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Residents' Perception and Analysis of the Contemporary Neighbourhood Design Practices in Lahore, Pakistan

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Abstract

Neighbourhood design has been of special interest to the Planners and allied professionals since long. Review of the relevant literature revealed persistent debate on its size and design concepts. In the pursuit of designs for comfortable, safe and environment friendly living, the contemporary designers have presented various concepts. This paper first explores the most frequently suggested neighbourhood design features and develops a list of 21 design features locally considered as important to influence the perception of residents. It then analyzes the contemporary residential neighbourhood design practices in Lahore Pakistan using eight randomly selected neighbourhoods and questionnaire survey of nearly four hundred residents. The study finds that whilst a mix of gridiron and rectilinear patterns somewhat akin to traditional street design is in vogue in Lahore, a majority of residents is satisfied with many of the design features. However, there is a need to enhance the provisions for social interaction and safe movement of pedestrians. Further, consultations with all the stakeholders are necessary to develop a locally suitable neighbourhood design concept. Findings of this study also suggest that high level of satisfaction of the residents can be achieved more with meeting their expectations even by providing low density land sub-divisions. Consideration of prospective residents' socio-economic background and nature of development in their areas of origin are more important than simply following the design features trumpeted in the literature as good neighbourhood designs.

Key Words: Neighbourhood Design Concepts; Housing Schemes; Lahore; Pakistan.

1. Introduction

A neighbourhood may be described as a small division of a city or sub-urban area which predominantly provides a residential environment and allied facilities for a small population. The neighbourhood size in terms of population may range from 2500 to 25000 persons. But in practice, this term is used for any area comprising a group of dwelling units having identifiable boundaries and community facilities to fulfil the daily needs of residing families [3, 15]. Thus, there are no hard and fast rules for the physical size or area and population of neighbourhood.

The concept of neighbourhood with respect to its size and design has been of interest to the town planners, architects, engineers, sociologists, geographers and even for social reformers especially since Howard proposed the idea of garden city [15, 31]. Excessive use of automobiles for daily movement and suburbanization during the 20th and 21st centuries resulted in several problems. Some of those most frequently discussed in the literature on city planning and neighbourhood design include: increased distances, lack of social interaction, sense of community, and security, increased environmental pollution, and health problems etc. [6, 11, 17, 19]. Such type of problems paved the way for designing walkable or pedestrianized neighbourhoods [1, 19, 33].

Pedestrian access to neighbourhood level activities like elementary schools, health clinics, parks, playgrounds and convenience shops is often considered as an indicator of urban quality [10].

Designing pedestrianized streets, locating parks and shopping areas at walking distance may increase possibility of interaction with neighbours. Moreover, walking is found to increase social interaction within the neighbourhood [23]. However, the quality of pedestrian access as opposed to the distance to neighbourhood level public facilities is of crucial importance. If the access route is not properly designed to protect the pedestri+ans from extreme climatic conditions, particularly during hot summer, this may not encourage walking, social interaction and a sense of community. On the other hand, some studies suggest that walkability may not be directly related to the sense of community in a neighbourhood as does the purpose of walking [34].

Of course, walkability is not the only indicator of urban quality at neighbourhood level. Review of literature revealed a number of other design features which contribute to quality aspects of neighbourhoods. Thus some authors suggest that a neighbourhood unit should be socially and environmentally sustainable not only in terms of provision and location of residential accommodation, public facilities, commercial areas and utility services but also in terms of its population density [5, 9].

Whilst, high residential density may cause social problems, it enhances the accessibility of public facilities [35]. In this regards, the New Urbanism movement supports the designing of high density, mixed use walkable as well as public transport based neighbourhoods to achieve social cohesion and environmental sustainability [27, 29].

Another concept of eco-towns propagates the designing of environment friendly towns or neighbourhoods with zero-carbon buildings [2,8]. Studies highlighting the significance of various other design features can also be found in the literature, however, Box 1 presents the most frequently suggested key features of quality neighbourhood design. Research involving simply the assessment of all of these design features as gleaned from the literature in terms of provision, accessibility, and quality in a neighbourhood may not be pragmatic. As [24] found that the physical design of a built environment may have influence on the feelings, thinking and even actions of its residents.

Box 1. Most frequently suggested neighbourhood design features

Walkability
Public facilities located within 5 to 10 minute walking distance
Pedestrian friendly streets with footpaths and tree lining
Car free streets where necessary
Slow speed streets with traffic calming measures
On-street parking
Hidden parking lots
Houses having front car porches
Buildings, windows and porches close to streets
Connectivity of Streets
Hierarchy of boulevards, streets and alleys
Interconnected street grid network to distribute traffic
Properly designed main road junctions with traffic islands
Mixed Land Uses and Diversity
Mixed uses within residential blocks
Mixed sizes of residential and commercial plots and building types
Mixed used commercial cum apartment buildings
Mixed uses within buildings
Diversity of people from all income groups, ages and cultures
Maximum opportunities for social interaction
Quality Architecture and Urban Design
Central placement of civic uses and community buildings within the neighbourhood
Quality of human comfort and a sense of place in design of public areas
Quality of urban aesthetics by beautifully landscaped surroundings
Human scale architecture of public buildings
Sustainability
Minimum environmental impact of development and its operations
Minimum cooling and lighting load through careful orientation of buildings and landscaping
Use of energy efficient lighting
Use of locally manufactured energy efficient building material
Minimum waste generation and preparation of solid waste management plan
Operation and Maintenance
Self governance through community organization
Independent decision making
Generation of own financial resources for operation and maintenance of neighbourhood
Self managed operation and maintenance system of infrastructure and utility services

Source: [10, 12, 16, 22, 27 34].

