

Conducting Physical Activity Intervention Afterward School Times: A Meta-analysis

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Abstract

Framework: Students' mainstream doesn't be involved in enough amounts of day by day, health-maximizing bodily exercise. One particular system to raise exercise is only about to endorse this inside the immediately after hours of school. A meta-analysis was carried out briefing the conducted study at this point concerning success of right subsequent school hour's activity for raising bodily exercise.

Procurement of Evidence: Article reviews, journals and database content have been searched for this review paper. The objective of this review paper is to conduct a systematic analysis. Integrated researches possessed subsequent traits: results certain towards immediately afterward school hour's involvement within the school setting; an intervention part created to boost bodily exercise; final result analysed bodily exercise, associated paradigms or else health of body. Examine results were extracted into various areas: "bodily exercise, fitness of body, composition of body, thickness of blood as well as about mental health and also inactive things to do. Within the studies for each pooled domain sizes of effect domain were being computed independently.

Combined Evidence: Inside numerous articles content found, out of 13, 11 distinctive researches describing results for programs right afterward school time intervention being studied. Though bodily exercise remained major element of whole examined involvements, only 8 researches calculated bodily activity. Within the six domains, positive effect sizes have been demonstrated, the effect size of physical exercise was 0.04 for fitness of body was 0.16, for composition of body 0.07 as well as for the thickness of blood it was 0.02.

Conclusions: Minimal evidence indicates that right subsequent hours of school activities programs could boost bodily activity concentrations as well as various body fitness associated factors. Other researches are essential which give higher thoughtfulness to hypothetical reasoning, level of implementation and measures about bodily activity indoors as well as outdoors the involvement.

Keywords: Toendorse; Physical activity; Meta-analysis deliberations

Introduction

Contribution within frequent bodily exercise has several advantages for the health of adolescence, which include favourable outcomes for psychological health as well as a decreased probability for childhood being [1]. Additionally, the function of physical inactivity leads to develop metabolic syndrome in young children is starting to be more and more evident [2]. Even with such predictable associations, the bodily exercise amounts of youth continue to be unacceptably [3]. Greater level of inactivity are endorsed to environments of "activity-toxic", which happen to be the ones that have constrained chance for bodily action, the two inside as well as outside of school and this leads to disadvantage [4]. Because of these factors, corporations such as: the IOM [5] and panel of experts have recognized intervention enhancement designed to enhance the bodily action levels of youth as significant public wellbeing precedence. Important institutions for promoting bodily exercise are schools as well as in recent times, are already identified as on to develop their attempts to boost exercise-relevant options for youth [6]. The overwhelming mainstream of youth attend the school and also schools possess facilities as well as staff needed to promote bodily activity [7] through physical instruction, break time, bodily exercise in classroom, wellness of staff, in-house pursuits, involvement of parents and also collaboration of community. Not remarkably, institutions have developed in to the fundamental argument for involvements intended for increasing bodily movement for adolescents as well as children. In spite of these positive aspects, educational institutions do have constraints; quite possibly the most noticeable are time limitations. Need for institutions on the way to develop educational accomplishment of youngsters followed to lowered amount of time for bodily education, break time, lunch, bodily exercise in classroom, and also other school based factors for physical movement

promotion. Furthermore, while the education of bodily exercise and learning may be the most important type of exercise students obtain within institute, merely trickle for circumstances need every day bodily instruction. Additional, programs related to physical education deliver as much as only 8% to 11% of day-to-day bodily exercise for students [8]. Though physical exercise interventions for the duration of the school day hold great prospective as well as continue being essential, programs right afterward institute hours are developing as likely viable places for promoting bodily exercise. Recent information present that as several as six million adolescence within the U.S. get involved in some kind of physical programs right afterward institute hour additionally "22 Million" family members would be interested in programs conducted afterward school time if obtainable. Programs afterward school time tend not to diminish after the time of school besides may be utilized nutritional addition bodily exercise period for adolescence. Furthermore, such activities provide a protected setting intended for young children to have interaction within such activities as well as it's useful to develop habit of bodily exercise. They might also provide 1/3 of kid's advisable 1 hour of average to energetic bodily action "MVPA." Despite the fact that bodily exercise intervention right afterward school times are becoming familiar as well as new research on this topic is at this time underway. The competence of such kind

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of activities in growing the bodily action ranks of applicants remains uncertain. Objective of such review is to deliver a meta-analysis view of priority published researches inspecting programs targeting students for bodily programs afterward school time. According to an assessment, implications for potential exploration and system implementation are offered.

