

# Gender Equality in Academics: Are we there?

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## Abstract

**Background:** Research productivity is one of the scholarly achievement measures and is an essential criterion for academic promotions. In Ethiopia, eight universities have recently been identified as research universities. Although gender differences in research productivity may be diminishing over time, women are still underrepresented in academics.

**Aim:** To determine potential sex differences in educational status, academic rank, and research productivity in research universities in Ethiopia.

**Methods:** This cross-sectional study was conducted in the 2018/2019 academic year in four research universities. Data analysis was done using IBM SPSS (Statistical software for social sciences) Version 25 and STATA software version 14. Percentage and t-test statistics was used to compare men's distribution versus women at each educational status, academic rank, and by research productivity measured by number of peer review articles published, and grants awarded.

**Results:** Among 8,549 research university faculty members, only 1,410 (16.49%) were women. Men outnumbered women at all academic faculty ranks, and the difference increased with advancing academic rank. Statistical t-test finding revealed a significant female under-representation in the number of faculty members, publication of peer-reviewed articles and research grant awards.

**Conclusions:** Men outnumbered women and had more publications as well as research grant awards. This inequity in research universities demands promoting the efforts to increase the number of female faculty members in academics and adopting a more systematic approach for equitable opportunities that enhance female research productivity. Future studies should explore peculiar barriers and opportunities in each discipline. [*Ethiop. J. Health Dev.* 2021; 35(SI-2):03-07]

**Keywords:** gender equality, grant awards, peer-reviewed articles, publication, sex difference

## Background

Research productivity, demonstrated by publishing in peer-review journals and obtaining research grant awards, is one of the measures of scholarly achievement and an essential criterion for academic promotions. International experiences on gender inequity in research participation are documented across various disciplines (1, 2, 3, 4). Until recently, only 27.2% of authors of all academic publications in the natural sciences and social sciences were women. In medical literature, women have been underrepresented in the prominent positions of first and last author. Although discrepancies have declined in the first author position, women remain underrepresented as last authors (5). Experiences in environmental science indicate that while women represent 20% of the scientists in the field, less than 4% of them were involved in writing articles (2). This low participation in research activities has resulted in women faculty members concentration in the lower levels of academic rank and administrative roles with limited leadership opportunities (6, 7).

The fourth sustainable development goal (SDG) aims to ensure equal access to education, including university targets of inclusive and equitable quality education and enhanced lifelong learning opportunities for all. Today, although there is a remarkable improvement in the proportion of women admitted to higher education globally, women's retention and competitive productivity still demand a corporate effort to progress. Women face gender-based stereotypes and differential treatments due to the patriarchal culture present even within higher learning institutions, particularly in Africa (8, 9, 10). Taking the gender gap in higher education as a proxy, women's research productivity in higher

education is affected by a low academic base, marriage, and the resultant family responsibilities (11).

Recognizing the challenges that women face in higher education, efforts are being undertaken to promote their participation. The United Nations Economic and Social Council's Resolution 2011/17 on Science and Technology, for example, supports the role of women and girls seeking science careers through education and training (12, 13). Thus, the increase in women's admission to higher education shall be coupled with capacity building and mentoring programs in tertiary and preparatory educational levels to increase women's scholarly achievements (14). Furthermore, there are encouraging efforts to sensitize the university community to research, such as allocating an increasing amount of funds for research, publication incentives to motivate and maintain productivity, and the release of annual reports from universities that indicate the extent of publications by gender. However, it is mandatory to continue scrutinizing barriers to make the working environment, including the appraisal system in higher education, gender-sensitive to increase women researchers.

Data on gender and research productivity is not available in Ethiopia. Yet, we assume that women under-representation is no different from evidenced worldwide. This paper will determine potential sex differences in research productivity among research universities in Ethiopia by comparing the number of men and women at each educational status, academic faculty rank, and the number of articles published and research grants awarded.

