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A COMPARATIVE ANALYSIS ON PHYSICAL FITNESS OF RURAL AND URBAN HIGH SCHOOL STUDENTS: A CASE OF BAGALKOT

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Abstract:

The word "Physical Education", Refers to various bodily characters such as physical strength physical development physical health and physical appearance. It refers to the body as a contrasted to mind physical education should aim to improve the mass of students and give them as much health struggle and stamina as possible to unable physical education is the process by which changes on the individual or brought about through his movement experience physical education is the some of the changes in the individual caused by experience centred in motor ability. The purpose of the study is found out the A Comparative Analysis on Physical Fitness of Rural and Urban High School Students. This study will help coaches and physical education teachers in selecting the good players. This will help physical education teachers and coaches in preparing training programme. This will lead to success in future planning. This will reveal which of the two groups possess better physical   education. The result of the study will help to students to participate in sports and game. The result of the study will give the clear idea about physical fitness of the rural and urban boys.

Keywords: factors affecting on students physical fitness, findings and conclusion

1.0 Introduction:

The objective of physical education concern with building up to physical power throw the growth and development of various systems like respiratory system digestive system in body participation in good programme of physical education promotion of bodily growth strength endurance structurally and functionally. Physical education through physical activities in the process of human behaviour the body is the basis of the function of the Muscular Strength so prevalent in our complicated modern living participation in organized physical education programmes will release these strains and tension to a greater extent. The term physical fitness is included in many familiar test batteries commonly uses in the schools in many cases the inclusion of fitness in such titles is most unfortunate error and one that logically could account at least in part for the current apathy of some people toward total personal fitness. This is not an indictment of physical fitness test batteries most of the batteries are excellent and include tests that do have some definite value but it is our feeling that many of tests in these batteries are not actually of physical fitness. Below performance to standardized tests especially on such items as speed and agility is not necessary indicative of poor physical fitness. If functional fitness is an individual matter than physical fitness tests are more relative than absolute and these are no such thing as reasonably healthy person who cannot improve his physical fitness level.

1.1 Review of Literature

Research scholar has made sincere efforts to collect the literature related to this study and found some reference to similar studies which have been reviewed and produced in this chapter.

Brongder (1973) made a comparison of physical fitness and antipoetic measures of preadolescent maximum American and Anglo American males. Three hundred Maxico-American males between the age of 8 and were selected as subjects. AAHPER youth fitness test physical fitness 13 anthropometrics measurements were taken. They were standing height sitting height weight shoulder width. The finding revealed significant difference between the Maxican-American and Anglo-American males in certain physical fitness items were significantly higher for the Maxican-American males.

Dahl (April 1971) administered the AAPER youth fitness test on 400 negro and white boys from the same texas schools district. All tests data was collected during spring semester of the 1969-70 St school year. It was found that the Negro boys obtained a higher mean score than the white boys on gross body co-ordination (Soft ball throw) the difference was significant at the 0.05 level of confidence. Negro boys scored significantly higher than white boys on muscular explosiveness (Standing broad Jump). A larger mean difference was obtained at the 01. level of confidence. Holfmann compared the effectiveness of four selected programme of physical education in the development of physical fitness and general motor ability. The conclusion

derived from study shows that physical fitness and general motor ability of student can be improved by special training by combination of isomietic and isotonic exercised.

[M. Robson et.al. 1978]

Ray in his study compared the physical fitness of tribal and urban students in tripura the administered the (AAHPER) test to 60 tribal and 60 urban students studying at M.B.B College Agartala their ages ranging from 16-22 years. The mean differences between the physical fitness of urban and tribal significant at 0.05 level of confidence. It was found that urban students were better in pull-ups and soft-ball throw for distance and their superiority was statistically significant at 0.05 level of confidence but in the remaining five items i.e., 50 mts dash 600 mts run/walk sit ups shuttle run and standing broad jump. The difference in performance of neither or confidences.

[Bijay Krishna Ray 1979]

Serenson made a comparison of physical fitness improvement for students assigned in two classes of varing module time blocks of the two module tested one was of frequent every two weeks combined mean perectile scores to both boys and girls in the 7th and 9th grades were computed on their initial tests. The rests and difference between the two tests frequent physical education classes are evidently of more value to the fitness of students that those of more distant time intervals even thought yearly time spent in the class is the same. The difference in improvement significantly favored the more frequent performance.

