

Assessment of Gender Parity in Faculty Employment at Higher Education Institutions in India

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Abstract

India is one of the countries in South Asia that is striving to fulfill Sustainable Development Goal 5 which is to propagate gender equality. It has achieved gender parity in higher education institution enrolment but not yet in faculty employment. This paper assesses gender parity in employment at higher education institutions in India with focus on teaching faculty and also measures the relationship between the numbers of female junior faculty and numbers of female pass outs at postgraduate level. The data source is AISHE reports from 2010/2011 to 2019/2020. The result shows that increasing numbers of highly educated women in India is in proportion to the number of junior faculty. It however shows that although there is an increasing trend in the number of female junior faculty (with the gender parity gap closing up at this rank) there are few females at senior faculty rank (with a wide gender gap). Statistical analysis shows that there is a positive and significant relationship between female junior faculty and sum of female postgraduate pass out. However, the p-value=0.003 of the combine independent variables (postgraduate pass out) being lower than the significant level ($\alpha=0.05$) signifies that not all independent variables determine the dependent variable. The assessment of individual p-value of each independent variable shows that only PhD pass out with p-value (0.81) greater than the significant level ($\alpha=0.05$) determines the numbers of female junior faculty in higher education institutions in India. Gender oriented government policies that will intentionally promote the inclusion of women into full senior faculty rank and other leadership positions is thereby needful.

Keywords: Gender parity, female faculty, tertiary education institution, India

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1. Introduction

During the post-independence period, the Indian educational system recorded significant gender inequality in students' enrolment at all levels of education. Achieving gender parity in education seems to be impossible because there are many complicated social factors that affects the education rights of the girl child (Sahni, 2017). However, since the beginning of the 20th century, the situation has changed and there has been a rapid increase in female enrolment and what appears unattainable during the post-independence era is now a reality. Presently, higher education enrolment is one of the areas where India has achieved gender balance and it is evident that in the near future, partialities and gender discrimination in other sectors and levels of education will soon become history (Bandyopadhyay and Subrahmanian, 2008; Luthra, 2021). The increase in female enrolments into Indian primary and secondary schools can be attributed to many factors including improved literacy level and various government policies that focus on increasing female access to schooling. These government policies include promoting access to primary schools, rapid expansion of schooling infrastructure, alternative and transitional schooling systems. The alternative and transitional schooling systems are bridge schools with the intention of integrating out-of-school girls into formal schools. Likewise, the successful efforts of the District Primary Education Programme (DPEP) in unifying interventions on the supply and demand side of primary education led to a sudden increase in female enrolment. (Bandyopadhyay and Subrahmanian, 2008).

Ideally, increase in female enrolment and pass out across all levels of education, especially in higher education should be proportional to increase in female faculty at higher education institutions (UNESCO IESALC, 2021). Also, more female pass-out especially at postgraduate level should mean more female involved in decision-making, leadership and effective participation in public life. However, this is not so because in India and also in other parts of the world; the female gender may have equal access to education with the male gender, but may not necessarily have equal employment opportunities with them (Kumar, 2012). United Nations has described gender inequality as the "greatest human rights challenge of our time" (Lawson et. al., 2022). Although globally, there are various international instruments advocating for gender parity across all sectors. Some of them include the Beijing Declaration (which is one of the most important instruments for promoting women's rights), the Sustainable Development Goal 5 (which propagate gender equality) and Sustainable Development Goal 4.5 (which addresses elimination of gender disparities in education), there are still

inconsistencies in achieving gender equality at work (UNESCO Bangkok, 2019). For example, the increase in women with doctorate degrees and subsequently as faculties in tertiary institutions does not reflect in senior and leadership positions. Women seems to hit a glass ceiling professionally as they remain underrepresented at senior faculty levels and also in higher education decision-making boards in India and many other countries (Khan, 2022; Pandey and Srinivas, 2022).

