Pedestrians’ perceptions of walkability and safety in relation to the built environment in Cali, Colombia, 2009–10

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ABSTRACT
Objective To assess pedestrians’ perceptions of the walkability of the urban environment and pedestrian safety in Cali, Colombia.

Design Standardised intercept interviews were conducted of 400 pedestrians walking in 20 randomly selected urban zones to ascertain frequency of walking, and perceptions of safety, the built environment and security. Four focus group meetings were held with community members and students addressing these issues in an open-ended forum. The study analysed quantitative data collected in street interviews and qualitative information from focus groups addressing respondents’ views on problems for pedestrians, how the built environment affects walking and ideal walking conditions.

Results Access to public transportation was deemed the most positive characteristic of the built environment and 61% of respondents liked walking in the street. When disaggregating street conditions, the majority of pedestrians were dissatisfied with their walking experiences. Pedestrians cited lack of respect for norms, personal safety and built environment characteristics as their main concerns. Among frequent walkers, residents tended to rate their neighbourhoods more negatively compared with non-residents. Through qualitative interviews it became apparent that narrow sidewalks that are frequently obstructed by motor vehicles are a key reason for pedestrian dissatisfaction. A perception of overall insecurity further determines how pedestrians assess or modulate their walking in this city.

Conclusions Overall, walking in Cali was perceived negatively by pedestrians because of built environment characteristics and perceptions of insecurity. Qualitative information used to complement intercept surveys can provide a better way to identify pedestrian-specific transport-related problems.

Pedestrians are the most common victims of transportation-related fatalities in middle and low-income countries.1–3 In Colombia, injuries are the second cause of mortality after cardiovascular diseases.4 Traffic injuries were the second cause of injury mortality in the country (19%) after interpersonal violence (38%) in 2010; pedestrians accounted for 31% of traffic fatalities and 28% of injuries.5 Previous studies suggest that up to 60% of traffic injuries in Colombia affect pedestrians.6 The Cali injury surveillance system reported that 34.5% of deaths in 2009 were among pedestrians, the second highest proportion after motorcycle deaths. Although pedestrian injuries have historically been a problem in Cali,7 little is known about pedestrians’ attitudes towards walking and transportation safety.

Most studies on walkability have been conducted in high-income countries and have examined walkability in the context of opportunities for physical activity,8 9 urban form10 and pedestrian and traffic safety.9–13 Some studies14 15 found that crashes were more common in high traffic density areas where pedestrians paradoxically had lower perceptions of traffic-related safety, and another study reported that pedestrians generally perceived their environment was less safe compared with non-pedestrians.16 These studies suggest that pedestrians’ perceptions are important because they can modulate behaviours independent of the built environment. We defined built environment as all buildings, spaces and infrastructure that are created or modified by people including land use and transportation systems.

In middle and low-income countries, studies have examined pedestrian safety with regard to specific engineering or behavioural interventions,17 18 but few have explored pedestrians’ perceptions of walkability in relation to the built environment. Four studies in Colombia examined walking behaviours. One studied the built environment and walking among older pedestrians,18 another assessed attitudes towards different modes of transportation,19 a third addressed pedestrian attitudes and behaviours (mostly among men) in places of high incidence of traffic crashes,17 and a fourth studied road facility designs, land use and density as modulators of walking and cycling.20 To our knowledge, this is the first citywide study examining pedestrians’ perceptions of the built environment and attitudes towards walking and personal safety among the general population and by residence status in the neighbourhood.

METHODS
We used pedestrian intercept interviews and focus groups to study pedestrians’ perceptions of walking and safety in relation to the built environment.

Pedestrian intercept interviews
Sample characteristics
The city of Cali has 22 geo-administrative areas called communes (comunas) composed of 339 neighbourhoods. We randomly selected 20 intersections within the city. To ensure wide variability,
we randomly selected 20 communes and did a stratified random selection of a neighbourhood within each commune. Once 20
neighbourhoods were selected, we randomly identified an intersection to conduct our measurements. Between June 2009
and January 2010, 20 interviews per intersection were conducted
for a total of 400.

Data collection
Pedestrian flow and traffic can be different depending on the
corner of a specific intersection, therefore we conducted five
interviews in each of the four corners of each intersection. Each
interviewer asked the first pedestrian they encountered if they
would agree to a 5–15 min interview and kept asking subse-
quent pedestrians crossing their path until five interviews were
completed. Interviews were conducted between 09:15 and 19:30
hours, mostly during weekdays (38%).

