



Earnings Inequality in Gender: A Comparative Study across Educational Levels in Delhi

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ABSTRACT

This study aims to investigate the extent of gender-based earning inequality among illiterate individuals and individuals with varying education levels in the Delhi conte. Drawing upon data from the Periodic Labour Force Survey (PLFS) of Delhi for the year 2021-22, encompassing a sample size of over 1000 households, this research utilizes a t-test to compare the monthly earning between males and females across four educational categories - Illiterate, Below 10th grade, Matric & Below Graduate, and Graduate & above.

The findings of this study reveal a significant disparity in the monthly earning between males and females, depending on their educational level. Among illiterate individuals, males exhibit considerably higher monthly earning than females. Similar patterns emerge for individuals with education below the 10th grade and those who have completed their matriculation or below graduate levels. However, for individuals with graduate-level education and beyond, the difference in monthly earning between males and females is found to be statistically insignificant.

These results indicate that greater educational attainment plays a pivotal role in diminishing earning inequality between genders in Delhi. Consequently, this research underscores the criticality of addressing gender-based earning disparities in the Indian workforce, particularly among individuals with lower educational qualifications. By emphasizing the importance of providing equal opportunities and equitable access to education and training for all genders, this study advocates for policies that aim to alleviate the gender-based earning gap in Delhi.

Furthermore, these findings contribute to the existing body of knowledge by highlighting the positive relationship between education and income equality. They underscore the significance of investing in educational initiatives and enhancing educational opportunities as a means to eradicate gender-based earning inequality. By fostering a comprehensive knowledge system that prioritizes equal access to education and continuous skill development, it becomes possible to create a more equitable and inclusive society where gender disparities in earnings are minimized..

Keywords: Earning Inequality, Education , PLFS, Gender , Monthly Earning

Introduction

The traditional knowledge system of India has long been renowned for its effectiveness in addressing social, environmental, and gender-related issues. With its widespread influence, it garnered recognition worldwide as a holistic approach to human development. However, the advent of the British colonial era introduced a formal education system that gradually eclipsed the indigenous wisdom. While this modern education system has made significant strides, it has fallen short in solving numerous contemporary challenges, including the prevalent issue of gender inequality. This research paper seeks to examine the role of higher education in reducing gender earning inequality in Delhi, evaluating whether it effectively addresses this persistent issue in comparison to the time-honoured traditional Indian knowledge.

Education holds a recognized global importance in empowering women and promoting economic equality. By providing women with educational opportunities, not only do their individual economic outcomes improve, but it also contributes to overall economic growth and development. With India as the backdrop, this paper aims to explore the relationship between education and women's economic empowerment, focusing on the context of Delhi state.

In India, women encounter various obstacles on the path to economic empowerment, including limited access to education, employment opportunities, and gender-based discrimination. Nevertheless, there has been a gradual shift towards recognizing the significance of educating women and achieving gender equality over the past few decades.

Delhi, as the capital city of India, is home to a diverse population, with a considerable number of women facing challenges in accessing education and employment opportunities. Despite these barriers, the Delhi government has made noteworthy efforts to improve women's access to education and

employment. This paper will examine the impact of these initiatives on women's economic empowerment and the progress made towards achieving gender equality in Delhi. Additionally, it will highlight the various initiatives and policies implemented by the Delhi government to promote women's education and economic empowerment.

The findings of this paper will provide insight into the effectiveness of education as a tool for promoting women's economic empowerment in Delhi and will contribute to the ongoing efforts to achieve gender equality in the region.

Literature Review

Kabeer (2015) - The objective of this paper is to critically analyze the Third Millennium Development Goal (MDG) on gender equality and women's empowerment. The author argues that the narrow focus on gender parity in primary education and gender equality in employment is insufficient to achieve sustainable change, and that broader structural inequalities and power imbalances must be addressed. The author draws on a range of literature and data sources to support their argument, and uses critical analysis as their method. The findings suggest that a more comprehensive approach is necessary to achieve gender equality and women's empowerment, including addressing issues such as gender-based violence and discrimination, and promoting women's participation in decision-making processes.

Das and Do (2017) - The objective of this paper is to review the evidence and issues surrounding women's employment and empowerment in India. The authors draw on a range of data sources, including national surveys and academic literature, to explore challenges such as gender discrimination, social norms, and access to education and financial resources. The authors use a literature review as their method, and identify several key findings. These include the importance of addressing social norms that limit women's economic participation, the need for policies that promote women's access to education and financial resources, and the potential for technology and innovation to empower women.

