How to design an effective school based intervention program

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Abstract

School have a crucial role in providing opportunities for children to engage in physical activity, thus improving physical fitness (Story et al., 2006; Lee et al., 2007) and, serve as an ideal setting for school based intervention (Kriemler et al., 2011; Lee et al., 2007; Pate et al., 2006; Dobbins et al., 2009). Conclusions from a study by Saris et al. (2003) show that kindergarten and schools are the best place for the implementation of intervention programs. School for the children is an environment where they have the possibility to play freely especially those children with limited or no access to play areas (McKenzie et al., 1996) and finally school is an environment where different children at different risk groups can interact with each other (Harrell et al., 1996; WHO, 2004).
Research studies suggest that the best primary strategy for improving the long-term health of children and adolescents through exercise may be creating a lifestyle pattern of regular physical activity that will carry over to the adult years (Freedson and Rowland, 1992). This implies as a primary importance to identify approaches that will be effective in increasing and sustaining activity levels of children.

Keywords: children, physical education, school program

Introduction

Research studies suggest that the best primary strategy for improving the long-term health of children and adolescents through exercise may be creating a lifestyle pattern of regular physical activity that will carry over to the adult years (Freedson and Rowland, 1992). This implies as a primary importance to identify approaches that will be effective in increasing and sustaining activity levels of children. A very important challenge faced by most of the studies today is the development of more approaches and efficient school based intervention (Kuboonchoo, 2001).

There are two key elements that should be noted and are of particular importance on the beginning phase of designing a quality school based physical activity/education intervention program.

Firstly the researcher have to be clear on the type of intervention that have to be implemented, the kind of information that the program will provide to the children, have to specify the main target and what should be included in the intervention program, and finally have to be clear on the main focus of the school based program (Fig 1).

Secondly the researcher must have information on the main determinants of physical activity among children in order to build a program as efficient and as close to the reality of children and the conditions in which they live and learn. Understanding the factors that influence and are associated with physical activity behavior is important key element in the design of school based intervention programs targeted children and adolescents.

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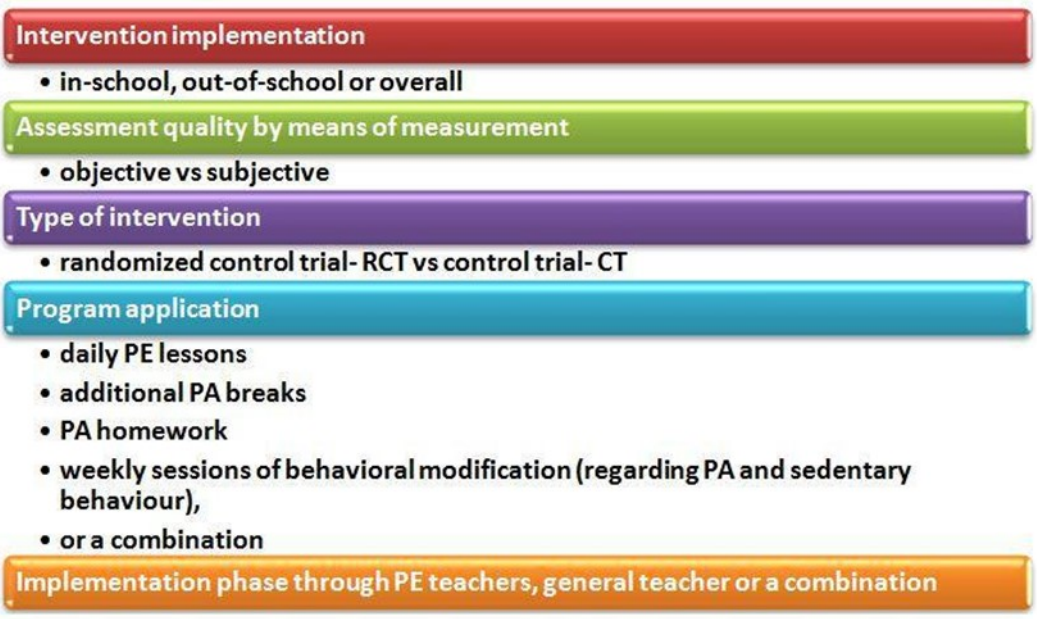

Figure 1: Design components of school based programs

Methods

To search the literature it was used Jab Ref 2.1.0 software using different databases Medline, Spires, Jstore, Google Schoolar. The search produced 857 references, which reduced to 545 when it was used different keywords such as school intervention, children, etc. From this search it was cited 57 papers in this literature review.

