INFLUENCE OF SELECTED PREDICTIVE VARIABLES ON RACE PERFORMANCE OF TRAINEES IN MAYCHEW ATHLETICS TRAINING CENTER,ETHIPIA

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ABSTRACT

Generalization has never been made on the secret of world class athlete's athletic performance. Therefore, the aim of this study was to investigate the Influence of some selected predictive Variables on Race Performance of Maychew Athletics Training Center Trainees. The research was cross-sectional explanatory in its design. Athletes were selected by using sampling techniques focused on group discussion; key informants interview, semi-structured interview and questionnaires for collecting data. Descriptive statistics and stepwise multiple regression were used for analyzing data. Based on the findings of the study; athlete's height, weight and training age were the most determinant factor in performance of race ($p<0.5$).

KEYWORDS: Anthropometry, leg length, performance and training.

INTRODUCTION

Secrets of elite athlete's athletic performance are being revealed everyday yet generalization has not been made. Because, much is known, much more remains to be known. Therefore, in recent years, there has been an increase in interest in issues related to the enhancement of athletes' athletic running performance (Marahma, 1999). In contrary with this, a plenty of challenges are affecting athletes' performance: anthropometric, physiological, physical fitness, diet status, and environmental factors. To date, much of the research concerning the performance of elite young athletes has focused on physical, physiological factors and how these related to age and maturation. It is not surprising; a number of physiological, anthropometric and biomechanical factors appeared to influence the race performance of highly trained elite athletes.

Anthropometry is defined as measurement of human body (Tak, 2011). Anthropometric profile was assessed by stature, mass, skeletal breadth, segment lengths girths and skin folds are used to describe human size, proportions, shape, compositions and symmetry (katralli & Goundar,2012). Various findings have reported the relationship between anthropometric measures and running performance. Studies on the characteristics of elite Kenyan distance runners to analyze their success regarding anthropometric aspects. The measurements measures include the subject's height, mass, leg length, calf circumference and ankle circumference.

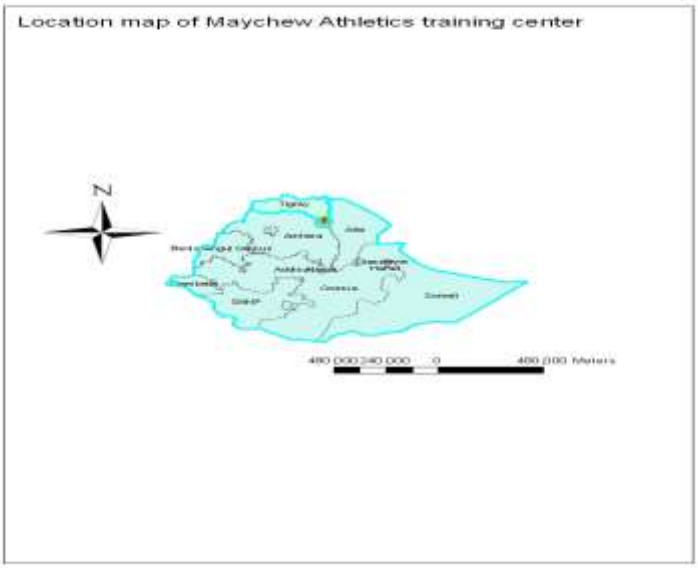
There was a controversial issue whether anthropometric, demographic and socio-economic variables have an association with race performance of athletes. Body mass index, body height skin fold, thickness, circumference of extremities, skeletal muscle mass and body fat have no influence on race performance on world class athletes (knechtle et al,2007).Underpinning this investigation, race performance time was not significantly influenced directly measured variables, height, leg length, body mass and average skin fold (Knechtle, 2007).

