THE PHYSICAL ACTIVITY INTERVENTIONS FOR CHILDREN IN SCHOOL-BASED SETTING: A SCOPING REVIEW

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THE PHYSICAL ACTIVITY INTERVENTIONS FOR CHILDREN IN SCHOOL-BASED SETTING: A SCOPING REVIEW

BY:

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CERTIFICATE

This is to certify that the dissertation entitled "THE PHYSICAL ACTIVITY INTERVENTION FOR CHILDREN ON SCHOOL-BASED SETTING: A SCOPING REVIEW" is the bona fide record of research work done by Ammar Syahmi Bin Abdullah during the period from August 2020 to June 2021 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfillment for the degree of Bachelor of Health Science (Honours) (Exercise and sport science).

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.

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Ammar Syahmi Bin Abdullah

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List of abbreviation

(PA= physical activity)

(DPA= Daily Physical Activity)

(LPA= Low Physical Activity)

(MPA= Moderate Physical Activity)

(VPA= Vigorous Physical activity)

(MVPA=Moderate Vigorous Physical Activity)

(SDT= Sedentary Time)

(PE= Physical Education)

(BMI=Body Mass Index)

(IG= intervention group/ CG= control group)

(BF= Body fat)

(TF= Trunk Fat)

(TC= Total Cholesterol)

(BTM= Born To Move)

(FMS= Fundamental Movement)

[CDPH= California's Department of Public Health- CFHL= CalFresh Healthy Living]

(TP= Team Petathlon)

List of Symbols

%	Percentage
cm	Centimetre
g	Gram
kg	Kilogram
m	Metre
Kcal	Kilo Calories

ABSTRAK

Latar belakang: Penduduk Malaysia menghadapi peningkatan berat badan berlebihan dan gemuk menyebabkan banyak penyakit kronik kesihatan. Kegiatan fizikal berkait secara songsang dengan beberapa hasil kesihatan kepada orang dewasa. Aktiviti fizikal dilaporkan dapat memberi pelbagai manfaat kepada fizikal dan psikologi kanak-kanak. Sekolah terbukti menjadi tempat yang sesuai untuk program intervensi yang bertujuan untuk mempromosikan aktiviti fizikal untuk manfaat kesihatan. Matlamat: Objektif tinjauan skop ini adalah untuk mengkaji intervensi aktiviti fizikal kanak-kanak dalam persekitaran sekolah. Kajian ini juga mengkaji peningkatan kesihatan fizikal dan emosi setelah intervensi aktiviti fizikal dan menentukan keberkesanan intervensi aktiviti fizikal kanak-kanak dalam suasana sekolah. Kaedah: Ebscohost, Springer Link, Scopus dan Science Direct dicari untuk artikel jurnal yang berkaitan. Kriteria inklusi adalah kajian yang meneliti intervensi aktiviti fizikal kanak-kanak berumur 7-18 tahun dalam persekitaran sekolah dan proses pencarian adalah dari 2016-2021. Hasil: 21 kajian memenuhi kriteria kemasukan dan semua memenuhi syarat dalam kajian ini. 17 kajian menunjukkan perubahan yang ketara sementara 4 yang lain tidak berjaya menghasilkan keputusan yang signifikan. Kajian ini juga membuktikan bahawa intervensi aktiviti fizikal mampu menambah baik kesihatan mental dan fizikal kanak-kanak. Kesimpulan: Ulasan ini memberikan bukti kukuh bahawa beberapa intervensi aktiviti fizikal dapat memberikan hasil yang signifikan pada tahap aktiviti keseluruhan kanak-kanak. Penemuan ini dapat menjelaskan, sebahagiannya, mengapa intervensi semacam itu berjaya dalam meningkatkan aktiviti fizikal.

ABSTRACT

Background: The population of Malaysia faces an increased burden of overweight and obese leading to many health chronic disease. Physical activity is inversely associated with several health outcomes in adults while physical activity has been reported to confer various benefits on children's physical and psychological state. School is proven to be a suitable setting for programe of intervention that aim to promote physical activity for health benefit. Aim: The objective of this scoping review is to study the physical activity intervention of children in school-based settings. This study also investigate the improvements of health and mood after physical activity intervention and determine the effectiveness of the physical activity intervention of children in a school-based setting. Method: Ebscohost, Springer Link, Scopus and Science Direct were searched for peer reviewed journal articles. Inclusion criteria were studies that examined a physical activity intervention of children aged 7-18 in school based settings and the search process was from 2016-2021. 21 studies met the inclusion criteria and all were eligible for in this study. Results: 17 of the studies show a significant changes while 4 others did not manage to produce a significant result. the physical activity intervention also manage to improve children mood and health. Conclusion: This review provides strong evidence that some physical activity interventions can have a significant result on children's overall activity level. This finding may explain, in part, why such interventions have had limited success in increasing physical activity.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Many reports showed high overweight and obesity levels among pre-school children living in developing countries (Onis & Blassner, 2000) Variety of reasons causes children overweight. Some of them are unhealthy eating habits, lack of physical activity, genetic factors or a combination of those factors are the most common causes. A medical problem, such as an endocrine disorder, can in rare cases cause a child to become overweight.