Similarly, we cannot completely ignore the perception of residents about neighbourhood design features. Thus, it sounds more logical that evaluation of neighbourhoods on the basis of design features commonly found in the literature must be supplemented with the perception of residents about how far they are satisfied with certain design features of their respective neighbourhoods. This study examines the contemporary neighbourhood design practices in Lahore. For this purpose, the design pattern and circulation system of the selected neighbourhoods have been critically analyzed in the light of international design practices. In addition, the residents' perceptions about various designs features and the problems they are facing in their respective neighbourhoods have also been evaluated thus enabling us to identify improvement measures particularly in local context.

This study is believed to be of importance not only because it aims to contribute to the current debate on neighbourhood design concepts but also due to the fact that research on the current practices of residential neighbourhood design in Lahore is scanty. In the later context, the findings of this study would be of interest to neighbourhood designers, planning officials and the residents alike.

The next section describes the methods adopted and the data collected for this research. The third section introduces the case study area (Lahore) and the selected neighbourhoods. The fourth section presents critical analysis of major design components of these neighbourhoods. These are augmented with the residents' perceptions/satisfaction level about various features of their respective neighbourhoods in the following sections. The final section presents conclusion of the study.

2. Research Methodology

The premise of this paper is to determine residents' perception about the quality of neighbourhood design. For this purpose, various research articles and other sources of literature such as books and websites were studied to identify the most frequently suggested features of a good neighbourhood design. A review of the LDA record revealed that there were more than two hundred residential housing schemes/neighbourhoods in the Lahore metropolitan area. Soft copies (scanned images) of 195 private housing schemes available with the LDA were obtained [18]. The detailed layout plans of almost all of the schemes have been prepared using a mix of gridiron and rectilinear pattern.

Following this, eight neighbourhoods (locally called as private housing schemes) located towards the southern periphery of the Metropolitan City of Lahore were selected randomly. Names of the selected neighbourhoods have been kept confidential, since these are private housing schemes and disclosing the names may affect their business. The data/information pertaining to design characteristics were derived by analyzing detailed layout plans of the neighbourhoods, field observations and holding brief discussions with the members of their respective management committees. For field observations, a neighbourhood design characteristics checklist was devised which was divided into ten sections comprising of more than sixty questions. Main sections of the checklist were related to site characteristics, land use breakup and layout features, circulation system, location and provision of community facilities, commercial areas, utility services, hard and soft landscape elements etc.

A questionnaire survey of 50 residents from each of the eight neighbourhoods was planned to be conducted to know their perception/ satisfaction level about various design features of their respective neighbourhood. Simple random sampling technique was used to select the residents for interview. In this sampling technique every member of the target population has equal probability of selection [26]. As far as the sample size is concerned, though the population of case study neighbourhood varies but it is by and large homogenous in nature. Considering similarity of responses and minimum valid sample size (N=30) for normal distribution, a target of 50 interviews from each neighbourhood was set, as suggested in literature on social research methods [21]. However, some of the randomly selected residents were not willing to give their opinion, thus making a total sample size of 363 residents from 8 neighbourhoods.

The questionnaire also sought their views on the degree of social interaction, causes of little social

interaction (where applicable), and changes to be made in the neighbourhood design to improve social interaction and safe pedestrian movement. The questionnaire also included 21 important features of the neighbourhood design, mainly relating to the provision and accessibility of community facilities, provisions for pedestrians and vehicles, street furniture, soft landscape elements etc. (See Box 2). These features were identified on the basis of our extensive interaction with planners working in planning agencies of the Punjab province, communication with neighbourhood developers and informal discussions on numerous occasions with residents of planned neighbourhoods in Lahore.

Box 2. Neighbourhood design features/ community facilities studied to explore residents' perception

Community Facilities
Primary school location & access to it
Secondary school location & access to it
Health clinic location and access to it
Sub-neighbourhood cent. location & access to it
Town centre location & access to it
Arrangement of activities in town centre
Parks and Playgrounds
Provision of playgrounds
Children playground location & access to it
Neighbourhood park location & access to it
Provisions for Pedestrians and Vehicles
Provision and width of footpaths
Pedestrian crossing facilities
Measures to reduce traffic speed
Parking facility outside school
Parking facility in town centre
Street Furniture and Soft Landscape Elements
Provision of street lights
Provision of waste bins in the town centre
Landscaping of town park
Landscaping along the roads/streets
Landscaping in other public areas
Provisions for Social Interaction and Security
Provision of places for social interaction
Security arrangements within the town

Source: Authors' own construct based on literature, personal experience and discussion with residents.

Whilst many of these features are somewhat similar to those enlisted in Box 1, these are locally considered as important indicators of the quality of neighbourhood design which may influence the satisfaction level of the residents. In order to facilitate data analysis, a five point Likert scale was used to determine the satisfaction level of residents ranging from highly satisfactory to highly unsatisfactory. The overall trend of residents' perception is also determined by assigning index scores to the each satisfaction level of the interviewees. The percentages of responses against each category for each design feature of neighbourhood are presented in the form of horizontal bar charts (Figures 2-6). Since this is categorical data, the most typical summary measure for this type of data is the percentage or number of cases in each category [32]. These are helpful in comprehending the pattern of satisfaction/ perception at a glance.

3. Introduction to the Case Study Neighbourhoods

The case study neighbourhoods are situated in the city of Lahore. It is the second largest city of Pakistan (Figure 1). According to the 1981 and 1998 census, its population was 2.952 and 5.144 million respectively. The current estimated population has increased to 6.748 million [4]. This explosion of population has exponentially increased the housing demand in the city. The government's housing and planning agencies have failed to meet the existing housing demand not only in Lahore but also in the country [14]. As a corollary to this, the private sector has stepped in to develop residential neighbourhoods (housing schemes) at various locations in the periphery of the city. In order to regulate private sector residential development, the Lahore Development Authority (LDA) as the principle planning agency has been promulgating private housing schemes rules from time to time. At present, the LDA is following the Punjab Private Housing Schemes and Land Sub-division Rules 2010 [20].

