

The Ciclovía and Cicloruta Programs: Promising Interventions to Promote Physical Activity and Social Capital in Bogotá, Colombia

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The extensively documented health benefits of regular physical activity (PA)¹ and its relevance for global public health^{2,3} have brought increasing attention to the implementation of community-based strategies in Bogotá^{4,5} and other Latin American cities.^{5,6} Evidence suggests that the implementation of strategies to enhance built and social environments is essential to effectively increase PA and to improve health and quality of life.^{7,8}

Bogotá has been recognized for the implementation of policies and built environment changes that have increased access to recreational programs, as well as for promoting public transportation and active commuting.^{4,9} Two of the widely praised approaches the city has implemented are the Ciclovía program and the network of bicycle paths, called Cicloruta.⁴ Both initiatives have strong potential to increase PA levels in Bogotá.^{10,11}

THE CICLOVIA AND CICLORUTA PROGRAMS

The Ciclovía program is a community-based program in which streets are temporarily closed to motorized vehicles to allow exclusive access for pedestrians, cyclists, skaters, and others for active recreation.¹⁰ Currently, Ciclovía involves a circuit of 121 kilometers (75 miles) of main avenues,⁵ which are closed every Sunday and holiday (72 events per year, from 7 AM to 2 PM).¹⁰ Estimates suggest that there are 600 000 to 1 400 000 participants each Sunday. The Ciclovía program was found to be cost-beneficial for the city.¹²

The Cicloruta is the most extensive bicycle path network in Latin America,¹³ with 300 kilometers (186.4 miles) of cycling paths. The paths connect to public transportation and provide access to many destinations in the city.⁴

Objectives. We compared participants from the Ciclovía (streets temporarily closed to motorized vehicles and open for pedestrians) and Cicloruta (bicycle paths) programs in Bogotá, Colombia, to assess associations of program participation with physical activity, safety, social capital, and equity.

Methods. We conducted 2 cross-sectional studies in October 2009 with intercept surveys: one among 1000 Ciclovía participants and the other among 1000 Cicloruta participants.

Results. Most Ciclovía participants met the physical activity recommendation in leisure time (59.5%), and most Cicloruta participants met it by cycling for transportation (70.5%). Ciclovía participants reported a higher perception of safety (51.2% regarding traffic and 42.4% about crime) and social capital (odds ratio = 2.0; 95% confidence interval = 1.4, 2.8) than did Cicloruta users. Most Cicloruta users reported living in low socioeconomic status categories (53.1%), had lower educational attainment (27%), and did not own cars (82.9%). Most Ciclovía participants reported living in middle socioeconomic status categories (64%), had low-to-middle educational attainment (51.1%), and did not own cars (66.1%).

Conclusions. The Ciclovía and Cicloruta programs have the potential to equitably promote physical activity and provide a mobility alternative in complex urban settings such as Bogotá. (*Am J Public Health.* 2013;103:e23–e30. doi:10.2105/AJPH.2012.301142)

The exponential growth of Ciclovías around the world,¹⁴ especially in the Americas,¹⁰ and the strong evidence of Cicloruta's international impact^{15–17} should be acknowledged. A systematic review conducted in 2008 found 57 Ciclovía programs in the Americas, 38 of which were active and regular, and 9 of which were in the United States.¹⁰ A recent review conducted in the United States showed 67 documented Ciclovía initiatives in North America, referred to as Open Streets,¹⁸ indicating the expansion of these programs beyond Latin America. The Ciclovías have also been shown to be programmatic interventions that can promote cycling across a population.¹⁶ Equally important is the evidence that the provision of separate cycling paths along the roads (Cicloruta) has been significantly associated with increased cycling for transportation in Europe,^{16,17} the United States,¹⁶ and Canada.¹⁵ In addition, studies indicate that strategies such as the

Ciclovía and Cicloruta carry public health cobenefits, such as improved quality of life,¹⁹ better air quality,^{20,21} health,¹¹ and the promotion of social capital (SC), safety, and equity.²²

SOCIAL CAPITAL, ENVIRONMENT, AND PHYSICAL ACTIVITY

For this study we defined SC as features of social organization, such as networks, norms, and social trust, that facilitate coordination and cooperation for mutual benefit.²³ Constructs of SC, including shared values,²⁴ cooperation,²⁴ social participation,²⁵ and collective efficacy (a form of SC that combines “social cohesion with the willingness to intervene on behalf of the common good”),^{26(p918)} have been shown to be associated with health-related outcomes and well-being. Constructs of SC have also been linked to the built environment,²⁷ which

can influence social interactions and perceptions of social environment²⁴ and safety.²⁶

