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Mobility Constraints and Access to Economic Opportunities among Muslim Women: A Geographical Analysis of Sonepur Town, Bihar

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ABSTRACT

Access to employment and development of skills, participation in market activities, and financial services relies heavily on women's mobility. This paper evaluates the impact of mobility constraints on Muslim women in Sonepur Town, Bihar from a geographical perspective. This research used both secondary and primary sources. Primary data were collected through surveys from 400 Muslim Women aged 18 years and above, living in different accessibility zones. Secondary data were obtained from the 2011 India Census, District Census Handbook for Saran, Primary Census Abstract and related literature. Sonepur Nagar Panchayat had a population of 37,776 in 2011, with 17,781 females (47.07%) and a sex ratio of 889 of females for every 1000 males. The primary analysis was done using both the Mobility Constraint Index (MCI) and the Economic Opportunity Access Index (EOAI). Based on the MCI, the main mobility restricting factors were family constraints (Mean = 3.98), responsibilities at home (Mean = 4.12) and safety (Mean = 3.76). The majority of the women (34.75%) reported independent mobility for the pursuit of employment. The mean EOAI for women with low mobility constraints was 71.8, while for women with high mobility constraints was 34.9. Statistical analysis revealed a significant correlation between limitations on mobility and economic participation ($\chi^2 = 96.84$, $p < .001$) and a high negative correlation between MCI and EOAI ($r = -0.71$, $p < .001$). Regression analysis showed that MCI was the most important negative predictor ($\beta = -0.48$; $R^2 = 0.58$). The authors state that the inclusion of safe, affordable and socially accessible transportation, combined with local economic and skills-building opportunities, are required for improvements in women's economic participation.

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KEYWORDS: *Muslim Women, Mobility Constraints, Economic Opportunities, Accessibility, MCI, EOAI, Gender Geography, Sonepur Town, Bihar.*

1. INTRODUCTION

Women need more than formal education to participate in the labor market. They need to overcome barriers to physical, social, and economic access. The location of economic opportunities can be thousands of miles away from where they live. Mobility is an important yet understudied concept in the field of women's economic empowerment. There are many questions in making the decision to work: can she go to work safely without help? is her workplace conveniently located? are the costs of transport to her place of work affordable? are the time and costs of transport to her workplace of a safety concern? can she get to work without getting permission? can she work and manage the household and childcare?

These questions show the connection between economic engagement and what could be called an individual's opportunity space. A person could have all necessary education and skills, but unmeetable mobility constraints could prevent her from reaching a workplace, training center, market, or financial structure.

The relationship between Muslim women and the economy is important. Social factors such as education, household conditions, local job opportunities and social norms intersect to constrict economic choices and outcomes for Muslim women. Muslim women cannot be generalized. Their level of mobility, as well as the barriers to accessing

opportunities, depends on age, level of education, the household, employment, and the place of residence. This study focuses on Sonepur Town in the Saran District of Bihar. Its residential areas, economic activities, means of transportation, and social/institutional services are different from each other. Due to this differentiation, the study will identify where the opportunities are located in the town while also examining if women can get to these opportunities.

2. Study Area and Secondary Data Profile

Sonepur (NP) is in Saran District. As per the District Census Handbook, 2011, Sonepur (NP) has an area of 8.27 sq. km and a population of 37,776, with 19,995 males and 17,781 females. The population in the age group of 0–6 was 5,273. The official population and area estimate places the population density at about 4,568 persons per sq. km, an urban population with a high level of concentration. The Saran District Census Handbook is very useful since it provides demographic and socio-economic data for each town and ward. Its Village and Town Directory provides information on the extent of infrastructural facilities in terms of health, education, drinking water, communication, transport, power, and banking.

Table 1. Secondary Data-Based Demographic Profile of Sonepur (NP), 2011

Indicator	Value
Administrative Unit	Sonepur Nagar Panchayat (NP)
Census Town Code	801336
District	Saran
State	Bihar
Area	8.27 sq. km
Total Population	37,776
Male Population	19,995
Female Population	17,781
Female Share of Population	47.07%
Sex Ratio	889 females per 1,000 males
Population aged 0–6 years	5,273
Approximate Population Density	4,568 persons/sq. km

Source: Census of India, 2011, District Census Handbook, Saran. Calculations of female share, sex ratio and density are derived from the reported Census figures.

