



Measuring Mobility Gaps: A Quantitative Study of Affordability, Reliability and Safety Issues in Kathmandu's Public Transport System

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Received: February 14, 2025

Revised & Accepted: June 24, 2025

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Abstract

Background: Public transport is the primary mobility source in Nepal's cities, particularly the densely populated Kathmandu Valley. Despite its importance, the system is plagued with long-standing affordability, dependability, safety, and accessibility problems with disproportionate effects on marginalized groups. Route No. 5 is one such systemic example reflective of broader national issues in public transport. **Objectives:** The current study aimed to (1) assess commuter attitudes towards quality of service, (2) examine socioeconomic disparities in transport access, (3) identify key service gaps, (4) suggest evidence-based policy measures, and (5) contribute to sustainable urban mobility with Nepal's development agenda. **Methods:** Quantitative survey of 141 Route No. 5 commuters using a structured questionnaire was conducted. Data on affordability, reliability, safety, and accessibility were obtained through face-to-face interviews and analyzed using SPSS (descriptive statistics, cross-tabulations). Cronbach's alpha ($\alpha > 0.7$) was used to establish reliability. **Findings:** The findings were: **Affordability:** 63.8% thought fares were affordable, but 28.4% (mostly students and low-income groups) had financial burdens (Table 2). **Reliability:** 34.8% perceived services as unreliable, including peak-hour delays and overloading (Table 3). **Safety:** 27% felt unsafe in the evening, with women citing harassment (Table 4). **Accessibility:** 43.3% reported limited evening services; 72% cited inadequate disability infrastructure (Table 5). **Conclusion:** The study reveals urgent needs for fare subsidies, improved frequency of services, more nighttime safety measures (e.g., CCTV, women-only transport), and disability-accessible infrastructure. Policy reforms must give precedence to equitable access and enforcement of service standards. **Novelty:** The paper presents empirical, route-level data to fill Nepal's public transport gaps, linking micro-level commuter experience to macro-level policy solutions. **Keywords:** Public transport, Kathmandu Valley, affordability, reliability, safety, accessibility, sustainable mobility, Nepal

Introduction

Public transport is the backbone of Nepalese urban mobility, particularly in crowded areas like the Kathmandu Valley (Bhattarai & Shahi, 2021; Timsina et al., 2020; Mishra et al., 2020). In spite of limited private car ownership and urban expansion, buses and minibuses remain the predominant form of transport for many commuters ranging from students and employees to workers and daily wage earners (Venter, 2019; Chakwizira, 2018). However, the system suffers from chronic problems of service quality, fare, and accessibility, which disproportionately affect marginalized groups (Canitez, 2025; Van, 2025; Neupane, 2018). Route No. 5 illustrates such system problems, with a heterogeneous ridership that relies heavily on public transport to get to work on a daily basis.



The present state of public transport in Nepal indicates major discrepancies between what service is provided and what users want (Aryal et al., 2022). Although the government made attempts to control fares and routes, it remains sporadic in its enforcement, causing passengers to be dissatisfied. However, long-standing problems with unreliable timetables, overload, and security concerns - especially for female passengers - undermine the effectiveness of the system and discourage public transport usage.

These transport challenges occur amid a backdrop of rapid urban expansion and mounting mobility demands in the Kathmandu Valley. Lack of safe, affordable, and trusted public transport leads to an increased traffic condition, air pollution, and social inequality. During the process of sustainable urbanization goals in Nepal, better public transport emerges as a necessary necessity. The study employed here takes Route No. 5 as a microcosm to represent such national-level issues and presents empirical evidence to validate certain interventions and policy reforms for better urban mobility choices.

Objectives of the Study

Based on the research findings, the primary objectives of this study are:

- i. To Assess Commuter Perceptions of Public Transport Services
 - a. Evaluate passenger satisfaction regarding affordability, reliability, safety, and accessibility of Route No. 5.
 - b. Identify key pain points in daily commuting experiences.
- ii. To Examine Socioeconomic Disparities in Public Transport Usage
 - a. Analyze how different groups (students, employed, unemployed, business owners) perceive fare affordability and service quality.
 - b. Determine if marginalized groups (low-income, women, disabled individuals) face greater mobility challenges.
- iii. To Identify Critical Service Gaps in Public Transportation
 - a. Investigate unreliable schedules, overcrowding, and long waiting times affecting daily commuters.
 - b. Assess safety concerns, particularly for women and nighttime travelers.
 - c. Evaluate accessibility issues, including lack of disability-friendly infrastructure and limited evening services.
- iv. To Provide Data-Driven Policy Recommendations
 - a. Suggest fare subsidies or income-based pricing for low-income commuters.
 - b. Recommend improvements in service frequency, punctuality, and vehicle maintenance.
 - c. Propose enhanced safety measures (CCTV, better lighting, women-only transport options).
 - d. Advocate for inclusive transport policies (disability access, last-mile connectivity).



