

Muhammad Adeel, Anthony G.O Yeh, Zhang Feng Transportation disadvantage and activity participation in the cities of Rawalpindi and Islamabad, Pakistan

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Transportation disadvantage and activity participation in the twin cities of Rawalpindi and Islamabad, Pakistan

Muhammad Adeel
Corresponding Author
m.adeel@lse.ac.uk

Research Officer (Spatial Analyst)
LSE Cities / LSE Kuwait Programme, London School of Economics and Political Science
Houghton Street, London WC2A 2AE, United Kingdom
Tel: +44 (0)20 7852 3631

Anthony G.O Yeh
hdxugoy@hkucc.hku.hk
Chair Professor

Department of Urban Planning and Design, The University of Hong Kong (HKU),
8F, Knowels Building, Pokfulam Road Hong Kong, S.A.R., China

Dr. Zhang Feng
fzhang78@hku.hk
Assistant Professor

Department of Urban Planning and Design, The University of Hong Kong (HKU),
8F, Knowels Building, Pokfulam Road Hong Kong, S.A.R., China

Abstract

This paper explores public transport related issues and their impact on activity participation in everyday life in the Pakistani urban context. The study is based on primary data collected through questionnaire survey from four case study communities in the twin cities of Rawalpindi and Islamabad, each of whom experience reduced access to public transport. Results show that out of home activity uptake is gender segregated. Men were more likely to travel for almost all activities. They were also more likely to either walk or use public transport for daily activity participation. On the other hand, women participated less frequently in the out of home activities. They were more likely to use personal automobile as well. Quantitative analyses highlight that transport related issues such as the financial costs of travel, availability and quality of public transport played a major role in shaping individual's activity participation. People often cut down their activities that required the use of motorized, particularly public transport. Women appeared to be additionally disadvantaged due to limited access to economic resources and increased reliance on personal means of transportation in the study area.

Keywords: Transport policy, Public transport, Activity participation, Poverty, Social exclusion, Pakistan

1. BACKGROUND

Social exclusion is a theoretical concept that acknowledges the undesired alienation of certain individuals from their society, and examines its process, causes and consequences (Duffy, 1995). Alienation occurs when people are unable to participate in activities such as employment, education, healthcare and leisure, which are normal activities to others in their own society. This will lead to low quality of life and reduced wellbeing of the disadvantages (Levitas et al., 2007). The concept also

recognizes that its causes lie with the individuals, the society or even with the state (Sen, 2000). Poverty is often the central reason behind it (Barry, 1998, Room, 1995). But, non-economic factors, such as exclusionary practices, play a significant and decisive in creating and prolonging the situation (Kabeer, 2000). Due to its broad, dynamic and context specific nature, authors agree that it is difficult to quantitatively 'measure' exclusion as the human needs, abilities and standards of participation vary across individuals and societies (Percy-Smith, 2000). Nevertheless, in a comparative sense, a state of reduced participation and a limited material welfare remain its defining factors. At present, social exclusion is a well-researched policy concept that has reached from Europe to the developing countries where majority of population can be termed as excluded due to widespread poverty and the alienation of individuals due to social customs and practices (De Haan and Maxwell, 1998, Beall, 2002).

The study of transport as 'the' cause of exclusion began to emerge in the late 1990s from the UK and has spread across the world in fifteen years or so. The influential work on the subject highlights that individual's accessibility, mobility and activity participation are often constrained by a number of technical or 'moral' shortcomings in the land use and transport systems, other than their ability to pay for motorized mobility (Hine and Mitchell, 2003, Hine and Mitchell, 2001). Transport related exclusion does not only reduce the individual's welfare by decreasing their physical mobility (Rosier and McDonald, 2011, Lucas, 2004b), it also results in 'limited horizons' as people are not psychologically able to look beyond their local boundaries and reach out to the opportunities in wider spatial context (Lucas, 2004a). Various approaches such as 'accessibility planning' (Social Exclusion Unit, 2003), free or concessionary fares, demand responsive transport and promoting virtual mobility have been suggested and often applied to improve the fragile 'connections' between vulnerable population and their life-line activities (Kenyon et al., 2002, Grieco et al., 2000). Although one might describe the agenda of transport related exclusion as a mobility focused and short term strategy to address a larger issue of social exclusion (Kenyon, 2003), the concept remain an important aspect of wider debate on access and inequality, as it aims to provide viable solutions to the suppressed mobility and promotes accessible public transportation for the success of social policy (Kenyon, 2012, Currie et al., 2007).

In the global south, most of the limited work has been done in South American (Delmelle and Casas, 2012) and African contexts (Porter, 2007, Porter, 2002, Porter, 2013, Lucas, 2011). Literature from the Asian continent, particularly from South Asia, remains wanting where the issues of transport and exclusion are faced by majority of residents (Elias et al. 2015, Currie, 2011, Gakenheimer, 2006, World Bank, 2004, Lucas 2012). The limited available literature in Asian context mainly comes from India and it is mostly focused on work related to travel and explores the mobility behavior of the poor, women or specific spatial locations such as squatter residents (Tiwari, 2002, Srinivasan and Rogers, 2005, Astrop, 1996). While the remaining regions of South Asia have been rarely discussed, none of the work in Asian context has particularly explored the role of transportation disadvantage in wider activity participation perspective. In case of Pakistan, two major reasons behind this lack of attention are a) a limited focus on social exclusion and activity participation perspective in government policies and b) a deregulated market where financial viability - rather than social needs of its users - drive the provision of public transport (Adeel et al., 2014b, Adeel et al., 2014a, Imran, 2010). Literature on the Asian experiences in transport disadvantage and social exclusion indicates the links between the two constructs along the lines of gender, income and location based disadvantages (Elias et al. 2011, Mumtaz, 2003, De Haan and Maxwell, 1998, Turner and Fouracre, 1995). Widespread issues related to poverty, ghettoization, underdevelopment and gender gaps exacerbate the already existing issues of transport related exclusion in the growing metropolitan areas in the South Asian countries.

Work on transport related exclusion has used a mix of quantitative and qualitative approaches for the examination of public transport accessibility (Church et al., 2000, Blair et al., 2013, Currie et al., 2010, Delbosc and Currie, 2011), individual space time accessibility (Neutens et al., 2011, Miller, 2003), individual activity spaces (Schönfelder and Axhausen, 2003, Kamruzzaman and Hine, 2012, Kamruzzaman and Hine, 2011) and travel behavior (Dodson, 2006, Lucas et al., 2013, Mattson, 2012). The limited, yet vivid, volume of qualitative work (or with substantial qualitative component) on the topic has used techniques such as focus groups (Lucas, 2011), ethnography (Rose et al., 2009, Ureta, 2008) and other less used research methods such as Q-Methodology (Rajé, 2007) to sort out the vulnerable population's ideas and feelings about the intensity of the issue.

