A Comparative Study of Physical, Physiological and Psychological Profile of School Going Boys and Girls

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ABSTRACT

It is of utmost importance to understand the various physical, physiological and psychological factors that contributing to the health and fitness status of school boys and girls. Therefore, the objective of the research was to make comparison between school boys and girls on selected physical, physiological and psychological variables. 400 subjects (200 boys & 200 girls) were selected from govt. school of class 9th to 12th . Selected variables were flexibility, power, abdominal strength endurance, speed, cardio respiratory endurance, BMI, fat, resting metabolism and self esteem. The data was collected on selected variables by applying following tests- sit & reach, vertical jump, curl up, 50 mtr, 600 mtr, Omron scanner (for BMI, fat and resting metabolism) and Rosenberg self esteem questionnaire. The collected data was analysed by applying descriptive statistics, ANOVA & MANOVA with the help of SPSS software. It was found that there is a significant difference between boys and girls at senior and junior level for 50 meter (speed) & 600 meter (cardio respiratory endurance) with value (F= 5.621, $P < 0.05$) & (F= 12.451, $P < 0.05$). For sit and reach(flexibility), vertical jump (power) & curl up (abdominal strength endurance) ability between boys and girls at senior and junior level there is an insignificant difference with value (F= .087, $P > 0.05$), (F= .099, $P > 0.05$) & (F= .277, $P > 0.05$). For physiological variables i.e. BMI, fat and resting metabolism between boys and girls at senior and junior level it was found that that there is a significant difference for fat (F= 15.036, $P < 0.05$) and an insignificant difference for BMI (F= .324, $P > 0.05$) and even for resting membrane (F= 3.495, $P > 0.05$). For psychological variable self esteem between boys and girls at senior and junior level it was found that there is a significant difference (F= 1.818, $P > 0.05$).

Keywords: Flexibility, Abdominal strength endurance, power, speed, endurance, BMI, Fat, Resting metabolism, Self-esteem.

INTRODUCTION

Much of a nation's future rest upon the status of its children. Healthy children are the foundation stones for a healthy nation. Many leaders around the world — Presidents, Prime ministers, Health ministers — have designated schools as an important setting in which children should develop behaviour and skills for physical, emotional and social well-being. Other than the family, no societal institution has greater impact on the lives of broods than schools. Every day masses of children and young people round the world go to school and spend a significant amount of time interacting with their peers, other students and teachers gaining knowledge, building attitudes and skills, and developing behaviours. Many behavioural patterns developed during childhood and adolescence is retained into adulthood**(Weber, 1984)**. Schools,

therefore, play a critical role in building healthier nations round the world. Schools provide an outstanding opportunity to enable students to obtain knowledge and skills and rise activity levels among young people as children and adolescents ideally spend a significant time of their young lives there and educational efforts can be put into action on a regular and continuous basis **(WHO, 1996***).*

The school is considered an excellent place to deliver students with an opportunity of daily physical activity, impart them the importance of regular physical activity and its role towards fitness and well-being, and build the skills that support active lifestyles (Active Living Research, 2007). It is vital that schools have an effective physical education program that has been designed precisely and is taught well to influence the physical, physiological and psychological well-being of children. The role of physical education teacher is vital for successful implementation of an effective Physical Education program. It is crucial that the teacher is motivated about serving children to achieve ideal fitness levels. The teacher should also be able to positively affect students' outlook towards importance of being fit by teaching, motivating and engaging the students through several educational tools as well as activities.

Role of physical education in maintaining good health is widely acknowledged, scientific studies have questioned the quality and quantity of Health & Physical Education lessons given in primary schools (Fairclough &, Stratton, 2005, Morgan & Hansen, 2008, Micheliet.al., 2011). Current studies have established optimistic results in improving Health related fitness, particularly cardio-respiratory fitness, via school-based interventions (Kriemleret.al., 2011). However, several have failed to address the various components that effect behaviour in the school setting, make reference to credible learning theories or curriculum direction in intervention designs, or specifically target improvements in all of the Health-related fitness components. In addition, few studies have designed and tested multi-component programs to extend learning into the school playground and the home - potentially limiting the impact that the program has on health outcomes and behaviour change (Dobbins et.al., 2009).

