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Gender disparity in academic performance in higher education institutions: a case of Wollo University, Ethiopia

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Introduction: Gender disparity in academic achievement in developing countries is a pervasive issue that requires attention. Examining the gender gap provides empirical evidence for decision-makers. This study explored gender-based disparities in academic achievement in higher education institutions.

Methods: We employed an ex-post facto research design and analyzed the cumulative grade point average (CGPA) and national exit examination results of 1,323 students to attain the study objective. Data analysis was conducted using the Chi-square test, independent samples t-test, correlation, and simple linear regression tests.

Results: The results revealed a statistically significant underrepresentation of female students in the top-achieving groups ($\chi^2(1) = 7.929, p < 0.05$), whereas their proportion in the lower-achieving groups ($\chi^2(1) = 19.18, p < 0.05$) was higher than expected. Additionally, a significantly more significant proportion of female students scored below the 50% minimum passing mark on the national exit examination ($\chi^2(1) = 23.857, p < 0.05$). Furthermore, the analysis demonstrated that male students attained statistically and significantly higher marks on both their CGPA [$t(1231) = 6.432, p < 0.001$] and national exit examination [$t(1231) = 10.855, p < 0.001$] at a 95% level of significance. The correlation test results revealed that students who performed well academically in their CGPA were more likely to score higher on the national exit examination [$r(1323) = 0.525, p < 0.01$].

Discussion: The findings suggest that further research is necessary to explore the underlying factors contributing to the observed gender disparities in academic achievement at the tertiary level. Moreover, additional efforts have to be undertaken by concerned bodies to support and mentor female students at higher institutions.

KEYWORDS

gender-disparity, academic performance, higher institution, female students, cumulative grade point average, national exit examination

1 Introduction

Any country's economic, political, and sociocultural development is greatly affected by the educational attainment of its citizens, mainly women (United States Agency for International Development-USAID, 2005). In this regard, Murphy and Carr (2007), USAID (2008), CSA (2012), and Chauhan and Kumar (2022) emphasized that education offers several benefits for girls in delaying marriage by lowering fertility rates, improving infant and child health and survival rates, and having a higher rate of return than any other investment. According to the United Nations (UN) (UN, 2009), girls who receive an education can better recognize and stand up for their rights for themselves and their families. Educating females has several positive effects, such as lower infant and maternal death rates, longer life expectancy, and higher educational attainment rates for children (Caldwell, 1986; Marcus and Page, 2016). Moreover, highly educated women benefit their families in other ways, such as better nutrition and health, increased family income, and the general welfare of the coming generations. Educated women also have higher engagement rates in the labor force and more significant earning potential. According to Schultz (1995), women in underdeveloped nations can earn up to 20% more for each extra year of education. Similarly, Psacharopoulos and Patrinos (2018) suggested that eliminating the gender gap in schooling might have a substantial and beneficial economic impact, possibly leading to a 12% rise in GDP in some nations. In addition, Jaysawal and Saha (2023) found that women's education improves their political empowerment, enhances their creditworthiness, helps them participate in public events, and increases their self-confidence and esteem.

Their educational level strongly impacts women's political engagement and empowerment. Educated women are more likely to participate in politics, including voting, running for office, and taking leadership positions (Paxton and Hughes, 2007). Furthermore, Camp (2009) discovered that women's educational attainment affects their participation in regional and national decision-making processes. A study conducted in Pakistan by Daraz et al. (2023) revealed that women's education significantly influences their perspectives in shaping priorities and fostering a desire for compatibility and shared values within their relationships. Furthermore, the study highlighted that educated women exhibit resilience, confidence, and a willingness to challenge prevailing societal norms and gender stereotypes when selecting a partner. Similarly, a study conducted in Australia (Tran et al., 2021) found that higher education levels are associated with increased hedonic and eudaimonic well-being in women, as well as lower levels of psychological distress. Research indicates that higher-education women are more likely to challenge gender stereotypes and speak up for their rights. For example, Kabeer (2005) emphasizes the value of education in helping women avoid domestic abuse and enjoy better relationships. The GPE (2016) study reported that women's earnings increase by 10% for every extra year of education.

Moreover, the likelihood of marriage for girls who complete secondary education is halved. An additional advantage is that children born to literate mothers are 50% more likely than illiterate mothers to survive beyond five. For every extra year of schooling for females, Sub-Saharan Africa would see a 25% boost in agricultural output and a 35% increase in cross-border trade (Somani, 2017). In this regard, Kim and Jung (2023) and Hamplová and Bičáková (2022) revealed that education delays marriage, which in turn allows women

to pursue educational and career aspirations, improves their health, fosters social productivity, and contributes to their empowerment and overall well-being. A study conducted in Northern Pakistan by Voigt and Spies (2020) revealed that women with higher levels of education tend to have fewer children and exhibit greater confidence, resulting in a more prominent and visible role in community life. A recent study in Ethiopia by Ahmed (2024) highlighted that educated women experience enhanced autonomy, improved employment opportunities, and a more outstanding commitment to investing in their children's health and education. Despite the well-recognized multifaceted benefits of educating women, the gender gap in education continues to persist, especially in developing countries worldwide (UNSECO, 2024).