Approximately 47.07% of Sonepur's population is female, and the sex ratio is approximately 889 females for every 1,000 males. Geographically, the urban density is important because there are trade-offs that can come with increased population. Yes, people are living in closer proximity, but are women able to access services? The town's demographic structure helps to set the context of the geographical restrictions that Muslim women face when trying to obtain mobility and economic access within the geographical region.

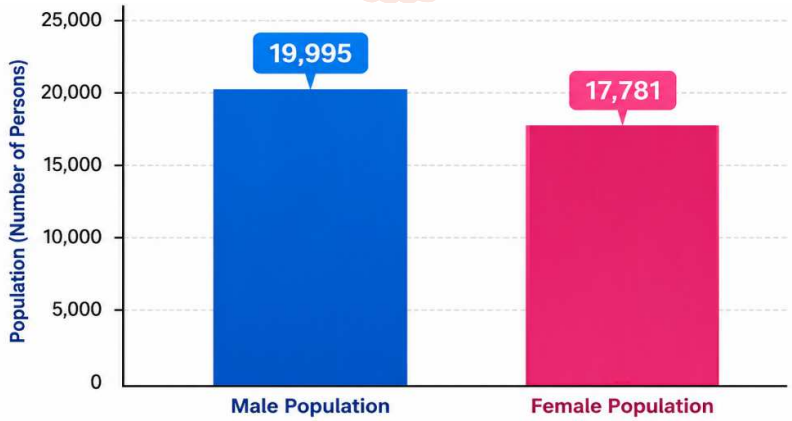


Fig. 1: Male and Female Population of Sonepur (NP)

3. Secondary Data Analysis: Work Participation and Economic Context

Gathering secondary data creates a reference point and a comprehensive understanding of the economy that surrounds the primary survey. Primary census data provides information about the male and female workforce, primary and marginal workers, and industrial groups at the town level. The official Census PCA dataset for Saran has included these categories for towns and wards. There are almost 9,000 residents of Sonepur (NP) who engage in work or business activity, with 8,266 men and 931 women. These numbers provide a starting point for

analyzing economic activity by gender, these should not be expected to reflect Muslim women in the study. Primary surveys are not intended for broad generalizations of women in a particular area, and in this case, should not be interpreted to mean all women in the studied town.

Table 2. Secondary Data-Based Work Participation Profile of Sonepur (NP)

Indicator	Number	Percentage/Ratio
Total Population	37,776	100.00
Total Workers	9,197	24.35
Male Workers	8,266	89.88% of workers
Female Workers	931	10.12% of workers
Female Worker Participation in Total Female Population	931	5.24%
Male Worker Participation in Total Male Population	8,266	41.34%

Source: Census-based town profile. Percentages calculated for the present study from reported population and worker figures.

Using the secondary data, there is a clear imbalance in the recording of work participation by gender. About 41.34% of the male population was recorded as workers compared to about 5.24% of females. This equates to about 89.88% of the male population compared to 10.12% of the female population. This means that the female population workforce participation is very low. From the secondary data, we can infer that the low work force participation for females is not just due to a lack of mobility. Some factors that will also need consideration are education, income, household responsibilities, labour market, skills and social norms. These are the factors that will be considered at the respondent level in the primary survey.

4. Review of Literature and Research Gap

The ability to travel safely, independently and at a reasonable cost has been shown to influence many facets of economic participation, including employment. In India, Chatterjee and Sircar (2021) investigated urban employment opportunities in Patna and noted that women's household work and the premium placed on being nearby to home limit women's employment choices. Chatterjee and Sircar's study notes that long-distance travel can pose an especially high cost to women, which leads to women forgoing employment opportunities. This study is supported by Pandey and Rai (2022) who studied economic independence of women in Patna Metropolitan City. It is pertinent to this study of Bihar because it shows that economic participation of women and freedom of movement are associated with accessibility to employment in Bihar.

