# CHAPTER 5
# DESCRIPTIVE RESULTS AND DISCUSSION

## 5.1 Basic information about children's trip to and from school

The descriptive results show the children's survey was returned almost evenly across the different grade levels (3rd grade-34.5%, 4th grade-33.8%, 5th grade-31.7%), with the 5th grade being slightly fewer, as one school only enrolled children between the 1st grade and 4th grade. There are almost an equal number of male and female children in the sample to be fair concerning gender (51.2% female, 48.8% male). The average child age taking the questionnaires home was 10 years old (standard deviation=0.81) Figure 5.1.

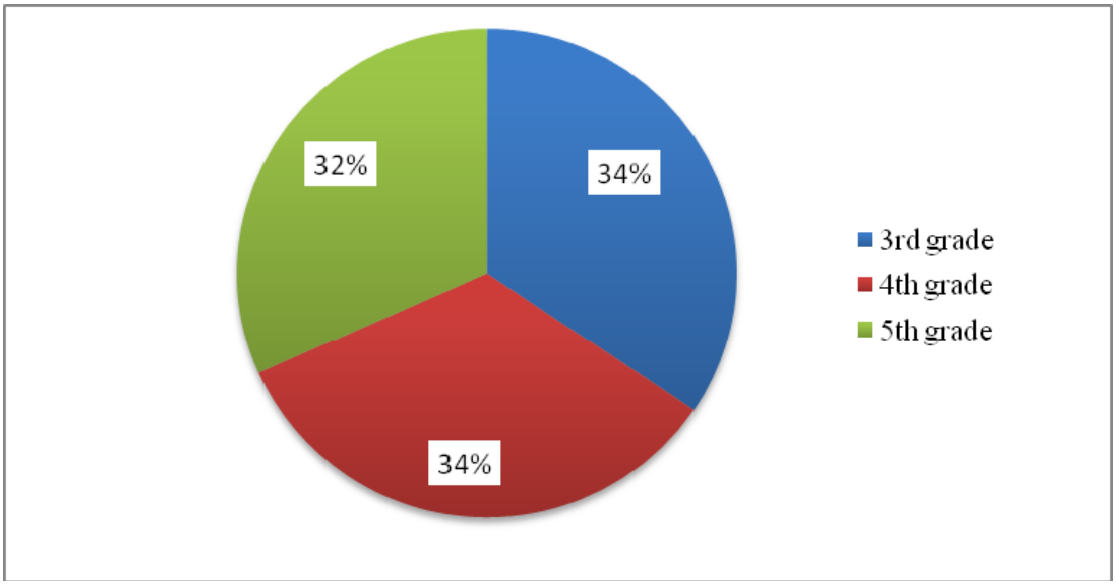



Figure 5. 1 : Distribution of children involved in the study according to grade levels. *N=561

The children involved in the study were not distributed evenly across income groups due to the uneven distribution of the population of Tehran across different socio-economic areas. Thus, 54.3 % of respondents are from low-income, 22.5% are from middle-income and 23.2 % are from high-income (Figure 5.2).

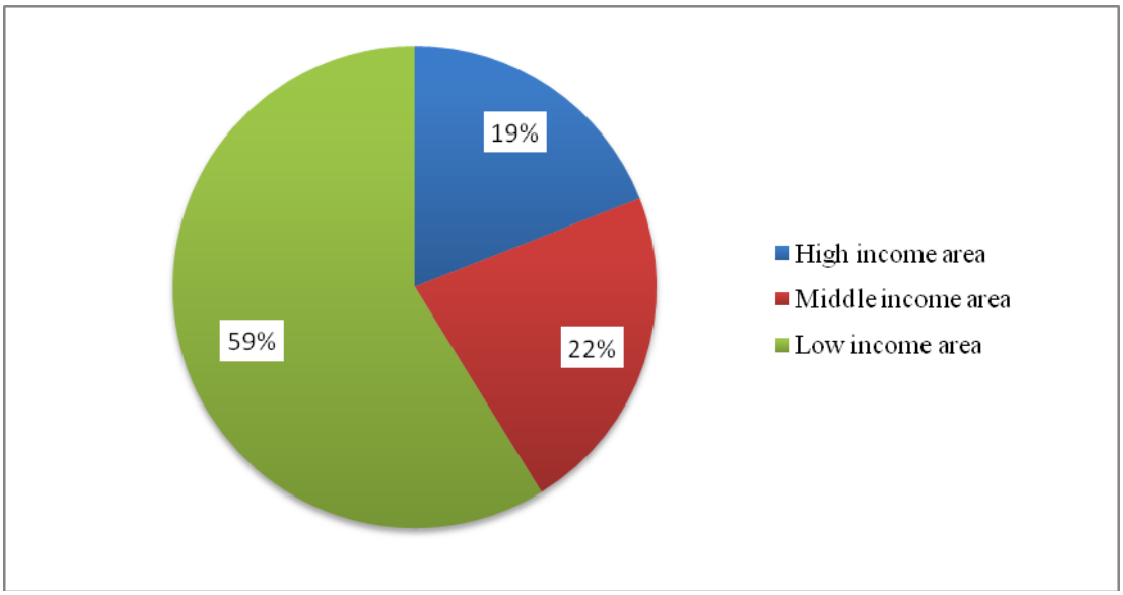



Figure 5. 2: Income groups' distribution of parents involved in the study

An almost equal number of fathers and mothers completed the survey (55.2% of parents were mothers and 44.8% were fathers). About 64.7% of parents of the sample population were born in Tehran, 5.6% of respondents did not report their place of birth. The average education level of parents completing the questionnaires was high school level (Standard deviation =0.70), however, 43.1% had university level education (Figure 5.3).

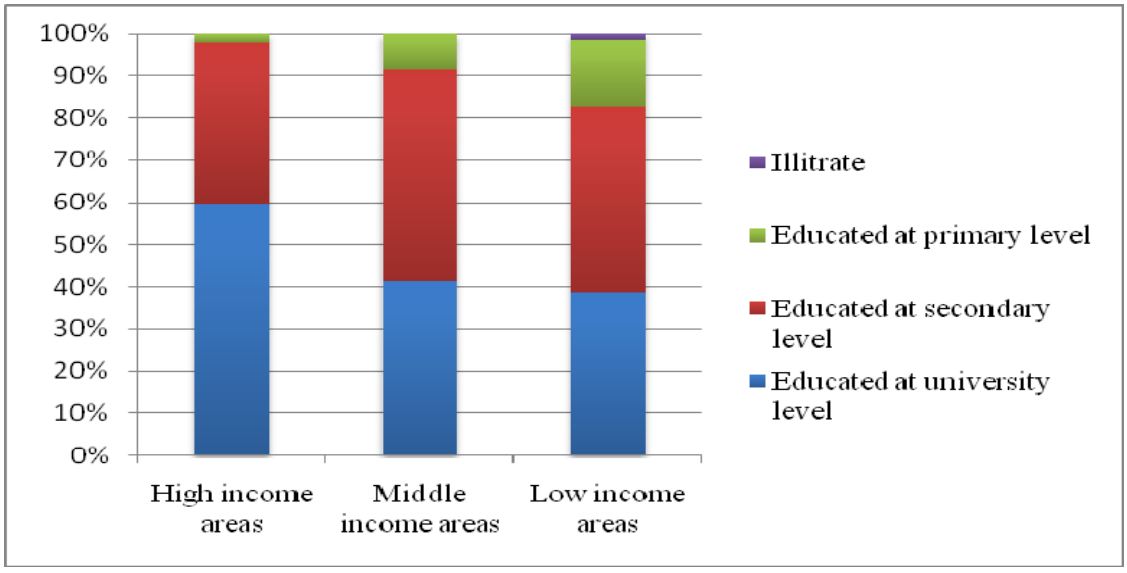



Figure 5. 3: Income groups' distribution of parents' educational level involved in this study

*N= 558

The majority of households in the sample study have more than one child (57.1% two children and 17.9% more than two children), while only 25% of households have only one child. The chart below shows the number of children in a household across income groups (Figure 5.4).

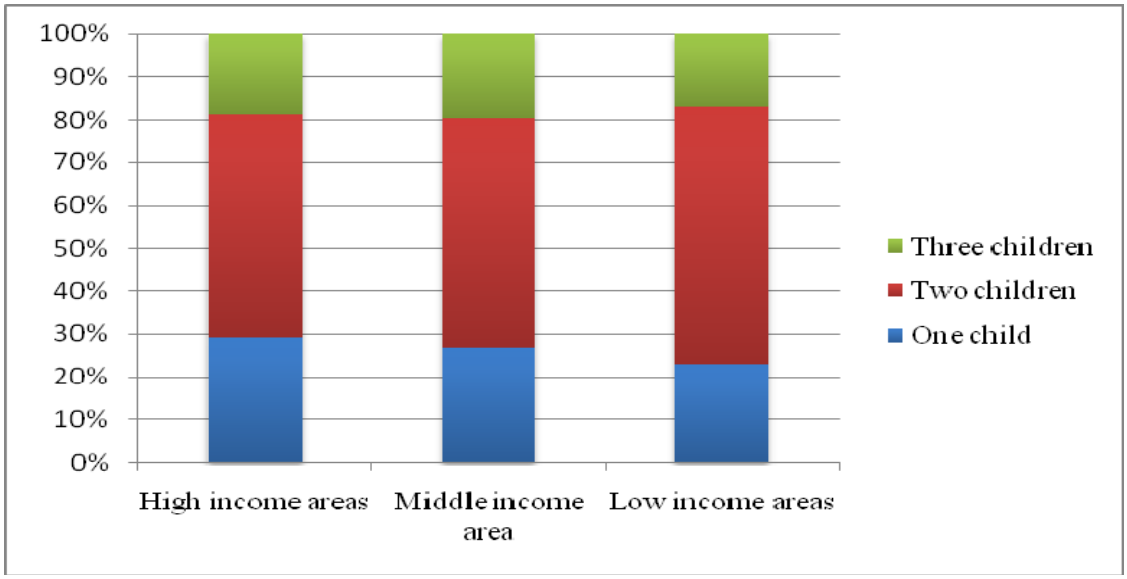



Figure 5. 4: Income groups' distribution of number of children in a household

*N= 558

A few studies showed the presence of a child under 5 years old or another school aged child in a household as being associated with a child's walking to and from school (Ahlport et al., 2008). Nearly 25% of households involved in this study have a child under 5 years old, and are mostly from middle- and low-income areas (Figure 5.5).