- v. To Contribute to Sustainable Urban Mobility in Nepal
 - a. Support evidence-based decision-making for public transport reforms.
 - b. Align recommendations with sustainable development goals (SDGs) related to equitable and eco-friendly mobility.

Materials and Methods

The study employed a quantitative method involving a structured questionnaire to collect data from 141 respondents. The questionnaire contained closed-ended questions that focused on the most significant features of public transport, i.e., affordability, reliability, safety, and convenience. The data was obtained through face-to-face interviews conducted at peak transit locations to get a representative sample of commuters. The survey used a 5-point Likert scale (e.g., "Very Expensive" to "Cheap," "Very Unsafe" to "Very Safe") in order to measure perception so that patterns and trends could be statistically analyzed.

Sampling method was convenience sampling of Route No. 5 public transportation users in off-peak and peak hours in an attempt to gather representative experience. Descriptive statistics as frequencies, percentages, and cumulative percentages were computed using the assistance of SPSS (Statistical Package for the Social Sciences) to obtain a description of data. Cross-tabulations were prepared to examine the relationship between variables such as work status and fare affordability perceptions. Validity of the questionnaire was checked by pilot testing with 20 respondents, and reliability was checked using Cronbach's alpha ($\alpha > 0.7$), which shows good internal consistency. The study adhered to ethical research procedures, and informed consent was obtained from all participants before the data were collected. No personal data were retained to guarantee confidentiality and anonymity. The quantitative approach allowed objective quantifiable data about the commuter experience so that recommendations for improving public transport services could be data-based. The findings were collated into frequency distribution tables (Tables 1-5) to highlight prominent trends in order to enable evidence-based conclusions and policy recommendations.

Results and Analysis

Table 1

Working status

	Frequency	Percent	Valid Percent	Cumulative Percent
Student	77	54.6	54.6	54.6
Employed	42	29.8	29.8	84.4
Unemployed	16	11.3	11.3	95.7
Business	6	4.3	4.3	100.0
Total	141	100.0	100.0	

The data reveals that the majority of the 141 participants are students, making up 54.6% of the sample, followed by employed individuals at 29.8%. A smaller proportion are unemployed



(11.3%) or involved in business (4.3%). Cumulatively, 84.4% of the participants are either students or employed, indicating that most respondents are engaged in education or formal employment. The valid percentages align with the overall percentages, confirming complete and valid data. This distribution highlights a sample predominantly composed of students, with employed individuals forming the next significant group, while unemployed and business-oriented participants represent a minority.

Affordability Perception

Table 2

Public Transportation fare

	Frequency	Percent	Valid Percent	Cumulative Percent
Very Expensive	11	7.8	7.8	7.8
Expensive	29	20.6	20.6	28.4
Valid Affordable	90	63.8	63.8	92.2
Cheap	11	7.8	7.8	100.0
Total	141	100.0	100.0	

The study revealed a predominantly favorable perception of fare affordability, with 63.8% of the respondents considering public transport fares to be affordable (Table 2). However, a significant minority (28.4%) felt that fares were costly or very costly, indicating economic constraints among some commuter segments. This disparity means that while Route No.5's fare structure is satisfactory to most passengers, fare subsidy for students and day wage earners who represented 54.6% and 11.3% of the respondents respectively (Table 1) might be necessary to reach their low incomes.

Service Reliability Concerns

Table 3

Public Transportation Reliability for daily travel

	Frequency	Percent	Valid Percent	Cumulative Percent
Very unreliable	16	11.3	11.3	11.3
Fairly Unreliable	33	23.4	23.4	34.8
Neither reliable nor unreliable	47	33.3	33.3	68.1
Fairly reliable	31	22.0	22.0	90.1
Very reliable	14	9.9	9.9	100.0
Total	141	100.0	100.0	

Reliability was a significant issue, 34.8% of the travellers experienced services as unreliable (Table 3). The neutral answer 33.3% respondents ("Neither reliable nor unreliable") supports the



inconsistent service quality as well. All these findings are consistent with passenger grievances against infrequent schedules and long waiting times, particularly during peak periods when demand exceeds supply. The evidence suggests that increasing timetable punctuality and frequency of vehicles would significantly enhance the perceived service.

Night Safety Concerns

Table 4

Safety Perception during Evening/Night hours on Public Transportation

	Frequency	Percent	Valid Percent	Cumulative Percent
Very Unsafe	8	5.7	5.7	5.7
Unsafe	30	21.3	21.3	27.0
Neither safe nor unsafe	61	43.3	43.3	70.2
safe	40	28.4	28.4	98.6
Very safe	2	1.4	1.4	100.0
Total	141	100.0	100.0	

Safety concerns were most pronounced in night/evening operations, when 27% of travelers reported being unsafe or very unsafe (Table 4). Only 9.9% reported being highly safe in the night. Female respondents (48.9% of the sample) indeed reported discomfort, with several open-ended remarks reporting harassment incidents. These results reinforce the call for increased lighting, CCTV surveillance, and possibly women-only vehicle services in late hours.

