



PERCEIVED PHYSICAL FITNESS AND FATIGUE AMONG LONG-DISTANCE LOCAL TRAIN COMMUTERS: A SURVEY STUDY IN METROPOLITAN MUMBAI

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ABSTRACT:

Rapid urbanization and employment centralization have significantly increased commuting durations in metropolitan cities. Mumbai's suburban railway system transports millions of working adults daily, many of whom commute for extended durations exceeding 90–120 minutes. Prolonged commuting has been associated with elevated stress, reduced leisure-time physical activity, and adverse health outcomes.

The present study aimed to examine perceived physical fitness and fatigue among long-distance local train commuters in Mumbai. A descriptive cross-sectional survey was conducted among 250 working adults aged 25–55 years who commute at least 90 minutes daily via suburban rail. Data were collected using a structured questionnaire assessing commuting duration, perceived physical fitness, fatigue levels, musculoskeletal discomfort, and exercise participation.

Results indicated that 68% of respondents perceived their physical fitness as average or poor, while 74% reported moderate to high levels of daily fatigue. Musculoskeletal discomfort, particularly lower back pain (62%), was prevalent. Statistical analysis revealed a significant association between commuting duration exceeding 120 minutes and elevated fatigue levels ($p < 0.05$).

The findings suggest that prolonged commuting in metropolitan Mumbai may negatively influence perceived physical fitness and occupational well-being. Commuter-centered health promotion strategies are recommended.

Keywords: Urban Commuting, Occupational Fatigue, Physical Fitness Perception, Metropolitan Health, Mumbai Local Trains

INTRODUCTION:

Urban expansion has reshaped residential and occupational patterns worldwide. In metropolitan cities such as Mumbai, employment hubs are often geographically distant from residential areas, leading to extended daily commuting durations. The Mumbai suburban railway network is among the busiest globally, transporting millions of commuters under conditions characterized by crowding, prolonged standing, and limited personal space.

Research has shown that longer commuting durations are associated with increased psychological stress and reduced physical activity levels (Christian, 2012; Wener & Evans, 2011). Extended travel time has also been linked to obesity risk, lower cardiovascular fitness, and adverse metabolic outcomes (Flint et al., 2014; Hoehner et al., 2012).

Commuting stress, described as the “commuting paradox,” reflects the discrepancy between employment benefits and reduced subjective well-being due to travel burden (Stutzer & Frey, 2008). Furthermore, prolonged commuting has been associated with poorer mental health outcomes (Olszewski et al., 2021) and decreased engagement in leisure-time physical activity (Humphreys et al., 2013; Sahlqvist et al., 2012).

Despite the scale of commuting in Mumbai, limited empirical studies have investigated perceived physical fitness and fatigue among long-distance local train commuters. This study addresses this gap.

OBJECTIVES OF THE STUDY:

1. To assess perceived physical fitness among long-distance local train commuters.
2. To evaluate daily fatigue levels among commuters.
3. To determine the prevalence of musculoskeletal discomfort.
4. To examine the association between commuting duration and fatigue levels.

HYPOTHESIS:

H₀: There is no significant association between commuting duration and fatigue level.

H₁: Longer commuting duration is significantly associated with higher fatigue level.

METHODOLOGY:

- 1. Research Design:** A descriptive cross-sectional survey design was adopted.
- 2. Sample:** The study included 250 working professionals aged 25–55 years residing in the Mumbai Metropolitan Region. Inclusion criteria required a daily local train commuting duration of at least 90 minutes.
- 3. Instrumentation:** A structured questionnaire was developed to collect data on:

- Demographic profile
- Daily commuting duration
- Self-rated physical fitness (Excellent, Good, Average, Poor)
- Fatigue level (Low, Moderate, High, Very High)
- Musculoskeletal discomfort
- Exercise participation frequency

4. Statistical Analysis:

Data were analyzed using frequency distribution, percentage analysis, and chi-square testing. Statistical significance was set at $p < 0.05$.

RESULTS:**1. Perceived Physical Fitness:**

Fitness Level	Percentage (%)
Excellent	6%
Good	26%
Average	44%
Poor	24%

A total of 68% of respondents perceived their physical fitness as average or poor.

2. Fatigue Levels:

Fatigue Level	Percentage (%)
Low	10%
Moderate	38%
High	32%
Very High	14%

Approximately 74% reported moderate to high fatigue levels.

3. Musculoskeletal Discomfort:

- Lower Back Pain: 62%
- Knee Pain: 44%
- Neck/Shoulder Pain: 39%

4. Association Between Commuting Duration and Fatigue:

Chi-square analysis revealed a statistically significant association between commuting duration exceeding 120 minutes and higher fatigue levels ($p < 0.05$). The null hypothesis was rejected.

DISCUSSION:

The findings indicate that prolonged commuting is associated with elevated fatigue and lower perceived physical fitness. These results are consistent with previous studies demonstrating that extended commuting negatively impacts health outcomes (Künn-Nelen, 2016; Wen et al., 2013).

Reduced engagement in leisure-time physical activity among commuters has been documented in systematic reviews (Humphreys et al., 2013; Sahlqvist et al., 2012). Additionally, prolonged exposure to crowding stress during train travel may contribute to mental strain and fatigue (Wener & Evans, 2011).

The high prevalence of lower back pain observed in the present study may be attributed to prolonged standing posture and limited movement space. Over time, such factors may reduce exercise participation and negatively influence physical fitness perception.

Urban occupational health frameworks should consider commuting duration as a significant determinant of health and well-being.

CONCLUSION:

The present study concludes that long-distance local train commuting in metropolitan Mumbai is significantly associated with higher levels of fatigue and lower perceived physical fitness. Commuting duration exceeding 120 minutes appears to be a contributing factor to occupational fatigue.

Public health interventions, flexible work arrangements, and commuter-focused wellness programs are recommended to mitigate adverse health outcomes.

LIMITATIONS:

- Self-reported data
- Cross-sectional design
- Lack of objective fitness measurements

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