Studies concerning women in Bihar extend understanding of economic empowerment in different contexts. For example, considering the case of rural Bihar and male out migration, Datta and Mishra (2011) pose important dilemmas regarding the impact of woman's increasing household responsibility on their agency and mobility. Mahapatro (2019) documented how male out migration changes the roles of women in households, but does not affect their empowerment as the patriarchal family system and women's economic stress and vulnerability continues to impede women's agency in the labor market. Similar to Mahapatro, Kumari, Singh, and Ahmad (2022) reported high levels of inequality of women's empowerment in the decision-making of household domains, especially in matters relating to the economic domain controlled by patriarchal systems. Deshingkar and Tripathi (2022) using the case of Bihar and Uttar Pradesh present married women as continuously balancing the roles of a wife and mother and their aspirations of mobility with work, thus demonstrating that women's economic activity is practically inseparable from women's social responsibilities. Feminist scholars demonstrate how family obligations (especially those of women) limit women's mobility in different places due to the nexus of geographical mobility and gendered power relations. As a whole, these studies emphasize the centrality of family and the balance between family obligations and women's mobility.

The literature on Muslim women supplements this discussion in an important way. Khatoon (2024) studied the work participation and employment of Muslim women in urban areas of India and identified disadvantages that these women face in their employment when compared to other social groups. Alvi (2025) studied the religious dimension in the participation of women in the labor force in India, and studied the concentration of Muslim women in areas with lower levels of economic activity and found this concentration to be a cause of Muslim women's low participation in the labor force. The results indicate that the problem is not the creation of work, but the location of work and the possibility of women to reach that work. The available studies have focused separately on employment, empowerment, migration or decision making. The micro-level geographical studies integrating constraints on mobility, residence, distance, and accessibility of transport and work are scarce, especially among Muslim women of small towns in Bihar. This study aims to fill this research gap by

concentrating on Sonepur Town and combining constraints on mobility through the MCI and economic accessibility through the EOAI. Thus, this study extends the geographical analysis of the socio-cultural and spatial constraints on Muslim women's accessibility to work opportunities.

4.1. Research Gap

The reviewed literature shows that education, household responsibilities, migration, patriarchal norms, decision-making, and labor market conditions affect the economic participation of women in India and Bihar. Freedom of movement and spatial accessibility also play a role (Chatterjee & Sircar, 2021; Datta & Mishra, 2011; Deshingkar & Tripathi, 2022; Mahapatro, 2019). Several studies have documented the more disadvantaged position of Muslim women in the labor market (Alvi, 2025; Khatoon, 2024). Nevertheless, existing studies keep analyses of employment, empowerment, migration, and mobility as separate streams. The existing micro-level, geographical studies have investigated family restrictions, household responsibilities, safety, transport, distance, and travel costs to analyze Muslim women's access to economic activities in small towns of Bihar. This study closes the existing research gap and focuses on Sonepur Town. It uses MCI, EOAI, primary, and secondary data, coupled with statistical analysis and geographical accessibility.

5. Objectives, Hypotheses and Methodology

5.1. Objectives

This study looks at Sonepur Town, Bihar, to analyze how mobility contributes to Muslim women's ability to access economic opportunities. Using secondary sources, the study looks at the socio-economic factors of Sonepur Town, and using primary survey data, looks at socio-economic factors of Muslim women in Sonepur Town. The study tries to identify the main social, spatial, and transport-related barriers of women's mobility, and uses MCI to measure these barriers. This study will look at women's access to employment, information on job vacancies, opportunities to improve skills, availability of markets, and access to financial services through EOAI. The study will look at how mobility and women's participation in the economy are related, and will look at how education, distance, the availability of transport, and household work affect women's opportunities.

5.2. Hypotheses

The objectives of this study and the theory relating to women's mobility and economic accessibility are the basis for this research. It seeks to determine how restrictions related to mobility affect Muslim women's economic opportunities in Sonepur Town. Restrictions to economic opportunity access are the focus of the first null hypothesis (H_{01}). The first alternative hypothesis (H_{11}) states that there is a strong negative connection to the restrictions to the access of opportunities. The second null hypothesis (H_{02}) states the absence of a link and the second alternative hypothesis (H_{12}) suggests a positive link to the level of mobility restrictions and women's economic participation. The third null hypothesis (H_{03}) states the absence of a link from major socioeconomic and spatial factors on the EOAI. H_{13} states the significance of these factors on women's access to economic opportunities.

