

# Exploring Educational Attainment among Individuals with Physical Disabilities: A Case Study in Bangladesh

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**Abstract:** This research aims to explore the educational attainment of people with physical impairments in Bangladesh. The objective is to determine the obstacles, chances, and tactics that help or impede academic achievement in this particular group of people via an extensive case study. The present study utilized qualitative and quantitative methods to collect data on educational achievement, age, gender, income, expenditure, educational expenditure, allowance, and other sources of income. The study investigated the demographic composition, educational level, and influence of variables on the educational attainment of individuals with physical disabilities in various municipal areas of Dhaka, Chattogram, Barishal, and Noakhali. Logistic and probabilistic regression analysis has been used in this context. The results showed that the demographic makeup of people with disabilities in Dhaka, Chattogram, and Noakhali was varied. There was a wide range in educational attainment, and variables including age, gender, income, and educational spending showed a significant impact. The results of probabilistic and logistic regression analysis showed a significant connection between these factors and academic accomplishment. The results will guide focused initiatives and policy changes aimed at improving educational equity and assistance for people with physical disabilities.

**Keywords:** physical disabilities; educational attainment; income; logistic model; probabilistic model

## 1. Introduction

Disabilities are defined as impairments in physical or mental abilities that prevent an individual or group from carrying out daily tasks to a level typically expected [1]. A person's functional capacity can be impaired by a wide range of conditions, including but not limited to physical, sensory, cognitive, and mental impairments, mental illness, and chronic diseases [2]. According to the World Health Organization [3], individuals with disabilities encounter prejudice, discrimination, and stigma while trying to access health-related resources. In many cases, these obstacles make it impossible for persons with disabilities to take part in society as completely as everyone else [4]. The impact of physically disabled individuals on the global population is significant and continues to increase. Currently, around 1.3 billion people, which is about 16% of the global population (approximately 1 in 6 individuals), face significant physical disabilities [3]. According to the World Bank, different disability categories impact various percentages of the population. Mobility disabilities affect 2–5% of individuals, vision disabilities affect 1.5%, hearing disabilities affect 5%, cognitive disabilities affect 2%, and other disabilities vary depending on the region and definition [5]. Future projections indicate a worrisome trend,

with an expected increase in the number of physically disabled individuals. By 2050, it is estimated that there will be 2.2 billion people with disabilities, accounting for 26% of the global population, according to the United Nations Enable [6]. The increase in escalation can be attributed to various factors, including the aging population, a rise in chronic diseases, and advancements in disability measurement techniques. There are clear disparities between regions, as developing countries have a higher prevalence of disabilities (up to 20% compared to 10% in developed nations). This is a result of limited access to healthcare, sanitation, and social safety nets. It is important to acknowledge the challenge of defining and measuring disability, which can result in slight variations in estimates from different sources and regions [7]. In addition to the statistics, there are further observations that highlight the unique difficulties experienced by women and girls with disabilities as a result of gender bias and societal prejudice. In many disadvantaged communities, there continues to be a lack of access to education, employment, and healthcare for physically disabled individuals [8].

People with physical disabilities frequently face distinct obstacles that affect their social circumstances [9]. Physical disabilities cover a broad spectrum of conditions, including mobility impairments and sensory limitations. Each individual's experience is unique. The social conditions experienced by individuals with physical disabilities are influenced by the attitudes of society, challenges related to accessibility, and the presence of support systems [10, 11]. A notable factor in the social condition of individuals with physical disabilities is the widespread existence of societal stereotypes and misconceptions. Such stereotypes can contribute to the marginalization of individuals with disabilities, reinforcing the belief that they are less capable or independent [12,13]. Individuals with disabilities may face challenges in building relationships and engaging in social events, potentially resulting in feelings of social isolation [14]. Ensuring accessibility is essential for improving the social condition of individuals with physical disabilities. Barriers to participation are created by environments that are not easily accessible, such as buildings lacking ramps or public spaces without proper accommodation [15]. When societal infrastructure neglects the needs of individuals with physical disabilities, it perpetuates exclusion and limits their participation in community life. In addition, the presence of support systems has a significant impact on the social well-being of individuals who have physical disabilities [16,17]. Access to quality healthcare, rehabilitation services, and assistive technologies can greatly improve their overall well-being and promote their active participation in society [18,19]. On the other hand, the absence of these resources can worsen the difficulties experienced by individuals with physical disabilities, restricting their access to education, employment, and community engagement [20,21].

Bangladesh is home to more than 23.6 million individuals, accounting for 15.6% of its population, who live with physical disabilities. Although a significant 61.6% of individuals participate in social activities, there are still several obstacles that need to be addressed [6]. The limited accessibility of infrastructure, transportation, and spaces hinders mobility, with urban residents (70.5%) having better access compared to their rural counterparts (57.4%) [22]. There is a noticeable difference in social participation between men and women with physical disabilities. Specifically, 65.55% of men engage in social activities, while the percentage of women is slightly lower at 56.16% [23]. The lack of resources and opportunities, combined with negative attitudes and misconceptions about disability, contribute to social stigma and exclusion. This is particularly challenging for individuals with physical disabilities, as poverty and limited access to education and employment further restrict their options [24]. Access to support services is insufficient, which makes it difficult to independently participate in social activities. Nevertheless, there is a glimmer of hope found in the "Persons with Disabilities (Rights and Protection) Act 2013" and in organizations such as the Centre for Disability in Development (CDD). Advocacy campaigns, training programs for individuals with physical disabilities, accessible technology, and community programs that promote inclusivity are all making significant progress [25]. It is essential to conduct targeted data collection, taking into account different disability types and age groups. This will help us improve our support efforts, especially considering that young people tend to have higher participation rates. It is crucial to prioritize investment in infrastructure that is easily accessible, inclusive education, and employment opportunities for the 23.6 million individuals. An in-depth analysis of the disparity between 65.55% and 56.16% in gender representation necessitates a dedicated focus on empowering women. It is crucial to prioritize anti-stigma campaigns to cultivate a genuinely inclusive environment that addresses prevailing negative attitudes. By

working together, we can create a much brighter future for the 23.6 million individuals in Bangladesh who have physical disabilities [26]. By considering both the majority of participants and the minority facing obstacles, Bangladesh can create a society where everyone, regardless of their abilities, can flourish and make meaningful contributions.

