

Educational Awareness for Higher Studies in Rural Areas for Girls : A Statistical Study

Chhavi pundir¹, Dr. Richa²

¹student, M.Sc. Statistics, School of Statistics, Maa Shakumbhari University, Saharanpur, Uttar Pradesh, India.

² Assistant Professor (Guest Faculty), School of Statistics, Maa Shakumbhari University, Saharanpur, Uttar Pradesh, India.

Abstract: In this paper, A Statistical study of Educational Awareness in Rural Areas for girls has been done. The primary data was collected in order to evaluate patterns of educational awareness and accessibility from rural areas, after the establishment of Maa Shakumbhari University, which is located in Punwarka. The impact of education in rural areas on girls and their family members before and after the establishment of the university has been studied. The answers were recorded in categorical form and were later coded numerically to make statistical analysis easier. The collected data were organized and analyzed using both parametric and non-parametric statistical techniques. A parametric analysis based on ANOVA(Analysis of Variance) within the framework of Randomized Block Design(RBD) was applied to examine variations among response categories. In addition, the Kruskal–Wallis test was used as a non-parametric alternative to verify the statistical significance of the observed differences. The Kruskal–Wallis test is an alternative to One- Way ANOVA. The combined use of these statistical techniques enabled a systematic comparison of responses. It helped to determine whether meaningful variations existed among the categories. The results of the analysis indicate statistically significant differences among responses, suggesting that observable changes in educational awareness. It Access to higher education is reflected in the collected data. The study demonstrates how statistical tools can be effectively applied to interpret categorical survey responses and evaluate educational patterns in rural areas.

Keywords: Rural Education, Educational awareness, girls' education, Higher education, Rural communities, Educational development.

Introduction

Education plays an important role in the development of any society. Education-related surveys generate categorical responses that require statistical methods for proper interpretation. When individuals respond to questionnaires by selecting options such as Yes, No, or Don't Know. The resulting data must be organized and analyzed using suitable statistical techniques in order to determine whether the observed differences among responses are statistically meaningful. Statistical analysis provides a systematic approach for converting qualitative responses into quantitative measures that can be interpreted scientifically. In many research studies involving grouped data, parametric techniques such as ANOVA(Analysis of Variance) are used to compare variations among different categories. This method allows the researcher to evaluate whether differences among groups occur due to random variation or due to statistically significant effects. When the structure of the data involves repeated observations across multiple statements or conditions, the analysis can be carried out using the framework of Randomized Block Design(RBD), which helps control variation among blocks while examining the differences among treatments. In many cases, the assumptions required for parametric analysis may not be fully satisfied, particularly when dealing with categorical survey responses. Then we use non-parametric statistical methods, which offer a useful alternative. The Kruskal–Wallis test allows comparison among multiple groups without requiring the assumption of normal distribution. The present study applies both parametric and non-parametric statistical techniques to analyze the questionnaire responses related to girls' education in rural areas. By using these techniques, the study attempts to identify patterns and variations in the responses and to demonstrate the effectiveness of statistical techniques in interpreting educational survey data.

Review of literature

Apoorva Gupta and Dr. Richa (2025) used a statistical method for a time series forecasting model. I have read some statistical methods like ARIMA and SARIMA from this paper.

Premchandran P (2025) investigates the major challenges that continue to affect girls' education in rural India despite several policy initiatives and improvements in educational indicators. The study uses empirical evidence from different studies carried out between 2010 and 2024. The researcher analyzes the socio-cultural, economic, and infrastructural barriers that limit girls' access to quality education. This study identifies important obstacles such as gender discrimination, early marriage, safety concerns, poverty, and poor school infrastructure. The findings show that although the enrollment rate of girls in schools has increased, many challenges still exist in retention, transition to secondary education, and learning outcomes. Early marriage also prevents many girls from continuing their education.