The terms physical activity and exercise are related, but they apply to different constructions. Physical activity is any bodily movement created by skeletal muscle contraction, which increases energy expenditure above the basal level. Training refers to a planned, disciplined and repeated physical movement explicitly designed to improve or sustain one or more physical fitness components (Caspersen, Powell, & Christensen, 1985). Exercise is known as a subset of physical activity. In 2017, however, a new consensus on terminology was formed to highlight the gaps between these definitions. Physical activity is defined as any part of the body movement generated by the contraction of skeletal muscles that raises energy expenditure above resting metabolic rate and is characterised by its modality, frequency, intensity, duration, and context of practice (Tremblay, et al., 2017) .

Physical activity is a fun and enjoyable things to do. It is an important part of playing and learning new activities. It is normal for children to exercise and be physically active. Babies rock their bodies and kick their feet, and infants love moving around, dancing,

climbing and jumping. Older kids love organised sports and playground games, and many kids like a bit of rough and tumble play. Children and adolescents must be physically active and eat healthy foods daily for them to grow healthy.

Physical activity has been reported to confer various benefits on children's physical and psychological state. In kids, physical activity is very important to safeguard against negative risk factors, for enhancing bone and muscle growth and development, to enhance shallowness and to stop anxiety and depression, as well as to support psychological feature development and tutorial performance. Bigger amounts of physical activity impart bigger health benefits (Eime, Young, Harvey, Charity, & Payne, 2013). Moreover, physical activity established during childhood not only protects against physical inactivity during adulthood but also reduce mortality and improves longevity because healthy lifestyle choices are established early in life.

Physical activity is inversely associated with several health outcomes in adults. Individuals who are more active and fit have lower risks of all-cause mortality, cardiovascular disease, some cancers, diabetes mellitus, and depressive symptoms and may have a lower risk of obesity and osteoporosis as well (a report of the Surgeon General Disease Control and Prevention, 1996). The belief that physical activity is good for health is old: Plato said, "Lack of physical activity destroys the good condition of every human being, while movement and methodical physical exercise preserve and save it".

There are short-term health effects of physical activity in children, they are most likely would be an influence on weight loss and control. In adults, regular physical activity is associated with weight loss and maintenance. Nevertheless, the relationship in children and adolescents is more complicated in that it is difficult to separate training effects on

adipose tissue from expected changes due to growth and maturation, especially in the per pubertal years.

According to international law, a 'child' means every human being below the age of 18 years. This is a universally accepted definition of a child and comes from the United Nations Convention on the Rights of the Child (UNCRC), an international legal instrument accepted and ratified by most countries. Many children of primary school age still need a lot of unstructured activity such as running and chasing and playing on the playground. Walking, riding bikes or scooters in the neighbourhood and playing outdoors in your backyard or local park can also be part of everyday physical activity. Yet school-age kids are often interested in helping with physical tasks such as gardening or car washing (Gunner, et al., 2005). Such kinds of unstructured activities can be more affordable and simpler than organised activities and sports to integrate into busy family life. These activities will all add up to giving a child a more active lifestyle.

Overweight and obesity are described as anomalous or excessive accumulation of fat which poses a health risk. Overweight children spend far more sedentary time compared with healthy children. It was also noted that obese children had the highest number of sedentary bouts during the weekdays rather than the weekends (Wafa, Hamzaid, & Talib, 2014). The same study also stated that body mass index (BMI)-for-age Z-score, body fat percentage, and waist circumference were negatively associated with physical activity questionnaire scores and pedometer move counts (Lee, Wong, & Shanita, 2015).

The term setting refers to the location in which physical activity takes place. For an adult, the setting may differ from the children. Children spent most of their time at school.

Not including after-school programme, most children spend about six hours per day from 7 am – 1 pm in school which is fewer in lower grades and more in higher ones. Children also had to go to school 5 times a week. Thus schools are considered a unique setting for physical programming.