We defined equity as an ethical concept of social justice and fairness,²⁸ where “people’s needs, rather than their social privileges, guide the distribution of opportunities for well-being.”^{29(p173)}

In this study we considered neighborhood socioeconomic status (SES) as an equity indicator because it is the standardized scale used in Bogotá to classify neighborhoods on the basis of income, location, surrounding areas, and urban characteristics.³⁰ Studies have indicated that income inequality is associated with low SC, poor health, and less socially cohesive environments, which often generate higher crime rates.³¹ By contrast, parks with higher SC levels are associated with an increased perception of safety, which has been attributed to positive social norms, lower levels of antisocial behaviors,³² and the natural surveillance generated by increased pedestrian traffic.²⁵ High SC levels have also been associated with preventing and decreasing crime, buffering socioeconomic inequalities³³ and protecting the health of those living in disadvantaged conditions.³¹ Parks with higher SC have also shown more users and higher levels of physical activity.^{25,34}

There is growing evidence of the impact of policies and environmental interventions to promote PA and other health-related and social benefits. But few studies have explored the potential outcomes of the Ciclovía and Cicloruta programs in Bogotá,^{4,5,10} and none have compared the users of the 2 programs to better understand how the programs function, influence various aspects of the city, and can be enhanced. The purpose of this study was to characterize the Ciclovía and Cicloruta participants and compare the programs to explore how program participation is related to PA, safety perception, SC, and equity.

METHODS

The data for this study were collected in Bogotá, Colombia. Bogotá has a population of 7 647 366³⁵ and is a city with high rates of homicide, interpersonal violence, traffic-related mortality,³⁶ robbery, and automobile theft.³⁶ Income inequality in Colombia is the highest in South America, with a Gini-index of 0.58.³⁷

The Cicloruta and Ciclovía Surveys

For the Cicloruta program, trained interviewers conducted an intercept survey of 1000 adult cyclists on weekdays in October 2009. The network was divided into 5 zones, with the 6 SES categories represented.²¹ Two interception points were selected per zone: one with low and one with high cyclist density. The interviewers surveyed every third adult crossing each interception point.

Trained interviewers conducted the intercept survey of 1000 adults at the Ciclovía on 3 consecutive Sundays in October 2009. The total distance of the Ciclovía was divided into 16 equidistant interception points to represent the entire circuit. The interviewers surveyed every third adult crossing each interception point.

Outcome Variables

For the Cicloruta survey, we analyzed PA as the outcome variable. We used the long version of the International Physical Activity Questionnaire³⁸ to assess PA levels by domain as suggested by the scoring protocol.^{38,39} However, we only considered the leisure time (LTPA) and transportation domains in this study.⁴⁰ Cycling for transportation was the outcome variable⁴⁰ because the purpose of the program is to provide a transportation alternative for the city. We classified individuals as meeting the PA recommendation (those who reported 150 minutes or more of cycling for transportation per week in bouts of at least 10 minutes each time) and not meeting the PA recommendation (those who reported less than 150 minutes of cycling for transportation per week), based on the 2008 Physical Activity Guidelines for Americans, which recommends at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic PA each week.⁴¹

For the Ciclovía analysis, we analyzed 2 outcome variables: PA and SC. To assess PA, we only considered the LTPA^{39,40} because Ciclovía is a leisure-time program and does not provide an alternative for transportation during the week. We calculated LTPA by adding up the minutes spent on leisure-time activities from any of the following 3 categories: moderate-intensity PA, vigorous-intensity PA (multiplied by 2 as suggested by the 2008 Physical Activity Guidelines for Americans⁴¹),

and walking, according to the LTPA categories from the International Physical Activity Questionnaire, which classifies walking and moderate intensity PA separately.³⁸ We classified individuals as meeting or not meeting the PA recommendation.⁴¹

We selected and adapted the SC questions from existing and valid international questionnaires,^{42–44} and we adapted specific questions (e.g., “Do you agree or disagree with the following statement: Most people who participate in the Ciclovía/Cicloruta can be trusted?”) for the surveys. We asked 10 SC questions to evaluate the respondents’ perceptions of different SC components in the Ciclovía, including trust, collective efficacy, mutual support, and shared values. Responses were Likert scales from 1 to 5, with 1 indicating that the respondent strongly disagreed with the positive SC statement and 5 indicating that the respondent strongly agreed.