In Ethiopia, the gender gap is currently narrowing, primarily in the lower grade levels, but as one moves up the educational ladder from secondary schools to preparatory and postsecondary education, the gender gap increases (Asfaw, 2012; Tenaw, 2018; Kassie, 2018; MoE, 2006-2019; Engida, 2019). Women have less access to education than men do in developing nations like Ethiopia, and the higher education sector is experiencing the most significant gender gap. For instance, the proportion of female undergraduate, second-degree, and third-degree students was 34.53, 16.6, and 9.7 percent during the 2017/18 academic year, respectively (FDRE, 2019). According to ecological systems theory (Bronfenbrenner, 1979), students' academic performance is influenced by a complex web of interrelated factors at multiple levels. Given this ecological complexity, any intervention intended to address academic performance disparities must take a comprehensive, multilevel approach. Poverty, educational status of parents, long commutes to school, gender-based violence, sociocultural variables, a lack of female-friendly school environments, early marriage and teenage pregnancy, shortage of motivated and gender-sensitive teachers, lack of self-confidence and motivation, and the absence of focused interventions to support girls are just a few of the many factors that have been identified as proxy factors (Dayioğlu and Türüt-Aşık, 2004; MOWA, 2006; UNESCO, 2012; Asfaw, 2012; Okioğa, 2013; Tiruneh and Philipos, 2014; United Nations, 2014; Rotich et al., 2014; Tesfa, 2017; Engida, 2019; Chauhan and Kumar, 2022; Geremow et al., 2023). In addition, females' self-perceptions, parents' employment and educational backgrounds, and their distinct expectations all play a part in how well their children perform academically (USAID, 2005; Memon et al., 2010; Asfaw, 2012; Okioğa, 2013; Rotich et al., 2014; Tesfa, 2017; Engida, 2019; Geremow et al., 2023). Students' motivation and quality of secondary education do have an impact on their later postsecondary academic performance (Dayioğlu and Türüt-Aşık, 2004; Tiruneh and Philipos, 2014; Tenaw, 2018; Geremow et al., 2023).

The absence of a female-friendly campus environment is another factor that affects female students' academic performance (Tenaw, 2018; Engida, 2019; Geremow et al., 2023). Tiruneh and Philipos (2014), taking Bahirdar University (Ethiopia) as a case study, concluded that university-related factors, such as rules and regulations, lack of female role model teachers, peer pressure, limited supportive training and tutorial classes, impact female students' academic performance. In patriarchal societies, families have different attitudes toward boys and girls; where boys are expected to be strong, independent, and assertive, while girls are expected to be weak, dependent, and lacking confidence, which would affect their later academic performance while joining higher education (Belete, 2013;

Rotich et al., 2014; Engida, 2019; Almelhem et al., 2022). Wakuma (2024) found that lack of teaching sufficient materials, limited rewards for good scorer females, limited absence of tutorial classes and other affirmative packages for women, lack of free department choice, lack of self-motivation and self-confidence, frequent absenteeism from class, and lack of adequate preparation prior to the exam are among the factors which affect the performances of female students in higher institutions.

Sexual harassment and intimidation in higher education institutions are among the factors that negatively affect female students' academic performances (Muasya, 2014; Tesfa, 2017; Engida, 2019; Makhaye et al., 2023; Kazaara, 2023; Lacey, 2023). In Botswana, Ahuja and Garutsa (2024) indicated that factors like mood swings, menstruation, psychological stress and financial strains significantly determine university students' academic performance. A study by Stermac et al. (2020) reported that female students who had experienced sexual harassment were three times less likely to score good grades in higher institutions than their counterparts. The study further pointed out that female students who had experienced sexual violence were more often delayed in assignments, courses, and exams, as well as being late for class or missing class, which perpetually affected their cumulative grade points and even their chance of graduation.

Gender disparities in academic performance, particularly at postsecondary levels, have not been adequately examined, and existing research on this topic has produced mixed results. Studies by Tasisa and Tafesse (2013), Olkaba (2013), Gebeyehu and Kathiresan (2016), Gobena (2018), Tenaw (2018), Kassie (2018), Guta (2019), Catherine (2020), Armah et al. (2021) found a statistically significant academic performance difference favoring male students in postsecondary educational levels. On the other hand, Dayioğlu and Türüt-Aşik (2004), Semela (2006), Jelas et al. (2014), Malik et al. (2016), Adelakun (2017), Hdi and Fagroud (2018), and Wrigley-Asante et al. (2023) revealed that female students outperform their male counterparts in their academic performances in higher education. A study by Abubakar and Adegboyega (2012), Josiah and Adejoke (2014), Goni et al. (2015), and Crowther and Briant (2022) reported no statistically significant gender-related difference in academic performance at higher institutions.

Most studies on gender disparity in Ethiopia are conducted in elementary or secondary schools (Belete, 2013; Eshetu, 2015a, 2015b; Abitew, 2019; Bekele, 2020; Ambaye, 2024), with only a few studies conducted at postsecondary levels (Tasisa and Tafesse, 2013; Tenaw, 2018; Kassie, 2018). Although gender disparity in academic achievement has been one of the contemporary issues in academic debates worldwide (Abdu-Raheem, 2012), the situation in higher education institutions has also not been sufficiently studied in Ethiopia. Furthermore, the Ethiopian government has devised different strategies to narrow the gender gap (MOWA, 2006; FDRE, 2019). Such policy effects have to be supported by empirical evidence. This study, therefore, opted to investigate whether there is a gender disparity in the academic performance of students at Wollo University (Ethiopia) during the 2023 academic year using their Cumulative Grade Point Average (CGPA) and national exit examination results. The study also examined the association between exit examination results and students' overall CGPA. The study examined whether CGPA is a good predictor of national exit examination results. To this end, the following null hypotheses were developed from the outset.

H_1 : There is no statistically significant difference in the proportion of male and female students in top-achieving groups in their CGPA and exit exam.