As the concept of social exclusion focuses on activity participation, transport related exclusion should highlight the role of transport in fulfilling and/or limiting the activity participation across vulnerable groups (Hodgson and Turner, 2003). An objective analysis of revealed activity participation as a determinant of transport related exclusion is relatively scarce and that is also for a small range of activities. For example, Farber et al. (2010) examines the inequalities in shopping activity participation caused by various personal and transport related constraints as a potential indicator of exclusion. In another study, that used two-day long dataset of 1994 Household Travel Survey from Portland, Farber and Páez (2009) empirically demonstrate that the reliance on automobile significantly reduced frequency and range of social activities among the respondents. In their study on discretionary activity participation among disabled Canadian adults, (Páez and Farber, 2012) report significant influence of various transportation disadvantage related variables on revealed frequency of discretionary activity participation, and their 'desire' of increasing participation as an indicator of social exclusion. Their study takes into account the activity participation over a period of month.

It seems that activity participation when measured in short periods such as daily levels, becomes less effective in untying the broader exclusionary processes as the window of observation period remains very small (Hine, 2007). People may not participate in all activities daily or may travel less frequently, but still be able to spend more time over longer study periods in activities by increasing their activity duration (Hamermesh and Pfann, 2005). The present state of knowledge needs more studies that take into account long term activity participation usually over multiple days, weeks or even months, to comment on the state of activity participation. However, the generally available datasets used in transportation literature barely collect multiple day diaries of mobility behavior.

2. STUDY OBJECTIVES

This paper aims to explore the role of socioeconomic and transport related factors that influence the frequency of social and recreational travel among Pakistani men and women living in areas with reduced access to public transport. More generally, the study explores the pattern of activity travel and mode choice across men and women and specifically explores the following three questions: 1) what is the long term pattern of activity participation and mode choice across Pakistani men and women? 2) Do the individual and locational disadvantages of access to transport affect the frequency of activity participation in social and recreational activities? 3) Whether these disadvantages have a similar effect across activities?

The empirical work reported here is not a statistical representative of the masses by any means. Its primary purpose is to put forward the broad picture regarding the impact of transportation issues on individual's activity participation. We build on the wider international debate to examine transport related exclusion in the Pakistani urban context. The lack of literature on the links between transport disadvantage and activity participation in the developing countries context, coupled with the vast

yet underreported gender differences in mobility and access to resources, make us to start the debate with somewhat exploratory standpoint. Lack of data availability further contributes to the narrow margin of 'new' work. This study aims to provide a firsthand look on the links between transport disadvantage and long term discretionary activity participation in a less researched socio-spatial context of Pakistani cities. Our research compliments the exiting literature by providing unique insights regarding the role of socioeconomic, spatial and the transport related circumstances in shaping individual's mobility and activity participation.

3. CONCEPTUAL FRAMEWORK

This study builds on the conceptual relationship between transport disadvantage and social exclusion from the earlier works by Páez and Farber (2012) and Lucas (2012). According to Páez and Farber (2012), mobility leads to activity participation (inclusion) and the relationship is mediated by accessibility. Whereas mobility itself is shaped by factors related to personal, economical and living space that interact with each other at various levels (Páez and Farber, 2012: p. 4). In the second conceptualization of the relationship between transport and social exclusion, Lucas (2012) sees that social and transport disadvantages combine to create transport poverty and each of the three elements may lead to inaccessibility to essential services, potentially resulting in exclusion and inequalities in one's own social, cultural and governmental contexts. While the authors of first framework take social and transportation issues in broader personal and housing contexts whereas the second conceptualization makes an implicit reference to activity participation as a cause of exclusion. This study combines the two concepts in one structure (Figure 1) so as to take into account social and transport related disadvantages of Lucas (2012) and activity participation of Páez and Farber (2012) that are shaped by one's local socioeconomic, cultural, political and spatiotemporal contexts. I further add here that 'Space and time' are also a significant component of the broader context that is 'external' to humans, and have a significant influence on the phenomenon. Transport disadvantage and social exclusion both vary in space and time between as well as within individual and social groups under study.

In sum, we contend that social disadvantage, which is described by personal and household socioeconomic status, and transport disadvantage, which is explained by access to land use and public transport resources, interact with each other to create transport poverty. All three elements lead to reduced spatial mobility and thus reduced accessibility and limited activity participation, resulting in generating new or exacerbating the existing level of exclusion.

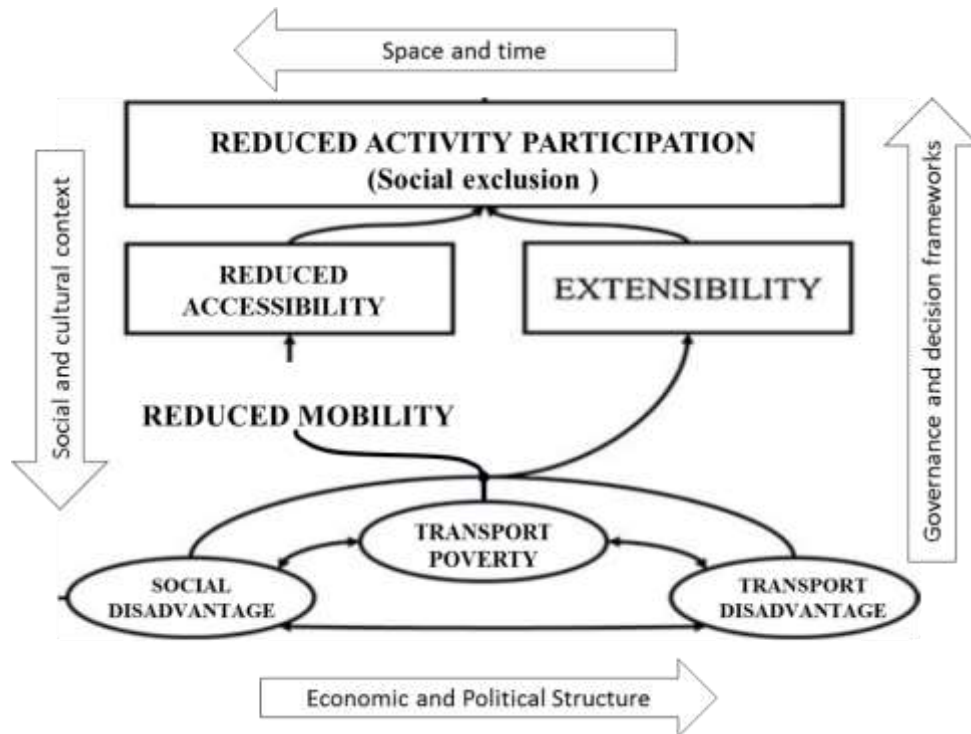


Figure 1: An activity based perspective on the relationship between transport disadvantage and social exclusion: Based on (Páez and Farber, 2012) (for variables in rectangles and overall flows) and Lucas (2012) (for broad contexts given in arrows and variables in oval figures) with the addition of the concept of reduced mobility

Extensibility is undoubtedly a significant alternative to physical accessibility. However, this study limits the debate to mobility based activity participation. It might be useful to mention that in developing societies, such as Pakistan, current levels of e-participation remain limited and socially disadvantaged are less likely to have an e-footprint due to their limited material welfare and lack of required infrastructure.