School is a suitable setting for programme of intervention that aim to promote physical activity for health benefit. Physical education and school playtime provide regular opportunities for children to engage in physical activity during the school day. However, there is growing concern that the curricular time allocated to physical education is not meeting statutory guidelines.

Setting can have a significant impact on whether an individual is physically active. How comfortable a person feels in a specific setting and how convenient that settings may also affect whether that person engages in an activity. Physical education and school playtime provide children with daily opportunities to engage in physical activity during the school day. Nevertheless, there is growing concern that the curricular time allocated to physical education is not meeting legislative requirements globally. The playground environment's success in encouraging physical activity has been seen as a supplementary setting to physical education.

In recent years there has been considerable interest in determining levels of physical activity among paediatric populations. Research suggests that an active childhood lifestyle reduces the risk of later years of health problems (Patrick, Sallis, & Kevin, 1994). The association between child physical activity and health is weak compared with stronger adult health and physical activity relationships (Riddoch & Boreham, 2000).

The United States Department of Health and Human Services recommends that children and adolescents between the ages of 6 and 17 perform 60 minutes (1 hour) or

more of moderate to intense physical activity every day (US Department of Health and Human Services, 2018). For children and adolescents, regular physical activity encourages health and fitness. The physically active youth have higher levels of fitness, lower body weight, and stronger bones and muscles relative to those who are inactive. Physical activity also has brain health benefits for children of school age, including better memory and decreased depression symptoms

An Australian parenting website, also recommend Children aged 5-18 should do moderate to intense physical activity for at least one hour each day and at least three days a week, this should include activities that strengthen muscles and bones (Australian Government Department of Health, 2018). Moderate physical activity gets your child gently huffing and puffing. Moderate activities are about as intense as a quick walk. Vigorous physical activity gets a lot of huffing and puffing and sweating from your kids. This could be fast running games or riding a bike.

Based on these two studies, for health benefits, children aged 5-12 years should accumulate at least 60 minutes of moderate to vigorous-intensity physical activity every day. Moderate to vigorous-intensity physical activity every day. Children's physical activity should include a variety of aerobic activities, including some vigorous-intensity activity. On at least three days per week, children should engage in activities that strengthen muscle and bone. To achieve additional health benefits, children should engage in more activity for up to several hours per day.

1.2 Problem Statement

Given the widely recognized value of the physical activity, physical inactivity among schoolchildren is still a pervasive problem. Across all 34 countries participating in the Global School-based Student Health Survey (GSHS) (2012), only 23.8% of boys and 15.4% of girls met recommendations to be physically active for at least 60 minutes daily. In Malaysia, the same GSHS data depicts a worrying pattern of only 15.3% girls and 30.2% boys aged 13 to 17 years meeting physical activity recommendations, whereas more than 48.5% girls and 46.4% boys reported spending more than 3 hours a day in sedentary activities. Low levels of physical activity have been identified in both healthy and obese Malaysian children. A recent study revealed that Malaysian children recorded low physical activity level and high sedentary behaviour, spending an average of 6.7 hours (standard error 0.1) daily in sedentary activities (Wong, Parikh, Poh, & Deurenberg ,2016). Moreover, only 15% of children achieved the recommended pedometer count of 13 000 steps per day for boys and 11 000 steps for girls, signifying that a high proportion of schoolchildren were physically inactive.

Children and teens spend about four hours a week at homework and about 32.5 hours a week attending school (Swanbrow, 2004). The study also found that today's children and teens spend more than 14 hours a week watching television and 2.75 hours a week using home computers which increase the sedentary lifestyles. Children and adolescent also spend less than two hours a week on average on sports and outdoor activities, while they spend most of their time on sedentary activities including television, home computers, reading and just doing nothing.

An increase in time spent at school make the physical activity of the children decrease. A decrease in physical activity can bring harm to children such as obesity and

cardiovascular disease. Children nowadays are more focused on academic compared to the sport which makes them more prone to sedentary lifestyles. Parents also insisted on sending their children to religious schools in the afternoon which make their children less physically active because less time to play with their friends (Jafar & Nasbah, 2018).

The prevalence of childhood obesity is increasing rapidly worldwide (WHO, 1998). It is associated with several risk factors for later heart disease and other chronic diseases including hyperlipidaemia, hyperinsulinemia, hypertension and early atherosclerosis (Berenson, et al., 1998). Given its importance to public health, child obesity patterns should be closely monitored. However, patterns are difficult to measure or compare locally and internationally, since a broad range of child obesity definitions are in use, and no widely recognized model has yet emerged (Cole, Bellizzi, Flegal, & Dietz, 2000).