H_2 : There is no statistically significant difference in the proportion of male and female students in the bottom-achieving groups in their CGPA and exit exam.

H_3 : There is no statistically significant mean difference between male and female students in their CGPA results.

H_4 : There is no statistically significant mean difference between male and female students in their national exit examination results.

H_5 : There is no statistically significant association between CGPA and national exit examination results.

H_6 : There is no statistically significant difference in the proportion of male and female students who scored a passing mark in their national exit examination result.

2 Materials and methods

2.1 Study site

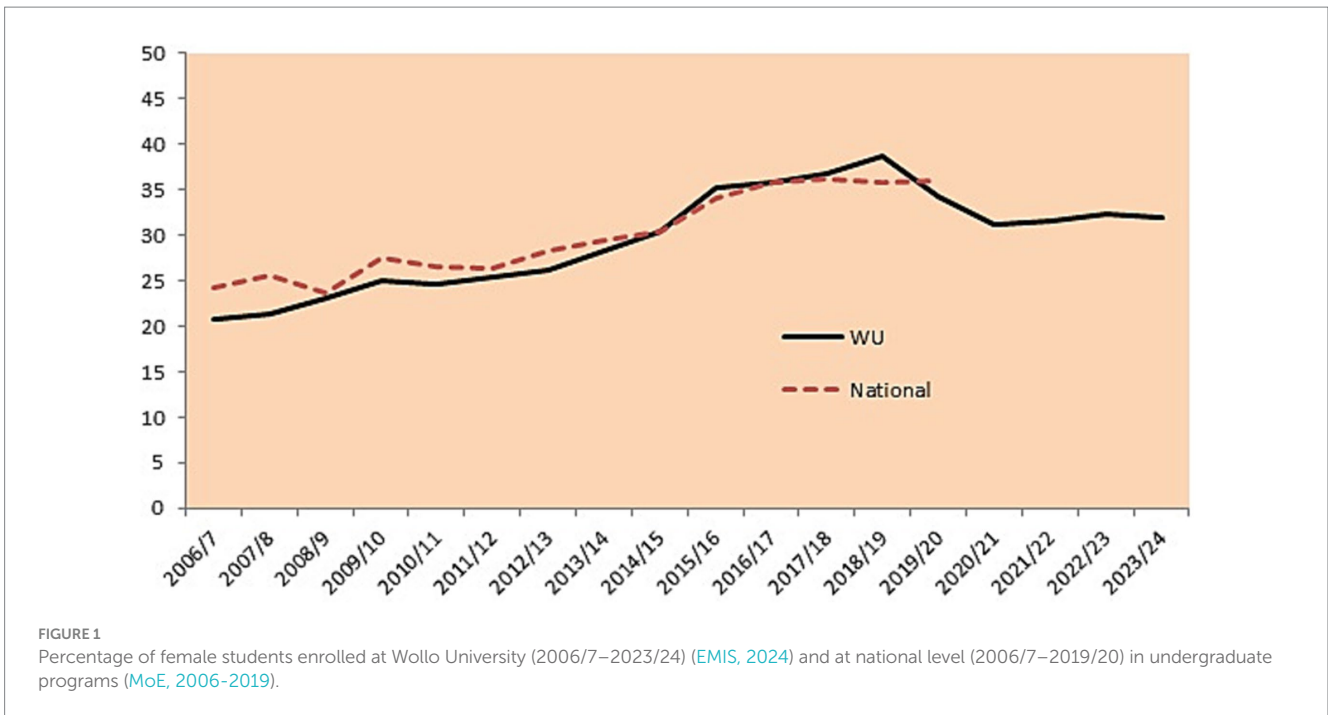
Wollo University is found in Dessie city administration (Amhara National Regional State, Ethiopia). Wollo University began admitting students in 2007 and is one of the federal public higher education institutions built among a group of 2nd generation universities in Ethiopia. As depicted in Figure 1, the proportion of female students at Wollo University is similar to the national trend, although a slight difference was observed in the late years. Though the proportion of female undergraduate students enrolled in the regular program at Wollo University since its establishment gradually increased (ranging from 20.8% during the 2006/7 academic year to 38.7% in the 2018/19 academic year), it still ranks behind its counterparts.

2.2 Research design, population and sampling technique

An *ex-post facto* research design, with a quantitative research type, was used in this study (using already existing data). As a result, the results of 1,323 (63% male and 37% female) students (all the available data) from 52 departments (only on the main campus) obtained from the registrar's office at Wollo University were used to investigate gender disparities in academic performance. All students from the main campus (Dessie Campus) with both the graduating grade point and national exit examination results were included in the study. Students from Kombolach Campus were not included in this study due to securing the necessary data.

2.3 Data sources

We measured the academic performance of university students using their CGPA and national exit examination results. The CGPA is



the mean grade point of students (out of 4 points) at graduation, while exit exam results represent the average score attained in the national exit examination (out of 100). Data on students’ academic performances were obtained from the central registrar’s office at Wollo University. The national exit examination, given only to law and health graduates, was implemented nationally for all undergraduate students for the first time in 2023. Scholars agree that standardized tests are good predictors of performance (Lauzon, 2001). According to Dobson and Skinner (2021), the CGPA is a valuable indicator of academic performance. In addition, national exit examinations are prepared by experts focusing on basic core courses, considered a good indicator for assessing students’ overall competencies. As a result, the quality and efficacy of academic programs can be enhanced using national exit exams (Al Ahmad et al., 2014). Thus, we preferred the national exit examination and CGPA results, which are expected to demonstrate students’ performance better than the class-based examination and one-time results.