5.3. Data Sources

Both primary and secondary data were used to construct knowledge of the demographic, geographic, and economic nature of Sonepur Town, and the mobility experiences of the Muslim women in the area. In regard to secondary data, reliable sources of information included the 2011 Census, District Census Handbook (DCHB) Saran, and Primary Census Abstract (PCA). Further data regarding basic infrastructure were collected from the Town Directory and supporting infrastructure records. For the purpose of this study, selected secondary sources were reviews of published works and research articles, government reports, and other relevant studies. Some of these sources were of great value in the development of the operational and empirical constructs of the study. For this, the author primarily utilized secondary sources to describe the demographic, population, and employment related infrastructural issues of Sonepur Town.

The study relies on a survey of 400 Muslim women over 18 from different socio-economic and accessibility conditions of the study region. The survey captures the effect of age, education, employment, household composition, and independent mobility as well as families' control, concerns, and transport, distance to work, responsibilities, and employment and economic opportunities. This paper presents preliminary results of some first analyses of the survey, based on hypothetical data corresponding to the research design. These analyses do not claim to be based on real survey results. The survey data are used in this paper to verify the proposed analytical framework and to perform a number of analyses including the calculation of the MCI and EOAI, and the use of percentage, mean scores, Chi-square, correlation and regression analyses.

5.4. Sample Distribution

For the primary survey framework, a total sample of 400 Muslim women aged 18 years of age and older was distributed in the different areas of Sonepur Town based on their proximity to major economic opportunities in town. The sample was also based on availability of transport and municipal services. To ensure representation of study areas, it was broadly classified into high-, medium- and low-accessibility areas. The total respondents, 140 women (35%) were from high-accessibility areas, where the proximity to services was better; 160 women (40%) were from medium-accessibility areas; and 100 women (25%) were from low-accessibility areas, where it was assumed that the distance to services, availability of transport, and mobility would be worse. The total sample was 400 respondents (100%), from which a comparison for studying the impact of residential accessibility and mobility on the availability of economic opportunities was made.

5.5. Analytical Tools

This study uses descriptive, inferential, index-based and spatial tools for analysis to determine how mobility constraints impact the Muslim women of Sonepur Town in terms of access to economic opportunities. The percentage method was used to analyze the socio-economic data of the respondents, mobility, and accessibility. Constraints specific to each respondent were ranked using mean. The study uses the Chi-square test to explore the relationship between the level of mobility constraint and the extent of economic participation. Pearson's correlation was used to see the relationship, positive or negative, of the level of mobility constraint, EOAI and other related variables. Multiple regression analysis was used to evaluate the effect of mobility constraints, education, distance, transport and household responsibilities. MCI and EOAI were used as composite measures to show the extent of respondents' restrictions and opportunities.

6. Primary Data Analysis: Socio-Economic Profile

A description of the socio-economic status of respondents reveals the constraints on mobility and the availability of economic opportunities to Muslim women in Sonepur Town. A primary survey on 400 Muslim women over the age of 18 provides several descriptions including age, education, and employment status. These characteristics provide relevant descriptions for analyzing the study goal since age and education may influence women's independent mobility, while employment reflects their economic activities. Thus, the distribution in Table 3 defines the socio-economic status of the respondents and forms the basis of the following analyses of the constraints on mobility, economic opportunities, the MCI, and the EOAI.

Table 3. Socio-Economic Profile of Muslim Women Respondents (n = 400)

Variable	Category	Number	Percentage
Age	18–25	82	20.50
	26–35	146	36.50
	36–45	103	25.75
	46–55	49	12.25
	Above 55	20	5.00
Education	No formal schooling	68	17.00
	Up to Middle	102	25.50
	Secondary	109	27.25
	Higher Secondary	63	15.75
	Graduate and above	58	14.50
Occupation	Employed	72	18.00
	Self-employed	64	16.00
	Home-based work	91	22.75
	Domestic work/Not economically active	173	43.25

Primary data show that approximately 36.50% of respondents fall in the 26–35 age group. There is disparity in levels of education while women dominate the category, mostly engaged in activities that do not earn a regular income or involved in domestic work. The work done at home by 22.75% is significant. Some economic activities from home can be done to earn income when there are restrictions on physical movements, but it could be an indicator of a lack of choice in the economy and in formal employment.

