

Development of High Intensity Interval Training Activity Module in Physical Education: A Need Analysis among Primary School Teachers

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Abstract Physical education (PE) subject is an important component in the national curriculum in Malaysia to produce a healthy and fit young generation. Active involvement in physical activity and exercise can improve cognitive function and aerobic capacity of children. In regards to that, High Intensity Interval Training (HIIT) is an alternative training protocol to improve body physiological function, fitness performance and health. Furthermore, HIIT has recently attracted significant research attention in a wide range of population lately. The objective of this study is to investigate the need of High Intensity Interval Training (HIIT) in the implementation of PE activities. The survey study through a questionnaire involved a total of 220 primary school PE teachers who were selected by purposive sampling technique. The questionnaire was divided into two parts, part A consists of information and background of the respondents, part B is about the development of HIIT activity module implementation in PE. Data were analyzed descriptively. This study showed that 86.8 percent of teachers agree that there is a need to develop HIIT module for PE subject as an initiation of HIIT activities in PE to ensure the practice of HIIT activities in long term among young minds. The implications of this study suggested that teachers pay attention to the need to develop HIIT module as an alternative training program that increases physical fitness among kids. Therefore, this study is expected to provide a basic overview of the need to develop a HIIT module to be practiced in PE class as the implementation of

HIIT improves aerobic fitness optimally in a shorter time period.

Keywords Physical Education (PE), Physical Education Class, High Intensity Interval Training (HIIT)

1. Introduction

Physical education (PE) is planned in the country's formal education system to develop healthy lifestyle habits among students through active involvement in physical, sports, recreational and social activities (Education Act 1996, Ministry of Education). In order to achieve the status of a developed country, Malaysia does not only require a high quality curriculum to create human capital with noble knowledge, skills and personality, but also healthy and active human capital ensures the country's productivity maintaining competitive internationally (Education Policy Planning And Research Division, 2006). This comprehensive approach in PE programme should be applied to all students from childhood to adolescence [1], [2]. PE subject focuses on the development of psychomotor, cognitive, affective, and physical domains. Hence, to achieve these goals, an effective and holistic PE subject programme must be implemented in schools [3], [2].

However, PE curriculum will not produce the expected results if the implementation process lacks due attention

from teachers, schools and parents [4]. Therefore, this research examines and discusses the implementation aspects as well as suggestions to overcome and improve the effectiveness of the implementation of PE activities in primary schools. Urban lifestyle has been rooting to unhealthy habits cum health issues as we are having insufficient time to carry out physical activities. The problem of time constraints is one of the common reasons given by society for not engaging in sports and physical activities [5]. PE is a subject where students are exposed to sports, fitness skills and also explore new physical activities in outdoors [6]. PE failed to achieve the minimum level of moderate to high intensity physical activity [7], [8]. HIIT is an alternative training protocol to improve body physiological function, fitness performance and health [9], [10], [11]. In general, there are two categories of HIIT training which has been categorised as resistance HIIT training and aerobic HIIT training. The HIIT activity of 15 minutes with rest intervals can improve fitness and health and would be the safest activity that involves children as it's suitable to carry out in school level (Chandler, 2020). It's highly recommended the implementation of HIIT activities in PE to improve aerobic fitness optimally in shorter time of period [12], [13].

In recent time, obesity has been increasing among Malaysians. Statistics show that 50.1 percent of adults in Malaysia are overweight or obese (NHMS 2019). This is due to an inactive (sedentary) lifestyle since childhood. The increase in obesity among primary school students can be resolved with the implementation of HIIT activities in PE [14], [15], [16]. HIIT activities with short training time periods are a very efficient exercise protocol for heart [17]. Moreover, HIIT training is suitable to be implemented and integrated in PE in schools to increase the fitness level of students ensuring activeness of lifetime [14]. HIIT activities interspersed with adequate rest create fun opportunities for students to actively engage in lifelong physical activity [18]. HIIT is an alternative aerobic exercise which can improve cognitive function and physical health [19], [20]. Manipulating the intensity of aerobic exercise has proven to have a positive effect on executive brain functions [21], [22]. HIIT training comes in various forms and one of the most effective methods in improving cardiovascular and metabolic functions, and hence, improves the physical performance of an athlete [23]. Indeed, HIIT physical training is required in a short period of time to improve fitness performance [21],[24],[25].