Measurement tool
Measurement tools on the perceptions of the built environment
and physical activity have been validated in other settings.21 22
Our data collection instrument, caminabilidad y transporte
urbano (walkability and urban transportation), incorporated
questions from two existing questionnaires, the neighborhood
environment walkability scale23 and a pedestrian survey ques-
tionnaire from the US Transportation Research Board.24 Questions
were translated into Spanish and back-translated to ensure
content fidelity.

The measurement instrument had nine sections: (1) date,
time, neighbourhood number, corner of intersection; (2) inter-
vewee’s residence status in neighbourhood; (3) reasons for
walking at the time of interview and frequency of walking in
that area; (4) modes of transport used before arrival to the
intersection and intended modes of transport to be used after-
wards; (5) perceptions about walking satisfaction and traffic
safety; (6) perceptions of safety in relation to crime; (7) overall
satisfaction with the built environment and access to the area;
(8) interviewee’s sex, age and occupation; and (9) any additional
comments. An agreement scale (definitely disagree, somewhat
disagree, somewhat agree, definitely agree, don’t know/no
answer) was used for sections 5–7. We also asked respondents if
they had been in a traffic crash during the past 5 years, had been
injured in the latest such crash, had been a pedestrian in that
event, or had been attacked or mugged anywhere in the city
during the time period.

Data analysis
We calculated frequencies and proportions of responses overall
and compared pedestrian characteristics and perceptions for
residents and non-residents in the neighbourhood where they
were interviewed. Because frequent pedestrians are likely to have
a better understanding of the areas in which they walk, we
separately examined results for people who reported walking at
least once a week or daily in the neighbourhood. We also
examined pedestrians’ perceptions in relation to the urban
characteristics of the neighbourhood.

Focus groups
Samples
Four focus group discussions were aimed at addressing pedes-
trian walking and safety themes in depth; two from the com-

munity and two from student groups at the university. We
invited community members to participate through the Junta
de Acción Comunal (civil society organisations that foster
citizen participation in community decisions).25 Based on
previous traffic injury surveillance data,26 we selected one
community with historically high levels of traffic injuries and
dense traffic and one with historically lower rates of injuries and
less traffic. We also conducted two focus groups among students
of human rehabilitation and civil engineering at the University
of El Valle. These students were likely to be frequent pedestrians,
sensitive to pedestrian and built environment issues because of
their main topics of study, and have different socioeconomic
backgrounds. The institutional review boards of both the
University of El Valle and the University of North Carolina
approved the study, and all participants provided informed
consent.

Data collection
Group discussions, moderated by trained facilitators, followed
five broad themes addressing similar topics covered in the
pedestrian intercept interviews: (1) general pedestrian safety
perceptions and compliance with the law; (2) perceptions of
traffic when using other modes of transportation; (3) percep-
tions of the built environment; (4) ideal conditions for pedes-
trian environments; and (5) positive and negative experiences
related to traffic and personal safety while walking. Each focus
group lasted approximately 1 h and discussions were recorded
and transcribed.

RESULTS
Pedestrian intercept interviews
Participant characteristics
Forty-one per cent of respondents were residents of the neigh-
bourhood where their interview took place. Forty-three per cent
were women; over 90% were between 18 and 65 years old, with
the largest age group 36–45 years (23%). The most common
occupations were sales (26%) and professional or technical jobs
(19.3%), but a substantial percentage of respondents were
unemployed or retired (32%) (table 1). Almost half of the
respondents reported they walked everyday, and 29% indicated
that they walked at least once a week in the area where they
were interviewed. Fifty-three respondents (13.3%) had been
involved in traffic crashes in the past 5 years, and of those 37
(60%) had been injured and 21 were injured as pedestrians.

Modes of transportation
Fifty-eight per cent of respondents arrived at the intersection
eclusively by foot, 34% by bus, 4.3% in two-wheeled vehicles
and 3.5% in four-wheeled vehicles. When asked about their
intent to use other modes of transportation during that trip,
26.3% indicated they intended to use bus public transportation,
5% private four-wheeled vehicles and 0.8% two wheelers.
Reasons for the current trip included errands or shopping
(46.2%), commuting between home and work or school (35.3%)
and walking recreationally (15.5%).