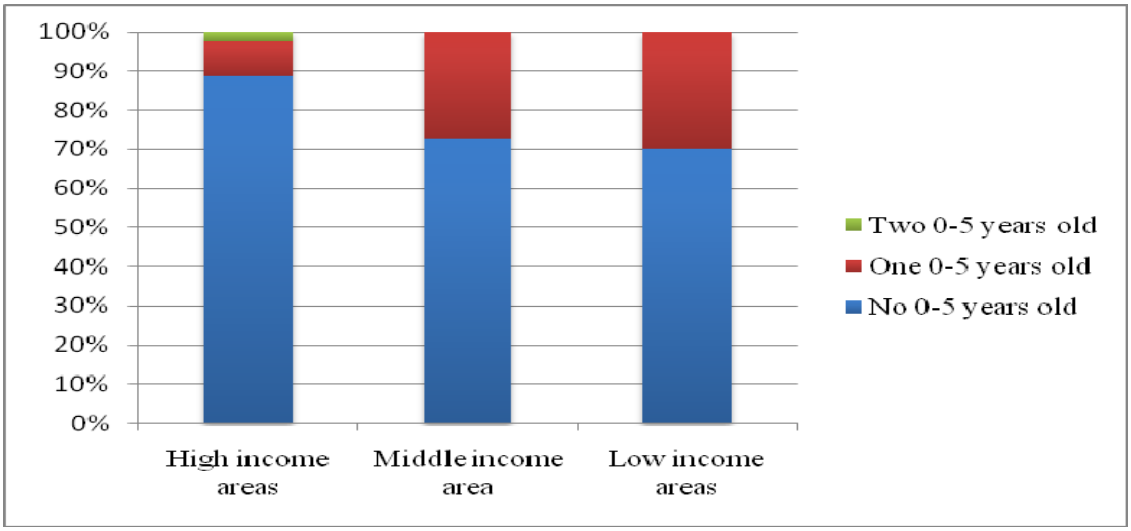



Figure 5. 5: Income groups' distribution of number of children under 5 years old in a household

*N= 556

Nearly 20% of households involved in this research have more than one child between 6-11 years old and are mostly from low-income areas (Figure 5.6).

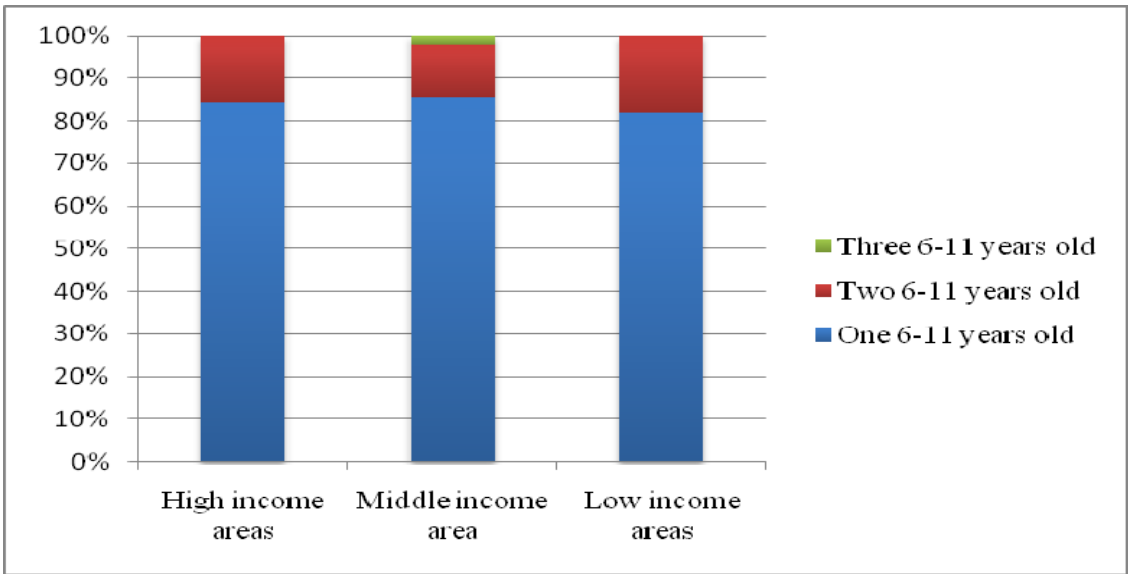



Figure 5. 6: Income groups' distribution of number of children 6-11 years old in a household

*N= 558

Additional variables including father's travel mode to work, household car ownership, and number of persons who hold a driving licence in the household, average household monthly income, parents' qualification and mothers' occupation are summarized in the table (Table 5.1).

Table 5. 1: Participant's characteristics

| Variables | Min | Max | Mean | Std. Dev. | Mode | Variance |
|---|---|---|---|---|---|---|
| Parent's gender | 1.00 | 2.00 | 1.4481 | .4983 | 1.00 | .2483 |
| Income groups | 1.00 | 3.00 | 2.4000 | .7890 | 3.00 | .6230 |
| Child's gender | 1.00 | 2.00 | 1.5357 | .4997 | 2.00 | .2497 |
| Child's age | 9.00 | 11.00 | 9.9484 | .7841 | 10.00 | .6149 |
| Number of children in a household | 1.00 | 3.00 | 1.9286 | .6520 | 2.00 | .4252 |
| Number of children 0-5 years old in a household | .00 | 2.00 | .2599 | .4495 | .00 | .2021 |
| Number of children 6-11 years old in a household | 1.00 | 3.00 | 1.1718 | .3896 | 1.00 | .1518 |
| Mothers' occupation | 1.00 | 5.00 | 1.7500 | .6095 | 2.00 | .3715 |
| Parent's qualification (The one who filled up the questionnaire) | 1.00 | 4.00 | 1.7016 | .7026 | 2.00 | .4936 |
| Monthly household income | 1.00 | 4.00 | 2.2672 | .8980 | 2.00 | .8064 |
| Car ownership in a household | 1.00 | 3.00 | 1.8807 | .5043 | 2.00 | .2543 |
| Number of family member holding driving license | 1.00 | 4.00 | 2.6461 | .5806 | 3.00 | .3370 |
| Father work travel mode | 1.00 | 5.00 | 2.6466 | .8727 | 2.00 | .7617 |

Studies show that parents are the final decision makers regarding the child's trip to school (McMillan, 2003; Pont et al., 2009; Zwerts et al., 2009). The findings of this study support the earlier findings, with about 86% of parents being the final decision makers and nearly 60% of them do not give permission to their children to walk to and from school on their own. However, walking to school (combination of walking with or without an adult) was the primary mode for the school trip in this study.

Children were also asked about how they usually go to school. Less than half of the children (about 42%) walk to school, while more than 25% of them walk with their parents or elder siblings. Over 26% of the children take a school bus and about 20% are

driven by their parents. However, there is a difference between the modes of children's travel to and from school. Figure 5.7 shows the differences between a child's current travel mode to and from school.

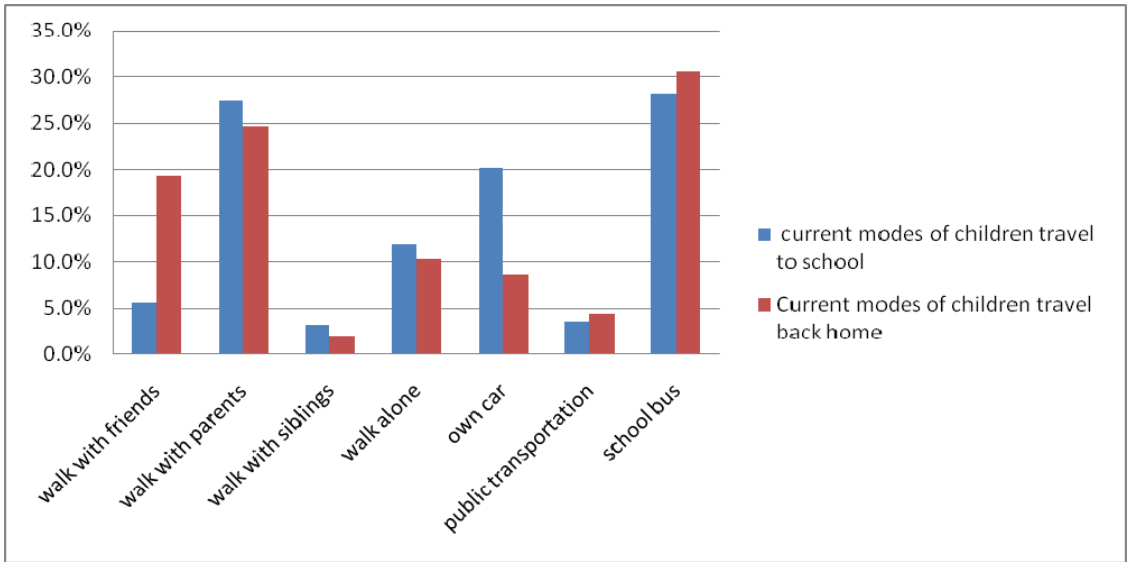



Figure 5.7: A child's current travel mode to and from school regardless of the different income groups; *N=561

Walking was still the predominant travel mode in the afternoon without considering the income groups, which is consistent with other studies (Buliung et al., 2009). However, over 25% walk with their parents or elder siblings. Children are more likely to walk with their friends on their trip home from school. The rate for taking the school bus is almost equal on trips to and from school with a slight increase in the afternoon, while only 9% of children were driven home from school by parents.

