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# The Examining Ethiopian Youth Athletes Development: Contextual Factors and Olympic Games Performance

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**Abstract:**

*This study examines the relationship between Ethiopian youth athletes participating in the Youth Olympic Games (YOG) and furthermore, examining the influence of gender, medal status, and competitive venue, in the performance of athletes in the senior Olympic Games (OG), focusing on middle- and long-distance events between 2010 and 2020. Historical data obtained from official website of international Olympic committee (*https://www.olympedia.org/results*), and Analyzed using descriptive and linear regression analyses of 118 athletes.* The outcome indicates that *only 23.8% of youth athletes transitioned to the senior level, suggesting a limited talent pipeline. Gender significantly influenced performance, particularly in the 5000m event, with men athletes outperforming females by an average of 87.70 seconds in this even. These findings highlight the need for the researchers to investigate factors influencing the transition from youth to senior success and address potential gender disparities in training and support systems. Examining both successes and failures could provide valuable insights to improve the athlete's development program and boost the conversion rate.*

**Keywords:** *Athletics, Ethiopia, Olympics, perormance, Senior, Youth*

## 1. Background

In the world of competitive sports, everyone from coaches and clubs to federations and governing bodies is laser-focused on one thing: maximizing athlete performance. But achieving peak performance is no easy feat. It's a complex problem with many moving pieces, influenced by everything from an athlete's genes and physical attributes to their mental makeup, training habits, and the environment they train and compete in (Sonnentag, Frese, 2005; Wright, Carling, Collins, 2014; Smith, 2014; Bondareva & Negasheva, 2017). And it's not just about the individual athlete. External factors like access to funding, training facilities, and local policies can also play a big role in determining how well athletes perform (Vagenas & Vlachokyriakou, 2012; Neto & Bertussi, 2015; Jayantha & Ubayachandra, 2015).

Researchers are digging deep, moving beyond single victories to explore the fascinating journey of athletes across their careers. This is because early performances might hold the key to answering later victories (Barreiros et al., 2014; Boccia et al., 2017; Lloyd et al., 2015; Neeru et al., 2013). This study joins the quest, examining into the interesting relation between an athlete's peak performances at the youth and senior levels in international events. It further analyses how factors like gender, athletes' medal status, and Olympic Games

venue influence their ultimate performance on the Olympic Games.

Remember those amazing young athletes who seem unstoppable? You know the ones who win championships and leave us impressed? Well, here's a surprising truth: less than 7 out of 100 of them actually keep their winning streak going when they grow older! That's right, studies across different sports show that even though some young athletes are incredible, very few actually become champions as adults (Gulbin et al., 2013; Agudo-Ortega et al., 2023). some other studies also suggesting that as few as 0% of young champions actually make it big as adults (Latorre-Román et al., 2018), while others offer a more optimistic 68% success rate (Brustio et al., 2021). Even more mind-boggling, some studies even report a perfect 100% transition rate (Vaeyens et al., 2009; Barreiros & Fonseca, 2012)!

Imagine this: almost 90% of young international sports stars don't make it to the big leagues later on (Güllich et al., 2022), and even in speedy sports like sprinting, most champions don't stay on top forever (Agudo-Ortega et al., 2023). This means that being amazing as a youngster doesn't guarantee future success.

So why is this happening? Well, growing up and becoming a senior athlete comes with big changes, both physically and mentally. It's like switching from a smaller playing field to a huge stadium – everything gets tougher! On top of that, the way athletes need to train changes too. It's not just about quick wins anymore, but about building long-term skills and staying healthy throughout a long career (Arne et al., 2023). This doesn't mean we shouldn't celebrate young talent! But it's important to remember that there's a whole journey ahead, and the goal shouldn't be just winning early but becoming a well-rounded athlete who can thrive for years to come. Think of it like planting a seed – you nurture it carefully, and over time, it grows into a strong, beautiful tree. That's the kind of development we want for our young athletes, not just short bursts of success.

This mixed bag highlights the mystery surrounding how young athletes develop into senior champions. What works for one sport might not work for another, and the leap from youth competition to the big leagues can be daunting, especially in areas like middle- and long-distance events where the connection between youth and senior success seems particularly unclear (Vaeyens et al., 2009).That's where this research comes in! By focusing on Ethiopian middle- and long-distance athletes, author diving deep into a specific group and their unique journey. This focused approach can unlock valuable insights into the factors that help or hinder their transition from youth to senior levels.

