Public Transport and urban mobility: Perception of people on services of public transport in Bathinda City, Punjab, India

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Abstract

Public transport as an essential part of the socio-economic and political structure of the country plays a vital role in development of modern society. Urbanization is one of the challenges in a developing country that needs planning and provisioning of adequate transport system and facilities. The availability of good road networks and affordable small private vehiclesmotivateurban and sub-urban dwellers to the use of private vehicles. Therefore, inclination of people towards the private vehicle (two and four wheelers) has been greater as compare to public transport (buses and three wheeler). Due to rapid growth in the private vehicle in the city the role of public transport in the urban mobility of people has become crucial to understand. Thus, this study is an attempt to evaluate public transport and urban mobility in Bathinda andpeople perception about quality of public transport. Apart from this the urban travel attitude and behavior of people in making choice of public transport as their means of transportation has also been studied and discussed.

Keywords: Public transport, mobility, urbanization, quality of public transport, response of people.

Introduction

Public transport systems provide a kind of complex systems with several subsystems such as land-use patterns, demography, infrastructure, an institutional framework and a legal framework. However, the spatial and age-wise distributions of population are significant demographic factors affecting transport systems as the demographic profile determines the nature of their demand. The socio-economic contours, including the income and occupational distributions of population impact the demand for public transportation and its affordability[1]. Public transport acts as an integral part of the socio-economic and political structure of the country because in present time developmental process in the urban areas are controlled by the public transport. People living in urban areas generally depend on the transport, especially for their movements as well as of the goods. Peoples use it for day-to-day activities such as for work, education, shopping and other leisure deeds[2]. Therefore, it is vital for city for the better functioning as well as maintaining good quality of life. It is doubtless that urban transport, its infrastructure and traffic management should consist offinest integration of the means and ways of mobility with full of profound ease and comfort maintaining the socio-economic and physical incorporation of the city[3]. It is also seen as influencing the regional patterns of development, environment, economic viability and socially acceptable levels of maintaining quality of life[4]. However, developing countries are showing high urbanization growth rates due to their dramatic economic development, coupled with increased mobility and population

expansion has become a big concern[5]. No doubt, infrastructure plays a vibrant role in the enhancement of the capacity of public transport but area under roads and streets in Class I cities of developing countries is very low as compared to developed ones. In India roads and streets occupies only 16.1 percent of the total built up area while in United States it is 28.19 percent[6]. Moreover, parked vehicles, roadside hawkers, and pavement dwellers etc. are highly critical in terms of road space which make major roads and junctions convenient and comfortable in Indian cities further cause to worse situation[6]. Transportation planning is a critical element in the evolution and growth of urban areas. There are mainly two types of transportation modes found in the world; public and private, out of these two the public transportation services are important in many ways. The rapid growth and utilization of private transport is becoming a source of congestion as well as pollution in the cities. There is no doubt that private transport has become advantageous over public transport but their unprecedented growth will have unimaginable consequences. This study is an attempt to evaluate the perception of people about the public transport and the behavior of people about the choice of mode of transportation for travelling purposes.

Improvement in the quality and efficiency of the public transport is equally important to attract more people especially for private vehicles holders[7]. Carr[8](2008) and Khurshid[9] (2012) focused on the working class people who used different modes of transportation and also explained the variable such as flexibility, cost, waiting and travel time that affect the people's

choice about the modes of transportation. In addition to this, willingness and behaviors of people play a dominant role in the choice of transportation modes for traveling. The behaviors of people about the choice of modes of transportation have been changing according to income, gender, age-group etc., because woman has more social pressure. Therefore they prefer to personal vehicles, car pool or intermediate transportation rather the bus or railways (in the case of middle and high income group women). Major focus of urban transportation planners in developing countries has mainly on the accessibility to limited areas like accessibility to the work sites. The numbers of trips to the areas apart from work siteshas been exceeding in urban areas that needs proper planning so that accessibility can be increased at any point where demand lies[4].