This study aims to explore the educational opportunities of individuals with physical impairments in Bangladesh. Our main goal is to thoroughly analyze the challenges, possibilities, and approaches that impact academic success within this particular group. The research utilizes a comprehensive case study approach to uncover the various factors that impact educational achievement. It provides valuable insights into the obstacles encountered and the potential pathways to success. Our main objective is to gather valuable insights that can guide specific initiatives and policy adjustments, promoting better educational equity and support systems for individuals with physical disabilities in Bangladesh. The research seeks to address the specific needs of this population and make a valuable contribution to the ongoing discussion on inclusive education. It also aims to advocate for measures that improve accessibility and create more opportunities for academic success.

This study is a valuable contribution to the existing community, as it provides insightful information about the educational experiences of individuals with physical disabilities in Bangladesh. There is a lack of research in many communities that specifically addresses the challenges and opportunities faced by this demographic in the field of education. This study seeks to address the gap in knowledge by conducting a comprehensive case study, providing a nuanced understanding of the factors that impact academic achievement. The research sheds light on the challenges and opportunities faced by individuals with physical impairments in the educational landscape, contributing to a more comprehensive and inclusive dialogue on education. It is essential to comprehend the specific strategies that either impede or promote academic achievement for this group to create focused interventions and policy adjustments. This research provides valuable insights that can help educators, policymakers, and advocacy groups develop targeted initiatives to support individuals with physical disabilities. By creating an inclusive educational environment, we can ensure their educational progress and success. In addition, the research's emphasis on Bangladesh provides a valuable viewpoint for the global conversation on inclusive education. Bangladesh, similar to other developing nations, encounters distinct obstacles in guaranteeing equitable educational opportunities for individuals with disabilities. The findings from this study can be used as a valuable resource for other communities facing similar challenges, promoting cross-cultural learning and the sharing of best practices. This research can provide valuable insights for the creation of inclusive policies and initiatives that are specifically designed for the local context. This will help improve educational equity in Bangladesh. The research serves as a driving force for positive change in the community, promoting a more inclusive educational system that empowers individuals with physical disabilities to achieve their academic goals. The paper has the potential to bring about real improvements in the educational experiences of individuals with physical disabilities, not just in Bangladesh but also as a model for global inclusivity in education.

## **2. Methodology**

### *2.1. Research Design*

This study employs a qualitative case study design, as it offers a holistic exploration of the educational experiences of individuals with physical disabilities in the unique context of Bangladesh. The case study design facilitates an in-depth examination of the multifaceted factors influencing educational attainment, allowing for a nuanced understanding of the challenges and opportunities faced by this particular group. The choice of a case study approach aligns with the research objective of comprehensively exploring the educational landscape for individuals with physical disabilities. By delving into the real-life experiences of participants within their natural settings, this design enables the researcher to capture the complexity and richness of their educational journeys. The selection of a single case study design does not imply a lack of diversity; rather, it ensures a focused and thorough investigation. Purposive sampling will be employed to select participants with varying demographic characteristics, including age, gender, type of physical disability, and geographic location within Bangladesh.

This deliberate sampling strategy aims to capture a diverse range of perspectives and experiences, providing a comprehensive view of the challenges and opportunities faced by individuals with physical disabilities in different educational contexts.

## 2.2. Data Collection

### 2.2.1. Quantitative Data Collection

Quantitative data were collected to supplement the qualitative insights gained from interviews, observations, and document analysis. A structured survey instrument was designed, incorporating closed-ended questions to gather numerical data on specific aspects related to educational attainment among individuals with physical disabilities in Bangladesh. The survey, administered to a subset of participants from the larger qualitative sample, aimed to quantify certain variables such as academic performance, attendance rates, and access to support services. The survey instrument underwent a rigorous validation process, ensuring its relevance and reliability in the context of the study. The quantitative data collected provided a statistical dimension to the overall findings, allowing for a more comprehensive analysis of trends and patterns in the educational experiences of the participants.

### 2.2.2. Qualitative Data Collection

Qualitative data were the cornerstone of this study, providing a deep understanding of the lived experiences of individuals with physical disabilities in the Bangladeshi educational system. Semi-structured interviews, conducted in a one-on-one setting, allowed participants to share their narratives, challenges, and strategies for academic success. Open-ended questions facilitated a rich exploration of personal experiences, providing valuable qualitative insights into the complexities of the participants' educational journeys. In addition to interviews, observations in educational settings and document analysis enriched the qualitative data by capturing contextual factors and historical perspectives. The integration of multiple qualitative data sources enhanced the depth and richness of the study's findings.