Acquisition of evidence

Methodical evaluation of researches was directed to find literature centred on endorsing bodily exercise aimed at adolescents as well as children, both like an only interference or else as a unique element of a multiple component intervention such as: “nourishment also bodily exercise”, in school setting right afterward school time. Specified the after-school emphasis of the overview, the research technique besieged 4 crucial factors: setting founded on school, after-school hour’s program, behaviour of bodily exercise as well as design of study (quasi, involvement, or else controlled). The following databases ended up looked for all pertinent articles or blog posts linked to the important elements: *PubMed, Science Direct, and EBSCO host*.

Consequences of program

Data collection for this review was based on outcomes of programs further divided in to six segments those were: bodily exercise, fitness of body, composition of body, blood fatty acid, psychological theories and activities which were sedentary in nature. Counting for activities was based on daily steps, accelerometers as well as activities in which physical movement was involved. Definition of fitness of body was related to cardiac fitness such as different body test and also stability of high and low blood pressure, thickness of bone mineral in other words strength of bone and also strength of muscles. Composition of body related to body fats, thickness of skinfolds and size of waist. Thickness of blood was related to cholesterol level in body. Mental health was further classified into three parts self-efficacy, weigh problem such as dissatisfaction of body as well as depression also self-esteem. Sitting activities in other words known as sedentary activities was related to playing video games, sitting in front of computer and TV for longer hours.

Extracted data

Characteristics of identified analysis as well as appropriate facts and figures were taken out into a standard form. Information which was extracted from each research were based on final evaluation included: name of program or involvement, design of research, evaluation was carried out even based on long term adherence as well as randomization unit such as: classroom, students and school, psychographic characteristics were also extracted such as such as gender, age, located place such as: urban, suburban or rural. Targeted outcomes are also included in data such as activities for health fitness and nutrition. Involved characteristics related to involvement are: school teacher and research staff who carried out involvement. At the end measures and implementation data included. Data included relates to measurement is: types of measures such as objective and self-report, measurement numbers such as pre and post-test. Information included associated with implementation is: follow-up, exposure, delivery quality, diversity in program and responsiveness. In addition outcomes of researches in practice of mean, standard deviation (SD) or standard error (SE) based upon the findings of report. Articles in which statistical information was not reported sufficient related to outcomes of program, constant attempt was made to interact with authors to request the needed information.

The effect size

For the outcome of each study effect sizes of standardize mean difference were calculated. Effect sizes founded on studies focusing on differences in control and treatment, vast numbers of studies up to 85% using similar type of test named as pre-test/post-test of independent groups, effect sizes raw-score metric was also used the focus of this test was examining difference in the outcomes of one group [9]. The steps drawn via Morris and De-Shone were utilized to group different design estimated effect size from various studies such as: pre-test/post-test for independent group, repeated measure for pre-test/post-test for one group in to common metric. In step on design of study was identified, in second step for each design of study effect size was calculated. Studies which reported pre and post-test of independent groups were computed as:

$$ESIG = (M \text{ post, E} - M \text{ pre, E}) / SD \text{ pre, E} - (M \text{ post, C} - M \text{ pre, C}) / SD \text{ pre, C}$$