The case study neighbourhoods were registered mainly during early 1980s to early 1990s, as Cooperative Housing Societies under the Cooperative Societies Act 1925 (VII of 1925). However, their detailed layout plans were submitted to and approved by the LDA after several years of their registration. It is normal to observe this lag in registration and approval of layout plan because of time consumed in raising funds, acquiring land for the neighbourhood,

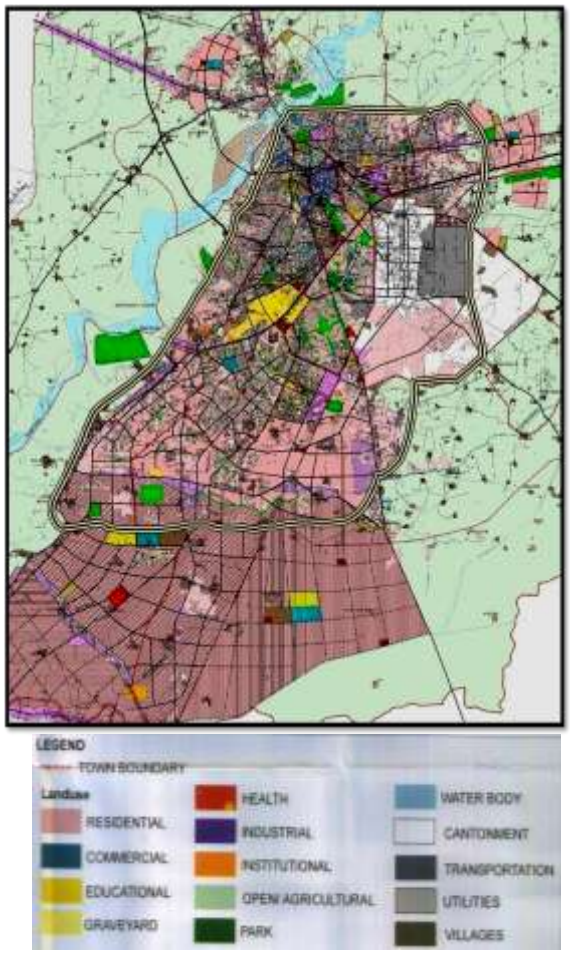

Fig. 1. Land use Map of Lahore
Source: Lahore Development Authority, 2012.

and designing process. However, these neighbourhoods have been developed on flat terrain. Regardless of their size, all these have boundary walls and security posts at their entry points thus portraying as modern gated communities. The later has gained importance in recent years due to very high security concerns in the wake of events that followed after the 9/11 incident. The approximate area of the four case study neighbourhoods (Figures 7 to 10) varies from 600 acres to 1200 acres whereas the area of the remaining four neighbourhoods (Figures 11 to 14) lies between 120 and 270 acres. The relatively large size of four of the case study neighbourhoods is because there is no restriction on maximum size in the said housing scheme Rules although these do suggest minimum area to be 100 kanal (12.5 acres). Resultantly, some of the neighbourhoods/housing schemes are spread over an area of 1000 acres (8000 kanals). In such cases, the distances within the neighbourhood are usually large and require the use of car for accessing public facilities.

The estimated design population of the large-sized four neighbourhoods ranges from 20000 to 60000 persons whereas that of other four neighbourhoods falls within the range of 2700 to 13000 persons. Thus the case study neighbourhoods can be termed low density residential development since their gross density varies from 23 to 50 persons per acre. It is pertinent to mention here that the design population has been estimated by multiplying average household size (i.e. 7 persons in urban areas of Punjab) with the total number of residential plots in each neighbourhood [4]. Moreover, the larger neighbourhoods are not yet fully colonized.

The survey data revealed that the resident population belongs to upper middle and high income class of the society. However, most of the families have shifted from old and unplanned area of Lahore and other cities of the Punjab. The variables of qualification/occupation and origin of household were included in the survey questionnaire but their analysis is not presented here, since no significant variation in the socio-economic status amongst the interviewees was observed.

4. Results and Discussion

This section first presents a critical analysis of the design pattern and circulation system within the eight randomly selected neighbourhoods situated in Lahore. The findings of the questionnaire survey of resident's perception about neighbourhood design characteristics as well as the provision and accessibility of various public facilities within their respective neighbourhoods are then discussed. As mentioned in the research methodology, a total number of 363 residents' were interviewed during this survey. The analysis of data concerning residents' perception has been shown in the form of bar charts drawn on the basis of percentage of responses to each question.

4.1 Design pattern and circulation system

In general, the layout/design pattern of selected neighbourhoods appears to be a sub-division of the area into small blocks using a mix of gridiron and

rectilinear patterns. These blocks comprise of residential plots, convenience shops, mosque and open space. Some of the blocks have also been provided with a primary school. The advantage of this sort of design pattern is that it is easy to demarcate on ground and results in minimum wastage as compared to curvilinear or other layout patterns [6, 7, 31]. Within the approximate centre of each block, an open space/park has been provided. For every two to three blocks, the open space is adjoined with a playground, primary school, mosque and convenience shops. This may be termed as sub-neighbourhood centre.

The higher order facilities are provided in the neighbourhood centre which is chiefly characterized by subdivision of land into public uses with no real essence of any design pattern. Often it is located close to the main park which is positioned in the middle of the neighbourhood and surrounded by main roads. The neighbourhood centre caters for higher order shopping in the form of a market comprising departmental stores, convenience shops and restaurants etc. The community centre or club, park/playground, society office, secondary school, private hospital and a central mosque are also situated in the neighbourhood centre.

The sizes of residential plots range from 1125 to 9000 square feet (sq ft). Maximum number of plots in the case study neighbourhoods falls within the range of 2250 to 4500 sq ft reflecting the market demand by upper middle and higher income groups. As far as the considerations of wind direction and solar movement in the orientation of plots are concerned, approximately 25 to 40 percent residential plots in each of the neighbourhood do not have North-South orientation which is considered as comfortable due to the prevailing wind direction in Lahore. This suggests that climatic conditions have not been given due consideration in the orientation of residential plots in the case study neighbourhoods. Although, it is not possible to draw all plots in these directions, but East-West orientation of plots may be called highly inappropriate for Lahore. In a situation where energy efficient building material is sparsely used, this orientation results in high room temperature within the houses for most part of the year due to hot weather prevailing in the city from April to October with highest ever recorded temperature ranging from 40.6°C to 48.3°C [28]. Consequently, the residents have to pay heavy electricity bills for using air conditioners during most of the time in summer [25].