Therefore, the researcher hypothesized that anthropometric, demographic and socio-economic variables including, age, weight, height, leg length, educational background, training age, diet status, gender and marital status of athletes significantly affect the race performance athletes

3. METHODOLOGY

3.1 Description of the study area:

3.1.1 The Study Area



Maichew, located at Latitude: 12° 47′ 15 N, Longitude: 39° 32′ 32 E, is the capital of the administrative zone of southern Tigray. It is 120 km away from the regional capital, Mekelle and is one of the historical places in Ethiopia having moderate and pleasant climate. The city stands above 2600 m.a.s.l and is surrounded on most sides with mountains. Currently, the city has a population sized about 23,484 of which males 11,057 and 12,427 are females, (CSA, 2007). This study was conducted on Maichew Athletics training Center which is found in Maychew Town. It is one of the four regional development project stations, constructed by Ethiopian Athletics Federation (EAF) to make training and vocational centers for athletes aged above 17 who graduate from the

youth development projects once their 'project age' phases out. Recently, the center has accommodated and training 35 athletes training by 3coaches and 1 manager.

3.3 Research Design

This is a cross-sectional exploratory study, which employed both quantitative and qualitative methods. The use of both methods provides a better understanding,'' Influence of Selected Anthropometric, Demographic and Socio-economic Variables on Race Performance of Maychew Athletics Training Center Trainees.''

3.2 Study Population

The study population included all athletes who were trained in Maichew Athletics Center (MAC), coaches, stakeholders, executive directors, senior experts and manager found at woreda and Regional levels. The entire population was selected for participation in this study rather than a sample due to the relatively small population size (all N = 35) and ease of accessibility.

3.3 Method of Data Collection

Table1. Summarized methods of data collection

S.No.	Research Methods	Method of data collection	Total individuals proposed for	Total individuals participated for
1	Qualitative Study	Focus group	Two groups of 8 each	Two groups, one with 6 & the other 8
		Key informant interview	12 individuals	9 individuals
		Semi-structural interview	12 individuals	12 individuals
2	Quantitative Study	Questionnaire	35 individuals	33 athletes

The data were collected in June, 2012. This study used both primary and secondary data. The primary data for qualitative data collection: two groups of focus group discussion, 9 individuals for key informant interview and 12 individuals for semi-structured interview. Beside this, secondary data was obtained using questionnaires from 33 athletes of MATC.

3.5. DATA ANALYSIS

The data collected from athletes and their respective coaches were coded and entered in to SPSS Version- 16.0 Statistical Software for analysis. The univariate analysis and multiple regression estimation techniques were performed to address the objectives set in the study. The univariate analysis was predominantly used simply to calculate mainly descriptive statistics and thereby characterize or describe the variables in the study. To this end, frequencies and percentages for categorical variables: means and standard deviations for numerical variables have been computed. In addition, stepwise multiple regression was used to determine the predicting factors of athletes` performance. The level of statistical significance was at $p<0.05$. The data obtained from focus group discussion, key informant interview and semi-structured interview were used to underpin the completeness of the information.

Study Variables:-

In order to make use of regression analysis to address some of the objective of the study, we utilize two variable cohorts, Dependent Variable and Independent Variables, along with their epigrammatic definitions.

(a). **Dependent Variable**:

The dependent or the outcome variable of the model to be used for the study was the **Athlete`s Performance**. It is a measurable quantity. Different literatures measure this dependent variable via a variety of definitions. In this study, we made use of **athlete`s best time to measure it** due to the fact that it is to be able to compare with the bulk of prior works, availability of data on such measures and of the researcher's preference for the chosen measures.

(b). **Independent or Explanatory Variables**:

It fact, it is possible to mention so many explanatory variables that are supposed to have an influence on the performance of athletes of our country in general, and that of Maichew ones in particular, this study spotlighted on the most important and common explanatory variables, especially analyzed in most prior works. Besides this, it has also considered several other independent variables which are either Ethiopian specific or significant from theoretical ground. These comprise athlete's demographic variables (age, gender and marital status), anthropometric variables (height, weight and leg length), socio-economic variables(educational level and training experience) and athlete's training variables(relationship between training and age, training experience, training days/weeks, intensity of training, recovery and overall training assessment).