Recent studies also show the inequalities that women face during the course of their career. A UNESCO IESALC report (2021) addresses women with doctorate degrees and discovers that in all fronts, inequality runs deep in the fields of study, research, publications and leadership positions in universities. It also discovered that despite the fact that there are increasing job opportunities in STEM (science, technology, engineering and mathematics) field of study, women are highly underrepresented. The report also showed concern why a majority of undergraduates, but a minority of senior lecturers, and professors are female. In the United Kingdom, Higher Education Staff Agency (HESA 2021) shows that in 2019/2020, women comprise 46.7% of higher education faculty but only 27.8% accounts for professors. Likewise, in the United States and Canada, women occupy 52.9% and 50% assistant professor rank respectively. Both countries have achieved gender parity at junior faculty level, but at full professorial rank, women comprise 28% and 34.3% in Canada and the United States respectively (Catalyst, 2020).

Agashe et al., (2022) reported a survey carried out by the Indian National Young Academy of Sciences IN 2020 on early-stage career scientist in India which shows that only 31.6% of their 854 respondents are female. Although this may not be a fair representation of the overall early-stage career scientist in the country, it may however reflect it. Likewise, the Indian National Science Academy (INSA) survey in 2020 shows gender disparity and on the other hand an improvement as it recorded an increase in women scientist members. There were 9% women scientist members (89 out of 1,044 members) in 2020 compared to 6% in 2015. Also, the INSA governing body has seven women out of the thirty-one members in 2020 compared to none in 2015 (Pandey and Srinivas, 2022).

Women are similarly underrepresented in quality academic publications, the UNESCO IESALC report (2021) addresses the issue of gender disparity in academic publications. Men are reported to publish on the average more articles than women with the ratio 1.6 to 1. It was also reported that the submission of academic papers for publication especially in top journals increased during the first wave of COVID-19 lockdowns. It was however discovered that women were not well represented in this development because they were presumed to be invariably occupied with child and elderly care during the period (Cui et al., 2020; McCormick, 2020). In general, apart from child and elderly care, other social issues such as change in spouse's job, lack of family support and many other family related issues are some of the factors that hampered women academic outputs which are invariably the reason women find it difficult to be promoted since rank progression is solely dependent on research productivity (Doherty and Manfredi, 2006).

Another reason why some women lag behind professionally is because they suffer career breaks. Women who had career breaks often face difficulties while returning to work, find it difficult to balance work and family life while some others have to quit their jobs. (Kumar, 2008; Kappalia, 2013; Khan, 2022). Literature proves that this scenario is however not true for unmarried women in academics because they rise faster than married women since they have the financial and time freedom to develop their career and pursue self-development. Unmarried women were promoted in an average of 6.7 years, while it took married women an extra 1.1 to make the same progress (Townsend, 2013) and there is a growing number of unmarried professional women (Ibrahim and Saili, 2015).

Nevertheless, it has been proven that women in senior and leadership positions in higher education in the United States possess unique leadership skills and always ask for feedback in order to improve on their job. They also have a different perspective to the norm which makes them stand out as problem solvers. Women leaders were rated as being resilient in achieving results, self-developed and with high integrity (Lawson et al., 2022). According to Offermann and Foley (2022), women leaders are better in improving workplace policies to benefit both men and women and synonymous with bridging the pay gap between both genders. Consequently, to prevent further loss of female faculty advantage, few research institutes offer spousal hiring. Spousal hiring is a policy that facilitate hiring couples in the same city and if possible, the same institution or through cooperation across organizations in the same city (Agrawal, 2021; Agashe et al., 2022).

Furthermore, the government of India in their efforts to support and promote female faculty in higher institutions, especially women in STEM, launched various Women Scientists Programs through the Department of Science and Technology. There are about eighteen programs in all, launched to promote women scientist by enhancing their Research and Development (R&D) infrastructure in order to carry out cutting-edge research in their respective fields. Notable of the schemes is the Mobility Scheme for women scientists working in regular position in government organizations to solve relocation issues due to family matters by acting as filler while they are searching for another career at their new location (DST, 2022). As laudable as these schemes are, they have their loopholes because their success depends on proper execution of the programs. According to

Gangopadhyay and Das (2016) analysis of the women scientist scheme, the grant disbursements are sometimes not timely, incomplete and short of the approved amount. In their own perception, the scheme disrepute a respected woman scientist because most times they worked unpaid, their spent money is not reimbursed and more so, DST staffs are not supportive. Thus, in order to overcome these challenges and uphold the hard work of female scientists, the schemes must be overhauled and there must be a fair system at work (Khan, 2022). This paper seeks to address the issue of underrepresentation of female faculty at senior ranks in higher education institutions in India. This is necessary because gender parity at senior faculty and leadership level is beneficial not only to educational sector but to the nation as a whole. It is an avenue to explore untapped talent pool of highly trained women more so, as there are large numbers of young women recently joining research academia and there is need for them to rise to the peak of their career unhindered. Thus, the need to analyze and show the current situation in India and the need for improvement.