Study Area and Objective of Study: One of the oldest and historical Bathinda city (class I) of Punjab state (India) has been selected for study. Local Planning Area (LPA) of Bathinda is situated in southern part of Punjab and also known as cotton belt of Punjab. Geographically LPA of Bathinda lies between the $30^0 4'30''$N to $30^0 21'20''$N latitude and $74^0 47'50''$E to $75^0 10'00''$ E longitude[10]. In Punjab state of India, there are 19 class I citiesand among those Bathinda is fifth largest city with more than 2.50 lakhs population. The demand for the public transport in district has increased at higher rate with the establishment of industrial, sports and institutional activities such as oil refinery, international and national stadium of cricket and hockey respectively, Central university of Punjab, Regional campus of Punjabi university and many other institutions. The demand of transport services has increased because a large numbers of students and labor class migrated from the different parts of country that needs public transport for the purpose of their daily movement. Therefore, Bathinda city was selected for the field survey to know the perception and problems related to use of public transport.

Methodology

The present study takesinto account both primary as well as secondary data. Secondary data has been collected from government, semi-government and private sources such as from the City Bus Enterprise, Punjab Roads Authority, District Transport office, books, articles, research papers, journals, magazines and internet resources. The primary data was collected from November 10, 2013 to January 5, 2014 through field survey by taking personal interviews. The interviews were

taken under varying circumstances such as taking bus rides, riding in autos and also visiting different wards of the city. Collected data were analyzed and presented using 'Likert scale' and simple descriptive statistical methods.

Results and Discussion

From Bathinda city 60 respondents were interviewed which belongs to different residential areas. Most of the respondents belong to working class or respondents who need means of transport on daily basis. The response varies with socioeconomic status of respondent, distance from the working place, nearness to bus stand/auto stand and quality of public transport. The major findings regarding perception have been discussed below:

Transportation in Bathinda: Rapid Motorization: As shown in the table-1 and figure-1 that number of registered vehicles has increased from 1, 76,563 in 2005 to 6,87,028 in 2013 and it increased at very higher growth rate that was 232.19 percent 2005-08[11]. The average registration of vehicles increased from about 5500 per month, even out of this two wheelers accounted for 70 percentage, three and four wheeler accounted for 28.5 percentage and other modes of transport like trucks, buses accounted for 1.5 percentage of the total registered vehicles in the city in the year 2013[11]. Therefore this trend shows the heavy increase of personalized vehicles ownership in the city. Apart from this the registration of vehicle increased at the higher rate than population growth rate that is 8.9 percentage in 2013 that are responsible for many problems such as road congestion, road accidents, parking problems, environmental pollution etc. in the city.

Public transportation in the city is controlled by both public and private stakeholder. Public stakeholder are Central government, State government, Municipal Corporation Board, Bathinda Development Authority (BDA), Punjab Roadways Transport Corporation (PRTC) and the private stakeholders are a group of people which includes auto-rickshaws, cycle-rickshaws, taxies etc. There are 10 city bus services operating in the city which are controlled by MCB and PRTC and it was started in June 2012. Therefore due to presence of insufficient and unorganized system of public transport in the city most of peoples use their personalized modes of transport for the intra urban movement[12]. Apart from this the intermediate modes of transport which are responsible for enhancing the problems like congestion, accidents, parking as well as pollution.

Table-1
Total Number of Registered Vehicles in Bathinda, 2005-2013

Year	Four Wheeler (Medium & Heavy)	Four Wheeler (Light Vehicles)	Three Wheeler	Two Wheeler	Others	Total	Growth Rate (total) in %
2005	4430	13,081	294	1,03,395	55,363	1,76,563	-
2008	14,950	47,229	1044	3,54,150	1,69,147	5,86,520	232.19
2012	19,429	55,305	1369	3,85,087	1,69,726	6,30,916	7.57
2013	25,131	66,130	1639	4,23,998	1,70,130	6,87,028	8.90

