



Sakshamaa Briefing Paper

Women's Safety and Mobility in Urban Bihar: A Case for Investment



Approaches to accelerate women's economic empowerment have traditionally focused on improving skilling, job conditions, wages, and access to capital and networks. Women's ability to access education, skilling, job opportunities and networks however remains influenced by myriad factors like social identity, economic standing, prevailing norms, and governance. Constrained daily mobility or the ability to physically access different facilities has a profound impact on women's economic participation and their empowerment. The inability to safely, and easily, reach educational institutions or places of work limit women's economic engagement. The daily mobility of women is guided by complex factors including established social norms, transport infrastructure, urban planning, and access to information and communication technology.

The third most populous state of India, Bihar is characterized by rigid gender norms, which translate to low levels of secondary school completion, just 12 percent women aged 15-49 have 12 or more years of schooling,¹ and an urban female labour force participation rate (LFPR) of just 6.9 percent - compared to a national average of 22.3 percent.² While this is higher than the states rural LFPR (4.4 percent)³, the numbers are alarming, requiring new and unexplored policy solutions, which expand on Government of Bihar's numerous efforts. One such uncharted pathway is the improvement of women's mobility and public safety via urban planning and transport infrastructure solutions. Accelerating conventionally 'gender-neutral' interventions, like electricity, lighting, pavements, roads etc. that can have a positive impact on women's public lives is particularly important in rigid patriarchal contexts like Bihar, where gender norm change may take generations to materialize. Existing evidence shows the positive impact of such interventions on women's economic lives - like proximity to highways, and regular electricity access leading to quicker shifts to non-farm employment, increased time spent on education, and greater employment hours in a month.⁴ ⁵ Investing in these

GENDER ASSESSMENT OF SAFETY, URBAN TRANSPORT, AND WOMEN'S MOBILITY IN BIHAR

Women's mobility, safety concerns, and experiences with transport were mapped in 3 cities of Bihar – Patna, Gaya, Muzaffarpur.

- Few women work. Of those who do, 42% commute to their place of work.
- The household and care work burden falls squarely on women. Working women spend 4 hours per day on household and care work compared to 1 hour by working men.
- Most women's trips are by walking, and 82 percent are for non-work-related purposes like household shopping, care work.
- More men have foregone economic opportunities due to transport related concerns.
- Walking environment, public transport, police presence and anti-harassment drives are priority domains for policy action.

¹ International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), India, 2015-16: Bihar. Mumbai: IIPS.

² Labour force participation rate (LFPR) (in percent) according to usual status (ps+ss) for women aged 15- 59. Ministry of Statistics and Programme Implementation (2017-18) Annual Report, Periodic Labour Force Survey. Government of India. New Delhi.

³ Ibid.

⁴ The World Bank (2018) The Web of Economic Corridors in South Asia.

<http://documents1.worldbank.org/curated/en/430671534922434794/pdf/The-Web-of-Transport-Corridors-in-South-Asia.pdf>

⁵ The World Bank (2018) In the Dark: How Much Do Power Sector Distortions Cost South Asia?
<https://openknowledge.worldbank.org/bitstream/handle/10986/30923/9781464811548.pdf>

opportunities in Bihar, will not only improve women’s access to public spaces, but will also address prevailing constraints faced by men as well.

With this background, mapping women’s safety concerns, experiences with transport, and their mobility patterns in urban Bihar is an important first step to devise urban planning and policy solutions that can improve their public experiences and participation in the economy. To explore these questions, two complementary assessments were completed in 2019-2020 across three cities of Bihar – Patna, Gaya and Muzaffarpur. The first was a public safety audit using the My SafetiPin and SafetiPin Nite mobile applications, and the second was a sample survey to quantify women’s urban mobility in the state.

Methodology

Safety Audit: Enhanced participatory data collection by the My SafetiPin and SafetiPin Nite mobile apps were used to identify urgent areas of intervention to address the issue of safety in public spaces. SafetiPin Nite mapped the three cities through night-time photographs, and My SafetiPin involved crowd-sourced data, providing women a tool through which they expressed their safety concerns. A team of urban planners and designers coded these photographs and audits, and combined with an algorithm, each city was given a Safety Score – based on the following 9 parameters: lighting, walk path, public transport, visibility, openness, crowd, gender diversity, security and feeling. 6903 audits were completed across the three cities (See Table 1).