4. DATA, STUDY AREAS AND METHODS

The study uses a case study approach by collecting primary data from four case study sites, from the cities of Rawalpindi and Islamabad, which have reduced access to public transport system. Two sites were selected from each city, one housing the urban poor and the other housing well off residents. The selection of the case study sites was based on the local knowledge of the first author as a consulting urban planner with local planning authorities as well as being a resident of Rawalpindi for many years.

Profile of the study area

The twin cities of Rawalpindi and Islamabad form the third largest metropolitan area in Pakistan that houses a population of approximately 1.8 million in an area of 278 km² (NTRC, 2006, RDA, 2013). Rawalpindi is a typical example of mix use, high-density Asian cities. Whereas, Islamabad, the national capital planned in 1960s, is as a medium density administrative and residential settlement. The Rawalpindi Islamabad Metropolitan Area (RIMA) is often seen as one urban agglomeration. Approximately, 70,000 workers and students commute daily between the two cities (CDA, 2012). RIMA's public transport network was planned in early 1980s and even today retains its original alignment (Figure 2).

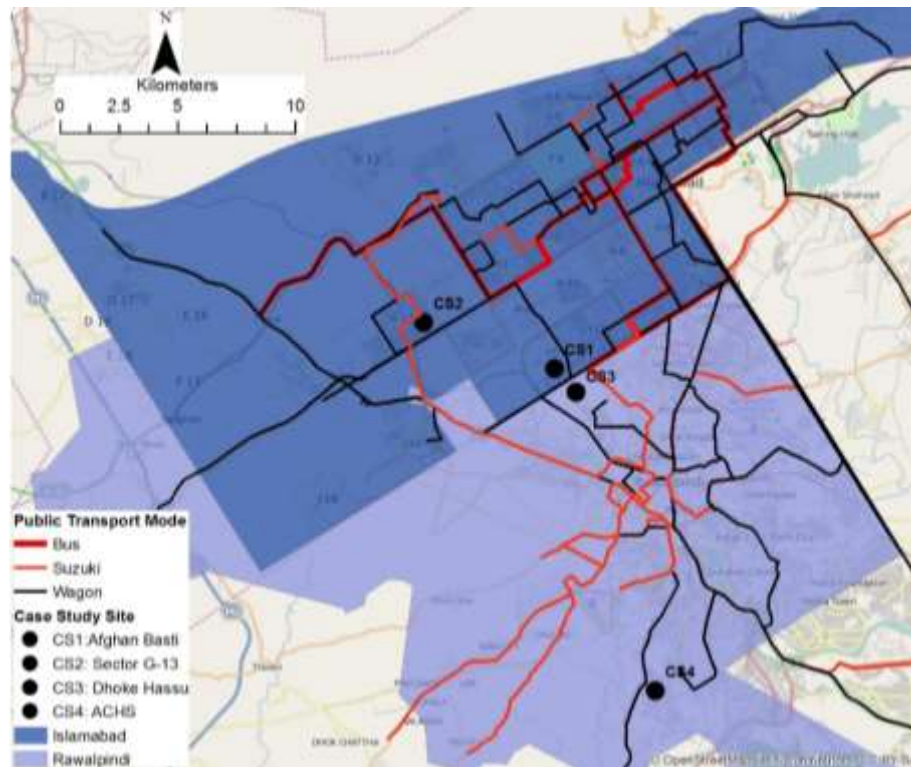


Figure 2: Map of built up areas and public transport route network in the twin cities of Rawalpindi and Islamabad (Source: Field survey by first author, Base map: ESRI ArcGIS Online)

Currently, 52 out of total 89 planned public transport routes in RIMA are inactive due to low ridership (Adeel et al., 2014b). Lack of public transport availability has given rise to paratransit services of Quinqi rickshaw in Rawalpindi which carries high risk of road accidents (Haider, 2014, Haider and Badami, 2005). The quality of existing public transport service also remains inadequate. Approximately 95% of the transport fleet is made up of 12-seat Suzuki and 18-seat Wagon vehicles and buses operate along a couple of routes only. Travelers cannot stand inside these modes and the vehicles are particularly less suitable for women, disabled and elderly (Figure 3)(Scandiaconsult and Contrans AB, 1995). Due to low income levels, affordability of public transport also remains a major problem for RIMA residents (NTRC, 2006, RDA, 1994).



Figure 3: Public transport modes in the Twin Cities of Rawalpindi and Islamabad, Pakistan

Table 1 below describes the salient characteristics of the case study sites where questionnaire surveys were carried out. **Site 1, Afghan Basti**, is the largest squatter settlement of Islamabad (AHKRC, 2009). Its residents work as laborers in nearby markets and are the poorest in RIMA (The Nation, 2012). There are no schools, clinics, markets or other public services nearby and the settlement also lacks access to public transport network, bus stops and pedestrian infrastructure (NTRC, 2013, The Express Tribune, 2014b).

Site 2, G-13, is a newly developed residential sector of Islamabad that houses middle and high income population. The site is located approximately two kilometer away from the built up area and lacks the provision of basic services such as schools, clinics, park and community center (The Dawn, 2012). Public transport does not serve the entire sector and its availability remains thin during off peak hours.

Site 3, Dhok Hassu, is a high density, mixed use residential neighborhood of urban poor in Rawalpindi. Transport supply remains low here and residents complain for long waiting times, over charging and frequent misbehavior by the transport operators (The Express Tribune, 2014a).

Site 4, Abad Cooperative Housing Society (ACHS), is one of the largest suburban gated communities of Rawalpindi. The site faces limited access to higher order services such as colleges, banks and retail stores. Its residents need to walk a considerable distance for the nearest bus stop. Travel to and from ACHS is more problematic for women, young, elderly and students (RDA, 1994, RDA, 1993).