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**Methodology****Study Setting and Study population**

There were 44 public universities in Ethiopia, classified into three categories: eight research, 15 applied, and 21 comprehensive universities. The research universities include Addis Ababa, Arbaminch, Bahir Dar, Gondar, Hawasa, Haramaya, Jimma, and Mekelle universities. Of the eight research universities, we selected four oldest universities: Addis Ababa University is the oldest in the country, established in 1950 as College of Addis Ababa and upgraded to Haile Selassie I University in 1962 and later changed to current name in 1975; Arbaminch University was established in 1986 as Arbaminch Water Technology Institutes and upgraded to University in 2004; Jimma University was established in 1952 as College of Agriculture, and later upgraded to University in 1999 after incorporating Jimma Institutes of Health sciences which was founded in 1983, which was established in 1980; and Gondar University of Gondar was established in 1954 as a public health college and upgraded to full-fledged university in 2003.

**Study design**

We used a cross-sectional quantitative research design using secondary data one year prior to the survey (in the 2018/2019 academic year).

**Data collection and procedures**

Data were abstracted from the selected universities'

research and technology transfer directors report using a data extraction tool designed by the investigators. Variables such as educational background (highest degree achieved), academic position, research productivity (as measured by number of peer review articles published in scientific journals), and research grant awards were recorded. All data were entered into a password-secured database.

**Statistical analysis**

We used descriptive and inferential statistics to show the difference between men and women faculty members by educational status, academic rank, the number of papers published on peer reviewed journals and research grants awarded across the selected institutions. The percentage and statistical t-test values were reported to compare the differences between the two sexes. P value less than 0.05 was considered significant. All analyses were conducted using IBM SPSS (Statistical Software for Social Sciences) Version 25 and STATA version 14.

**Results**

Four universities, Addis Ababa, Jimma, Arbaminch, and Gondar universities participated in this study. A total number of 8,549 faculty members were included, of which 1,410 (16.49 %) were women, and 7,139 (83.51%) were men. **Table 1** lists the four research universities included in our study, the number and the percentage of faculty members at each institution.

**Table 1. Number and percentage distribution of male and female faculty members at research universities in Ethiopia, 2020.**

Research university	Total number of faculty members	Number of male faculty members (%)	Number of Female faculty members (%)
Addis Ababa University	2782	2355(84.65)	427(15.35)
Arbaminch University	1109	938(84.58)	171(15.42)
Jimma University	1938	1614(83.28)	324(16.72)
University of Gondar	2720	2232(82.06)	488(17.94)

Female faculty members were proportionally low compared to male faculty members across the distribution of the measured covariates, and the difference increased with advancing educational level and academic rank (see **Table 2**). Among the 1,410 female research university faculty members we studied, 0.28% (n = 4) held the rank of professor compared with 1.65% (n = 118) of the 7,139 male faculty members

included in our study. Of the men in our study, those who held a senior faculty academic rank (associate professor and professor) were 9.13% (n = 652) compared with only 1.91% (n = 27) of the women. The most common academic rank held by women in our cohort was lecturer: 65.53% of women (n = 924) female faculty members held this position.

**Table 2. Distribution of faculty members' educational background and academic rank stratified by gender at research universities in Ethiopia, 2020.**

	Male n (%)	Female n (%)
<b>Total number of faculty members</b>	7139(83.51)	1410(16.49)
<b>Educational background</b>		
Bachelor's degree	1134(15.88)	339(24.04)
Master's Degree	3947(55.29)	766(54.33)
MD	226(3.17)	91(6.45)
MD +Specialty	391(5.48)	105(7.45)
PhD	1407(19.71)	109(7.73)
<b>Academic Rank</b>		
Technical assistant	326(4.57)	218(15.46)
Lecturer	4225(59.18)	924(65.53)
Assistant Professor	1936(27.12)	241(17.10)
Associate Professor	534(7.48)	23(1.63)
Professor	118(1.65)	4(0.28)

Table 3 demonstrates the comparison of the number of faculty members and research productivity by gender at research universities. Significant female under-

representation was observed in the number of faculty members, publication of peer-reviewed articles and research grant awards.

**Table 3. Comparison of research productivity by gender at research universities in Ethiopia, 2020.**

Characteristics	Male (mean $\pm$ SEM)	Female (mean $\pm$ SEM)	P value
<b>Number of faculty members</b>	1785 $\pm$ 325.5	353 $\pm$ 69.3	0.0051*
<b>Research productivity</b>			
Number of publications of peer-reviewed articles	737 $\pm$ 249.6	66 $\pm$ 27.7	0.0368*
Number of grant awards	292 $\pm$ 69.9	35 $\pm$ 7.3	0.0106*

\* P value <0.05

## Discussion

In this study, we found that female faculty members represented less than one-sixth of the total faculty members among research universities in Ethiopia. The proportion of male was greater than female in all academic faculty ranks, and this difference increased with advancing academic rank. Comparison of the number of faculty members and research productivity by gender demonstrated significant female under-representation in research universities.

