self-worth but younger pupils had higher perceived physical self-worth than older pupils. These data suggest that physical activity; sport or exercise programme leaders must practise sensitivity

and care by not perpetuating negative stereotypes about body weight. Concomitantly, education and awareness of the dangers of body image disorders among school youths particularly in all-girl schools and in young secondary school students should be stepped up. The MOE reviewed the TAF scheme and with the MOH launched a nationwide holistic health framework for schools in 2000, (CHERISH; Championing Efforts Resulting in Improved School Health) which targets the holistic development of students, which included a healthy maintenance of body weight for all students, not just those who are under-weight weight or over-weight. Importantly CHERISH echoes the WHO's Health Promoting Schools concept, adopted by many countries. Innovative school-based interventions to increase physical activity and reduce physical inactivity among Singaporean youths

HealthTrek Information Tracking System - a tool for building a health-enabling environment in schools

NIE researchers juxtaposed the use of information and computer programming technology to come up with a world's first HealthTrek Information Tracking System (HITS) housed in a Personal Digital Device (PDA) (Quek, 2002), HITS, allows an individual to appraise his current body weight, food intake, physical activity patterns and mood status over time. Importantly, the system is able to prescribe suggestions for remediation based upon recommendations enunciated by the Health Promotion Board of Singapore. Highlights of the HITS' features include an age and a sex-specific weight gain/weight loss calculator, for safe weight gain or weight loss, a food planner that gives a breakdown of key nutrients in foods that are selected and a physical activity planner that gives the rates of energy expenditure for different activities that are selected. The food database houses over 2000 local and non-local food items, while the physical activity database has more than 800 specific activity types. The mood gauge allows a person to track negative or positive feelings over time. The attractiveness of HITS is that it offered real-time data of participants, overcoming the need for recall, which can be used on its own or pooled as group data in providing individualised evidence based data so that specific lifestyle changes can be made. The effectiveness of HITS for monitoring individualised physical activity and food consumption and mood states was evaluated in 37 primary school pupils, aged 9-10 years (Wang et al 2005). Participants kept track of their daily food intake, physical activity consumption and mood state for seven days, by keying in the relevant data required as soon

as they consumed food or engaged in physical activity while data on mood was keyed in immediately before and after food and/or physical activity consumption. Results affirmed the researchers' assertions that in IT-savvy primary school pupils, the use of HITS housed in a PDA, provided an excellent means for the transmission of individualised and real time data that effected positive intentions and increased awareness for a healthy lifestyle- 92% of pupils felt that HITS made them more discerning of their food choices and 95% of the pupils reported that HITS made them more conscious of their daily energy expenditure and for a healthy lifestyle. Nearly 100% of the pupils surveyed reported that they wished to continue using HITS and also continue to raise their levels of daily physical activity. At the present time, HITS is no longer available for use due to cost factors but its utility and effectiveness (real-time localised and holistic data- food, physical activity consumption and mood) as a health-enabling device can be further explored, when the cost of its implementation becomes more affordable.

PRIDE for PLAY- personal responsibility in daily effort for participation in lifetime activity for youths

PRIDE for PLAY is an acronym for Personal Responsibility in Daily Effort for Participation in Lifelong Activity for Youths (Chia, 2006). MOE advocates that schools should emphasize holistic development of pupils- this means paying sufficient and appropriate attention to the mental, physical, emotional, social and environmental development of all pupils and students. Weekly compulsory physical education classes of 70 minutes in schools and the associated sports activities after classes are inadequate to meet emergent physical activity guidelines of a daily accumulation of at least 90 minutes of physical activity of at least moderate intensity (Andersen et al., 2006). Daily play sessions that are exclusive of an active daily recess, physical education classes taught by trained specialists and after-school sport sessions, can provide many developmental and holistic health benefits that may carry over into adulthood. A school environment that is play-encouraging, play-enabling and play-inviting can help a useful, innovative and natural way of inculcating a love for movement and help redress a serious trend of physical activity insufficiency while youngsters engage electronic gaming activities. Pilot initiatives in two primary schools for the PRIDE for PLAY programme were conducted (Chia, 2007). This involved working closely with the school leaders and all teachers involved to forge a strong partnership for action and subsequent evaluation.

The pilot study involved an infusion daily physical play of between 20 to 45 minutes during curriculum hours, either as stand-alone additional play and physical activity sessions or as part of an extended recess. Outcome deliverables like pre-and post school-based physical activity, assessed using pedometers, social-emotional outcomes among pupils, assessed using age-modified questionnaires and indicators of academic achievement were garnered.

For one pilot school that involved 270 Primary 2 pupils, daily step count in school was significantly increased by 24% from 3742 to 4642. In the other pilot school that involved 225 Primary 2 pupils, daily step count in school increased by 10% from 4520 to 4984. These amounted to achieving 39-42% of the daily recommended step count for girls and 31-33% of the recommended step count for boys (Tudor-Locke et al 2004). Social emotional learning outcomes of the pupils involved with the PRIDE for PLAY programme were also significantly improved with no compromise to academic standards. The principals of both schools raised the following points that are instructive for the success of PRIDE for PLAY- the programme had the support and buy-in from the key stakeholders- school management, teachers, parents and the pupils themselves. Other schools have translated, customised and adapted the PRDIE for PLAY programme into daily physical education. Further research directions associated with PRIDE for PLAY include establishing holistic or social-emotional learning outcomes as a result of programme implementation in a wider spectrum of schools in Singapore.