In above formula C and E used for control as well as experimental sets, correspondingly. Pre-test value was not reported by those studies using pre-test/post-test for independent groups, calculated formula for size of effect for independent group is given as:

$$ESIG = (M \text{ post, E} - M \text{ post, C}) / SD \text{ post, C}$$

Calculated effect size of one research which used repeated measure of pre-test/post-test design for single group was given as:

$$ESRM = (M \text{ post, E} - M \text{ pre, E}) / SD \text{ pre, E}$$

Before the aggregation of effect sizes in to group The Cox Logged OR was computed for those studies in which binary result was reported. For the adjustment small sample size effect size evaluations Hedge’s was utilized (Herman JR, 2006), it is computed by multiplying correction factor and effect size written as:

$$[1 * (3 / \{4N - 9\})]$$

In above formula total size is equal to N. For every study Corresponding 95% CIs and single effect size was calculated for the results six segments bodily exercise, fitness of body, composition of body, blood fatty acid, psychological theories and activities which were sedentary in nature. For the improvement of positive effect size within the group of treatment each effect size was adjusted for overcome differences in the scale’s direction. The purpose of this direction was for ease of interpretative, for the presentation of effect size in similar direction and grouped in and across researches for every domain individually, for researches reporting greater than on results for segments vigorous bodily exercise as well as moderate bodily exercise, immediate effect size was evaluated for presenting the complete effect size for every given domain for every research. The adjusted effect size was evaluated separately for every study which was reporting multiple adherence analysis through utilizing follow-up point of time. Studies in which standard errors (SEs) were stated, standard deviations (SDs) were calculated as:

$$SDs = SE \times \sqrt{n}$$

Findings of one research were reported only from the group of involvement in categories of five dosages [10]. For this research the effect size was computed utilizing lowest involvement of dosage in form of the group of comparison while for remaining group of four dosage only effect size was calculated. The computation was based on hypothesis that the revelation of lowest dosage group imitated natural adjustment examined with in control group. Across all studies effect

size for each polled domain was calculated through weighting the influence of every study by its standard deviations (SDs) as well as size of sample. Random effect inverse variance was used to compute effect size of pooled domains. It is highlighted by model based assumption that all finding of every study was estimating diverse, so far correlated effects of treatment [11]. I-squared was used to compute the entire inconsistency percentage within size of effect because of differentiation. The percentages given to heterogeneity are constructed as 25% to low, 50% to medium as well as 75% to high correspondingly. Evaluation of sensitivity was conducted on domains pool to conclude the impact of outcome of any study on whole effect size by rejecting only one research and the effect size of pooled domain was estimated again. The study of sensitivity permits to analyse the impact of design of study, size of sample and also measure of outcome whether binary or continuous. Due to the small sample size of researches in review, examines characteristics of study under investigation such as: “composition of sample, involvement length and location” linked with treatment in which effect size was not showed.

Combined evidences

To fulfil the initial search total 590 references were reviewed from previous studies through three dimensions of databases. Total 200 articles of candidates were saved after reviewing title of study and abstract of study. Articles of candidate were searched to meet the criteria of inclusion, if they were not as per requirement they were excluded. This procedure brings about 30 articles. Those articles were excluded in which database was almost same, and researchers concluded almost the same outcome. For this review paper 13 distinctive articles were taken out of these articles 7 unique researches were examined [12-18]. In these articles various afterward school time programs for endorsing bodily exercise were estimated. As the concern of this review paper is to explain impact of programs conducted afterward school time based on

bodily exercise, results only linked with activity of body, fitness of body, composition of body were examined. Data related to behaviour of diet was not considered for this review paper, not even information related to involvement of parents.