2. Research methodology and findings

The objective of this study is to assess the level of gender parity in higher education institutions' employment and to evaluate the relationship between female postgraduate pass out and employment into junior faculty rank at higher education institutions in India. For the purpose of this study, higher education institution is defined as an institution of tertiary education which includes universities, polytechnics, colleges and research institutes. Data analysis for the study is based on secondary data from the All India Survey on Higher Education (AISHE) yearly report from 2010/11 to 2019/20 and other relevant literature.

3. Level of gender parity in higher education institutions in India.

The growth pattern of female faculty was assessed across all ranks in higher education institutions and universities in India. There are three faculty ranks in India namely Assistant Professor (junior faculty), Associate Professor (mid faculty) and Professor (senior faculty). The result shows that there is an overall increase in the numbers of female faculty across the ranks in higher education institutions in India (Figure 1). Although, the growth pattern is not steady with fluctuations in the trend, the total number of female faculty in 2019/2020 exceeded that of 2011 significantly by 126% (Table 1). It is noteworthy that female junior faculty increased by 139% while senior faculty increased by 67% between 2010/2011 and 2019/2020. It is evident from this result that the numbers of female at junior faculty rank increased at a faster rate than female in senior faculty rank.

Table 1: Percentage Increase in the numbers of Female Faculty in Higher Education Institutions in India from 2011/2012-2019-2020

	Total	Professors	Readers	Lecturer/ Assistant Professor
Range	300370	15452	28920	255998
% Increase	126.3	67.1	94.6	138.9

Sources: AISHE Annual Reports (2010/2011-2019-2020)

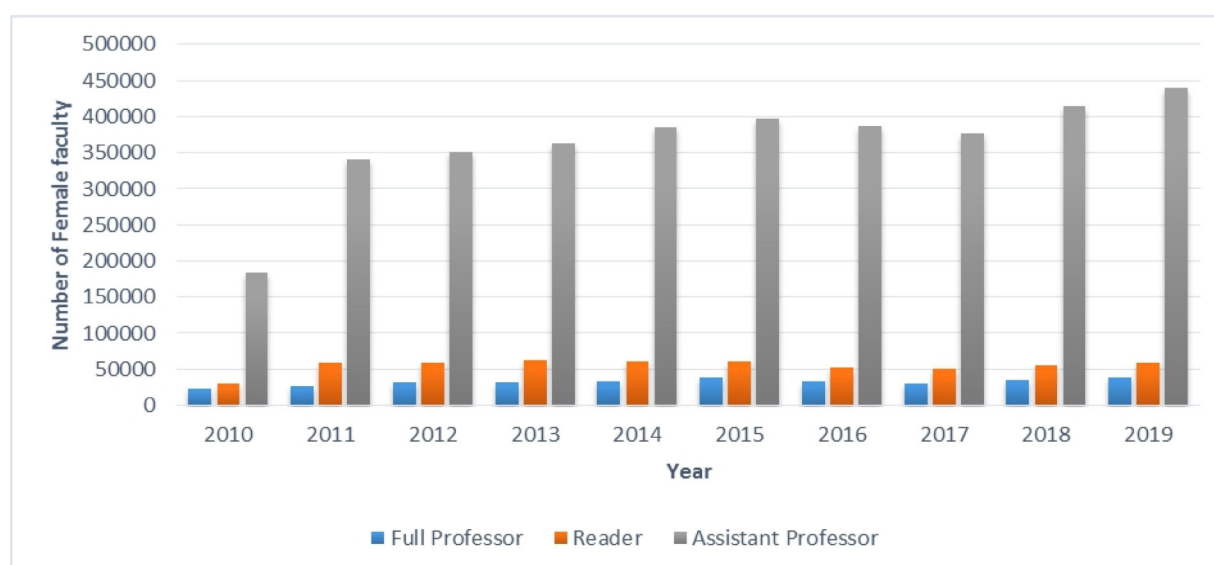


Figure 1: The Trend of Female Faculty Ranks in Higher Education Institution from 2011/2012- 2019/2020
 Sources: AISHE Annual Reports (2010/2011-2019-2020)