The mean peer-reviewed article published in this study showed the lower participation of female faculty members in research activities, which was also evident in another report from South Africa (15). The under-representation of females in research productivity demonstrated in this study may be attributed to the smaller proportion of female faculty members in research universities. On the other hand, female faculty members, despite their small number, are at the lower academic rank. And that may be attributed to their young age which automatically put them in less networking and collaborative work.

Research publications and grant awards continue to be essential components for a promotion and that can be evaluated systematically across institutions (16, 17). The finding in this study that showed male faculty members having higher proportions in advanced academic rank is partly attributable to their increased research productivity. That difference can, however, have an alternative explanation: faculty members with advanced academic rank tend to publish more because of networking and collaborative work. And that is why

statistical gender difference is seen in research productivity (18).

It is well documented that previous research track of faculty members usually considered in manuscript review process, awarding grant funding and when recruiting research advisors (19). These favors faculty members in advanced academic rank for more opportunities in collaborative works and co-authorship (20). In this regard, our findings support those men were at a more advantageous position than women who were at the junior level (21).

Ethiopia has recently been recognized as one the countries that saw an increase in research publications (22). Nevertheless, much is to be done to catch up with the global women's scientific productivity growing in parallel with women's representation in academia (23). Although factors such as asymmetric home or childcare responsibilities, cultural stereotypes, professional isolation, parental leave policies of countries, and different career motivations are associated with difference in research productivity (24, 25, 26, 27), there is a still a need to examine the root cause for gender inequalities in research universities in Ethiopia.

## Limitation

The data from the four most prominent and oldest universities are expected to reflect the gender equality in academics in the country. This "snapshot-in-time" approach provides information that can serve as a baseline for repeat analyses, which will allow us to measure trends over time. The data reported by each university's research and technology transfer office (secondary data) was not verified. This study also did

not consider a contribution to publication as reflected in the authorship position (e.g., first, or last author), which implies higher productivity. A broader range of productivity outcomes, the metrics used in other research to measure quality and impact of research publication such as the h and m-index, were not obtained from more reliable sources such as Scopus and PubMed. Furthermore, our methodology was also unable to account for variables such as leave of absence, duration of employment, and part-time appointment, which may differentially affect one sex more than another.

### Conclusion

Female faculty members were under-represented in each academic rank, and this difference increased with advancing levels. Moreover, significant difference in research productivity was observed in research universities in Ethiopia. In addition to fostering the efforts to increase the number of female faculty members in the academic arena, it is essential to promote mentorship for junior faculty members. Future studies are recommended to investigate factors associated with the trend and make inferences about the association between publications and promotion in Ethiopia and elsewhere.