N.Gray Price (1968) conducted a study on the relationship of college foot-ball players, strength, speed and agility to the Coache's ranking of ability playing position were combined offensive backs offensive lineman, defensive lineman and into whole group units. The players were further divided as to group-I or group-II. Correlations were the completed between the objective tests scores and Coache's subjective evaluation. It was concluded that arm strength and agility and total 't' scare were moderate predictors of foot-ball ability and leg strength and speed were significant predictors of foot-ball ability.

Lindal L. Parchman (1978) compared the leg strength and cardio vascular respiratory endurance of college women during a semesters class participation in basketball and swimming leg strength was tested with a dynamo-meter. Endurance was determined from the time a bicycle ergo meter ride could be continued at a set side number of revolutions per minute and constant load.

Thomas Cole Johnson (1972) conducted a study to investigate the effect of a season of inter-collegiate soccer participation on selected components of physical fitness. The elements of physical fitness measured were agility cardio respiratory endurance, muscular strength of the

legs and running speed. The subjects were sixteen members of the 1971 Emory University Soccer Team. The pre-season practice and competitive season lasted approximately ten weeks. During that period the subjects were engaged in a maximum of four practice and or game situation per week. The seasons schedule included thirteen games plus two pre season practice games. It was found that participation in inter-collegiate soccer programme in likely to cause adaptations in the circulatory and respiratory system that will result in increased efficiency or improved cardio-respiratory endurance it produced significantly improvement in agility, muscular strength of the legs and running speed.

Johnson (1973) investigated the effect of season of inter-collegiate soccer participation on selected components of physical fitness. He concluded that participation in inter-collegiate soccer programme will likely cause adaptations in circulatory and respiratory systems that will results in increased efficiency or improved respiratory endurance. Although there were indication of improvement. It is unlikely that participation in inter- collegiate will produce significant improvement in agility., muscular strength of the legs., and running speed.

Karanjit Singh (1978) evaluated the physical fitness pf hockey player's sixty-seven male hockey players were selected randomly from the total population of Punjab State to serve as subjects in this study. The subjects were tested in 9 different components of physical fitness, extent flexibility, dynamic flexibility, explosive strength, static strength, dynamic strength, trunk strength, co-ordination, equilibrium and endurance. The data thus collected were statistically analyzed to find out the level hockey players is each element of physical fitness. This study showed dominance of explosive strength and re-piratory endurance elements of physical fitness among hockey players.

1.2 Statement of the Problem

The purpose of the study is found out the A Comparative Analysis on Physical Fitness of Rural and Urban High School Students. This study will help coaches and physical education teachers in selecting the good players. This will help physical education teachers and coaches in preparing training programme. This will lead to success in future planning. This will reveal which of the two groups possess better physical   education. The result of the study will help to students to participate in   sports and game. The result of the study will give the clear idea about physical fitness of the rural and urban boys.

1.3 Objectives of the study

1.   To study the significant difference between sportsman and non-sportsman with respect to speed, endurance, agility, strength and flexibility.

2.   To study the significant difference between rural and urban (sportsman and non-sportsman) of high school boys with respect to speed, endurance, agility, strength and flexibility.

3.   To study the significant difference between urban and rural sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility.

4.   To study the significant difference between urban and rural non-sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility.

Hypotheses

1.   There is no significant difference between sportsman and non-sportsman with respect to speed, endurance, agility, strength and flexibility.

2.   There is no significant difference between rural and urban (sportsman and non-sportsman) of high school boys with respect to speed, endurance, agility, strength and flexibility.

3.   There is no significant difference between urban and rural sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility.

4.   There is no significant difference between urban and rural non-sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility.