	Night Audits	Women’s Audits
Patna	2750	940
Gaya	805	915
Muzaffarpur	503	990

Mobility Mapping: A sample survey of 1947 respondents across the three cities collected their demographic information and recorded their monthly travel diaries (See Table 2). The sample focused on the prime working age group – people between 18 and 49 years of age, and was split equally across gender, with 49.9 percent (women) and 50.1 percent (men). Focus group discussion (FGDs) with women on their professional aspirations, challenges and barriers faced while traveling to access economic and other opportunities were conducted. FGDs were also completed with transport providers to understand their perceptions of safety and harassment, awareness of their role and openness to change.

	Proportion of Population	Proportion of Surveys	Number of Surveys
Patna Municipal Corporation	67%	67%	1299
Gaya Municipal Corporation	19%	18%	348
Muzaffarpur Municipal Corporation	14%	15%	300

Travel Diaries: Travel diaries are a widely used measure to assess the mobility patterns of individuals or groups, and draw inferences for transport and city planning. For this survey, a traditional travel diary, based on memory recall was used. Respondents’ typical weekday travel schedules, covering their travel time, trip purpose, destination, main travel mode, and cost were recorded.

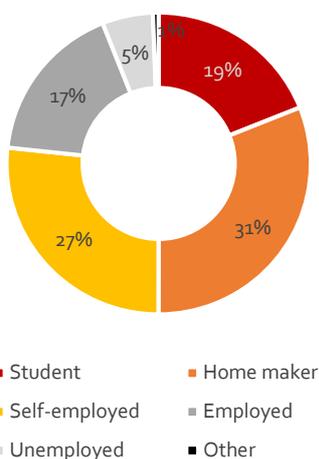
Women’s Work Status

In urban Bihar, more women have moved to the current city of residence for education, work or marriage: Twice the number of women have lived in the current city for less than 10 years, as compared to men, indicating that women may have migrated to the current city of residence for education, work or marriage as compared to men, who are more likely to have been born in the city.

Gender disparity in education stands out in the three cities: Women in Patna, Gaya and Muzaffarpur, are more likely not to have a formal education (-5.5 percent), and lower access to vocational and higher education i.e. a diploma (-3 percent) and a college degree (-15 percent). The difference in education level, by gender is statistically significant (p value = 0.00).

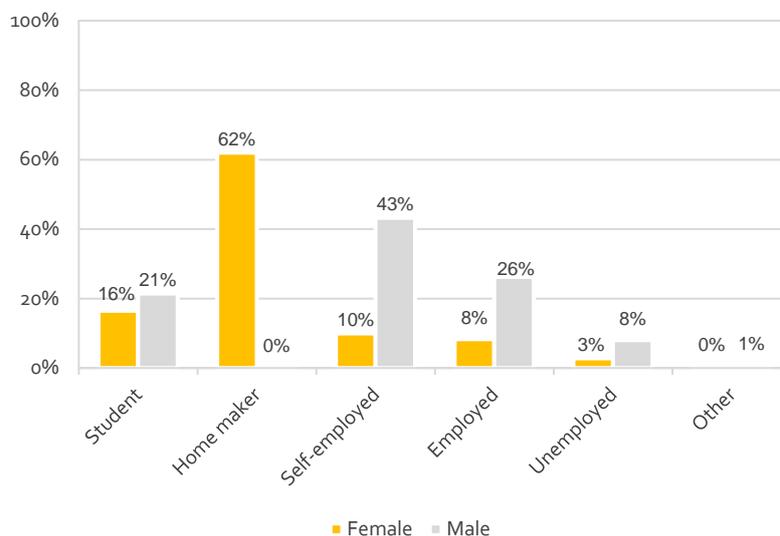
Urban Bihar is characterized by a self-employed work force with long hours and days: Self-employed persons are 1.5 times the number of employed persons and include rickshaw drivers (both electric and otherwise), wage laborers, shopkeepers and street vendors. The median number of hours engaged in paid work is 8, with one-third of the respondents working for more than 8 hours per day. Half of the survey respondents work for 6 days and close to 40 percent working all seven days of the week. One-third of the working women work 7 days a week, compared to 41 percent of men. A higher share of women than men are engaged in part-time paid work. This reflects the employment profile of the sample, and that of urban Bihar where a large section of the workforce is self-employed or employed in the informal economy.