### 2.2.3. Sampling Technique

Purposive sampling [27] was employed to select participants who could offer diverse perspectives on the educational experiences of individuals with physical disabilities in Bangladesh. The selection criteria included variations in age, gender, type of physical disability, and geographic location. This deliberate sampling strategy ensured a representative and comprehensive exploration of the challenges and opportunities faced by this population within the educational context. The sample size was determined iteratively, considering the saturation of themes in qualitative data and the statistical power required for quantitative analysis. The careful selection of participants aimed to capture the complexity and diversity of experiences, contributing to the robustness of the study's findings.

## 2.3. Statistical Analysis

Like other model techniques, logistic regression analysis seeks to minimize the number of variables while simultaneously producing a coherent and statistically significant model that describes the relationship between the result variable and the independent variables [28]. When dealing with assumptions like non-normal distribution and non-existent mutual covariance, logistic regression analysis may be used instead of awareness analysis and contingency tables. The logistic function is shown in Equation (1).

$$l(x_i) = E(y/x) = \log \left[ \frac{p(x_i)}{1 - p(x_i)} \right] = \sum_{k=0}^p \phi_k x_{jk} \quad (1)$$

The above equation can be demonstrated with  $(i=1, 2.. n, k=1, 2 \dots p)$ . Here, the  $P(x_i)$  possibility is as follows [29].

$$p(x_i) = \frac{e^{\sum \phi_k x_{jk}}}{1 + e^{\sum \phi_k x_{jk}}} = \frac{e^{l(x_i)}}{1 + e^{l(x_i)}} \quad (2)$$

Logistic regression often uses the maximum likelihood technique for parameter estimates. The formation of a maximum likelihood function is the first step in using this approach. This function allows for the potential of data to be seen concerning parameters that are not known. One way to describe the contribution of a pair (xi, yi) is shown below:

$$P(y_i/x_i) = p(x_i)^{y_i} [1 - p(x_i)]^{1-y_i} \quad (3)$$

To get the probability function, we multiply the elements in Equation by n observations, assuming that the observations are independent of each other. So, here is how the likelihood function is expressed:

$$L(y/x, \phi) = \prod_{i=1}^n p(x_i)^{y_i} [1 - p(x_i)]^{1-y_i} \quad (4)$$

Evaluation of logistic regression coefficients for significance. To compare the expected and actual numbers, we may use the likelihood function as shown in the following formula:

$$D = -2 \log \frac{\text{Likelihood of a reduced model}}{\text{Likelihood of the whole model}} \quad (5)$$

According to Gibbons and Hedeker [30], the probability ratio is denoted by the sentence in parentheses. When expressing the logarithm in terms of probability function type, the following formula would be obtained. Determining the quality of fit relies heavily on statistics.

$$D = -2 \sum_{i=1}^n \left[ y_i \log \left( \frac{P_i^o}{y_i} \right) + (1 - y_i) \log \left( \frac{1 - P_i^o}{1 - y_i} \right) \right] \quad (6)$$

By comparing the D values of these cases where the independent variable is present and those where it is not, we may find the significance of the independent variable. Here we describe the change in D as a function of the presence or absence of the independent variable:

$$G = D(\text{for reduced model}) - D(\text{for the whole model}) \quad (7)$$

Interpretation of coefficients. The "odds" and "odds ratio" are used to decipher the coefficients in the logistic regression. The correlation between the odds value estimated for x = 1 and the odds value derived for x = 0 is represented by the odds ratio Ω. Based on this, the following is one way to express the odds ratio:

$$\Omega(1, 0) = \frac{P(1)/[1 - P(1)]}{P(0)/[1 - P(0)]} \quad (8)$$

The following is the odds ratio [31] if the logistic regression's independent variable is binary and coded as 0, 1:

$$\Omega = e^{\phi} \quad (9)$$

Determination of goodness of fit. In the determination of model goodness of fit, Hosmer-Lemeshow's C<sup>∞</sup> the test statistic is used and can be calculated as [32].

$$C^{\infty} = \sum_{m=1}^t \left[ \frac{(g_1 m - b_{1m})^2}{b_1 m} + \frac{(g_0 m - b_{0m})^2}{b_0 m} \right] \quad (10)$$

Where m represents the risk group. C<sup>∞</sup> test statistic shows the t – 2 degrees of freedom chi-square distribution.