The path to athletic glory remains shrouded in mystery, especially for Ethiopian and other sub-Saharan athletes. While studies have explored factors like genetics, environment, and blood composition (Robert et al., 2003; Colin et al., 2004; Zelalem et al., 2021), a definitive answer to what makes champions escapes us (Chew, 2004). This research seeks to shed light on this question by investigating how performance factors like gender, athlete status, and even the Olympic venue itself impact performance of athletes in terms of middle and long distance finishing times. By focusing specifically on Ethiopian athletes, both young and experienced, the study aims to understand how these elements shape their journey towards Olympic success.

In essence, this research asks: How are gender, medals status, and Olympic Games competition venue associate to performance of athletes at the Olympics, specifically for Ethiopian athletes? Do these factors lead to differences in performance? By unraveling these questions, the research hopes to achieve several goals. Like, gain a deeper understanding of the factors propelling

Ethiopian athletes towards Olympic glory. It also used to identify areas where training or support systems could be improved; moreover, it will contribute to a broader knowledge of athletic development within diverse contexts like Ethiopia

**Operational definitions**

Athletics: - is a sports discipline that consists of middle- and long-distance events. This includes 800m, 1000m, 1500m, 2000 steeplechase, 3000m for youth, and 800m, 1500m, 3000m steeplechase, 5000m, and 10000m in senior Olympics.

Youth: - under 19 years of age athletes of Ethiopians, who participated in the 2010, 2014, and 2018 Olympic Games.

Contextual factors: - variables that affect the performance of Ethiopian athletes in the Olympic Games; they include gender, medal status, and Olympic games competition venue.

Competition venue: - the city where youth and summer Olympic Games are going on. These include Singapore, Nanjing; and Buenos Aires for the youth Olympics; London; Rio de Janeiro; and Tokyo for the senior Olympics.

Performance: the time required to complete a specific middle- and long-distance athletic event in the given Olympic Games.

Medals Status: is the gold, silver, bronze, or non-medal experience of the athletes in the given Olympic Games.

**Conceptual model of the study**

This study delves into the world of Olympic athletics, specifically focusing on Ethiopian middle- and long-distance runners. We're guided by the "organizational regulation theory of performance" (OSRT), which emphasizes the impact of an athlete's environment on their success. In this context, "performance" refers to an athlete's ability to excel in their chosen event within the unique setting of the Olympic Games.

According to OSRT, various factors within the Olympic environment influence an athlete's performance. These factors can influence factors like motivation, commitment, and ability to handle pressure, ultimately impacting the overall quality of competition. Understanding how these contextual factors interact with performance is crucial for supporting athletes and developing effective training strategies, not just for Ethiopia but for the global sporting landscape.

Our study draws on OSRT as a foundation, considering diverse factors that might contribute to an athlete's success. By analyzing these factors, we aim to build a comprehensive model that can guide future research and training practices. Figure 1 visually represents the key elements of this model.

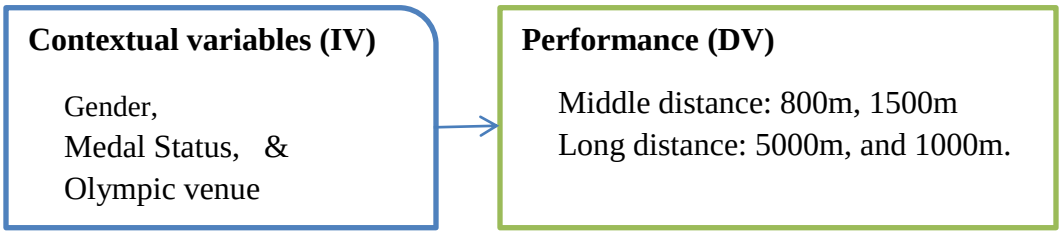

Figure 1. Conceptual model of the study

As shown in Fig. 1, each element of the model addresses specific aspects of the study. The model consists of contextual factors including gender, status, and competitive venue, dealing with the performance of the athletes.

## 2. Materials and Methods

### Design

The study employed a descriptive observational survey design as it was found appropriate for its purposes. It allows the scholar to compare and evaluate many different variables at the same time with little or no additional cost (Rakesh and Priya, 2019).

### Source of data and sampling

The present study used historical data from the International Olympic Committee's official results websites (https://www.olympedia.org/results).
Informed consent from participants was unnecessary because the data were publicly available. The article looked at 296 Ethiopian athletes who competed in either the Youth Olympic Games (2010, 2014, and 2016) or the Senior Olympic Games (2012, 2016, and 2020). There were 68 men and 70 women athletes in total. The researcher then purposely selected only middle and long-distance events and a total of 118 Ethiopians were selected as samples of the study.