Literature Review

School based program implementation areas

School have a crucial role in providing opportunities for children to engage in physical activity, thus improving physical fitness (Story et al., 2006; Lee et al., 2007) and, serve as an ideal setting for school based intervention (Kriemler et al., 2011; Lee et al., 2007; Pate et al., 2006; Dobbins et al., 2009). Conclusions from a study by Saris et al. (2003) show that kindergarten and schools are the best place for the implementation of intervention programs. School for the children is an environment where they have the possibility to play freely especially those children with limited or no access to play areas (McKenzie et al., 1996) and finally school is an environment where different children at different risk groups can interact with each other (Harrell et al., 1996; WHO, 2004).

There are two major type of program interventions to be noticed for those who design the programs aiming in school settings. Firstly, increasing the frequency and duration of physical education in school (quantity PE intervention) and secondly designing the program of physical education without changing its frequency and duration quality PE intervention).

Those who design the intervention of a physical activity/ education program have several possibilities for the implementation of them. The more used targets for the implementation of the school based program are the physical education class where over 95 percent of children are involved (Lee et al., 2006) and recess time as the best place and periods for the program implementation. School age children spend a significant amount of their wakeful hours either in transit to or in the school setting, and that in many countries, all children attend school until they reach adolescence. It is thus essential to promote physical activity throughout the school day during classes, lunch times, and recess. Programs can target all children (ensures 100% of children are exposed to the intervention, thereby increasing the reach of these interventions), both genders and different type of study researchers choose different population e.g. overweight and obese children. Studies who select the school for the implementation of their physical activity programs can benefit from the many advantages that this place offers.

First, both groups of children that exist in schools active and those inactive (at risk of various problems) can benefit from the program.

Second, targeting the interventions at all children in

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a school could avoid stigmatizing children who are overweight, obese, or with established risk factors for chronic diseases. Stigmatization of children and adolescents has been shown to negatively impact self esteem, self worth and mental health Dobbins et al. (2009). Results by Dobbins et al. (2009) showed that all intervention reviewed, included changes to school curricula. Printed educational materials were used in the studies of Haerens, Deforche, Maes, Stevens, Cardon and De Bourdeaudhuij (2006); Luepker et al. (1996); Manios et al. (1999). Community-based strategies were used in three studies (Ewart et al., 1998; Luepker et al., 1996; Manios et al., 1999), and educational sessions were used in two of the studies (Luepker et al., 1996; Stone et al., 2003).

Researchers can implement their programs in home (after school or have the possibility to choose to combine both school and community based implementation.

There are several targets for the implementation of the physical activity/ education programs:

1) programs related only on physical education class aiming to increase the level of activity children are engaged during these classes
2) programs involving all PE curriculum
3) training of the physical education and general teachers (learn more effective ways to promote physical activity and to incorporate it into existed or implemented curricula)
4) giving information and additional material (the benefits of physical activity and healthy nutrition, unhealthy food choices)
5) changing of the whole school program,
6) providing opportunities (equipment) to play so increasing the amount of time children are engaged in physical activity during the school day.

School based programs that promote physical activity have a golden opportunity to reduce inactivity and possibility in the near future to reduce morbidity. Through these programs the school offers the possibility to increase the percentage of children and adolescents who are active during the day, to increase participation in various sports activities both in school and outside of it as well as providing opportunities to meet the criteria of 60 minutes per day of moderate to vigorous physical activity (Strong et al., 2005). There is an important opportunity through school-based interventions to ensure greater attention to improving knowledge of chronic disease prevention and health promotion, and by providing students with both knowledge and the opportunity to be more active during the school day, children will develop healthier lifestyles that may track in adulthood.

Determinants of physical activity in school age children

Physical activity for the entire life and especially in children and adolescent is promoted and is a key component between energy gained and spent. Kohl and Hobbs (1998) on their article "development of physical activity behaviors among children and adolescents defined three main affecting areas in order to understand the possible determinants of behavior (physical activity) as follows:

1) physiologic and developmental factors,
2) environmental factors,
3) psychological, social, and demographic factors.