Chhavi Pundir and Dr. Richa (2025) worked on the review of study examining the relationship between rural and urban environments. The researcher analyzes their influence on social mobility. The study emphasizes that social mobility is significantly affected by disparities in access to resources, education, and opportunities between rural and urban areas. It highlights that rural regions often face challenges such as inadequate infrastructure, poverty, and limited educational facilities, whereas urban areas provide better access to higher education and employment opportunities. In this research, the researcher also discusses migration as an important pathway through which individuals from rural areas can improve their socio-economic status. It also creates challenges like social adjustment and urban pressure.

Dr. Shailendra Gehlot (2023) investigates the major factors responsible for the dropout of girls from higher education in rural areas. The study emphasizes that social, economic, and educational problems are the primary barriers affecting girls' education. It highlights that negative social attitudes, practices like early marriage, and the influence of traditional norms significantly restrict girls from continuing their education. In this research, the researcher also points out parental illiteracy and lack of awareness about the importance of higher education. Specifically, lack of proper educational facilities, inadequate transportation, and absence of guidance and counseling services act as major challenges. The researcher also observes that girls are often considered weaker in society.

Shabana Khatun (2022) explores the relationship between gender inequality and educational participation in rural areas. She points out that although access to education has improved, gender disparities continue to exist, particularly in rural regions. Due to social pressure, girls face multiple challenges such as social restrictions, early marriage, and lack of family support, which limit their educational opportunities. In this study she also points out that economic hardship forces many girls to discontinue their education and engage in household responsibilities. She concludes that improving access, awareness, and institutional support can significantly enhance girls' participation in education. The study shows that reducing gender inequality in education is essential for overall rural development.

Anjali Chugh (2021), in her study, examines the major obstacles that prevent girls from accessing education in rural areas. The study highlights that despite improvements in enrollment, dropout rates among girls remain high due to traditional beliefs and economic challenges. It emphasizes that poverty and gender discrimination affect girls' education. She points out that lack of proper school infrastructure, sanitation facilities, and safety concerns discourage girls from continuing their education. The data suggests that improving awareness, infrastructure, and support systems can enhance girls' participation in rural areas. So this research concludes that a combined effort of policy and social change is necessary to improve girls' education in rural areas of India.

Anita Kumari (2021): In this research the researcher examines the key determinants influencing girls' education in rural areas. The study points out that despite improvements in enrollment, dropout rates among girls remain high due to multiple socio-economic challenges. She highlights that poverty and financial conditions are major obstacles that limit access to education for girls. The study suggests that parental perception and knowledge play a crucial role in shaping girls' educational outcomes. The data suggest that improving awareness and providing basic facilities can increase participation rates. The result of this study is that addressing both social and economic barriers is essential for improving girls' education in rural regions.

Aasia Ahmed Radiowala and Manjusha S. Molwane (2021) focus on the various barriers that rural women face in accessing education. The authors highlight that lack of proper educational facilities in rural areas is one of the major challenges. They also emphasize that social and cultural restrictions significantly limit the participation of girls in education. Financial constraints and poverty further restrict families from supporting girls' education. In addition, issues such as lack of transportation and safety concerns act as important barriers. The study also points out that parental attitudes and lack of awareness play a crucial role in determining whether girls receive education or not. Using a descriptive research approach, the authors found that gender inequality still persists in rural education systems. The study suggests that improving infrastructure, increasing awareness, and providing better support systems can enhance access to education for rural women. The research determines that targeted policies and interventions are necessary to overcome these challenges and promote girls' education in rural India.

Suresh Solomon G and Nancy Jasmine Goldina (2021) examine the educational performance of students studying in rural schools. In this study, they highlights that the performance of rural students is often lower compared to students in urban areas due to lack of facilities, limited exposure, poor economic conditions, and inadequate learning environments. This research emphasizes that equality in education is a fundamental principle. Every student should receive equal opportunities for learning and development. The research focuses on identifying various factors that influence the academic performance of rural students. They discuss issues such as poverty, lack of educational resources, insufficient infrastructure, and limited employment opportunities for families.

Santosh Mehrotra and Kalaiyaran, A. (2020) explore the relationship between education and gender equality in rural India. The research highlights that education plays a crucial role in motivating girls and improving their social status. The study emphasizes that rural girls face multiple barriers such as poverty, early marriage, and lack of access to educational institutions. The conclusion of this study is that promoting girls' education is essential for achieving gender equality and sustainable development in rural regions.