The distances analyzed were 800m, 1000m, 1500m, 2000 steeplechase, 3000m, from youth and 800m, 1500m, 3000m steeplechase, 5000m, and 10000m in senior summer Olympics. It is mentioned that the first youth Olympics took place in 2010. In this study, the final filtered data included Ethiopian athletes who participated in youth and/or senior Olympics (118 athletes) were divided first into three groups: Category 1 (C1), athletes who participated in senior Olympics without previous participation in youth Olympics, Category 2 (C2), athletes who participated in youth Olympics; Category 3 (C3), athletes who participated in senior Olympics with previous participation in youth Olympics.

### Statistical Analysis

In this study, the descriptive statistics (mean, standard deviation, frequencies, and percentage) were calculated for all variables. Regression analysis was used to examine the determinant factors (gender, status, and venue) on the performance of athletes in specific events in the Olympic Games. This analysis indicates the importance of some predictors (independent variables such as gender, medals status, and venue) on the dependent variable (performance) when accounting for athletes that participated in the Olympics, in doing so, SPSS version 25 software was used

## 3. Results

### 3.1. The relation between youth and Senior Ethiopian athletes in the Olympics

The total number of middle and long-distance events Ethiopian athletes was 118. Of these, 97 (82.20%) athletes participated in the senior Olympics (C1) and 21 (17.79 %) in the youth Olympics (C2). (See table 1).

Table 1. Characteristics of Ethiopian Olympic athletes (C1, and C2)

| A | Middle and long distance events | Gender | | | |
|---|---|---|---|---|---|
| | | M | St. | F | St. |
| C 1 | 800m (n= 9, 7.56%) | 3 | - | 6 | - |
| | 1500m (n=18, 15.12%) | 9 | - | 9 | 1(S),1(B) |
| | 3000m steeplechase (n=18) | 9 | 1(S) | 9 | 1(S) |
| | 5000m (n=18, 15.10 %) | 9 | 1(B) | 9 | 1(G), 2(B) |
| | 10000m (n=18, 15.10%) | 9 | 1(G),2(B) | 9 | 2(G),1(B) |
| | Marathon (n= 17, 14.30%) | 9 | 1(S) | 8 | 1(G),1(B) |
| | Total 97(82.20%) | 47(48.45%) | | 50(51.55%) | |
| C 2 | 800m (n= 4, 3.33%) | 2 | 1(G),1(B) | 2 | 1(B),1(S) |
| | 1000M (N= 2, 1.70%) | 1 | 1(G) | 1 | 1(G) |
| | 1500m (n=4, 3.37 %) | 2 | 1(B),1(S) | 2 | 1(G),1B) |
| | 2000m steeplechase (N= 6, 5.00 %) | 3 | 2(G),1(S) | 3 | 3(S) |
| | 3000m (n= 5, 4.20%) | 3 | 1(G),2(S) | 2 | 2(B) |
| | Total 21(17.79%) | 11(52.38%) | | 10(47.62%) | |

*Note: A= athleths, M= male, F = female, G= gold, S=silver, B= bronze and St= Status*

In C3, there are about 5(3 male, 2 female) athletes. These are C1 and C2 athletes participating in youth and later in senior Olympics. Therefore, just only 23.80 % of Ethiopian youth athletes participated later in the senior Olympics. Moreover, there is no, C3, athletes earn at least a bronze medal in the senior Olympics. Their maximum status in a senior Olympics was 4th level (see Table 2).

Table 2. Characteristics youth athletes participated later in senior Olympics (C3).

| N0 | Name | Gender | Events | YOG | MSt. | Events | SOG | FR |
|---|---|---|---|---|---|---|---|---|
| 1 | Berihu Aregawi | M | 3000m | 2018 | Silver | 10000m | 2020 | 4th |
| 2 | Melese Nibret | M | 1500m | 2018 | Bronze | 800m | 2020 | 7th |
| 3 | Yomif Kejelcha | M | 3000m | 2014 | Gold | 10000m | 2020 | 8th |
| 4 | Lemlem Hailu | F | 800m | 2018 | Bronze | 1500m | 2020 | 9th |
| 5 | Mekides Abebe | F | 2000 m * | 2018 | Silver | 3000m* | 2020 | 4th |

*Note: YOG= youth Olympics, SOG = senior Olympics, MST= Medal Status, * = steeplechase, &, FR= finishing rank*

From C1, there was a performance difference across genders in 5000m. Most of the medals, 3 (75 %), were won by female athletes. In C2, there are no athletes without medals in all events. including, 800m. There are about 4 medals in 800m, (see Table 1). Table 1 and 2 summarizes the characteristics of the participants.