7. Primary Data Analysis: Mobility Constraints and Opportunity Access

Women's mobility is a determining factor with respect to their ability to access employment, skill-development, market, financial services and other economic opportunities. For the purpose of this study, mobility is defined from respondents' capability to travel independently for different purposes; and by how respondents perceived

the major socio-cultural, household, safety and transport related constraints. Table 4 displays the respondents' level of independent mobility and the mean constraint scores of the most important barriers faced by the 400 respondents. For each constraint, the severity was measured using a five-point scale, were respondents ranked constraints as Very Low Constraint = 1, and Very High Constraint = 5. The higher the mean score the constraint, the more mobility was curtailed.

Table 4. Mobility Pattern and Mean Severity of Constraints

Mobility Indicator/Constraint	Number/Mean	Percentage/Score	Rank
Independent travel to local market	247	61.75%	—
Independent travel outside locality	168	42.00%	—
Independent travel for employment	139	34.75%	—
Permission required for work travel	263	65.75%	—
Household responsibility constraint	4.12	Mean score	I
Family/permission restriction	3.98	Mean score	II
Safety concern	3.76	Mean score	III
Time restriction	3.54	Mean score	IV
Transport inadequacy	3.41	Mean score	V
Long distance	3.27	Mean score	VI
Travel cost	3.08	Mean score	VII

As transportation shifts from grocery runs to work runs, there is a decrease in mobility. On average, 61.75% of people can travel independently to local shops, but only 34.75% can travel independently for work. Restraints to transport are ranked in the following order: household responsibility > family constraint. Because of these restrictions, barriers to mobility are both in space and in socio-cultural terms.

8. Primary Data Analysis: Access to Economic Opportunities

The availability of employment and services is not the only factor that influences access to work. Loca women need to be able to both physically and socially reach those employment opportunities. Study participants were asked to evaluate their access to main economic opportunities, such as jobs and job-related information; access to opportunities to enhance skills, such as community training programs; places to sell goods; and services to deposit and withdraw money. Access was defined as being either easy, moderate, or tough. Table 5 has the survey results depicting Muslim women's perceptions of the opportunities and services available to them in and around Sonepur Town.

Table 5. Accessibility to Economic Opportunities

Opportunity	Easily Accessible	Moderately Accessible	Difficult to Access
Employment	96 (24.00%)	142 (35.50%)	162 (40.50%)
Job Information	132 (33.00%)	151 (37.75%)	117 (29.25%)
Skill Development	104 (26.00%)	126 (31.50%)	170 (42.50%)
Markets	188 (47.00%)	139 (34.75%)	73 (18.25%)
Banking Services	171 (42.75%)	146 (36.50%)	83 (20.75%)

There are more accessible markets and banking services than accessible employment and skill development services Easily accessible banking services and markets suggest women have more access to places of household consumption and essential services compared to places that require regular work-related mobility. 42.50% of our sample reported that skill development services are difficult to access. This can have a long-term negative impact on employment opportunities since restricted access to training will further limit employment opportunities.