2.4 Data analysis techniques

After the raw data were obtained from the registrar’s office, the required student results were carefully encoded in SPSS version 22 software. Necessary data screening techniques like outlier detection and normality tests were checked before analysis. Using the Z-value of Kurtosis and Skewness and the P-P plot and histogram, the normality test result revealed the absence of significant outliers. Students with only one dataset were excluded from the analysis. Finally, gender disparity analysis was conducted using the Chi-square test (Equation 1) and independent samples t-test (Equation 2). The Chi-square test was employed to determine whether the proportion of female students in the top 10% and bottom 10% achiever groups significantly differ or not from their male counterparts. The Chi-square test was also utilized to check whether the proportion of female students who did not achieve

a pass mark (50 points out of 100) in the national exit examination was higher than expected compared to the proportion of male students.

On the other hand, an independent samples t-test was used to determine whether there was a statistically significant difference in mean results between male and female students. Moreover, the Pearson product-moment correlation test (Equation 3) was applied to see the association between CGPA and exit examination results. Linear correlation (Equation 4) was also employed to estimate the exit exam result using the CGPA as a proxy covariate. All tests were tested at a 95% significance level (or 0.05 alpha level). Results were displayed using numeric values, tables, line graphs, and scatter plots.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \tag{1}$$

Where: χ^2 is the Chi-square value, and ‘O’ and ‘E’ represent the observed and Expected frequencies, respectively.

$$t = \frac{M_X - M_Y}{\sqrt{\left[\frac{\left(\sum X^2 - \frac{(\sum X)^2}{N_X} \right) + \left(\sum Y^2 - \frac{(\sum Y)^2}{N_Y} \right)}{N_X + N_Y - 2} \right] \cdot \left[\frac{1}{N_X} + \frac{1}{N_Y} \right]}} \tag{2}$$

Here, M_X and M_Y are the means of the two independent groups, and N_X and N_Y are the total number of cases for the two groups. X and Y represent the respective scores of each student.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \tag{3}$$

Where: ‘r’ stands for the correlation coefficient, ‘n’ is the total sample size, and ‘x’ and ‘y’ represent the raw score values of the correlated variables, respectively.

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + b_nX_{ni} + u_i \tag{4}$$

Where ‘Y’ is the dependent variable; b_0 represents the intercept, b_1 - b_n represents the regression coefficient, x_1 - x_n represents the independent variables, and u_i is the disturbance error.

3 Results

This study used the CGPA and national exit examination results of 52 Wollo University (Dessie campus) departments for the 2023 academic year as data sources. The results of 1,323 students were used to examine gender disparity in academic performance. The proportion of students from the College of Business and Economics, mainly marketing management (7.1%), management (7%), and accounting and finance (6.2%) was much higher than other departments. Sex-wise, the proportion of male students (63%) was much higher than that of females (37%). During this academic year, the overall mean CGPA and exit exam results were 3.14 and 57.46, with a standard deviation of 0.414 and 13.36, respectively (Table 1).

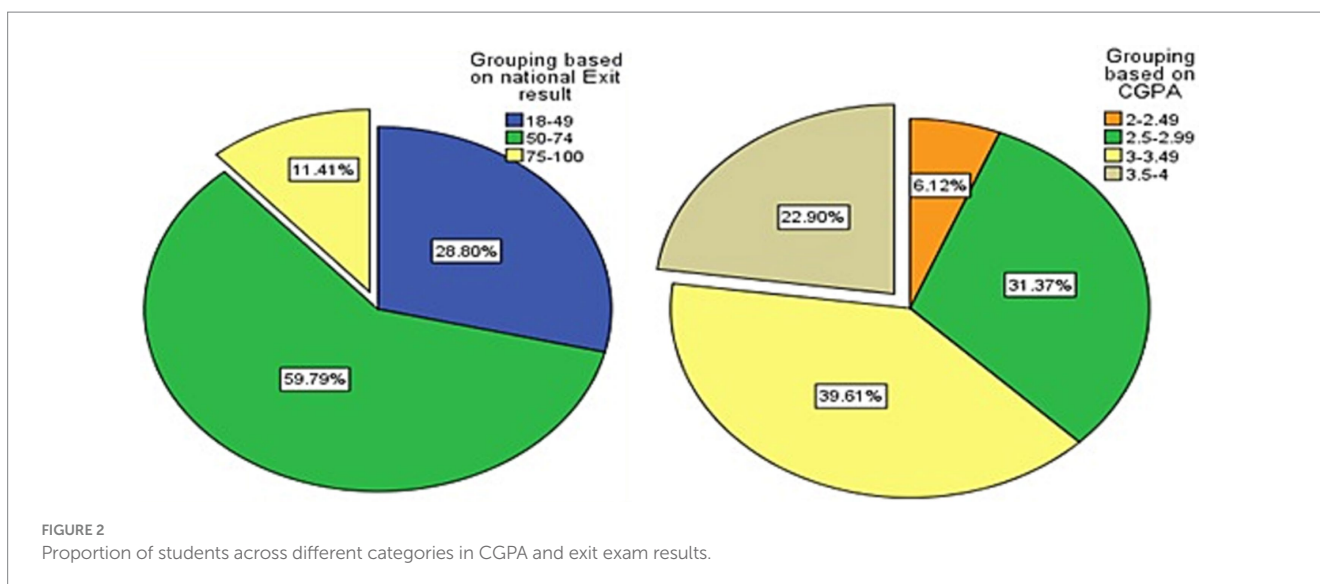
As depicted in Figure 2, 22.9% of participants had scored a CGPA of 3.5 and above, while the percentages for 3.0–3.49, 2.5–2.99, and 2.0–2.49 were 39.61, 31.37, and 6.12%, respectively. Similarly, the proportion of students who scored above 75 points in the national exit exam result was only 11.41, while the proportion for 50–74 was 59.79%. During the 2023 academic year, of the total admitted students, 28.8% (the percentage for males was 23.3%, while it was 38.2% for females) did not secure the minimum pass mark in their exit examination. As shown in Figure 3, differences were observed regarding the proportion of male and female students in the higher- and lower-achieving groups, with male students obtaining better both in the CGPA and exit examination results.