Table 1 Salient characteristics of the case study sites

	Afghan Basti	G-13	Dhok Hassu	ACHS
City	Islamabad	Islamabad	Rawalpindi	Rawalpindi
Status	Squatter settlement	Planned residential	Urban slum	Planned gated community
Location	Southern side, near employment opportunities	Western side, away from the developed area	Western side, close to the city center	Southern side, in low density suburbs
Income level	Low	Middle and high	Low	Middle and high
Size (km ²) (approx.)	2	4	2	½
Population (2014)	8,000	5,000	36,000	5,000
Year started	Early 2000s	Early 2010s	1960s	1990s

Data collection

The survey questionnaire used in this study comprised of various closed and open ended questions that sought information on respondent's socioeconomic status, how often they participated in an activity outside home, their mode and duration of travel, perceived level of difficulties with public transport; and their opinion whether (and how) transportation issues restricted their activity participation or not? The questionnaire recorded individual activity participation in the following nine activity categories;

- I. Work
- II. Education
- III. Shopping
- IV. Healthcare
- V. Social
- VI. Recreational
- VII. Cultural
- VIII. Religious
- IX. Political

The respondents were asked whether they participate in any of the nine activities or not. If the respondent positively replied to the activity, the frequency of activity was recorded in following time scales;

- I. Daily
- II. Twice weekly
- III. Weekly
- IV. Twice a month
- V. Monthly
- VI. Occasionally
- VII. Not Applicable/ Do not know

A sample size of 240 respondents was equally divided between men and women across four study sites. Adults who were present in the local streets and public places (such as community centers) during survey periods, were approached randomly and asked for their willingness to participate in the survey. Only those respondents who reported being a local resident of the site were interviewed. Data collection took place between December 2013 and January 2014. The survey forms were digitized and analyzed in STATA 13.

Methods of analysis

After detailing the long term activity travel behavior and transport related issues, the study examines the effect of socioeconomic characteristics and transportation issues on individual's mode choice and the frequency of participation in social and recreational activities.

Respondent's usual mode of travel is examined using a binary logit model that measures their probability of using public transport versus private automobile. Frequency of participation in social and recreational activities is examined through Zero Inflated Negative Binomial Regression (ZINB). Our data shows that a large portion of respondents participated less frequently in these activities. Respondents who participated in an activity after a month's gap were allocated '0' activity frequency or otherwise the average number of times a respondent would have travelled over a month. Use of ZINB model provided additional insights into the 'lack of participation' by computing a binary logit model for zeros in the data.

Models of mode choice and activity frequency were run with various combinations of predictor variables and we report the best appropriate model in the results section. The results provide a thorough understanding of how transport disadvantage shapes activity travel behavior in the study area.

5. RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

In the final completed sample of the survey (n=239), the least number of questionnaires were from Afghan Basti (22%) and most from G-13 (28%). Women constituted 43% of the total sample, with lowest representation of 37 % in Afghan Basti and highest of 48 % in ACHS. This is mainly due to the lack of response, privacy and language, particularly in the Afghan Basti site.

On the main activity of respondents, 52% reported being employed, 10% as students, 14% as homemakers and 24% reported being free-timers who did not have any specific activity. Women constituted all the homemakers and three quarters of free timer's respondents. Of all respondents, approximately 80% aged between 18 and 45 years whereas 65% reported being married. Majority of young and married respondents were women. On education level, 28% population was illiterate, 12% had primary education and 30% reported having matriculation and graduation degrees, each. Nearly 63% respondents had a monthly household income below Rs.¹ 30,000 (US\$294), around 30% reported income between Rs. 30,000 to 100,000 (US\$294 to US\$980) and remaining 7% reported earning more than that. On household vehicle ownership, 45% did not own any vehicle, 36% reported having a motorcycle, 32% reporting owning a car while 9% reported having a bicycle. Women and those living in case study sites of Afghan Basti and Dhok Hassu were more likely to report lower education levels, reduced personal income and inability to drive household automobiles.

¹ Rs. denotes Pakistan Rupee, 1 US \$ = 102 Rs. in May 2014 (approximately)

Activity travel behavior in case study sites

Frequency of activity travel

It is well known that activity participation is a highly gendered phenomenon in Pakistan (World Bank, 2005). Women are increasingly concentrated in homemaking roles and very few travel to work or education due to a traditional patriarchal system where men are considered breadwinners while female take the role of homemakers. Women participation in public activities like religious, cultural and political activities also remains negligible due to the traditional gender based division of public and private spaces in Pakistani society. Household maintenance, personal care, social and recreational activities are the usual activities in which both men and women participate (Khan, 1999).