Circulation system of a neighbourhood consists of a hierarchy of roads for motorized transport and footpaths for pedestrian movement. A main road originating from the entrance of each case study neighbourhood linking its secondary roads has the right-of-way ranging from 80 to 100 feet. Only two small neighbourhoods have been provided with 50 feet wide main roads. Width of other roads and streets within these neighbourhoods lies between 30 to 60 feet depending on the plot sizes being served. Most of the roads and streets are encroached by the residents of the abutting houses with 6 to 8 feet long ramps and green verges. The main roads especially along commercial areas lack service roads, cross junctions have been provided repeatedly, and the distance between two consecutive junctions at main roads is quite small. In large neighbourhoods, there is lack of proper links to provide ready access to sub-neighbourhoods centres.

In order to encourage the residents to move on foot within the neighbourhood, it is necessary to provide adequate and climate friendly pedestrian facilities. These generally include exclusive walkways, footpaths, pedestrian refuge and crossings at major roads and traffic calming measures [30]. Review of the design patterns of case study neighbourhoods show that none of these has any planned and coordinated system of footpath connecting its various parts. The footpaths have been provided sparingly along main roads and their size varies but generally falls in the range of 2.5 to 5 feet. In the absence of shading trees, properly designed slopes at the ends and attractive pavement, walking is not comfortable for people of all ages particularly during summer. Moreover, the foot paths have not been supported with formal pedestrian crossings at the junctions.

The overall land use distribution in these neighbourhoods show subdivision of the land into various uses viz. residential (50-60%), commercial (2-3%), open spaces (5-9%), public buildings (2-3%), graveyard (1-2%), and roads/access streets (25-35%). These percentages of land uses fall within the private housing schemes regulations prevalent at the time of

approval of these neighbourhoods. The rules prevalent from time to time have generally suggested break-up/distribution of land uses, minimum right of way, and provision of public facilities and utility services.

Perhaps that is why most of the facilities and services provided in the case study neighbourhoods are in line with the fundamental design principles as discussed in section 1. But, the important aspects of neighbourhoods design and location of public facilities (from walkability point of view) have always been left on the whims and moods of private developers and those of the designers, whether architects or town planners.

4.2 Perception about community facilities and neighbourhood centres

It is persistently suggested that neighbourhood level community facilities like daily shopping, primary school, mosque/church, health clinic and children play area should be provided at walking distance [1, 33]. Analysis of the data shows that a majority of the residents is satisfied with the location and accessibility of sub-neighbourhood centres, town centres and arrangement of activities as well as health facilities located within these centres (See Figure 2). The findings indicate that these facilities have been placed at appropriate and well connected land parcels within the neighbourhoods. The very reason of a high level is satisfaction is that the span of about half of the case study neighbourhoods is less than the maximum walking distance (1/2 miles) as suggested in literature. But a significant percentage of interviewed residents of the other case study neighbourhoods embracing very large area with span more than ½ miles is also satisfied. This is primarily because they do not prefer to go to community facility areas on foot any way.

However, the satisfaction level of the residents with the location and accessibility of primary and secondary schools is extremely low, despite the fact that the educational facilities are also located within sub-neighbourhood and town centres. The survey findings also revealed that majority of the interviewed residents want their children to go to school on foot. If schools are not located at a walking distance, pick and drop is needed which, of course, is a wastage of time and money, as numerous residents stated that they use motorcar for this purpose to save time.

This problem has stemmed from large size of half of the case study neighbourhoods with low population density which in turn seems to be a by-product of absence of any limit on maximum size and population density of private housing schemes in the Punjab. This is contrary to the current global trends of neighbourhood development which emphasise high density compact development to reduce travel distances and the use of motor vehicles [17, 23, 27].

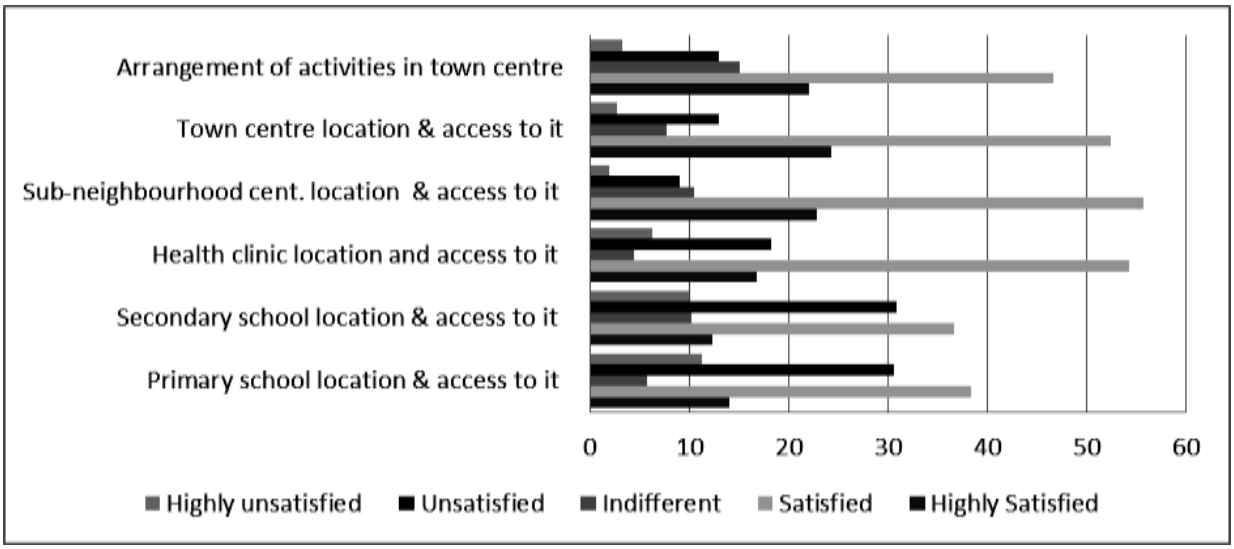

Fig. 2 Residents' perception about the provision and access to community facilities (Response percentage)
Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011