The Chi-square test examined the proportion of male and female students across different categories in their CGPA and whether their national exit examination results differed significantly. As shown in Table 2, statistically significant differences were observed in both cases. The proportion of female students in the top scorers group was much lower than expected. In comparison, their proportion in the lowest scorers group was higher than expected [$\chi^2(2) = 39.822, p < 0.05$] for exit exam result and [$\chi^2(3) = 111.819, p < 0.05$ for CGPA], and the difference was statistically significant at 95% of level significance. For instance, the percentage of males in the very distinctions (3.5 points and above) was 29%, whereas the proportion of females in this category was only 12.5%.

TABLE 1 Descriptive statistics on CGPA and exit exam results (n = 1,323).

		N	Mean	Std. deviation	Skewness	Kurtosis	Minimum	Maximum
CGPA	Total	1,323	3.14	0.414	-0.088	-0.81	2.00	3.99
	Male	834	3.231	0.393	-0.323	-0.462	2	3.99
	Female	489	2.985	0.404	-0.721	0.345	2.12	3.94
Exit exam	Total	1,323	57.46	13.36	0.029	-0.458	18	94
	Male	834	59.24	12.908	-0.436	0.017	23	94
	Female	489	54.42	13.581	-0.479	0.122	18	89

Source: SPSS output (2024).



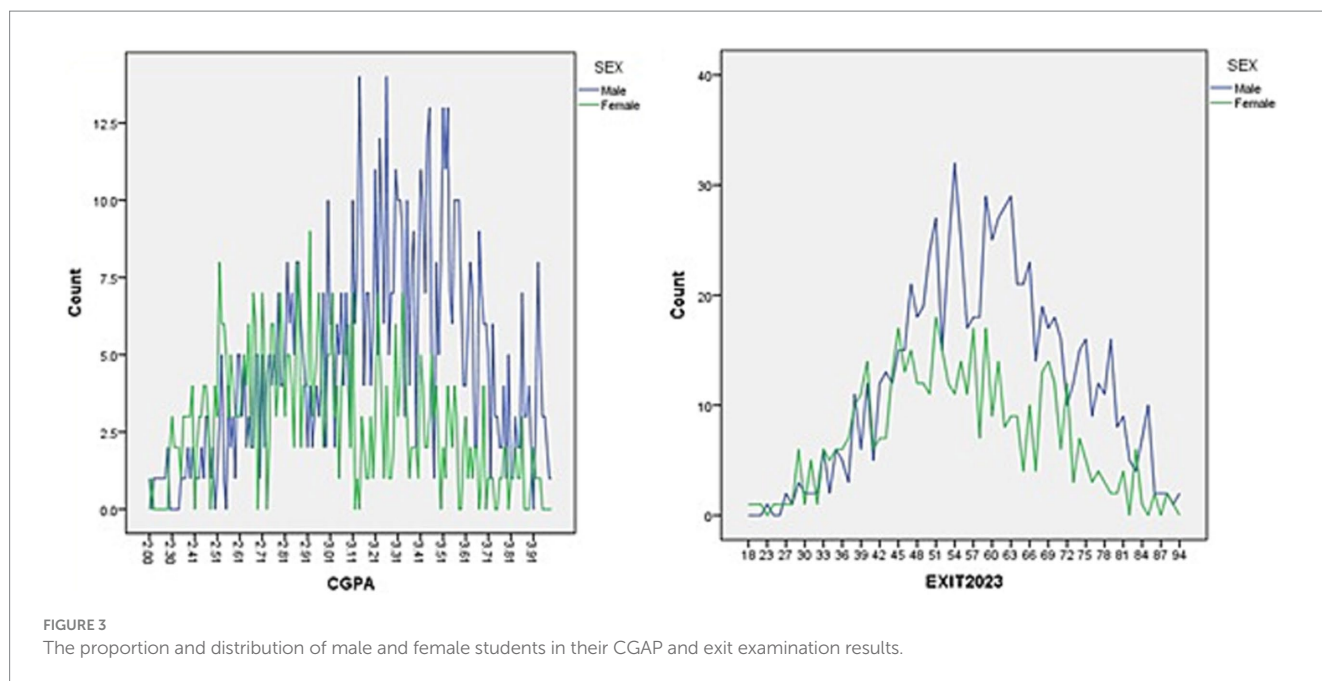


TABLE 2 Chi-square test on the proportion of male and female SEX students across different categories.