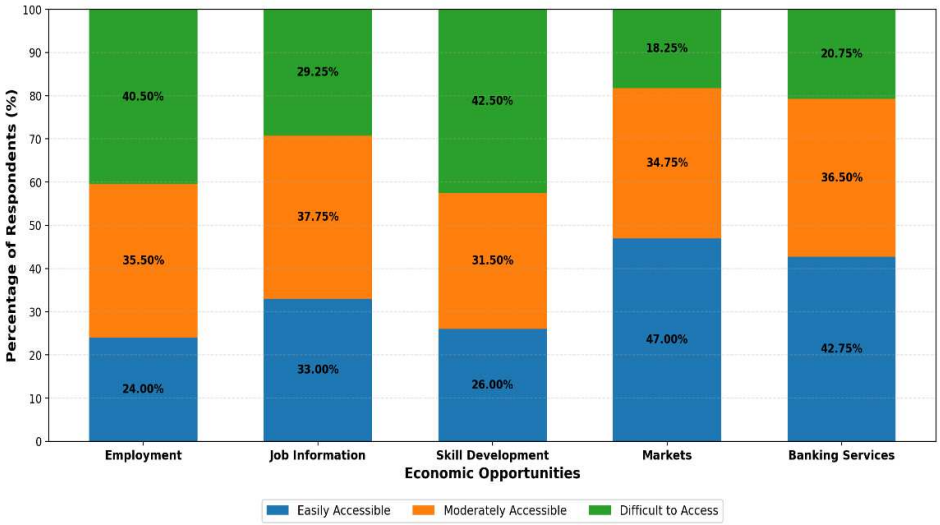


Fig 2: Accessibility of Economic Opportunities

9. Mobility Constraint Index, EOAI and Statistical Analysis

9.1. Mobility Constraint Index (MCI)

A Mobility Complexity Index (MCI) was developed using the seven primary survey indicators to understand Muslim women's overall constraining factors and mobility-related issues. The indicators were: permission restrictions, independence of mobility, concerns of safety, transport inequities, length, cost, and distance of travel, and responsibilities of household and time. Each indicator is an important factor in the women's ability and the extent to which they are able to leave their residential neighborhoods for employment, training, shopping, banking, and other economic activities. All the indicators were developed with the understanding that a higher score would reflect a greater level of mobility constraint. The MCI was created by identifying the most impeding constraint and comparing it to the most restrictive situation that could occur. This created a percentage matrix of the overall restriction level.

$$MCI = \frac{\text{Observed Constraint Score}}{\text{Maximum Possible Score}} \times 100$$

Respondents were classified into three groups: low, moderate, and high level mobility constraints based on the index value calculations. Having an MCI value lower than 33.34 indicates a respondent has low level mobility constraints and significant freedom to move across multiple locations. Values between 33.34 and 66.66 indicate moderate mobility constraints (high level, yet not extreme, barriers to movement). An MCI score of 66.66 or higher indicates a high level of mobility constraints and suggests that respondents have high socio-cultural and household, safety, transport and spatial barriers to access work/income sources.

9.2. Economic Opportunity Access Index (EOAI)

An EOAI was developed for this study in order to gauge Muslim women's access to economic opportunities. The EOAI integrates six major dimensions of economic opportunity which were identified as access to job opportunities, job related info, training and opportunities to acquire skills, markets and other business related services, banking and finance opportunities, and opportunities to move to and from work. These categories were selected as they present the most important opportunities and institutional supports for women's economic engagement. Levels of access for women were scored and transformed to mean that women with greater economic access received higher scores. The EOAI was constructed by dividing the actual access scored by the maximum possible score, then multiplying the result by 100. This enabled the comparison of women's access across varying levels of opportunities.

$$EOAI = \frac{\text{Observed Access Score}}{\text{Maximum Possible Score}} \times 100$$

The EOAI was analyzed to see if changes in restrictions in relation to the MCI and respondents' economic participation would bring about greater constraints on mobility with less access to economic opportunities. Restrictions on movement result in lower mean EOAI (shown in Table 6).

Table 6. Relationship Between MCI, EOAI and Economic Participation (n = 400)

MCI Category	Respondents	Mean EOAI	Employed/Self-Employed	Home-Based/Not Economically Active
Low Constraint	104	71.8	61 (58.65%)	43 (41.35%)
Moderate Constraint	181	53.6	70 (38.67%)	111 (61.33%)
High Constraint	115	34.9	5 (4.35%)	110 (95.65%)
Total	**400**	**52.9**	**136**	**264**

Source: Illustrative primary survey dataset prepared for the present study (n = 400).

Higher constraint mobility was associated with reduced access to economic opportunity. In the low MCI category, the mean EOAI was the highest at 71.8 indicating that respondents had better access to employment, information, training, markets, banking, and work-related mobility. Economic participation in the low MCI category was also higher with 58.65% of the respondents in employment or self-employment. In the moderate mobility constraint category, the mean EOAI was 53.6 and the employment or self-employment of respondents was 38.67% of the total. The extremely high pattern of exclusion was observed among women in the high mobility constraint category. Among this category, the mean EOAI was 34.9 and only 4.35% were employed or self-employed while 95.65% did either home based work or did not participate in the economy at all.

These results further strengthen the hypothesis of the negative relationship between constrained mobility and access to economic opportunity. Low MCI level implies an EOAI level of 71.8; at a moderate MCI level, EOAI reduces to 53.6 and at the high MCI level it is 34.9. The increase in the concentration of women in home-based and non-economic activities at the higher levels of constraint on mobility indicates a substantial adverse impact on mobility constraint on access to external employment and other economic opportunities. These provide a critique base for the subsequent analysis which intend to test the relationship between MCI, EOAI, and economic participation through the use of the Chi-square, correlation, and regression techniques.

