

Comparison of Handball Project Trainees with Non Trainee Students in Physical Fitness and Academic Achievement the Case of Bench Maji Zone; Ethiopia

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Abstract: Positive association between physical fitness and academic achievement in youth students has been suggested yet the causal effect of physical fitness on academic achievement remains unclear. The aim of this study is to compare the physical fitness and academic achievement of handball project trainees and non-trainees students of Bench Maji zone, SNNPRS, Ethiopia. To achieve the innate objective of the study cross sectional research design with quantitative approach is employed. In so doing purposefully twenty five Mizan primary and secondary school students whose member of handball project with the age of 15.9 ± 0.7 and twenty five students from grade 9, 15.7 ± 0.6 years old were selected randomly. Physical fitness is measured by 60 meter shuttle; 12 meter cooper test and Illinois agility test whereas the academic achievement is measured by 2017/18 transcript. The data is analyzed through descriptive statistics, independent T-test and Pearson correlation coefficient. The statistical analysis reveal that, academic achievement of handball train students is 53.6 ± 5.8 and 52.4 ± 5.8 , whereas non-train students are 61.32 ± 1 and 60.6 ± 11.9 respectively. The above mean value shows that as handball train students are significantly less than non-train students ($P= 0.03, 0.04$) in both semester. However in 60m shuttle (speed) the handball trainees are significantly greater than non-trainees ($P=0.00$) with the mean value of 7 ± 0.96 and 6.09 ± 0.53 respectively. In the 12' copper test handball trainees score mean value is 2009.7 ± 339.5 whereas non trainees 2436.9 ± 372 , this statistical value shows as handball trainees' students are significantly greater than non-trainees in endurance performance. However result of Illinois agility test indicates as there is no significant difference among the group ($P=0.3$). The person correlation shows as there is no any strong relation between Physical fitness variables and academic achievement of 1st semester ($r=0.06$ $P=.75$, $r=.04$ $P=.81$, $r=.17$ $P=.405$) and 2nd semester ($r=.2$ $P=.32$, $r=.15$ $P=.46$ and $r=.08$ $P=.65$). Overall in the physical fitness the handball trainee students are greater, inversely in the academic achievement the non-hand ball trainees are greater, however the correlation value indicates as there is no any strong relation between academic achievement and physical fitness.

Keywords: Handball trainees and non-trainees, physical fitness and academic achievement

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I. INTRODUCTION

Handball is one of ball games which manifest strict interaction of players against the opponents. Though handball is emerging in United States of America, gradually it spreads through the world (4). The handball is attractive in terms of playing activity particularly in fast action taken up by the pace makers in the team. Based on the findings of (4), provided that Team handball is a dynamic sport that is fun to play and exciting to watch. The sport uses natural athletic skills such as running, jumping, throwing, and catching to provide the action for the game. Players and spectators alike enjoy the fast, continuous play, the body contact, and the goalie action. First-time spectators describe team handball as soccer with your hands, but they also notice elements that remind them of basketball, water polo, and ice hockey.

Physical fitness is one of the backbone physical qualities that handball players required and it can enable them to endure until the end of the match. The demanding physical fitness variables are agility, speed and endurance of the players to acclimatize the circumstances of the match. Physical fitness with diets is very essential However; according to Grissom physical exercise has a great role on the academic achievement of the learners. The advantage of physical exercise can excel the academic achievement of the players; this positive projection of physical fitness can contribute to the outcome of the student academically (8). *Academic*

achievement refers to what the student have learned or what skills the student has learned and is usually measured through assessments like standardized tests, performance assessments and portfolio assessments (11).

For instance, one of the significance of regular physical exercise can increases the amount of oxygenated blood towards brain, which is rich in oxygen. This is the targeted system where teaching and learning process can be takes place. According to Wolfson finding, brain gym exercise and balanced movements can be good predictor of anxiety and stress. Thus, physical exercise is one of the patients as well as normal individual's health weapon to reduce, maintain or eradicate the occurrence of unwanted health problems in life (14).