Sociodemographic Variables and Program Participation

Additional information collected about participants in the Cicloruta and Ciclovía included gender, age group (18–29 years, 30–49 years, or ≥ 50 years), occupation (not remunerated, remunerated, student), household monthly income (US \$0–\$195, US \$196–\$487, or ≥ US \$488), education (less than middle school, middle to high school, university and above), marital status (single, widowed, or divorced; married or living with a partner), car in the household (yes, no) and SES (1–6, 1 being the lowest and 6 the highest).³⁰ We also analyzed characteristics of program use (frequency of use for Ciclovía: infrequent = once per month; frequent = 2–3 days per month; regular = 4 or more days per month; and for Cicloruta users: infrequent = from once per year to once per week; frequent = 2–4 days per week; regular = 5–7 days per week) and participation in the other program—Cicloruta use among Ciclovía users and vice versa. We classified variables regarding safety and security as unsafe, neutral, and safe.

Data Analysis

We carried out the statistical analysis with SAS version 9.2 software (SAS Institute Inc, Cary, NC). First, we described the sociodemographic characteristics of the Ciclovía and

Cicloruta users and compared them by using the Pearson χ^2 test.

Second, we conducted a principal component analysis to reduce the number of SC variables from the Ciclovía survey by using a varimax (orthogonal) rotation method.⁴⁵ We added 5 questions that had loadings greater than 0.57 together and labeled that as the SC level. The SC variables did not have linearity in the scatter plot. We subsequently dichotomized the SC variable because the responses were Likert scales and were not considered continuous variables.^{46,47} We categorized the SC variable into high (scores above the mean of 17.4) and low (scores at or below the mean) levels.

Third, we developed a multivariate logistic regression model to examine the relationship between frequency of participation on the Ciclovía and perceived SC levels. Lastly, we conducted 2 multivariate logistic regression models to examine associations between meeting the PA recommendations and the characteristics of program use or participation.

RESULTS

As shown in Table 1, participants of both programs were primarily men (70.1% in Ciclovía and 87.7% in Cicloruta) in the group aged 30 to 49 years (40.7% in Ciclovía and 49.9% in Cicloruta) who were regular participants of the program (52.2% in Ciclovía and 70.1% in Cicloruta). Cicloruta users were more likely to live in SES categories of 1 and 2 (53.1%), to have lower educational attainment (27% less than middle school), and to not own a car (82.9%). Cicloruta users were also less likely than Ciclovía participants to have incomes of US \$488 or more a month (15.4%) and to report being a student (4.1%). Most Ciclovía participants reported living in low- and middle-SES categories of 1 to 4 (92%) and having a low to middle educational attainment (51.1% high school or below). In addition, 66.1% of the Ciclovía participants reported not having a car.

The PA characteristics (Table 1) differed significantly between the 2 groups, as a majority of Ciclovía participants reported meeting the PA recommendation in LTPA (59.5%), and nearly three quarters of the Cicloruta participants reported meeting the recommendations by cycling for transportation (70.5%).

TABLE 1—Sociodemographic and Program Participation Differences Among the Ciclovía and Cicloruta Participants and Users: Bogotá, Colombia, October 2009