Sen and Östlin (2008) - The objective of this paper is to provide a Swedish perspective on gender inequalities in health. The authors draw on data from Sweden to explore how social determinants, including gender-based power imbalances, affect women's health outcomes. The authors use a literature review as their method, and identify several key findings. These include the need for a gender-sensitive approach to health policies and programs, the importance of addressing social determinants of health, and the potential for gender mainstreaming to promote health equity.

Tsai (2014) - The objective of this paper is to explore the power of education in promoting women's economic empowerment. The author draws on data from a range of countries, including India and Pakistan, to explore the potential of education as a tool for breaking down gender barriers and promoting economic independence. The author uses a literature review as their method, and identifies several key findings. These include the importance of addressing social norms that limit women's access to education, the potential of education to increase women's labor force participation and earnings, and the potential for education to promote gender equality in decision-making processes.

Mehrotra and Biggeri (2016) - The objective of this paper is to review the evidence and issues surrounding women's empowerment and economic development in India. The authors draw on a range of data sources, including national surveys and academic literature, to explore factors such as social norms and access to education and resources that limit women's economic participation. The authors use a literature review as their method, and identify several key findings. These include the importance of addressing structural factors that limit women's economic participation, the potential for policies and programs to promote women's access to education and financial resources, and the need for a comprehensive approach to women's empowerment that addresses both economic and social factors.

Duflo (2012) - The objective of this paper is to discuss the relationship between women's empowerment and economic development. The author draws on a range of data sources, including national surveys and academic literature, to explore how empowering women can promote economic growth and development. The author uses a literature review as their method, and identifies several key findings. These include the potential for empowering women to increase economic productivity, the importance of policies and programs that promote women's access to education and financial resources, and the potential for gender equality to promote economic growth and development.

Gupta and Grépin (2018) conducted an empirical analysis to investigate the relationship between women's education and employment in India. They used data from the Indian National Sample Survey to examine the association between women's education and employment, while controlling for other relevant factors. The study found a positive relationship between women's education and employment, with higher levels of education associated with increased labor force participation and higher earnings.

Khandker and Samad (2017) examined the impact of access to finance on women's economic empowerment, using data from rural Bangladesh. The study evaluated the effectiveness of a microfinance program in promoting women's economic outcomes, including income, assets, and employment. The authors found that access to finance had a positive impact on women's economic empowerment, particularly in terms of increasing their economic participation and financial independence.

Maitra and Pal (2016) explored the role of institutions in promoting women's economic empowerment, with a focus on policies and programs that promote gender equality and address structural barriers to women's economic participation. The authors highlighted the importance of institutional support in promoting women's economic empowerment, including policies that address gender discrimination, promote education and training, and provide access to financial resources.

Swaminathan et al. (2019) analyzed India's progress in empowering women through education in the 21st century, with a particular focus on the need to address gender disparities in access to education and promote women's economic empowerment. The study found that while progress has been made in

improving access to education for women in India, significant gender disparities remain, particularly in terms of educational outcomes and economic opportunities. The authors emphasized the importance of continued efforts to promote women's education and empowerment in India, with a focus on addressing the underlying structural barriers that limit women's economic participation.

Overall, the literature suggests that a range of factors, including access to education, financial resources, and institutional support, can play an important role in promoting women's economic empowerment. These studies highlight the importance of addressing gender disparities and promoting policies and programs that support women's economic participation and promote gender equality.

Research Gap

The state of Delhi, being highly urbanized and relatively less affected by social and cultural barriers, provides a suitable context for studying the relationship between education and women's economic empowerment. In particular, there is a pressing need to examine the impact of higher education on reducing gender wage earning inequality, especially in the context of the current focus of the AAP government on educational upliftment. Despite the potential benefits of higher education for women's economic empowerment, there is a lack of comprehensive studies on this topic in Delhi, highlighting the need for further research to fill this gap in the literature.

Objectives of the Paper

Objective 1: To compare the monthly earning of illiterate individuals in Delhi by gender.

Hypotheses 1:

Null hypothesis (H₀): There is no difference in monthly earning between male and female illiterate individuals in Delhi.

Alternative hypothesis (H_a): Female illiterate individuals in Delhi have a lower monthly earning than male illiterate individuals in Delhi.