Methodology

This study is based on primary data. In this study the data were collected through a structured questionnaire and Google form. The questionnaire and Google form designed to examine the level of educational awareness and accessibility in five rural villages that are so close to the university. The main purpose of collected primary data was to obtain authentic and first-hand information directly from respondents. These data provide more reliable and authentic information because the responses are obtained directly from individuals. In this study related to social awareness and girls' education, the use of primary data is very important. It allows the researcher to understand the actual perceptions, knowledge, and attitudes of people living in a particular area (area of research). Therefore, primary data were considered the most appropriate source of information for this research.

A structured questionnaire was created to gather information from people. The questionnaire covers various topics: questions related to girls' education, employment, and the views of villagers on girls and boys in rural areas. In this questionnaire the questions were written in a simple and clear language so that respondents could easily understand them and give accurate responses. Some questions need to be answered with yes, no or don't know, while some others require a rating. After these responses were collected, the categorical value of responses was later converted into numerical values (codes) for statistical analysis and interpretation.

This survey is done from five villages that are closest to the university and are from the rural area. These villages are located within approximately 5km range of the university. These are the names of five villages: Punwarka, Lakhnauti Khurd, Lakhnauti Kalan, Aasanwali, and Sundalheri. Our objective in selecting these villages is that the university's influence is most effective here. The presence of a university in or near rural areas can potentially affect the educational environment of nearby communities, motivating girls to pursue higher education and helps villagers to change their attitude towards girls. Therefore, selecting villages located near the university provided an appropriate context for examining. The presence of the institution has contributed to changes in educational awareness and attitudes among residents in the rural area.

The target population for the field survey, the researcher selected people from the villages, such as students, young adults, and other individuals who are capable of providing information. The information about educational awareness and opportunities in their community. The respondents represent different age groups and backgrounds within the rural population. People from different communities or backgrounds help us in understanding educational awareness and perceptions in rural areas.

The researcher has collected data by herself. The data has been collected from every individual, door-to-door. The researcher personally visited each of the people of selected villages. The researcher approached individuals one by one to collect their responses. Personal visits were made to ensure that the respondents clearly understood the purpose of the study. The meaning of the questions included in the questionnaire. In many cases, rural respondents such as old people may have difficulty understanding written questions if someone does not explain them properly. Therefore, direct communication between the researcher and the respondents helped clarify any doubts. The researcher also ensured that the responses were recorded accurately. Collection of data by this method also helps build trust between the researcher and the respondents. Data collection through a questionnaire increased the reliability and authenticity of the information collected during the survey.

In addition to the questionnaire, we collected data using another method. An online survey method was also adopted in which responses were collected from individuals who are currently studying in higher educational institutions. Therefore, a questionnaire was created using a Google Form and distributed among the students of Maa Shakumbhari university and other college students under the Maa Shakumbhari University. The main objective of this online survey was to understand the opinions of the students currently studying at the university, as well as those from other colleges, regarding this university. It aims to determine whether students have any complaints against the university and what benefits they have derived from it.

The Google Form was shared through digital platforms among university and college students. A total of sixty-one responses were collected through this method. The responses obtained through the online survey complemented the data collected from rural villages. It helped create a more comprehensive dataset for statistical analysis and interpretation.

After the data collection process was completed, the responses obtained from both the questionnaire and Google Form were carefully organized for analysis. Since the responses were collected in categorical form (Yes, No, and Don't Know), after that, these categorical data were converted into numerical codes to make them easy and suitable for statistical analysis.

For the analysis of the collected data, two statistical techniques, parametric and non-parametric were applied. A parametric statistical technique based on ANOVA (Analysis of Variance) was applied to examine whether significant differences exist or not among the responses. This method is widely used in statistical research to compare variations among different groups or treatments. In this research, the analysis was conducted within the framework of a randomized block design, where the response categories were treated as treatments and the questionnaire statements were considered as blocks. The procedure involved the calculation of the correction factor, sums of squares, mean squares, and the F-statistic in order to determine whether the observed differences among responses were statistically significant.