Figure 1. Type of occupation



N: 1,947

Figure 2. Type of occupation, by gender

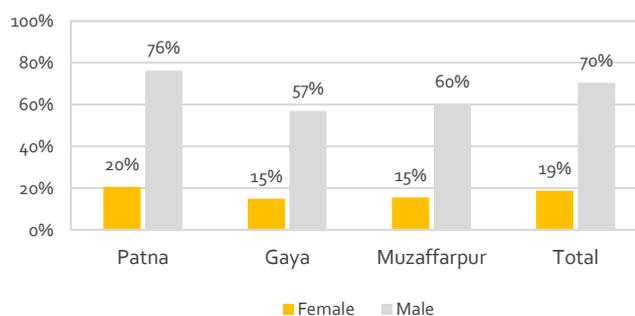


N: M=975, F=972

There is a gender employment gap of 50 percentage points between men and women: 62 percent of women are homemakers, and men are the chief wage earners for 96 percent of the households.

The ratio of women engaged in paid work to men is 1:4 (19 percent of women are engaged in paid work as compared to 70 percent of men). Women who are engaged in paid work, do so as tailors, domestic workers, vegetable vendors, teachers, home-based workers making mosquito nets, in beauty parlours, and grocery stores. 42 percent working women commute for work, 22 percent work from home, and the rest do a combination of both. Working women earn 25-50 percent lesser than working men - the median

Figure 3. Workers in each city and total, by gender



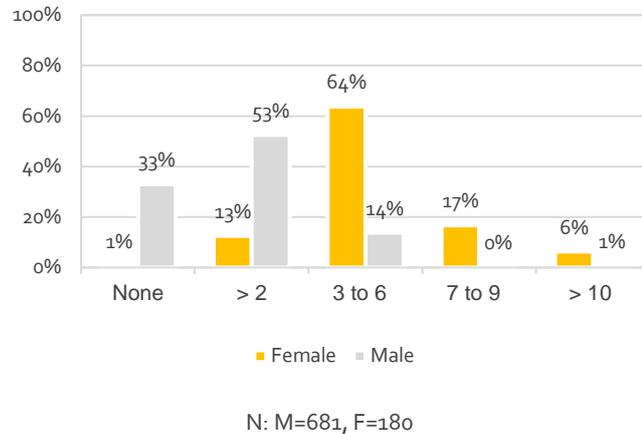
N: M=686, F=182

income for working women is in the range of Rs 7501-10,000 as compared to Rs 10,001-20,000 for men. The gender disparity in education, fewer hours of paid remunerative work, along with bearing a major burden of household and care work, could explain some of the income gaps between women and men.

The household and care work burden falls squarely on women:

Working women spend 4 hours per day on household and care work compared to 1 hour by working men. The gender disparity is also observed amongst students, as female students spend twice the time (median = 2.0 hours) on household work as compared to male students (median = 1 hours). Further, close to half the male (49 percent) and two-thirds of the female (65 percent) respondents reported that they are supported by other female members of the household. This could be a major factor in limiting women’s full participation in the work force.

Figure 4. Time spent on household and care work by working people, by gender

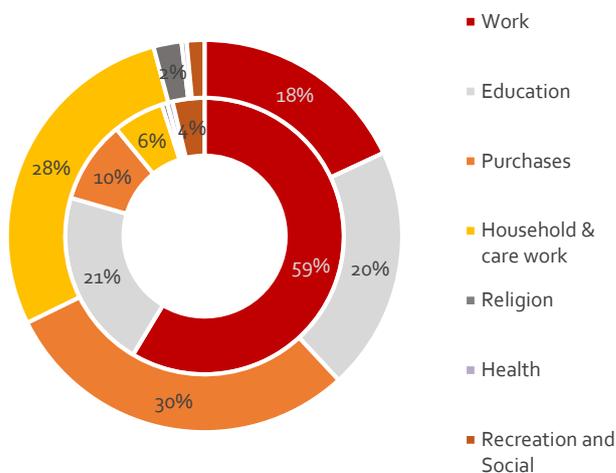


35 percent of women do not own a smart phone: Women are twice as likely as men to own a basic phone with a gender differential gap of 19 percentage points in the possession of smartphones. Therefore, any mobility focused ICT intervention such as real time information of public transport, QR code payments will need to cater to basic phones and smart phones.