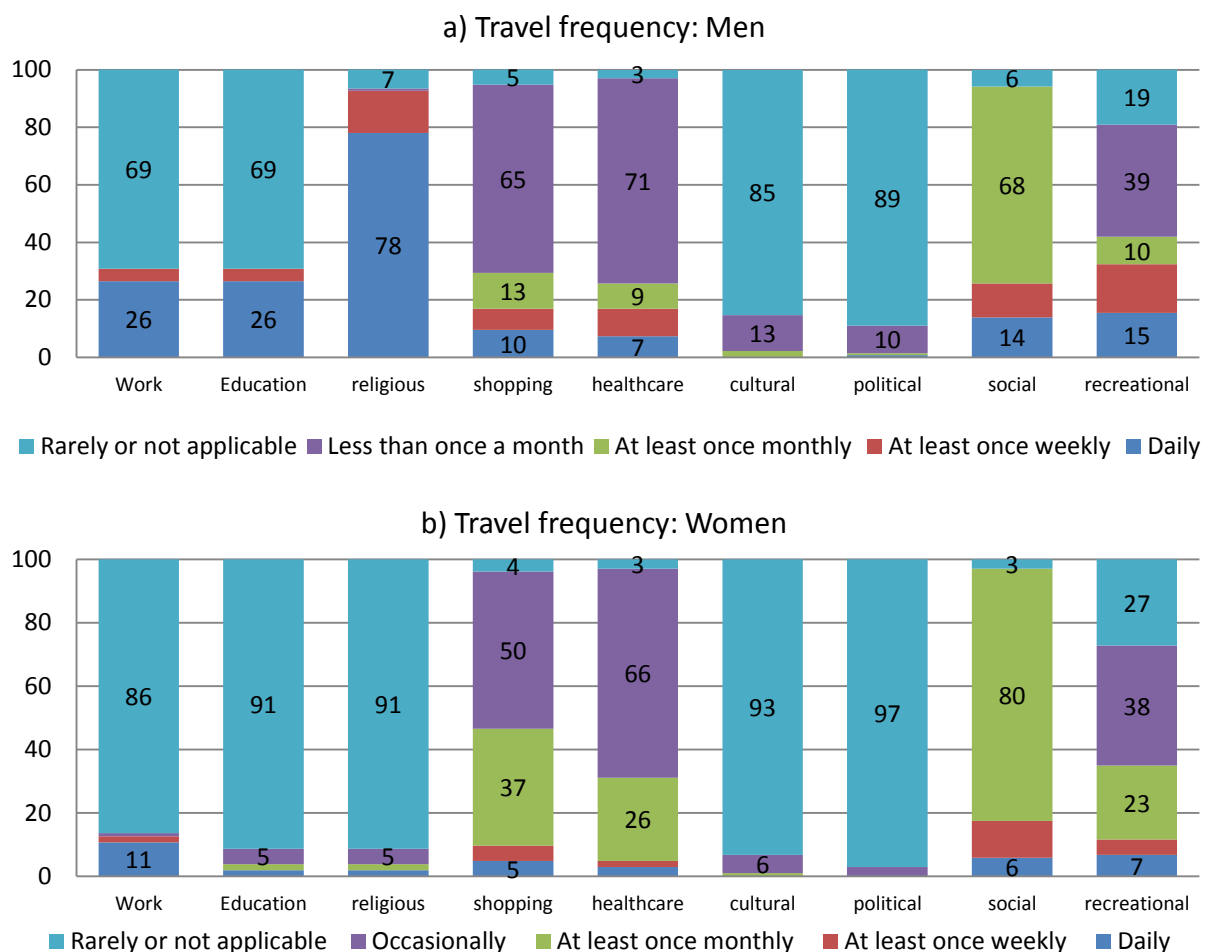


Figure 4: Frequency of activity participation

The results of the survey in Figure 4 confirm that, as compared to women, men travelled more frequently for most of the activities. Approximately, 26% men reported travelling daily for work and education, as compared to 11 % and 2 % women reporting so, respectively. Nearly 78 % men, but only 2% women, reported daily travel for religious activities. On social and recreational activity participation, 14 and 15% men reported travelling daily as compared to only 6 and 7% women, respectively. However, women reported frequent travelling for shopping and healthcare purposes (47% and 26 %, respectively) as compared to men (30 % and 26 %, respectively).

Mode choice

Figure 5 presents gender differences in mode choice by the type of activity. On active travel, men were more likely to report walking as compared to women. Nearly 96 % men reported walking to religious activities as compared to 62% women. Approximately, 58% men respondents, mostly from Afghan Basti and Dhok Hassu sites, reported walking to work as compared to only 8% women. Similarly, 57% and 48% men reported walking to healthcare and recreational activities as compared to 37% and 19% women, respectively.

On overall mode choice, women were more likely to use personal automobile than using public transport, for activities other than religious purposes. Whereas men were more likely to use public transport than using personal automobiles. Among all motorized trips, women share of personal automobile based trips was largest for travel related to work (82%) and education (77 %) that was more than twice than that of men (34% for both activities). For social and recreational activities, 41% and 48% women reported using personal automobile as compared to 29% and 31% men, respectively. The gender differences in share of public transport based trips are relatively smaller and men were more likely to use public transport than women.

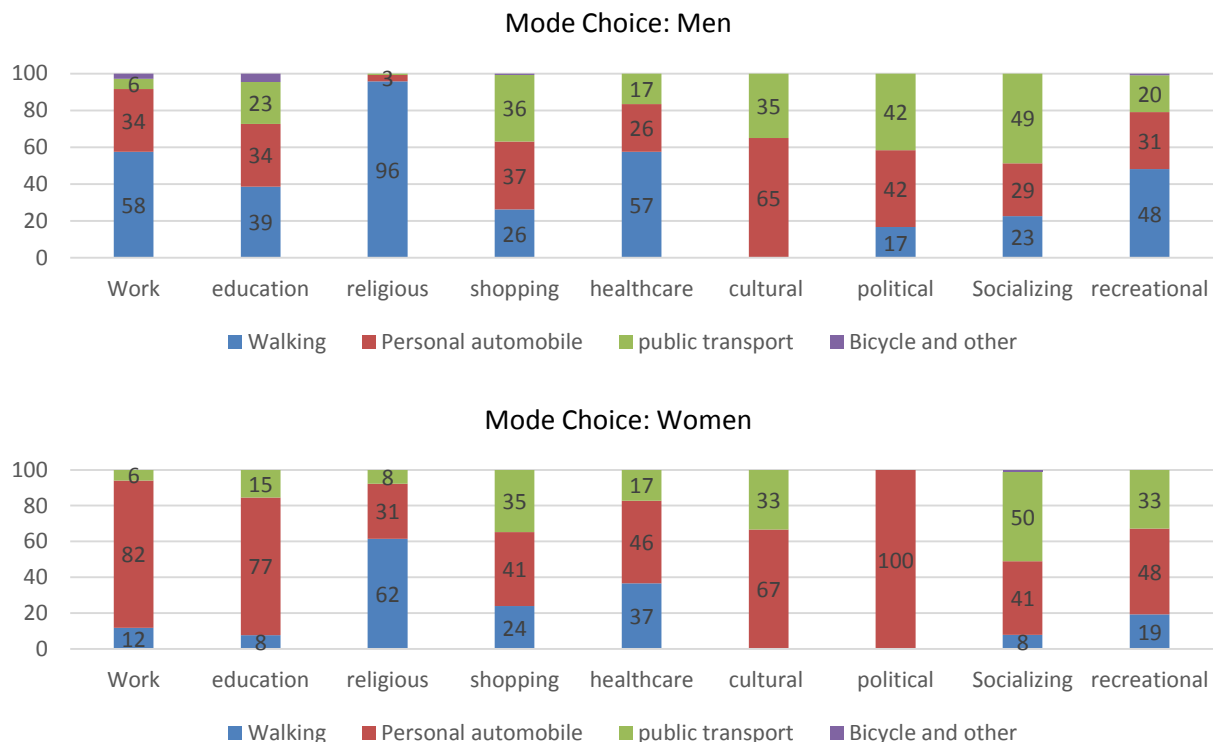


Figure 5: Mode choice by type of activity

The study further asked the respondents about their 'usual mode of transport' in three options: personal automobile, public transport or walk. Of all, 48 % reported personal automobile and 50 % reported public transport and only 2% reported walking as their usual mode of transportation.

Table 2 presents the results of logit model of usual mode choice (personal automobile versus public transport). Results show that, among men, those without automobile at home or belonging to poor households with monthly income below Rs. 30,000 (US\$294) were more likely to use public transport. Whereas among women, additionally those having higher education, employed, married, reporting issues of long waiting time and reduced accessibility to destination by public transport or

living in ACHS case study site were more likely to use personal automobile as compared to the public transport. Results highlight that as compared to men, Pakistani women are more sensitive to transport related issues for their mode choices.