In the sport research field, previous studies have examined the positive effects of physical activity on intelligence and brain development using various intelligence measurements such as MRI (Magnetic Resonance Imaging), memory test, concentration test, and cognition test (2, 5, 9, 15). For example, Corder found that complex fitness training during a 20-day program increased children's intelligence test scores (i.e., Wechsler Intelligence Scale for Children) by analyzing 24 children aged 12–16 years old (6). Zervas, Danis, and Klissouras concluded that aerobic exercise significantly increased cognition among 26 children aged 11–14 years old. Budde, Voelcker-Rehage, Pietrabyk-Kendziorra, et al.9) found that complex physical training programs increased concentration by stimulating brain function among 99 children aged 13–16 years old (15).

Furthermore, significance of exercise goes to the maintenance of self-esteem, where individuals can have positive will of their selves. It has also good link or association with the academic achievement of the learners in the class room or school compound (7). In support of the above idea, the relationship between physical fitness and academic achievement got peculiar attention Apart from the design of school curriculum to deliver physical exercise; their strict mission to fulfill the standard of education put aside the importance of physical exercise to students. Therefore, the purpose of this research is to determine the relationship between physical fitness and academic achievement in handball project players in respect to non-trainees students in Mizan aman city, Bench Maji Zone, Ethiopia.

Due to scarcity of studied literature in handball project existed in Ethiopia. A few studies have been conducted by Ethiopian scholars, for instance (1), and others. The authors conducted in Eastern and northern part of Ethiopia. But there is no studied research particularly to Bench Maji zone Southern Nation Nationalities people regional state of Ethiopia. Thus, this study is intended to conduct the comparison of handball project trainees with non-trainees' students in physical fitness and academic achievement in Bench Maji Zone, SNNPR.

However physical fitness quality and academic achievement of Mizan city handball trainees in comparison to other non-trainees were not investigated yet. So this research was conduct to fill this gap. Moreover, this research, which is the first in Bench Maji Zone in MizanAman city administration aimed at investigating the project players with non-trainees' students comparing their physical fitness level and academic achievement.

II. MATERIALS AND METHODS

This comparative study was carried out on handball project trainees and non-trainees students of Bench Maji zone, Ethiopia from September 2017 to June 2018. A total 50 subjects (male) of aged ≥ 17 , years were in this study.

Study Design: The study was employed cross sectional research design to determine U-17 trainees' handball project and non-trainee students of physical fitness and academic performance of Bench Maji zone Mizan Aman city. In this study the two consecutive semester academic achievement of both handball trainees and non-trainees were taken. Beside this the design enabled the researcher to measure the selected physical fitness variables of both handball trainees and non-trainees were conducted by 2017/2018.

Sample size: The study population of this research project was both male handball trainees and non-trainee's students of Mizan primary and secondary school, who are attending in regular academic year program in 2017/18. The total number of study sample was 50; To this end both purposive and random sampling technique was employed twenty five Mizan primary and secondary school students whose member of handball project with the age of 15.9 ± 0.7 were selected purposively as a study respondent and twenty five students from grade 9, 15.7 ± 0.6 years old were selected randomly. However all participants were Mizan primary and secondary school students.

Inclusion criteria

Male handball project of Mizan aman city trainees, being free from chronic disease, voluntary and aged under 17, grade 9 mizan aman primary and secondary school students, being free from any drug abuse was the criteria's that was needed to be fulfilled to be the subject of this study.

Exclusion criteria

In contrast to this the female players, trainees with medical restriction, drug abuse, involuntary and bellow and above expected class was excluded from the study.

Procedure methodology

Participation of the students was entirely voluntary, and the confidentiality of the participants' information was ensured. Students were also free to decline to participate in the study. Then an informed was received from each study subjects and anyone who was not willing to take part in the study had the full right to exclude himself/herself. To ensure confidentiality of respondents, their names will not be registered on the questionnaire.