	Category	SEX		Total	Pearson Chi-square	df	p-value
		Male	Female				
National exit result	18–49	194 (23.3)	187 (38.2)	381 (28.8)	39.822	2	0.000
	50–74	524 (62.8)	267 (54.6)	791 (59.8)			
	75–100	116 (13.9)	35 (7.2)	151 (11.4)			
	Total	834	489	1,323			
CGPA	2–2.49	32 (3.8)	49 (10)	81 (6.1)	111.819	3	0.000
	2.5–2.99	195 (23.4)	220 (45)	415 (31.4)			
	3–3.49	365 (43.8)	159 (32.5)	524 (39.6)			
	3.5–4	242 (29)	61 (12.5)	303 (22.9)			
	Total	834	489	1,323			

Source: SPSS output (2024).

Similarly, the proportions of male and female students in the highest quartile groups (75 and above) in their national exit examination were 13.9 and 7.2%, respectively. The reverse was obtained in the lower categories. As depicted in Table 3, the proportion of female students who did not score a pass mark in their national exit examination (38.2%) was significantly higher than expected compared with male students (23.3%). Figure 4 graphically shows the differences between the two groups.

The Chi-square test of independence was employed to compare the proportion of male and female students in the top and bottom achieving groups in their CGPA. As depicted in Table 3, the interaction is statistically significant at a 95% level of significance, where the proportion of top-achieving male students was higher than expected [$\chi^2(1) = 7.929, p < 0.05$]. Their proportion in the bottom-achieving groups was lower than expected [$\chi^2(1) = 19.18, p < 0.05$] compared with female students. In addition, the proportion of female students (those who scored below 50%) was statistically lower than their counterparts [$\chi^2(1) = 23.857, p < 0.05$].

The independent samples *t*-test was employed to determine whether the mean differences between male and female students in their CGPA and national exit examination results were statistically and significantly different. As depicted in Table 1, male students, on average, scored 3.23 (0.393) in the CGPA, while the mean score for females was 2.985 (0.404). In addition, male students scored 59.24 (12.908) in their national exit examination results, whereas the mean score for female students was 54.42 (13.581). These mean differences were statistically significant for both CGPA [$t(1231) = 6.432, p < 0.001$] and national exit examination results [$t(1231) = 10.855, p < 0.001$] at a 95% level of significance (Table 4). Pearson product-moment correlation analysis (Table 5 and Figure 5) was conducted to examine the association between the CGPA and exit examination results. A moderate positive and significant relationship [$r(1323) = 0.525, r^2 = 0.276, p < 0.01$] was found, where students who scored better in their CGPA were more likely to attain better scores in their national exit examination results. The correlation for male students was found to be a bit higher [$r(834) = 0.518, r^2 = 0.268, p < 0.01$] than the

correlation for female students [$r(489)=0.482, r^2=0.232, p<0.01$]. CGPA explained approximately 27.6, 26.8, and 23.2% of the difference in exit examination results for male and female students, respectively.

Linear regression was employed to estimate the influence of sex on exit examination and CGPA scores. As depicted in Table 6, sex was a covariate that determined students' academic performances in their

TABLE 3 Chi-square t-test for top-and bottom-achieving groups in CGPA and national exit examination results.

Score type	Category	Sex	Observed	Expected	Chi-square	p-value
CGPA	Top achieving group (3.75 and above)	Male	71	58	7.929	0.005
		Female	21	34		
		Total	92	92		
	Bottom achieving group (below 2.5)	Male	32	51	19.18	0.001
		Female	49	30		
		Total	81	81		
National exit examination result	Students scored below 50 in the national exit examination	Male	194	240	23.857	0.001
		Female	187	141		
		Total	381	381		

Source: SPSS output (2024).