Likewise, there is also a significant increase in the number of female faculty in universities and their

colleges across India (Figure 2). The growth pattern is similar to that of higher education institutions as there is an overall increase in the numbers of female faculty except for the mid faculty rank; there is a percentage decrease of 17.5% in the numbers of female in mid faculty rank. The number dropped from 58,362 in 2011/2012 to 48,175 in 2019/2020, and it may be deduced that more female in mid faculty rank is getting promoted to senior faculty rank than the amount of female in junior faculty rank being promoted to mid faculty rank. While there are fluctuations in the overall growth trend, the total number of female faculty in universities and their colleges grew by 8.4% during the years under study (Table 2). Overall, the rate of increase in the numbers of female faculty in universities and their colleges is lower than that of higher education institutions.

Table 2: Percentage Increase in the numbers of Female Faculty in Universities and their colleges in India from 2011/2012-2019-2020

	Total	Professors	Readers	Lecturer/ Assistant Professor
Range	32984	2083	-10187	41088
% Increase	8.4	9.2	-17.5	13.3

Sources: AISHE Annual Reports (2010/2011-2019-2020)

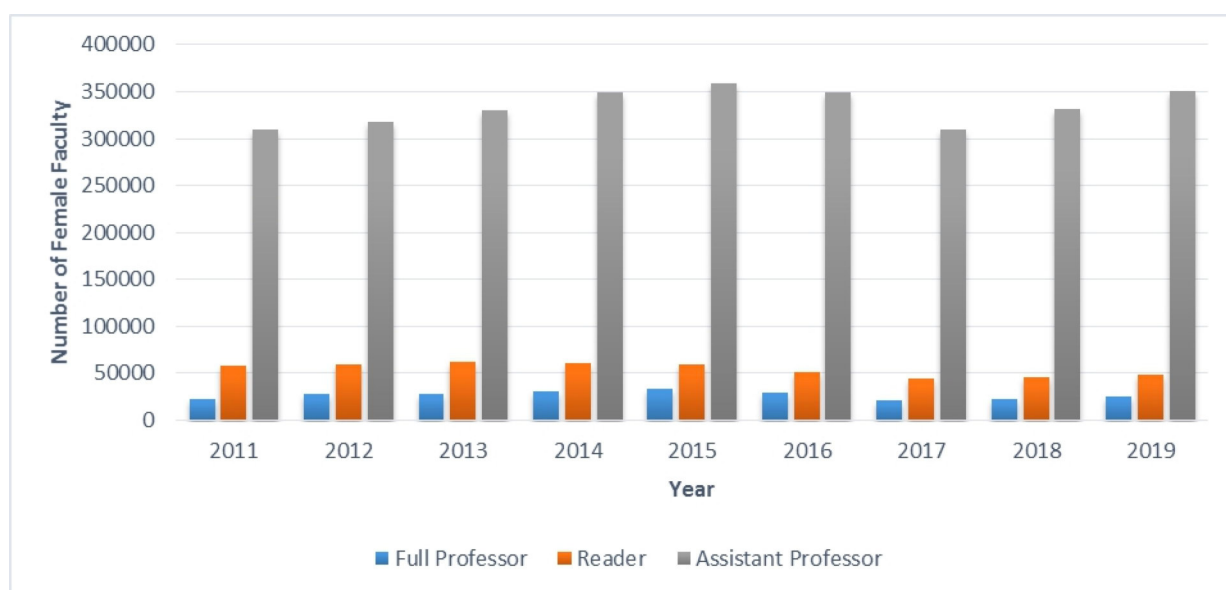


Figure 2: The Trend of Female Faculty Ranks in Universities and their Colleges from 2011/2012-2019/2020

Sources: AISHE Annual Reports (2010/2011-2019-2020)