Women’s Mobility Patterns

Women travel less than men, make more trips by walking and shared Intermediate Public Transport (IPT)⁶: Contrary to global travel trends, where women travel more frequently than men, women in urban Bihar make 37 percent fewer trips per day. Women’s per capita trip rate is 1.28 compared to 1.75 for men. Overall, work and education trips constituted 62 percent of all trips while purchases, household and care work constituted most of the remaining trips.

Figure 5. Travel purpose, by gender



82 percent of women’s trips are for non-work-related purposes:

Less than one-fifth (18 percent) of women’s trips are for work, and non-work-related trips account for 82 percent of women’s travel in urban areas of Bihar. Education, purchases and household and care work-related trips constitute 77 percent of women’s trips in Patna and Muzaffarpur and 81 percent in Gaya. In fact, close to four-fifths of household and care trips are undertaken by women. Therefore, conventional mobility services

N = 88,309, Outer pie is female respondents and inner pie is male respondents

⁶ IPT includes e-rickshaws, autos, tuk-tuks, shared autos etc.

planning based on only work and education trips will exclude around 40 percent of all trips in urban areas of Bihar, and most of women's trips (62 percent) –erasing women's care-related and other travel.

87 percent of women's trips are by walking (57 percent) and shared IPT (30 percent): A gender-disaggregated analysis across the three cities reveals that 57 percent of women's trips are by walking and 30 percent are by shared intermediate public transport (IPT). Women make 1.6 times or 60 percent more walk trips than men, and 1.5 times or 50 percent more trips by shared intermediate public transport –both of which impacts their time poverty. While the overall mode share of car use is extremely low, women make 30 percent more trips by cars than men.

Gender gap in riding bicycles is 62 percent: Only 32 percent of women knowing how to ride a bicycle. However, a higher proportion of women in Gaya (40 percent) know how to cycle compared to Muzaffarpur (33 percent) and Patna (30 percent). Even though Bihar is one of the states with a strong cycling culture and with existing schemes and leadership to encourage girl students to take up cycling, this figure still shows the scale of the challenge ahead in promoting cycling amongst urban women.

Women, and men, say that the unavailability of public transport, waiting times, unaffordability and safety have led to them forego economic and educational opportunities: One-fifth of respondents have foregone opportunities due to the lack of transportation or fear of safety. The gender-disaggregated data highlights that 26 percent of men reported giving up work or educational opportunities than women (11 percent). The gendered difference is statistically significant ($p=0.000$). The unavailability of public transport (43 percent) and waiting time (45 percent) are two major reasons due to which people forego educational and economic opportunities, followed by unaffordability (26 percent) and safety concerns (18 percent). However, 27 percent of women forego opportunities due to safety concerns compared to 14 percent of men, which is statistically significant ($p=0.004$).

Women's Perceptions of Safety and Transport

Patna, Gaya, and Muzaffarpur received average Safety Scores in the women's and night audit: Based on the women's audit and nighttime mapping of three cities, the following aggregate scores were given: Patna- 2.6/5, Gaya- 2.2/5, Muzaffarpur- 2.3/5. While these cities performed well on criteria like Openness and Lighting, parameters like Gender Usage, Public Transport, Walkpaths, and Security require attention.

Women's Travel for Education

Women travel longer distances for education, with average trip distances of 3.6km. Close to one-third of female students walk, 10 percent use cycles whereas 45 percent used shared IPT. Three times the number of men cycle for education-related trips, whereas 1.4 times the number of women use shared IPT.

