WOMEN SAFETY IN PUBLIC TRANSPORT

Mayank Choudhary[1],Sudhanshu Dube[2],Rakesh Verma[3]

1. M. Tech Student, Civil Engineering Department, SVVV, Indore.
2. Associate Professor, Civil Engineering Department, SVVV, Indore.
3. Associate Professor, Civil Engineering Department, SVVV, Indore.
Mayankchoudhary845@gmail.com,sudhanshudube28@rediffmail.com,rakeshverma3388@gmail.com

ABSTRACT

India is youngest economy in the world.Last few decades there is a radical change in the Indian education system which makes the women workforce, more educated, self-dependent. Increasing in women outdoor activities increase need of safety of women.Therefore, a study survey is done in Indore on women safety by using questionnaire form to find answers to research questions like what kind of issues are faced by womenin public transport and how safe they feel in public transport and at the bus stops.The paper aims to analyse various statements and to find factors which affect women safety in public transport and at the bus stops.

Keywords: Women safety; Safety in public transport; Factor analysis

1. Introduction

India is almost a fifth of the world's population and second most inhabited country within the world. As per Census 2011, the population of Republic of India is 1210.19 million, where 586.47 million (48.5%) area unit females and 623.72 million (51.5%) area unit males. Population doubled to 1.2 billion from 1975 to 2018. In 1998, The Indian population reached the billion-marks. By 2024 Republic of India are going to be the world's most inhabited country. Republic of India increment rate is 1.2% and ranking is 94th within the world (in 2013). The sex quantitative relation is 944 females for a thousand males (in 2016) and in 2011 (940 females for 1000 males).

Madhya Pradesh is that the second largest state of Republic of India. Madhya Pradesh population is over seventy-two million. It's the fifth-largest state in Republic of India by population. As per details from Census 2011, Madhya Pradesh has population of 17.27 Crores. The population of male and female is 37,612,306 and 35,014,503 severally. Per population census 2011 sex quantitative relation of M.P is 931 females per a thousand males.

Indore is the district of Madhya Pradesh. According to Census India, population of Indore in 2011 is 1,964,086 of which male and female are 1,020,057 and 944,029 respectively. Indore is the most populous and the largest city in M.P. It is also considered as an education hub of the state.

It is experienced that women are more educated, self-depend than before. Increasing in women education, workforce, and outdoor activities helps growing Indian economy. Increasing in women outdoor activities increase need of safety of women. Women's Safety in Public Transport is one of the key challenges across the globe. The authorities are taking various measures to make Public Transport safe and comfortable for women. It is very important to understand the travel needs of men and women are very different. In developing countries, lots of women forced to remain at home owing to lack of safe transportation option. Women are more likely to travel shorter distances and to stop more frequently than men during their journey.

According to study conducted by Thomas Reuters Foundation in 2014, it has ranked Delhi at 4th position for most dangerous transport system for women. The poll was conducted in 15 of the world's largest capitals and in New York, the most populous city in the United States.

Indore has emerged as the sixth most unsafe city for women in the country after five big cities including Delhi, Mumbai, Kolkata, Vijayawada and Hyderabad with a record of 104 cases of insult to modesty of women in 2015. With a whopping 70% increase in the number of cases of insult to modesty of women as compared to last year, Indore has come up as a risky city for women. The city had recorded an increase in the number of crimes against women under different head during 2015, reveals the latest National Crime Record Bureau (NCRB) report.

Though there has been a 3.8% decrease in the number of cognizable crimes recorded in the city as compared to last year, the numbers of crime against women have significantly shot up The cases of sexual harassment have gone up from 80 in 2014 to 92 in 2015. Similarly, the cases related to insult to modesty of women have increased in the past one year. As many as 31 cases were reported in 2014 as compared to 2015 where 104 incidents have come up, said the report.

While women remain safe at office premises and other places related to work, according to reports, one woman has been assaulted on a public transportation in 2015 whereas 103 others at places other than work. The government has to create confidence in women so they could fearlessly travel in public transport and para-transit. Government of India is also discussing with Mobile Handsets manufacturers to install panic buttons in mobile phone to generate alerts in the distress. Women in most developing cities have been witnessing increasing in number of threats to urban safety and security in public transport. It should be noted that, while some of these public transport menaces takes place or occurs in different forms, many have been a reflection of the nexus of inadequate public transport and differential capability to cope with the poor quality of public transport services. Safety and criminal activities pervading public transport services in most cities, have led to increasing discourse about how to mitigate it. Most women face the threat of insecure public transport and the possibility of sexual and physical harassment among others. This mobility problem has been increased in Nigerian cities and other developing countries during the last few years.