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### References

1. National Research Council. Gender differences at critical transitions in the careers of science, engineering, and mathematics faculty. National Academies Press; 2010 Jul 18.
2. West JD, Jacquet J, King MM, Correll SJ, Bergstrom CT. The role of gender in scholarly authorship. *PloS one*. 2013 Jul 22;8(7):e66212.
3. Chauvin S, Mulsant BH, Sockalingam S, Stergiopoulos V, Taylor VH, Vigod SN. Gender differences in research productivity among academic psychiatrists in Canada. *The Canadian Journal of Psychiatry*. 2019 Jun;64(6):415-22.
4. Diamond SJ, Thomas CR, Desai S, Holliday EB, Jagsi R, Schmitt C, Enestvedt BK. Gender differences in publication productivity, academic rank, and career duration among US academic gastroenterology faculty. *Academic Medicine*. 2016 Aug 1;91(8):1158-63.
5. McDermott M, Gelb DJ, Wilson K, Pawloski M, Burke JF, Shelgikar AV, London ZN. Sex differences in academic rank and publication rate at top-ranked US neurology programs. *Jama Neurology*. 2018 Aug 1;75(8):956-61.
6. Bates C, Gordon L, Travis E, Chatterjee A, Chaudron L, Fivush B, Gulati M, Jagsi R, Sharma P, Gillis M, Ganetzky R. Striving for gender equity in academic medicine careers: a call to action. *Academic medicine: journal of the Association of American Medical Colleges*. 2016 Aug;91(8):1050.
7. Fridner A, Norell A, Åkesson G, Sendén MG, Løvseth LT, Schenck-Gustafsson K. Possible reasons why female physicians publish fewer scientific articles than male physicians—a cross-sectional study. *BMC medical education*. 2015 Dec 1;15(1):67.
8. Bunyi GW. Gender disparities in higher education in Kenya: Nature, extent and the way forward. In *African Symposium: An On-Line African Educational Research Journal* 2004 (Vol. 4, No. 1).
9. Nawe J. Female participation in African Universities: effective strategies for enhancing their participation with reference to the University of Dar es Salaam, Tanzania. 2002.
10. Okeke IN, Babalola CP, Byarugaba DK, Djimde A, Osoniyi OR. Broadening participation in the sciences within and from Africa: Purpose, challenges, and prospects. *CBE—Life Sciences Education*. 2017 Jun;16(2):es2.
11. Ademe E. Underachievement among University Female Students in Ethiopia: Perceived Causes, Priorities, and Single-Sex Teaching. Aachen Shaker, 2008.
12. McGaughey F. Monitoring international human rights law from above or below? The role of non-governmental organisations in United Nations Human Rights State Reporting. 2017.
13. Mergo L, Sinha AK, Sharma K. Sacrifice, Vow, and Ritual Feast among the Oromo of Horro Guduru Hinterland (Ethiopia). *Anthropos*. 2014 Sep 14;109(2):429-48.
14. Ademe E. Enabling Instruments, Encouraging Results, and Unmet Challenges: Females' Higher Education Access in Ethiopia. *Ethiopian Journal of the Social Sciences and Humanities*. 2016;12(1):39-61.
15. Prozesky H. Gender differences in the journal publication productivity of South African academic authors. *South African Review of Sociology*. 2006 Jul 1;37(2):87-112.
16. Lee S, Bozeman B. The impact of research collaboration on scientific productivity. *Social studies of science*. 2005 Oct;35(5):673-702.
17. D'Amico R, Vermigli P, Canetto SS. Publication productivity and career advancement by female and male psychology faculty: The case of Italy. *Journal of Diversity in Higher Education*. 2011 Sep;4(3):175.
18. Holliday EB, Jagsi R, Wilson LD, Choi M, Thomas Jr CR, Fuller CD. Gender differences in publication productivity, academic position, career duration and funding among US academic radiation oncology faculty. *Academic medicine: journal of the Association of American Medical Colleges*. 2014 May;89(5):767.
19. Witteman HO, Hendricks M, Straus S, Tannenbaum C. Female grant applicants are

- equally successful when peer reviewers assess the science, but not when they assess the scientist. *Biorxiv*. 2018 Jan 1:232868.
20. Mayer AP, Blair JE, Ko MG, Hayes SN, Chang YH, Caubet SL, Files JA. Gender distribution of US medical school faculty by academic track type. *Academic Medicine*. 2014 Feb 1;89(2):312-7.
  21. Bentley P. Gender differences in research productivity: A comparative analysis of Norway and Australia (Master's thesis). 2009.
  22. Duermeijer C, Amir M, Schoombec L. Africa generates less than 1% of the world's research; data analytics can change that. An in-depth analysis of the continent's research reveals promising developments—and strategies for continued improvement. 2018 Mar 22.
  23. Van Arensbergen P, van der Weijden I, Van den Besselaar P. Gender differences in scientific productivity: a persisting phenomenon. *Scientometrics*. 2012 Dec 1;93(3):857-68.
  24. Leahey E. Gender differences in productivity: Research specialization as a missing link. *Gender & Society*. 2006 Dec;20(6):754-80.
  25. Beaudry C, Prozesky H. Factors that affect scientific production in Africa: a gender analysis. *Research Features*. 2017.
  26. Raj A, Carr PL, Kaplan SE, Terrin N, Breeze JL, Freund KM. Longitudinal analysis of gender differences in academic productivity among medical faculty across 24 medical schools in the United States. *Academic medicine: journal of the Association of American Medical Colleges*. 2016 Aug;91(8):1074.
  27. Garg N. Underrepresentation of females in academia: A relative rate index and system dynamics model. 2012.