Authors concluded that during the entire life, all the three main areas interact to influence physical activity especially in children and adolescent in a "multidimensional way ". In order to define and understand the possible factors that may affect children^{0}s physical activity patterns, Lindquist et al. (1999) cited in the review of Dobbins et al. (2009), provided an approach for understanding this factors based on the work of Kohl and Hobbs (1998) as described before in the literature. The authors defined four groups (levels) as determinants of physical activity shown in figure 2.

1. Sex, age, and ethnicity as physiological determinants of physical activity among children and youth. (Lindquist et al., 1999; Pate et al., 1994; Sallis et al., 1993). Data from the study of Reynolds et al. (1990) indicate that psycho social variables are associated with physical activity. A review including 108 studies (evaluated 40 variables) aimed at correlations of physical activity, was conducted by Sallis et al. (2000) in children aged 3-12 years and adolescents aged 13-18 years. Physiological variable that were consistently associated with children^{0}s physical activity was sex (male), while for adolescents physical activity were sex (male), ethnicity (white), and age (inverse).

Psychological determinants of physical activity include confidence in ones ability to engage in exercise/ self-efficacy (Dishman et al., 2004), perception of physical or sport competence (Sallis et al., 2000), having a positive attitude toward physical activity (Trost et al., 1997), enjoyment of physical

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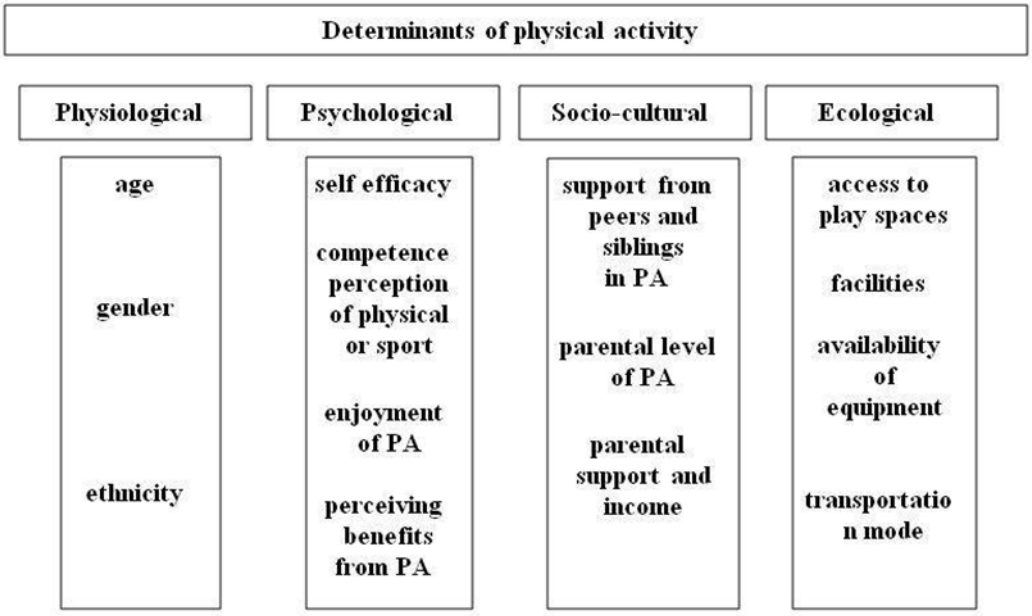

Figure 2: Determinants of physical activity in children

activity (Dishman et al., 2005) and, perceiving benefits from engaging in physical activity (Tappe et al., 1990; Zakar-ian et al., 1994). Conversely, perceived barriers to physical activity, such as lack of time or feeling tired, are negatively associated with physical activity among youth (Tappe et al., 1990; Zakarian et al., 1994). Dishman et al. (2004) conducted a school based intervention named "Lifestyle Education for Activity Program (LEAP)", with an emphasize in changes in instruction and school environment, among adolescent girls (both ethnic- white and black). The results from this school based intervention indicated that self-efficacy and satisfaction exhibited synchronous, cross-sectional relationships with physical activity. This intervention had direct effects on self -efficacy, goal setting, and physical activity. In conclusion we can increase physical activity through incentives on children to use self-efficacy.

