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The consequence of deconditioning on the levels of physical fitness in healthy school going children

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ABSTRACT

Background: Physical inactivity (PI) and sedentary behaviours (SB) play a significant impact in health-related risks and the development of chronic diseases. Evidence suggests that a majority of elementary school children do not receive health instruction during school because of that the levels of physical fitness have reduced. *Methodology:* In this observational study, total of 119 normal school going children of aged 11-16 years were randomly selected. Baseline assessment were done of all the children's and after that, they performed a battery of tests which assess their physical fitness levels. *Result:* The results of all the physical fitness assessment tests have showed significant reduction in the physical fitness levels as compared to the normal peers. Among all the tests, girls performed better with flexibility test and boys performed better in muscular endurance and core strength. *Conclusion:* All the test results showed reduction in fitness levels when compared it with the peer age normal school going children. So, emphasis should be made in schools for incorporation of physical activity session in routine schedule.

Keywords: School going children, physical activity levels, cardio respiratory fitness.

1. INTRODUCTION

After the coronavirus disease (COVID-19), it had an impact on physical activity (PA) behaviors worldwide, home boundness for long-term can have unsettling effects such as weight gain, social isolation and a possible decline in PA levels in all age group people. The drop in PA levels may be especially noticeable among active people, who habitually participating sports (Balanzá-Martínez et al., 2020; Vandelanotte et al., 2009). The valuable guidelines Position Stand and recommended that the PA guidelines for healthy adults are at least 150 minutes per week of moderate aerobic exercise or at least 75 minutes per week of vigorous aerobic activity.

This is in addition to muscle-strengthening exercises that target key muscle groups twice a week or more (Dor-Haim et al., 2021). The prevention of common chronic diseases and health-related hazards are significantly

influenced by less activity (PI) and less active behaviors (SB), justifying the release of science-based benchmarks. Anses, (2015) updated these standards for lowering daily sitting time and engaging in regular physical activity (cardiorespiratory capacity, muscular strengthening, balance and flexibility) while taking into account daily routines and social interactions.

Evidence suggests that a majority of elementary school children do not receive health instruction during school. Teachers are less likely to include content in classroom curricula if states do not require testing in that particular subject and data reveal that only 15.7% of states require students be tested on health education topics. Many obstacles prevent instructors from including health instruction in their curricula, including time constraints, a lack of resources and inadequate or no health training. Limited research exists regarding the specific implementation of health instruction in elementary school classrooms (Cardon and Salmon, 2020; Deng et al., 2020; Xia et al., 2021). So, as a result, the study's goal is to find out the physical fitness levels and check the effect of deconditioning in the school-going children.

2. METHODOLOGY

In the present observational study, after taking approval from the institutional Ethical Committee Sumandeep Vidyapeeth deemed to be University (SVIEC/ON/PHY/RP/FEB/23/5), in the march 2023, 6th to 9th standard normal healthy school going children who are from nearby schools (Government & Private) of the campus were approached. Principle of the school was approached and explained about the study. Students of the 6^{th} -9^{th} standard were approached and explained about the study.

Total 119 students who were meeting the eligibility criteria participated in the study. Those who agreed to take part in the study, written informed consent form was obtained from them. Participation information sheet was given to them explaining the details of the study. The Subjects were screened by pediatrician about general physical fitness, any known illness and any Neurological/ Musculoskeletal or cardio vascular condition assessed and those who met the inclusion and exclusion requirements were chosen to participate in the study.

Firstly, all the included subjects' anthropometeric measurements (Height & Weight) were taken. After that all the involved students were performed different physical fitness tests like sit and reach test, curl up, push-ups and modified Push-ups, 600m run test and 50m Dash were performed by all the included students. Enough rest has been given to all the students to avoid error in the results of the tests. All the collected data were compared with the age matched normal reference values of FIT INDIA Protocol which was published in 2019 by Government of India.

3. RESULT

Figure 1 shows Mean of BMI at all ages and it was almost similar to the Standard values. In Table 1, the majority of the P-Value is less than 0.05. So hence it can be said that the null hypothesis is rejected and it can be said that the means of Sit and Reach test and Standard value of has differences.