Handball train students and non-train is plane to independent variable where as physical fitness (agility, speed and endurance), 2017/18 transcript is plane to the depended variable. Physical fitness is measured by 60 meter shuttle; 12 meter cooper test and Illinois agility test whereas the academic achievement is measured by 2017/18 transcript. In order to select the study sample, participant's information sheet and comprehensive questionnaire was developed and administered to enable the acquisition of information on past and present health status and their willingness of the participates.

As long as the procedure of data collection is concerned, the researcher was gate through the following steps, so as to collect the relevant data. The first thing the researcher was found permission from the director/coordinator of the school. The researcher was recruited four data collectors of sport professionals, who have strong attachment with the schools and was give training on data collection. In order to collect adequate and reliable data, the researcher was collected from the school of the participants as a data gathering tools. The study variables were considered the two consecutive average semesters of their grades were observed, and on the other hand, the physical tests which can assess agility, endurance and speed of the trainees are Illinois agility run test, Cooper VO2 max test and 60 meter speed test respectively were conducted by the study.

Statistical analysis

The data collected with the above mentioned instruments were presented in two forms. The first type of presentation was the discussion of the findings being sometimes supported by theoretical arguments. In order to analyze quantitative data, descriptive statistics such as mean standard deviation, percentage and frequency counts was used. In addition to this, inferential statistics such as independent t test was used to identify differences among groups categorized by class and participation group. Also, Pearson correlation was used to examine relationships between variables interest. Data analysis was performed using IBM SPSS statistics 25.0, the level of statistical significance was set at $p < 0.05$.

III. RESULTS

The characteristics of study participants and academic achievement over two consecutive semesters are shown in **Table 1**. The study also observed the physical fitness of both handball project trainees and non-equivalent students of the same grade. The study gathered the socio-demographic variables of groups, personal data, family background, Handball project sport activities specific to handball trainees only and the health status of the participant groups.

Table1: Background information of Handball project trainees and non-trainees

Demographic Variables of the participants

	Groups	Trainees		Non Trainees	
		Frequency number	in Per cent	Frequency	Per cent
Sex of the trainees	Female	0	0	0	0
	Male	25	100	25	100
Age	15	8	32	9	36
	16	11	44	14	56
	17	6	44	2	8
Birth year	1993	6	24	2	8
	1994	11	44	14	56
	1995	8	32	9	36
Place of childhood	Urban	24	96	25	100
	Rural	1	4	0	0
Educational placement	Government	25	100	25	100

Based on **table 1** finding of background information of Handball project trainees of sex of the trainees, all participants are male, regarding age of 15, 16 and 17, birth year of the trainees, 1993, 1994 and 1995, place of childhood urban and rural, and educational placement of trainees; 100%; 32%, 44% and 24%; 24%, 44% and 32%; 96% and 4%; and 100%; respectively. This explains that majority of Handball trainees were, male, age of 16, birth year of 1994, urban and learning in governmental school.

Table 2: Handball project trainees and non-trainees family educational background

	HANDBALL TRAINEES FAMILY				NON TRAINEES FAMILY			
	Father educational back ground		Mother educational back ground		Father educational back ground		Mather educational back ground	
	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent	Frequency	Valid Percent
Illiterate	4	16.0	10	-	-	-	1	4.0
primary and secondary	10	40.0	6	1	1	4.0	1	4.0
High school	4	16.0	4	6	6	24.0	7	28.0
Certificate	4	16.0	2	-	-	-	3	12.0
Diploma	1	4.0	2	9	9	36.0	3	12.0
First degree and above	2	8.0	1	9	9	36.0	10	40.0
Total	25	100.0	25	25	25	100.0	25	100.0

Based on **table 2** finding of Handball trainees of father educational background of concerning illiterate of 4, primary and secondary of 10, high school of 4, certificate of 4, diploma of 1 and first degree and above of 2; 16%, 40%, 16%, 4% and 8%; respectively.