In recent time, this causes great personal suffering, vast injuries and material damages and lost. It also places enormous burden on the livelihood of women as weaker sex in the society. It is important to mention that only few women have the ability to withstand the constraints pose by inadequate supply and management of public transport in the city. In other words, the prevailing insured or unsafe public transport and travel or mobility differentiation along gender dimension interacts closely with urban livelihoods of the concerned people, particularly the vulnerable group – women. As a result of these shortcomings and a host of others, women over the years have being victims of different crimes.India ranks 134 in 2011 among 187 countries in terms of the UNDP Human Development Index (HDI) and Gender Inequality Index (GII).

Safety in Indore, India: according to government of India reports:

Safety walking alone during daylight	55.36	Moderate
Safety walking alone during night	33.93	Low

Public transport of Indore

Indore City Bus- Indore's City Bus transport system runs through 277 km of road with a daily ridership of 55,000. Atal Indore City Transport Services Ltd, a PPP scheme operates buses and radio taxis in the city. The buses designated as City Bus operate on 27 Routesand 8 MIDI Bus routes, with 426 bus stops. The buses are color-coded into three colors: Blue, Magenta and Orange according to their route.

Indore BRTS (I BUS) – Indore BRTS is a bus rapid transit system with air-conditioned (AC) buses. Buses are equipped with services like GPS and IVR which are used to track the position of the bus with information displayed on LED displays installed at the bus stops.

Indore Magic (Nagar seva) – Indore Auto Rickshaw is a magic service for small distance travel. Daily approx 5 lakh people travel within the city.

2. Review of Literature

In Malaysia (Penang) the mass public transport is the public bus system. The public bus is considered as the lifeblood of the state economy as most urban dwellers, especially women, depend on buses to commute, for various purposes (Sham, Omar and Amat 2013). While travelling, passengers expect the buses to be user-friendly and safe for young women. passengers endorse the use technology like destination audio-visual displays in all buses to make it convenient for elderly and visually impaired people (Verma, et al. 2014). Currently, in India, 92 percent of working women feel insecure especially at night, in all the major economic centers across the country and 85 percent of women in Bangalore complained about feeling unsafe while travelling (India 2012). A study done in Chennai state that 66% of surveyed respondents had been sexually harassed while commuting (Sarkar and Partheeban 2011). Direct factors, several indirect factors also determine that Women feeling less safe While travelling in

public transport. (Delbosc and Currie 2011). Indirect factors like Service gaps influencing feeling of safety while commuting. Another study state that if more people feel unsafe on public transport, they may refuse to use it (Lynch and Atkins 1988). Fear of crime and victimization is quite widespread among women. Almost every crime survey on fears, said that fearfulness of crime is much greater in woman than men (Sideris and Fink 2008).in relation to trip purpose woman travel patterns are different than men with respect to frequency and distance of travel. An urban area or a peri-urban area, women make more complex trips than men (Babinard 2010). Public transportation is an important mode of transport, but because of fear and safety concerns women move to private modes of transport. Past studies have shown that passenger fears and concerns about safety influence their travel decisions. According to UK Department survey for Transport, an extra 10.5 % of journeys would be generated if public felt more secure while travelling and waiting at the stations (Sideris and Fink 2008). Similarly, another study shows that most women feel insecure while waiting at the bus stop, when they are not comfortable with services, when there is no indication of security and when they receive no information of the bus services (Sham, Omar and Amat 2013). Los Angeles inner-city survey state that car owners would use public buses if they are clean and safe (Sideris and Fink 2008).

3. Methodology

In order to address the issue of woman safety in public transport system in Indore, proper research methodology identification was a matter of utmost importance.

After observing, studying & travelling through various modes of public commute for several days, we went on to identify & observe several trends related to woman safety in public transport system here in Indore.A survey form was then prepared, which included several questions based on various probable problems faced by the woman while using public transport.