Source: Regional Transport Office, 2013
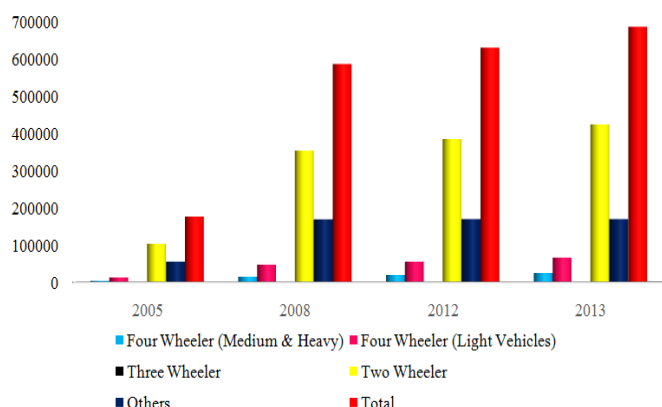
Source: Regional Transport Office, 2013
Figure-1
Number of Registred Vehicle in Bathinda; 2005 to 2013

The field work was started with the aim to know the volume of traffic on the main road of the city like Mansa road, Dabwali road and the Guru Kashi Marg (table-2 and figure-2) during the peak hour traffic. Peak hour timing for this survey was selected on the basis of personal observation of traffic rush on different roads. Purpose was to see the share of public transport in mobility of people on three different roads. Timing and duration for the count has varied. Data reveals the role of public transport for the people of Bathinda city. Buses or other large vehicles run carrying passengers from 50 to 100 per ride on average is recorded in survey. During the peak hours large buses carry more than 4000 persons while more numbers of small vehicles pass during that hour and transport 3 persons per ride on an average. Peak hour timing for this survey was selected based on the observation of traffic rush on different roads. Purpose was to see the share of public transport in mobility of people on three different roads.

Table-2
Vehicles and Passengers on Three Different Roads of Bathinda (per day)

Number of vehicle passed on the Mansa roads during peak hours (8.00 am. to 10.00 a.m.)								
	Two Wheeler	**Three Wheeler**	**Four Wheeler**	**Trucks**	**Tractor**	**School Buses**	**Large Buses**	**Mini Buses**	**Total**
No. of vehicles	728	68	730	137	91	39	55	17	1865
Percentage	39.04	3.65	39.14	7.35	4.88	2.09	2.95	0.91	100
Passenger per ride	1.5	6	2.5	2	2	50	90	45	
No. of passengers transported	1092	408	1825	274	182	1950	4950	765	11446
Percentage	9.54	3.56	15.94	2.39	1.59	17.04	43.25	6.68	100

Number of vehicle passed on the Dabwali roads during peak hours(5 p.m. to 6.30 p.m.)								
	Two Wheeler	Three Wheeler	Four Wheeler	Trucks	School Buses	Large Buses	Mini Buses	Total	
No. of vehicles	690	45	800	111	11	40	12	1709	
Percentage	40.37	2.63	46.81	6.49	0.64	2.34	0.7	100	
Passenger per ride	1.5	6	2.5	2	50	90	45		
No. of passengers transported	1035	270	2000	222	550	3600	540	8217	
Percentage	12.6	3.29	24.34	2.7	6.69	43.81	6.57	100	

| Number of vehicle passed on the Guru Kashi roads during peak hours (8.00 am. to 10.00 a.m.)								
	Two Wheeler	Three Wheeler	Four Wheeler	Trucks	School Buses	Large Buses	Mini Buses	Total	
No. of vehicles	1806	229	1152	44	22	103	29	3385	
Percentage	53.35	6.76	34.03	1.3	0.65	3.04	0.86	100	
Passenger per ride	1.5	6	2.5	2	50	90	45		
No. of passengers transported	2709	1374	2880	88	1100	9270	1305	18726	
Percentage	14.47	7.34	15.4	0.47	5.87	49.5	6.97	100	