Definition of the Terms

i) Rural Area: Rural area is referred to as the area under the jurisdiction of Mandal Panchayat having population of less than thousand. ii) Urban Area: Urban area is generally referred to as the area under the municipal organization of the town having population more than 50 thousand. iii) Sportsman: Those who are taking part in the completion are known as sportsman. iv) Non Sportsman: The student who does not participate in single game and who is not represented in any level of participation in this life is considered as non sportsman. v) Speed: Rate of change of displacement of the object is called as speed. vi) Endurance: Endurance is the result of physical capacity of the individual to certain movement over a period of time. vii) Agility: It is the capacity of the individual as measured by the rate of changing his position on place. viii) Strength: It is the force that a muscle or group of muscles can exert against a resistance in one maximum effort. ix) Flexibility: The range of motion of a particular joint measured in degrees extensibility of the soft tissue ligaments and especially of the muscle and the anatomical structure of the joint help to determine the degree of flexibility. x)   (AAHPER) TEST: (AAHPER) means American Association of health physical education and recreation. In this test there are so many variables are involved. They are speed endurance agility strength flexibility power etc.

1.4 Methodology

The researcher has used experimental method to compare the physical fitness between rural and urban high school students of Shri Netaji Subhaschandra Bhose-Government High school, Neeralakeri and Basaveshwar High Scool Bagalkot respectively for this experimental method (AAPHER) test of physical fitness is applied to high school boys to collect the data. In this chapter the procedure adopted for selection of subjects criterion measures. Collection of data procedure for administrating test at the statistical technique used for analysis of data have been presented. Sample size was 40 Male students from Shri Netaji Subhaschandra Bhose, Govt. High School, Neeralkeri are considered as rural students and 40 male students from B.V.V.S High School, Bagalkot are considered as urban area student were selected for the study out of forty twenty students are sports man and twenty students are non sportsman. We selected the subjects from the 8th to 10th classes and the age of the subjects ranged 15-17 years.

AAPER TEST

1) 50 Meter Run : To measure the speed capacity of the student. Equipments : Two stop watches two instructors chunnam score card pen. Description : This test was administered to two subjects at a time both subjects took position behind the starting line. The starter used the commands ready 'Go' each runner was assigned to a separate time keeper. The time keeper recorded time at the finishing line. The scores were recorded time taken by the subjects to across finishing line from the starting line time was recorded nearest to the one 10th of a second.

ii)   Endurance 1500 mtr Run : To measure the endurance   capacity of   the   student. Equipments : Two stop watches two instructors chunnam score card-pen. Description : The subjects were instructed to stand on the starting line and asked him 1500 mtr after giving command ready go and he was allowed to runner was assigned to a separate time keeper. The time keeper recorded time at the finishing line. The scores were recorded times taken by the subjects to across finishing line.

iii. 4 x 10 Meter Shuttle Run : Purpose : To measure the agility of the student. Equipments : Ground chunnam whistle stop watch score card pen. Description : Performing shuttle Run 10 meter distance was measured on the ground marked with a Chunnam on both sides subjects were instructed to start his run from one side and touching line on other side and returning back to the starting line like this he has to run three times and his time taken after completion of shuttle run was recorded entrered in the result sheet in seconds.

iv) Standing Broad Jump : Purpose : To measure the strength of the student. Equipments: Floor chunnam score card pen tape. Description : Subjects asked to stand on a marking line both feet apart and he was instructed to take standing broud jump on the floor after taking jump each distance covered was measured and recorded in meters.
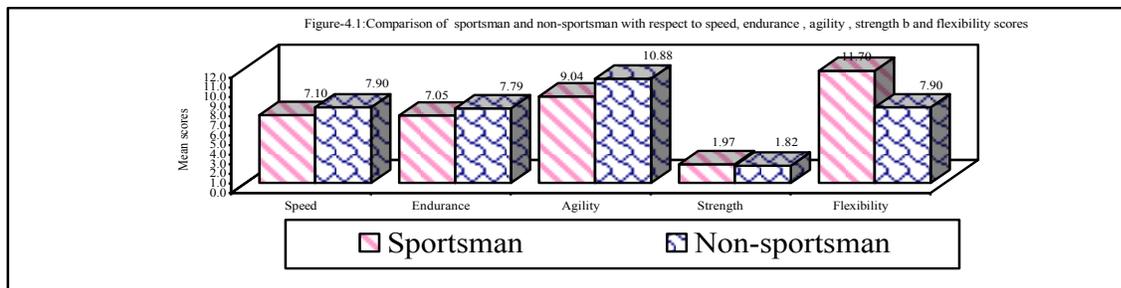
1.5 Differential statistics

The differences between the group (sportsman and non-sportsman) and location (urban and rural) with respect to speed 50 meters run, endurance 1500 meters run, agility 4x10 meters shuttle run, strength broad jump standing and flexibility sit and rich from sportsman and non-sportsman boys of high schools were compared by u unpaired t-test and the results were discussed in the preceding section.