And another one table is mother educational background of concerning illiterate of 10, primary and secondary of 6, high school of 4, certificate of 2, diploma of 2 and first degree and above of 1; 40%, 24%, 16%, 8%, 8% and 4%; respectively. finding of non-handball trainees of mother educational background of concerning illiterate of 1, primary and secondary of 1, high school of 7, certificate of 3, diploma of 3 and first degree and above of 10; 4%, 4%, 28%, 12%, 12% and 40%; respectively. This explains that majority of mother educational background was. First degree and above and father educational background of concerning, primary and secondary of 1, high school of 6, diploma of 9 and first degree and above of 9; 4%, 24%, 36% and 36%; respectively. This explains that majority of trainees' mother educational background was illiterate. And father educational backgrounds were primary and secondary school and majority of the non-trainees' mother educational background were First degree and above and Non Handball trainees father educational background were diploma and First degree and above.

Academic Achievement of students

Table 3: Independent t-test of trainees and non-trainees of academic achievement

	Handball Trainees		Non trainees		t-test
	M	SD	M	SD	
1 st Semester A.P	53.63	5.877	61.32	10.052	3.104*
2 nd Semester A.P	52.47	5.879	60.65	11.985	2.98*

A.P = Academic Performance M= Mean value, SD=Standard deviation; * P < 0.05

Based on **table 3** shown that, the two semesters academic performance of handball trainees and non-trainees first and second semester was compared. Handball trainees first semester Average academic achievement have achieved in average and standard deviation scores of 53.63±5.877, N= 50, t (48)= 3.104) lower than non-trainees 61.32±10.05, N= 50, t (48)= 3.104). Handball trainees second semester Average academic performance they have achieved in average and standard deviation scores of 52.47±5.87, N= 50, t (48) = 2.98) lower than non-trainees 60.65±11.98, N= 50, t (48) = 2.98).

Thus, it indicates that non handball trainees academic outcome were significantly (P<0.05) greater than the handball train group whereas handball trainees students of two semester academic achievement in average of 53.63±5.8and 52.47±5.8 with respectively for 1st and 2nd semester. Thus, it indicates that handball trainees academic outcome were significantly (p 0.05) less than the non-trainees group. This explains that the two semesters academic achievements on both students first and second semester were significant variation.

Physical Fitness performance of students

Table 4: Independent t-test of trainees and non-trainees of physical fitness

	Handball Trainees		Non trainees		t-test
	M	SD	M	SD	
Speed	6.09	0.53	7.17	0.96	4.935*
Endurance	2009.76	339.54	2436.92	372.81	4.235*
Agility	18.86	5.879	19.14	11.985	0.85

M= Mean value, SD=Standard deviation; * P < 0.05

In the first row of the table, an independent samples *t*- test was performed comparing the mean between speed of Handball trainees and non-trainee’s physical fitness. As speed of Handball trainees and non-trainee’s physical fitness their significance difference (M= 6.09, SD= 0.53, and non-trainees M=7.17, SD= 0.96 N=50, t (48) = 4.935, P<0.05, two tailed. The result of the mean difference in the groups was large, in eta squared of 0.33.

In the second row of the table, an independent samples *t* test was performed comparing the mean between endurance of Handball trainees and non-trainee’s physical fitness. Their significance difference (M= first semester.76, SD= 339.54, and non-trainees M= 2436.92, SD= 372.81 N=50, t (48)= 4.235, P<0.05, two tailed. The result of the mean difference in the groups was large, in eta squared of 0.27.