Table 2: Logit model of usual mode of transport: public transport versus private

<i>Use of public transport</i>	Women					Men				
	Coef.	Std.Er.	z	P>z	Sig	Coef.	Std.Er.	z	P>z	Sig
Poor (monthly income < Rs. 30,000 (US\$294))	2.012	0.931	2.160	0.031	*	1.141	0.577	1.980	0.048	*
Owns motorcycle	-4.997	1.370	-3.650	0.000	***	-1.723	0.505	-3.410	0.001	**
Married	-3.514	1.277	-2.750	0.006	**	0.691	0.477	1.450	0.148	
Locality (Reference: Afghan Basti, Islamabad)										
G-13/1 Islamabad	-1.402	1.383	-1.010	0.311		-0.788	0.727	-1.080	0.278	
Dhok Hassu	-0.594	1.305	-0.450	0.649		-0.378	0.709	-0.530	0.594	
ACHS	-5.075	1.615	-3.140	0.002	**	0.274	0.745	0.370	0.713	
Education	-0.464	0.211	-2.200	0.028	*	0.024	0.082	0.290	0.769	
Public transport is too slow	0.514	0.285	1.800	0.071	.	-0.104	0.141	-0.730	0.463	
Transport Expenditures	0.001	0.001	-0.490	0.626		0.001	0.001	-1.940	0.052	*
Constant	2.943	1.649	1.780	0.074	*	0.706	0.995	0.710	0.048	*
Test statistics										
Number of obs.	102					131				
LR chi2(12)	85.2					48.7				
Prob > chi2	0.0000					0.0000				
Log likelihood	-27.350					-65.680				
Pseudo R2	0.609					0.270				

Key: '.' p<.1; '*' p<.05; ** p<.01; *** p<.001

While the number of women in education and employment activities is increasing with time, it seems that urban women are increasingly becoming personal automobiles dependent. The inability of current public transport system to meet women mobility needs has a significant part in forcing the working and student women (and their families) to rely on personal means of transportation for their socially acceptable mobility. In the context of reduced household vehicle ownership and transportation affordability, coupled with social constraints on mode choice (e.g. women are not allowed to drive motorcycles or bicycles), increased personal automobile dependency of women potentially limits their activity choices and frequency of participation.

Cost of mobility

The survey results show that household transportation expenditures increase constantly with the increase in income level. Low income households spent less than Rs. 3,000 (US\$29) per month in transportation costs, except those living in the suburban site of ACHS who reported spending Rs. 5,000 (US\$49) a month (Figure 6). These expenses made up to 15% of their monthly income in Dhok Hassu, a relatively higher share of 21 % in Afghan Basti and G-13 and further higher share of 24 % in ACHS. Middle income households spent around Rs. 9,000 (US\$88) in monthly transportation costs that constituted 14 to 17% of monthly income in all case study sites. High income residents earning more than Rs. 100,000 (US\$980) per month, all of whom were residing in G-13 and ACHS, reported spending Rs. 16,500 to 22,000 (US\$161 to US\$215) monthly in transportation that made up 10% of their income in G-13 and much higher 17% of monthly income in the suburban site of ACHS.

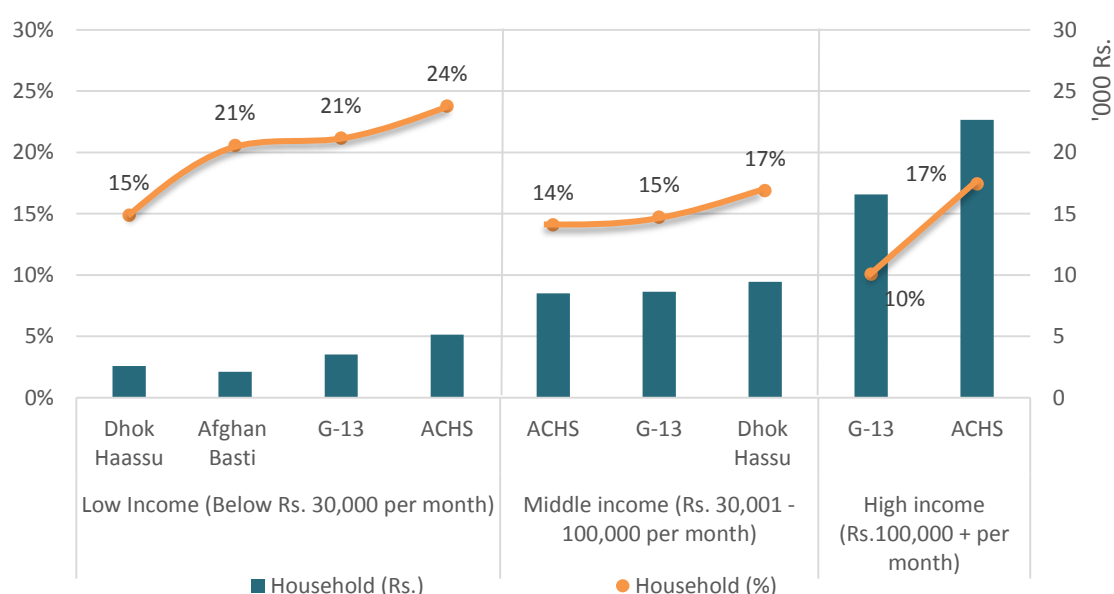


Figure 6: Monthly households transport expenditures

The findings confirm that the affordability of transportation presents a formidable challenge for low and middle income households spent higher share of incomes on transportation as compared to the high income households. While low income population kept their transportation costs at the minimum possible levels, they still spent higher share of their income on transportation. These costs were further exacerbated in the suburban areas which face limited access to services as well as public transport.

Due to their continued dissatisfaction with the existing public transport system, the majority of the population is somehow forced to either rely on personal automobile or limit their activity participation to the minimum possible level. Discussions with the residents of Afghan Basti highlighted that they minimized transport expenditures either by finding work and activities nearby in walking distance or cutting down their automobile based travels. Yet the transportation expenditures ate up to one quarter of their household budget leaving little for spending on food and other necessities.

Issues with public transport

The study asked respondent to rank nine different issues with cost, availability and quality of public transport, from a scale of 1 to 5, representing the problem from negligible to extreme level. Not surprisingly, the cost of transportation was the top most issue expressed by 57 % respondent as an extreme or major concern (Figure 7). Only 26 % population reported transportation costs as a minor or negligible issue with public transport.