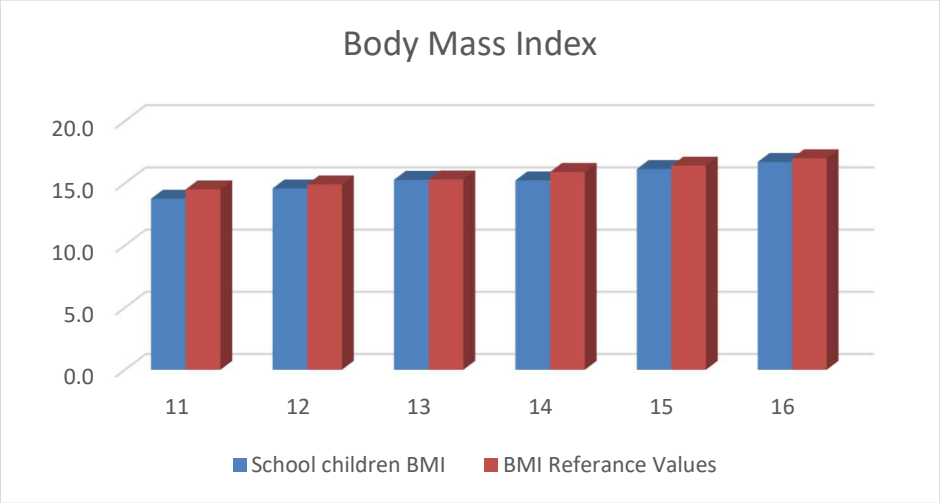

Figure 1 BMI Comparison

Table 1 Sit and Reach Test

Years	Mean	Std. Deviation	t	Df	P value
11	16.8333	4.17424	-1.051	11	.316
12	17.2000	4.35904	-2.398	32	.022
13	17.9340	5.40402	-3.053	52	.004
14	19.4190	5.17958	-3.266	62	.002
15	20.2368	5.28248	-5.033	37	.000
16	21.2000	3.55903	-2.669	3	.076

Table 2 Curl UP

Years	Mean	Std. Deviation	t	Df	P value
11	14.0833	4.16606	-3.672	11	.004
12	15.3939	3.59635	-5.361	32	.000
13	17.6981	3.19004	-4.112	52	.000
14	17.3651	3.08640	-6.776	62	.000
15	16.0263	3.52203	-9.143	37	.000
16	15.5000	4.04145	-2.969	3	.059

As in Table 2, All of the P-Values are lower than 0.05, the null hypothesis can be deemed to be rejected and it can be said that the means of Curl up test and Standard value of has differences.

Table 3 Push UP

Years	Mean	Std. Deviation	t	Df	P value
11	13.5000	4.60237	4.140	11	.002
12	13.9091	5.68091	4.458	32	.000
13	14.3019	5.78654	4.783	52	.000
14	14.6984	7.93651	.198	62	.843
15	16.2895	7.21076	.247	37	.806
16	18.5000	6.24500	.320	3	.770

In Table 3, all of the P-values are less than 0.05, the null hypothesis is rejected and it can be said that the means of Push Up test and Standard value of has differences.

Table 4 600m Walk/Run

Years	Mean	Std. Deviation	t	Df	P value
11	3:46:39	1:46:52	7.345	11	.000
12	3:47:01	2:04:55	10.438	32	.004
13	3:55:11	1:05:22	26.189	52	.000
14	4:06:34	0:45:20	43.162	62	.002
15	3:49:00	1:00:47	23.221	37	.000
16	4:37:36	0:36:07	15.366	3	.001

As in Table 4, all of the P-Value is less than 0.05 so hence it can be said that the null hypothesis is rejected and it can be said that the means of 600m Walk/Run test and Standard value of has differences.

In Table 5, all of the P-Values are lower than 0.05, the null hypothesis can be deemed to be rejected and it can be said that the means of 50m Dash test and Standard value of has differences.

Table 5 50m Dash

Years	Mean	Std. Deviation	t	Df	P value
11	10:59	3:22	11.260	11	.002
12	10:47	2:28	25.094	32	.000
13	10:45	2:39	29.508	52	.000
14	11:21	1:42	52.758	62	.003
15	11:04	1:52	36.548	37	.000
16	10:40	0:59	21.462	3	.004

4. DISCUSSION

This study aimed to determine the deconditioning effects on the levels of physical fitness in Healthy school-going Children. Nowadays, children and adolescents all around the world spend an increasing amount of time sitting, reclining or lying, with an energy expenditure of 1.5 metabolic equivalents (METSs) (Tremblay et al., 2017). According to a recent data, 81% of adolescents aged 11 to 17 do not meet the minimum PA need for their age, with considerable disparities between genders, regions and nations (Guthold et al., 2020).