Hypothesis-1: There is no significant difference between sportsman and non-sportsman with respect to speed, endurance, agility, strength and flexibility. To achieve this hypothesis, the t test was applied and the results are presented in the following table.

Table-4.1: Results of t test between sportsman and non-sportsman with respect to speed, endurance, agility, strength and flexibility

Variables	Groups	Mean	SD	t-value	p-value	Signi.
Speed 50 meters run	Sportsman	7.0995	0.2385	-10.6247	0.0000	S
	Non-sportsman	7.8983	0.4113			
Endurance 1500 meters run	Sportsman	7.0490	0.4731	-8.1157	0.0000	S
	Non-sportsman	7.7877	0.3280			
Agility 4x10 meters shuttle run	Sportsman	9.0405	0.1247	-35.9808	0.0000	S
	Non-sportsman	10.8840	0.2991			
Strength broad jump standing	Sportsman	1.9678	0.1570	3.1999	0.0020	S
	Non-sportsman	1.8168	0.2538			
Flexibility sit and rich	Sportsman	11.7000	3.6459	5.5323	0.0000	S
	Non-sportsman	7.9000	2.3621			

Source: Primary data

Figure-4.1:Comparison of sportsman and non-sportsman with respect to speed, endurance , agility , strength b and flexibility scores

From the results of the above table, we had seen that,

1.   The sportsman and non-sportsman of high school boys differ statistically significant with respect to speed 50 meters run (t=-10.6247, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the non-sportsman boys of high schools have higher speed of 50 meters run as compared to sportsman boys of high schools.

2.   The sportsman and non-sportsman of high school boys differ statistically significant with respect to endurance 1500 meters run (t=-8.1157, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the non-sportsman boys of high schools have higher endurance of 1500 meters run as compared to sportsman boys of high schools.

3.   The sportsman and non-sportsman of high school boys differ statistically significant with respect to agility 4x10 meters shuttle run (t=-35.9808, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted.

4.   The sportsman and non-sportsman of high school boys differ statistically significant with respect to strength broad jump standing (t=3.1999, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the sportsman boys of high schools have higher strength broad jump standing as compared to non-sportsman boys of high schools.
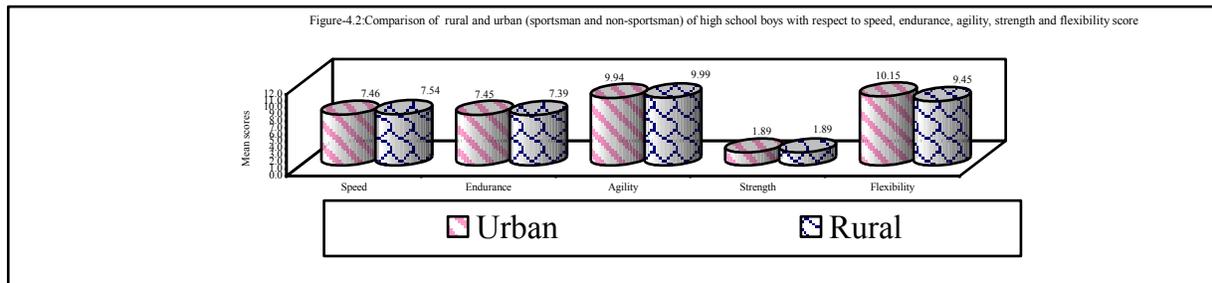
5.   The sportsman and non-sportsman of high school boys differ statistically significant with respect to flexibility sit and rich (t=5.5323, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the sportsman boys of high schools have higher flexibility sit and rich as compared to non-sportsman boys of high schools.