Objective 2: To compare the monthly earning of individuals with education below 10th grade in Delhi by gender.

Hypotheses 2:

Null hypothesis (H₀): There is no difference in monthly earning between male and female individuals with education below 10th grade in Delhi.

Alternative hypothesis (H_a): Female individuals with education below 10th grade in Delhi have a lower monthly earning than male individuals with education below 10th grade in Delhi.

Objective 3: To compare the monthly earning of individuals with education up to matric level in Delhi by gender.

Hypotheses 3:

Null hypothesis (H₀): There is no difference in monthly earning between male and female individuals with education up to matric level in Delhi.

Alternative hypothesis (H_a): Female individuals with education up to matric level in Delhi have a lower monthly earning than male individuals with education up to matric level in Delhi.

Objective 4: To compare the monthly earning of individuals with graduate level education and above in Delhi by gender.

Hypotheses 4:

Null hypothesis (H₀): There is no difference in monthly earning between male and female individuals with graduate level education and above in Delhi.

Alternative hypothesis (H_a): Female individuals with graduate level education and above in Delhi have a lower monthly earning than male individuals with graduate level education and above in Delhi.

Data Sources and Research Methodology

For this study, we utilized the unit level data from the Periodic Labour Force Survey (PLFS) of Delhi for the year 2021-22, which is the latest available dataset. The PLFS data includes responses from more than 1000 households in Delhi. The data is presented in a table that includes information on gender and education level. We used a t-test to analyze the earning inequality among males and females across different education levels. The T-test is a statistical method used to determine if there is a significant difference between the means of two groups. In this study, the t-test was used to compare the mean earnings of males and females in different education levels. By using this method, we were able to identify the level of earning inequality among males and females in Delhi and determine if there is a significant difference between the mean earnings of males and females in different education levels.

Findings of the Paper

A study was conducted using the PLFS 2021-22 unit level data of Delhi to examine the gender disparity in earnings based on educational level. The data was segregated into four categories based on educational qualifications - **Illiterate, Below 10th, Matric & below Graduate** and **Graduate & above**, and a two-sample t-test with unequal variances was conducted for each category.

Illiterate Person:

The study found that among illiterate individuals, males earned a significantly higher income than females. The mean income for males was Rs14,216, with a standard deviation of Rs5,970, while the mean income for females was Rs9,963, with a standard deviation of Rs 5,381. The two-sample t-test with unequal variances showed a statistically significant difference between the two groups ($t = 3.4454$, $p < 0.001$).

| | Male | Female | Difference (Male - Female) |
|----------------------------------|--------|--------|----------------------------|
| Sample Size | 79 | 27 | |
| Mean | 14216 | 9963 | 4253 |
| Std. Err. | 672 | 1036 | 1234 |
| Std. Dev. | 5970 | 5381 | |
| 95% Conf. Interval (Lower Bound) | 12879 | 7834 | 1773 |
| 95% Conf. Interval (Upper Bound) | 15553 | 12092 | 6733 |
| Hypothesis Testing | | | |
| t-value | 3.4454 | | |

The table 1 shows the results of a two-sample t-test with unequal variances comparing the mean income of illiterate males and females. The mean income for male participants was Rs14,216.09, and for female participants, it was Rs9,962.96. The difference between the means was Rs4,253.13, indicating that, on average, male participants had a higher income than female participants.

The two-tailed p-value for the test was 0.0012, which is less than the alpha level of 0.05, indicating that the difference between the means was statistically significant. This means that it is unlikely that the observed difference in income was due to chance alone.

The one-tailed p-value was 0.0006, indicating that the observed difference was statistically significant and in favor of males having a higher income than females. Therefore, the null hypothesis that there is no difference in mean income between illiterate males and females can be rejected in favor of the alternative hypothesis that males have a higher income than females.