Modern children are fatter, less physically fit and less physically active than in the recent past. These secular trends have occurred in many countries, but have been described most clearly in Malaysia. These problems will persist without adherence to the current policies and guidelines.

1.3 Study Objectives

1.3.1 General Objective

To study the outcomes physical activity interventions conducted on children in school-based settings.

1.3.2 Specific Objectives

i. To investigate the physical activity intervention in school based settings that is effective in improving the children physical activity patterns.
ii. To study the improvements of health and mood after physical activity intervention.
iii. To study the relationship of the physical activity interventions and body mass index.

1.4 Research question

i. Does type of physical activity intervention in school based settings affect the physical activity patterns of the children?
ii. Does physical activity interventions affect the health and mood of the children?
iii. Are physical activity intervention in school based settings effective in reducing obesity or overweight?

1.5 Significance of the study

This study will determine which of the physical activity interventions of children in school is successful. The findings of this study will provide new guidelines for students in school to increase their physical activity by doing the physical activity intervention in the school. Hence reduce the risk of being an overweight or obese person. For researchers, this study will help to let them know what is lacking in this area of research to physical activity in children. These data will help school teachers to plan school activity and sports for children.

CHAPTER 2

LITERATURE REVIEW

2.0 Justification

The differences between this studies from others are that this study reviews the physical activity interventions specifically in school-based settings. As we all know children nowadays spent most of their time in school. Thus the physical activity intervention during school time is crucial to be known by researchers.

2.1 Physical activity of children

Physical activity and sedentary activities are key components of lifelong weight control, however, we have limited understanding of the aspects of such behaviours in childhood. In one of the research, it is found that children do not voluntarily engage in sustained periods of constant intensity physical activity (McManus A. M., 2007). More recent evidence has shown that bouts of the movement were shorter and less intense in overweight compared to lean boys (Stone, Rowlands, & Eston, 2009). Evidence from spontaneous walking in adults has also shown that the length of each walk has resulted in obese adults walking about 2 hours per day less than the lean, which is equal to about 3.5 miles per day. (Levine, et al., 2008). In the same study, participants were overfed for 8 weeks resulting in weight gain and a decrease in the distance walked per day in the obese, indicating a mechanistic correlation between obesity, weight control and spontaneous physical activity. Thus it is proven that obese people engage in fewer activity bouts and takes longer rest intervals between bouts, both during the weekdays and weekends.

An important strategy for achieving a healthier body composition is to encourage the participation of physical activity in overweight and obese children throughout their lives (WHO, 2004). The evaluation of physical activity habits is therefore particularly important, as the physical activity in childhood may be central to the development of a physically active lifestyle (Twisk, Kemper, Mechelen, & Post, 1997) and it is of interest to improve our understanding of the variation in physical activity behaviour.

Another study found that both normal-weight and overweight/obese children and adolescents followed similar daily activity patterns (McManus, Chu, Yu, & Hu, 2010). For children, the 8 hour seems to be a time when normal-weight boys are considerably more active on weekdays than overweight/obese kids. All children of normal weight and children of overweight had three levels of physical activity, which coincided with morning school trips and extracurricular activities. During weekdays, these periods were the key times when children were most active. At the weekend, activity patterns were less apparent, in the evening it seemed to be a time when normal-weight boys were substantially more active than overweight boys on weekend days.

A previous study in children have shown both overweight or obese and normal-weight children have generally higher levels of activity during school hours compared with evenings, suggesting that the home environment is closely associated with reduced levels of physical activity. This supports the use of family-based interventions to increase physical activity in obese children (Page, Cooper, & Stamatakis, 2005).

Another study found that males are generally more active than females, and physical activity is lower in successive age groups (Patrick, Sallis, & Kevin, 1994). Children ages 6 to 11 year fare slightly better, obtaining 16 and 10 min per day of vigorous activity for boys and girls, respectively. If moderate and vigorous activities are combined,

the values change, but the patterns are similar. Children engaged in more than 1 hour per day of at least moderate-intensity physical activity as measured by the accelerometer (Troiano, et al., 2004). Some study also revealed significant differences in overall physical activity as well as in the domains of physical activity of Malaysian primary school children by sex, age group, and ethnicity (Wong, Parikh, Poh, & Deurenberg, 2016). Girls were generally less active than boys, older children were less active than their younger counterparts and among all the ethnicities, Chinese children were found to be the least active. These findings suggest that strategic efforts and programme should focus on promoting physical activity in all domains among primary school-aged children in Malaysia.