Parks and playgrounds are considered a separate land use as open spaces in the Punjab Private Housing Schemes Rules. Every housing scheme developer is bound to allocate minimum 7% of the total area of the neighbourhood for parks, playgrounds and other green spaces [20]. Such open spaces have been provided in all the case study neighbourhoods at the rate of 7 to 9% of their respective total area. Provision of more than the minimum required area under open/green spaces in some of the neighbourhoods indicate that this land use has been given due significance in the layout pattern. Internationally, provision of parks and playgrounds in a neighbourhood is considered as indispensable for enhancing the quality and sustainability of living environment [8, 27, 33]

4.3 Perception about Parks and Playgrounds

Figure 3 clearly depicts that the majority of responding residents is highly satisfied with the provision of parks and play grounds in the case study neighbourhoods. The sub-neighbourhood level parks and playgrounds are located at a walking distance. But the residents have to use motorcycle or car to reach main parks and playgrounds within each neighbourhood. This is also an observable fact that a majority of high income people go to neighbourhood parks by car. Perhaps that is why the percentage of highly satisfied residents is much less than those who are satisfied with the provision and access to parks and playgrounds.

4.4 Perception about Provisions for Pedestrians and Vehicles

Figure 4 shows that almost half of the respondents are not satisfied with the provision and width of footpaths within their respective neighbourhoods. Keeping in view the extreme climatic conditions in Lahore, particularly during summer, it is not possible to walk along a road or footpath without proper shade of trees. On the other hand, a vast majority of the respondents is willing to go to community facility areas on foot, if comfortable pedestrianized access is provided. Lack of environment friendly pedestrian facilities is causing excessive use of motorcars and motorbikes for reaching daily need activities, especially for pick and drop of school going children. In addition, parking spaces close to educational institutions and commercial areas are inadequate. People are left with no choice except to park their vehicles along the roads/access streets. That is why the opinion of the residents is divided on this aspect wherein the proportion of those who are highly satisfied with the parking facility outside school is just 12% of the 363 respondents. Similarly, opinion of the respondents about traffic calming measures is almost equally divided amongst all the five levels of satisfaction. This is because of the fact that poorly designed road humps are provided to reduce the speed of vehicular traffic instead of traffic calming measures like chicanes, pinch points, speed cushions, carriageway narrowing and woonerfs, as adopted in many European countries to create civilized streets [13].

4.5 Perception about Street Furniture and Soft Landscape Elements

Neighbourhood level street furniture includes benches, bollards, light poles, trash receptacles, cycle stands, tree planters, railing and road signs etc. Soft landscape elements are the trees, shrubs, flowerbeds and grass. Both the street furniture and soft landscape elements are considered as essential for inducing a sense of community, safety and healthy environment [30]. Illumination of street furniture is also important for feeling of security and comfort and observation of details in areas used for pedestrian movement during night time. These also help to define the urban fabric and shape our daily lives and perception of surroundings [30].

Analysis of the case study neighbourhoods revealed that both hard and soft landscape elements have been provided though sparingly. That is why the percentage of highly satisfied (27%) residents is much less as compared to those who are satisfied i.e. 52% (See Fig.5). However, some of the residents are of the view that some developers are reluctant in provision of street furniture and landscape elements.

Most of the neighbourhood level parks in all the schemes have been provided with walking tracks and benches. Indigenous species of trees, shrubs and flower beds have also been planted. But the sub-neighbourhood level parks and open spaces have very few benches, light poles and landscape elements. Their maintenance is poor as compared to that of the neighbourhood level parks and open spaces. Trees

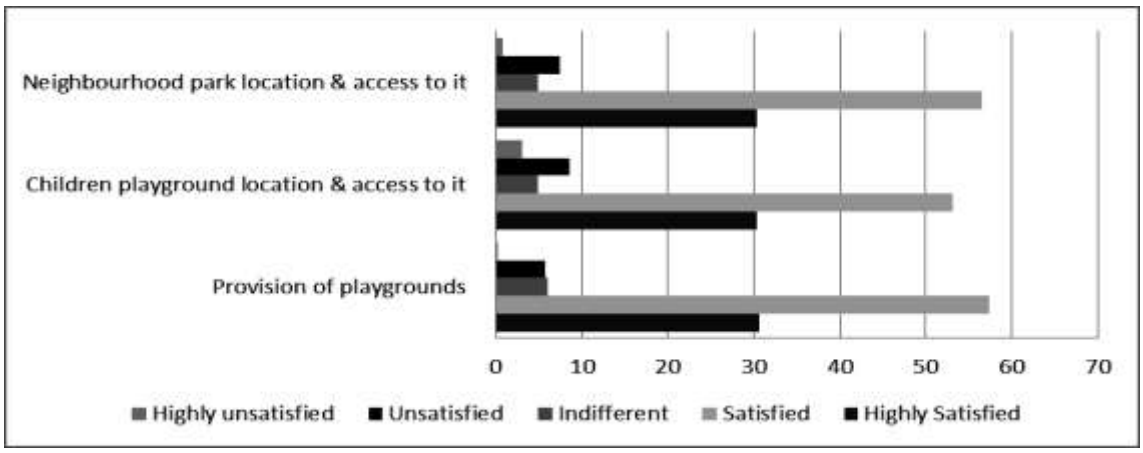

Fig.3 Residents' perception about the provision and access to parks and playgrounds (Response percentage)
Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011