In addition to the parametric analysis, a non-parametric statistical technique known as the Kruskal–Wallis test was also applied. This test is particularly useful when the assumptions required for parametric tests may not be fully satisfied, especially when dealing with ordinal or ranked data. The Kruskal–Wallis test is based on ranking the observations and comparing the sum of ranks among different

groups. In this method, the responses are arranged in ascending order and assigned ranks, after which the sum of ranks for each group is calculated. The test statistic is then computed and compared with the critical value of the chi-square distribution at a chosen level of significance.

Both techniques allow the researcher to examine the data from multiple perspectives. Applying more than one statistical method helped strengthen the reliability of the result. The conclusions derived from the study are supported by appropriate statistical evidence. Thus, the combined use of these parametric and non-parametric methods provided a comprehensive framework for analyzing the collected data and evaluating the level of educational awareness in rural areas.

Data Analysis

Hypothesis

Ho: There is no significant difference in the level of education in rural areas after the establishment of the university.

H1: There is a significant difference in the level of education in rural areas after the establishment of the university.

Testing of hypotheses

In testing of the above hypothesis, both parametric and nonparametric statistical techniques have been applied. The use of two different methods helps in ensuring the reliability and validity of the result obtained from the collected data.

Parametric test – Two-Way ANOVA

For testing the hypothesis, two -way analysis of variance (ANOVA) based on a randomized block design (RBD) has been applied. This method is chosen because the collected data is categorized by two distinct factors.

A total of 50 respondents from rural areas participated in the survey. The responses obtained from them were tabulated according to the survey question. These responses were then arranged in tabular form and analyzed using the two-way ANOVA method to determine whether there exist significant differences in the responses, but the results from ANOVA feel a bit abstract.

ANOVA Table for calculation

Source of variation	Degree of freedom	Sum of squares	Mean sum of squares	F value
Between columns	2	6091.097	3045.55	42.15
Between rows	16	0	0	0
Error	32	2312.24	72.26	--
Total	50	--	--	

Since the ANOVA showed zero variance between rows, it is evident that the data does not align with the standard parametric assumptions of normality required for parametric testing. “To ensure a more reliable and robust analysis, A non-parametric test is now more appropriate for it, so I have selected the Kruskal-Wallis test.”

Yes	37	34	14	11	33	35	35	20	35	31	34	38	38	33	35	38	40
No	7	11	31	31	11	7	9	24	8	9	8	5	7	10	9	7	5
Don't know	6	5	5	8	6	8	6	6	7	10	8	7	5	7	6	5	5

To verify the results obtained from the parametric test, a non-parametric statistical test known as the Kruskal–Wallis test was also applied. This test is used when the data is categorical and does not necessarily follow a normal distribution. In the present study, the responses of the respondents were categorized into three groups:

- Yes
- No
- Don't know

$$H = \frac{12}{n(n+1)} \sum \frac{R_i^2}{n_i} - 3(n+1)$$

The Kruskal–Wallis test was applied to determine whether there is a significant difference among these three response groups with respect to the survey questions related to educational awareness and participation. The calculated value of the Kruskal–Wallis test statistic was $H = 35.22$, while the tabulated chi-square value at a 5% level of significance with 2 degrees of freedom is 5.991. Since the calculated value ($H = 35.22$) is greater than the tabulated value ($\chi^2 = 5.991$), the null hypothesis is rejected. Therefore, it can be concluded that there is a significant difference in the level of education in rural areas after the establishment of the university.

Graphical Representation

This charts 1.1 and 1.2 illustrate a significant longitudinal shift in sociocultural attitudes toward female education, highlighting a transition from systematic resistance to widespread community endorsement. Initial data reveals a high degree of restriction, with 72% of the community originally opposing independent mobility for girls and 64% resisting sending them outside the village for any purpose.