Hypothesis-2: There is no significant difference between rural and urban (sportsman and non-sportsman) of high school boys with respect to speed, endurance, agility, strength and flexibility. To achieve this hypothesis, the t test was applied and the results are presented in the following table.

Table-4.2: Results of t test between rural and urban (sportsman and non-sportsman) of high school boys with respect to speed, endurance, agility, strength and flexibility

Variables	Location	Mean	SD	t-value	p-value	Signi.
Speed 50 meters run	Urban	7.4583	0.5378	-0.6930	0.4904	NS
	Rural	7.5395	0.5105			
Endurance 1500 meters run	Urban	7.4452	0.6043	0.4351	0.6647	NS
	Rural	7.3915	0.4946			
Agility 4x10 meters shuttle run	Urban	9.9375	0.9461	-0.2304	0.8184	NS
	Rural	9.9870	0.9754			
Strength broad jump standing	Urban	1.8938	0.2350	0.0598	0.9525	NS
	Rural	1.8908	0.2133			
Flexibility sit and rich	Urban	10.1500	3.5988	0.8678	0.3882	NS
	Rural	9.4500	3.6158			

Source: primary data

Figure-4.2:Comparison of rural and urban (sportsman and non-sportsman) of high school boys with respect to speed, endurance, agility, strength and flexibility score

❖   The rural and urban (sportsman and non-sportsman) of high school boys do not differ statistically significant with respect to speed 50 meters run (t=-0.6930, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban (sportsman and non-sportsman) of high school boys have similar speed of 50 meters run.

❖   The rural and urban (sportsman and non-sportsman) of high school boys do not differ statistically significant with respect to endurance 1500 meters run (t=0.4351, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban (sportsman and non-sportsman) of high school boys have similar endurance of 1500 meters run.

❖   The rural and urban (sportsman and non-sportsman) of high school boys do not differ statistically significant with respect to agility 4x10 meters shuttle run (t=-0.2304, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected

❖   The rural and urban (sportsman and non-sportsman) of high school boys do not differ statistically significant with respect to strength broad jump standing (t=0.0598, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected.
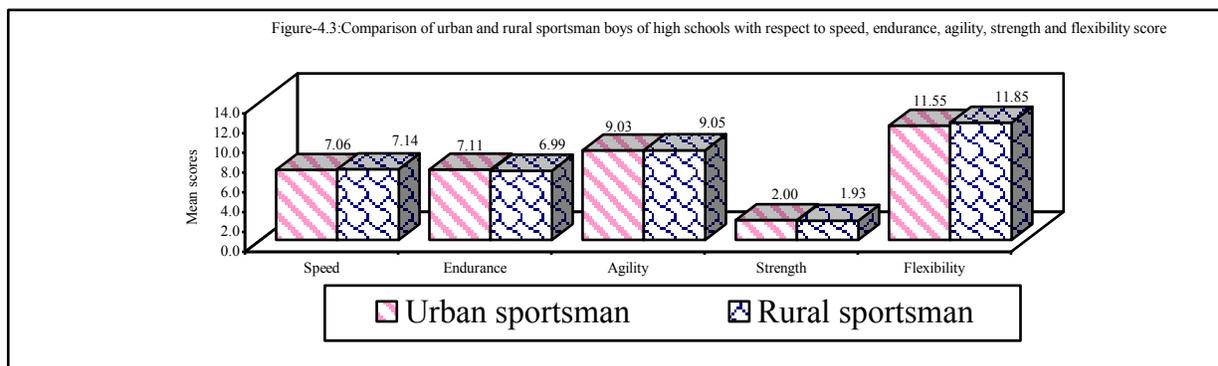
❖   The rural and urban (sportsman and non-sportsman) of high school boys do not differ statistically significant with respect to flexibility sit and rich (t=0.8678, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban (sportsman and non-sportsman) of high school boys have similar flexibility of sit and rich.

Hypothesis-3: There is no significant difference between urban and rural sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility. To achieve this hypothesis, the t test was applied and the results are presented in the following table.