The set of issues related to the availability of public transport (distance to bus stop, availability at night, waiting at bus stop and in vehicle waiting time) was identified as the second most problematic concern. Approximately, 35% to 42% respondents expressed all four indicators of public transport availability (distance to bus stop, availability at night, waiting time at bus stop or inside the vehicle) as an extreme issue. An additional one third respondent identified these issues as a major or considerable issue. Distance to bus stop was reported as the top issue of public transport availability across all case study sites with 55 % respondents expressing it an extreme or major concern.

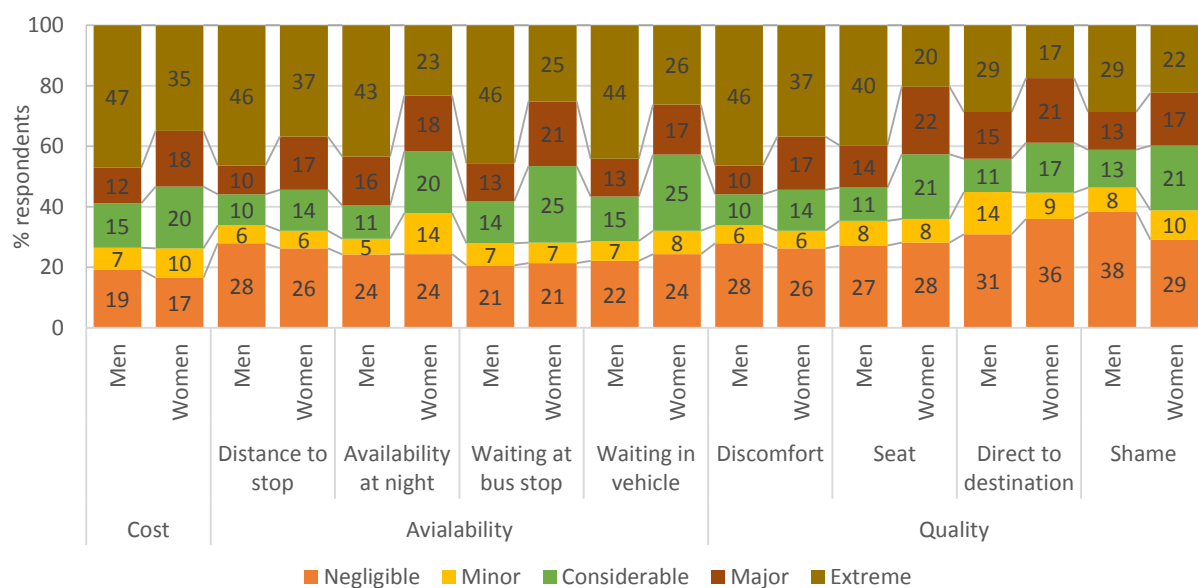


Figure 7: Issues with public transport

Issues related to the quality of public transport, (discomfort while using the transport, availability of seat direct access to destination and feeling shame in using public transport) were given the third priority issue. More than one quarter respondents identify it as extremely problematic issue and additional one quarter respondents expressed it as a major concern with public transport. We were concerned that many passengers, particularly women and educated workers, might be ashamed of travelling in the poor quality of transport service. Approximately one quarter of respondents agreed that it was an extreme issue for them while one third respondents reported it a negligible concern.

Surprisingly, men expressed 'extreme' level of issues with public transport more frequently than women. This is probably because men travelled more frequently on public transport than women and had to suffer more frequently, resulting in higher discontent with exiting public transport system. Secondly, the women respondents might have exhibited greater restraint in sharing their level of discontent with public transport because of the fear that expressing severe concerns might increase social restrictions on their use of transport system. This observation is supported by the fact that relatively greater share of women, as compared to men, reported 'major' or 'considerable' level of concerns with various issues.

How do transport disadvantage shapes discretionary activity participation?

As highlighted in the earlier sections, the majority of women participated occasionally in work, education or religious activities or did not participate at all (replied rarely or N.A). Cultural and political activity participation was even lower among respondents. In order to see how do the transport related issues shape activity participation in the study area, we focused on social and recreational activity participation that show highest levels of participation among women and are more closely linked with social exclusion in the Pakistani context.

Table 3 presents the results of ZINB models the frequency of social and recreational activity participation among survey respondents. Results in the negative binomial section explain the effect of predictor variables on the frequency of long term activity participation if the respondent is not in the zero group. Gender is a significant predictor of frequent participation for both activities. The expected frequency of activity participation among women would decrease by a factor of 0.703 and 0.706 times the expected frequency of men respondents, for social and recreational activities, respectively.

For social activity participation, those who relied on public transport were significantly less likely to make frequent trips, as compared to those who reported walking as their usual mode of transportation. Same was true for those who reported having a personal automobile at home which represents the decisive effects of transportation costs for uptaking social activities. Residents of G-13 and Dhok Hassu sites were also significantly more likely to make frequent social trips as compared to those living in Afghan Basti or suburban site of ACHS, when controlled for other variables.

Recreational activity travel was influenced by similar but relatively fewer variables. Other than being a woman, having lower income, or reliance on personal automobile for daily mobility, significantly decreased the frequency of recreational activity participation. Residents of G-13 study sites were significantly more likely to make frequent recreational trips than the reference category of Afghan Basti, probably due to their higher income and living in a planned community that provides greater recreational opportunities nearby.

Logit section of ZINB models presents the odds of being in the zero group of activity frequency i.e. the participating less than once a month. Household transportation expenditures were positively linked with the odds of being in zero group for both activities whereas trip duration exhibited a significant but opposite effect. Longer trip duration increased the odds of being in zero group for social activities while decreased the odds of being in the zero for recreational activities. As compared to Rawalpindi, living in Islamabad significantly increased the odds of being in zero group for recreational activities whereas social activities were not affected by the city of residence.