This decrease probably occurs because parents stated that their work schedule made it more difficult for them to pick their children up in the afternoon compared to trip sharing in the morning (the school hours for government primary schools in Iran is 7:45 am to 12:30 pm) (Kingham et al., 2011). Children also mentioned that they are sleepy in the morning, which caused them to run late and, consequently, need a ride to school. Moreover, they gave other reasons such as "early in the morning the weather is colder and darker than in the afternoon". This is consistent with other studies that

showed that weather is an influential factor in choosing the mode of travel for children (Panter et al., 2010; Børrestad et al., 2011). They also conveyed "there are only a few people on the streets early in the morning when I go to school so I am scared of walking on my own" (school calendar in Iran is from 23rd of September to 10th of June; means during autumn, winter and spring). Studies also showed that the presence of pedestrians and daylight is associated with children walking to school (Johansson, 2003; Ahlport et al., 2008).

Modes of children travel to and from school is different based on children's age and gender. The result of descriptive analysis in this study shows, male children are more likely to walk to school autonomously or with their friends while female children are more likely to walk with their parent to school. The result also reveals female children use school bus to go to school slightly more than male children, which all these results are consistent with other research in different part of the world (see Figure 5.8).

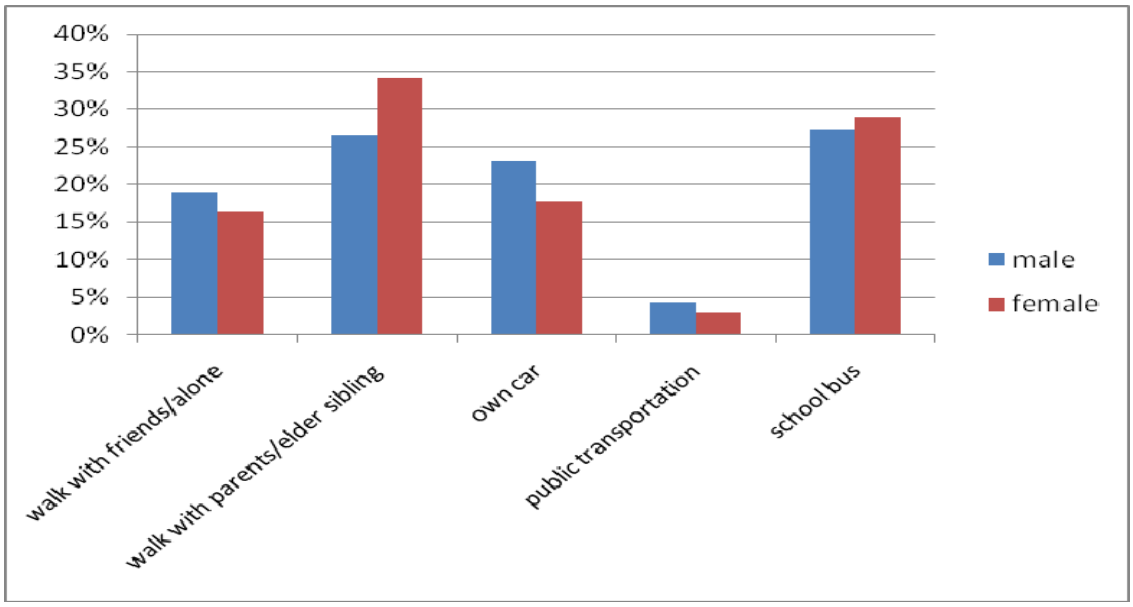



Figure 5.8: A child's current travel mode to school regarding child's gender

*N=561

The results also show younger children are more likely to walk to school with an adult or use school bus to go to school. While children get older, they will become more

independent and are more likely to walk to school with their friends or on their own. These results also are consistent with the findings of other research (see Figure 5.9).

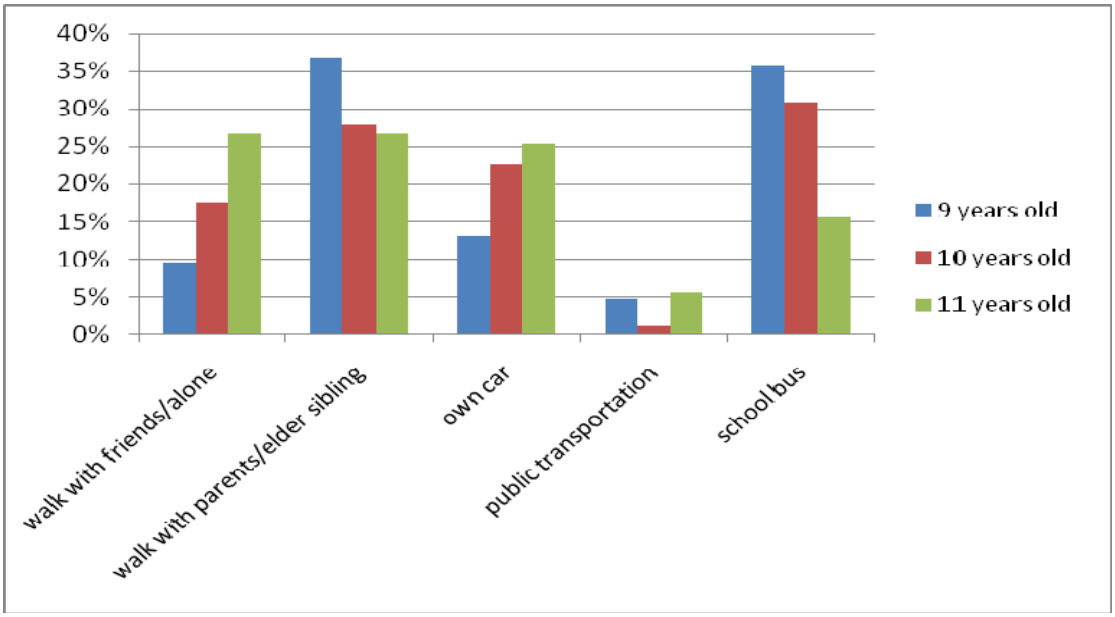



Figure 5. 9: A child's current travel mode to school regarding child's age

*N=561

It is more likely that mothers escort their children to school relative to other adults in the family (Morris, 2003; Zwetrs et al., 2007; McDonald, 2005). Approximately 61% of children are escorted by their mothers while the rate dropped to 16% for fathers and only 10% of children are escorted by another adult within the household (grandparents or elder siblings). A little more than 17% of children travel to school without an adult.

On the way back home from school, mothers are again the main escort (75%). However, a large number of children travel with their friends or alone, while the percentage of students who take the school bus is almost the same. Nobody chose cycling or skating to and from school. This may be explained by poorly planned roads for cycling and skating, climate conditions during the school calendar year or cultural and social norms in Iran regarding cycling and skating on the streets, especially for girls. Figure 5.10 shows the main escorts for children while walking to and from school between their parents and elder siblings.

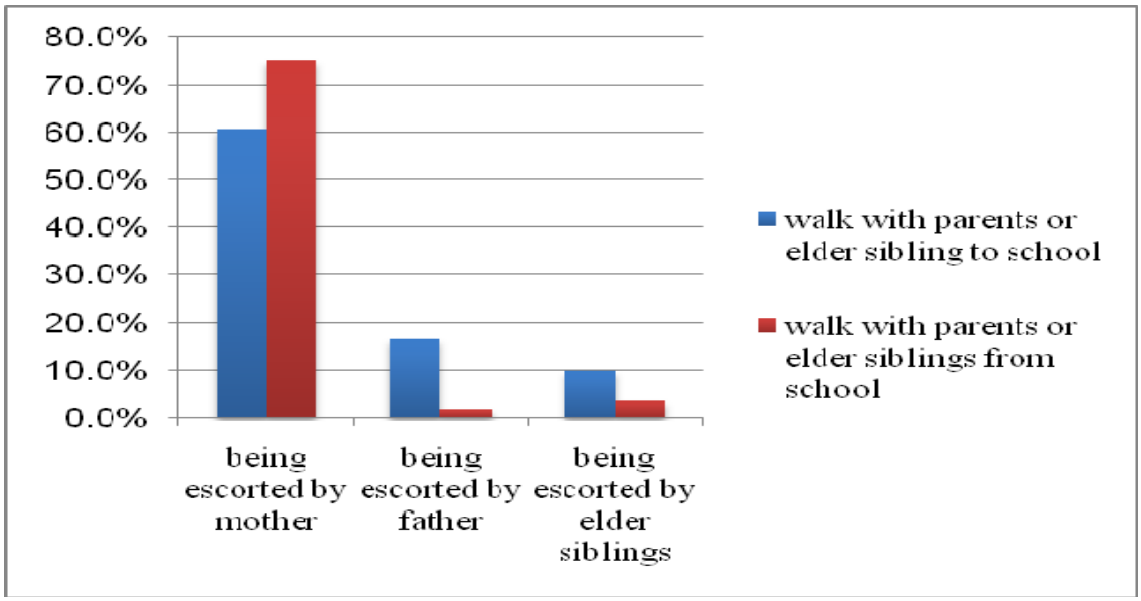



Figure 5. 10: Typical adult escort when walking to school

*N (tip to school)=553, N (trip back home)=547

Driven by parents has a higher rate among high-income groups, while students from low-income groups have the highest rate for walking to and from school. Lotfi and Koohsari (2009) found the same in their study while measuring the objective accessibility to neighbourhood facilities in Zone 6 in Tehran (Figures 5.11and 5.12).