Table-4.3: Results of t test between urban and rural sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility

Variables	Location	Mean	SD	t-value	p-value	Signi.
Speed 50 meters run	Urban sportsman	7.0630	0.2486	-0.9671	0.3396	NS
	Rural sportsman	7.1360	0.2284			
Endurance 1500 meters run	Urban sportsman	7.1115	0.6545	0.8322	0.4105	NS
	Rural sportsman	6.9865	0.1513			
Agility 4x10 meters shuttle run	Urban sportsman	9.0270	0.1255	-0.6801	0.5006	NS
	Rural sportsman	9.0540	0.1255			
Strength broad jump standing	Urban sportsman	2.0015	0.0747	1.3747	0.1773	NS
	Rural sportsman	1.9340	0.2065			
Flexibility sit and rich	Urban sportsman	11.5500	4.1482	-0.2571	0.7985	NS
	Rural sportsman	11.8500	3.1669			

Source: Primary data

Figure-4.3:Comparison of urban and rural sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility score

❖ The rural and urban sportsman boys of high schools do not differ statistically significant with respect to speed 50 meters run (t=-0.9671, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban sportsman boys of high schools have similar speed of 50 meters run.

❖ The rural and urban sportsman boys of high schools do not differ statistically significant with respect to endurance 1500 meters run (t=0.8322, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban sportsman boys of high schools have similar endurance of 1500 meters run.

❖ The rural and urban sportsman boys of high schools do not differ statistically significant with respect to agility 4x10 meters shuttle run (t-0.6801, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban sportsman boys of high schools have similar agility of 4x10 meters shuttle run.

❖ The rural and urban sportsman boys of high schools do not differ statistically significant with respect to strength broad jump standing (t=1.3747, p>0.05) at 5% level of significance.

Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban sportsman boys of high schools have similar strength broad jump standing.
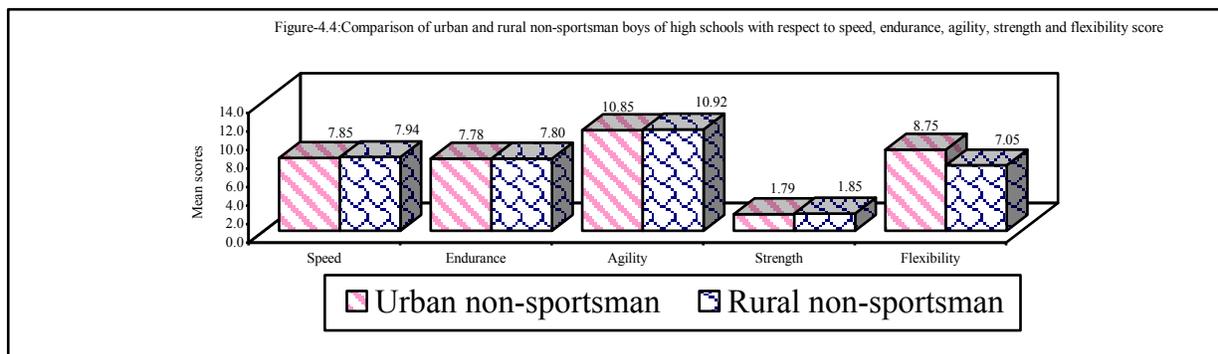
❖   The rural and urban sportsman boys of high schools do not differ statistically significant with respect to flexibility sit and rich (t=-0.2571, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban sportsman boys of high schools have similar flexibility of sit and rich. The mean scores are also presented in the following figure.

Hypothesis-4: There is no significant difference between urban and rural non-sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility. To achieve this hypothesis, the t test was applied and the results are presented in the following table.

Table-4.4: Results of t test between urban and rural non-sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility

Variables	Location	Mean	SD	t-value	p-value	Signi.
Speed 50 meters run	Urban non-sportsman	7.8535	0.4506	-0.6834	0.4985	NS
	Rural non-sportsman	7.9430	0.3742			
Endurance 1500 meters run	Urban non-sportsman	7.7790	0.2944	-0.1671	0.8682	NS
	Rural non-sportsman	7.7965	0.3661			
Agility 4x10 meters shuttle run	Urban non-sportsman	10.8480	0.2762	-0.7571	0.4537	NS
	Rural non-sportsman	10.9200	0.3234			
Strength broad jump standing	Urban non-sportsman	1.7860	0.2887	-0.7622	0.4507	NS
	Rural non-sportsman	1.8475	0.2165			
Flexibility sit and rich	Urban non-sportsman	8.7500	2.2913	2.4124	0.0208	S
	Rural non-sportsman	7.0500	2.1637			

Source: secondary data

Figure-4.4:Comparison of urban and rural non-sportsman boys of high schools with respect to speed, endurance, agility, strength and flexibility score

❖   The rural and urban non-sportsman boys of high schools do not differ statistically significant with respect to speed 50 meters run (t=-0.6834, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban non-sportsman boys of high schools have similar speed of 50 meters run.