Variables	Ciclovía, No. (%)	Cicloruta, No. (%)	χ^2 (P)
Gender			93.03 (< .001)
Female	299 (29.9)	123 (12.3)	
Male	701 (70.1)	877 (87.7)	
Age, y			17.1 (.002)
18–29	362 (36.2)	310 (31)	
30–49	407 (40.7)	499 (49.9)	
≥ 50	231 (23.1)	191 (19.1)	
Marital status			472.6 (< .001)
Single, widowed, or divorced	533 (53.3)	956 (95.7)	
Living with partner or married	467 (46.7)	43 (4.3)	
Education level			240.3 (< .001)
< middle school	111 (11.1)	269 (27.0)	
Middle or high school	404 (40.0)	558 (56.0)	
University and above	483 (48.4)	170 (17.0)	
Occupation ^a			43.8 (< .001)
Not remunerated	74 (7.4)	93 (9.3)	
Remunerated	816 (82.0)	865 (86.6)	
Student	103 (10.3)	41 (4.1)	
Monthly income, ^b US \$			166.6 (< .001)
0–195	99 (11.0)	141 (14.8)	
196–487	422 (47.0)	666 (69.8)	
≥ 488	384 (42.0)	147 (15.4)	
Socioeconomic status ^c			144.9 (< .001)
1–2	279 (28.0)	531 (53.1)	
3–4	642 (64.0)	488 (44.8)	
5–6	77 (8.0)	21 (2.1)	
Motorized vehicle at home			74.2 (< .001)
Yes	339 (33.9)	171 (17.1)	
No	661 (66.1)	829 (82.9)	
Meeting PA recommendation by cycling for transportation ^d			572.3 (< .001)
Yes	174 (17.4)	705 (70.5)	
No	826 (82.6)	295 (29.5)	
Meeting PA recommendation in leisure time ^e			54.4 (< .001)
Yes	595 (59.5)	403 (40.3)	
No	405 (40.5)	597 (59.7)	
Frequency of use or participation			72.7 (< .001)
Infrequent	202 (20.2)	101 (10.1)	
Frequent	276 (27.6)	198 (19.8)	
Regular	522 (52.2)	701 (70.1)	
Safety perception (accidents)			48.5 (< .001)
Unsafe	166 (16.7)	295 (29.5)	
Neutral	321 (32.2)	247 (24.7)	
Safe	510 (51.2)	458 (45.8)	

Continued

TABLE 1—Continued

Security perception (crime)			99.5 (< .001)
Unsafe	253 (25.3)	450 (45.0)	
Neutral	323 (32.3)	297 (29.7)	
Safe	424 (42.4)	253 (25.3)	
Factors mostly related to safety perception			132.3 (< .001)
Crime or robbery	290 (29.2)	535 (53.6)	
Traffic, road quality, or vehicles	703 (70.8)	463 (46.4)	

Note. PA = physical activity.

^aRemunerated = employer, employee, or own-account worker; nonremunerated = unpaid family worker or unemployed.

^bConverted to US\$ exchange rate as of 2009.

^c1 = lowest socioeconomic status; 6 = highest socioeconomic status.

^dYes ≥ 150 min; No < 150 min.

^eYes = 150 min or more of moderate or 75 min of vigorous activity per week; No < 150 min of moderate or < 75 min of vigorous activity per week.

Perception of safety was higher among Ciclovía users, with 51.2% reporting feeling safe at the Ciclovía with respect to traffic and accidents and 42.4% with respect to crime. By contrast, more Cicloruta users reported feeling unsafe: 29.5% with respect to traffic and 45% with respect to crime.

We obtained similar results during the analysis of SC. The SC perception differences between the 2 programs are presented in Table 2. A higher proportion of Ciclovía participants reported agreeing with the 5 positive components of SC for the Ciclovía program. The participants especially agreed with

the following 3 items: the willingness of Ciclovía participants to help each other (62.4%), to get along with each other (61.4%), and to help in specific situations such as fixing a flat tire or helping another participant get up after a fall (73.2%). The only SC component about which more than 50% of the Cicloruta users agreed was the willingness of Cicloruta users to help each other (56.3%).

Results from the logistic regression analysis examining LTPA and characteristics of Ciclovía users are shown in Table 3. Those who reported regular participation in the program had increased odds of meeting the LTPA recommendation (odds ratio [OR] = 1.7; 95% confidence interval [CI] = 1.1, 2.4), as did those who reported performing vigorous (OR = 4.9; 95% CI = 2.5, 9.2) and moderate (OR = 1.9; 95% CI = 1.2, 3.0) activity during the Ciclovía. Walking or jogging (OR = 1.3; 95% CI = 0.8, 1.9) and using other wheels during the Ciclovía (OR = 1.7; 95% CI = 0.7, 3.5) were also positively associated with meeting the LTPA recommendation; however, the association was not significant.