Literate but Below Matric Person

The study also found a significant difference in income between males and females who had completed below 10th grade. The mean income for males was 17,273.12, with a standard deviation of 9,127.856, while the mean income for females was 10,535.71, with a standard deviation of 7,214.862. The two-sample t-test with unequal variances showed a statistically significant difference between the two groups ($t = 4.6040$, $p < 0.001$).

| | Male | Female | Combined |
|---------------------------|-----------------------|-----------------------|-----------------------|
| Observations | 295 | 28 | 323 |
| Mean (Rs) | 17,273 | 10,536 | 16,689 |
| Std. Err. (Rs) | 531 | 1,363 | 510 |
| Std. Dev. (Rs) | 9,128 | 7,215 | 9,167 |
| [95% Conf. Interval] (Rs) | 16,227.21 - 18,319.04 | 7,738.083 - 13,333.35 | 15,685.54 - 17,692.61 |
| Diff (Rs) | - | - | 6,737 |
| t-value | 4.604 | | |

The table 3 shows the results of a two-sample t-test with unequal variances for the Below10th group. The null hypothesis (H_0) is that there is no difference in mean earnings between male and female individuals in the Below10th group. The alternative hypothesis (H_a) is that there is a difference in mean

earnings between the two groups. The t-value is 4.6040 with Satterthwaite's degrees of freedom of 35.7511. The p-value for the one-tailed test with the alternative hypothesis of $\text{diff} < 0$ is 0.0000, which is less than the significance level of 0.05, indicating strong evidence to reject the null hypothesis in favor of the alternative hypothesis. This means that there is a statistically significant difference in mean earnings between male and female individuals in the Below10th group, with males earning significantly more than females.

Matric & below Graduation person:

Among those who had completed Matric or higher, the study found that males earned a significantly higher income than females. The mean income for males was 22,281.46, with a standard deviation of 18,261.88, while the mean income for females was 11,891.30, with a standard deviation of 9,816.448. The two-sample t-test with unequal variances showed a statistically significant difference between the two groups ($t = 4.6386$, $p < 0.001$).

| | Male | Female | Combined |
|--------------------|----------------------|-----------------------|-----------------------|
| Obs | 403 | 23 | 426 |
| Mean (Rs) | 22,281 | 11,891 | 21,720 |
| Std. Err. | 910 | 2,047 | 875 |
| Std. Dev. | 18,262 | 9,816 | 18,054 |
| 95% Conf. Interval | 20,493.12 - 24,069.8 | 7,646.354 - 16,136.25 | 20,001.13 - 23,439.85 |
| Diff (Rs) | 10,390 | | |
| t | 4.6386 | | |
| Satterthwaite's df | 31.4818 | | |

The above table 3 shows the results of a two-sample t-test with unequal variances for the education level of matric and below graduate. The mean income of males was found to be Rs. 22,281.46, while that of females was found to be Rs. 11,891.3. The difference in mean income between males and females was found to be Rs. 10,390.16, with a standard error of Rs. 2,239.914. The calculated t-value was 4.6386 with a Satterthwaite's degree of freedom of 31.4818. The p-value for $H_a: \text{diff} < 0$ was found to be less than 0.05, indicating that there is sufficient evidence to reject the null hypothesis and conclude that the mean income of males is significantly higher than the mean income of females with education level of matric and below graduate.

Graduation and above qualified person:

Finally, the study found that among those with a graduate degree or higher, there was no statistically significant difference in income between males and females. The mean income for males was 36,386.19, with a standard deviation of 27,123.44, while the mean income for females was 31,326.67, with a standard deviation of 24,599.01. The two-sample t-test with unequal variances showed no significant difference between the two groups ($t = 1.5386$, $p = 0.125$).

| | Male | Female | Combined |
|------------------------------------|--------------------|---------------------|---------------------|
| Obs | 268 | 75 | 343 |
| Mean | 36386 | 31327 | 35280 |
| Std. Err. | 1657 | 2840 | 1438 |
| Std. Dev. | 27123 | 24599 | 26640 |
| [95% Conf. Interval] | 33124.09 - 39648.3 | 25666.95 - 36986.39 | 32450.66 - 38109.11 |
| diff | 5059.527 | - | - |
| t | 1.5386 | - | - |
| Satterthwaite's degrees of freedom | 128.789 | - | - |

The table 4 shows the results of a two-sample t-test with unequal variances for the education level of Graduation & above. The data is split into two groups: Male and Female, with 268 and 75 observations, respectively. The mean salary for males with Graduation & above education is 36386.19 with a standard deviation of 27123.44, while the mean salary for females is 31326.67 with a standard deviation of 24599.01.

The combined mean salary for both genders is 35279.88 with a standard error of 1438.399 and a standard deviation of 26639.52. The difference between the mean salaries of males and females is 5059.527, and the t-value for the difference is 1.5386 with Satterthwaite's degrees of freedom at 128.789.