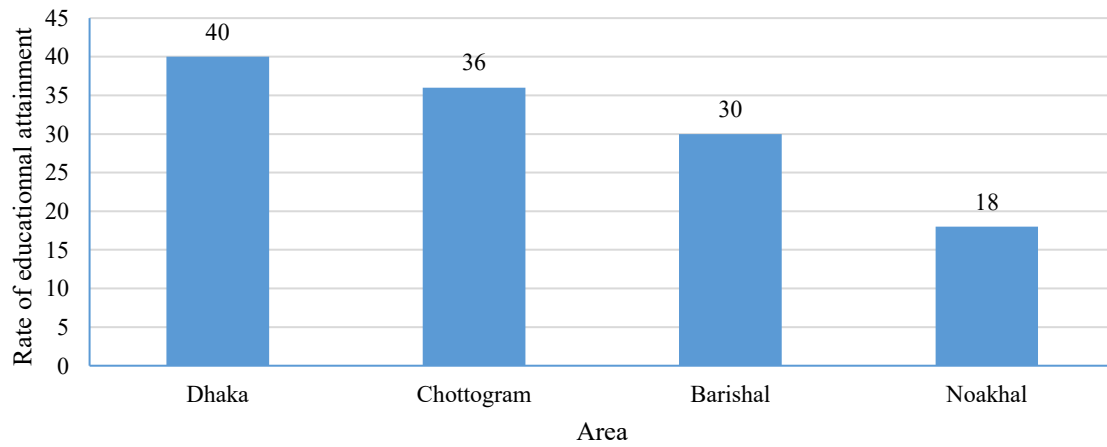
### 3. Results

#### 3.1. Constructing Educational Attainment of Physically Disabled Individuals

##### 3.1.1. Education Status of Physically Disable Individuals

Our sample of 200 participants provides evidence of nuanced variations in the educational attainment of individuals with physical disabilities in different areas of Bangladesh. The data, collected in Dhaka, Chottogram, Barishal, and Noakhali, provide valuable insights into the discrepancies in educational opportunities and outcomes for this specific demographic. The rate of educational attainment in each area is shown in Figure 1. In Dhaka, the educational attainment rate of 40% among individuals with physical disabilities is indicative of comparatively greater access to education in comparison to other regions in our study. Several factors contribute to this, such as a well-established infrastructure, improved accessibility in educational institutions, and a greater awareness of inclusive education policies. The educational landscape in the capital city may provide more supportive environments, leading to a higher percentage of individuals with physical disabilities achieving

academic milestones. Chottogram has a relatively low educational attainment rate of 36%. It indicates a positive educational environment for individuals with physical disabilities in this major port city. The percentage demonstrates a dedicated focus on offering educational opportunities that are easily understandable and inclusive.



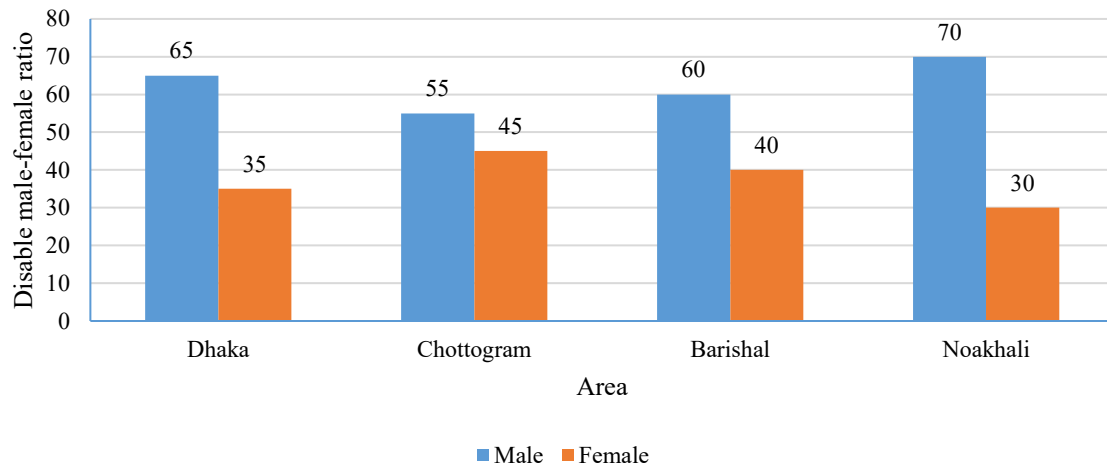
**Figure 1.** Rate of educational attainment in each area.

Nevertheless, the slightly lower rate in comparison to Dhaka may suggest regional disparities in the implementation of inclusive policies or variations in the accessibility of support services. Barishal has a moderate level of achievement when it comes to educational attainment for individuals with physical disabilities, with a rate of 30%. Although the rate is lower compared to Dhaka and Chottogram, it indicates that a considerable number of individuals are successfully overcoming obstacles to pursuing education. Barishal could greatly benefit from focused efforts to improve accessibility and support services. This could potentially result in better educational outcomes for individuals with physical disabilities. Noakhali showcases a significant disparity with an educational attainment rate of 18%, suggesting a limited level of accessibility and achievement in educational endeavors for individuals with physical disabilities. There may be underlying issues in this specific region, such as inadequate infrastructure, lack of awareness, or insufficient support services. It is essential to implement targeted interventions and policy changes in Noakhali to effectively address the disparities and improve educational opportunities for individuals with physical disabilities. Thus, the varying educational attainment rates in Dhaka, Chottogram, Barishal, and Noakhali shed light on the diverse experiences of individuals with physical disabilities in different regions. Dhaka and Chottogram have higher rates, Barishal has moderate success, and Noakhali faces more significant challenges. It is crucial to implement localized strategies and policy interventions to foster a more inclusive educational environment throughout Bangladesh. This will help to ensure that individuals with physical disabilities have equal opportunities in all regions.

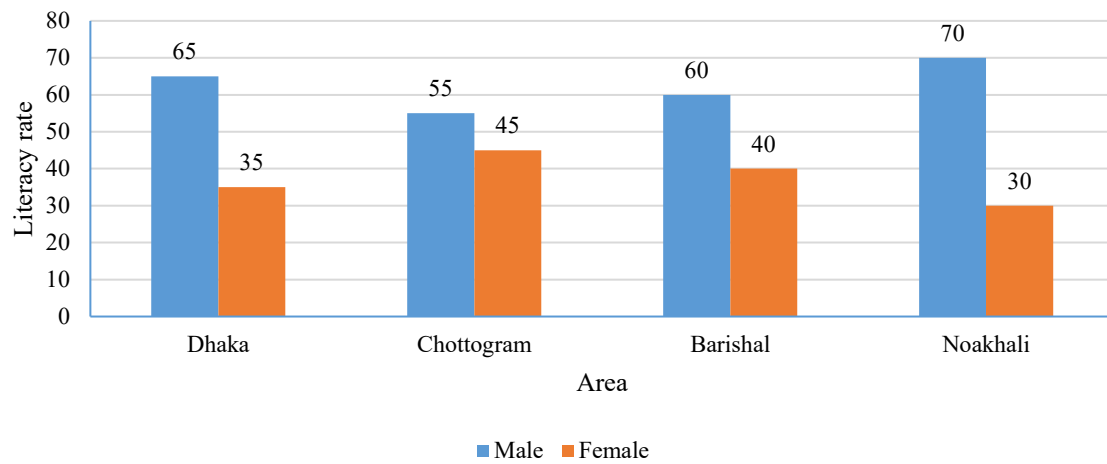
### 3.1.2. Male and Female Ratio in Educational Attainment

