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# Effect of age-appropriate physical activity program of physical education on selected academic performance variables among school students of Medchal district

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**Abstract**
**Objective:** To examine the Effect of the Age-Appropriate Physical Activity Program of physical education on Selected Academic Performance variables among School Students of Medchal District.
**Method:** A sample of (N=180) subjects was selected by a random sampling method based on age categories. The subject's age ranges from 10 to 16 years. The selected subjects were divided into six groups i.e. three experimental groups 1,2,3 and three control groups 1,2,3 based on the three age categories (category I – 10 to 12 yrs., category II- 12 to 14 yrs. and category III- 14 to 16 yrs. of age) from schools of Medchal district. Twelve weeks of Age-Appropriate Physical Activity Program (AAPAP) of P.E for 30 minutes in the initial 6 weeks and 40 minutes duration of training was given in later 6 weeks. Pre-test and post-test were conducted on selected academic performance variables i.e., GPA. GPA was administered by formative assessment tests. Statistical technique analysed initially was paired sample T-test was used to know the separate results for each age category and later ANCOVA and Bonferroni post hoc test was used in this study to know the combine effects of age categories on GPA.
**Results:** The results of the study indicate that improvement in selected academic performance variables, i.e., GPA, was significantly improved among students of experimental groups when compared to control groups as a result of their participation in an age-appropriate physical activity programs of their respective age categories.

**Keywords:** Age-appropriate, GPA

## Introduction
Physical Education through meaningful Physical exercise is an essential aspect of General Education.
In the modern school system, the Physical Education curriculum plays an important role. Without it, it is impossible to establish all personality facets mentally, socially, and culturally. Most schools offer primary priority to Physical Education. A definite Physical Education curriculum must be formulated at the outset of the session and then carried out successfully in a coordinated fashion. It will offer the students and the teachers an opportunity in Physical Education. Physical Education is now gaining a modern aspect, and its significance is strongly felt when improving the quality of educational programs. A successful physical education curriculum will develop motor and physical skills while enhancing the overall academic experience. Physical education classes can, at times, seem like kids running around willy-nilly, throwing balls, and running in circles. But, if taught correctly, it's so much more. I.e. Physical education provides a physical development component of a student's education to accompany their academic work. Physical education is an integral part of every student's education because it promotes overall development and helps students become fit citizens through physical activities.

## Age-appropriate, Physical activity and Academic performance
### Age-appropriate
It is suitable or right for people of a particular age or age group". – Cambridge dictionary
If children aren't exposed to age-appropriate activities and experiences early on, they will not gain the skills necessary for their present and future development stages.

The physical activities you choose to use in your curriculum should be appropriate for the age and skill level of your class. Ensuring you have these appropriate activities for your class fosters maximum participation. Activities included in your curriculum should be geared toward improving the entirety of a student's physical aptitude and aid his or her development. For example, younger students should have activities that aid complex motor skill development, which some students may still be lacking. This includes activities such as jumping rope, hop-scotch, tag games, dodge ball, etc. All of these activities improve a student's physical fitness while developing basic physical skills like jumping, running, or throwing. Older students, on the other hand, should be involved in more complex games that require social, cooperative, and cognitive skills, in addition to basic motor skills. Team sports such as basketball, kickball, or softball require students to use basic motor skills and think about what they're doing and why. These types of activities are good to include in classes with more physically advanced students. (Physical Education Activities & Curriculum Development - Video & Lesson Transcript | Study.Com, n.d.)

**Relationship between Physical activities, Physical Education and academic performance on children**

It is no secret anymore that appropriate physical activity is necessary to a student's overall well-being. The benefits of physical education in schools are far-reaching, including both increased student physical health and better academic performance. Benefits of PE carry over from the playing grounds into the classroom, leading to better academic performance. Research reveals that children who take part in physical education are better able to regulate their behavior and stay focused in class and achieve better in academics (Marisa Healy (owis) 2022) [2]. A positive relationship between physical fitness and academic achievement has been demonstrated in public school children in the northeastern United States by promoting fitness through increased opportunities for physical activity during physical education. (Chomitz *et al.*, 2009) [3]. According to a study conducted by ahamed, school-based physical activity has no negative impact on children's academic performance. (Ahamed *et al.*, 2007) [4].