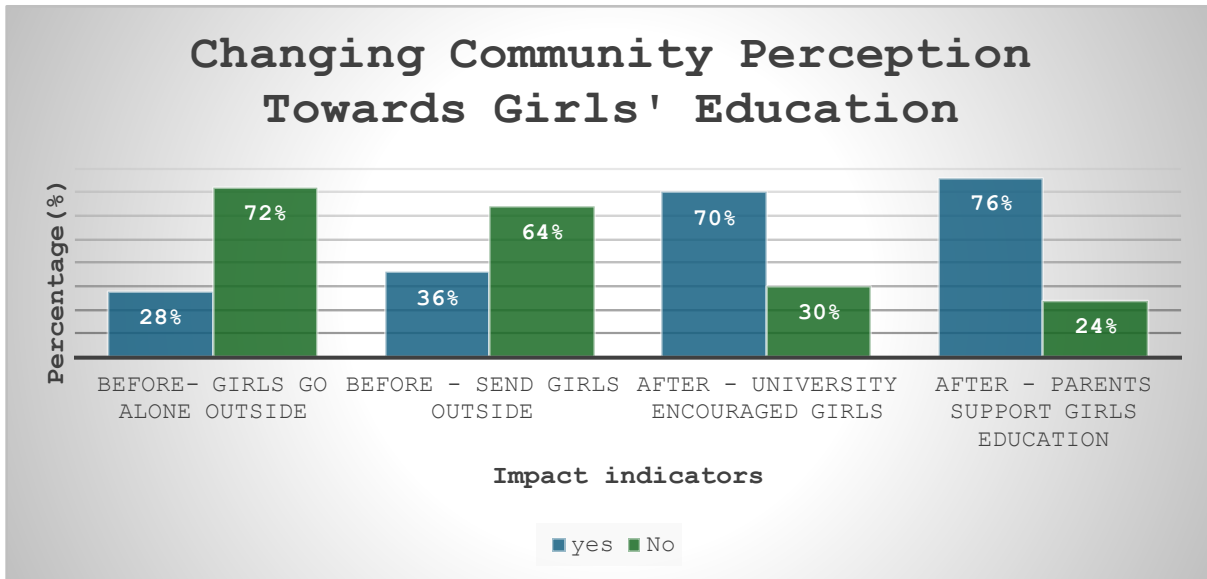


Figure -1.1

However, post-intervention metrics demonstrate a transformative reversal: 76% of parents now actively support girls' education, and 70% of respondents acknowledge that universities are increasingly encouraging female enrollement. This shift suggests that institutional advocacy and community-based interventions are highly effective in dismantling traditional gender-based barriers and fostering a more inclusive educational environment.