Source: Field Survey, 2013
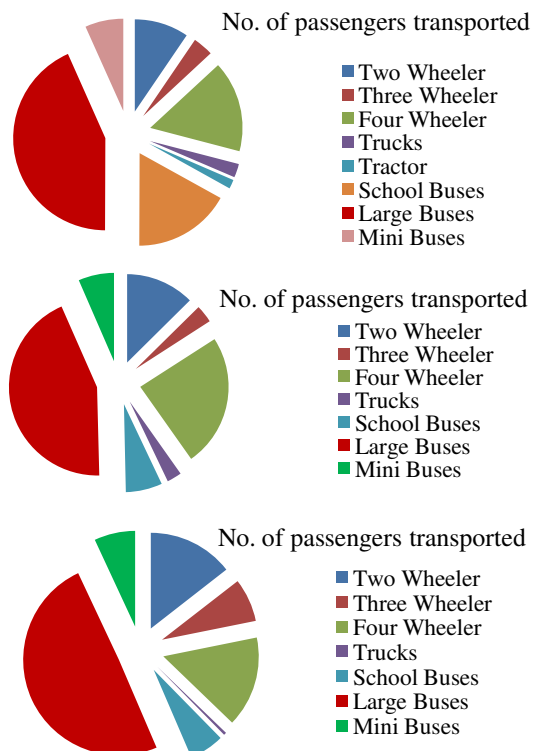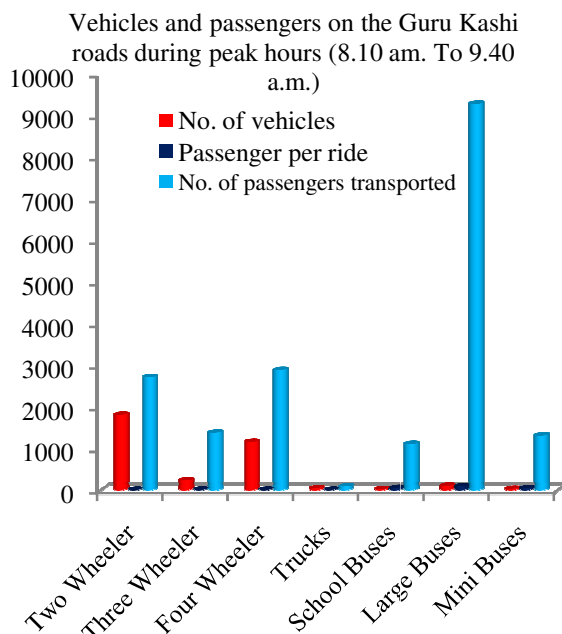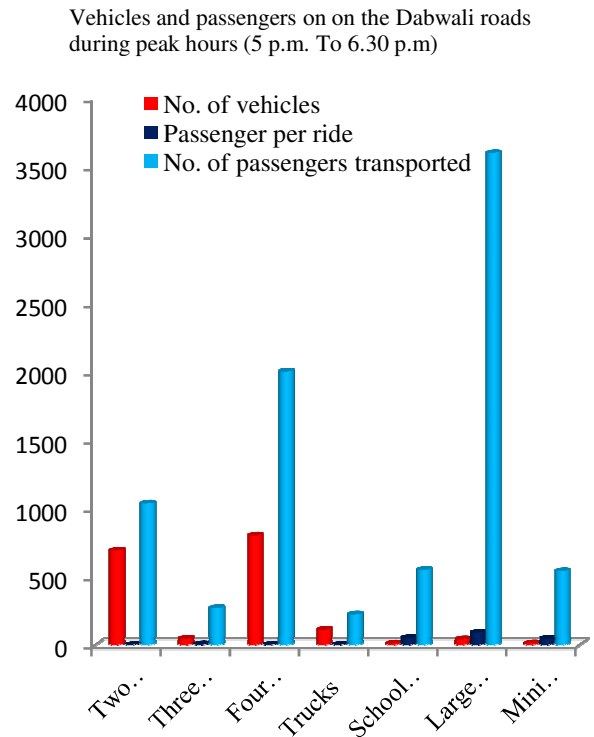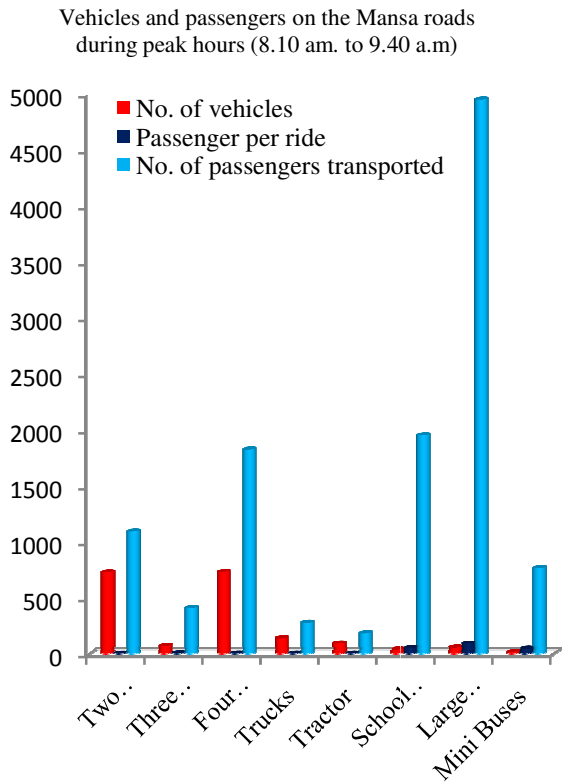
Figure-2
Vehicles and Passengers on Three Different Roads of Bathinda (per day)