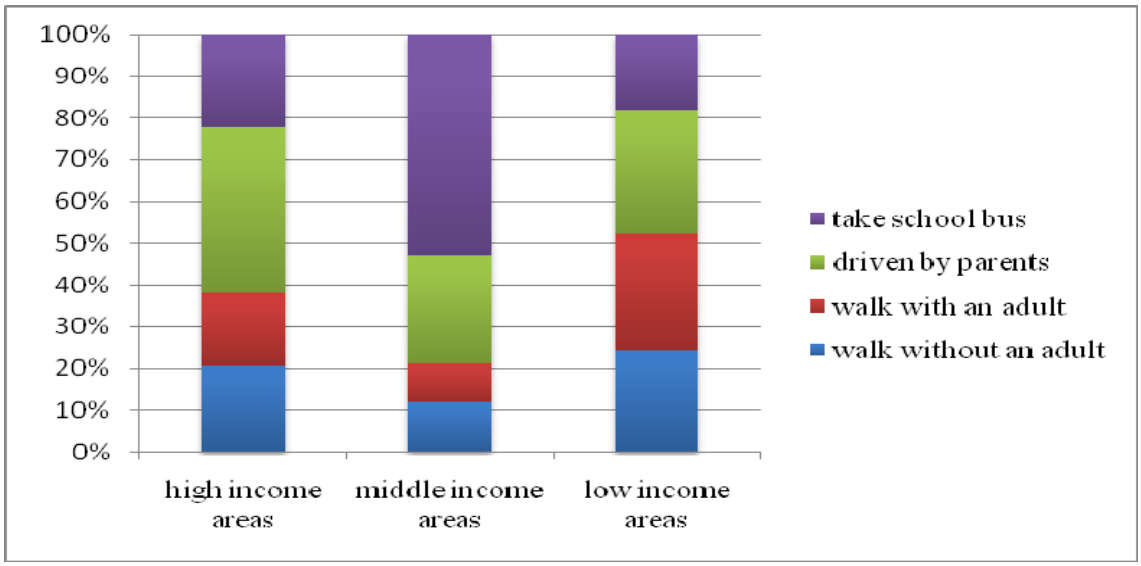



Figure 5. 11: A child's current method of transport to school across different socio-economic areas

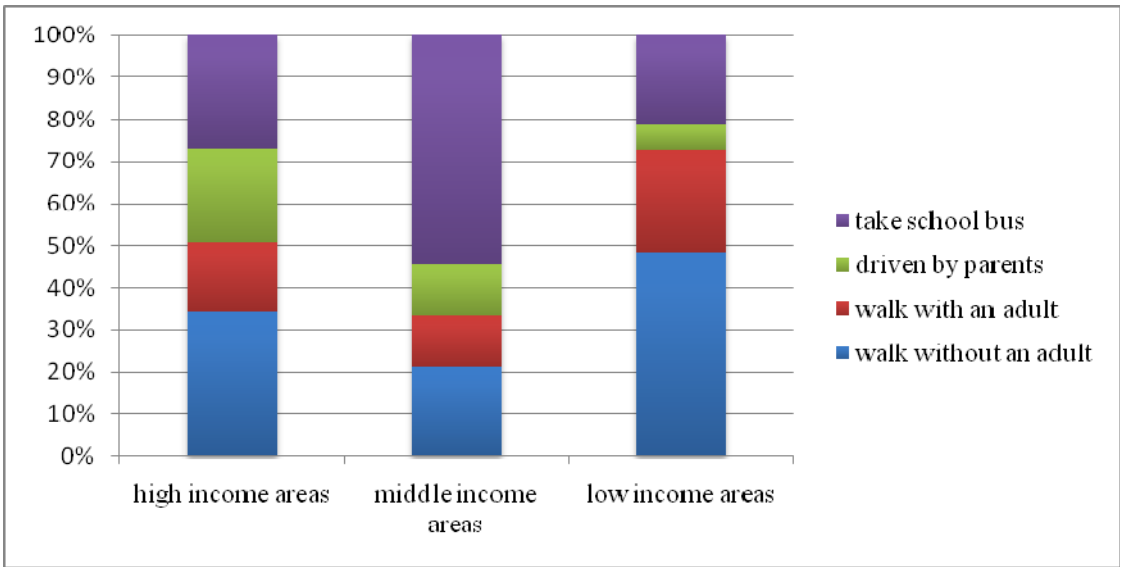



Figure 5. 12: A child's current method of transport from school across different socio-economic areas

To understand if there are any barriers for children in their walking to and from school, parents were asked about the preferred method of transport to school for their child to see if it varies from the current travel mode. Over 40% of parents reported that walking is the best method of transport to school for their child if they could company them. None of the parents chose cycling to school, and only a few of them think that walking children to school in a group or on their own is a convenient travel mode to school (Figure 5.13).

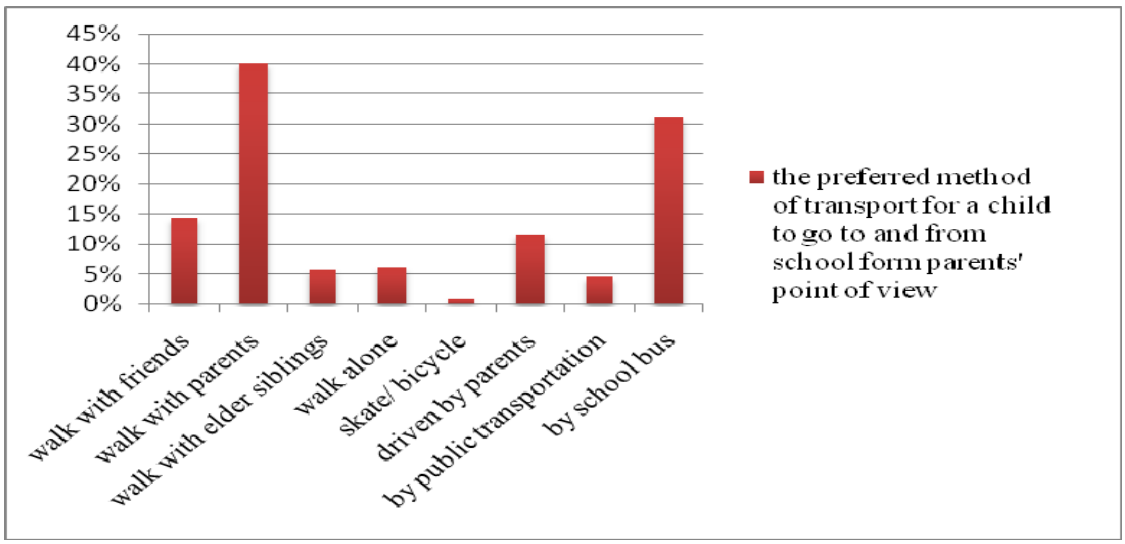



Figure 5. 13: The preferred method of transport for a child to go to and from school (Parental views regardless of different socio-economic areas)

Walking to and from school with parents as the best transportation mode to school; has a higher rate among low-income groups, while most of the parents from middle-income groups would like to send their child to school by school bus (Figure 5.14).