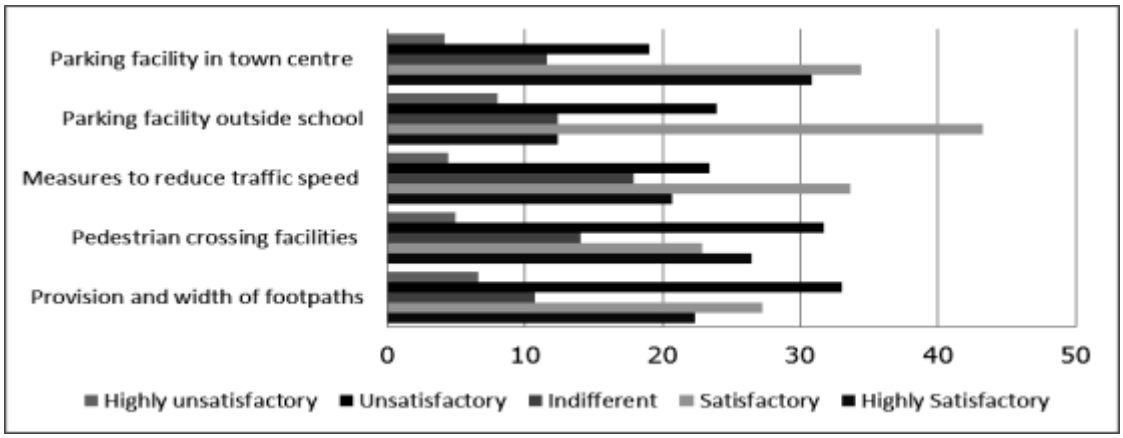

Fig. 4 Residents' perception about the provisions for pedestrians and vehicles (Response percentage)
Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011

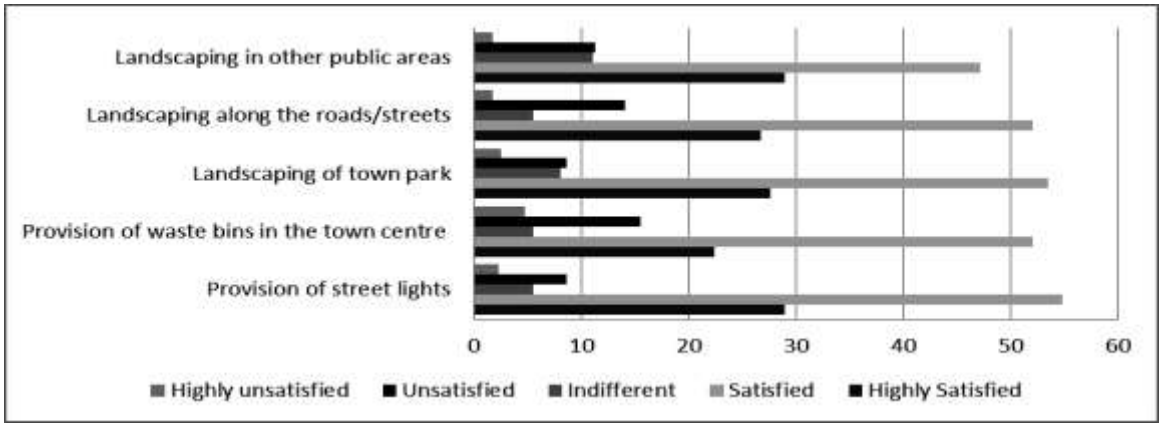

Fig. 5 Residents' perception about the provision of street furniture and landscape elements (Response percentage)
Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011

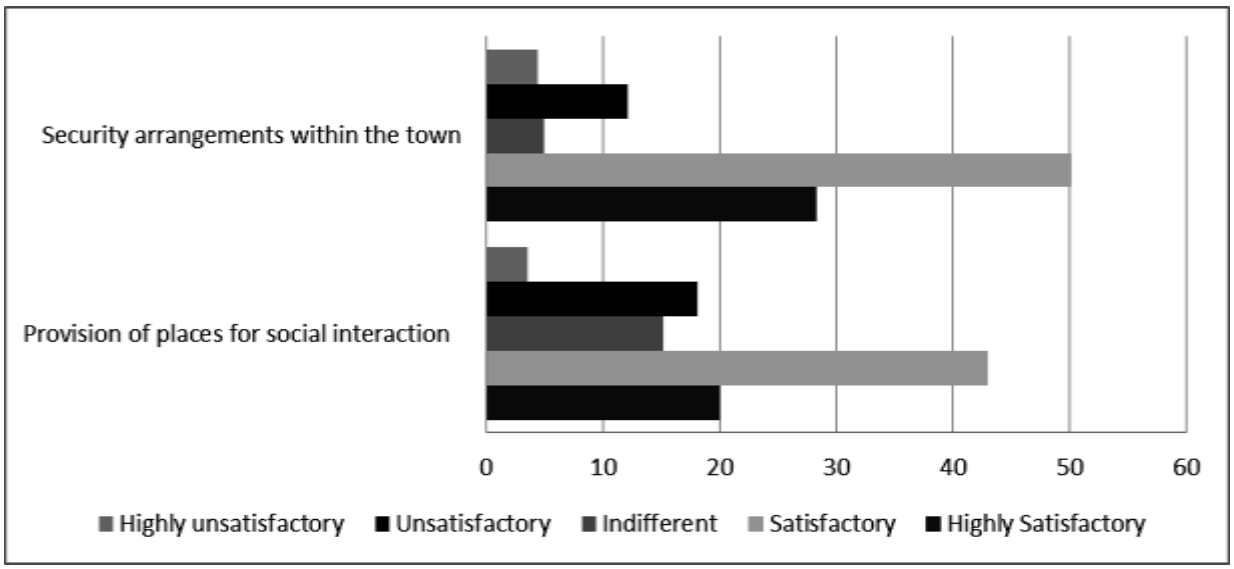

Fig. 6 Residents' perception about the provisions for social interaction and security (Response percentage)
Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011

planted along the roads are scattered and do not provide with sufficient sunshade to encourage walking. Illumination of street furniture is extremely rare and street lights are not switched on during night time due to shortage of electricity. Still it is worth mentioning that two of the case study neighbourhoods have arranged alternate sources of energy and thus illumination of some of the street lights and other street furniture is possible to continue during electricity failure.