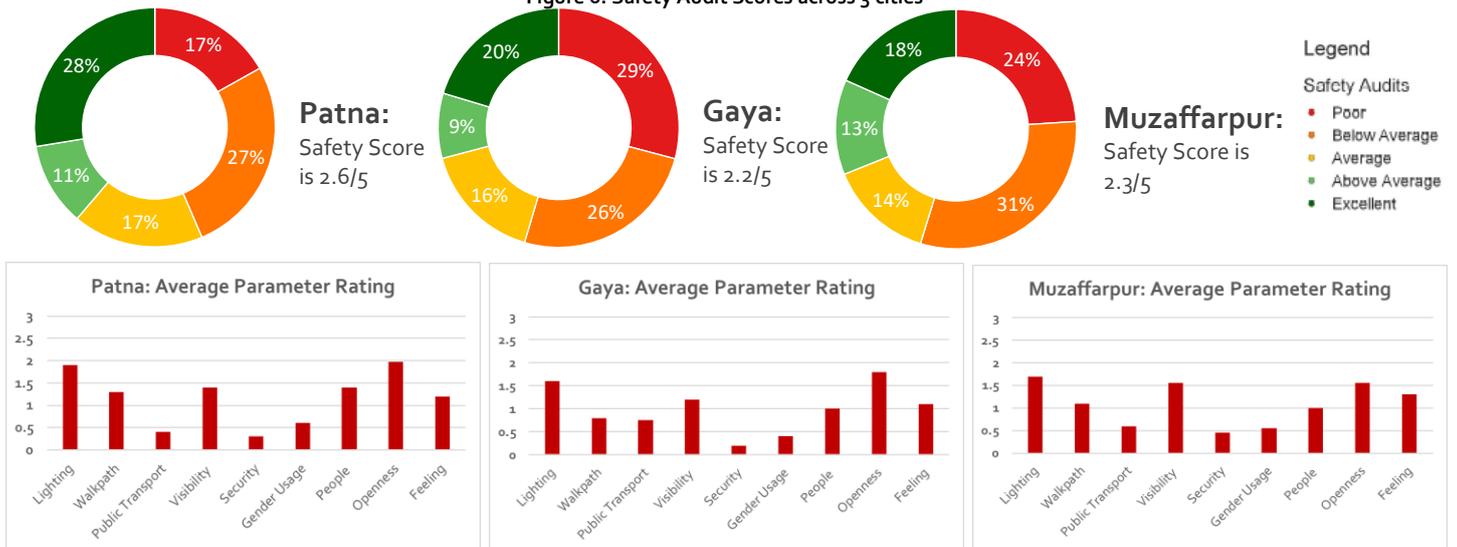
Women's Travel to Work

While women travel the same or longer distances as men for education, they find economic opportunities closer to their residences. Women's average work trip length is 3.40km, 45 percent shorter than men's average work trip length (5.0km). However, more than half the number of women walk to work, and travel less than 1 km. More than a quarter of women (28 percent) use shared IPT, with e-rickshaws and smaller auto-rickshaws catering to average distances of 3.3km and 3.7km, respectively.

Thus, the quality of walking infrastructure and shared IPT services disproportionately affects women's access and mobility.

Women's access to bicycles can be improved to reduce their costs and reliance on shared IPT. There needs to be a greater awareness amongst IPT drivers as 60 percent of the IPT trips are by women.

Figure 6. Safety Audit Scores across 3 cities



Normalization and internalization of sexual harassment, low presence of security personnel:

Close to one-fourth of the female respondents to the mobility survey have faced harassment while commuting, with a wide variation across the cities of Muzaffarpur (44 percent), Gaya (25 percent) and Patna (16 percent). This appears counterintuitive when compared to cities like Delhi and Bengaluru, which have high reported rates of harassment. This indicates that harassment is internalized and normalized to a larger extent in urban Bihar. Staring (77 percent) and lewd comments (52 percent) are the two major types of harassment faced while commuting, followed by stalking (25 percent). The cities scored poorly in the safety audits on the security parameters as well, with audits showing that >65 percent areas across the cities had no visible police or security guard presence.