**Various commissions on physical education program**

Physical education should be required in all schools beginning in elementary school, according to various commissions, from the Kunzru Committee in 1959 to the national education policy 2020 reports. The physical education curriculum should be restructured and updated to reflect the children's ages and current state for the all-round development of the children.

**Significance of the Study**

Due to the lack of studies in the age appropriate physical activity programs on school physical education curriculum the current study of the age-appropriate Physical Activity of Physical Education Program on selected academic performance variables among school students of Medchal district was conducted.

Thus, this study may effectively develop the student progress in the respective age categories.

**Methodology**

**Selection of the subjects**

A sample of (N=180) subjects was selected by random sampling method based on their age categories. The subjects Age ranges from 10 to 16 years. The selected subjects were divided into six groups i.e. three experimental groups (AAPAP) 1, 2, 3 and three control groups (RPE) 1, 2, 3 based on the three age categories (category I – 10 to 12 yrs., category II- 12 to 14 yrs. and category III- 14 to 16 yrs. of age) from schools of Medchal Dist. Twelve weeks of Age-Appropriate Physical Activity Program (AAPAP) of P.E for 30 minutes in initial 6 weeks and 40 minutes duration of training was given in later 6 weeks For experimental groups and control group not participated in intervention program they take part in routine physical education. Pre-test and post-test were conducted on the selected variable. I.e. GPA by administering Formative assessment test.

**Selection of variables**

The investigator reviewed the available scientific literature on the basis of discussion with experts, feasibility criteria, and availability of equipment's and relevance of the present study variable. Selected Health Related Fitness variables is –GPA. GPA by administering Formative assessment test.

**Experimental design**

1. The 180 subjects from the 3 age categories (category I – 10 to 12 years, category II- 12 to 14 years and category III- 14 to 16 years of age) of 60 each in each age category from3 schools(ZPHS Kolthur, ZPHS Keshawaram, ZPHS Lalgadimalakpet) of Medchal district of the Telangana state.
2. The selected subjects will be randomly divided into 6 equal groups of 30 subjects each based on their age categories.
3. Three experimental groups of age-appropriate physical activity program of physical education (AAPAP of PE) i.e. Experimental Group I(AAPAP-1) – (10 to 12 years), Experimental Group II(AAPAP-2)- (12 to 14 years), Experimental Group III(AAPAP-3)- (14 to 16 years) and three control groups of Routine physical education program (RPE-1)C.G-1,(R.P.E-2) C.G-2, and (RPE-3) C.G.-3 from same age category as Experimental groups.
4. Three control groups with routine physical education program. Control groups didn't participate in any training program of AAPAP.
5. Twelve weeks of training will be given to experimental groups for three days per week with 45 minutes duration per day and which excludes warming up and warring down.

**Collection of data**

In order to collect the data test were administrated before and after Twelve weeks training, the score were recorded in the initial and final readings for the group.

**Statistical technique**

The data collected from the group on the selected variables were statistically examined to find out whether there was any significant difference between the pre-test and post-test for experimental and control groups was employed by using Statistical Technique of T-test was used initially to compare the means scores and T-ratio for significant differences separately for each age categories i.e. between AAPAP-1, 2, 3 (E.G) and RPE-1, 2, 3(C.G), Then finally the ANCOVA, with Bonferroni post hoc test was used in this study. To know the combine effect of age-appropriate physical activity program of physical education-1, 2, 3 and Routine physical education

program 1, 2, 3 for three age categories for the differences in selected academic performance variable-GPA. The level of significance was fixed at 0.05 level of confidence.

## Results

The results of the study indicates that improvement in GPA, was significantly improved in all the 3 Experimental Groups, as a result of the participating in AAPAP of P.E. It was hypothesized that the training of Age-appropriate physical activity program of physical education would cause more improvement in GPA on all the 3 Experimental Groups. Hence the hypothesized was accepted.