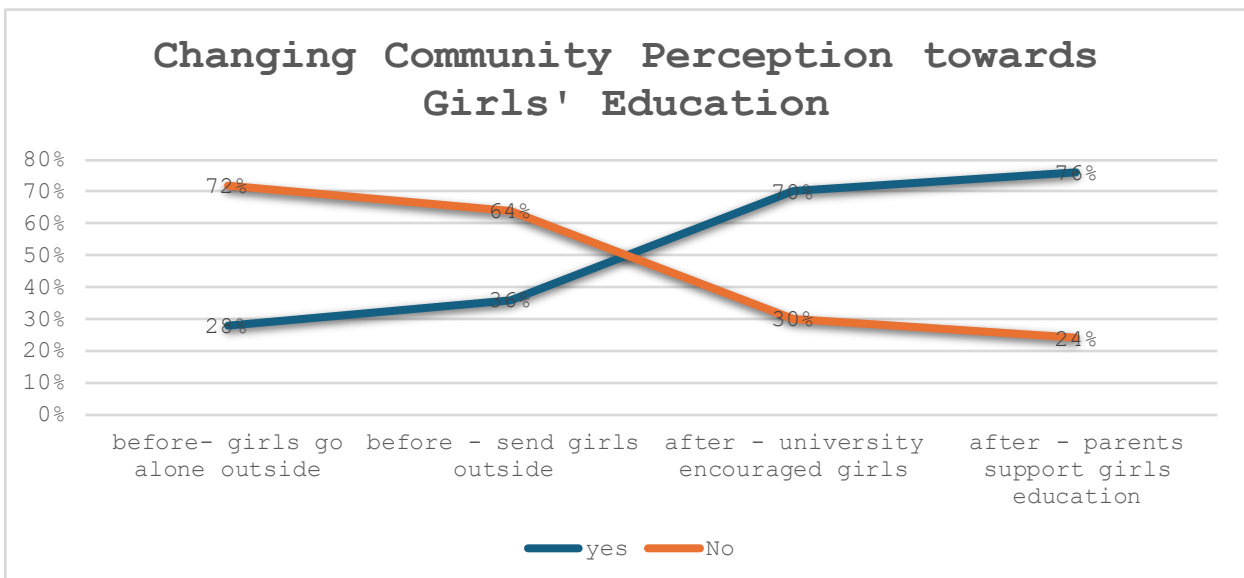


Figure -1.2

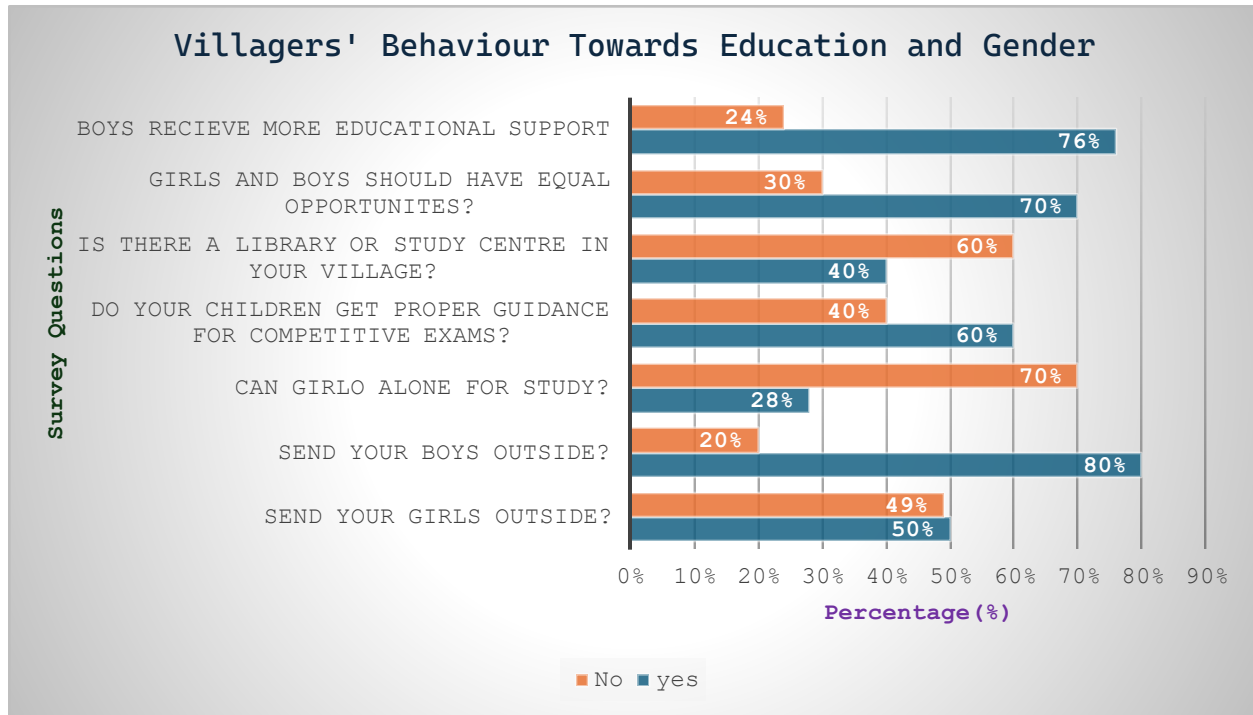


Figure -1.3

In figure 1.3, the chart reveals a persistent “implementation gap” between the community’s stated egalitarian values. A significant majority (70%) theoretically support equal opportunities for both genders, but a stark disparity remains in practice, with 76% of respondents admitting that male children receive superior educational support. This behavioral lag is deeply intertwined with safety and infrastructure concerns; while 80% of families are comfortable sending boys outside the villages for study, only 50% afford the same mobility to girls. Furthermore, the data identifies a critical infrastructure deficit, as 60% of the community lacks local libraries or study centers. This absence of local resources effectively penalizes female students, whose educational access is curtailed by the 70% of respondents who believe it remains unsafe for girls.