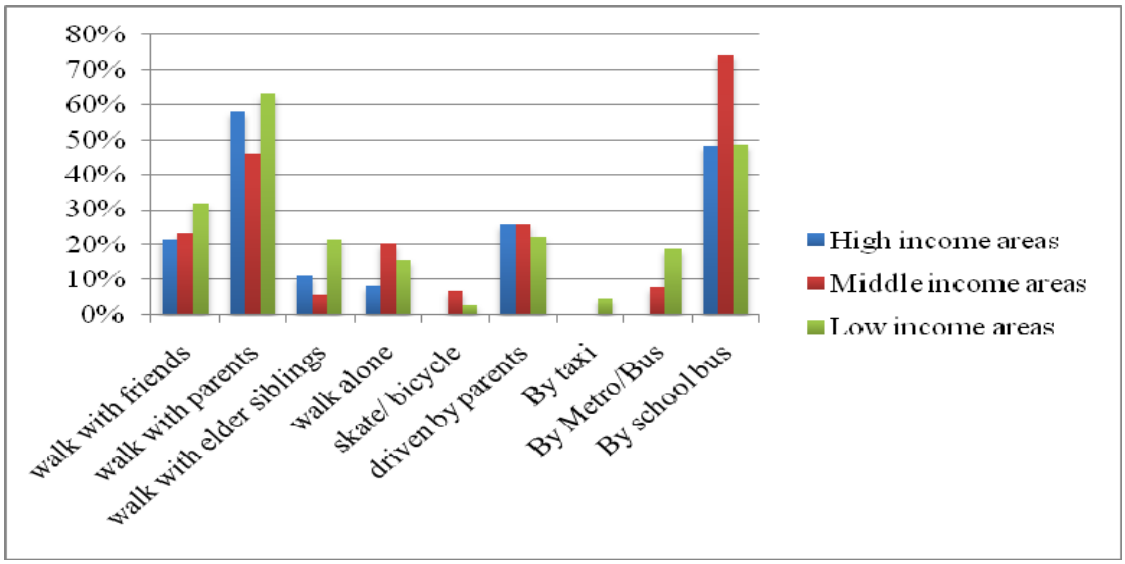



Figure 5. 14: The preferred method of transport for a child to go to and from school
(Parental views across different socio-economic areas)
*N=558

Children were also asked how they would like to go to and from school if it is different from their current school transportation mode. Children's preference in choosing school travel mode is slightly different on their trip to and from school. The majority of children from all three income groups reported they would like to walk to school with their friends, while the percentage increased slightly on their trip back home from school. The second preferred travel mode to and from school from the children's view is taking the school bus, the percentage is almost the same on their trip to and from school. They stated that taking the school bus is a convenient method of transport to go to and from school and also gives an opportunity to them to chat with their friends on the way. Children's preference for the other methods of transport to and from school across different areas is shown below in figures 5.15 and 5.16.

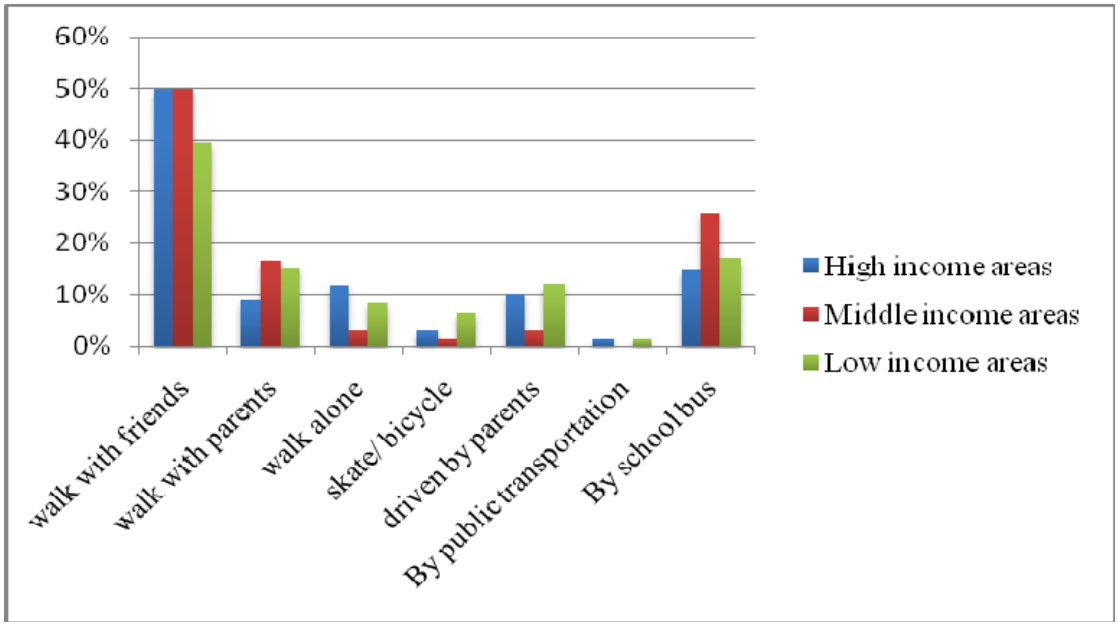



Figure 5.15: The preferred method of transport for a child to go to school
(Children's views across different socio-economic areas) *N=558

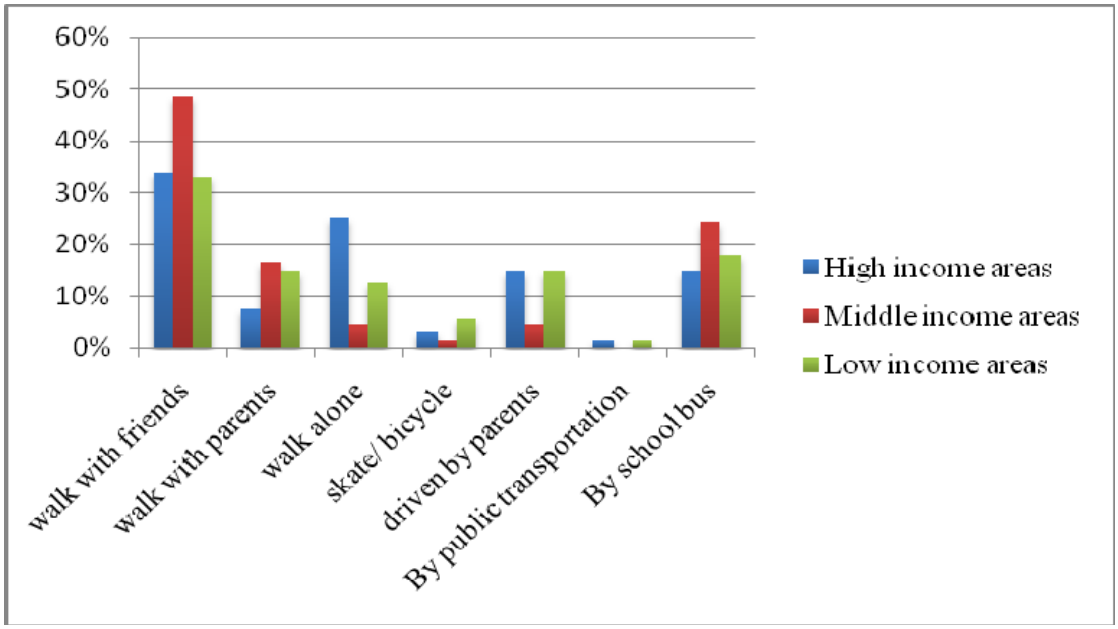



Figure 5.16: The preferred method of transport for a child back home
(Children's views across different socio-economic areas) ; *N=558

A short travel distance does not guarantee that students would walk to and from school (Panter et al., 2010). Nearly 49% of the children involved in this study from all three different socio-economic areas, lived less than 1 km from the school, 21% were located between 1 km and 1.5 km and 11% stayed between 1.5 km and 2 km. Almost

18% of the children had to travel more than 2 km to school. However, slightly more than 40 % of students walk to school, especially on their own (Figure 5.17).

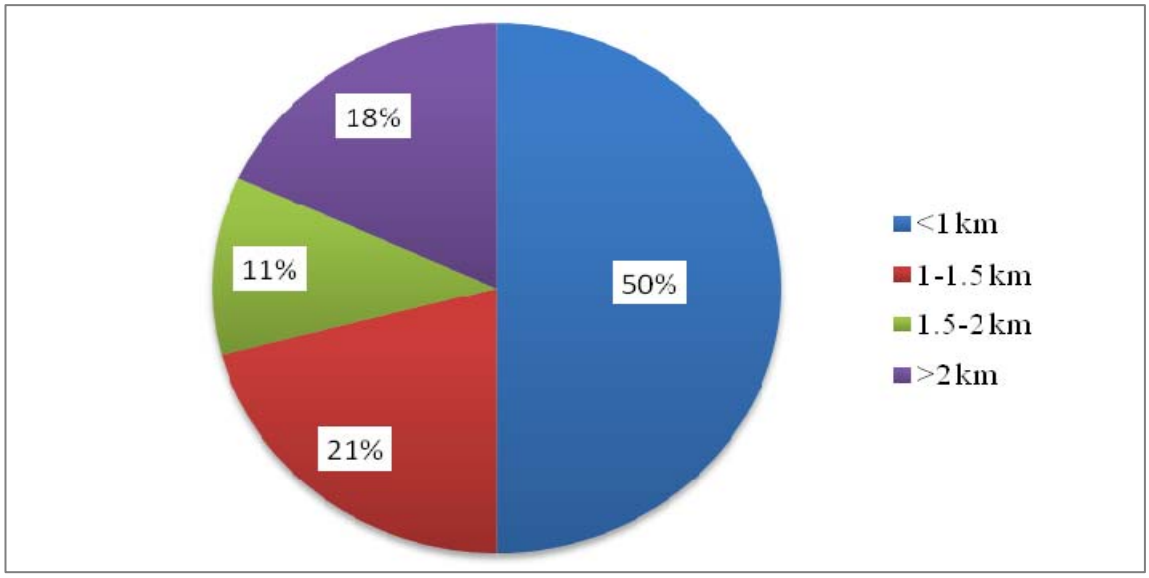



Figure 5.17: The distribution of the study population based on parental perceived distance between home and school

These data are examined in association with different socio-economic status areas. This shows that the majority of children who were living within ½ km from the school were from low-income areas, while for distances over two kilometres they were mostly from high-income areas (Figure 5.18).