The questions which were included for the research purpose, related to the woman safety, were targeted to gather information about the commuters, on the basis of their -

- **Personal Background**
- **Social Conditions**
- **Economic Conditions**
- **Psychological Conditions**
- **Physical Condition**
- **Personal Experiences During Commute**

A well-structured questionnaire includes question related to socio-demographics; preferences and satisfaction level of women commuters. The form included socio demographic attributes like age, qualification, occupation, income group etc. remaining questions were prepared on Likert scale.

Then on ground survey was conducted on bus stops, road side interviews were done & responses were noted. The survey was conducted during the peak hours, at the same time of the day, for several days. Four squares were surveyed namely Bhawarkua Square, Vijay Nagar Square, c21 Square, Rajeev Gandhi Square, Palasia Square, Rasoma Square, Vishnupuri Square. The survey form was filled on the basis of answers given by the pedestrian.

Over 4500 pedestrians were surveyed during this period & 1,62,000 observation were collected. The data so collected was later on analyzed & conclusions were drawn based on the analysis results. Following two analysis has been done in this research:

1. Descriptive analysis
2. Factor analysis

4. Analysis and Results

4.1. Descriptive Analysis

Women make complex trips than men and a decent transportation service further provides prospects to women such as jobs, childcare, education and health services (Babinard 2010). The tendency to shift to private mode of transport would increase enormously if the services are found substandard and not in line with the hopes. Also, if people feel insecure while travelling then they might be fearful and might distinguish that probability of crime is high and hence choose a mode which maximizes their safety.

Table 1: below shows the how frequently women use different type of public transport in Indore.

Type of Public Transport being used by women	Percentage of women
Nagar Seva (City Van, Tata Magic)	26.7 %
City Bus	38.8%
I Bus	34.5%

Frequency of use of Public Transport	Percentage of women
Many times a day	18 %
Daily up and down	59 %
Occasionally	21 %

The sample collected shows that 59% of women use public transport daily, 21% use it occasionally and 18% use it many times a day. Questions were asked about the category of public transport that they travelled in. Respondents were asked to tick all transport system that they have used at least once. It was found that (38.8%) have travelled in city buses and 34.5% travelled in I bus and 26.7% travelled in nagar seva. Even though there are a lot of differences in the quality of these three types of public transport. Ibus in buses being the better one, more number of women travelling in I bus feel safe (84%). Only 16% of the total women feel unsafe in I bus. 97% of women feel unsafe while travelling through nagar seva and 85% of women feel unsafe in city bus. Only 41% of the total women surveyed feel they are always safe at the bus stop, while the remaining feel unsafe. So, along with public transport, women feel unsafe while waiting for their bus at the bus stop as well. Moreover, as much as 74% of the women feel unsafe while getting off the public transport due to overloading. It might be due to insufficient lighting at the bus stop or due to overloading, non-leveling of the footpaths or because the bus doesn't stop at the bus stops, so women fear that getting injured during the process. Safety at bus stops plays a vital role because it is from the bus stop that the bus journey begins. Feeling unsafe can create a negative

image about the entire bus journey which can lead to biased decision making. Not just this, women face several other problems or situations while travelling. Almost every women surveyed has faced one or the other crime (Theft of belongings, jewelry snatching, eve teasing, molestation, crime against children) while travelling. 51% women complained about theft while travelling in the bus. Only 39% of women think that staff are not helpful remaining 61% think that they are helpful. All these have a direct impact on the perception of safety which affects the number of women using public transport to travelThese issues should be addressed promptly; otherwise a large number of women will shift to unsustainable private modes.

4.1. Factor Analysis

Factor analysis is most important method which is used to reduce numerous variables into factors. All the variables under research are analysed together to extract the underlying factors. Since the survey form had 30 statements in the Likert scale format, factor analysis was considered the best method to extract the major factors. In this study, Principal Component Analysis (PCA) was used, out of the two widely used factor analysis approaches in the transportation sector: PCA and Principal Axis Factoring. A scree plot was used to determine the number of factors to be extracted. That means a scree test is used to identify the optimum number of factors that can be extracted before the amount of unique variance begins to dominate the common variance structure. the scree test is derived by plotting the latent roots against the number of factors in order of extraction, and the shape of resulting curve is used to evaluate the cut-off point. Here the concept of latent root (eigen value) is very important the concept is that only the factors having latent roots or eigen values greater than 1 are considered significant; all factors with latent roots less than 1 are considered insignificant and are discarded.