In the third row of the table, an independent samples *t* test was performed comparing the mean between agility of Handball trainees and non-trainee’s physical fitness. As agility of Handball trainees and non-trainee’s physical fitness there is no significance difference (M=18.86, SD=5.879, and non-trainees M=19.14 SD=11.985 N=50, t (48) = 0.85, P< .05, two tailed. The result of the mean difference in the groups was small, in eta squared of 0.01.

Relationship between Academic Achievement and Physical Fitness

Table 5: Correlation measures among research variables

	1	2	3	4	5
1	1 st Semester A.P	0.841**	-0.171	.406**	-0.135
2	2 nd Semester A.P		-0.131	.467**	-0.086
3	Speed			-.321*	-0.393**
4	Endurance				0.114
5	Agility				

A.P = Academic Performance Note: **= P < 0.01, * = P < 0.05

The person product- movement correlation is run to determine the relationship between academic achievement which is expressed as first semester average result and second semester average result and selected physical fitness component of students. There was strong significant relationship among average 1st semester academic performance and 2nd semester average academic performance (r= 0.84, p<0.01). There was low negative correlation between speed with average of both semesters academic performance (r= -0.17, p< 0.01; r= -0.13, p< 0.01). There was positive moderate significant relationship between endurance and average both semester academic achievement (r= .406, p< 0.01; r= 0.467, p< 0.01) while there was negative significant relationship between endurance and speed (r= -.321, p<0.01). There was low negative relation between agility with average both semester academic achievement (r= -0.135, p< 0.01; r= -0.086, p< 0.01), while there was low significant relation between agility and speed (r=-0.393, p< .01). And also there was low relationship between agility and endurance (r= 0.114, P< 0.01).

IV. DISCUSSION

The purpose of the study was to determine the comparison of academic achievement and physical fitness of both handball trainee’s and non-handball trainees in Mizan Aman, Bench Maji zone south west Ethiopia.

There is low correlation between academic achievement and physical fitness of both Handball trainees and non-Handball project students. The study is inconsistent to the study conducted in Haramaya University model school (1).

The study is consistent to the following authors (13) because there is no consistent data that can support for regular basis of physical activity with the academic achievement of the trainees. And also there is no a consistent evidence that can support the increment of physical activity to the improvement of academic achievement.

Based on the review of (3) physical activity and academic performance on child development, they found from a decade research, the impact is positive. Doing physical activity can enhance the achievement of academic learning, though the study is in children setting. The change of sport, play and active recreation was resulted that exploit the physical activity of kids; it has an effect on the academic achievement with a longitudinal survey study.

According to (15) experimental controlled design on the mental test of trained twins and untrained twins, they found an improvement after 6 months of exercise group; though there was not statistically significant difference with the untrained exercise groups. Even though there was difference in their performance, they recommended chronic physical activity can produce effect with the outcome of academic achievement.

By the same continuum of decade study, from 2000 onwards reduction in physical education, art and music, or more engagement in academic subject matters for instance in mathematics and reading did not result high in academic result by (13). As the authors asserted that ignorance in physical activity or the above factors did not be associated with the decrement of academic performance in elementary schools, a study conducted in Virginia.

The study has found Based on the result of the study the comparison between academic achievements of both semester of 2017/18 was relatively the same. Though the grade levels of both average academic semesters differed but the outcome of their achievement shown a little bit variation in their average scores and different in individual scores of the non-handball project trainee's academic achievement.

The result has been found from endurance physical fitness in both handball trainees and non-trainees both have had good endurance level and but endurance cannot be a good factor for their academic achievement in their grade levels.

In the contrary, agility physical fitness of both handball trainees and non-trainees was not statistically significant. Both handball trainees and non-trainees have had not good endurance level and agility cannot be a good indicator of academic achievement in their grade levels.

As per the result shown that physical fitness cannot predict the academic performance of the handball trainee's; in contrast to this except speed of non-trainee's, the other endurance and agility cannot predict the academic performance of Bench Maji zone Handball project trainees and non-trainee's.