In the table-2 it can be seen that the personal vehicles mainly two-wheeler and four-wheeler comprise 78 percent of total vehicle on the route and the public transport (large, mini and school buses, three wheeler) comprise for about 9.5 percent of the total vehicle. On the other hand the personal vehicle meets the mobility demand of 26 percent of the people and public transport meets the mobility demand of 70 percent of the people. After a preliminary survey on three different roads the second phase of field survey i.e. taking interviews were started from November 23, 2013. In the following sections data collected through the interview schedule has been analyzed and discussed.

Socio Economic Profile: Income: The respondents have been divided into five categories as per classification by 'Master Plan of Bathinda' report. Out of five income groups 18 percent of respondents were in the category of very low income groups, 33 percent under low income group, 20 percent under middle income group, 15 percent under high and 13 percent respondents were in very high income groups. Income is more crucial element than others because it is process that affects the behavior of respondent about the choice of modes of transportation for travelling purposes.

Education: The data related to education of the respondents revealed that 13.33 percent respondent didn't have any kind of formal education, 20 percent have only primary education, 16.66 percent have studied up to higher secondary level, 33.33 up to graduation and 16.66 percent respondents were post graduate.

Age: Out of 60 respondents 17 were in the age group of below 25, 27 were under 25 to 40 and remaining 16 were of above 40 years of age group.

Modes of Transportation Used: The study found that approximately 50 percent of the respondent use public transportation during travelling and 20 percent use private modes of transportation but during the bad weather condition about 82 percent people rely on public modes of transportation due to several factors. The reason is waterlogging like condition that appears during rainy season in the city that badly affects the mobility of people. Such statistics gives a clear understanding of the important of public transportation (figure-3).

Problems Related to Public Transportation: A set of questions were asked about the problems faced by respondent related to public transportation. When it was asked whether they get such transport modes easily most of the people (about 60 percent) replied positive. There is only one bus stand in the city which connects it with other parts of the state. Ten' City Buses' are also running inside the city which has helped people in their mobility and several autos are also running but number of auto stands is less and people don't get auto facility from every locality. Lower income group and several working class people have to travel long distance from their households to catch