Features of involvement

All the articles which were reviewed, gave information related to the rise of physical activities as a single strategy as well as more than one strategy to enhance behaviours related to health in children or students (Table 1). In addition, four researches [12,13,16,17] gave information related to combined effect of diet stuff such as: “intake of vegetables and fruits” as well as involvement of bodily activities. One study stated results linked with variations in variable of psychosocial factors associated with bodily exercise such as giving preference to physical activities, issues associated with weight put on such as dissatisfy shape of body and also indicators for psychosocial. This research stated results linked with change in sitting or sedentary behaviour such as “playing video games, watching TV.” Other studies [14,16] stated results linked up with change in composition of body such as “waist size, body fat’s percentage,” fitness of body such as “fitness of cardiac muscles,” health of skeleton such as “mass of bones mineral” or thickness of blood such as “level of cholesterol.” These four researches utilize a Randomized Control Trial (RTC) while the remaining ones using no control or nonrandomized design with pre-test/post-test with or without control group [14,18-20]. Randomized Control Trial (RTC) researches used treatment design named as “two-arm parallel,” in this participants of control group related with physical activities conducted in club afterward school times or else get an education about health which focused on eating healthy foods along physical exercise. Hypothesis of researches which was utilized to monitor development in involvement as well as calculation of results for testing involvement were available in these researches [11,18,20].

Researchers	Research design and Location	Population Targeted	Audience	Description for involvement
Slawta, 2006	Non randomized or no control in 4 elementary Research was held in Ashland OR school	Students ranging between 6 to 12 years	Total: pre population (N) 91 post sample (n) 75 Boys = 41 Girls = 34	3 times in a week, 12 weeks program Bodily exercise was main focus including yoga, training for strength, running laps
Herman, 2006 He did not discussed children control	Pre-test/post-test design with non-randomization Research was held in Stillwater OK	Students of K-8 th class attending programs right afterward school times	Total: population (N) 43 Males = 20 Females = 23	One day in a week only for 90 minutes Focus was on combined effect of vegetables intake and physical activities
Yin and Moore, 2005	Randomized Control Trial (RCT) in 18 schools Research was held in Augusta GA	3 rd grade students belongs to low income class	Sample size was 278 in which: Boys = 128 Girls = 132 9 schools data was collected on pre and post basis	5 days in a week, 8 months program Focus was on aerobic for the fitness of body Sessions were managed by school teachers Discussion about control not available
Weintraub, 2008	Randomized control group and two-arm parallel design was used It was held in northern CA	4 to 5 class children were involved with more than 85 percentile for gender as well as age	Total: population (N) 21 Sample (n) 9 Control group 12	3 days in a week, 4 months program Focus was on utilizing team sports program right afterward school time
Lubans, 2008	Quasi experiment design was used within three secondary schools in Australia	14 to 15 years students	Total: N (population) = 116 Pre sample size = 97 Post sample size = 87	8 weeks are duration for program Focus was on enhancing bodily exercise and reducing sitting behaviour in students Control was only based on planned exercise
Melnyk, 2007	It was based on two phases, in phase one pre-test was done and in phase two randomized control trial was used	Students who were fat or overweight	Total: N = 23 Phase one sample size = 7 out of which 1 was boy and 6 were girls Phase two sample size = 5 in which boy was 0 and girls were 5	9 week program Focus was on health effectiveness
Barbeau, 2007	Randomized Control Trial, It was held in Augusta GA	With the age group between 8 to 12 only black girls were involved	Total: N309 Sample: n118 pre and post Control: n83	Program was for 10 months, 5 days in a week Focus was on reducing accumulated adipose tissue among black girls

Table 1: Description about various researches.

For development of program social cognitive theory was utilized as the foundation of theory along with prototype of proceeds and precede social cognitive theory also used. The estimated average size of sample for post-test of researches was 217.8287.6 with 116 median, range varies from 2137-1044.41. The estimated time span for involvement was about 24-26 weeks with range about 9 weeks. Only [13] study did not mention the time related to involvement. The estimated time devoted to bodily movement was about 125.4-274.5 minutes in a week along with varies range of 42 minutes in a week 400 minutes in a week. In case, the session's number per week was not stated, this was anticipated that schools are offering programs afterward school time 5 days in a week. A study did not state the duration devoted to the afterward school time programs especially for bodily activity.