In order to evaluate the level of gender parity in faculty employment at Indian higher education institutions, there is need to know the numbers of female faculty compared to their male counterparts. According to AISHE 2019/2020 report, there are 74 female faculty per 100 male faculty at higher education institutions and 59 female faculty per 100 male faculty at universities and their colleges. Figure 3 shows a clearer picture as it displays the number of male and female faculty in higher education institutions across all faculty ranks. The figure shows a great disparity in the numbers of female and male at junior faculty rank. The gender gap widens at mid faculty rank and it is more extensive at senior faculty rank. There are 43% female faculty at junior faculty rank in 2019/2020 compared to 27.5 % at senior faculty rank in the same academic year. Likewise, figure 4 displays the numbers of male and female faculty in universities and their colleges. A great gap in gender parity is also observed as female faculty constitutes 44.4% of junior faculty rank, while there are 28% female in senior faculty rank in 2019/2020 academic year.

The level of gender parity at higher education institutions is very similar to that of universities and their colleges depicting the need for more women to ascend the promotion ladder. These finding are in line with the IESALC report (2021) which stated that although there is a commendable increase in female enrolment, it does not translate to occupying key academic positions at higher institutions or attaining key leadership roles.

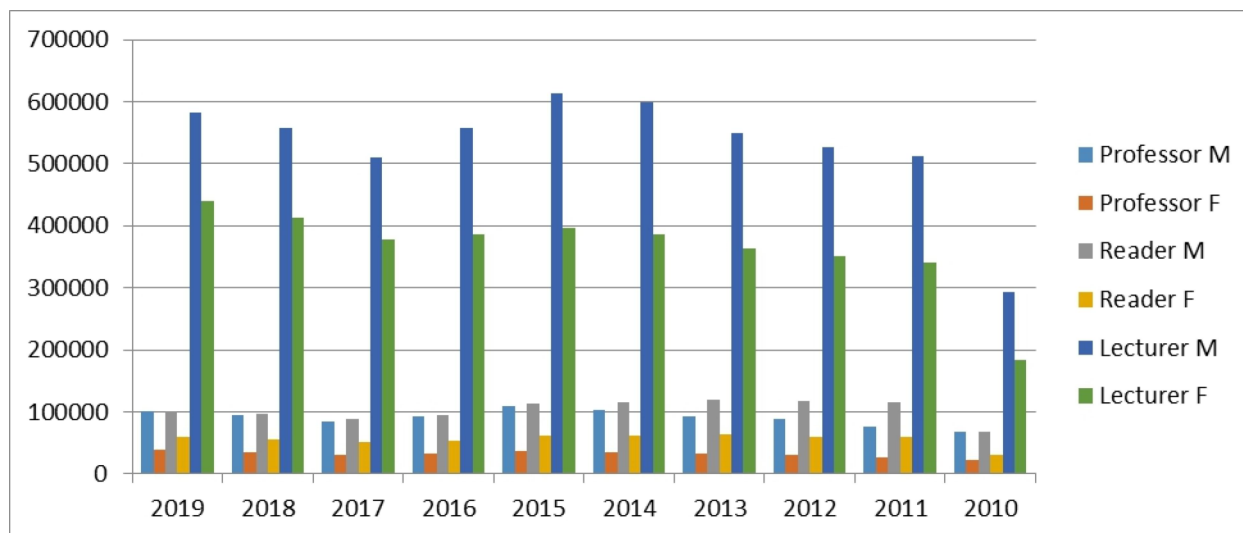


Figure3: The trend of Higher Education Institution faculty ranks from 2011/2012- 2019/2020
 Sources: AISHE Annual Reports (2010/2011-2019-2020)