It is well known that having a higher BMI causes a decline in athletic ability and a poorer overall score of Health-Related Physical Fitness components in children (Graf et al., 2004; Okely et al., 2004; Raudsepp and Jürimäe, 1997; Ding and Jiang, 2020; Mendoza-Muñoz et al., 2020; Brunet et al., 2007; Sacchetti et al., 2012; Júdice et al., 2017; Dewi et al., 2021; López-Gil et al., 2020). Similar results have been found out in our study that all the children's are on their higher end of the BMI. This is concerning considering the strong correlations between increased screen time, sedentary behavior and negative health outcomes (Nelson et al., 2006). The current study's findings are consistent with these school-children.

However, according to Ortega et al., (2012), Polevoy (2023) and Ortega et al., (2008), subjective physical fitness is considered a potent measure of health even in childhood. This study found that among school-aged children, a greater body mass index was linked to worse general physical fitness, cardiorespiratory fitness, muscle strength, speed-agility and flexibility. Aside from strength and cardiorespiratory fitness, the current study also suggests that participating in sports and muscle-strengthening exercises are positively associated with speed, agility and flexibility (Table 1).

In the current research different physical fitness test were performed by the normal school going children which measures the different components of the fitness levels. To assess the abdominal muscle strength, curl up test was performed on both boys and girls who measured the abdominal muscles power and stamina, which is crucial for core stability and back support. The results of current research were showed that almost all the students have lesser repetition in 30 second as compare to their peer group (Table 2).

Muscular endurance is also one of the most crucial factors in determining one's level of physical fitness levels. In the present study all, the boys have performed the Push-ups and girls have performed Modified Push-ups in 30 seconds. For both the tests results, upon comparison of boys' and girls', boys have performed better (Table 3). Such findings are not surprising; as biological maturity and age have a significant impact on physical performance in both boys and girls, even though there are no differences in the pre-puberty stages (De-Miguel-Etayo et al., 2014; Rodríguez-Negro et al., 2021).

The sit-and-reach test assesses lower back and hamstring muscular flexibility and it was also included in this physical fitness examination. The findings of this investigation showed reduced flexibility as compared to the peer age group but in this test, girls performed outstanding as compare to boys. However, boys outperformed girls in the speed-agility and muscular strength tests, while girls outperformed boys in the flexibility test (Tomkinson et al., 2018). Cardiorespiratory fitness testing has long been regarded as not just a performance indicator, but also a health-related predictor of the risk of Cardio Vascular Diseases (Ruiz et al., 2016; Al-Mallah et al., 2018).

Poor cardiorespiratory fitness during adolescent and childhood is also linked poor skeletal and mental health (Hillman et al., 2008) and with metabolic syndrome arterial stiffness and myocardial infarction in adulthood (Högström et al., 2014). In the present study to assess the cardiovascular fitness 600 m Run/Walk test and to assess the acceleration and speed 50 m Dash tests were used as both the test has a good reliability and validity. The results of both the tests were showed significant reduction if the values are contrasted with peers' typical reference values (Table 4, 5).

So, the current study uses certain battery tests on school-aged boys and girls to objectively define the degrees of physical fitness. All the test results showed reduction in fitness levels when we compare it with the peers. The small random convenience sample of participants, which is not representative of all school-aged boys and girls, is a drawback of this study. In order to get a better idea of

the levels of physical fitness among school-aged children, a representative sample will be taken from the data obtained here. This will serve as a great beginning point for a broader investigation.

5. CONCLUSION

Based on the results of battery of tests performed for physical fitness assessment showed, reduced physical fitness levels in normal school going children of 11-16 years as compare to their peers. So, it is recommended for the all the schools to incorporate the physical fitness session in the routine schedule during the school time.

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Authors' contributions

All of the authors contributed equally in manuscript work & production.
Dhwani Chanpura: Concept of research, Data collection, analysis of data.
GP Kumar: Concept of research, Editing and finalizing the manuscript.

Ethical approval

This study was approved by institutional Ethical Committee (SVIEC/ON/PHY/RP/FEB/23/5), in the march 2023.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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