Concerns around walking environments, especially at night:

The audits showed that 62 percent of Patna, 52 percent of Gaya, and 61 percent of Muzaffarpur have walk paths that are in very poor condition - unpaved, broken or blocked with parked vehicles, encroachments, extensions etc. The mobility survey found that while walk trips are predominant and constitute around 40 percent of all trips, less than 15 percent of the road space is allocated for footpaths. Streets in Gaya and Muzaffarpur rarely have any space allocated for footpaths, and pedestrians often share road space with motorized vehicles. This is underscored in respondents’ perceptions of the walking environment. Around two-thirds of the respondents perceive the walking environment to be poor in the day (64 percent) and in the night (67 percent). Fast and rashly driven vehicles, narrow, high, discontinuous, encroached and uneven footpaths are the major causes for the poor perception of the walking environment, followed by water-clogged streets, intentional rash driving by men in the presence of women and secluded neighborhoods. Groups of men waiting at corners / shops are a concern for women.

The poor perception of streets was seen to be twice as prevalent in men and thrice in women in the night, as compared to daytime. Deserted streets, fear of theft and anti-social elements and groups of men at street corners/ shops are the key reasons for women’s poor perception of streets in the night. Women expressed a higher preference for female Police personnel and improving streets within neighborhoods.

Overwhelming demand for improved bus-based and shared intermediate public transport:

77 percent of Patna, 60 percent of Gaya and 68 percent of Muzaffarpur do not have public transport access within 10 minutes reach, according to the safety audits. More than four-fifths or respondents to the mobility survey are willing to use sustainable modes of transport if they are provided with improved services. Shared intermediate public transport is the most preferred mode of transport (93 percent), followed by walking (85 percent), public buses (84 percent) and private buses (82 percent).

Four-fifths of the respondents rated public and private buses as poor or very poor, due to overcrowding (80 percent). The shared tempos cater to longer trip distances compared to the smaller auto-rickshaws and e-rickshaws. While permitted to carry 3 passengers (excluding the driver), these Tempos are modified to carry around 10 passengers. 76 percent of the respondents rated IPT services as poor or worse. Overcrowding, ad-hoc prices and rash driving are major concerns. Close to three-fourths of the respondents have stated that reduced overcrowding will have a higher impact on IPT services, followed by safe driving (64 percent) and better design (61 percent) for protection from extreme weather. Almost three-fifths have felt that driver behaviour (59 percent) and fare regulation (58 percent) is vital for improving IPT services. E-rickshaws are the preferred mode of IPT for close to half of all respondents. This is due to the limited scope of overcrowding in the e-rickshaws, porosity and frequent service.

What Next?

These assessments are some of very few that have estimated women's care-related travel, safety perceptions and transport needs- all key policy inputs. Conventional mobility services planning, based only on work and education trips, will exclude around 40 percent of all trips in urban Bihar, and most (62 percent) of the trips made by women – creating gender-blind plans and erasing women's care-related and other travel needs. One of the 'low-hanging fruit' solutions for women's safety and mobility is to improve the urban walking environment, particularly by addressing lighting, footpaths, and bus stops. In terms of larger policy interventions, some actions that should be explored include awareness and behaviour change campaigns on safe mobility and public harassment, increasing the supply of buses, and increased regulation of intermediate public transport services. Investing in urban policy solutions that integrate gendered mobility indicators, factoring in mode shares and walking distances/time by gender, travel distance for mobility of care and household cost on transport per month by gender, and experiences of sexual harassment will pay dividends in terms of improving women's public safety and participation in economic life.



This Briefing Paper is prepared by Devaki Singh and Madhu Joshi, and is based on two assessments supported by Centre for Catalyzing Change's Sakshamaa- Initiative for What Works Bihar:

- *PATNA GAYA MUZAFFARPUR: SAFETY AUDIT REPORT by SafetiPin; team led by Kalpana Viswanath and Rwritee Mandal. Project team included; Raj Pratap Thakur, Shilpy Mehta, Shreya V Basu, Sonali Vyas.*
- *Women's Access and Mobility Plan for Cities in Bihar: Analysis by The Urban Catalysts, team led by Sonal Shah. Project team included; Vishnu Mohankumar Jaya, Kanika Gounder, Manisha Sharma.*

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