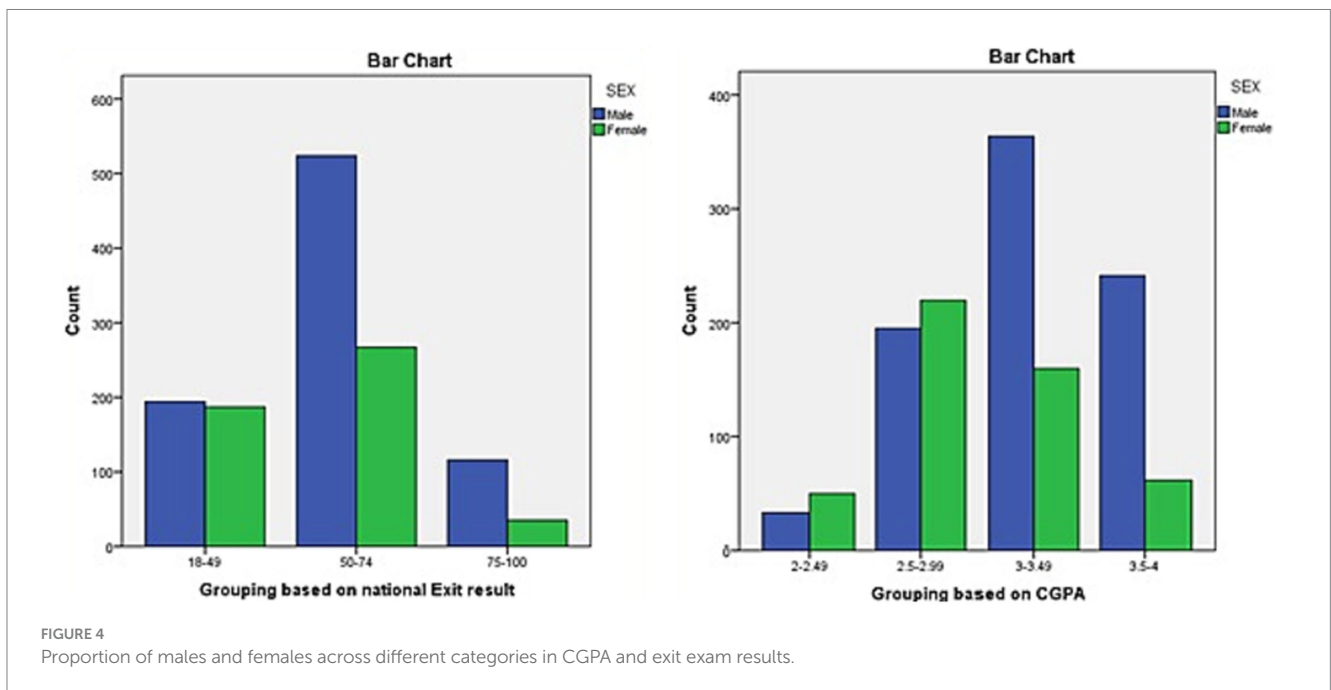


FIGURE 4 Proportion of males and females across different categories in CGPA and exit exam results.

TABLE 4 Independent samples test on academic gender disparity.

		Levene's test		t-test for equality of means						
		F	Sig.	t	df	p-value	Mean difference	Std. error difference	95% CI	
									Lower	Upper
EXIT2023	Equal variances assumed	2.164	0.141	6.432	1,321	0.000	4.821	0.750	3.351	6.292
	Equal variances not assumed			6.347	980.646	0.000	4.821	0.760	3.331	6.312
CGPA	Equal variances assumed	1.178	0.278	10.855	1,321	0.000	0.24555	0.02262	0.20117	0.28993
	Equal variances not assumed			10.783	1001.25	0.000	0.24555	0.02277	0.20086	0.29024

Source: SPSS output (2024).

CGAP and exit examination results at a 95% significance level. For instance, the exit examination result decreased on average by 4.821 points when the student’s sex shifted from male to female, and the rate of reduction for CGPA in the same scenario was 0.246 points.

4 Discussion

This study investigated gender disparities in academic performance in higher education institutions using national exit examinations and CGPA scores as good indicators of academic achievement. The Chi-square test, independent samples t-test, correlation analysis, and linear regression were employed. The proportion of female students admitted to the national exit examination during the 2023 academic year was small (37%), which implied that female graduates from higher institutions are still lower despite the affirmative actions taken by the government to increase the number of female students in higher institutions. This result is consistent with Guta (2019), who found that fewer females graduated from higher institutions. The gender-gap disparity analysis revealed a statistically significant difference in academic performances between

male and female students, with male students demonstrating higher achievement in their CGPA and exit examinations. The study found evidence of gender disparities in academic performance, with male students demonstrating higher levels of achievement than their female counterparts. All the null hypotheses tested were rejected, indicating that the observed differences in academic outcomes between genders were statistically significant. The Chi-square test revealed that the proportion of male students in higher-achieving groups in the case of the CGPA and exit examination was higher than expected.

Their proportion in the lower-achieving groups was lower than anticipated compared to female students. In addition, the data revealed that, compared to their male classmates, a more significant percentage of female students failed to score a passing mark in the national exit examination. This study shows a gender difference in academic achievement in higher education, with male students outperforming female students. These findings call for more research to determine the underlying causes of this disparity. These results are in line with the findings of Mergo (2007). Gebeyehu and Kathiresan (2016), Guta (2019), and Kassie (2018) reported a lower proportion of females in the top-achieving groups in higher institutions. Studies (Tiruneh and Philipos, 2014; Gebeyehu and Kathiresan, 2016; Gobena, 2018; Tenaw, 2018; Almelhem et al., 2022; Makhaye et al., 2023; Geremow et al., 2023) have confirmed that due to myriad personal, institutional, and socioeconomic related factors, females students in higher institutions struggle not to secure higher grades but to survival and graduate. As a result, their academic performance was lower than that of male students. For instance, a study (Geremow et al., 2023) at Wolkite University (Ethiopia) identified a lack of moral support and self-confidence, improper supervision, poor high school performance, financial constraints, and a shortage of resources as significant factors that negatively impacted the educational success of

TABLE 5 Correlation between CGPA and national exit examination results.

		CGPA	R ²
Male (N= 834)	Exit	0.518**	0.268
Female (N= 489)	Exit	0.482**	0.232
Total (N= 1,323)	Exit	0.525**	0.276

** The correlation is significant at the 0.01 level (two-tailed). Source: SPSS output (2024).

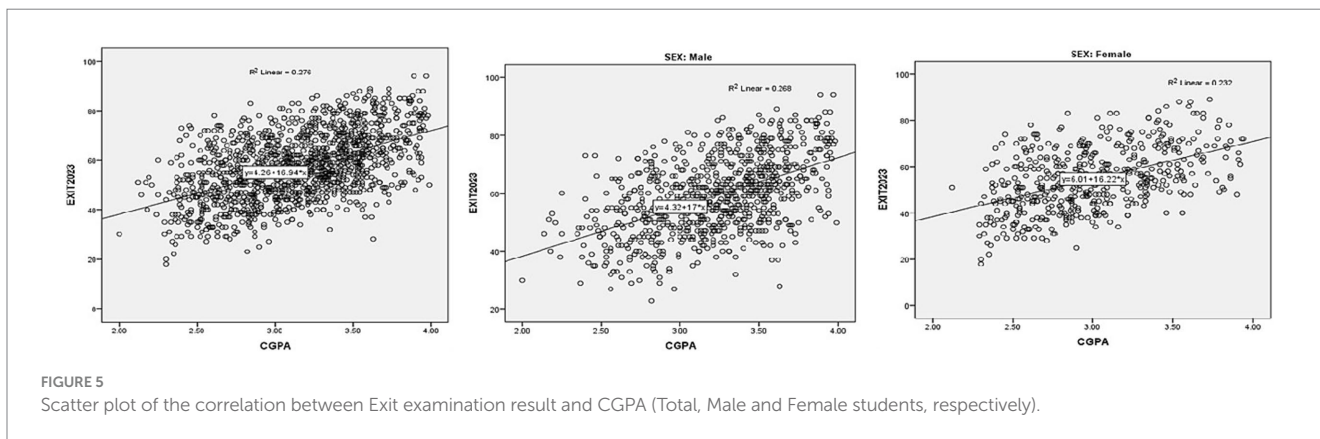


TABLE 6 Linear regression coefficient.