### 3.2.Regression Model

The results of the regression analysis enabled us to estimate the influence of gender, status, and competitive venue, in the performance of athletes in specific events of the Olympic Games (see Table 3). The results of the linear regression enabled us to predict the influence of gender, status, and venue on the performance of athletes in specific events of the Olympic Games. The regression models for most middle and long-distance events were statistically significant ($F = 29.43$, $p < 0.001$, $R^2 = 0. .92$, for 800m; $F = 11.67$, $p < 0.001$, $R^2 = 0.17$, for 1500m; $F = 57.73$, $p < 0.001$, $R^2 = 0.96$, for 5000m and $F = .121$, $p < 0.001$, $R^2 = 0.24$, for 10,000,m) and showed that gender was a significant variable ($p< 0.001$) only in 800m middle and 5000m long distance events suggesting that Ethiopian athletes competing

in these events in the Olympics were most likely to participate and perform better in the senior Olympics (see Table ). This variable had, a predicted performance in 5000m ($R^2$=.96, which means 96% explained variance) and in 800m ($R^2$=.92, which means 92% explained variance).

Table 3. Regression Models Predicting the performance of athletes.

| 800m (n=12) | | | | | | |
|---|---|---|---|---|---|---|
| IV | B | SE | T | P | F | $R^2$ |
| Constant | 98.91 | 3.37 | 29.32 | .001 | 29.43 | .92 |
| Gender | 15.09 | 1.63 | 9.25 | .001* | | |
| Status | -1.20 | 1.15 | -1.91 | .332 | | |
| Venue | -.72 | .79 | -.91 | .391 | | |
| 1500 m (n=22) | | | | | | |
| IV | B | SE | T | P | F | $R^2$ |
| Constant | 288.99 | 44.80 | 6.44 | .001 | 11.67 | .17 |
| Gender | -3.31 | 16.11 | -.205 | .840 | | |
| Status | -10.75 | 12.83 | -.83 | .414 | | |
| Venue | -5.30 | 8.52 | -.62 | .542 | | |
| 5000 m (n=18) | | | | | | |
| IV | B | SE | T | P | F | $R^2$ |
| Constant | 719.12 | 24.33 | 29.55 | .001 | 57.73 | .96 |
| Gender | 87.70 | 6.77 | 12.94 | .001* | | |
| Status | 2.33 | 4.45 | .52 | .608 | | |
| Venue | -2.27 | 4.45 | -.51 | .617 | | |
| 10000 m (n=18) | | | | | | |
| IV | B | SE | T | P | F | $R^2$ |
| Constant | 915.68 | 548.55 | 1.66 | .001 | .121 | .24 |
| Gender | 35.48 | 142.57 | .24 | .808 | | |
| Status | 97.80 | 56.91 | 1.71 | .111 | | |
| Venue | 79.132 | 90.317 | .876 | .398 | | |

*Note: IV=Independent variables, , *p < 0.001(2-tailed)*

## 4. Discussion

This study explored the journey of Ethiopian middle- and long-distance athletes, examining the transition from youth to senior Olympic participation. The findings reveal a low conversion rate (23.8%), with most athletes competing in just one category (youth or senior) during their careers. Even talented youth medalists didn't always secure bronze medals as seniors.

This result aligns with previous research, showing similar trends in other countries (Hollings & Hume, 2011; Stephen et al., 2014). This moderate "progression linearity" suggests the complexity of athlete development (Baker, 2013; Abbott & Collins, 2002).

However, a ray of hope exists! The study found that athletes who transitioned successfully were top competitors in the senior Olympics and likely future medalists. This aligns with the idea that early success predicts senior achievement (West et al., 2011; Hollings et al., 2014).

The development rate is quite low and suggests several potential issues with athlete development in the country. There could be a significant gap in talent between youth and senior levels, limiting the overall pool of elite athletes in Ethiopia. This could be due to a number of factors, such as inadequate scouting inadequate support systems or resources available to help young athletes progress to the senior level (Doreen, Ngota, and David, 2020), the training and development programs for youth athletes may not be effectively preparing them for

the demands of senior competition. This could be because the programs are not challenging enough, or they don't focus on the specific skills and techniques needed to succeed at the senior level. Additionally, there may be a lack of qualified coaches who can help young athletes develop their talent (Mucheke, Nicholas, & Waiganjo, 2023).

Interestingly, the study found that women competing in the 5000m had the highest medal count. However, none of the athletes who transitioned from youth to senior (C3) managed to secure medals. This aligns with research on Kenyan athletes (Randall & Yannis, 2012).