**Table 1:** Paired sample 'T' test of experimental groups and control groups on GPA (Units in GPA Score)

| Sl. No | Parameters | N=180 | Groups | Pre-Test | | Post-Test | | T ratio | Sig. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Mean | SD | Mean | SD | | |
| 1. | GPA | 30 | RPE-1 (C.G) | 6.5067 | 1.03121 | 6.4200 | 0.93159 | 1.208 | 0.237 |
| | | 30 | AAPAP-1 (E.G) | 6.4900 | 0.77342 | 7.1833 | 0.78788 | -15.082 | 0.000 |
| | | 30 | RPE-2 (C.G) | 6.2867 | 0.84435 | 6.3333 | 0.84091 | -1.676 | 0.105 |
| | | 30 | AAPAP-2 (E.G) | 6.2333 | 0.58033 | 6.7400 | 0.52889 | -12.821 | 0.000 |
| | | 30 | RPE-3 (C.G) | 6.1500 | 0.93762 | 6.1333 | 0.86755 | 0.356 | 0.724 |
| | | 30 | AAPAP-3 (E.G) | 6.1500 | 0.57939 | 6.7800 | 0.74621 | -11.303 | 0.000 |

* Significant at 0.5 level of confidence, required table value is 2.05.

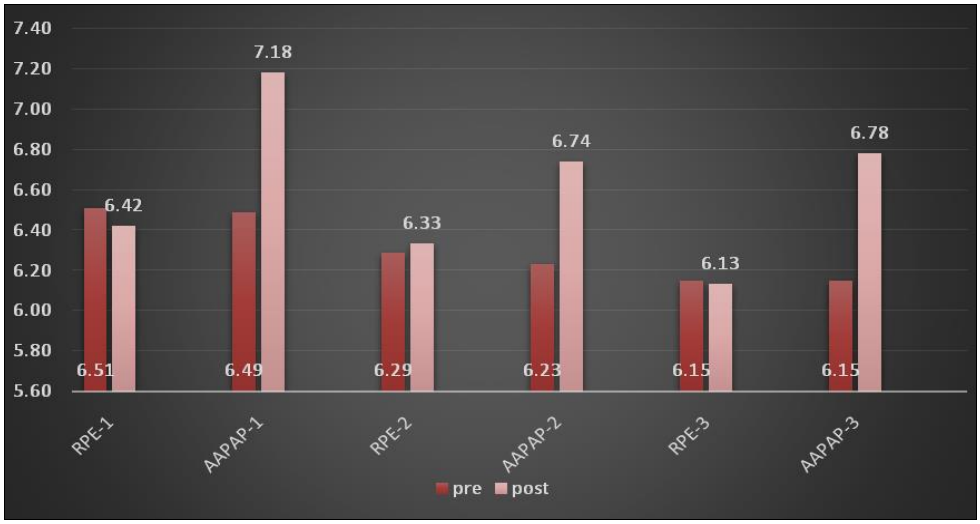


**Fig 1:** Bar Diagram Showing the Mean Difference Between pre-test and post-test of the experimental and control groups on Flexibility For Age categories 1,2,&3

## Discussion

By observing the obtained results in table – 1 it shows that the mean scores of GPA for experimental groups AAPAP-1, 2, & 3 pre-test score was 6.49, 6.23, 6.15 and post-test score is 7.18, 6.74, 6.78. The obtained t-ratio's was 15.08, 12.82, and 11.03, which was greater than the table value i.e. 2.05 for 29 degrees of freedom. So AAPAP-1, 2 & 3 is significant at 0.05 level of confidence.

Whereas control groups RPE-1, 2, & 3 pre-test mean scores was 6.51, 6.29 & 6.15 and post-test scores was is 6.42, 6.33 &6.13.Whereas the t- ratio's for RPE-1, 2, 3 was 1.20, 1.67, and 0.356 which is less than the required table value of 2.05 for 29 degrees of freedom, it is insignificant.