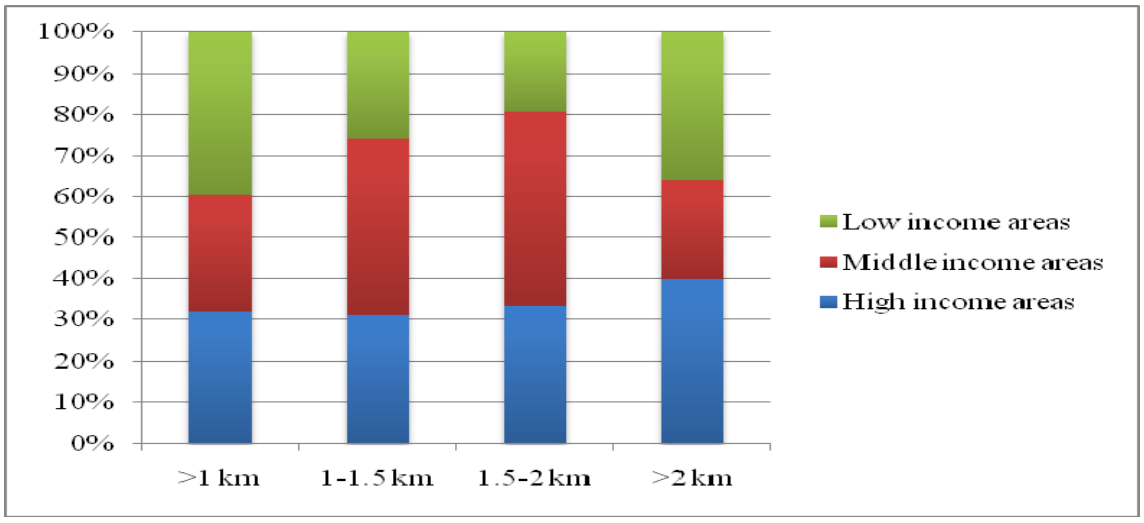



Figure 5.18: The cross tabulation between parental perceived distance between home and school and different socio-economic status areas

This confirms the result of other studies that show that people from low-income groups stay nearer to school to avoid the cost of travel (Lotfi & Koohsari, 2009).

When this data were examined in relation to school transportation mode, about 72% of children who were living within ½ km from school walked to school. Over 25% were driven in a private vehicle or took the school bus. The percentage of children who walked decreased dramatically for those living ½ km to 1 km from school: 40% walked compared to 58% who used motorized travel modes. For distances over 1.5 km the walking rates continued to drop, being driven by private vehicle rates stayed almost constant and taking the school bus rate increased (figures 5.19 and 5.20).

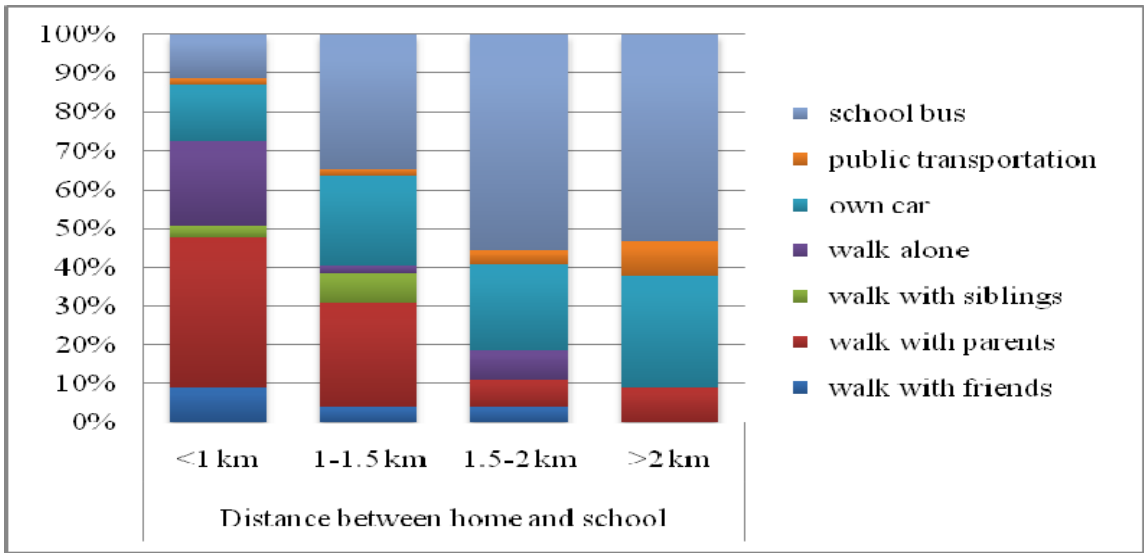



Figure 5.19: The cross tabulation between parental perceived distance between home and different travel modes to school

Increasing the traffic safety is the primary purpose of programmes surrounding the trip to school in Tehran to encourage children to walk to and from school on their own. If their child walked to school, parents were asked a series of questions about the potential traffic safety barriers. Nearly 40 % of children would cross the street without any traffic lights, or crossing guard; 25% of parents reported that their children would cross the street with more than four lanes of traffic on their way to school.

Almost 60% of parents said their children would have to walk in the road or on the edge of road due to the absence of continuous pavements along the routes. Finally, 61% reported that the routes around the school are dangerous due to careless drivers driving at high speed (more than 30km/hr).

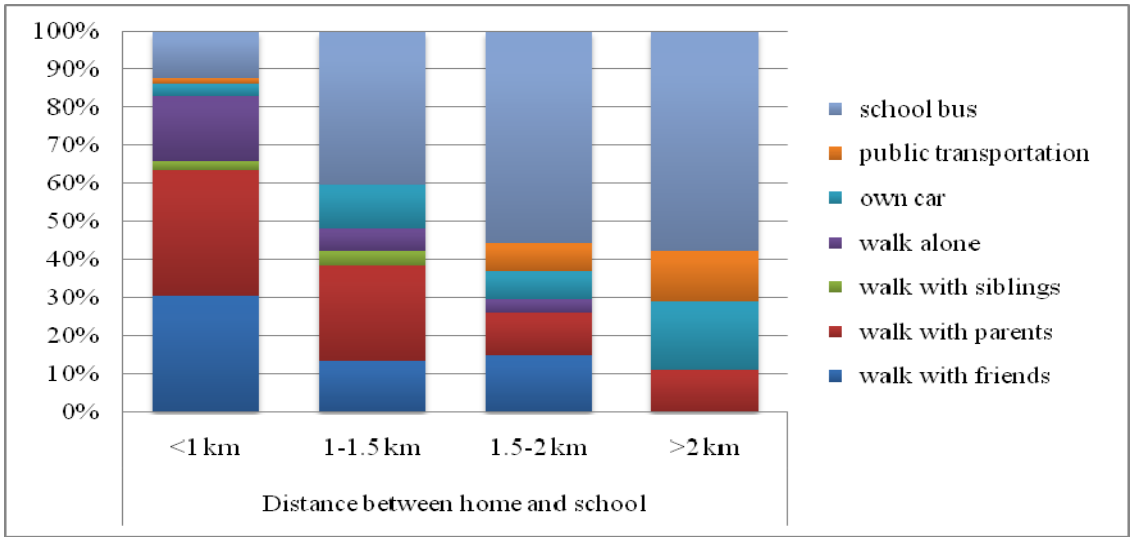



Figure 5.20: The cross tabulation between parental perceived distance between home and different travel modes from school

Furthermore, parents of children who walked to school were asked about the potential personal safety barriers in the neighbourhood for their child. About 65% of children walked along roads in which there were some shops; 54% of parents reported that their children would meet a person with an addiction or foreign builder on their way to go to school. Finally, nearly 30% reported that their children would walk along a road that could be seen from the first floor window. The results are summarized in table 5.2.

Table 5. 2: Parental perception of traffic safety and neighbourhood safety barriers for their children in their walking to and from school

| If your child were to walk to and from school or already does, would they have to any of the following on his/her way to and from school? | Yes | No | Missing |
|---|---|---|---|
| Cross a road with more than 4 lanes | 25.4 | 57.5 | 17.1 |
| Cross a road at an intersection that does not have a street signal or a stop sign to stop traffic | 38.9 | 44.8 | 16.3 |
| Cross a road without a painted crosswalk | 43.7 | 40.1 | 16.3 |
| Walk in the road or on the edge of road because there is no pavement | 59.1 | 24.6 | 16.3 |
| Walk along a road that has traffic moving at more than 30 km/hr | 60.7 | 21.8 | 17.5 |
| Meet undesirable persons on the road | 45.2 | 38.5 | 16.3 |
| Walk along a road where there are some shops | 53.6 | 29.4 | 17.1 |
| Walk along a road that can be seen from a first floor window | 67.5 | 15.9 | 17.1 |

Children also reported their perceived traffic safety and neighbourhood safety barriers. Most of the children reported that the pavement width was sufficient and they do not have to walk in the road or on the edge of the road. However, most of parents believe that the pavements are narrow. This may be explained because of the children's size; they compare the pavement width with their own size and think it is wide enough. The results are summarized in table 5.3.