These findings cannot elucidate the mechanisms that link physical fitness and Academic performance. It also should be noted that the study sample was limited at Bench Maji zone, Ethiopia which may affect its generalize ability. Since Academic achievement has many confounding variables, future studies are needed to investigate the relations between physical fitness and Academic performance by considering the potential intermediation factors such as cognitive function using a large sample to make generalize.

V. CONCLUSIONS

By using the cross sectional design, the researcher detected except speed of non-trainee students, physical fitness cannot predict the academic performance among handball project trainees and non-trainees students in Bench Maji zone, SNNPRS, Ethiopia. Moreover, it is suggested that as the correlation value indicates there is no any strong relation between academic achievement and physical fitness. The comparison of speed physical fitness in both handball trainees and non-trainees was statistically significant via independent t test. However the comparison of non-handball trainees speed physical fitness is statistically significant difference with their academic achievement. But in handball trainees speed cannot determine the academic outcome.

REFERENCES

- [1]. Aklilu, S.A; Rani, S; and Negussie, B;. (2014). Relationship between Physical Fitness and Academic Achievement: The Case of Model School Students at Haramaya University, Ethiopia. *International Journal of Scientific and Research Publications* 4 (1)
- [2]. Budde H, Voelcker-Rehage C, Pietrabyk-Kendziorra S, et al. : Acute coordinative exercise improves attentional performance in adolescents. *NeurosciLett*, 2008, 441: 219–223. [PubMed]
- [3]. Castelli, D. M., Centeio, E, E., Hwang J., Barcelona, J. M., Glowacki, E. M., Calvert, H. G. and Nicksic, H. M. (unspecified year). *The History of Physical Activity and Academic Performance Research: Informing The Future.*
- [4]. Clanton, R., E. and Dwight, M., P. (1997). *Team Handball step to success.* Library of Congress Cataloging-in-Publication Data. United States of America
- [5]. Colcombe SJ, Erickson KI, Scalf PE, et al. : Aerobic exercise training increases brain volume in aging humans. *J Gerontol A BiolSci Med Sci*, 2006, 61: 1166–1170. [PubMed]
- [6]. Corder WO: Effects of physical education on the intellectual, physical, and social development of educable mentally retarded boys. *Except Child*, 1966, 32: 357–364. [PubMed]

- [7]. Ekeland, Heian, Hagen, Abott, and Nordheim, Exercise to improve self-esteem in children and young people ,2004;(1): DOI: 10.1002/14651858.CD003683.pub2CD003683.
- [8]. Grissom, Gb. (2015). Physical Fitness and Academic Achievement. *Journal of Exercise Physiology*. 8(1). 11-25.
- [9]. Kwok TC, Lam KC, Wong PS, et al. : Effectiveness of coordination exercise in improving cognitive function in older adults: a prospective study. *ClinInterv Aging*, 2011, 6: 261–267. [PMC free article] [PubMed]
- [10]. Santrock, J.W. (2006). *Educational Psychology (2ndEd.)*. New Delhi: Tata McGraw-Hill; P 25-26
- [11]. Thomas Keeley and Fox, (2009) The impact of physical activity and fitness on academic achievement and cognitive performance in children, *International Review of Sport and Exercise Psychology* 2(2):198-214 DOI: 10.1080/17509840903233822
- [12]. Wilkins, J. L. M.; Graham, G.; Parker, S., Westfall, S., Fraser, R. G., & Tembo, M. (2003). Time in the arts and physical education and school achievement. *Journal of Curriculum Studies*, 35, 721-734.
- [13]. Wolfson, C. (2002). Increasing behavioral skills and level of understanding in adults: A brief method of integrating Dennison's Brain Gym balance with Piaget's reflective processes. *Journal of Adult Development*, 9(3):
- [14]. Zervas Y, Danis A, Klissouras V: Influence of physical exertion on mental performance with reference to training. *Percept Mot Skills*, 1991, 72: 1215–1221. [PubMed]

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