**Table 2:** Analysis of covariance of experimental groups and control groups on GPA (units in GPA score)

| Test | AAPAP1 (EG-1) | RPE1 (CG1) | AAPAP2 (EG-2) | RPE2 (CG-2) | AAPAP3 (EG-1) | RPE3 (CG3) | SV | SS | DF | MS | F Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pre-Test** | | | | | | | | | | | |
| Mean | 6.49 | 6.50 | 6.23 | 6.28 | 6.15 | 6.15 | Between | 4.221 | 5 | 0.844 | 1.375 |
| SD | .77 | 1.03 | .58 | .84 | .57 | .93 | Within | 106.817 | 174 | 0.614 | |
| **Post-Test** | | | | | | | | | | | |
| Mean | 7.18 | 6.42 | 6.74 | 6.33 | 6.78 | 6.13 | Between | 22.763 | 5 | 4.553 | 7.738 |
| SD | .78 | .93 | .52 | .84 | .74 | .86 | Within | 102.371 | 174 | 0.588 | |
| **Adjusted Post-Test** | | | | | | | | | | | |
| Mean | 7.09 | 6.30 | 6.77 | 6.32 | 6.85 | 6.19 | Between | 18.764 | 5 | 3.753 | 53.610 |
| | | | | | | | Within | 11.550 | 173 | 0.070 | |

* Significant Confidence level at 0.05. (The table value of significance required at the 0.05 confidence level for 5 and 174 is 2.266 and 5 and 173 is 2.266).

## Results of GPA for ANCOVA

Table above shows the analysed results of analysis of co-variance yielded a main effect for the experimental and control groups for age-appropriate physical activity program of physical education on GPA.

Pre-test: pre-test GPA, F (5,174) =1.37, p <.05, the 1.37 pre-test F value obtained was less than the 2.266 table value needed. The pre-test GPA scores for AAPAP1, RPE1, AAPAP2, RPE2, AAPAP3 & RPE3 are (M=6.49, S.D=.77), (M=6.50, S.D=1.03), (M=6.23, S.D=.58), (M=6.28, S.D=.84),

(M=6.15, S.D=.57) and (M=6.15, S.D=.93) respectively. As a result, prior to the start of the respective treatments, the pre-test for age-appropriate physical activity programme of PE and routine physical education programme group of GPA was found to be Insignificant at 0.05. Post-test: post-test GPA, F (1,174) =7.73, p <.05, the 7.73 post-test F value obtained was greater than the 2.266 table value needed. The post-test GPA scores for AAPAP1, RPE1, AAPAP2, RPE2, AAPAP3 & RPE3 are (M=7.18, S.D=.78), (M=6.42, S.D=.93), (M=6.74, S.D=.52), (M=6.33, S.D=.84), (M=6.78, S.D=.74) and (M=6.13, S.D=.86) respectively. Result for post-test, the mean values of GPA showed significant confidence at 0.05. Therefore, the results obtained showed that the intervention on GPA significantly improved in treatment group. The adjusted post-test GPA, F (1,173) =53.61, p <.05, the 53.61 post-test F value obtained was greater than the 2.266 table value needed. The adjusted post-test GPA scores for AAPAP1, RPE1, AAPAP2, RPE2, AAPAP3 & RPE3 are (M=7.09), (M=6.30,), (M=6.77), (M=6.32), (M=6.85) and (M=6.19) respectively. Thus, for the degrees of freedom 1 and 173, the adjusted post-test mean value of GPA shows significant at 0.05 level. Therefore, the intervention group on GPA, the observed F value of the adjusted post-test mean produced significantly.

Due to the fact that six groups were compared, whenever the 'F' ratio for the adjusted post-test was found to be significant, the Bonferroni post hoc test was used to determine the paired mean differences, which are shown in table 3.