When examining educational outcomes among people with disabilities, especially in terms of gender, we discover a complex situation that requires thoughtful analysis. The data provided in Figure 2 shows the proportion of disabled males to females in various regions of Bangladesh. The gender ratio in Dhaka is significantly imbalanced, with 65% males and 35% females, indicating a noticeable gender disparity. Chottogram demonstrates a comparable pattern with a male-to-female ratio of 55% to 45%, while Barishal and Noakhali exhibit ratios of 60% to 40% and 70% to 30%, respectively. Further analysis of literacy rates among disabled individuals underscores the unequal educational achievements based on gender is shown in Figure 3. The literacy rate for disabled males in Dhaka stands at 65%, while for females, it is 35%. The Chottogram reflects this pattern, with a male literacy rate of 55% and a female literacy rate of 45%. Barishal and Noakhali also demonstrate a consistent trend, with disabled males consistently showing higher literacy rates than females. These findings call for a thorough analysis of the factors that contribute to the gender disparities in educational

achievement among disabled individuals. Various factors, such as societal norms, cultural biases, and access to educational resources, can play a significant role in shaping these patterns.



**Figure 2.** Ration of disabled male-female.



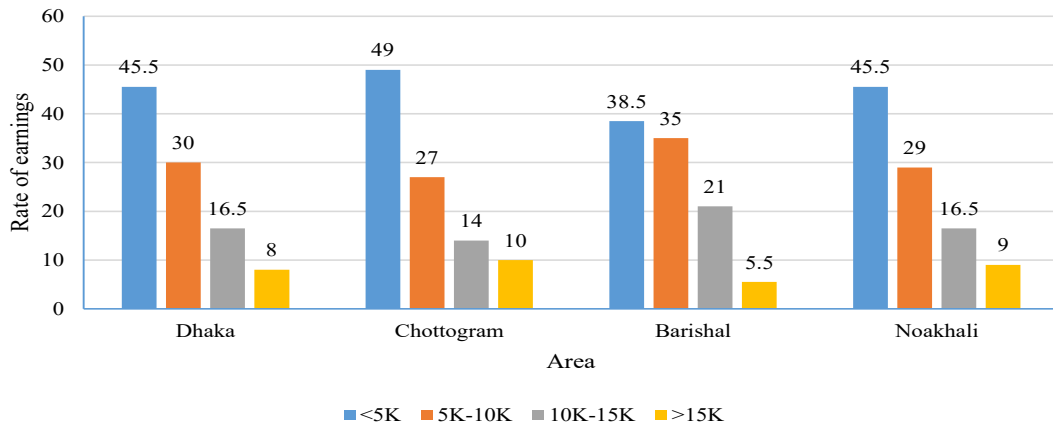
**Figure 3.** Literacy rate of disabled male-female.

Furthermore, the differences in various regions indicate that the obstacles encountered by disabled individuals in obtaining education may be specific to their particular circumstances. It is crucial to implement focused interventions to address these disparities. Efforts should be directed toward addressing obstacles that have a greater impact on disabled women to guarantee equal opportunities for quality education. Our approach includes the implementation of inclusive policies, the provision of customized support services, and the cultivation of a more inclusive educational environment. In addition, the data highlights the importance of taking a comprehensive approach that takes into account gender and regional factors when developing strategies for inclusive education for people with disabilities. Customizing interventions to address the unique challenges experienced by disabled women in various regions can result in more effective and fair outcomes. Thus, the examination of educational achievement among disabled individuals in Bangladesh reveals notable gender inequalities that require immediate consideration. To address these disparities, it is crucial to have a thorough understanding of the factors that contribute to them. By implementing specific strategies, we can ensure that individuals with disabilities, regardless of their gender or location, have equal opportunities to access and benefit from education.

### 3.1.3. Overview of Income

The data presented in Figure 4 offers a comprehensive analysis of the income distribution among physically

disabled individuals in various regions of Bangladesh. The income groups are divided into four brackets, and the percentages show the proportion of disabled individuals in each income range in the respective regions. A significant portion of physically disabled individuals in Dhaka belong to the income group of less than 5,000 Bangladeshi Taka (BDT), making up 45.5% of this demographic. Accounting for 30%, the second-largest group in Dhaka falls within the income range of 5,000 to 10,000 BDT. The distribution decreases as the income brackets increase, with 16.5% falling within the 10,000 to 15,000 BDT range and 8% earning above 15,000 BDT. Chottogram, another significant urban center, showcases a comparable pattern but with certain variations. Almost half of the physically disabled individuals, the majority of whom earn less than 5,000 BDT, fall within this income range. Next is the income bracket of 5,000 to 10,000 BDT, which accounts for 27% of the total. The percentages gradually decrease for the higher-income groups.