Dependent variable	Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	R	R ²
		B	Std. error	Beta				
Exit Exam	(Constant)	64.060	1.089		58.850	0.000	0.174	0.030
	SEX	-4.821	0.750	-0.174	-6.432	0.000		
CGPA	(Constant)	3.476	0.033		105.824	0.000	0.286	0.082
	SEX	-0.246	0.023	-0.286	-10.855	0.000		

Source: SPSS output (2024).

girls in higher institutions. Tesfa (2017), Engida (2019), Stermac et al. (2020), Lacey (2023), and Kazaara (2023) underlined that lack of self-motivation and self-confidence, sexual harassment, and intimidation negatively affect the academic performance of female students in higher education institutions. According to Semela (2006), female students exhibit low academic self-esteem and are significantly less confident about their abilities, mainly in the hard sciences, which results in lower academic performance. However, our findings differ from Dayioğlu and Türüt-Aşik (2004), Fortin et al. (2013), and Wrigley-Asante et al. (2023), which reported a significant improvement in female students' achievement of higher grades than male students in higher academic institutions. The independent samples t-test results revealed that male students outperformed female students in the CGAP and national exit examination results, and the differences were statistically significant. The finding is consistent with the research reports of Josiah and Adejoke (2014), Tasisa and Tafesse (2013), Olkaba (2013), and Guta (2019), in which a statistically significant difference in academic performances in higher institutions favoring males was reported. The current findings differ from those of Adalakun (2017) and Hdii and Fagroud (2018), who noted that female students outperformed their counterparts in academic performance in higher education.

The regression analysis also confirmed that gender determines academic performance in higher education institutions. The correlation result revealed that students who scored higher in their CGPA were more likely to attain good points on the national exit examination, and the association was moderate and statistically significant. This evidenced that students who performed better in their courses in higher institutions had a better chance of securing good passing marks on the exit examination, which is given after graduation. The correlation coefficient between the CGPA and the national exit examination results was higher for male students than for females.

5 Conclusion and recommendations

Gender disparity analysis in academic performance in higher institutions was conducted using CGPA and national exit examination results. The results of this study indicated a significant gender-based achievement gap in the academic realm of higher education, with male students outperforming their female counterparts. The data revealed that female students are underrepresented in the top-achieving groups, constituting a disproportionately large share of the lower-achieving cohorts. Furthermore, the proportion of female students who did not pass the national exit examination was higher than expected. The statistical analysis further evidenced apparent academic performance differences in the CGPA and exit examination results, again favoring males. The results showed a positive and moderate association between CGPA and exit examinations. The results of this study evidenced that more work is left to narrow gender gaps in academic performance in higher institutions. The results indicate that further research is necessary to determine the underlying causes of the gender gap in academic achievement in higher education. The following suggestions were put forth considering the study's findings:

- A thorough investigation should be conducted to understand better the institutional, social, cultural, and personal elements (based on ecological systems theory) that might influence the differences in academic achievement across genders.
- Provide extensive mentoring programs and support systems to empower female students and address their unique obstacles in higher education. These are examples of academic tutoring, counseling, and networking/leadership development opportunities.
- Continuous monitoring systems should be conducted regularly through collecting and analyzing gender disparity data to inform evidence-based policymaking and track the progress toward achieving gender equity in higher education.
- Strengthening the support programs that build female students' academic performance, such as tutoring and counseling, should be implemented.
- Work with secondary schools to create early intervention strategies that inspire and prepare young women to pursue higher education and succeed in rigorous academic programs.

5.1 Limitations of the study

This study used secondary data (ex-facto design) from a higher institution. As a result, generalization may be very difficult. We only considered gender as a factor. Further research on similar issues should consider other factors in larger geographical areas to gain credible knowledge and a better understanding of gender disparities in academic achievement in higher education institutions. In addition, this study only examined the gender gap in academic performance, and the causes behind the disparities were not investigated, which requires further research.

Data availability statement

The data analyzed in this study is subject to the following licenses/restrictions: the data set used for this manuscript was obtained from the main registrar of Wollo University. Requests to access these datasets should be directed to <https://wu.edu.et/>.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the [patients/participants OR patients/participants legal guardian/next of kin] was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

AE: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. SAL: Conceptualization, Methodology, Writing – review & editing. AM: Conceptualization,

Methodology, Writing – review & editing. AAb: Conceptualization, Methodology, Validation, Writing – original draft. BG: Formal analysis, Methodology, Writing – review & editing. EnM: Conceptualization, Methodology, Writing – review & editing. AAN: Conceptualization, Formal analysis, Methodology, Supervision, Writing – review & editing. EIM: Conceptualization, Formal analysis, Methodology, Writing – review & editing. EH: Formal Analysis, Methodology, Writing – review & editing. SAR: Methodology, Writing – review & editing.

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