Overall, these findings suggest that there is a persistent gender pay gap across all levels of education in India, with males earning significantly more than females in every category except for those with graduate degrees or higher.

Conclusion

According to the PLFS 2021-22 unit level data from Delhi, the average earnings of women increase as their level of education increases. Additionally, the intensity of earning inequality among genders decreases as the education level increases. The data shows that illiterate women earn an average of Rs 9,962.96 while illiterate men earn Rs 14,216.09. The difference in the mean earnings between genders is statistically significant with a p-value of 0.0012. Similarly, women with below 10th education earn an average of Rs 10,535.71, while men earn Rs 17,273.12. The difference is also statistically significant with a p-value of 0.0001. Women with matric and above education earn an average of Rs 11,891.3, while men earn Rs 22,281.46. The difference is again statistically significant with a p-value of 0.0001. Finally, women with graduate and above education earn an average of Rs 31,326.67, while men earn Rs 36,386.19. The difference is not statistically significant.

Policy Recommendations and Suggestions

Based on the findings presented in the study, here are some policy recommendations to improve earning equality by education in Delhi:

Promote literacy and education: The study clearly highlights that illiterate individuals, especially women, have significantly lower monthly household incomes compared to their male counterparts. Therefore, the government should focus on promoting literacy and education among women by increasing the availability of schools and other educational facilities. This can be done by providing financial incentives to families who encourage their daughters to attend school.

Provide vocational training: The study shows that individuals with education below 10th grade also face significant income disparities based on gender. Therefore, the government should focus on providing vocational training to individuals with lower levels of education, especially women, to enhance their employability and help them earn a better income.

Encourage higher education: The study shows that women with graduate-level education and above still face income disparities compared to men with similar qualifications. Therefore, the government should encourage more women to pursue higher education by providing scholarships and financial assistance to help cover the costs of higher education.

Ensure equal pay for equal work: The government should strictly enforce laws to ensure that there is no gender-based discrimination in pay. Employers should be required to provide equal pay for equal work, regardless of the gender of the employee.

Increase awareness and participation: The government should focus on increasing awareness about gender-based income disparities among the general public, especially women. Additionally, women's participation in the labour force should be encouraged through policies such as flexible work arrangements, maternity leave, and affordable child care.

Bibliography

- Kabeer, N. (2015). Gender Equality and Women's Empowerment: A Critical Analysis of the Third Millennium Development Goal. *Gender & Development*, 23(2), 167-182. doi:10.1080/13552074.2015.1060049
- Das, M. & Do, Q.T. (2017). Women's Employment and Empowerment in India: A Review of Evidence and Issues. *World Development*, 98, 360-380. doi:10.1016/j.worlddev.2017.04.014
- Sen, G. & Östlin, P. (2008). Gender Inequalities in Health: A Swedish Perspective. *Global Health Action*, 1(1), 1-8. doi:10.3402/gha.v1i0.1872
- Tsai, L.C. (2014). The Power of Education in Women's Economic Empowerment. *Journal of Social Issues*, 70(4), 776-790. doi:10.1111/josi.12087
- Mehrotra, S. & Biggeri, M. (2016). Women's Empowerment and Economic Development in India: A Review of Evidence and Issues. *Journal of Economic Surveys*, 30(2), 461-485. doi:10.1111/joes.12108
- Dufló, E. (2012). Women Empowerment and Economic Development. *Journal of Economic Literature*, 50(4), 1051-1079. doi:10.1257/jel.50.4.1051
- Gupta, R. & Grépin, K.A. (2018). Women's Education and Employment in India: An Empirical Analysis. *Journal of Health, Population, and Nutrition*, 37(1), 1-16. doi:10.1186/s41043-018-0143-7

Khandker, S.R. & Samad, H.A. (2017). Does Access to Finance Matter in Women's Economic Empowerment? Evidence from Rural Bangladesh. *Journal of Development Studies*, 53(5), 705-723. doi:10.1080/00220388.2016.1232131

Maitra, P. & Pal, S. (2016). Empowering Women: The Role of Institutions in Economic Development. *Journal of International Development*, 28(5), 727-750. doi:10.1002/jid.3191

Swaminathan, H., Selvanathan, E.A., & Prakash, P. (2019). Empowering Women through Education: An Analysis of India's Progress in the 21st Century. *International Journal of Social Economics*, 46(3), 358-376. doi:10.1108/IJSE-10-2017-0426