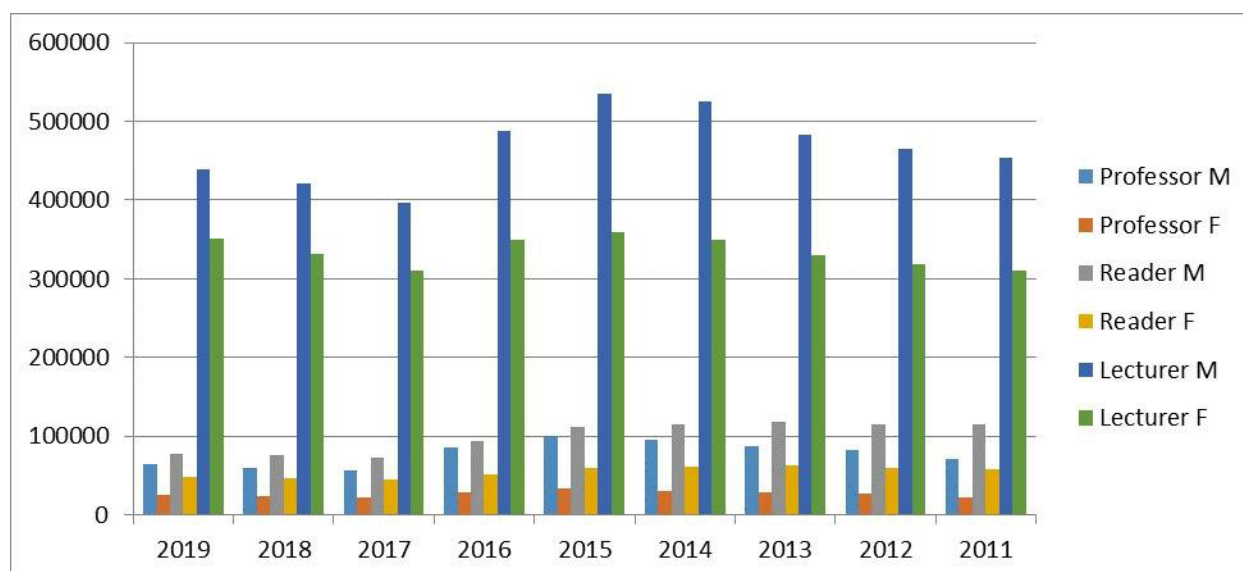


Figure 4: The trend of universities and their colleges' faculty ranks from 2011/2012- 2019/2020
 Sources: AISHE Annual Reports (2010/2011-2019-2020)

The gender parity issue is not only peculiar to higher education institutions but also prevalent in research institutes. For instance, in research carried out by the Council of Scientific and Industrial Research- National Institute of Science Communication and Policy research (CSIR-NIScPR) on gender parity in CSIR laboratories across India (CSIR is a leading scientific body in India), the results showed a great disparity between male and female scientists. Low number of female scientists are recorded across all ranks and there is an average of 18% female scientist (Aggarwal, 2022). Also, the gender gap widens the more as they move up the promotion ladder. There are 38% female at Scientist rank (which is equivalent to junior faculty rank) and only 8% female at Chief Scientist rank (which is equivalent to senior faculty rank). This is a clear indication that there is still a long way to go in order to achieve gender parity in academic employment in India.

4. The relationship between female pass-out and employment to junior faculty rank in higher education institutions in India

In order to establish a relationship between the number of female postgraduate degree pass-out and junior faculty in higher education institutions, a multiple regression analysis was carried out. This is to determine whether the numbers of female employed into junior faculty rank is dependent on the numbers of level-wise female postgraduate pass outs. Junior faculty rank is used because that is the entry level into academic employment. The null hypothesis (H_0) states that there is a relationship between the numbers of female postgraduate pass outs and female junior faculty in higher education institutions, that is, the numbers of female faculty at junior faculty rank

are dependent on the amount of female postgraduate pass outs. The alternative hypothesis (H_1) states that the numbers of female junior faculty in higher education institutions are not determined by the numbers of postgraduate pass out. The multiple regression was run with female junior faculty in higher education institution as the dependent variable and postgraduate, MPhil and PhD level pass out as independent variables.

The result (table 3) shows that the multiple R is 0.96 indicating a very strong relationship between numbers of female junior faculty and numbers of all female postgraduate pass out. The R^2 is 0.92 and demonstrates that 92% of the variance in number of female junior faculty can be explained by the number of postgraduate pass-out. The probability value (p-value=0.003) of all independent variables (postgraduate pass out) is lower than the significant level ($\alpha=0.05$), the null hypothesis (H_0) stating that the observed pattern of the linear trend is significant is rejected and the alternative hypothesis (H_1) is accepted.