4. RESULTS

4.1. Physical characteristics of athletes

Table 2**:** Physical characteristics of the athletes and their performance (mean ± s.d.)

Physical characteristics	Freq(percentage)	mean ± s.d.
Socio-Demographic-Athlete training variables		
Gender		
Males	**17(51.51)**	
Females	**15(48.49)**	
Marital Status		
Single	**33(100)**	
Married		
R/nship b/n Training and Age		
Always	**5(15.15)**	
Sometimes	**3(9.1)**	
Occasionally	**25(75.75)**	
R/nship b/n Training and Experience		
Always	**7(21.21)**	
Sometimes	**4(12.12)**	
Occasionally	**22(66.67)**	
No. of training days/Week		

5 days	**31(93.94)**	
2 days and above	**2(6.06)**	
Weight of training		
Yes	**30(90.91)**	
No	**3(9.09)**	
Intensity of training		
Yes	**29(87.88)**	
No	**4(12.12)**	
Overall assessment of the training		
Poor	**1(3.03)**	
Fair	**2(6.06)**	
Good	**26(78.79)**	
Excellent	**4(12.12)**	
Athlete`s Age		17.40±.67
Athlete`s Educational Level		9.98±1.01
Athlete`s Training Age		30.7 ±114.83
Average rest an athlete takes in one training Session		1.72±0.45
Anthropometric variables		
Athlete`s Height		16.3±..25
		53.19±8.01

Athlete`s Weight	.9970±.25
Athlete`s Leg Length	

(a). **Socio-economic and training related information**

As can be seen clearly from Table 2, the gender distribution of the athletes was quite uneven, with 48.49% female athletes and 51.51% male athletes. This could be attributed to the fact that men participate actively in athletes events than females. Having carried out age wise comparison, it was found that mean age of those athletes were found to be 17.40 with standard deviation ± 0.616. This implies that the majority of athletes age in the center were between16-19 (17.60 ± 0.616) age and regarding to training age (experience) of athletes, it was also obtained that athletes mean training age was 30.7 month with the standard deviation 11.48 months indicating that the majority of the athletes training age was 19.22-42.18 (30.7 ±11.48) months. Similarly, referring to the average time in second at which an athlete took in one training session had obtained being 1.72 ±0.454 seconds.

(b). **Demographic and Training information**

Table 2 also revealed that athletes have had mean educational level of 9.98 and the standard deviation of 1.02 indicating that the majority of the athletes` educational level was 9-11. It was also indicated that the dominant educational level of the athletes was from grade 9 up to grade 11 (9.98 ±1.02).
As to the assessment of the training given in the center was concerned, the majority responded that the overall training is good although most (78.79%) athletes responded that the training they took there is intensive (87.88%)and something that does not match in line with their age.

(c). Anthropometric information

Results from anthropometric variables also indicated that the average leg length of the athletes was 0.99 meters with standard deviation ±0.24 meters implying that the leg length of the majority of athletes was between 0.75 meters and 1.23 meters. Similarly, athlete mean weight and height were 53.19kg with standard deviation of ± 8.01kg and 1.66 with standard deviation of ± 0.96 respectively. And, athletes height ranges between 1.38-1.8(1.63± 1.88) meter.

4.2. Determinants of Athlete's athletic Performance

Model Validation and Criticism

Examination of the scatter plots and normal probability plot (PP-plot) of residuals were made to detect departures from normality, outliers, non-constant variance, and the wrong functional forms. One obstacle that presents difficulty in rendering multiple regression analysis is the existence of multicollinearity among independent variables. The standard statistical method for testing data for multicollinearity, *i.e.,* variables` variance inflation factor (VIF) was, therefore, assessed to ensure whether the problem exists or not. Moreover, partial regression plots were also examined since they provide an easy way of identifying the extent of departures from linearity, non-constant variance and the existence of outliers.