Pedestrians’ perceptions
Approximately 90% of interviewees agreed or strongly agreed
that traffic was too heavy in the immediate area where they
were interviewed, but 61% liked walking there (table 2). Two-
thirds agreed or strongly agreed that drivers exceeded speed
Walking frequency

Reasons for walking (this trip)

Occupation groups

Transport modes before interview

Intended use of other mode

Reported injuries in past 5 years

Continued

Variable | Resident No. (%) | Non-resident No. (%) | All No. (%)
--- | --- | --- | ---
Interviewed pedestrians | 163 (40.7) | 237 (59.3) | 400 (100)
Sex | | | 
Male | 86 (52.8) | 140 (59.3) | 226 (56.5)
Female | 77 (47.2) | 97 (40.9) | 174 (43.5)
Age group, years | | | 
18–25 | 25 (15.3) | 46 (19.4) | 71 (17.8)
26–35 | 30 (18.4) | 51 (21.5) | 81 (20.3)
36–45 | 37 (22.7) | 57 (24.1) | 94 (23.5)
46–55 | 34 (20.9) | 40 (16.9) | 74 (18.5)
56–65 | 22 (13.5) | 25 (10.6) | 47 (11.8)
66–75 | 14 (8.6) | 15 (6.3) | 29 (7.6)
75 or more | 1 (0.6) | 3 (1.3) | 4 (1.0)
Occupation groups† | | | 
Professional, technical and related | 32 (19.6) | 45 (19.0) | 77 (19.3)
Administrative and managerial | 6 (3.7) | 8 (3.4) | 14 (3.5)
Clinical and related | 1 (0.6) | 0 (0.0) | 1 (0.3)
Sales | 35 (21.5) | 71 (29.9) | 106 (26.5)
Service workers | 9 (5.5) | 18 (7.5) | 27 (6.8)
Agricultural, fishermen and hunters | 0 (0.0) | 0 (0.0) | 0 (0.0)
Production, transport and labourers | 9 (5.5) | 11 (4.6) | 20 (5.0)
Other non-classifiable and informal | 8 (4.9) | 12 (5.1) | 20 (5.0)
Non-employed or retired | 61 (37.4) | 67 (28.3) | 128 (32.0)
Military and security forces | 2 (1.2) | 5 (2.1) | 7 (1.8)
Reasons for walking (this trip) | | | 
Between work/study and home | 55 (33.7) | 86 (38.3) | 141 (35.3)
Shopping or errands | 76 (46.6) | 110 (46.0) | 186 (46.5)
Recreation, sport, visiting friends | 29 (17.8) | 33 (13.9) | 62 (15.5)
Other (ie, church or doctor visit) | 3 (1.8) | 8 (3.4) | 11 (2.7)
Walking frequency | | | 
First time | 0 (0.0) | 5 (2.1) | 5 (1.3)
Rarely (once every 6 months or less) | 6 (3.7) | 15 (6.4) | 21 (5.3)
Occasionally (once a month) | 5 (3.1) | 61 (25.8) | 66 (16.5)
Frequently (once a week) | 46 (28.2) | 68 (28.8) | 114 (28.5)
Every day | 106 (65.0) | 87 (36.9) | 193 (48.3)
Missing | 0 | 1 | 1
Transport modes before interview‡ | | | 
By foot | 131 (80.4) | 102 (43.0) | 233 (58.3)
Bicycle | 2 (1.2) | 7 (2.9) | 9 (2.3)
Bus or similar public transportation | 26 (15.9) | 109 (46.0) | 135 (33.7)
Motorcycle | 1 (0.6) | 7 (2.9) | 8 (2.0)
Private vehicle or taxi | 3 (1.8) | 11 (4.6) | 14 (3.5)
Other | 0 (0.0) | 1 (0.4) | 1 (0.3)
Intended use of other mode§ | | | 
By foot | 117 (71.8) | 163 (68.8) | 280 (70.0)
Bicycle | 0 (0.0) | 2 (0.8) | 2 (0.5)
Bus or similar public transportation | 39 (23.9) | 66 (27.9) | 105 (26.3)
Motorcycle | 1 (0.6) | 0 (0.0) | 1 (0.3)
Private vehicle or taxi | 6 (3.7) | 6 (2.5) | 12 (3.0)
Other | 0 (0.0) | 0 (0.0) | 0 (0.0)
Reported injuries in past 5 years | | | 
Reported traffic event involvement | | | 
No | 142 (87.1) | 204 (86.4) | 346 (86.7)
Yes | 21 (12.9) | 32 (13.6) | 53 (13.3)
No answer | 0 | 1 | 1
Reported being injured in traffic event | | | 
No | 139 (90.8) | 210 (90.1) | 349 (90.4)
Yes | 14 (9.2) | 23 (9.9) | 37 (9.6)
No answer | 10 | 4 | 14