The World Health Organization (WHO) has published the Global Recommendations on Physical Activity and Health to address the declining physical activity (PA) and physical fitness (PF) levels of children and the corresponding increase in non-communicable diseases (NCDs). These recommendations are basic guidelines on the frequency, duration, intensity, type and total amount of physical activity needed for preventing NCDs. The WHO recommendations now outline that children of age group 6-17 years should participate in at least 60 minutes of moderate-to-vigorous physical activity every day, and to perform vigorous physical activity (high intensity), muscle-strengthening physical activity and bone-strengthening physical activity, at least three days per week (WHO 2010). Sedentary behavior, including watching television and working on computers, should be restricted to less than 2 hours per day during leisure time.

Childhood and adolescence are pivotal periods in life of an individual because these are formative years in which major physiological and psychological changes take place. Lifestyle and healthy/unhealthy behaviors of an individual turn into habits during these years, which has significant influence on that individual's adult behavior and health status.

PROCEDURE AND METHODOLOGY

Selection of the subjects

Testing for the normative study took place over a 10 months period. For the purpose of the study, 200 boys (senior group of 100 boys from 11th & 12th class and junior group of 100 boys from 9th & 10th class) 200 girls (senior group of 100 girls from 11th & 12th class and junior group of 100 girls from 9th & 10th class) of Delhi Government School S.K.V Padam Nagar were chosen. Prior consent to conduct the physical fitness, physiological and psychological test of the subjects was obtained from the school authorities.

Selection of the Variables

For the purpose of this study it was finalized to compare physical, physiological, and psychological variables of girls and boys. Therefore, following variables were selected for research purpose:

INDEPENDENT VARIABLES
1) Gender – Boys & Girls
2) Level – Senior & Junior

DEPENDENT VARIABLES
1) Physical Variables
   Flexibility
   Power
   Abdominal strength endurance
   Speed
   Cardio Respiratory Endurance
2) Physiological Variables
   BMI
   Fat
   Resting Metabolism
3) Psychological Variable
   Self-Esteem

Criterion measures

Following criterion measures were used for the purpose of collecting data from the sample:

TABLE:List of Selected Variables

S. No.	Variable	Test Item	Unit
1	Flexibility	Sit and Reach Test	Centimeters
2	Power	Vertical Jump	Inches
3	Abdominal Strength and Endurance	Curl- Up	Numbers
4	Speed	50 yard Run	Seconds
5	Cardio Respiratory Endurance	600 yard Run /Walk	Seconds
6	Body weight status	Omron scanner	Kg/m²
7	Fat	Omron scanner	percentage
8	Resting Metabolism	Omron scanner	Kcal
9	Self- Esteem	Questionnaire- Rosenberg Self Esteem Scale	As per norms

Data Collection

The research scholar personally contacted the Principal of school of Delhi and discussed the need and importance of the investigation taken. The scholar requested the school Principal to extend their cooperation for the study. The school authorities were ensured that they will be provided with the normative values & evaluation of their student on various aspects of physical, physiological, psychological variables. The authority were provided with an informed consent form which was duly signed prior to the implementation of testing programme either by the principal or the parents of the children being tested. Research team visited the school site on the permitted days for obtaining data on all the components. The data was collected by forming different stations for each test. The subject moved from one station to the other after the completion of test on a particular station. After arranging the stations, the research team started the data collection in the sequence mentioned above.

Statistical Technique

A detailed statistical evaluation for physical, physiological and psychological components after the collection of data from the subjects selected for the purpose of study:

➢ Descriptive statistics
  • Mean
  • Standard deviation
➢ Physical and physiological variables were analysed by applying Two way MANOVA.
➢ Psychological variable was analysed by applying Two way ANOVA.
➢ All the statistical techniques were applied by using SPSS software version 16.0.