Every step counts- how an active recess can help to buttress physical activity achieved during PE lessons

Chia & Wangye (2008), embarked on a study to evaluate the step rate of 125 boys and girls from Primary 2 and Primary 6, using the Omron HJ-005 pedometers during four 30-minute PE lessons, taught by specialist PE teachers with games-based activities, rope skipping, throwing, jogging and shuttle-run based activities and during an 30-minute unstructured recess where pupils were free to play with games equipment. Results revealed that the average number of steps achieved in a typical 30-minute PE lesson was 1660 ± 535 steps with a step rate of 55.4 ± 17.8 steps/min. Steps accumulated during daily recess averaged 1208 ± 526 steps or a step rate of 40.3 ± 17.5 steps/min. There was no significant sex difference ($p > 0.05$) in steps accumulated

or step rate among the four structured PE lessons. However, the boys were significantly more physically active than girls ($p < 0.05$) during unstructured daily recess. The difference in steps accumulated between Primary 2 and Primary 6 pupils was not significant during daily recess ($P > 0.05$). Aggregated step count or step rate during PE and recess among Primary school pupils in Singapore are within the range of findings documented elsewhere (e.g. Scruggs et al 2005; Tudor-Locke et al 2006). When the steps were aggregated for PE and recess, girls achieved 24% and boys achieved 19% of the daily recommended steps (Tudor-Locke et al 2004). Primary school girls were just as physically active as the boys during school structured PE, but boys were significantly more active during the unstructured daily recess.

Primary 6 pupils were just as physically active as Primary 2 pupils during the daily recess periods and the results of the present study did not support the view that physical activity declines with age, (e.g. Trost et al., 2002) at least not during the daily recess periods, a finding that finds agreement with Ridgers et al. 2005. Schools should capitalise on young pupils' natural inclination for play and the availability of qualified PE teachers and games equipment during recess to chalk-up as many steps as possible so that more youths are able to meet the daily recommended step count of 12 000 for girls and 15 000 steps for boys (Tudor-Locke et al., 2004).

Conclusion

The consequences of physical activity insufficiency among young people are multifaceted and have a negative impact on the holistic development of the young person. Intervention programmes that target the holistic development of young people can be successful and sustainable when there is whole school acceptance of the programme, a strong trust between the school management, stakeholders (parents, and MOE) and the researchers, when the interventions are multifaceted- before, during and after school programmes, active recess, an extended recess, tuck-shop or canteen nutritional programme, the availability of safe equipment and facilities, parental involvement, school events and school partnerships with the community.

The use of electronic gadgets such as PDAs, mobile phones and new technology monitors, coupled with youth-friendly software programs can help increase awareness of the need for a healthy lifestyle among youths in Singapore.

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PROMJENE MOTORIČKO- FUNKCIONALNIH SPOSOBNOSTI NOGOMETAŠA MLADIH UZRASNIH SKUPINA NAKON TROMJESEČNOG KINEZIOLŠKOG TRETMANA

Sažetak

Na uzorku od 47 nogometaša starosne dobi 15 i 16 godina utvrđene su statistički značajne razlike u nekim motoričko-funkcionalnim sposobnostima između inicijalnog i finalnog mjerenja. Mjerenje se vršilo u pripremnom razdoblju u razmaku od tri mjeseca, a sadržaji transformacijskog procesa obilovali su vježbama za razvoj brzine tipa sprinta, agilnosti, eksplozivne snage i izdržljivosti. Temeljem rezultata dobivenih t-testom utvrdilo se da je razlika između dva mjerenja vidljiva već nakon tri mjeseca i to u većini primjenjenih testova izuzev testa za eksplozivnu snagu tipa horizontalne skočnosti. Iako je skočnost bitna u nogometu ipak je naglasak stavljen na vertikalnu a ne horizontalnu skočnost, jer su takvi skokovi češći i uobičajeniji u nogometu pa se i u trenažnom procesu i na samim utakmicama ta sposobnost više razvija. Iz tog razloga ovi rezultati mogu biti smjernica trenerima mladih nogometaša pri korekciji trenažnog sadržaja u ovom razdoblju u smislu da povećaju vježbe i sadržaje koji potiču razvoj eksplozivne snage tipa horizontalne skočnosti. Globalno promatrajući ovakvi podaci o izraženim razlikama u dvije vremenske točke a izmjereni nakon pripremnog razdoblja su očekivani jer je intenzitet rada u tom periodu jako visok i baziran upravo na razvoju bazičnih motoričkih i funkcionalnih sposobnosti.

Ključne riječi: *nogometaši, motorika, transformacijski proces, razlike*

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