Possible explanations for Ethiopian women's success in the 5000m include genetic predisposition, hard work within families, early exposure to running, physiological advantages, and training at altitude (Robert et al., 2003; Colin et al., 2004; Robert et al., 2005; Randall & Yannis, 2012; Zelalem et al., 2021).This success brings various benefits, including increased participation in long-distance running, role model creation, national pride, and global recognition (Gregory, 2013).

Overall, this study highlights the challenges and opportunities in transitioning Ethiopian athletes from youth to senior success. By further exploring the factors influencing this transition and leveraging the strengths of female athletes in certain events, Ethiopia can unlock its full potential on the global sporting stage.

A regression analysis was calculated to predict the performance of athletes based on the athletes' gender, status, and competition venue, in the Olympic Games. As a result, gender was found to predict the performance of athletes. The regression models for all middle and long-distance events were statistically significant ($F = 29.43$, $p < 0.001$, $R^2 = 0. .92$, for 800m; $F = 11.67$, $p < 0.001$, $R^2 = 0.17$, for 1500m; $F = 57.73$, $p < 0.001$, $R^2 = 0.96$, for 5000m and $F = .121$, $p < 0.001$, $R^2 = 0.24$, for 10,000,m) and showed that gender was a significant variable ($p< 0.001$) in 800m middle and 5000m long distance events suggesting that Ethiopian male and female athletes competing in these events in the Olympics were most likely to participate and perform better in the senior Olympics. These parameters explain about 96.00% and 92.00 % of the variation of performance in 5000m and 800m athletes respectively.

Ethiopian athletes have long dominated middle-distance races, but a fascinating trend has emerged: women are leaving their male counterparts in the dust, particularly in the 5000m. This study reveals a whopping 87.70-second performance gap between genders. Female athletes not only win most medals (75% in 5000m), but also outperform males who transitioned from youth to senior categories. This phenomenon, previously unexplored, demands further investigation.

Several potential explanations exist. Physiology might play a role, as females sometimes have advantages in long-distance running. Cultural factors, like strong support systems for female athletes, could also contribute. Additionally, past successes might inspire younger generations, creating a self-perpetuating cycle.

To fully understand this intriguing trend, further research is needed. Are training methods different? Do socioeconomic barriers hinder male athletes more? Do psychological factors like societal expectations influence performance? By delving into these questions, we can not only appreciate the remarkable achievements of Ethiopian women, but also work towards creating a level playing field for all athletes, regardless of gender.

**Study Limitation**

This study focused on Ethiopian athletes at the Olympics, but what about everyone else? The findings might not apply to athletes from other countries or competitions like World Championships. To get a bigger picture, future studies should include more athletes from diverse backgrounds and tournaments, along with additional factors that influence performance.

## 5. Conclusions

Ethiopian athletes rarely transitioned from youth to senior Olympics, with gender playing a major role in performance, especially for the 5000m. Analysis revealed that gender predicted up to 96% and 92% of the performance variance for 800m and 5000m athletes, respectively. This aligns with the impressive achievements of female athletes in these events, as evidenced by an 87.70-second performance improvement associated with gender in the 5000m. Further investigation is needed to understand this intriguing gender gap and its potential causes.

## 6. Recommendation

The low conversion rate suggests that achievement alone isn't enough (Christophe & Jean-Baptiste, 2003). Further investigation is needed to understand why most athletes don't make the jump, while others excel. Examining both successes and failures could solve valuable insights to improve the athlete's development program and boost the conversion rate (Christophe, and Jean-Baptiste, 2003).

Negrea (2024) highlights the need for a comprehensive strategy to identify, nurture, and develop young talent in Ethiopia. This strategy should focus on addressing the issues mentioned above, such as improving scouting and providing more support and resources for young athletes, and improving the quality of training and development programs. By taking these steps, Ethiopia can help ensure a strong pipeline of future elite athletes.

This study also offers crucial insights for Ethiopian athletics stakeholders like the Federation and Olympic Committee. By analyzing the low transition rate from youth to senior categories and the surprising influence of gender, particularly in the 5000m, they can develop targeted strategies. Future research should expand beyond Ethiopia, exploring training methods, socioeconomic factors, and global best practices. Additionally, investigating the wider sports system in Ethiopia can reveal areas for improvement, ultimately fostering a thriving and equitable environment for athletes to shine on the world stage.

Overall, as Negrea (2024) suggests, the low transition rate from youth to senior level in Ethiopian athletics is a cause for concern. However, by addressing the underlying issues, Ethiopia can take steps to improve athlete development and ensure a brighter future for its sporting ambitions

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