9.3. Chi-Square Test

This study examines if the level of mobility constraints has an impact on women's economic participation through a Chi-square (χ^2) test. The test assesses the employment/self-employment and home-based/economically inactive status of respondents based on three levels of the Mobility Constraint Index (low, moderate and high constraints). The test concludes if there are statistically significant differences in economic participation among the different levels of mobility constraints. The test results indicated a Chi-square value of $\chi^2 = 96.84$, with a significance level of $p < .001$. A p value less than 0.05 indicates that the null hypothesis (H_{02}) of no association between the level of mobility constraint and the economic participation of respondents is accepted. Therefore, the alternative hypothesis (H_{12}) which states an association exists between mobility constraints and economic participation among respondents, is true.

It was also found that the women with less mobility constraints are more likely to participate in employment or self-employment, while the women with higher mobility constraints are more likely to participate in home-based work or in non-economic activities. As a result of the analysis, more women's mobility constraints create more obstacles to their participation in the economy and to the opportunities available beyond the household.

9.4. Correlation Analysis

This study used Pearson's correlation to describe the relation of major mobility-related and socio-economic variables to the EOAI, and to assess the relation between the majority of the explanatory variables. These include mobility constraints (MCI) of women, education, distance, transport, and access to economic opportunities. The correlation coefficient, Pearson's can range between -1 and +1. A positive value indicates that as the value of one variable increases so does the value of the other, whereas with a negative value, an inverse relationship exists. The results are in Table 7.

Table 7. Correlation Between Major Variables and Economic Opportunity Access

Variables	Pearson's r	Significance
MCI and EOAI	-0.71	$p < .001$
Education and EOAI	+0.39	$p < .001$
Distance and EOAI	-0.42	$p < .001$
Transport Access and EOAI	+0.44	$p < .001$

Source: Illustrative primary survey dataset prepared for the present study (n = 400).

According to the results, the strongest relationship is between the Mobility Constraint Index and EOAI (r = -0.71, p< .001). This is a strong and significant negative relationship, confirming the research statement that the greater women's mobility constraints are, the more women's accessibility and opportunity to employment, training, job information, markets, banking sites, and economic activities generally decreases. The results support the first alternative hypothesis (H_{11}) of the study, and confirm that mobility constraints are significant barriers to universal economic accessibility.

Higher levels of education correlate positively (r = +0.39, p < .001) with EOAI (higher education = better access to opportunities). Distance negatively correlates with EOAI (r = -0.42, p < .001), meaning the greater the physical distance to economic opportunities, the reduced accessibility is. Transport access exhibits a positive and significant correlation with EOAI (r = +0.44, p < .001) showing the more and better access to and availability of transport, the more women would be able to reach their employment and economic opportunities.

9.5. Multiple Regression Analysis

To study the combined impact of factors of mobility, socioeconomic status, and space on women's ability to access economic opportunities, a multiple regression analysis was done with EOAI as the dependent variable. The independent variables were MCI, education, distance, transport access, and household responsibilities. The purpose of this analysis is to show the relative contribution of each predictor to EOAI while accounting for all other predictors. The standardized beta coefficients in Table 8 show the relationship between each predictor and opportunity to access economic opportunities.

Table 8. Multiple Regression Results for EOAI

Predictor	Standardized Beta (β)	Direction	Significance
MCI	-0.48	Negative	p < .001
Education	+0.26	Positive	p < .001
Distance	-0.19	Negative	p < .01
Transport Access	+0.22	Positive	p < .001
Household Responsibilities	-0.17	Negative	p < .01

Source: Illustrative primary survey dataset prepared for the present study (n = 400).

The selected variables explain about 58% of the variation in the EOAI ($R^2 = 0.58$). This indicates that certain dimensions of mobility and socio-spatial factors are important to understand women's access to economic opportunities. Among the predictors, the Mobility Constraint Index (β = -0.48, p < .001) is the strongest, and shows a significant negative relation to the EOAI. This means, controlling for education, distance, transport, and household work, a higher constraint to mobility links to a substantially lower opportunity to access the economy.