Furthermore, since there is a strong relationship between the variables, level-wise contribution of female postgraduate pass out (p-value) to female faculty was considered to ascertain which level of postgraduate pass out is significantly related to numbers of female junior faculty. The probability value for postgraduate and MPhil pass out are 0.01 and 0.04 respectively; since these values are lesser than the significant level ($\alpha=0.05$), the null hypothesis (H_0) stating that the observed pattern of the linear trend is significant is rejected and the alternative hypothesis (H_1) is accepted. This means postgraduate and MPhil pass out does not determine the number of female junior faculty. On the other hand, p-value of PhD is 0.81 and since this value is greater than the significant level ($\alpha=0.05$), the null hypothesis (H_0) stating that the observed pattern of the linear trend is significant is accepted and the alternative hypothesis (H_1) is rejected. This implies that only the numbers of PhD pass out determines the numbers of female junior faculty in higher education institutions in India.

These findings verify CSIR-NIScPR report that majority (three quarter) of CSIR female scientists have a doctorate degree (Aggarwal, 2022). Likewise, another report on Status of Women in Science (SSESS, 2017) shows that 66% of the respondents (female science professionals from premier institutes under eight ministries and autonomous departments under the Government of India along with few schools and colleges across India) are PhD holders. The implication is PhD degree pass outs are preferred above MPhil and postgraduate degree pass outs when being considered for employment into junior faculty rank.

Table 3: Regression analysis measuring the relationship between level-wise female postgraduate pass out and female junior faculty

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.958187
R Square	0.918123
Adjusted R Square	0.868996
Standard Error	11202.14
Observations	9

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	7.04E+09	2.35E+09	18.68895	0.003792
Residual	5	6.27E+08	1.25E+08		
Total	8	7.66E+09			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	231897.3	30137.66	7.694601	0.000591	154425.9	309368.6	154425.9	309368.6
Ph.D.	-0.60244	2.375722	-0.25358	0.809915	-6.70943	5.504545	-6.70943	5.504545
M.Phil.	-4.70384	1.702778	-2.76245	0.039719	-9.08097	-0.32671	-9.08097	-0.32671
Post Graduate	0.304273	0.076844	3.959625	0.010747	0.10674	0.501807	0.10674	0.501807

Source: AISHE Annual Reports (2010/2011-2019-2020)

5. Conclusion

The Indian government is striving to achieve gender parity in employment at higher education institutions. This is evident in the increasing trend of female employment in the sector in the years under study. There is a

significant increase in the number of female faculty; the total number of female faculty in higher education institutions and universities and their colleges in 2019/2020 exceeded that of 2011/2012 academic year significantly by 126% and 8.4% respectively. However, there is a percentage decrease of 17.5% in the numbers of female faculties on readers' rank in universities and their colleges over the same period. It was also observed that the rate of increase at full professor rank (67%, 9.2%) is far lower than assistant lecturer rank (139%, 13.3%) in higher education institutes and universities and their colleges respectively. Generally, the rate of increase in the numbers of female faculty in universities and their colleges is much lower than that of higher education institutions.

Furthermore, there is a big difference in the number of female and male faculty and the gap widens as the rank increases. There are 43% female at junior faculty rank compared to 27.5% at senior faculty rank in higher education institutions and 44.4% female at junior faculty rank compare to 28% at senior faculty in universities and their colleges in 2019/2020 academic year.

Additionally, there is a very strong relationship between numbers of female junior faculty and numbers of combine female postgraduate pass out at R^2 is 0.92 indicating that that 92% of the variance in numbers of female junior faculty can be explained by the numbers of postgraduate pass out. However, the p-value=0.003 of the combine independent variables (postgraduate pass out) being lower than the significant level ($\alpha=0.05$) signifies that not all independent variables determine the dependent variable. The assessment of individual p-value of each independent variable (postgraduate= 0.01, MPhil= 0.04 and PhD = 0.81) shows that only the numbers of PhD pass out with p-value greater than the significant level ($\alpha=0.05$) determines the numbers of female junior faculty in higher education institutions in India.

Although there is a poor representation of women at full professor rank, gender orientation policies (employing highly qualified female academics into senior faculty rank and ensuring female at junior and mid faculty rank get timely promotion) could lessen the gap. Deliberate actions to appoint or promote women into leadership and political positions may also be considered because women constitute about half or more of national workforce and the diligence and detailing in their work cannot be overlooked. It is noteworthy that ensuring gender parity in higher education institutions is indirectly building a promising future for India as the nation will on the long run experience increase in pools of innovators, change makers, entrepreneurs as well as increase in female faculty in higher education institutions.

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