buses, which is time consuming. When it was asked, will they change their mode of transportation if travel distance increase, most of the people replied 'no', which means they are highly dependent on Public transport. People who are completely dependent on public transportation have no other choice.
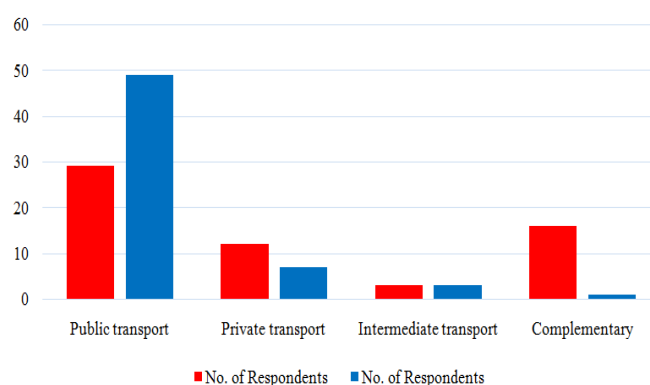
Source: Field Survey, 2013
Figure-3
Chief modes of transportation used by respondents

On the basis of routine travelling most of the respondents said that they get the bus easily and they have no problem in travel time taken by the buses and autos. When it was asked that 'if travel distance increases'will they change the mode of transportation', most of the respondent replied 'yes'. It was also observed that at the time of striking and political rally routine passenger face difficulties as they get late for their work or colleges and some time they reach home at late night which becomes unsafe for woman passengers. It was also analyzed that if the service and networking of public transportation is increased people are going to have more benefit.

People of JogiBasti, Janta Nagar, ParsaramBasti and other slum areas face lots of difficulties due to unavailability of public transport. They have to walk to catch city buses at railway station. As there is no fixed autos stand in those localities auto and rickshaw demands money very unreasonably. Wherever there is a fixed auto stand prices are also fixed but wherever it is not fixed, people don't prefer to use autos. This problem is faced by university and college students also who don't own private vehicle. During night time or at the time of early morning high charges are taken by the auto- drivers both in the areas where demand is less or high. It was also revealed from the survey that some auto drivers refused to go in the slums areas where road conditions are not good.

Perception of People about the Modes of Public Transportation: The perception of respondents about the quality of public transportation has been analyzed on the basis of income, age, gender and purpose of travelling. It is found that residents of Bathinda city like to travel in buses other than private vehicles. However, it was found that respondents were unhappy about the quality of bus services in Bathinda.

On the basis of Income: When quality of public transport as perceived by different income group people was analyses it was found that low income group people think services, networking, security, cleanliness, punctuality and prices charged are good but in the condition of crowding and travel's duration the condition is bad. Most of the lower-middle income group people also consider service, security, travel's duration, punctuality and adapted prices are good and comfort, cleanliness, crowding and are just average. Response of middle income group and upper middle income group was also similar and they think buses are always overcrowded which causes discomfort. In the case of high income group people complained a lot about the quality.

On the basis of Age: On the basis of age it was observed that mostly in the case of below 25 years of people services, networking, security, punctuality and adapted prices were considered good. For comfort and cleanliness services are average but buses and autos are overcrowded. People of 25-40 age group feel that from security, punctuality and adapted prices point of views public transport are good but rest of things are bad like services, network, comfort, cleanliness and the travel durations. People above 40 years of age feel secure but services, networking, comfort, cleanliness, travel duration and adapted prices were considered of average quality and public transport are always overcrowded and buses don't reach the destination on time.

On the basis of Gender: Male and female respondents consider services, network, security, punctuality and the adapted prices of public transport are good while in terms of comfort, cleanliness and the travel durations it is average. But the only problem the public transport has is the overcrowding.

On the basis of Purpose of Working: When quality of public transport was analyses for working class people and students again result came similar. For them public transport is good in case of network, security, punctuality and the adapted prices. But services, comfort in the buses, cleanliness and travel duration are of average quality. Crowding in the buses and autos agitate them always. Students feel that buses are not available for them at required time.

Overall Quality of Public Transport: After analyzing the data under different categories all the data about the qualities of public transportation were graded on five point Likert-type scales. People were asked to say about the qualities as: Very good=5, Good=4, Average=3, Bad=2 and Very Bad=1.