*Percentages may not add due to rounding.
†Occupational classification follows the international standard classification of occupations.‡
‡Mode of transportation used before arrival to interview point.§Intended use of other mode(s) of transportation upon completion of interview.
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limits while driving, and almost 60% believed pedestrian signals were inadequate. Fifty-nine per cent reported that crossing the street was difficult. Half of the interviewees thought that crime was excessive in the area, but 66% deemed the areas relatively safe during daytime, with the same proportion reporting the same streets were unsafe at night. Nearly a quarter of respondents had experienced a personal attack in the past 5 years. Opinions were diverse on neighbourhood characteristics, with most respondents satisfied with cleanliness and the availability of commercial outlets, markets, schools and nightclubs and bars. Over three-quarters of respondents were satisfied with vehicular or pedestrian travel time in the area and over 80% were satisfied with access to public transportation. In contrast, approximately 70% of respondents were dissatisfied with air pollution or noise, 60% were dissatisfied with overall neighbourhood safety, and 70% thought there was not enough police presence in the area.

Residents versus non-residents comparisons

There were differences between the perceptions of residents and non-residents who walked in the neighbourhood at least once a week or on a daily basis. Residents judged their neighbourhoods as less safe, harder to walk in, less clean and in more need of physical improvements (table 3).

Focus groups

Two major themes that emerged were problems related to walkability and problems related to personal safety. Participants said walking was negatively affected by the invasion of pedestrian public space by street sellers, furniture from restaurants or bars and parked automobiles. They also mentioned that pedestrian public space by street sellers, furniture from restaurants or bars and parked automobiles. They also mentioned that pedestrian infrastructure (eg, sidewalks, bridges, etc) was sometimes too narrow to walk in, not well maintained, and lacked adequate facilities (table 3).

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*Group from commune 6*

In regard to safety, participants mentioned that drivers had a lack of respect for traffic rules in relation to pedestrian crosswalks and traffic control signals.

*Group from commune 21*

...One feels vulnerable at all times even when the pedestrian light is green, one waits to see what drivers will do because they can continue without stopping.**

(Civil engineering group)
Use of pedestrian bridges was influenced by the quality of illumination and the perception of security. Bridges or road segments with traffic-calming devices were avoided in areas where muggings are more prevalent.

"...In pedestrian bridges people prefer to cross the street under because they [bridges] are not safe. The problem is security. Kids and women get robbed and their belongings taken from them." (Group from commune 6)

"...In some places traffic-calming measures are not advisable [for car occupants] because thieves take advantage of slow speeds to do carjackings." (Group from commune 21)

Participants mentioned that the lack of buffers between sidewalks and roads increased walking hazards. Some thought the police were deficient in enforcing existing laws and many expressed a heightened sense of vulnerability as pedestrians and judges’ behaviours as generally irresponsible. Paradoxically, many pedestrians in the groups identified themselves as transgressing the law. The concept of ‘culture’ emerges from these focus groups as a reason for justifying certain behaviours:

"...It is not worth having ideal infrastructure conditions if there is no culture among pedestrians; the city has bridges and pedestrians don’t use them. Kids should be taught to be good pedestrians and fines for pedestrians should be implemented." (Group from commune 21)

Additional elements mentioned by participants and related to ‘culture’ understood as general lack of respect for traffic norms in the population included jaywalking and lack of respect for traffic control devices among drivers. People also expressed that noise was a concern in several areas.