❖   The rural and urban non-sportsman boys of high schools do not differ statistically significant with respect to endurance 1500 meters run (t=-0.1671, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban non-sportsman boys of high schools have similar endurance of 1500 meters run.

❖   The rural and urban non-sportsman boys of high schools do not differ statistically significant with respect to agility 4x10 meters shuttle run (t=-0.7571, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban non-sportsman boys of high schools have similar agility of 4x10 meters shuttle run.

❖   The rural and urban non-sportsman boys of high schools do not differ statistically significant with respect to strength broad jump standing (t=-0.7622, p>0.05) at 5% level of significance. Hence, the null hypothesis is accepted and alternative hypothesis is rejected. It means that, the rural and urban non-sportsman boys of high schools have similar strength broad jump standing.

❖   The rural and urban non-sportsman boys of high schools differ statistically significant with respect to flexibility sit and rich (t=2.4124, p<0.05) at 5% level of significance. Hence, the null hypothesis is rejected and alternative hypothesis is accepted. It means that, the rural and urban non-sportsman boys of high schools have different flexibility of sit and rich.

1.6 Finding and suggestions:

The purpose of the study is to compare the physical fitness of Urban boys versus Rural Boys of Basaveshwar High School, Bagalkot and Government High School, Neralakeri respectively. For testing the physical fitness (AAHPER) test administered to the Urban and Rural Boys. For administrating (AAHPER) Fitness test of 40 boys from Rural high schools and 40 Boys from Urban high schools were selected. Further two groups were formed 20 boys each of sports men and non-sportsmen for both Urban and Rural area. For collecting the data (AAHPE) Fitness test administered to these boys. The variables in these tests are speed, endurance agility strength and flexibility.The data were analyzed with reference to the objectives and hypotheses by using differential analysis with student unpaired t-test by using SPSS 11.0 statistical software and the results obtained there by have been interpreted.

1.7 Conclusion
Within the limitation of this study the following conclusions justified as per the results obtained. Of the five Physical variables Speed, Endurance, Agility, Strength and Flexibility were found to

be the sportsman boys of high school have higher strength and flexibility where as Non sportsman have higher in speed Endurance and Agility. Rural and Urban boys have similar in Speed, Endurance, Agility, Strength and Flexibility.

Works Cited:

- Boone H. (1967), "A Comparison of physical fitness level of urban and rural boys" completed research in health physical education and recreation.

- Corbett S. T. (1976) P. P. 12:31, "The physical fitness of women smokers and non-smokers, completed research in health physical education and recreation 9:31(1967) 86 cited by pultanaura, "the difference in physical fitness between selected sports group, (unpublished fitness masters thesis, university college physical education, Mysore.

- Bolfmann (1977), 31: 5178, "A comparison of four selected programmes of physical education upon physical fitness and general ability. Dissertation abstracts international.

- Knutgen H. G. (1961), "Comparison of fitness of Danish and American school children"

- Mookerjee S. (1978). Snipes Journal , " A study of physical fitness of boys 13 to 17 years of age"

- Mall N. T. VI, P. (1978), "Comparative analysis of physical fitness with some physical and socio-phychological variables of school boys (13 to 15 years) possessing this academic achievements "

- Robbon M. (et. al, 1979), A Comparative study of physical fitness of elementary school children of defense and non-defense personal

- Ray B. K. (1979), "Comparison of physical fitness of tribal and urban students in tripura, (unpublished master's thesis tiwji university Gwalior)

- Serenson J. P. (1970), "A Comparative study of physical fitness improvement for students assigned in two classes of varying module time blocks.