The same author through year 2005, provided the evidence linking increased enjoyment with increased physical activity among black and white adolescent girls (Dishman et al., 2005). Sallis et al. (2000) on their study show psychological variables that were consistently associated with children^{0}s physical activity: physical activity preferences, intention to be active, perceived barriers (inverse) and for ado-lescents physical activity that were perceived activity competence, intentions, and depression (inverse). Trost et al. (1997) used a survey to assess and identify the various predictors of vigorous physical activity (VPA) and moderate and vigorous physical activity (MVPA) in elementary school children at fifth grade for one year. For boys, self-efficacy in overcoming barriers was the only significant predictor of VPA, while beliefs regarding activity outcomes was a significant predictor of MVPA while physical activity self-efficacy and positive beliefs regarding physical activity outcomes were important predictors of future physical activity behavior. For girls, self-efficacy in overcoming barriers and enjoyment of school physical education, were significant predictors of VPA. For MVPA, participation in community sports and self-efficacy in overcoming barriers were significant predictors. Zakarian et al. (1994) found that to maintain and increase the level vigorous exercises to children and youth, social factors may be useful.

3. Social- cultural influences include support for and participation in physical activity of peers and siblings (Sallis et al., 1988), parental level of physical activity (Anderssen and Wold, 1992; Garcia et al., 1995; Reynolds et al., 1990; Sallis et al., 1988, 1992; Zakarian et al., 1994) parental support (Sallis et al., 2000), and parental income. Sallis et al. (1988) demonstrated that the family has a significant influence on physical activity and the friends and other peers can have an impact in promoting younger^{0}s physical activity (Anderssen and Wold, 1992). In another study Zakarian et al. (1994) showed that correlates were similar for both groups (both grades) and included family, and friend support during their research. Sallis et al. (1992) defined evidence based on their work that those children who played with their parent were more active compared with others.

4. Ecological determinants of physical activity include access to play spaces, facilities, availability

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of equipment (Stucky-Ropp and DiLorenzo, 1993), and transportation to activities or programs (Sallis et al., 1992). In addition, time spent outdoors in the early years is positively correlated with physical activity levels among children (Sallis et al., 1993). Stucky-Ropp and DiLorenzo (1993) investigated the factors that may influence physical activity in this children on a study enrolled about 232 children in fifth and sixth grade together with their mothers using an interview. They concluded that availability of equipment^{0}s may be associated with physical activity in children. The same conclusion was found is a study of Sallis et al. (1992) stressing the importance of availability of facilities for participation of physical activity by the children. The same results were attained after one year in another study by the same author (Sallis et al., 1993).

Discussion

In conclusion the results from the study by Saris et al. (2003) show that kindergarten and schools are the best place for the implementation of intervention programs. School for the children is an environment where they have the possibility to play freely especially those children with limited or no access to play areas (McKenzie et al., 1996) and finally school is an environment where different children at different risk groups can interact with each other (Harrell et al., 1996; WHO, 2004).
Research studies suggest that the best primary strategy for improving the long-term health of children and adolescents through exercise may be creating a lifestyle pattern of regular physical activity that will carry over to the adult years (Freedson and Rowland, 1992). This implies as a primary importance to identify approaches that will be effective in increasing and sustaining activity levels of children. School based programs that promote physical activity have a golden opportunity to reduce inactivity and possibility in the near future to reduce morbidity. Through these programs the school offers the possibility to increase the percentage of children and adolescents who are active during the day, to increase participation in various sports activities both in school and outside of it as well as providing opportunities to meet the criteria of 60 minutes per day of moderate to vigorous physical activity (Strong et al., 2005). There is an important opportunity through school-based interventions to ensure greater attention to improving knowledge of chronic disease prevention and health promotion, and by providing students with both knowledge and the opportunity to be more active during the school day, children will develop healthier lifestyles that may track in adulthood.

References

Anderssen N and Wold B (1992). Parental and peer influences on leisure-time physical activity in young adolescents., *Res Q Exerc Sport* **63**(4), 341–348.