"...There are some areas that are nice for walking but in places like downtown or near the ‘autopista’ [freeway], people honk a lot, street sellers yell and the noise of radios or commercial activities at full volume are annoying." (Group from commune 6)

Table 2 Perceptions of traffic safety, personal safety, and urban structure of 400 pedestrians who responded to intercept interviews in Cali, Colombia, 2009–10

<table>
<thead>
<tr>
<th>Perceptions of traffic safety, personal safety, and urban structure</th>
<th>Strongly disagree No. (%)</th>
<th>Disagree No. (%)</th>
<th>Agree No. (%)</th>
<th>Strongly agree No. (%)</th>
<th>DK/ NR* No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions of safety and traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too much traffic</td>
<td>18 (4.5)</td>
<td>21 (5.3)</td>
<td>67 (16.8)</td>
<td>291 (72.7)</td>
<td>3 (0.7)</td>
</tr>
<tr>
<td>I like walking in this street</td>
<td>73 (18.3)</td>
<td>77 (19.3)</td>
<td>154 (38.5)</td>
<td>91 (22.7)</td>
<td>5 (1.2)</td>
</tr>
<tr>
<td>I’m forced to walk here due to traffic</td>
<td>212 (53.0)</td>
<td>122 (30.5)</td>
<td>36 (9.0)</td>
<td>24 (6.0)</td>
<td>6 (1.5)</td>
</tr>
<tr>
<td>Traffic here is slow. Too much traffic</td>
<td>98 (24.5)</td>
<td>104 (26.0)</td>
<td>81 (20.3)</td>
<td>108 (27.0)</td>
<td>9 (2.3)</td>
</tr>
<tr>
<td>Most drivers exceed speed limits</td>
<td>52 (13.0)</td>
<td>73 (18.3)</td>
<td>139 (34.8)</td>
<td>124 (31.0)</td>
<td>12 (3.0)</td>
</tr>
<tr>
<td>Pedestrian signals are adequate here</td>
<td>147 (36.8)</td>
<td>99 (24.8)</td>
<td>66 (16.5)</td>
<td>84 (21.0)</td>
<td>4 (1.0)</td>
</tr>
<tr>
<td>Signals here make me feel safer</td>
<td>134 (33.5)</td>
<td>102 (25.5)</td>
<td>79 (19.8)</td>
<td>80 (20.0)</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>There is too much pollution here</td>
<td>55 (13.8)</td>
<td>94 (23.5)</td>
<td>88 (22.0)</td>
<td>155 (38.8)</td>
<td>8 (2.0)</td>
</tr>
<tr>
<td>This street is easy to cross</td>
<td>149 (37.7)</td>
<td>83 (20.8)</td>
<td>75 (18.8)</td>
<td>88 (22.0)</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>Perceptions of safety and crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streets are well lit at night in this neighbourhood</td>
<td>66 (16.0)</td>
<td>59 (14.8)</td>
<td>84 (21.0)</td>
<td>89 (22.3)</td>
<td>104 (26.0)</td>
</tr>
<tr>
<td>There is a lot of crime in this neighbourhood</td>
<td>55 (13.8)</td>
<td>93 (23.3)</td>
<td>110 (27.5)</td>
<td>86 (21.5)</td>
<td>56 (14.0)</td>
</tr>
<tr>
<td>It is unsafe to walk here during the day</td>
<td>159 (39.8)</td>
<td>103 (25.8)</td>
<td>91 (22.8)</td>
<td>33 (8.3)</td>
<td>14 (3.5)</td>
</tr>
<tr>
<td>It is unsafe to walk here at night</td>
<td>32 (8.0)</td>
<td>39 (9.8)</td>
<td>97 (24.3)</td>
<td>157 (39.3)</td>
<td>75 (18.8)</td>
</tr>
<tr>
<td>Perceptions of urban characteristics that respondents considered acceptable in neighbourhood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No of pedestrian crossings of any type</td>
<td>97 (24.3)</td>
<td>103 (25.8)</td>
<td>112 (28.0)</td>
<td>65 (16.3)</td>
<td>23 (5.8)</td>
</tr>
<tr>
<td>Vehicular access to this street</td>
<td>30 (7.5)</td>
<td>56 (14.0)</td>
<td>152 (38.0)</td>
<td>143 (35.8)</td>
<td>19 (4.8)</td>
</tr>
<tr>
<td>Access to public transportation in this street</td>
<td>26 (6.5)</td>
<td>44 (11.0)</td>
<td>138 (34.5)</td>
<td>182 (45.5)</td>
<td>10 (2.5)</td>
</tr>
<tr>
<td>Time to travel in vehicle through this street</td>
<td>25 (6.3)</td>
<td>67 (16.8)</td>
<td>202 (50.5)</td>
<td>94 (23.5)</td>
<td>12 (3.0)</td>
</tr>
<tr>
<td>Time to walk through this street</td>
<td>53 (13.3)</td>
<td>52 (13.0)</td>
<td>176 (44.0)</td>
<td>112 (28.0)</td>
<td>7 (1.8)</td>
</tr>
<tr>
<td>Street cleanliness</td>
<td>90 (22.5)</td>
<td>63 (15.8)</td>
<td>136 (34.0)</td>
<td>106 (26.5)</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>Noise in this street</td>
<td>156 (39.0)</td>
<td>121 (30.3)</td>
<td>77 (19.3)</td>
<td>41 (10.3)</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>No of restaurants</td>
<td>67 (16.8)</td>
<td>72 (18.0)</td>
<td>129 (32.3)</td>
<td>95 (23.8)</td>
<td>37 (9.3)</td>
</tr>
<tr>
<td>No of supermarkets and markets</td>
<td>47 (11.8)</td>
<td>56 (14.0)</td>
<td>142 (35.5)</td>
<td>127 (31.8)</td>
<td>28 (7.0)</td>
</tr>
<tr>
<td>No of shops</td>
<td>73 (18.3)</td>
<td>61 (15.3)</td>
<td>130 (32.5)</td>
<td>111 (27.8)</td>
<td>25 (6.3)</td>
</tr>
<tr>
<td>No of schools</td>
<td>73 (18.3)</td>
<td>58 (14.5)</td>
<td>96 (24.0)</td>
<td>95 (23.8)</td>
<td>78 (19.5)</td>
</tr>
<tr>
<td>No of bars, discos and clubs</td>
<td>83 (20.8)</td>
<td>70 (17.5)</td>
<td>109 (27.3)</td>
<td>61 (15.3)</td>
<td>77 (19.3)</td>
</tr>
<tr>
<td>Overall safety</td>
<td>112 (28.0)</td>
<td>106 (26.5)</td>
<td>123 (30.8)</td>
<td>45 (11.3)</td>
<td>14 (3.5)</td>
</tr>
<tr>
<td>Police and security services</td>
<td>143 (35.8)</td>
<td>114 (28.5)</td>
<td>76 (19.0)</td>
<td>47 (11.8)</td>
<td>20 (5.0)</td>
</tr>
</tbody>
</table>