**Table 3:** Bonferroni post hoc test mean differences on GPA among different groups (units in GPA score)

| RPE-1 | RPE-2 | RPE-3 | AAPAP-1 | AAPAP-2 | AAPAP-3 | Mean Difference | Sig. p value |
|---|---|---|---|---|---|---|---|
| 6.302 | 6.324 | | | | | -0.022 | 1.00 |
| 6.302 | | 6.195 | | | | 0.107 | 1.000 |
| 6.302 | | | 7.095 | | | -0.793 | 0.000 |
| 6.302 | | | | 6.775 | | -0.473 | 0.000 |
| 6.302 | | | | | 6.852 | -0.55 | 0.042 |
| | 6.324 | 6.195 | | | | 0.129 | 1.00 |
| | 6.324 | | 7.095 | | | -0.771 | 0.00 |
| | 6.324 | | | 6.775 | | -0.451 | 0.00 |
| | 6.324 | | | | 6.852 | -0.528 | 0.00 |
| | | 6.195 | 7.095 | | | -0.901 | 0.00 |
| | | 6.195 | | 6.775 | | -0.58 | 0.00 |
| | | 6.195 | | | 6.852 | -0.657 | 0.00 |
| | | | 7.095 | 6.775 | | 0.320 | 0.054 |
| | | | 7.095 | | 6.852 | 0.243 | 1.00 |
| | | | | 6.775 | 6.852 | -0.077 | 1.00 |

Above table shows a paired mean differences on GPA

**Results of post hoc test on GPA**

**Significant comparisons**

RPE-1 and AAPAP-1, RPE-1 and AAPAP-2, RPE-1 and AAPAP-3, RPE-2 and AAPAP-1, RPE-2 and AAPAP-2, RPE-2 and AAPAP-3, RPE-3 and AAPAP-1, RPE-3 and AAPAP-2, RPE-3 and AAPAP-3

The mean difference values for the above comparisons were.793,.473,.551,.771,.451,.528,.901,.580, and.657 which are significant at the p value 0.05 level of confidence. This suggests that the differences were significant. The significant results were found between the all RPE and AAPAP groups. As a result, these pairwise comparisons revealed varying effects on GPA.

According to the comparison, the AAPAP-1 group has improved significantly more superior than the AAPAP-3, AAPAP-2, and all other RPE groups. AAPAP-3 is better than AAPAP-2 and all other RPE groups and AAPAP-2 are superior to all other RPE groups, while RPE-1, RPE-3, and RPE-2 are superior respectively.

**Insignificant comparisons**

RPE-1 and RPE-2, RPE-1 and RPE-3, RPE-2 and RPE-3, AAPAP-1 and AAPAP-2, AAPAP-1 and AAPAP-3, AAPAP-2 and AAPAP-3

The mean differences in comparisons were.022,.107, 0.129, 0.320, 0.243 and.077, which are not significant at the 0.05 level of confidence. This indicates that the differences were not statistically significant. The insignificant comparisons are seen among all RPE and AAPAP groups.

As a result, these pairwise comparisons have a significant influence on GPA. Figure II depicts the adjusted post-test mean difference between the experimental and control groups.

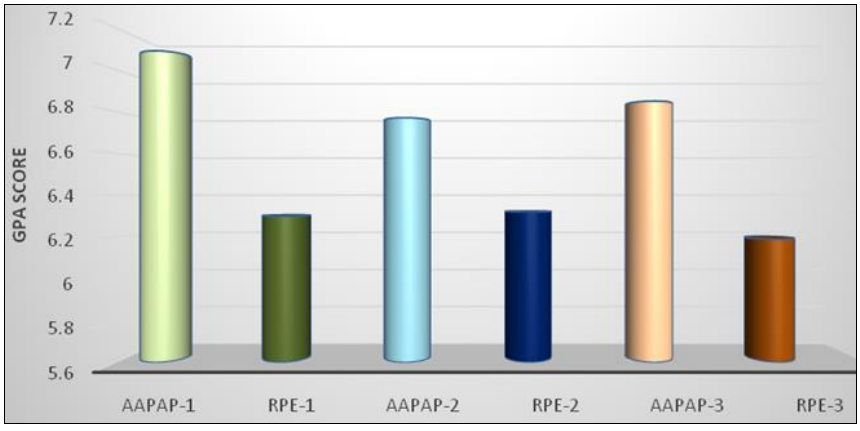


**Fig 2:** The adjusted post-test mean values of experimental and control groups with regard to GPA

## Conclusion

Within the limitation of the study and on the basis of the obtained results from this study, the following conclusions had been drawn:

It was concluded that the participation in 12 weeks of AAPAP of P.E training program had significantly improved the academic performance variable- GPA on all the 3 Experimental groups when compared to control groups.

From the post hoc test it was also observed that AAPAP-1 is better than AAPAP-2 & 3.

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