Table 3: Zero Inflated Logit Regression model for social and recreational activity participation

Frequency of travel	Social activity					Recreational activity				
	Beta	SE	z	P>z	Sig	Beta	SE	z	P>z	Sig
Negative Binomial Model										
Being women	-0.703	0.365	-1.920	0.054	*	-0.706	0.337	-2.090	0.036	*
Age	0.006	0.017	0.350	0.725		0.033	0.015	2.160	0.030	*
Monthly household income	-0.001	0.001	-1.950	0.051	*	0.001	0.000	0.570	0.570	
Area of residence (Reference: Afghan Basti)										
G-13	2.032	0.783	2.600	0.009	**	1.010	0.553	1.830	0.068	.
Dhok Hassu	1.331	0.710	1.880	0.061	.	-0.690	0.602	-1.150	0.252	
ACHS	0.533	0.790	0.670	0.500		0.148	0.621	0.240	0.811	
Mode of travel (Reference: Walking)										
Public transport	-1.414	0.617	-2.290	0.022	*	-0.719	0.464	-1.550	0.121	
Personal automobile	-0.508	0.742	-0.680	0.493		-0.717	0.391	-1.830	0.067	.
Automobile owned	-1.328	0.559	-2.380	0.017	*	-0.327	0.456	-0.720	0.473	
Constant	3.230	0.775	4.170	0.000	***	2.008	0.745	2.700	0.007	**
Inflate Model: Logit										
Household transport expenditures	-0.001	0.008	-2.680	0.007	**	-0.001	0.000	-2.170	0.030	*
Trip duration	0.015	0.005	2.870	0.004	**	-0.054	0.025	-2.180	0.029	*
Living in Islamabad	0.865	0.629	1.380	0.169		2.009	0.845	2.380	0.017	*
Constant	-0.904	0.679	-1.330	0.019	*	0.295	0.572	0.520	0.061	.
/lnalpha	0.963	0.292	3.300	0.001	**	0.699	0.220	3.18	0.001	**
alpha	3.715	0.781				2.084	0.468			
Test statistics	Vuong test of ZINB vs. NB z = 2.68 Pr>z = 0.0037					Vuong test of ZINB vs. NB z = 2.6, Pr>z = 0.0045				
	Total Obs. = 205		Log likelihood = -334.6			Total Obs. = 175		Log likelihood = -355.727		
	Non Zero obs. = 74		LR chi2 (8)= 30.66			Non Zero obs. = 85		LR chi2 (8)=31.38		
	Zero obs. = 131		Prob > chi2 = 0.0003			Zero obs. = 90		Prob > chi2 = 0.0001		

Key: '.' p<.1; '*' p<.05; ** p<.01 ; *** p<.001

As a whole, ZINB models point out that mobility issues related to access, mode choice and costs of transportation significantly affect the long term social and recreational activity participation in the study area. Gender appears to be an important determinant of the level of participation. Women are less likely to participate frequently in social and recreational activities as compared to men. This is

probably linked to the strong influence of sociocultural context on female mobility which defines (and also limits) their choice of activities and travel characteristics. Other than this, as compared to recreational activities, participation in social activities seems more sensitive to transport related disadvantages. This is probably linked with the differences in accessibility and travel needs for both activity types. For example, social activities are carried out more frequently and generally use automobiles whereas, recreational activities are carried out less frequently and are less automobile intensive (refer to fig 3 and 4). Similarly, social activities seem more constrained in space and time due increased participation of women and children which makes them more vulnerable to transportation issues such as affordability and availability of public transport. On the other hand, recreational activities are mostly carried out by men and that also in nearby places making them less space time constrained and less vulnerable to the transport related issues.

6. CONCLUSIONS AND RECOMMENDATIONS:

This paper explored the transport related issues and their impact on activity participation in everyday life in the Pakistani urban context. Data was collected through questionnaire survey from four case study sites with relatively lower level of proximity to public transport network in the twin cities of Rawalpindi Islamabad Metropolitan Area. The study found that, affordability of transportation is the toughest mobility challenge for urban residents. While cities are expanding quickly, for the majority of low and middle income groups, transportation costs are too high to be considered affordable. Household transportation expenditures are further exorbitant among residents of suburban and 'planned' localities as these areas exhibit reduced accessibility and lack of public transport. On the other hand, traditional 'unplanned' urban neighborhoods that exhibit high population densities have a mixed land use based higher walking accessibilities to majority of services but issues with reduced access to public transport prevail here as well.

The survey results show that out of home mobility and activity participation remains a gender segregated issue. Men are more likely to travel for almost all the activities but work, education and religious travel remain more frequent and men dominated activities. Women travel less often, and mostly for household maintenance (e.g. grocery shopping) and social activities (e.g. visiting relatives). Religious and recreational activities are carried out in nearby places and so mostly done through walking. For other activities, that are located at farther places, men are more likely to use public transport. While women travel remains quite low, they are more likely to use personal automobile for most of the activities. Female share of personal automobile based subsistence trips remain significantly higher than men. This is probably linked to the fact that, for the majority of women, public transport remains least acceptable option because of its quality and accessibility characteristics that are barely appropriate to their socially constrained mobility needs. Mobility issues such as long walking distances to public transport locations, travelling in congested and male dominated transport increase their risk of safety and personal security. As a result, women travel usually when necessary and often leave the discretionary activities aside. It seems that people often limit their activities that require the use of motorized transportation. Women appear additionally disadvantaged due to limited personal income and lack of access to household mobility resources. Living in suburban area further exacerbate transportation disadvantage for women and the poor because of limited availability of public transport in these areas and a general lack affordability for private motorized transport among the urban poor.

We have explored the effect of various transport related issues on social and recreational activity participation. Issues of cost, availability and quality of transport play a significant role in reducing social and leisure activity travel among lower and middle income families. It was found that, as

compared to recreational activity, social activity travel is more sensitive to transportation issues of accessibility, quality and affordability. In the context of limited information on mobility -exclusion nexus in developing countries, the results provide a useful starting point to explore the effect of various disadvantages on activity participation specifically in Pakistan and more general ally in similar developing countries elsewhere.

An important question emerges from the above analysis. Is reduced activity participation caused by exclusionary processes or a limited personal desire for activity participation? In a walking based society, where day to day needs are available within short distances, the spatial dispersion of social and recreational activities does seem to limit the desire for participation. This is particularly true for Pakistani women, who face additional social and cultural mobility constraints such as lack of walking, permission from home and need for veiling and escort during travel. We did not, however, study the quality, value and contents of the activity travel for the respondents. Therefore further research in this direction of identifying the gap between the 'needed and desired level of participation' would be desirable. Learning from activity behavior patterns, it is important to emphasize the necessity of an inclusive public transport system that considers the mobility constraints of its users, particularly related to affordability, accessibility and quality of public transport. Realizing an urban transport system from gender perspective would be more beneficial for women and their households since it will reduce women overdependence on household means of transportation and increase their independent mobility and access to services. Measures such as allocation of priority seats, bus stops and waiting areas for women and elderly can significantly reduce gender gap in mobility and activity participation. They will also help in reducing transportation expenditures and automobile ownership in the middle class population and suburban communities, benefiting both the household and society as a whole.

Note:

Afghan Basti, the poorest case study site of this paper, was demolished by the Islamabad city government in July 2015, because of land ownership issues and its residents were forced out without any financial compensation. This should not affect the findings of this paper because the site existed when the study was conducted. Currently, Islamabad houses at least ten other localities similar to Afghan Basti.

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