4.6 Perception about Provisions for Social Interaction and Security

The residents were also asked to give their views on the provision of places for social interaction within their respective neighbourhoods. In most of the cases, a community centre or club, some of which also contain gymnasium facilities, is provided within the neighbourhoods. The rest of the opportunities for social interaction are possible in parks/playgrounds and commercial centres.

Amazingly, majority of them is satisfied as opposed to those who remained indifferent or unsatisfied with the provision of places for social interaction. Many residents pointed out that busy life style of present era is the constraining factor in this regard. Perhaps diverse origin of the residing families may be another reason for less social interaction.

As far as arrangements for security are concerned, the management committees of all the eight case study neighbourhoods have hired services of private security agencies in the wake of deteriorated law and order situation in the big cities of Pakistan. Nevertheless only 30% of the interviewed residents feel that security arrangements are highly satisfactory whereas about 20% are of the view that the security arrangements are not satisfactory and hence there is a need to 'do more' in this regard (See Fig. 6).

5. Summing up the Results

The overall trend of interviewed residents' perception about the design features provided in the case study neighbourhoods is shown in Table 1 (Appendix B). The figures presented in the table have been calculated by assigning index scores to the each satisfaction level of the interviewees. The Likert scale if used with index numbers gives a more precise measure of persons' attitude/perception and increases the validity and reliability of the results [26].

Therefore, the scores of -2, -1, 0, +1, +2 were assigned to 'highly unsatisfactory', 'unsatisfactory', 'indifferent', 'satisfactory' and 'highly unsatisfactory' responses, respectively. Following this, actual frequency of each response category was multiplied with its respective score and the resultant

values were summed-up to obtain the weighted total. It was then divided by the total frequency of each response category (363) to obtain the satisfaction index. The index values may vary between -2 and +2. An index of -2 indicates that 100 percent respondents are highly dissatisfied and an index of +2 indicates that all of them are highly satisfied. The calculated index values were then arranged in descending order.

The index values indicate that the residents are most satisfied with the provision of playgrounds, open spaces, location of town centre and sub-neighbourhood centre, as these attained comparatively higher values as compared to those of other facilities. The underlying reason for a high level of satisfaction with these facilities is clearly linked with two factors. One, most of the residents of these neighbourhoods have shifted either from old unplanned residential areas where there was a sever lack of recreational facilities and planned neighbourhood centres/sub-centres. Two, their previous socio-economic characteristics were not as high as their present status in the society.

On the other hand, the residents are least satisfied with important attributes like location and access to schools, provision and width of footpaths, measures to reduce traffic speed (traffic calming), parking and pedestrian crossing facilities outside schools. These are serious concerns of the residents and appear to be the contributing factors for reducing the walkability of the neighbourhoods. Some of the responding residents suggested that there was a need to provide covered walkways to encourage walking. Some interviewees recommended provision of road humps to reduce traffic speed whilst some asked for public transport to reduce traffic volume and hence to facilitate pedestrians for safe movement within the neighbourhoods

6. Conclusions

Neighbourhood is an important urban unit and an appropriate scale for designing residential communities with provision of necessary public facilities at walking distance. This study has provided empirical evidence on the contemporary neighbourhood design practices in Lahore and the residents' perception about the provision and accessibility of community facilities, hard and soft landscape as well as social interaction. Analysis of the layout plans of the eight case study neighbourhoods shows that a blend of gridiron and rectilinear patterns somewhat akin to traditional street design has been adopted given the flat terrain of Lahore and convenience of demarcating this pattern on ground. Field surveys confirmed that crossing of through roads from most of the case study areas contribute to traffic problems and resultant air and noise pollution. Lack of clear design patterns and crossing of through roads is a reflection of absence of any guidelines on the part of regulators.

Review of literature suggests that major emphasis of neighbourhood design concepts is on the creation of pedestrianized and socially interactive living environment. Analysis presented above shows that although community facilities have been accommodated in the design of neighbourhoods in such a way to ensure accessibility for the residents. Even the larger neighbourhoods divided into sub-neighbourhoods contain community facilities at walking distance for the residents. Yet inadequate provision of design features associated with pedestrianized environment do not encourage walking particularly in extreme climatic conditions. That is why, a majority of the residents interviewed for this study is satisfied but desire more provisions for comfortable pedestrian movement, as the access to these facilities is predominantly car based. Similar stance of the residents has been found out in case of the provision of places which promote social interaction thus pointing towards inadequacies to this end.

The overall findings of perception of interviewed residents about the design features of neighbourhood dictate high level of satisfaction. This in turn suggests that high level of satisfaction of the residents can be achieved more with meeting their expectations even by providing low density land sub-divisions. In this regard, consideration of prospective residents' socio-economic background and nature of development in their areas of origin are more important than simply following the design.

There is a need to provide pedestrian pathways to such activity areas which not only ensure protection from traffic hazard but also give adequate considerations to harsh climatic conditions. Similarly, the variety of places for social interaction needs to be

incorporated in the design so as to enhance social activities on regular basis. Lastly, it is suggested that the stakeholders' consultation workshops should be held to develop neighbourhood design guidelines. These may be made part of the Punjab Private Housing Schemes and Land Sub-Division Rules.

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We are thankful to the residents of the case study neighbourhoods who gave interviews and provided their valuable input. The untiring efforts of the survey assistants are highly acknowledged. We would also like to acknowledge invaluable comments of anonymous reviewers on earlier draft of this paper which helped us to make significant improvement and bring in more clarity. Features boasted in the literature as good neighbourhood designs. Nevertheless, there is a need to bring improvement in neighbourhood design concepts for the 21st century living in Lahore and other Pakistani cities. Merely locating daily need activity areas as well as a primary school at walking distance is not sufficient.