Dishman R K, Motl R W, Saunders R, Felton G, Ward D S, Dowda M and Pate R R (2004). Self-efficacy partially mediates the effect of a school-based physical-activity intervention among adolescent girls., *Prev Med* **38**(5), 628–636. **URL:***http://dx.doi.org/10.1016/j.ypmed.2003.12.007*

Dishman R K, Motl R W, Saunders R, Felton G, Ward D S, Dowda M and Pate R R (2005). Enjoyment mediates effects of a school-based physical-activity intervention., *Med Sci Sports Exerc* **37**(3), 478–487.

Dobbins M, De Corby K, Robeson P, Husson H and Tirilis D (2009). School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6-18., *Cochrane Database Syst Rev* (1), CD007651. **URL:***http://dx.doi.org/10.1002/14651858.CD007651*

Ewart C K, Young D R and Hagberg J M (1998). Effects of school-based aerobic exercise on blood pressure in adolescent girls at risk for hypertension., *Am J Public Health* **88**(6), 949–951.

Freedson P S and Rowland T W (1992). Youth activity versus youth fitness: let's redirect our efforts., *Res Q Exerc Sport* **63**(2), 133–136.

Garcia A W, Broda M A, Frenn M, Coviak C, Pender N J and Ronis D L (1995). Gender and developmental differences in exercise beliefs among youth and prediction of their exercise behavior., *J Sch Health* **65**(6), 213–219.

Haerens L, Deforche B, Maes L, Stevens V, Cardon G and De Bourdeaudhuij I (2006). Body mass effects of a physical activity and healthy food intervention in middle schools., *Obesity (Silver Spring)* **14**(5), 847–854. **URL:** *http://dx.doi.org/10.1038/oby.2006.98*

Correspondence: Juel Jarani, Faculty of Movement Sciences , Sport University of Tirana, Muhamet Gjollesha, Tirana, Albania, Email jjarani@ust.edu.al

Harrell J S, McMurray R G, Bangdiwala S I, Frauman A C, Gansky S A and Bradley C B (1996). Effects of a school-based intervention to reduce cardiovascular disease risk factors in elementary-school children: the Cardiovascular Health in Children (CHIC) study., *J Pediatr* **128**(6), 797–805.

Kohl, 3rd H and Hobbs K E (1998). Development of physical activity behaviors among children and adolescents., *Pediatrics* **101**(3 Pt 2), 549–554.

Kriemler S, Meyer U, Martin E, van Sluijs E M F, Andersen L B and Martin B W (2011). Effect of school-based interventions on physical activity and fitness in children and adolescents: a review of reviews and systematic update., *Br J Sports Med* **45**(11), 923–930.
URL:*http://dx.doi.org/10.1136/bjsports-2011-090186*

Kuboonchoo K (2001). Energy balance and physical activity., *Biomed Environ Sci* **14**(1-2), 130–136.

Lee C D, Blair S N and Jackson A S (1999). Cardiorespiratory fitness, body composi-tion, and all-cause and cardiovascular disease mortality in men., *Am J Clin Nutr***69**(3), 373–380.

Lee S M, Burgeson C R, Fulton J E and Spain C G (2007). Physical education and physical activity: results from the School Health Policies and Programs Study 2006., *J Sch Health* **77**(8), 435–463.
URL:*http://dx.doi.org/10.1111/j.1746-1561.2007.00229.x*

Lee S M, Howell W and Allison B (2006). The Role of Schools in Preventing Childhood Obesity, *President?s Council on Physical Fitness and Sports Research Digest* **7 (3)**.

Lindquist C H, Reynolds K D and Goran M I (1999). Sociocultural determinants of physical activity among children., *Prev Med* **29**(4), 305–312.
URL:*http://dx.doi.org/10.1006/pmed.1999.0546*

Luepker R V, Perry C L, McKinlay S M, Nader P R, Parcel G S, Stone E J, Webber L S, Elder J P, Feldman H A and Johnson C C (1996). Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health. CATCH collaborative group., *JAMA* **275**(10), 768–776.

Manios Y, Kafatos A and Codrington C (1999). Gender differences in physical activity and physical fitness in young children in Crete., *J Sports Med Phys Fitness* **39**(1), 24–30.