A module is a complete teaching unit which is used to achieve the stated learning outcomes to enable a student to master the content of a subject very well [26]. Rusell's view, (1979) is in line with [27], roots its use in a systematic manner enabling students in mastering a unit of study. Indeed, modules provide teachers with a logical and systematic framework in organizing learning activities. Furthermore, modules have been recognized as useful tools in the process of teaching and learning which can increase

students' motivation and interest of learning that results in their achievement in PE [28].

1.1. Research Problems

In Malaysia, PE is a compulsory subject taught from preschool to form five. Every lesson of PE runs for 30 minutes, twice a week on alternate days of the week (Ministry of Education Malaysia, 2016). The Physical Education content is divided into 25% fitness and 75% skills. According to [29], various interesting training methods need to be devised to improve fitness and motivation. Subsequently, lack of PE facilities and equipment in schools as well as the teaching methods implemented are less attractive [30]. In case the problem of lack of play area facilities and equipment prolong, it is certainly difficult for PE teachers to teach effectively. Rural schools face the same issue which is lack of play area facilities and equipment which makes it difficult to implement PE [31]. HIIT is a type of high intensity training performed intermittently with short breaks. The advantage of HIIT lies in the ability to challenge anaerobic and aerobic endurance. HIIT activities with short training time periods are very efficient exercise protocol for cardio health (Ito, 2019). PE is a very suitable learning pace to introduce and promote HIIT activities among school children [32].

1.2. Research Objective

To achieve this goal, specific objective is set in this study:

Identify the need of implementation High Intensity Interval Training activities in Physical Education.

2. Methodology

2.1. Participants

Researcher carries out a survey study in which data was only taken for once from a study sample over a period of time which provides a clear picture as in whole [33]. The sample of this study consisted of 220 primary PE teachers selected through purposive sampling technique. Therefore, the researcher has selected specifically primary school PE teachers from Peninsular Malaysia and the questionnaire was sent out as Google Form via email and messenger.

2.2. Instrument

Questionnaires constructed by the researcher were used as the instrument of this study considering the need for flexibility time to answer the questionnaire among the study respondents. According to [34], it has also suggested that data needs analysis that can be done through survey method by using questionnaires to examine a problem and

challenges faced by teachers and students in planning the improvement on teaching and learning. A questionnaire instrument was used to obtain data in the required analysis phase related to the objectives of the study. The questionnaire is divided into two parts, part A consists of information and background of the respondents such as age, gender and working experience, part B is about the development of HIIT activity implementation in PE. Part B consists of four questions relating to the perception of teachers and three questions relating to the importance of HIIT activities in PE. That includes time allocation for PE activities, proposing PE activities, insufficient facilities for PE activities, integration of PE activity techniques on implementation, mapping out PE activities with shorter time frame, initiation of HIIT activity module in PE. Data of Part B was analyzed using percentage, mean and standard deviation. All questions were categorised into five groups based on the Likert Scale, in which 1 (strongly disagree), 2 (disagree), 3 (disagree), 4 (agree) and 5 (strongly agree) according to [35]. This instrument is in the form of a questionnaire consisting of 7 questions. The content validity of this questionnaire was adapted and modified from the module content validity questionnaire [34]. There were three experts in Physical Education has been chosen to identify the validity of the questionnaire. The results of analysis showed that the validity of questionnaire is 93% of the experts agreed. Therefore, the questionnaire perceives a high validity to find the need of teachers on HIIT in physical education.

2.3. Data Analysis

The findings of the questionnaire in this study were

analysed descriptively using IBM SPSS computing software version 26 Statistics.

3. Results

Table 2 discusses Part B which is the importance of HIIT module for PE teachers in terms of percentage. There are seven questions in the section related to the requirements of the HIIT module for PE teachers. This analysis shows that teachers do need HIIT module for PE and 86.8 percent out of 220 PE teachers agree that there is a need to develop HIIT module for PE subject. This is because PE time allocation for each session is insufficient to perform physical activities that improve students' fitness level is 81.7%. Meanwhile, physical activities or games planned by PE teachers based on PE textbooks during PE session do not improve aerobic fitness levels optimally among school students (80.0%). In addition, 84.1 percent indicated that sports facilities and equipment in schools were not enough to conduct PE sessions well, which caused the effectiveness of PE session affected. 81.8 percent of teachers presume that the integration of easier, effective and fun physical activities in PE should be implemented to improve the fitness level of students. 82.1 percent of PE teachers need an integration of physical training of a shorter period of time to be planned and developed to improve the fitness level of students during PE session. As a result, 88.4 percent of PE teachers affirmed importance of the introduction and integration of HIIT in PE class at primary school.