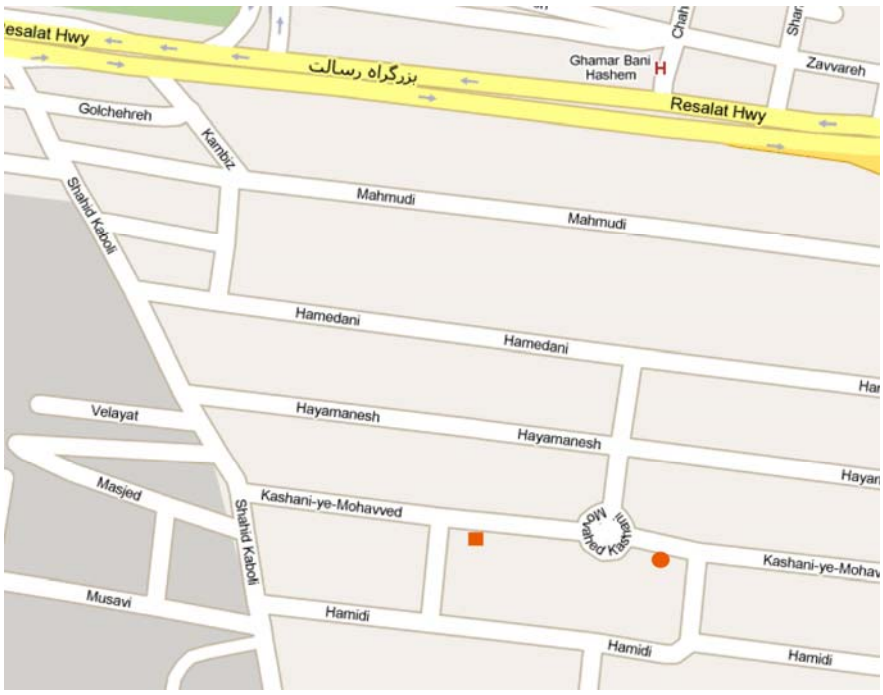
Table 5. 3: Children's perception of traffic safety and neighbourhood safety barriers in their walking to and from school

| If you were to walk to and from school or already do, would you have any of the following on your way to and from school? | Yes | No |
|---|---|---|
| Cross a road without a painted crosswalk | 46.4 | 39.2 |
| Frightened of having car accident because of high speed traffic | 46.1 | 49.8 |
| Walk in the road or on the edge of road because there is no pavement | 6.5 | 91.5 |
| Frightened of being abducted | 50.2 | 45.7 |
| Walk along the road where there are no police officers | 53.6 | 32.1 |

## 5.2 Descriptive results of urban design elements in neighbourhoods

Data was collected from the urban design characteristics for the neighbourhood surrounding each school site (see appendix C for measurement tools). A half kilometre was selected as a reasonable walking radius around each school based on the regulation concerning the registration of students in government primary schools, as was explained earlier in chapter 3 (Department of Facilitating and Renovating of Schools in Tehran, 2006). On the two days that data were collected in the field at each site (i.e. urban design observation), elements of the urban design that were hypothesized in literature as being related to children walking to and from school were recorded.

In fifteen school sites, the male and female schools were not located next to each other. Therefore, the neighbourhoods around both schools were measured (one male and one female). However, in the other three school sites, only a wall split the schools, thus, they were treated as one school. Map 5.0 shows the neighbourhood surrounding one of the school sites (Map 5.1).




Map 5. 1: The neighbourhood surrounding schools in district number 7
(red spots show the schools)

In total, 505 street segments were measured across 15 school sites, an average of 34 segments per study site. The minimum number of segments observed at a site was 30 and the maximum was 108. The urban design data collection took nearly 4 hours for each site.

The urban design data collection instrument included the following three sections: perceived traffic safety, perceived personal safety and actual traffic safety and personal safety. This included the elements of urban design that were suggested in the literature; also those mentioned by children and parents that impact children walking to and from school (McMillan, 2003). Table 5.4 summarizes the urban design characteristics assessed across the fifteen school sites, while table 5.5 presents a summary of the urban design data for each individual socio-economic status area.

Table 5. 4: Percentage of blocks within ½ km radius of school with urban design characteristics

| Neighbourhood characteristics | Average | Max | Min |
|---|---|---|---|
| **School location** | | | |
| Flat school neighbourhood area | 74.7% | 99.7% | 2.1% |
| Gentle slope school neighbourhood area | 19.2% | 97.9% | 0.0% |
| Steep slope school neighbourhood area | 5.9% | 68.2% | 0.0% |
| **Perceived traffic safety** | | | |
| Blocks with a complete pavement network (both sides) | 38.4% | 69.8% | 25.0% |
| Blocks with a complete pavement network (one side) | 46.3% | 75.0% | 30.2% |
| Blocks without pavement network | 15.2% | 22.2% | 0.0% |
| Blocks with complete buffered pavement network | 36.6% | 97.9% | 11.8% |
| Blocks with traffic speed limitation | 0.0% | 100.0% | 0.0% |
| Blocks with at least a neighbourhood park | 6.1% | 18.8% | 2.6% |
| Blocks with access to bus | 60.6% | 64.6% | 25.0% |
| Blocks with access to metro | 0.0% | 0.0% | 0.0% |
| Blocks with access to taxi | 97.2% | 100.0% | 96.0% |
| **Perceived crime safety** | | | |
| Blocks with first floor windows facing the street | 49.0% | 100.0% | 97.4% |
| Blocks with no abandoned buildings | 97.8% | 100.0% | 97.4% |
| Blocks with no vacant lots | 99.0% | 100.0% | 97.7% |
| Blocks with no graffiti | 86.1% | 93.8% | 83.3% |
| Blocks with no undesirable people | 27.1% | 80.2% | 11.0% |
| Neighbourhood with moderate density | 22.5% | 100.0% | 0.0% |

Table 5.4, continued

| | | | |
|---|---|---|---|
| Neighbourhood with low density | 23.2% | 68.2% | 0.0% |
| Neighbourhood with many pedestrians (adult & children) | 43.6% | 50.4% | 15.9% |
| **Actual traffic safety** | | | |
| Average of traffic lanes | 2 | 6 | 1 |
| Average street width (m) | 10 | 45 | 4 |
| Average pavement width (m) | 1.05 | 2 | 0 |
| Average of block length (m) | 166 | 750 | 30 |
| Blocks with traffic circles | 8.1% | 21.9% | 4.0% |
| Blocks with speed bumps | 97.6% | 100.0% | 96.5% |
| **Aesthetics** | | | |
| Blocks with street trees | 74.3% | 100.0% | 63.4% |
| Blocks with mixed land use | 70.7% | 93.2% | 35.4% |
| Blocks with public space | 10.3% | 31.3% | 3.7% |

*The values summarized across twelve school sites, average blocks assessed across 15 school sites = min= 0.0%, max=100%; (max and min in this table is related to each area)

Table 5.5**:** Percentage of blocks within ½ km radius of school with urban design characteristics across different areas

| Neighbourhood characteristics | High income areas | Middle income areas | Low income areas |
|---|---|---|---|
| **School location** | | | |
| Flat school neighbourhood area | 33.3% | 2.1% | 99.7% |
| Gentle slope school neighbourhood area | 9.1% | 97.9% | 0.0% |
| Steep slope school neighbourhood area | 57.6% | 0.0% | 0.0% |
| **Perceived traffic safety** | | | |
| Blocks with a complete pavement network (both sides) | 33.3% | 69.8% | 33.0% |
| Blocks with a complete pavement network (one side) | 66.7% | 30.2% | 45.0% |
| Blocks without pavement network | 0.0% | 0.0% | 21.9% |
| Blocks with complete buffered pavement network | 78.8% | 97.9% | 15.4% |
| Blocks with traffic speed limitation | 0.0% | 0.0% | 0.0% |
| Blocks with at least a neighbourhood park | 12.1% | 18.8% | 2.6% |
| Blocks with access to bus | 33.3% | 55.2% | 65.0% |
| Blocks with access to metro | 0.0% | 0.0% | 0.0% |
| Blocks with access to taxi | 100.0% | 100.0% | 96.0% |
| **Perceived crime safety** | | | |
| Blocks with first floor windows facing the street | 48.0% | 52.0% | 97.4% |
| Blocks with no vacant lots | 100.0% | 100.0% | 98.9% |
| Blocks with no graffiti | 90.9% | 93.8% | 86.6% |
| Blocks with no undesirable people | 33.3% | 82.0% | 14.0% |
| Blocks with no undesirable land use | 87.9% | 75.0% | 29.3% |
| Neighbourhood with high density | 0.0% | 0.0% | 100.0% |
| Neighbourhood with moderate density | 42.4% | 100.0% | 0.0% |
| Neighbourhood with low density | 57.6% | 0.0% | 0.0% |

Table 5.5, continued

| | | | |
|---|---|---|---|
| Neighbourhood with many pedestrians (adult & children) | 21.2% | 27.1% | 53.3% |
| **Actual traffic safety** | | | |
| Average of traffic lanes | 2 (2-4) | 3 (2-6) | 2 (1-6) |
| Average street width (m) | 10 (8-40) | 12 (8-30) | 9 (4-45) |
| Average pavement width (1m) | (0.6-1.5) | 1.3 (1-2) | 1 (0-2) |
| Average of block length (271m) | (100-750) | 179 (30-510) | 154 (55-420) |
| Blocks with traffic circles | 18.2% | 21.2% | 4.0% |
| Blocks with speed bumps | 100.0% | 100.0% | 96.6% |
| **Aesthetics** | | | |
| Blocks with street trees | 100.0% | 100.0% | 63.0% |
| Blocks with mixed land use | 90.9% | 35.4% | 80.3% |
| Blocks with public space | 24.2% | 31.3% | 4.0% |

Note: all values represent the percentages except for the average number of traffic lanes, average street width, average pavement width and average block length

### 5.2.1 Perceived traffic safety

The perception of the lack of traffic safety caused by the absence of pedestrian facilities may reduce the number children walking to and from school. Studies show that the presence or absence of facilities for pedestrian, increasing in traffic speed, separation between traffic and pedestrians affected people's perception of traffic safety (Beck & Greenspan, 2008). Street segments were assessed for the presence of pavements and how much separation was available from traffic for pedestrians. Approximately 38.4% of the blocks had a complete pavement network (i.e. pavements on both sides of the street). About 46.3% of the blocks had pavements on only one side and 15.2 % of them had no pavements at all (Figures 5.21, 5.22, 5.23).