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Appendix A Layout Plans of the Case Study Neighbourhoods

Fig. 7. Case Study Neighbourhood-1
Source: Lahore Real Estate. Com, 2011.

Fig.9. Case Study Neighbourhood-3
Source: Lahore Real Estate. Com, 2011

Fig. 8. Case Study Neighbourhood-2
Source: Lahore Real Estate. Com, 2011.

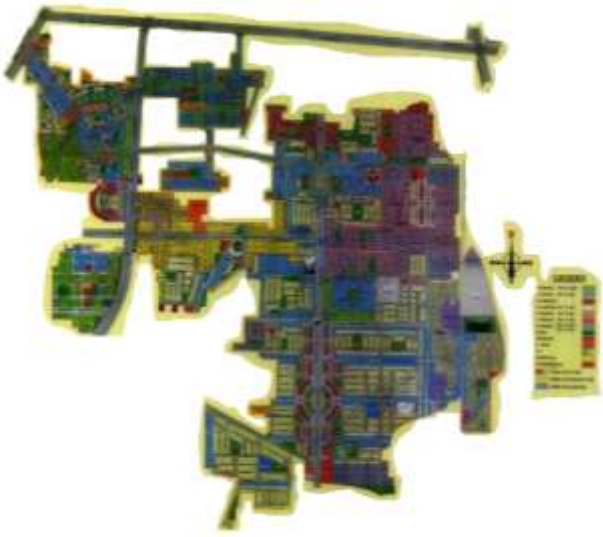

Fig. 10. Case Study Neighbourhood-4
Source: Lahore Real Estate. Com, 2011.

Appendix A (continued) Layout Plans of the Case Study Neighbourhoods

Fig. 11. Case Study Neighbourhood-5
Source: Lahore Real Estate. Com, 2011.

Fig. 13. Case Study Neighbourhood-7
Source: Lahore Real Estate. Com, 2011.

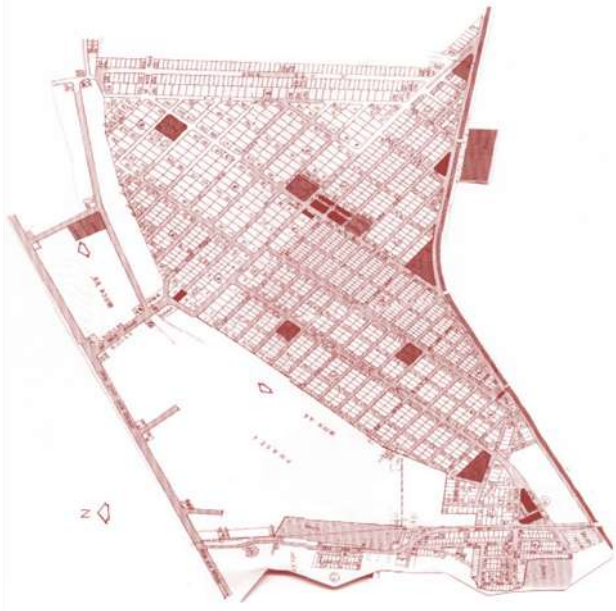

Fig. 12. Case Study Neighbourhood-6
Source: Lahore Real Estate. Com, 2011.

Fig. 14. Case Study Neighbourhood-8
Source: Lahore Real Estate. Com, 2011.

Appendix B

Table 1 Overall Trend of Resident's Perception/Level of Satisfaction about the Design Features of the Case Study Neighbourhoods

Sr. No.	Neighbourhood Design Features	Residents' Perception/Level of Satisfaction						
		Highly Un-satisfactory	Unsatis-factory	Indiff-erent	Satis-factory	Highly Satisfactory	Weighted Total	Satisfaction
		Score	Score	Score	Score	Score	Score	Index
1	Provision of playgrounds	-2	-21	0	208	222	407	1.12
2	Neighbourhood park location & access to it	-6	-27	0	205	220	392	1.08
3	Provision of street lights	-16	-31	0	199	210	362	1.00
4	Children playground location & access to it	-22	-31	0	193	220	360	0.99
5	Landscaping of town park	-18	-31	0	194	200	345	0.95
6	Landscaping in other public areas	-12	-41	0	171	210	328	0.90
7	Sub-neighbourhood centı location & access to it	-14	-33	0	202	166	321	0.88
8	Landscaping along the roads/streets	-12	-51	0	189	194	320	0.88
9	Security arrangements within the town	-32	-44	0	182	206	312	0.86
10	Town centre location & access to it	-20	-47	0	190	176	299	0.82
11	Provision of waste bins in the town centre	-34	-56	0	189	162	261	0.72
12	Arrangement of activities in town centre	-24	-47	0	169	160	258	0.71
13	Parking facility in town centre	-30	-69	0	125	224	250	0.69
14	Provision of places for social interaction	-26	-66	0	156	146	210	0.58
15	Health clinic location and access to it	-46	-66	0	197	122	207	0.57
16	Measures to reduce traffic speed	-32	-85	0	122	150	155	0.43
17	Pedestrian crossing facilities	-36	-115	0	83	192	124	0.34
18	Parking facility outside school	-58	-87	0	157	90	102	0.28
19	Provision and width of footpaths	-48	-120	0	99	162	93	0.26
20	Primary school location & access to it	-82	-111	0	139	102	48	0.13
21	Secondary school location & access to it	-72	-112	0	133	90	39	0.11

Source: Questionnaire survey of 363 residents of 8 neighbourhoods in Lahore, 2011.

Note: The observed frequencies of 'Highly Unsatisfactory', 'Unsatisfactory', 'Indifferent', 'Satisfactory', 'Highly Satisfactory' were multiplied with -2, -1, 0, +1, +2 to obtain respective score of each level of satisfaction.