**Figure 4.** Rate of earnings.

In Barishal, a significant percentage (38.5%) of individuals with physical disabilities earn a monthly income of less than 5,000 BDT, while 35% fall within the 5,000 to 10,000 BDT range. The income distribution in Barishal shows a higher percentage in the 10,000 to 15,000 BDT bracket (21%) compared to Dhaka and Chottogram. The category with the lowest percentage is the >15,000 BDT category, which accounts for only 5.5%. In contrast, Noakhali also exhibits a distribution in which 45.5% of individuals with physical disabilities earn less than 5,000 BDT, mirroring the situation in Dhaka. The income brackets that follow are arranged in descending order, reflecting the same trend seen in the other regions. The differences in income distribution among physically disabled individuals in different regions may be due to regional economic disparities, varying employment opportunities, and accessibility to support programs. It is essential to analyze and comprehend these income dynamics to develop focused policies and interventions that can enhance the economic well-being of physically disabled individuals in various regions of Bangladesh.

### 3.2. Results of Regression Analysis

Table 1 presents a comprehensive overview of the key variables taken into account in this research. This section includes four primary categories: location, demographics, socioeconomic status, and habits. The study covers four districts in Bangladesh: Dhaka, Chottogram, Barishal, and Noakhali, to provide a comprehensive geographical perspective. This promotes a wide range of viewpoints and varied life experiences. 'Demographics' provides a clear understanding of the people involved. The age range encompasses individuals from 15 to 50 years old, encompassing a wide range of experiences. Gender is also taken into account and classified as either male or female. 'Socioeconomic status' delves further into the financial aspects. Monthly earnings are divided into four levels to offer insights into economic disparities. In addition, this analysis examines expenditure, educational expenditure, and the presence of other income sources to provide a comprehensive understanding of financial standing and priorities. Ultimately, habits are shaped by individual decisions and unique situations. The relationship status, whether married or unmarried, provides insight into the dynamics of a family. The table also



explores if individuals receive an allowance and if they have other sources of income, indicating possible support systems and financial autonomy.

**Table 1.** Description of the variables.

Characteristic	Description	Levels
Location	4 districts in Bangladesh	Dhaka, Chottogram, Barishal, Noakhali
		Demographics
Age	Respondents' age range	15–50 years old
Gender	Respondent's gender	Male, Female
		Socioeconomic status
Income	Monthly income category	Below 5000 BDT, 5000–10000 BDT, 10000–15000 BDT, Above 15000 BDT
Expenditure	Monthly expenditure	
Educational expenditure	Monthly expenditure on education	
		Habits
Relationship status	Marital status	Married, Unmarried
Financial support	Allowance received	Receives allowance, Doesn't receive an allowance
Other income sources	Additional income sources	Has other income sources, Doesn't have other income sources

Table 2 shows the outcomes of logistic regression. The logistic regression results reveal the relationship between independent variables and the education attainment of individuals with physical disabilities. The odds ratios indicate how the odds of achieving higher education change with a one-unit increase in each variable. A lower odds ratio for "Area" and "Age" suggests a slight decrease in the odds of higher education with changes in these variables. "Gender" exhibits a substantial positive impact, as reflected in its higher odds ratio (3.762812), indicating that females, represented by the reference category, have significantly higher odds of attaining education compared to males. "Income" positively influences education attainment, with an odds ratio of 1.07632, indicating that as income increases, the odds of higher education also rise significantly. Conversely, "Expenditure" shows a minor negative impact, implying that higher general expenditures are associated with slightly lower odds of higher education. "Educational Expenditure," "Marital Status," "Allowance," and "Other sources of income" do not appear statistically significant, as their odds ratios are close to 1, and the associated p-values are above conventional thresholds. Overall, this suggests that, in this analysis, gender and income play pivotal roles in influencing the education attainment of individuals with physical disabilities, while other factors show limited or no statistically significant associations.

Table 3 shows the results of probabilistic regression. In this probabilistic regression analysis, the coefficients provide insights into the relationship between independent variables and the dependent variable, which appears to be related to some health-related or lifestyle factors. Negative coefficients for "Area," "Age," "Expenditure," "Educational Expenditure," "Marital Status," and "Other sources of income" suggest a negative impact on the dependent variable, whereas positive coefficients for "Gender," "Income," and "Allowance" indicate a positive impact. Specifically, the coefficient for "Gender" (0.6282033) suggests that females, the reference category, have a higher value for the dependent variable compared to males. The statistical significance of these coefficients is assessed using the z-values and associated p-values. Notably, "Income" has a highly significant positive effect, indicating that as income increases, the dependent variable also tends to increase. The log-likelihood, LR chi2, and Pseudo R2 provide an overall assessment of the model fit, with a higher log-likelihood, chi-squared value, and Pseudo R2 suggesting a better-fitting model. In this case, the model appears to be statistically significant (Prob > chi2 = 0.0000), and the Pseudo R2 of 0.2337 indicates that the model explains about 23.37% of the variance in the dependent variable.

**Table 2.** Results of logistic regression.

Variables	Odds Ratio	Standard Error	z Value	p>   z	95% Conf. Interval	
					Lower Value	Upper Value
Area	0.76522	0.08652	-1.65	0.185	0.70765	1.87531
Age	0.98721	0.09872	-1.61	0.034	0.93215	1.00876
Gender	3.76281	1.98735	2.32	0.031	1.10543	8.35909
Income	1.07632	$7.5 \times 10^{-5}$	5.34	0	1.00702	1.00088
Expenditure	0.98323	$7.5 \times 10^{-5}$	-1.34	0.234	0.99765	1.00008
Educational expenditure	0.98765	0.00019	0.65	0.565	0.99974	1.00088
Marital status	0.87382	0.23457	-0.34	0.734	0.65439	2.29326
Allowance	1.87463	0.87365	0.97	0.785	0.87653	4.45677
Other sources of income	1.98732	0.87624	1.25	0.321	0.70873	4.13988
Number of Observation	200					
LR chi2	50.57					
Prob > chi2	0.0000					
Pseudo R2	0.2442					