* Percentages may not add due to rounding.
\* Did not know or no response.
Colombia. The invasion of pedestrian spaces by cars or motorcycles, narrow sidewalks, obstacles in sidewalks, non-compliance with norms by users, and increased personal insecurity were key elements affecting the overall perceptions of walking experiences in the city. Although individual characteristics and crash engineering approaches are important, planning and wide-scale built environment contexts also contribute to explain (and improve) safety outcomes.14 29 In this case, the lack of a safety culture among the population in general and a built environment favouring motorised transport over pedestrians and cyclists emerged as prominent explanations for perceived safety outcomes.

While our results showed no substantial differences by age or sex, there were differences by pedestrians’ neighbourhood residential status. Residents tended to rate neighbourhoods and safety more negatively than non-residents but were more satisfied with neighbourhood services. Most residents presumably had more information than non-residents about their neighbourhood, although we did not collect data regarding the time the respondents lived in their current residence. Pedestrians’ perceptions have had low agreement with objectively measured neighbourhood characteristics in several studies.13 14 30 Our finding of differences among residents and non-residents implies that perceptions are related to the person’s uses and expectations for the neighbourhood. Pedestrians deemed access to public transportation as the most positive characteristic of the city, and study participants thought that the new bus rapid transit system was an improvement over the traditional buses.