Involvement effectiveness evidence

There exist total 153 articles related to evidence of involvement which computed effect sizes. Effect size for on article was not calculated due to the not enough in formation within article, continuous attempt was not successful to contact and request author for extra information. In addition, the outcomes associated to the composition of body were excluded because of the analysis of sensitivity, and outcome had a negative impact on effect sizes of pooled domains [12]. In similar article the numeric values seemed to be misstated in the table of document as well as it was linked with negative impact supporting values of pre involvement. Only four researches used the combined effect of bodily exercise, fitness of body, composition of body, blood fatty acid, psychological theories and activities which were sedentary in nature. There was no proof that combined method was greatly effective, hence the outcomes of presented contain all researches, irrespective of components of program. The effect sizes computation for pooled domains. The estimated effect sizes for pooled domains were positive, only psychosocial domain such as: "depression and self-esteem" is indicating negative effect size. Regardless of positive effect size of these domains, factors like psychosocial, bodily activity as well as activities sedentary in nature relates to the lower bounds of CIs 95% were not positive as well as correspondent to zero, these domains signifying no impact from the involvement. Measure for important outcomes of these involvement effect sizes were in the range of small to moderate. The effect size of physical exercise was 0.04, for fitness of body was 0.16, for composition of body 0.07 as well as for the thickness of blood it was 0.02.

The following groups were removed in which the participants were exposed to mediation known as exposure, the degree to which the components of programs were provided as approved manuals of program known as follow-up, interest of implementers, their affectivity and attitude towards program known as delivery quality as well as examine of what things to do that may mimic the condition of treatment were calculated under control. All these researches contain data related to approved or explained involvement's exposure. The session was held on 5 day in per week. Researches also stated participant's rate of attendance at the sessions of programs as well as participant's dropout rate in time span of experience of an involvement.

It is analysed after reviewing different researches only four researches stated attendance of participants with involvement [10,14,19,21]. Within articles, there exist positive correlation between rate of attendance and results of programs associated with the fitness of body, composition of body, signifying that the programs held afterward school times showed positive results. Data related to follow-up the guidelines of programs were stated in these researches [10,14,19,22]. Within these researches the heart rate strength at time of bodily exercise serving involvement

in form of indicator which is involving participants within modest dynamic bodily exercise which is main emphasis about intervention.

In addition two researches explained manuals of program which contain involvement activities in writing or else for an objective to track that an activity related to involvement had been finished [17,23]. Responsiveness of program were stated in to six researches [10,18,19,23,24] within these researches rating criteria through parents, teachers and students for the response enjoyment of program was being used. The outcomes of these researches were positive, which showed that participants were satisfied with the components of program. A research used attendance of participants in form of secondary measure for satisfaction; this research described that only those students attend the program who liked it. Only three researches 34, 36, 37 reported about the differentiation in program while two researches 35, 36 stated about the quality of delivery.

Deliberations

Though the majority of researches conducted to limited time, the outcomes of this review paper recommend that the programs held right afterward school times are more effective in enhancing the levels of bodily exercise, fitness of body, composition of body as well as for the thickness of blood in children as well as in youngsters. The finding of review peruses that setting right afterward school time kind of framework which should include fitness maximizing physical activities could easily endorsed. But, due to the factor of heterogeneity in bodily exercise program, population which is targeted besides with availability of less information related to opportunity of activity, the particular vigorous components of fruitful afterward school time program stay unclear.

Execution and content of program

While insufficient reports of involvements help it become challenging to identify what were the effective components of programs, several thoughts appeared. A component which required further investigation is rate of attendance in other words program's exposure. Within articles limited data recommends that the taking response from the participants impacts high on level of attendance [14]. Researches showed that students who participate in 40% sessions their body fitness enhance in terms of cardiac fitness, muscles fitness and also fitness of bones. The fluctuated rates of attendance are endorsed to other multiple factors like availability of transport, amusement as well as modifying activities of participants. The only factor which linked participants with afterward school time program is transport provision; it should be on to most consideration for the management of program.