**Table 3.** Results of probabilistic regression.

Variables	Odds Ratio	Standard Error	z Value	p>   z	95% Conf. Interval	
					Lower Value	Upper Value
Area	-0.0787	0.04328	-1.34	0.134	-0.2132	0.03872
Age	0.98721	0.09872	-1.61	0.034	0.93215	1.00876
Gender	-0.0325	0.01765	-1.67	0.057	-0.0456	0.00076
Income	1.07632	$7.5 \times 10^{-5}$	5.34	0	1.00702	1.00088
Expenditure	0.68766	0.28766	2.42	0.043	0.04325	1.65323
Educational expenditure	0.98765	0.00019	0.65	0.565	0.99974	1.00088
Marital status	0.00019	$8.8 \times 10^{-5}$	5.21	0	0.00013	0.00054
Allowance	1.87463	0.87365	0.97	0.785	0.87653	4.45677
Other sources of income	$-9 \times 10^{-5}$	$9.9 \times 10^{-5}$	-1.54	0.323	-0.0002	$8.2 \times 10^{-5}$
Log-likelihood	-85.0860					
LR chi2	50.67					
Prob > chi2	0.0000					
Pseudo R2	0.2434					

#### 4. Discussion

The study on the correlation between income and education attainment among individuals with physical disabilities in Bangladesh has provided valuable insights into the complex challenges experienced by this group. The study found a significant correlation between income and educational opportunities, emphasizing the clear socioeconomic inequalities that affect the accessibility of education for individuals with physical disabilities. This is consistent with prior research, like the study conducted by Cameron et al. [33], which investigated the educational achievement gaps among individuals with physical disabilities in low-income countries. This study, like the present study, highlights the widespread difficulties that arise from having limited financial resources. In addition, the research conducted by Zulfiqar et al. [34] on the correlation between income and access to assistive technologies for students with physical disabilities in Bangladesh aligns with the findings of the study. The study highlights the correlation between higher incomes and the ability to provide children with necessary assistive technologies. It emphasized the impact of financial capacity on the quality of education and support received by families. Saha and Habib [35] conducted a study on the financial barriers to inclusive education in rural Bangladesh. They highlighted the impact of economic constraints on families with physically disabled children, preventing them from fully engaging in educational activities. This study's findings support the notion that differences in income levels play a significant role in creating a noticeable gap in educational opportunities.

In a study conducted by Alam and Kabir [36], they explored the connection between income levels and educational opportunities in Bangladesh. Their findings support the notion that families with higher incomes are better equipped to overcome obstacles, allowing them to access specialized educational resources and transportation. In a study conducted by Rahaman [37], the focus was on exploring the impact of socioeconomic factors on the educational achievement of individuals with physical disabilities. The research provided valuable insights into how income and education intersect in complex ways. There is a wealth of research that supports the idea that income plays a significant role in shaping the educational experiences of individuals with physical disabilities in Bangladesh. Research conducted by Haque et al. [38], Molla et al. [39], and Islam et al. [40] consistently highlights the significant impact of socioeconomic disparities on educational access. The research study of Islam et al. [41] also sheds light on income-related barriers in urban Bangladesh. Overall, the extensive research highlights the urgent requirement for specific interventions and policy measures to tackle the significant influence of income on educational achievement for individuals with physical disabilities in Bangladesh.

Understanding the various factors that affect the educational performance of individuals with physical disabilities in Bangladesh goes beyond just considering income. The study has revealed additional factors that are positively related to educational attainment, such as gender, expenditure, and age. These findings align with a wider range of research that, together, provides a detailed understanding of how different socio-demographic factors interact with the educational experiences of this vulnerable population. When considering gender, the findings of this study are consistent with previous research. Several studies have emphasized the importance of gender in influencing educational opportunities for individuals with disabilities. Notable research conducted by Rojo-Ramos et al. [42], Mononen and Halonen [43], and Gao et al. [20] has shed light on this topic. Gender disparities in education may arise from societal norms, as gender roles can shape expectations and opportunities for individuals with physical disabilities.

Spending is another important factor that has a positive impact on educational achievement. Research conducted by Rahaman [37] and Haque et al. [38] supports this discovery, highlighting the significance of financial investment in addressing obstacles to education. Increased spending often leads to improved access to assistive technologies [44-48], specialized support services, and inclusive educational environments, which in turn promote positive educational outcomes for individuals with physical disabilities. Research conducted by Ahn et al. [21] and Jung et al. [19] supports the notion that there is a strong correlation between age and educational attainment. These studies indicate that as individuals with physical disabilities grow older, they gather experiences and adaptive strategies that enhance their access to education. It is important to acknowledge that age-related factors can intersect with other variables, including shifting support needs and evolving societal

attitudes toward disability. These findings highlight the intricate challenges faced by individuals with physical disabilities in Bangladesh and the diverse range of solutions needed. The interactions between income, gender, expenditure, and age collectively shape the educational landscape. Therefore, it is crucial for interventions and policy initiatives focused on improving educational opportunities to take a comprehensive approach that takes into account the interconnectedness of these factors. This study, along with other related research, provides valuable insights into the factors that impact the educational paths of individuals with physical disabilities in Bangladesh. The findings contribute to a deeper understanding of this issue.