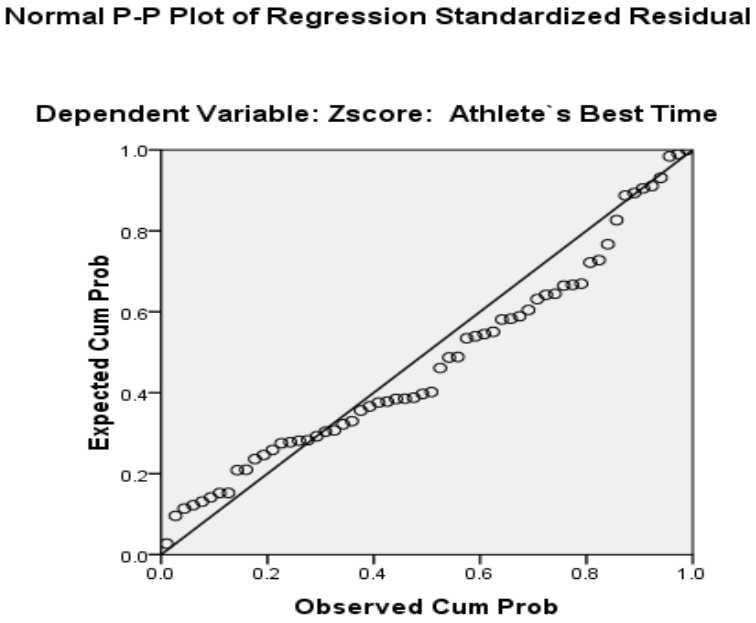
Table 3. Condition of multicollinearity of explanatory variables in the model

Variable	VIF	Tolerance=1/VIF
AtAge	**2.58**	**0.387597**
AtSex	**3.01**	**0.332226**
AtEduL	**2.25**	**0.444444**
AtMStatus	**2.16**	**0.462963**
AtTrAge	**2.07**	**0.483092**
Athght	**1.90**	**0.526316**
Atwght	**1.65**	**0.606061**
AtLL	**1.60**	**0.625**
Tra_Age	**1.029**	**0.971817**
Tra_Exp	**4.20**	**0.238095**
Mean VIF	**2.494333**	

Table **3.** above displays the condition of VIF of exogenous variables in the model. As it can be seen from the table, the VIF of each of these variables is far less than 10, which indicates that the associated

regression coefficients will not be poorly estimated because of multicollinearity. Therefore, the variables included in the models were each producing independent effects.

The number of variables was reduced from multiple regression calculation becousse of numerous reasons. As a result, Athlete`s Gender, R/nship b/n Training and Age, Age, Height , best time and Leg Length were treated for further calculation. Thus, the ratio of valid cases (33) to number of independent variables (6) was also 8 to 1, which was equal to or greater than the minimum ratio (5:1). The requirement for a minimum ratio of cases to independent variables was satisfied.



Figures 3.1

Figure 1. also shows the standardized normal probability plot (P-P plot) of the residuals of each model. The plots indicate no violation of the assumption of normality in each model as all points lie (approximately) on the 45^0 line.

Table4. Results of Stepwise Wise Multiple Regression Analysis on Determinants of Athletes Performance

Independent Variable	*1*				*2*				*3*			
	B	Std. Err.	t	P-Value	B	Std. Err.	t	P-Value	B	Std. Err.	T	P-Value
Constant	5.311	2.118	2.508	.015	6.093	2.066	2.950	.005	6.983	2.373	2.943	.005
At_hgt	-0.319	1.27	-.251	.015	-.345	1.22	-.283	.007	.173	1.31	.132	.007
RnTA	-.285[a]	-	-2.361	.022	-.191	.081	-2.361	.022	-.183	0.077	-2.372	.022
At_sex	.024[a]	-	-1.669	.101		-	-1.839	.071		-	-1.807	.071
At_age	.131[a]	-	.190	.850	.029[b]	-	-.041	.967	.039[c]	-	-.046	.967
At_wgt	-.059[a]	-	1.035	.305	.080[b]	-	1.111	.071	.081	0.072	1.123	.041
At_LL	-.285[a]	-	-.171	.639	-.035[b]	-	-.092	.771	0.091[c]	-	-.042	.771
N	33				33				33			
R	.831				.842				.884			
R^2	.691				.708				.781			
Adjusted R^2	.681				.701				.774			