Table 1. Demographics of study participants in the form of mean and standard deviation

	N	Mean	Std. Deviation
Age	220	31.9682	7.56910
Experience	220	11.9817	7.80344

Table 2. High Intensity Interval Training module requirements for Physical Education teachers

Item	Percentage	Mean	SD	Level
In your opinion, 30 minutes of PE class according to the weightage of 30% on the fitness aspect is not enough to increase fitness level of students.	81.7% Yes	4.09	.90	Very high
Physical activities or games planned by PE teachers based on PE textbooks during PE lesson do not increase the level of aerobic fitness optimally among school children?	80.0% Yes	4.00	.87	Very high
The sports facilities and equipments in the school are not enough to run the PE sessions consistently	84.1% Yes	4.20	.89	Very high
Integration which is easier, more effective and fun physical activities in PE needs to be implemented to increase the fitness level of primary school students.	81.8% Yes	4.09	.90	Very high
Integration of shorter period time of physical activities needs to be planned and developed which increases the fitness level of students during PE lesson.	82.1% Yes	4.10	.89	Very high
The introduction and integration of high intensity physical activities in primary school is important.	82.4% Yes	4.12	.91	Very high

Overall, the mean scores for all questions were very high. The findings of the study prove that there is a need to develop a HIIT module for PE subject which recorded the highest score ($M = 4.34$; $SP = .92$). Time allocation for PE session is insufficient to perform physical activities to improve the fitness level of students ($M = 4.09$; $SP = .90$). Physical activities or games planned by PE teachers based on PE textbooks during PE class did not increase the level of aerobic fitness optimally among school children ($M = 4.09$; $SP = .90$). Moreover, sports facilities and equipment in schools were not sufficient to conduct PE sessions ($M = 4.20$; $SP = .89$). Additionally, PE teachers think that there is a need for the integration of physical training that is easier, effective and fun in PE should be implemented to improve the fitness level of primary school students ($M = 4.09$; $SP = .90$). Findings of this study shows that there is a need to integrate physical training of shorter time periods to be planned and developed to improve the fitness level of students during PE ($M = 4.10$; $SP = .89$). The introduction and integration of HIIT in the PE at the primary school is important ($M = 4.12$; $SP = .91$).

4. Discussions

Findings of this study manifest that there is a need in the development of HIIT modules in PE as a reference to the implementation of PE at the primary school in an orderly and systematic manner. PE is an important subject to produce students who are balanced in terms of physical, emotional, spiritual, intellectual and personality. Integration of easier, effective and fun physical activities in PE needs to be implemented to increase the fitness level of primary school students can help students to maintain throughout life in order to remain active [36, 37]. Creativity and various teaching methods have to be adapted to increase the motivation and enjoyment of students to maintain throughout life in order to remain active [29]. Modern physical education classes can use high-intensity physical activity to help students develop training skills that they can use along the run. HIIT training is also more efficient and effective in terms of time use because studies show that HIIT training produces greater improvement compared to traditional endurance training to increase aerobic fitness and maximum oxygen consumption despite using shorter training volume and duration [9]. It is important to find an approach or method of exercise that is easy to practice and uncomplicated to implement that causes a healthy lifestyle among school children [25]. This can be an alternative method for teachers, which improves fitness among school children. Likewise, it also serves as a guide for teachers to encourage students to actively participate in HIIT activities from a young age. Based on this study, PE teachers can run PE class effectively as it is outdoor-friendly and can be done at one's convenience. Other than that, comprehensive assessment development is also important to assess

students' achievement on HIIT during physical education class [36].

5. Conclusions and Recommendations

The implications of this study have suggested that teachers pay attention to the need to develop HIIT module as an alternative training program to increase physical fitness among kids. Therefore, this study is expected to provide a basic overview of the need to develop a HIIT Module to be practiced in PE class. In conclusion, HIIT is a resourceful use of time, sensible tool whereby new and experienced physical educators can include in their PE activities.

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