Figure 5. 21: street with pavements on both sides in middle income areas

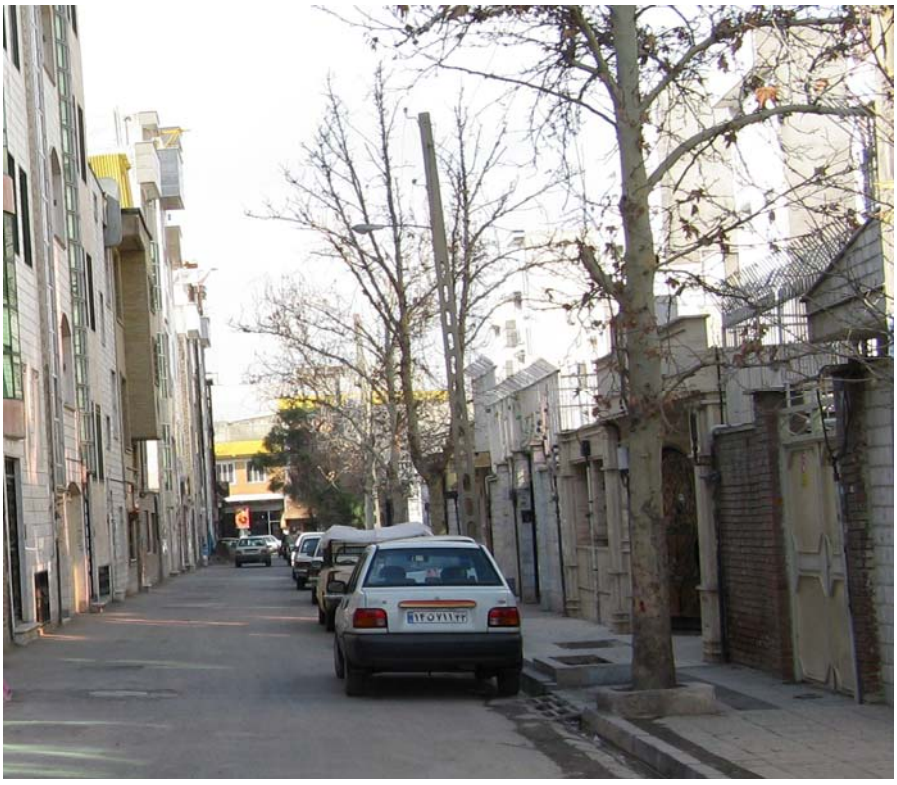


Figure 5. 22: street with pavements on one side in high income area

Figure 5. 23: street with no pavements at all in low income area

The street segments also were assessed for the presence of traffic speed limitation around the schools and accessibility to public transportation. There is no speed limitation in any of the neighbourhoods. Almost all the blocks around the school sites have easy access to taxi, however, the percentage decreased respectively for accessing the bus and metro. More than 50% of middle and low income areas have access to bus, while this percentage is lower (about 30%) for high income areas. However, none of the neighbourhoods have access to metro.

### 5.2.2 Perceived crime safety

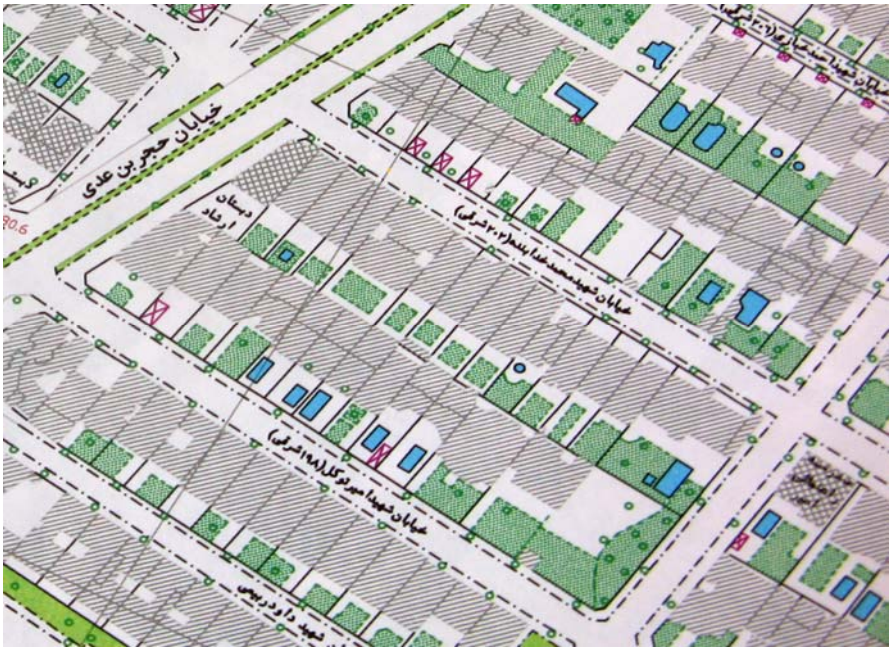
The parent comfort level about allowing children to walk to school on their own might be affected by elements of urban design that relate to safety and security (McMillan, 2003; Fyhri & Hjorthol, 2009; Timperio et al., 2006). Studies repeatedly show that personal safety issues are a prime concern for parents in choosing children's travel mode and are more important than traffic dangers (Granville et al., 2002, Yeung et al.,

2008, McNeill et al., 2006). Appleyard's work showed that pedestrian activity is associated with the level of personal safety within a neighbourhood and its' cleanliness as well (Appleyard, 1981). The "Broken Window Theory" also supports that maintaining a neighbourhood well may increase the perception of the safety (Harcourt & Ludwig, 2006, Sampson, 2003).

Elements such as only a few pedestrians on the street prevent walking within a neighbourhood (Johansson, 2003). However, this factor should be examined on a child's walking to and from school. Almost all of the measured blocks had first floor windows visible from the street and lacked vacant lots. This can be explained by the construction regulations in Tehran. All buildings must be constructed in the northern part of the site, and not exceed more than 60% of the length of the lot. Therefore, usually, buildings on one side of a street have first floor windows facing the road, and buildings on the other side of the street have windows facing their courtyard in front of them (municipality of Tehran)(Figure 5.24, map 5.2). However, the courtyards in Tehran have been separated from the street with a high fence or wall to block the view (>2m).

The majority of street segments did not have abandoned buildings or undesirable land use (i.e. CD shops for adults). Neighbourhood safety can also be improved via easy access to public transportation and floor retail units (McMillan, 2003; Van Dyck et al., 2009). Studies by Holt et al. (2009) determined that the presence of mixed land use was also associated with walking trips. In this study, the majority of school sites had mixed land-use.

Figure 5. 24: first floor windows facing the street on left and fences of the courtyards on right




Map5.2: location of buildings in a plot

Nearly 71 per cent of the blocks measured had first floor retail units; blocks in low-income areas had a higher rate with first floor retail units (Figure 5.25).


Figure 5. 25: the commercial floors in one of the neighbourhoods in Tehran

### 5.2.3 Actual traffic safety

The traffic condition in the neighbourhood streets affects children's walking to and from school. Studies show that traffic speed and volume are related to children pedestrian collisions (Miller et al., 2004; Zargar et al., 2003; Garder, 2004). Therefore, actual traffic safety was assessed by focusing on the physical characteristics of the street environment that would influence these two variables. The majority of segments assessed were residential streets, and the average number of traffic lanes was two (figure 5.26). The average street width across the school sites was 10 metres; the average block length was 166 metres and the pavement width averaged 1.05 metres. Traffic signals to stop cars were present for 29.5% of school sites. Nearly 8.1 % of blocks had traffic circles and all of the blocks had speed bumps. However, painted crosswalks and traffic calming elements were largely absent from the school sites. Only 14.1% of streets had crosswalks and 18.1 per cent of streets had traffic calming elements (figure 5.27).

Figure 5. 26: in front of the main gate of one the schools with two traffic lanes

Figure 5. 27: a street around one the schools with speed bumps and students who are walking

### 5.2.4 Aesthetics of the neighbourhood

The general aesthetics of the neighbourhood may impact on children's active commuting. Studies have shown that aesthetic features such as street trees, greenery and park spaces can encourage people to walk more (Pont et al., 2009). However, the presence of dense trees on the street may decrease the perception of safety in the neighbourhood and decrease the children's walking as well (Johansson, 2003). In this

study, over 74% of the blocks had street trees while; only 10.3% of blocks had public spaces. Mixed land use (any development other than residential within ½ km radius of the school) was present on 70.7% of blocks. Street furniture across school sites was only limited to bus stations. Sitting furniture was completely absent from the school sites. Figures 5.28 and 5.29 show the street trees and a small neighbourhood park in two neighbourhoods.

Figure 5. 28: street trees in one of the neighbourhoods from high-income areas

Figure 5. 29: a small park in a neighbourhood from low-income area

The next two chapters present the results of the regression. Chapter 6 tests the underlying assumption of the Safe School Environment programme in Iran of a direct relationship between traffic safety and children walking to school and presents other factors that influence the trip decision. Chapter 7 offers suggestions on how these factors actually relate to one another to determine which one prevents children from walking to school on their own. It also discusses whether these impediment factors vary across different socio-economic areas in Tehran.