Having said that, increasing rate of participants is probably going to be additional elaborate than just supplying conveyance. Enjoyment is also considered as a crucial factor which engages students in bodily exercise. After review, it is examined that little data was given related to different kinds of amusement activities held right afterward school time instead of this information that chosen activities were amusing. In numerous researches selected activities were designed on the base of culture to attract audience as well as to discourse the problem of enjoyment [17,24]. Unluckily, while these researches stated greater levels of amusement but there were not found any significant development in programs related to bodily exercise.

Consequently, amusement and activities based on culture might not be sufficient to enhance levels of activity. It can be contented that, in these researches deficiency in effect sizes just because of the design of research, which might be not according to a group of comparison. For

creating an effect similar to an involvement and reducing the expected as well as measurable effect of an involvement it is important to provide group of comparison with tailored involvement which must contain pursuing elements. In addition, providing consent to be involved in a research is prime factor to highlight responsiveness of those behaviours which are targeted, even at the time of randomized control trial [25]. Apart from those recommended activities by research, appearing in precise activities of control groups in combination with defining the active elements of an involvement is significant; as these reported factors can be a reason for minimizing the effect of null.

Measurement of physical activities

It is important for future researches to give more inclusive valuations related to bodily exercise by including both during and afterward school times program. Only four researches stated computing level of activity intensity at time of program [10,14,20,22]. Though, this calculation was done primarily for the sake to monitor success of suggested activity as well as information was gathered only on the base of subsample of participants. But, for control conditions no parallel measures were gathered. Researches which highlighted the level of activity as a result, they only provided methods associated with activity throughout program [19,20,24,25]. There is no research found which distinct the level of activity done inner as well as outer of program. The absence of quantification related to the levels of activity excludes a valuation amount of activity participants obtaining at time of program as well as at what level the program adds to their levels of activity right afterward school time's activities could contribute up. So far, with no distinct measures of activity inner or outer the program, this stays unclear no matter if adolescence recompense for activity which they performed at time of program through minimizing their level of activities outer.

It is recommended by present studies that adolescence do minimize their level of activity through prolonged durations of absence such as in summer vacations as for that reason they possess low outcomes such as "fitness of cardiac muscles" related to programs at time of return to school. Furthermore, it is difficult to assume that participants who involved in the activities of program or who not involved in the activity program whether they utilize the program which helps in skills development. It is easy to build through recent references that designing of programs based on afterward school time involvement to fight with obesity. The subsequent designs used by different researchers helps in developing and estimating active programs right afterward school time. It is derived from current researches that randomization at school level as well as vast evaluation and also adherence seems to be very important for getting better understanding related to the program involvement effectiveness held right afterward school times.

For any involvement design of program is an important component to consider. It is examined in this review that small data is given related to the development of suitable kind of activities, range of activities, the framework along regular training and also about the perception of school staff related to programs. This evidence is important for additional improving the usefulness of involvements as a way to grasp how these programs were created and employed. Valuable data can only be obtained via on-going evaluation, precisely evaluation based upon process quality.

Concerns like

How frequently is the bodily exercise program being executed? As well as the programs being executed as envisioned? The answers of these questions were not given in many reviewed researches. At the end, this review specifies that those students who attend these programs of

bodily exercise remain more vigorous and also obtain various benefits related to health. The program will not influence you if you remains outer the level of bodily exercise of program. The duration of program in which children remain active is finite. Conversely, it's significant to promote use of bodily exercise program outer a program and also at the time of program this must be assessed. A very productive involvement will effect in adolescence if they will also want to stay energetic outside a program of bodily exercise or the duration in which they are no longer part of bodily exercise program.

Conclusion

Contemplation of issues carried out within this review is that practitioners must allow to design, apply as well as propagate efficacy of afterward school time's activities to encourage bodily exercise among students of each age group. Numerous large scales 16, 17 are presently started that might address the confines of those examined in this review. Over-all, evaluation of literature specifies that bodily exercise activities held right afterward school times promise for enhancing levels of activity of students whether children or adolescence.

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