## **5. Conclusions and Policy Recommendations**

### *5.1. Conclusions*

The study on educational attainment among individuals with physical impairments in Bangladesh has provided valuable insights into the obstacles, possibilities, and approaches that impact academic success within this distinct population. This extensive case study sought to uncover the intricate factors impacting the educational experiences of individuals with physical disabilities in Bangladesh. The findings provide valuable insights into the various challenges experienced by this group, underscoring the importance of tailored interventions. Through logistic regression analysis, it was found that specific socio-economic factors have a significant influence on educational outcomes. It is worth noting that income plays a crucial role in determining educational attainment, showing a positive correlation. The significance of economic empowerment in enabling individuals with physical impairments to access education cannot be overstated. In addition, the study found that gender played a crucial role, as females had a much greater likelihood of attaining higher education compared to males. Nevertheless, the research also sheds light on aspects that may not align with common beliefs. Interestingly, there were no statistically significant associations found between variables such as marital status, educational expenditure, allowances, and educational attainment. The intricacies of the relationship between socio-economic factors and educational achievements within this specific group highlight the multifaceted nature of the issue. The study emphasizes the importance of implementing specific policies and support systems to address the distinct challenges experienced by individuals with physical impairments. Efforts should prioritize improving accessibility, not just in terms of physical infrastructure but also in addressing socio-economic disparities. By implementing specialized training programs and awareness campaigns, educators can be empowered to create an inclusive learning environment that meets the needs of a diverse range of students.

### *5.2. Policy Recommendations*

To improve the educational achievements of individuals with physical disabilities in Bangladesh, policymakers must give utmost importance to economic empowerment programs. Creating specific financial assistance initiatives, like scholarships and grants, can help ease the financial strain on individuals and their families. In addition, customized vocational training programs and job prospects that cater to the unique requirements of this group can help them achieve greater financial autonomy. These initiatives strive to create a supportive environment that allows individuals with physical impairments to pursue education without financial obstacles. This policy recommendation aligns with the identified positive correlation between income and educational attainment, emphasizing the pivotal role of economic empowerment in fostering inclusive education.

Efforts should be focused on developing an inclusive physical infrastructure that can meet the diverse needs of individuals with physical impairments. This entails ensuring that educational institutions are equipped with wheelchair accessibility, ramps, and other assistive technologies. Engaging with pertinent stakeholders, such as disability advocacy groups, can provide valuable insights for creating universal design standards. In addition, advocating for the utilization of educational resources and technologies that are easily accessible can greatly improve the learning journey for students who have physical disabilities. By placing a strong emphasis on inclusive infrastructure, policymakers can play a crucial role in dismantling physical obstacles and creating an educational atmosphere that is inviting and easily accessible to everyone.

Policymakers need to address the gender disparities in educational attainment among individuals with

physical impairments by developing and enacting education policies that are responsive to gender differences. This requires focused interventions to tackle the specific obstacles encountered by individuals of both genders in this particular group. Tailored support programs, mentorship initiatives, and awareness campaigns can be developed to empower women, capitalizing on their greater likelihood of educational achievement. Furthermore, it is important to address gender stereotypes in the educational system and create an inclusive environment that ensures equal opportunities for individuals with physical impairments.

To ensure the success of inclusive education, policymakers must give top priority to comprehensive teacher training programs and the development of inclusive curricula. Educators must undergo training to effectively create an inclusive learning environment that addresses the diverse needs of students with physical impairments. This encompasses techniques for clear and concise communication, the utilization of helpful technologies, and a deep comprehension of the unique learning needs of this particular group. At the same time, it is important to develop inclusive curricula that prioritize diversity and accessibility. This means including content that represents the experiences of individuals with physical impairments. Through the allocation of resources towards teacher training and the development of an inclusive curriculum, policymakers have the opportunity to cultivate a more supportive and fair educational system that caters to the diverse needs of every student.

### *5.3. Limitation of the Study and Future Research*

Although the study on the educational attainment of individuals with physical impairments in Bangladesh has provided valuable insights, it is important to recognize certain limitations that affect the interpretation and generalizability of the findings. There are concerns about the generalizability of the study's findings due to the varying experiences of individuals with physical impairments in different cultural, economic, and educational contexts. In addition, the data's cross-sectional nature limits the ability to establish causal relationships. This emphasizes the importance of conducting longitudinal studies to capture the temporal dynamics of factors that influence educational outcomes over time. There is a possibility of social desirability bias when relying on self-reported data, as individuals may tailor their responses to align with societal expectations. In addition, the analysis may have limitations in terms of the variables considered, potentially excluding important factors such as the presence of assistive technologies or specific health conditions. Ultimately, the study's limited scope in capturing intersectionality hinders a comprehensive understanding of the intricate dynamics that impact educational attainment. Recognizing these limitations is crucial for a nuanced understanding of the study's results, which can guide future research efforts to fill gaps and gain a more comprehensive understanding of the obstacles and possibilities encountered by individuals with physical impairments in their educational pursuits.

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Conceptualization, A.J.U. and M.R.; methodology, A.J.U. and M.R.; software, A.J.U. and M.R.; validation, A.J.U., M.R. and A.R.; formal analysis, A.J.U. and M.R.; investigation, A.R.; resources, A.R.; data curation, A.J.U. and M. R.; writing—original draft preparation, A. J. U. and M. R.; writing—review and editing, A. R.; visualization, A.J.U., M.R. and A.R.; supervision, A.R.; project administration, A.R.; funding acquisition, A.R. All authors have read and agreed to the published version of the manuscript.

### **Institutional Review Board Statement**

Not applicable.

### **Informed Consent Statement**

Not applicable.

## Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author.

## Conflicts of Interest

The authors declare no conflict of interest.

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