McKenzie T L, Nader P R, Strikmiller P K, Yang M, Stone E J, Perry C L, Taylor W C, Epping J N, Feldman H A, Luepker R V and Kelder S H (1996). School physical education: effect of the Child and Adolescent Trial for Cardiovascular Health., *Prev Med* **25**(4), 423–431.
URL:*http://dx.doi.org/10.1006/pmed.1996.0074*

Pate R R, Davis M G, Robinson T N, Stone E J, McKenzie T L, Young J C, American Heart Association Council on Nutrition P A, Committee M P A, on Cardiovascular Disease in the Young C and C o C N (2006). Promoting physical activity in children and youth: a leadership role for schools: a scientific statement from the Ameri-can Heart Association Council on Nutrition, Physical Activity, and Metabolism Physical Activity Committee in collaboration with the Councils on Cardiovascular Disease in the Young and Cardiovascular Nursing., *Circulation* **114**(11), 1214– 1224.

Reynolds K D, Killen J D, Bryson S W, Maron D J, Taylor C B, Maccoby N and Farquhar J W (1990). Psychosocial predictors of physical activity in adolescents., *Prev Med* **19**(5), 541–551.

Sallis J F, Alcaraz J E, McKenzie T L, Hovell M F, Kolody B and Nader P R (1992). Parental behavior in relation to physical activity and fitness in 9-year-old children., *Am J Dis Child* **146**(11), 1383–1388.

Sallis J F, McKenzie T L, Alcaraz J E, Kolody B, Hovell M F and Nader P R (1993). Project SPARK. Effects of physical education on adiposity in children., *Ann N Y Acad Sci* **699**, 127–136.

Sallis J F, Patterson T L, Buono M J, Atkins C J and Nader P R (1988). Aggregation of physical activity habits in Mexican-American and Anglo families., *J Behav Med* **11**(1), 31–41.

Sallis J F, Prochaska J J and Taylor W C (2000). A review of correlates of physical activity of children and adolescents., *Med Sci Sports Exerc* **32**

Correspondence: Juel Jarani, Faculty of Movement Sciences , Sport University of Tirana, Muhamet Gjollesha, Tirana, Albania, Email jjarani@ust.edu.al

(5), 963–975. Salmon J,

Saris W H M, Blair S N, van Baak M A, Eaton S B, Davies P S W, Di Pietro L, Fogelholm M, Rissanen A, Schoeller D, Swinburn B, Tremblay A, Westerterp K R and Wyatt H (2003). How much physical activity is enough to prevent unhealthy weight gain? Outcome of the IASO 1st Stock Conference and consensus statement., *Obes Rev* **4**(2), 101–114.

Stone E J, Norman J E, Davis S M, Stewart D, Clay T E, Caballero B, Lohman T G and Murray D M (2003). Design, implementation, and quality control in the Pathways American-Indian multicenter trial., *Prev Med* **37**(6 Pt 2), S13–S23.

Story M, Kaphingst K M and French S (2006). The role of schools in obesity preven-tion., *Future Child* **16**(1), 109–142.

Strong W B, Malina R M, Blimkie C J R, Daniels S R, Dishman R K, Gutin B, Hergen-roeder A C, Must A, Nixon P A, Pivarnik J M, Rowland T, Trost S and Trudeau F (2005). Evidence based physical activity for school-age youth., *J Pediatr* **146**(6), 732–737.
URL:*http://dx.doi.org/10.1016/j.jpeds.2005.01.055*

Stucky-Ropp R C and DiLorenzo T M (1993). Determinants of exercise in children., *Prev Med* **22**(6), 880–889.

Tappe M K, Duda J L and Menges-Ehrnwald P (1990). Personal investment predictors of adolescent motivational orientation toward exercise., *Can J Sport Sci* **15**(3), 185– 192.

Trost S G, Pate R R, Saunders R, Ward D S, Dowda M and Felton G (1997). A prospec-tive study of the determinants of physical activity in rural fifth-grade children., *Prev Med* **26**(2), 257 –263.
URL: *http://dx.doi.org/10.1006/pmed.1996.0137*

WHO (2004). Global strategy on diet, physical activity and health.

Zakarian J M, Hovell M F, Hofstetter C R, Sallis J F and Keating K J (1994). Correlates of vigorous exercise in a predominantly low SES and minority high school popula-tion., *Prev Med* **23** (3), 314–321.
URL: *http://dx.doi.org/10.1006/pmed.1994.1044*

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