The few school-based studies that have been published in the literature indicate that many factors influence children's levels of physical activity during playtime (Ridgers, stratton, & Fairclough, 2006). Sex, age, prompts obtained, seasons, equipment provision, playground room, playtime length, and training are all factors to be considered. However, no studies have yet taken into account the cumulative effects of any of these variables. Although such research would be difficult to perform, those who attempted them would have a greater understanding of the factors that affect children's physical activity. Physical activity advocates will be able to identify the most successful ways to stimulate activity during the school day and maximise playtime using these complex study designs. It is necessary to develop more successful evidence-based and school-based approaches aimed at increasing children's physical activity during playtime.

This topic has been the focus of some previous research. Since some of the studies are based on data from a single geographic area, it is possible that the location of living has no discernible effect on physical health in 12-year-old Greek schoolchildren. (Tsimeas, Tsiokanos, Koutedakis, Tsigilis, & Kellis, Does living in urban or rural settings

affect aspects of physical fitness in children? An allometric approach, 2005). More research involving allometric scaling is needed to investigate aspects of health and fitness in paediatric populations from various countries.

Major variations in total physical activity as well as physical activity domains among Malaysian primary school children were discovered in some studies by sex, age group, and ethnicity. (Wong, Parikh, Poh, & Deurenberg, Physical Activity of Malaysian Primary School Children: Comparison by Sociodemographic Variables and Activity Domains, 2016). Girls were found to be less active than boys, older children were found to be less active than younger children, and Chinese children were found to be the least active of all ethnic groups. These results indicate that Malaysian primary school-aged children should be motivated to participate in physical exercise across all realms by strategic efforts and programmes.

A research performed in China, which is close to this study, reveals that Chinese children participate in a lot of low-intensity, short-duration play. (McManus, Chu, Yu, & Hu, How Children Move: Activity Pattern Characteristics in Lean and Obese Chinese Children, 2010). Small lifestyle changes are likely to have a significant effect on activity pattern characteristics, and determining the biological and environmental (both physical and sociocultural) antecedents of this action pattern is a crucial next step. During the school day and at home, the obese kid engages in exercise bouts and takes longer break periods between bouts.

2.2 School-based settings

Recognising that physical activity and fitness decline for females during early teen years and for males during the later teen years, attention to these transitions period is

critical. There is a need to prepare the children for the transition to adolescent roles and environments in which there is less structure for physical activity. Nevertheless, school remain the best setting for reaching children because physical education, health curriculum and school environmental components make it possible to reach most children.

The setting refers to the location or type of environment in which something is placed or where an occurrence occurs. Setting plays an important part in deciding a person's physical activity pattern. School setting means in the school, on school grounds, in school vehicles, or at any sponsored activity supervised or sanctioned by the school. Since school is children second home, it is a good place to do a study on them. The majority of a child's time is spent in school, which may limit their everyday physical activities. Physical education and curricular classes were insufficient for children to achieve the recommended levels of physical activity.

Children spend roughly half of their waking hours at school from the ages of 5 to 18 (Dobbins, Husson, DeCorby, & LaRocca ,2013). Because of this, schools are in a unique position to influence health. School-based interventions can help students, parents, teachers and administrators prevent diseases by providing programs, policies and environments that support healthy lifestyles. Schools are also useful resources for increasing physical activity. School-based interventions must be certain to provide adequate resources and support to teachers, administrators and staff.

The setting affects a person's willingness to participate in an interaction. The setting will have a big effect on whether or not someone is physically involved. Because of the near-universal attendance of school children and the potential to affect children's behaviours that track into puberty and adulthood, school-based interventions for primary

school pupils are also a major outlet for behavioural improvement (Kelder, Perry, Lytle, & Klepp, 1995). School-based programme for elementary school students also a significant avenue for behavioural change due to the near-universal participation of school children and the ability to influence children's habits that track into adolescence and adulthood (Lytle, Kelder, Perry, & Klepp, 1995).