Focus groups provided us with a more comprehensive understanding of pedestrians’ perceptions of walking, and group discussions mirrored some of the same issues found in the interviews. Through the focus groups it became clearer that pedestrian dissatisfaction was specifically related to motor vehicles or motorcycles invading narrow sidewalks and the lack of traffic signals. The generalised perception of unsafe environments increases pedestrians’ and other users’ risky behaviours (ie, by not using pedestrian bridges or not stopping at traffic lights). From the discussions in focus groups, participants mentioned a ‘lack of culture’ or ‘lack of respect for traffic norms’. In this sense, findings from this study coincide with a previous survey conducted in this city in 2005 that highlighted pedestrians’ lack of respect for traffic norms,17 although the current study also identified motorists’ lack of respect for safety regulations and behaviours.
There are elements that complement this notion of lack of respect for norms as the only modulator for pedestrian behaviours. Built environment characteristics also precluded pedestrians from engaging in desired behaviours and modulated interactions between different users or between users and their surroundings (eg, walking on narrow sidewalks, in streets without signals, or walking in the street because motor vehicles were parked on the sidewalks or walking in areas with no signals). Apart from the concept of a general lack of respect for traffic norms that emerged, participants highlighted the benefits of environmental modifications implemented for the construction of the bus rapid transit system, which widened sidewalks, improved access for pedestrians, and increased control signals or traffic-calming measures for motor vehicles. Environmental modifications were interpreted as positive changes that improved interactions between pedestrian and motor vehicle traffics. Participants recognized that adequate planning was reflected in these modified bus rapid transit areas.

This study had some limitations. We used a convenience sample. However, it was a large sample with mostly frequent walkers. Due to security concerns we did not collect information during night times. When collecting pedestrian information, the times of interviews are important because in the evenings behaviours and users are different compared with day times. We did not collect information about perceptions of other subpopulations such as mobility-impaired individuals nor in relation to the use of traffic-calming devices in relation to personal security. However, this topic was extensively addressed in the focus group discussions in which environmental deficiencies for disabled populations and older pedestrians emerged and issues of personal security conflicting with traffic safety devices were also mentioned. While we did not measure our overall response rate for all intersections, we did so for measurements conducted in communes 1–5 only where we found response rates were 90%. Although not measured, similar interviewers did not report decreases in response rates for other areas.

A major strength of our study was the combination of quantitative and qualitative information to assess pedestrian perceptions of safety and walkability. The random sampling of intersections also provided us with opportunities to interview people in different neighbourhoods, in areas with different land uses and socioeconomic levels. The selection of focus groups from different socioeconomic levels also allowed greater ability to generalise our findings. Furthermore, the comparison between residents’ and non-residents’ perspectives provided useful insights into how these subpopulations perceive known urban environments.

These findings are informative for city planners and authorities, but also provide opportunities for comparing pedestrian perceptions with actual observations of the built environment. Two US studies by McGinn and colleagues found that evaluator perceptions with actual observations of the built environment.

What is already known on the subject

- Pedestrian injuries are a common source of road traffic injuries worldwide.
- Fatal pedestrian injuries constitute the largest percentage of fatal road traffic injuries in Colombia but are the second cause of mortality in Cali, after motorcycle injuries.
- Few studies have explored perceptions of walkability and traffic safety in relation to the built environment in low and middle-income countries.

What this study adds

- In Cali, Colombia, a large proportion of pedestrians perceive that walking in the city is unsafe because of poor compliance with traffic rules by all users but also because of the characteristics of the city infrastructure.
- Traffic-calming and traffic safety measures are not always perceived as useful because of personal security concerns.
- In environments where walking experiences are perceived negatively it is harder to promote healthy habits.

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Contributors AV and DR designed the study. All other authors had substantial contributions in the acquisition of data. LAN, DO and JFR analysed the qualitative data. LAN, DO and JFR were responsible for the preparation of the final manuscript. All authors reviewed the manuscript and approved the final version.

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REFERENCES


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**Methadone overdoses**

Nearly a third of the 15 500 Americans who die each year of a prescription drug overdose are involved with methadone. As well as its longstanding use in the treatment of addiction it is now being used to treat pain. CDC results showed that six times as many people died of methadone overdoses in 2009 as in 1999. To prevent these deaths, states are urged to develop prescribing guidelines and use drug monitoring while healthcare providers are asked to screen for substance abuse, limit quantities, monitor patients on high doses and better educate patients.

**Dangerous wire grill-cleaning brushes**

A CDC report urges extra care with food eaten off grills cleaned with wire brushes after six injuries were documented. Apparently the bristles became lodged in the barbecued food and in turn punctured soft tissues in the neck or gastrointestinal tract causing pain while swallowing or pain in the abdomen. Doctors used scans to see the bristles. In three of the cases, pain while swallowing was the main symptom; for the other three cases, pain in the abdomen was the primary symptom.
Pedestrians' perceptions of walkability and safety in relation to the built environment in Cali, Colombia, 2009–10

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