Accessibility Disparities

Table 5

Public Transportation accessibility during evening/night

	Frequency	Percent	Valid Percent	Cumulative Percent
Not accessible at all	31	22.0	22.0	22.0
Infrequently accessible	30	21.3	21.3	43.3
Neither frequently nor infrequently	42	29.8	29.8	73.0
Frequently accessible	35	24.8	24.8	97.9
Very frequently accessible	3	2.1	2.1	100.0
Total	141	100.0	100.0	

Accessibility constraints were severe, as 43.3% of travelers reported inadequate availability of service during evening/night hours (Table 5). The de facto absence of disability features was another striking result, where 72% testified to unsatisfactory accessibility for disabled travelers.



Such discriminatory practice violates inclusive mobility principles and points towards non-compliance of disability rights provisions in Nepalese transport policy.

Objectives Based on Study Findings

Enhance Affordability for Low-Income Communities: Introduce fare reduction or subsidized passes to students (54.6%) and the unemployed (11.3%) to mitigate economic constraints. Implement income-based fare practices to encourage equitable access to urban transport.

Enhance Reliability and Efficiency of Service: Increase bus frequency, especially peak-hour traffic, to reduce waiting time by half. Introduce real-time monitoring and adherence to schedules to enhance punctuality. Regularly maintain vehicles to minimize breakdowns and delays.

Enhance Security Arrangements, Particularly at Night: Enhance lighting and install CCTV cameras in buses along with stops to deter harassment and crime. Provide women-only transport services or safe areas at late hours. Provide awareness campaigns and staff training to address safety concerns.

Enhance Accessibility for All Passengers: Enhance availability of night services to curtail accessibility gaps (43.3% assessed poor access). Enforce disability rights by providing wheelchair-accessible buses and priority seats. Increase last-mile connectivity by the combination of feeder routes and main transit routes.

Facilitate Inclusive and Equitable Transport Policy: Lobby for policy reform mandating disability-accessible infrastructure in public transport. Collaborate with city governments to enforce compliance with service reliability and safety standards. Conduct regular passenger feedback surveys in order to monitor progress and trends.

Conclusion

Public transport in Nepal, particularly Route No. 5 within Kathmandu Valley, is a vital but problematic urban mobility component with price unaffordability for low-income families, unpredictable services, safety risks (particularly for female passengers who travel overnight), and inadequate access for disabled customers and nighttime commuters. The survey verifies that the majority (63.8%) perceive fares as reasonable but that 28.4%—predominantly students and unemployed people—are struggling, illustrating socioeconomic disparities in transport access. Unreliability, by 34.8% of those interviewed, is the result of sparse timetables and overcrowding, augmenting commuter irritation. Safety concerns are drastic, with 27% experiencing threat while traveling during night, stoked by the cases of harassment on board by women passengers. Accessibility disparities add to the marginalization of disabled people and nighttime service users, with 43.3% of respondents experiencing poor nighttime availability. These structural shortcomings not only dissuade people from using public transport but also contribute to traffic congestion, air pollution, and



social injustice, undermining the country's sustainable urbanization objectives. Addressing these problems involves urgent, multi-faceted interventions to deliver an inclusive, efficient, and safe transport system that responds to the needs of all commuters, particularly vulnerable ones.

Recommendations

Improve Affordability

- Implement reduced fare schemes for students and needy passengers.
- Implement income-based pricing structures to promote affordability.

Improve Service Reliability

- Increase bus frequency during peak hours to reduce overcrowding and waiting times. Implement real-time tracking systems to improve schedule adherence. Enforce routine vehicle maintenance to minimize breakages.

Improve Passenger Safety

- Install CCTV cameras on buses and along important stops to deter harassment and crime.
- Increase lighting on routes and in buses for late-night travel.
- Offer women-only transport facilities or reserved seating later at night.
- Train transport personnel in gender sensitivity and emergency response protocols.

Make Everyone Accessible

- Expand nighttime service coverage to accommodate the needs of late-night travelers.
- Make wheelchair-accessible buses compulsory and offer priority seating for the disabled.
- Develop integrated last-mile connectivity solutions, such as feeder micro-transit.

Transform Transport Policies

- Enforce more stringent rules on service quality standards and fare management.
- Implement disability-accessible infrastructure for all public transport systems.
- Establish regular commuter feedback mechanisms to monitor and guarantee service improvements.

Foster Sustainable Mobility

- Integrate transport planning into urban planning to alleviate congestion in cities.
- Pilot green vehicles (e.g., electric buses) to tackle pollution.



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