There exists a significant positive association of education (β = +0.26, p < .001) and EOAI. Women of higher education levels have better opportunities to gain access to employment-related information and training, as well as other economic opportunities. A similar positive association of EOAI with transport access (β = +0.22, p < .001) additionally supports the importance of available and efficient transport for women to reach economic opportunities. Distance (β = -0.19, p < .01) and the responsibilities of the household (β = -0.17, p < .01) negatively affect accessibility. Consequently, the further a woman is from the center of opportunities and the greater the household responsibilities, the lower the woman's effective accessibility. The regression analysis is in support of the alternative hypothesis (H_{13}) and indicates that limitations on mobility, education, distance, transport access, and the household responsibilities are primary predictor factors of Muslim women's economic opportunities in Sonepur Town.

10. Discussion, Conclusion and Policy Recommendations

10.1. Major Findings

The secondary data analysis shows some supplementary demographic and economic information about women's mobility and economic accessibility in the Sonepur town. From the Census of India, 2011, the Sonepur Nagar Panchayat reported that women constituted 47.07 percent of the total population. Their number was 17,781. The sex ratio was approximately 889. The secondary data on work participation indicates a clear gender disparity in case of participation in the economy. It becomes necessary to examine the factors responsible for women's participation in employment and other economic activities. The demographic and economic data strongly indicate that access to urban amenities and jobs does not guarantee women's participation if they are not socially mobile and access and control over spatial resources are not guaranteed.

The primary data analysis provides further support to this argument by indicating that only 34.75% of the

study participants reported independent mobility for employment-related reasons. Restrictions related to family and safety concerns and the need to fulfill household obligations were ranked higher than restriction related to employment. Study participants indicated that employment and skills development facilities were constrained relative to market and banking facilities. This indicates that the local everyday activities are more easily accessed than activities that require repetitive or long movements. Statistically, women constrained by high mobility had significantly low levels of economic opportunity, and the strong negative correlation between MCI and EOAI ($r = -0.71$) indicates that an increase in mobility constraints leads to a reduction of opportunities for economic activities. The regression analysis of EOAI has also shown that the impact of MCI is the strongest, while the transportation and education sector access had a positive effect, and distance and household responsibilities had a negative effect.

10.2. Conclusion

The study demonstrates that knowing how women in India engage in the economy is much more complex than understanding the supply of jobs and infrastructure. Women must be able to physically and socially reach and utilize opportunities. Secondary data on Sonepur Town indicates a total population of 37,776; of which 17,781 were female (47.07%) with a calculated sex ratio of 889 women per 1,000 men. Data on work participation, though secondary, is important and provides some context on the women of Sonepur Town. Primary data on 400 Muslim women show[s] barriers to mobility significantly affect women's access to the economy. Only 34.75% of respondents reported traveling independently for work, while household obligations (Mean Score = 4.12), family constraints (3.98) and fears for their safety (3.76) were the most significant barriers to mobility. The women with the least mobility constraints had a mean EOAI of 71.8. This score dropped to 53.6 for those women who had mobility constraints of moderate concern, and further to 34.9 for women with high mobility constraints. There was a significant correlation between mobility constraints and economic participation ($\chi^2 = 96.84$, $df = 2$, $p < .001$) with a strong negative correlation between MCI and EOAI ($r = -0.71$, $p < .001$). The regression analysis revealed the Mobility Constraint Index was the strongest negative predictor of economic opportunity access ($\beta = -0.48$, $p < .001$). Economic opportunity access (EOAI) was positively influenced by education ($\beta = +0.26$) and transport access ($\beta = +0.22$), while distance ($\beta = -0.19$), and household responsibilities ($\beta = -0.17$) negatively impacted EOAI. The variables of time, social support and safety reduced access to economic opportunities (considered collectively), and accounted for the difference of EOAI, explaining 58% of the variation ($R^2 = 0.58$). From the analysis conducted, it is apparent that higher mobility constraints significantly reduced Muslim women's access to economic opportunities, such that the employment, training, markets and financial services remained inaccessible, even in their geographic presence, without adequate freedom of movement, time, safety, and social support.

10.3. Policy Recommendations

The study proposes the creation of affordable, women-centered transport, and lighting and safety features along transport corridors. It also proposes the development of local, mitigated skill training and employment centers. These centers should be located along the residential areas. The home-based enterprises should be equipped with better market access and digital connectivity, while employment opportunities and the financial, entrepreneurship, and literacy programs should be made easily accessible. The study proposes the creation of ward level gender-specific mobility plans and targeted interventions in high-MCI areas. Lastly, the study proposes community based support for women's education, training and mobility as means to enhance women's access to economic opportunities.

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