Result and Discussion

Descriptive Statistics of Physical, Physiological and Psychology Variables

Variable	Group	N	Mean	Std. Deviation
Flexibility (sit & reach)	Boys	200	33.53	7.722
Flexibility (sit & reach)	Girls	200	32.76	7.352
Power (Vertical jump)	Boys	200	12.39	2.730
Power (Vertical jump)	Girls	200	7.95	2.974
Abdominal strength endurance (Curl up)	Boys	200	23.32	6.487
Abdominal strength endurance (Curl up)	Girls	200	23.34	6.477
Speed (50 meter)	Boys	200	9.850	1.0552
Speed (50 meter)	Girls	200	13.635	1.1177
Cardio respiratory endurance (600 meter)	Boys	200	194.91	38.882
Cardio respiratory endurance (600 meter)	Girls	200	229.34	95.295
BMI	Boys	200	18.722	3.3856
BMI	Girls	200	19.845	3.8387
Fat	Boys	200	13.883	4.7168

Fat	Girls	200	23.873	6.8142
Resting Metabolism	Boys	200	1296.52	176.078
Resting Metabolism	Girls	200	1062.38	143.835
Self Esteem	Boys	200	19.540	.218
Self Esteem	Girls	200	18.745	.218

Note: n= number of subjects selected

Above table representing descriptive statistics in term of mean and standard deviation of physical variable flexibility (sit and reach) for boys and girls group. It was found in the table mean and standard deviation value for boys is 33.53 and 7.722 respectively. Whereas the mean and standard deviation value for girls for same variables was 32.76 and 7.352.

Above table representing descriptive statistics in term of mean and standard deviation of physical variable power (vertical jump) for boys and girls group. It was found in the table mean and standard deviation value for boys is 12.39 and 2.73 respectively. Whereas the mean and standard deviation value for girls for same variables was 7.95 and 2.974.

Above table representing descriptive statistics in term of mean and standard deviation of physical variable abdominal strength endurance (curl up) for boys and girls group. It was found in the table mean and standard deviation value for boys is 23.32 and 6.487 respectively. Whereas the mean and standard deviation value for girls for same variables was 23.34 and 6.477.

Above table representing descriptive statistics in term of mean and standard deviation of physical variable speed (50mtr) for boys and girls group. It was found in the table mean and standard deviation value for boys is 9.85 and 1.0552 respectively. Whereas the mean and standard deviation value for girls for same variables was 13.635 and 1.1177.

Above table representing descriptive statistics in term of mean and standard deviation of physical variable cardio respiratory endurance (600mtr) for boys and girls group. It was found in the table mean and standard deviation value for boys is 194.91 and 38.882 respectively. Whereas the mean and standard deviation value for girls for same variables was 229.34 and 95.295.

Above table representing descriptive statistics in term of mean and standard deviation of physiological variable BMI for boys and girls group. It was found in the table mean and standard deviation value for boys is 18.722 and 3.3856 respectively. Whereas the mean and standard deviation value for girls for same variables was 19.845 and 3.8387.

Above table representing descriptive statistics in term of mean and standard deviation of physiological variable fat for boys and girls group. It was found in the table mean and standard deviation value for boys is 13.883 and 4.7168 respectively. Whereas the mean and standard deviation value for girls for same variables was 23.873 and 6.8142.

Above table representing descriptive statistics in term of mean and standard deviation of physiological variable RM for boys and girls group. It was found in the table mean and standard deviation value for boys is 1296.52 and 176.078 respectively. Whereas the mean and standard deviation value for girls for same variables was 1062.38 and 143.835.

Above table representing descriptive statistics in term of mean and standard deviation of psychological variable self-esteem for boys and girls group. It was found in the table mean and standard deviation value for boys is 19.54 and .218 respectively. Whereas the mean and standard deviation value for girls for same variables was 18.745 and .218.

Table: Representing the Test of between Subjects Effect for Physical, Physiological and Psychological Variables between Boys and Girls at Senior and Junior Level.

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
	SR	4.840	1	4.840	.087	.768
GROUP * LEVEL	VJ	.810	1	.810	.099	.753
	CU	11.222	1	11.222	.277	.599
	FM	5.705	1	5.705	5.621	.018
	SM	64110.240	1	64110.240	12.451	.000
	BMI	4.080	1	4.080	.324	.570
	FAT	478.953	1	478.953	15.036	.000
	RM	86171.603	1	86171.603	3.495	.062
	Self Esteem	17.223	1	17.223	1.818	.178