Physical education is taught twice a week in most Malaysian schools, with each session lasting 40 minutes, as mandated by the Ministry of Education. This may have met the minimum time and frequency requirements, but the allotted time was insufficient to complete the overall training stimulus needed to improve cardiovascular fitness, as shown by the test group of males and females (Rengasamy, Raju, Akina, Lee, & Roa, 2014). The time length is also insufficient in comparison to the United States Department of Health and Human Services (1996) physical activity recommendation of at least 30 minutes of moderate physical activity on most days of the week. Intervention programme within physical education classes are effective in improving cardiovascular endurance and flexibility due primarily to the increased duration of physical activity. Physical educators and curriculum designers are highly urged to integrate intervention services into daily physical education because it is assumed that raising the physical activity level is sufficient to enhance selected cardiovascular endurance among Malaysian school students is important. (Rengasamy, Raju, Akina, Lee, & Roa, 2014).

There is some evidence that school-based physical activity programe are successful in increasing physical activity from 5 minutes to 45 minutes more per day, reducing the time spent watching television from 5 minutes to 60 minutes less per day and improving the average oxygen consumption or aerobic capacity, representing an individual's physical fitness level. The evidence also indicates that children exposed to school-based physical activity are about three times more likely than those not subjected

to moderate to intense physical activity during the school day (Dobbins, Husson, DeCorby, & LaRocca, 2013). The evidence suggests the ongoing implementation of school-based physical activity interventions at this time, given the positive effects on behaviour and one physical health status measure. Therefore school is an important setting in developing a better health community.

2.3 Physical activity intervention on School-Based Settings intervention in Southeast Asia

The limited school-based investigations that have been reported in the literature suggest that many factors affect children's physical activity levels during playtime (Ridgers, Stratton, & Fairclough, 2006). These factors include sex, age, prompts received, seasons, equipment provision playground space, playtime duration and training. However, no studies to date have considered the impact of all these factors together. Whilst such studies would be complex, investigations that attempt such designs would provide a clearer understanding of the factors that contribute towards children's physical activity during playtime. These complex research designs would further enable physical activity promoters to detect the most effective approaches to stimulating activity during school increase playtime. More effective evidence- and school-based interventions, which aim to increase children's physically active play during playtime, are required.

Interventions that used this approach modified curricula and policies to increase the number of time students spend in moderate or vigorous activity while in PE classes. This can be done in a variety of ways, including (1) adding new (or additional) PE classes, (2) lengthening existing PE classes, or (3) increasing moderate to vigorous physical activity (MVPA) of students during PE class without necessarily lengthening class time.

Examples of the last approach include changing the activities taught (e.g., substituting soccer for softball) or modifying the rules of the game so that students are more active (e.g., having the entire team run the bases together if the batter makes a hit). Many of these interventions also included the presentation of information on cardiovascular disease prevention, rendering it difficult to separate the effects of health education and modified PE.

Policy makers in Southeast Asia has sought to improve children's physical education through numerous initiatives. In Malaysia, governmentis still academic centric and lack of initiatives to improves children physical activity. Malaysian children are not physically healthy enough to enjoy the health effects of daily physical exercise, opting instead to maintain a sedentary lifestyle. Additionally, people who were physically inactive as children are more likely to be inactive as adults.

In the study conducted in Singapore, two types of intervention, exergaming and persuasive health messages were used to encompass both behavioural and cognitive intervention. Exergame refers to the use of video game consoles to exercise by monitoring a person's movement and response. The exergaming of physical education classes increased children's interest in completing physical tasks, which resulted in enhanced self-efficacy, behaviours, and perceived behavioural regulation (Lwin & Malik, 2013). Furthermore, recent studies on the efficacy of coping-framed signals in shaping physical activity beliefs have been confirmed by the cognitive approach that incorporates the philosophy of expected behaviour. (Graham, et al., 2006)

In Thailand, the Bright and Healthy Thai Kid Project was initiated from May 2004 until January 2005 in which a participatory action initiative was used that involved teachers, parents and students to promote health (Sirikulchayanonta, Ratanopas,

Temcharoen, & Srisorrachatr, 2011). The total number of students studied was 5126 from 4 Bangkok schools. The project was integrated into the regular course curriculum and was delivered by the teachers who were given prior knowledge via workshop. In the workshop, teachers were given lessons in causes and consequences of childhood obesity, child nutritional assessment, eating right, exercise and health as well as weight management. An interesting finding before the intervention was the fact that Thai mothers did not perceive their child's overweight status to be an issue, rather, they believed it to be healthy (Sirikulchayanonta, Ratanopas, Temcharoen, & Srisorrachatr, 2011). Also, parents had a more positive social attitude about eating due to fast food advertisements, which had high contents of fat and low fibre. The study intervention helped reduce the high-caloric dietary intake significantly in both the obese and normal groups. Light-intensity exercise in the form of walking up the stairs showed a significant percentage increase for the normal group while the obese group also increased. Aerobic exercises such as fast walking, running and aerobic dance all showed a significant percentage decrease in obesity after the intervention. The schools shared similar demographics for gender, the number of students and family socioeconomic status, parental support and school environment.