Autocorrelation (serial dependency of the response variables) was evaluated through the Durbin-Waston test procedure (see last column of Table 4), while homoscedacity (see figure 1), was graphically assessed (standardized residuals versus fitted values). As seen all specifications, the results confirmed that the model did not suffer from those problems, known as spherical assumptions (the assumption of autocorrelation and homoscedacity).

The partial regression plots of each of the continuous independent variables, Athletes Age (years), Athletes Height (meter), Athletes Weight (kilogram), Athletes Training Age (month) and Athletes Leg length (centimeter) were also drawn using SPSS v.16. Thus, each plot does not show any apparent deviation from the assumption of linearity.

Step-wise Regression Analysis

Stepwise multiple regression analysis was performed to select the most important factors affecting the performance of athletes in the center. That is, the data was subjected to the stepwise regression analysis and then the best predictors of those athletes` performance were selected. The

contribution of each of these selected predictors to the average performance of the athletes was also determined.

The results of the stepwise regression analysis are presented in Tables 5-6 under the aforementioned assumptions of the model. As can be seen from the results in Table 5., the p-value of the F-test to see if the overall model is significant found to be zero to three decimal places. This indicates that the model is statistically highly significant.

The estimated coefficient of RnTA , which indicates how often AVERAGE athlete`s training (0=always, 1=usually, 2=sometimes, 3=occasionally or 4=never) relays on athete`s age, was negative and statistically significant at the 5 percent level. Moreover, this coefficient of RnTA (0.170, $p<0.002$) revealed that the Athlete`s performance of those athletes in the center was getting higher and higher as the frequency of training became more and more.

Results in Table 4 also indicated that there is positive multiple correlation ($R =0.884$) among the independent variables and the dependent measure. This implies that the factors are relevant towards the determination of the dependent measure. Also the adjusted R^2 value of 0.781 revealed that the three independent variables accounted for 78.1% of the total variance in the dependent measure (Athlete`s performance). The remaining 21.9% could be due to errors and factors that are not considered in this model.

Athlete's height and training provided to athletes found to be the most statistically significant determinant factors in affecting the performance of the athletes at 5% level of significance. Jointly, both of them brought variation to the performance of the athletes by 78.1%.Therefore, training do not match with their training.

5. DISCUSSION OF FINDINGS

The training center has been established for youngster athletes of Tigray and Afar Regional State, Ethiopia. Most of athlete's were male and single. Alongside, the training provided to them was five days per week. In spite of this, their training age too little and also their training did not match with their age.

Various studies portrays, height and weight were the most important determinant factors in challenging athlete's athletic performance (Knechtle et al, 2007, Temfemo et al, 2008 and Singh and Yadav, 2010). In this study as well, there were anthropometric predictive variables, such as, height and weight which significantly affect the performance of the athletes.

Recent study shows, athlete's age and leg length and sex were found to be statistically insignificant in determining athlete's athletic performance (Leyk, 2006). In our finding, athlete's age and leg length and sex were found to be statistically insignificant in determining athlete's athletic performance. Since all the athletes were the same in their age.

This research investigation will be fruitful and taken into generalization, if the coming researchers incorporate more variables and population for their further investigation.

6. CONCLUSION

This study depicts anthropometric characteristics, such as, height and weight. And also training age was found to be the most determinant factor in influencing the Race Performance of Trainees in Maychew Athletics Training Center, Ethipia.

7. ACKNOWLEDGEMENT

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