Above table representing the test of between subjects effect for physical variables i.e. flexibility, power, abdominal strength endurance, speed and cardio respiratory endurance between boys and girls at senior and junior level. The table showing result of 50 meter (power) for comparison between boys and girls at senior and junior level proved that there is a significant difference (F= 5.621, $P < 0.05$). It was found that there is a significant difference between boys and girls at senior and junior level for 600 meter (cardio respiratory endurance) (F= 12.451, $P < 0.05$). For sit and reach (flexibility) ability between boys and girls at senior and junior level there is an insignificant difference (F= .087, $P > 0.05$). When we compare vertical jump (power) ability between boys and girls at senior and junior level there is an insignificant difference (F= .099, $P > 0.05$) and even for curl up (abdominal strength endurance) there is an insignificant difference (F= .277, $P > 0.05$)

Above table representing the test of between subjects effect for physiological variables i.e. BMI, fat and resting metabolism between boys and girls at senior and junior level. The table showing result of fat for comparison between boys and girls at senior and junior level proved that there is a significant difference (F= 15.036, $P < 0.05$). When we compare BMI between boys and girls at senior and junior level there is an insignificant difference (F= .324, $P > 0.05$) and even for resting membrane there is an insignificant difference (F= 3.495, $P > 0.05$).

Above table representing the test of between subjects effect for psychological variable self esteem between boys and girls at senior and junior level. The table showing result of self esteem for comparison between boys and girls at senior and junior level proved that there is a significant difference (F= 1.818, $P > 0.05$).

Conclusions

Based on the findings and within the limitations of this study, the following conclusions were drawn:

1) For comparison between boys and girls on flexibility where an insignificant difference was found with F value of 1.068 at 0.05 level of significance (p = 0.302). The obtained result proved that boys were having more flexibility than girls but the difference is not reliable enough.

2) For comparison between boys and girls on power where a significant difference was found with F value of 239.773 at 0.05 level of significance (p = 0.000). The obtained result proved that boys were having more power than girls.

3) For comparison between boys and girls on abdominal strength endurance (curl up) where an insignificant difference was found with F value of 0.001 at 0.05 level of significance (p = 0.981). The obtained result proved that girls were having more abdominal strength endurance than boys.

4) For comparison between boys and girls on speed (50 meter) where a significant difference was found with F value of 1.4123 at 0.05 level of significance (p = 0.000). The obtained result proved that boys were having more speed than girls.

5) For comparison between boys and girls on cardio respiratory endurance (600 meter) where a significant difference was found with F value of 23.022 at 0.05 level of significance (p = 0.000). The obtained result proved that boys were having more cardio respiratory endurance than girls.

6) For comparison between boys and girls on BMI where a significant difference was found with F value of 10.014 at 0.05 level of significance (p = 0.002). The obtained result proved that girls have more BMI than boys.

7) For comparison between boys and girls on fat where an significant difference was found with F value of 313.340 at 0.05 level of significance (p = 0.000). The obtained result proved that girls have more fat than boys.

8) For comparison between boys and girls on resting metabolism where a significant difference was found with F value of 222.343 at 0.05 level of significance (p = 0.000). The obtained result proved that boys have more resting metabolism than girls.

9) For comparison between boys and girls on self esteem where a significant difference was found with F value of 6.671 at 0.05 level of significance (p = 0.010). The obtained result proved that boys have more self esteem than girls.

Recommendations

In the light of the conclusion drawn from the present study the following recommendation are made:-

- In order to improve the obvious weakness in muscular strength and muscular endurance, the school children are to be subjected to special physical education/ training programme.

- Health related fitness test should be conducted annually in schools throughout India in order to have fit citizens.

- Longitudinal and interventional studies are needed in order to clarity if changes in physical activity and cardio respiratory fitness may favorably influence the levels of CVD risk factors already in these ages and even into adulthood.

- Understanding the association between cardio respiratory fitness and CVD related outcomes in children and adolescence could help to established whether cardio respiratory fitness could be prepared as a health marker or not at these ages.

- Having optimal values for cardio respiratory fitness health set from an early age could be useful to identify the target population for primary prevention, as well as for health promoter policies. In this regard, schools may play an important role; firstly by identifying children with low cardio respiratory

fitness, and secondly by promoting positive health behavior such as encouraging children to engage in physical activity as well as decreasing time spent in sedentary activities.

- Similar study can also be taken on various Age groups by same method.
- Similar study can be conducted by adopting some different types of physical, physiological and psychological variables.

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