Taken together, regular and quality physical education, recess, and physical activity in the classroom setting enable students to be more physically active during school hours and significantly contribute to recommended levels of vigorous- or moderate-intensity physical activity. Opportunities exist for increasing physical activity outside of normal school hours, including active transport to and from school and active after-school and sports programs. These programmatic efforts can further contribute to the daily recommended levels of vigorous or moderate-intensity physical activity among students for whom such programs are available and accessible in the school setting.

Schools can be rich resources for joint-use agreements that facilitate physical activity programming for students in their community outside of school time. Research is limited on the effectiveness of physical education, recess, classroom physical activity, and before- and after-school programs across subgroups based on race/ethnicity and immigrant and socioeconomic status. Additional research is needed to document any differential effects of these approaches among these subgroups. Even though sufficient evidence exists to support augmenting student physical activity during school hours and at school-related after-school activities, important questions remain about tailoring interventions to fit the wide social and physical variations among schools.

2.4 Findings of the intervention.

The study reported that poor self-regulation in early childhood may predispose children to excessive weight gain through early adolescence. This was supported by another study that comprehensive efforts to prevent youth risk for obesity should include target self-regulation and decision-making skills. It is recommended that both parents and teachers participate in the guidance of school children about self-discipline in eating habits, money management and time management (Gunner, et al., 2005). A supportive environment conducive to healthy eating and physical activity both in the school and at home should be encouraged.

There is some evidence that school-based physical activity services are effective in increasing physical activity from 5 to 45 minutes a day, decreasing time spent viewing television from 5 to 60 minutes a day, and enhancing overall oxygen intake or aerobic ability, which represents an individual's level of physical health. Children who participate in school-based physical exercise are three times more likely than those who do not

participate in mild to extreme physical activity during the school day, according to the evidence (Dobbins, Husson, DeCorby, & LaRocca, 2013) Given the beneficial impact on attitudes and one physical health status metric, the research indicates that school-based physical activity programmes should be continued at this time. As a result, schools are a significant environment for more study in the development of a sustainable society.

Classroom-based physical activity programmes have gotten a lot of attention because of the changes in academic performance, student conduct, and attitude toward physical activity. (Mullender-Wijnsma, et al., 2015). The current evidence suggests that school-based physical activity programmes are a good way to improve wellness and academic performance. There are also beneficial outcomes in terms of brain development, pupil concentration, and improved physical activity (PA) in school environments. (Reis et al., 2016).

Findings imply that playing exergames during PE lessons can help to boost children's confidence in performing physical activities, and in turn lead to more positive physical activity-related self-efficacy and attitudes (Gao et al., 2016). In the current study, when children were exposed to coping-framed health messages, the inclusion of exergaming into their PE lesson was equally effective as the activities in the regular PE curriculum in influencing children's physical activity beliefs. These messages were also more effective than threat-framed messages among children who took part in regular PE lessons.

PA interventions have received considerable attention due to improvements seen in academic achievement, classroom behaviours, and attitude toward PA (Mullender-Wijnsma et al., 2015). Present literature support school-based PA interventions as an effective strategy for improving health outcomes and academic achievement. Positive

effects are also noted in terms of brain function, maintaining student attention, and increased PA in school settings (Reis et al., 2016).

CHAPTER 3

METHODOLOGY

3.1 DATA SOURCES.

Related studies were searched electronically using the following databases: Ebscohost, Springer Link, proquest and Science Direct. Briefly, the selected studies were hand-searched using the same selection criteria which is the title must contain physical activity pattern of children, school and accelerometer. Also, cross referencing on the related previously published study was performed to obtain additional information. No attempts were made to contact the authors for additional information. Comparable searches were made for the other databases.

3.2 INCLUSION CRITERIA

Studies were included in this scoping review if they: (1) targeted boy and girl children, age 7-18 years old; (2) reported physical activity, physical inactivity, and/or sedentary behaviour; (3) were written in the Malaysian and/ or English language, and (4) were published as a journal article, conference proceeding, thesis at Master or Doctoral level in full or abstract form, or report. Any research designs were eligible for inclusion. Studies were excluded if: (1) they targeted adults populations, (2) they focused on sports performance and/or coaching (3) they were published as literature reviews, (4) they did not provide clear information about the age or the school level of the participants, or (5) a full text was not available, except for student theses.