On an average people feel secure in public transport and the prices charged to them is also reasonable. So, in terms of security, punctuality and adapted prices public transport was considered good. While for service availability, networking, cleanliness and comfort it is average and with regard to crowding it is bad (table-3).

Quality of Government Owned Public Transport: Few questions were asked specifically about the government owned

public transport and it was found that most of the people rely on public transport as it is available at the time of peak hours for the working people and students. At night time services are not available, behavior of drivers and conductors is good, people feel secure in the public transport. But the only problem is that services and frequency of government buses of city buses are very less (table-4).

Table-3
Respondents Views about the Characteristics of Public Transport (Both Public and Private)

Variables	Mean	Standard Deviation
Services	3.18	.873
Networking	3.06	.899
Security	3.55	.746
Comfort	2.86	.832
Crowding	2.45	.964
Cleanliness	2.95	.891
Travel's Durations	2.95	.928
Punctuality	3.38	.958
Charged Prices	3.45	.768

Source: Field Survey, 2013

Table-4
Perceptions of People about the Public Transportation (Only Govt. buses)

Variables	Mean	Standard Deviation
Reliability on the public transportation at the peak hours	3.65	.755
Availability of public transportation at the late night	2.76	1.15
behavior of driver/ conductor	3.98	.947
Security in buses	4.61	1.07
Services or availability	2.60	.763
Frequency of buses	2.48	.676

Source: Field Survey, 2013

Characteristic of Transportation Charges: Although people are satisfied with the present transportation charges charged to them but they don't want any change (70 percent) in the charges as it will have negative impact on their economic condition. The study revealed that almost 55 percent respondents know that the fare of transportation are decided by the government, 45 percent people do not know about this.

Need of Auto Stand near the Locality: During the interview it was felt that many people of the city needs more public transport facilities in their areas. When it was asked whether they need auto stand in their locality 75 percent people replied 'yes'. The unavailability of the services affect their mobility as it becomes time consuming (figure-4). If there will be a fixed auto stand in their area they will be able to move at reasonable prices.

Source: Field survey, 2013

Figure-4
Need of auto-stand near the locality

During the interview it was felt that Bathinda city has a well distinct divide i.e., east and west Bathinda. East Bathinda is well connected and accessible to the people while west Bathinda which has most of the slum notified areas lack several facilities. Since this study had no intention to reveal the problem according to ward of the city or any other geographical or administrative unit so area wise discussion has not been given.

Conclusion

Public transportation is becoming need fordaily activities of people and in carrying goods from one place to another. These are essential for improving accessibility to employment, education, health, and other urban services for improving welfare of the urban poor and low-income households. Although number of private vehicles is increasing everywhere due to numbers of factors but the demand of public transport has never decelerated. It is particularly playing a key role in the life of poor man, because they don't buy their own personal vehicle due to the lack of financial resources. In the developing world mostly the poor people live in the outer areas of city due to cheaper availability of land than the inner parts of city. On another hand outer areas of city are served by insufficient public transport due to poor management and planning. The study analyzed quality of public transport from several bases like age, gender, income. It was found that lower income people are satisfied with the public transportation in the terms of services, networking, security, comfort and cleanliness, but they were not satisfied with condition of crowding and travel duration. The people of lower middle income class were satisfied in the terms of service, security and cleanliness but in the terms of crowding, travel duration and comfort they were neither satisfied nor unsatisfied with the service of public transportation. In addition to other income group people were mostly satisfied in the terms of service, security and networking, but are not satisfied with the level of crowding and with time of travelling. The study further found that the respondent below 25 years of age were not satisfied with the level of crowding and travel time. But on the another hand other two age groups were satisfied the time of travelling in the routine purposes due to fixing time of job or other works. On the basis of gender classification it was observed that both male and female disagreed with level of crowding in the public transportations. The 75 percent peoples says that they requires the auto stand near their locality on fixed fares on the both at night and evening.

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