Results

The present study was conducted to examine the condition of rural education. This study analyzes the changes that occurred before and after the establishment of the university in the Saharanpur. The findings of the study show that before the university, the condition of girls’ education in rural areas was not very encouraging. In many villages, girls were not allowed to go for higher education. Social restrictions and traditional family attitudes played an important role in limiting girls’ educational opportunities. In rural families, boys were generally given permission to travel outside for studies, but girls were often restricted due to safety concerns and social norms.

Another important issue was early marriage. In several cases, girls who were pursuing education were married at a young age, which resulted in the discontinuation of their studies. Because of these reasons, many girls were unable to complete higher education even if they were academically capable.

Transportation was also a major barrier. Even when some families allowed their daughters to study in nearby cities such as Saharanpur, traveling daily was difficult due to the lack of convenient and safe transport facilities. As a result, many girls preferred or were forced to select nearby colleges that offered only limited courses.

Due to the absence of diverse academic programs in rural areas, girls were often restricted to traditional courses such as Bachelor of Arts (B.A.) or Bachelor of Commerce (B.Com.), even if their interests were in other professional or technical fields. This limited their career prospects and personal development.

However, a major change occurred in 2021 with the establishment of Maa Shakumbhari University in Punwarka, a village located near Saharanpur. The establishment of this university created new educational opportunities for students living in nearby rural areas. The availability of a university close to the villages significantly reduced the problems related to distance and transportation. Parents became more comfortable sending their daughters for higher education because the institution was located nearby. As a result, more girls began to enroll in higher education programs.

The university provides a wide variety of courses such as law, social work, management, artificial intelligence, statistics, mathematics, biology, physics, chemistry, and doctoral programs. These academic programs have expanded the educational choices available to students and allowed them to pursue subjects according to their interests.

The establishment of the university has also contributed to the overall development of the surrounding region. Many employment opportunities have been created for local villagers. Men and women from nearby villages are working in different roles such as administrative staff, security personnel, and other service positions within the university.

Furthermore, the presence of the university has improved the infrastructure and economic condition of the region. The development of roads, transportation facilities, and local markets has increased. Land prices in nearby areas have also increased due to the growing educational importance of the region.

The faculty members of the university are well qualified and dedicated to providing quality education. The university administration, including the vice-chancellor, is actively working to improve the academic environment and to develop the institution further.

Conclusion

The conclusion is based on the result of the study after the establishment of Maa Shakumbhari University has led to many positive changes in the educational environment of rural areas of Saharanpur.

Before the establishment of the university, girls had many barriers in pursuing higher education, including social restrictions, early marriage, lack of transportation, limited academic options, the absence of good colleges, and the unavailability of courses. Some boys, too, were previously unable to pursue their higher studies either due to household responsibilities that prevented them from stepping out or simply due to lack of time.

On December 2, 2021, Maa Shakumbhari University was established in Punwarka village, located in the Saharanpur district of Uttar Pradesh. With the establishment of the university, the doors to higher education were opened for girls. Virtually all the obstacles they faced are resolved. Social restrictions ceased to exist because the university is situated right within the village; consequently there are no issues regarding transportation. Parents are now free from worry concerning their daughter, as they are able to return home on time.

In addition to educational benefits, the university has also contributed to social and economic development in the surrounding villages. Employment opportunities have increased, infrastructure has improved, and the overall educational atmosphere in the region has become more positive. Parents now support girls' education more than before. Due to these factors, rural girls were unable to complete their education.

Therefore, it can be concluded that the establishment of Maa Shakumbhari University has played an important role in promoting rural education and empowering girls through better access to higher education.

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