3.3 STUDY SELECTION

The search was conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. The following keywords were used during the search: Physical activity patterns and school-based settings. Studies were screened for employing children as subjects, and physical activity pattern in school as outcome measures.

453 records were searched in ebscohost, springer link, science direct and proquest Hamzah Sendut Library and were screened for eligibility, and an additional 2 eligible papers were identified via screening of the references lists of reviews identified by cross referencing. As shown in figure 1, after the full-text screening, a total of 21 studies met the inclusion criteria and were included in the current scoping review.

3.4 DATA EXTRACTION

The titles and abstracts of retrieved articles were reviewed using the criteria specified to determine whether full-texts were required for further analysis. Each full-text manuscript was evaluated systematically according to the study: (1) objectives, (2) characteristics of the study (study design, participants, age and sample size), (3) contents of the experimental study (4) targeted outcomes, and (5) main findings. The outcomes extracted from those studies were not combined, reanalysed or changed due to the nature of this scoping review.

CHAPTER 4

RESULTS

4.1 SEARCH RESULTS

The initial search from the databases identified 453 potential articles while 2 were found through cross-referencing. After removing duplicates, 397 articles were assessed based on titles and abstracts against the selection criteria. A total of 367 articles were excluded because they did not investigate the physical activity pattern of the children in school and does not fulfilled the inclusion/exclusion criteria.

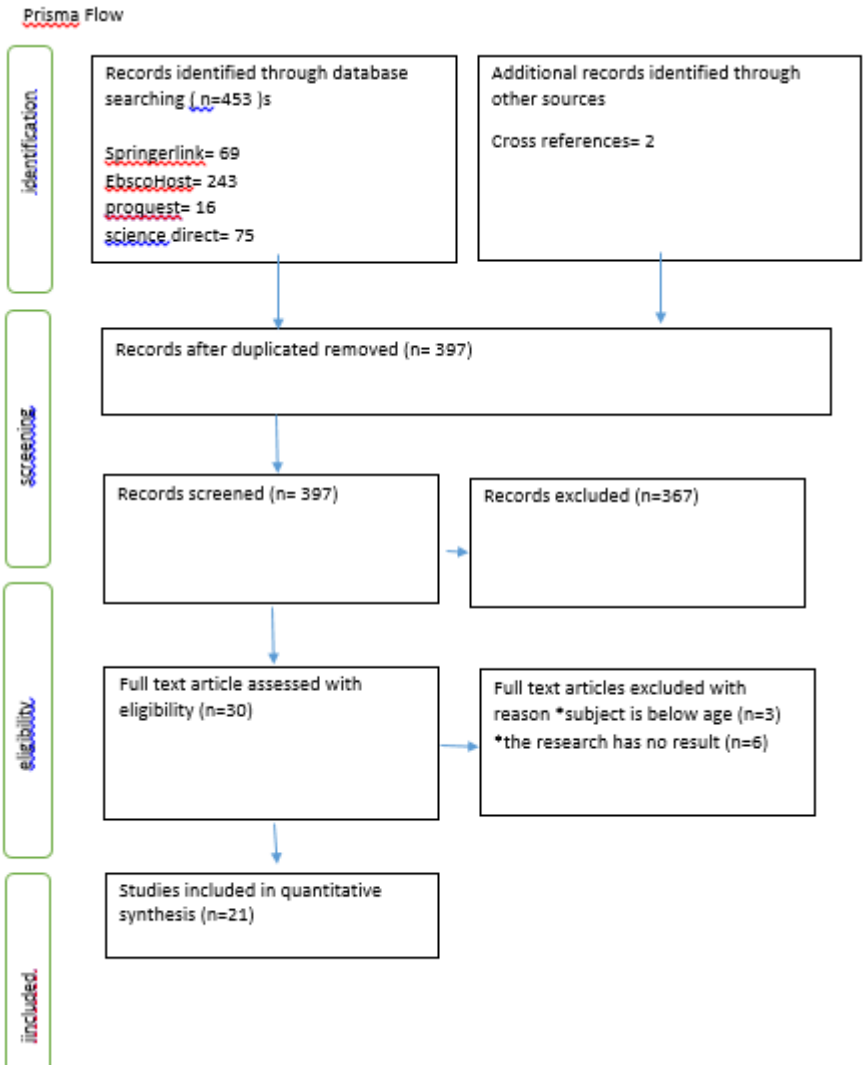

figure 1

Figure 1 shows the Prisma flow for the study selection