Varimax rotation method was considered best for this data because here we consider the variables are not correlated to each other. Kaiser-Meyer-Olkin Measure of Sampling Adequacy, in this case is .823, which is consider good for this analysis. An additional test, the Barrett's Test of Sphericity (sig. = 0.000), recommended conducting factor analysis confirming that factors exist. A total of 65.031% of the variability in the data sample is explained cumulatively by them. A total of 5 factors were extracted by Factor Analysis from a total of 30 exploratory variables. The factor loadings below 0.30 were suppressed using the software SPSS(IBM). Only the factor loadings which are more than 0.30 were considered to find the underlying factors. Most of the factor loadings were greater than 0.50.

These factors were named keeping the magnitude of the factor loadings that the factors attained and the extent to which the factor loadings describe the correlation between the extracted factors and the statements in table.

Table 2: Name of factors and the variance explained by them

Statements with factor loading > 0.30	Name of factor
Public transport stops are safe for young mothers and elderly ladies	
Bus stops are safe for young girl	
Bus stops are safe for women	Security
Is Public transport vehicle is stopping exactly on the public transport stop	
Is your luggage is safe in public transport	
Is separate seat available for males and females in public transport	
Have you occupy your women special seat easily at public transport	
Do public transport cannot guarantee safety of women inside the public transport	
Do you feel safe in empty public transport	
Do you feel safe at the public transport stop during night time	
Do you feel safe reaching your public transport stop from origin at night time	
There is proper light at Bus stops in the night	

Destination display system are available inside the public transport	
Feel very unsafe while reaching to the door of bus from the seat	
Do you feel unsafe while coming out of the bus due to overloading	
Is behaviors of drivers or conductor is good	Misconduct
Is staff of public transport are helpful	Behaviours
Display of information about public transport time will reduce the waiting time, that in turn will reduce the crime at public transport	
Computerized ticketing system helps to reduce the corruption	
Toilet facility are available on public transport stop	
Do you feel unsafe with co passengers	
Public transport stopping station are conveniently located	Infrastructure
Public transport information - schedule & route maps are available & reliable	convenience
Are you suspicious about your last bus stop destination	
Toilet facility is needed on public transport stop	
Drinking water are needed on public transport	
Few seats should be reserved only for young mothers or elderly or physically challenged women, not for all women	Reservation
Crimes against women are may be more in overloaded buses	
Do you feel need of separate public transport for women	Technological
Bus information is easily available through calls, SMS"s & on the Internet	assistance

A brief discussion about the factors is given below:

Factor 1: Security
It comprises the statements which signify how safe young mothers, elderly ladies and young girl feel at the bus stop while waiting for a public transport. It also includes other statements which influence how safe women feel at the bus stop, like existence of proper lighting and easy information about public transport, buses don't stop at the bus stop. The statements with highest factor loadings named as factor.

Factor 2: Misconduct Behaviors
Statements related to fear of coming out of the bus, crime at public transport, staff behaviour, availability of toilet facility at bus stops are included in this factor.

Factor 3: Infrastructure convenience
It includes the statements which are related to infrastructure like toilet facility, drinking water facility at bus stop, availability of information schedule and route maps, and statements related to convenience like location of bus stops.

Factor 4: Reservation
This factor involves statements which are related to reserved seats of young mothers and physically challenged women in the bus. Crime against women in overloaded buses.

Factor 5: Technological assistance
This is a composite factor comprises of statements which are related to technology and priority like bus information through Calls, SMS or through Internet, feel need of separate public transport for women.

5. Conclusion

In this study, investigate has been done to find how safe women feel while travelling in buses in Indore, while using different modes of public transport, namely Nagar Seva, City Bus & iBus. The analysis was carried out after conducting survey which included questions related to women's socio-demographics, women safety and security, complaint redresser system etc.

The factor analysis which was done has shown some major factors which affect women safety who use public transportation system. They are:

- Security
- Misconduct Behaviors
- Infrastructureconvenience
- Reservation
- Technological assistance

Further research work can be done by extending the study area in other cities of India as well. It would help in strengthening and providing a much wider and clearer foundation about women safety in public transport. These factors should keep in mind before planning or developing public transport stops. In Indore, these factors can be used in future public transport system like metro trains.

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