Male Cicloruta users (OR = 1.94; 95% CI = 1.2, 3.2), regular Cicloruta users (OR = 10.18; 95% CI = 6.1, 16.8), and Cicloruta users who reported participation in the Ciclovía over the past 12 months (OR = 1.6; 95% CI = 1.1, 2.2) were more likely to meet the PA recommendation by cycling for transportation (Table 4). Similarly, users living in low-SES neighborhoods (OR = 1.5; 95% CI = 0.4, 4.9) and those who did not have a car at home (OR = 1.5; 95% CI = 1.0, 2.3) had an increased likelihood of meeting the recommendation through cycling for transportation; nonetheless, the relationship was not statistically significant.

The participants who reported regular Ciclovía participation were more likely to have higher SC perception of the Ciclovía (OR = 2.0; 95% CI = 1.4, 2.8) than infrequent participants of the program (Table 3). Frequent participants were also more likely to have a higher SC perception than infrequent ones (OR = 1.7; 95% CI = 1.2, 2.6).

DISCUSSION

The study shows that in both the Ciclovía and Cicloruta the majority of the Ciclovía participants reported meeting the PA

TABLE 2—Social Capital Perception Differences Among Ciclovía and Cicloruta Participants or Users: Bogotá, Colombia, October 2009

Variables	Ciclovía, No. (%)	Cicloruta, No. (%)	χ^2 (P)
Program participants or users are willing to help each other			9.1 (.01)
Agree	623 (62.4)	563 (56.3)	
Neutral	238 (23.8)	258 (25.8)	
Disagree	138 (13.8)	179 (17.9)	
Program participants or users get along with each other			46.2 (< .001)
Agree	614 (61.4)	472 (47.2)	
Neutral	257 (25.7)	309 (30.9)	
Disagree	129 (12.9)	218 (21.8)	
Program participants or users can be trusted			34.6 (< .001)
Agree	410 (41)	319 (31.9)	
Neutral	353 (35.3)	330 (33)	
Disagree	236 (23.7)	351 (35.1)	
Program participants or users share values			22.7 (< .001)
Agree	339 (33.9)	424 (42.4)	
Neutral	339 (33.9)	296 (29.6)	
Disagree	321 (32.2)	280 (28)	
Program participants or users would help you to fix a flat tire or to get up if you fell			481.5 (< .001)
Agree	730 (73.2)	280 (28)	
Neutral	152 (15.3)	176 (17.6)	
Disagree	115 (11.5)	544 (54.4)	

TABLE 3—Characteristics of Ciclovía Participation Related to Meeting LTPA Recommendation and Social Capital: Bogotá, Colombia, October 2009

Characteristics Related to Meeting Physical Activity Recommendation ^a	OR (95% CI)
Frequency of participation ^b	
Regular	1.7* (1.1, 2.4)
Frequent	1.1 (0.8, 1.6)
Infrequent (Ref)	1.0
Type of activity performed	
Walking or jogging	1.3, (0.8, 1.9)
Other wheels	1.7 (0.7, 3.5)
Cycling (Ref)	1.0
Intensity of the activity	
Vigorous	4.9* (2.5, 9.2)
Moderate	1.9* (1.2, 3.0)
Low (Ref)	1.0
Safety perception (accidents)	
Safe	1.0 (0.6, 1.6)
Neutral	0.7 (0.4, 1.5)
Unsafe (Ref)	1.0
Security perception (crime)	
Safe	1.0 (0.6, 1.5)
Neutral	1.0 (0.6, 1.4)
Unsafe (Ref)	1.0
Social capital	
Frequency of Ciclovía participation ^a	
Regular	2.0* (1.4, 2.8)
Frequent	1.7* (1.2, 2.6)
Infrequent (Ref)	1.0

Note. CI = confidence interval; LTPA = leisure time physical activity; OR = odds ratio. Model adjusted by gender, age, marital status, education level, and socioeconomic status.

^a150 min of moderate intensity or 75 min of vigorous intensity.

^bRegular = 4 days per month or always; frequent = 2–3 days per month; infrequent = from at least once a year to once per month.

**P* < .001.

recommendation in LTPA, whereas the Cicloruta participants did so by cycling for transportation. In addition, we found that the Ciclovía participants felt considerably safer about crime than did Cicloruta users. Ciclovía participants had higher SC perceptions than Cicloruta users. As a reflection of equity the 2 programs had broad distributions of

participants from the various SES categories,⁴⁸ particularly from the low- and middle-income groups.

Our findings about the Cicloruta users meeting the PA recommendations were consistent with previous studies in which exclusive bike lanes were positively associated with increased levels of cycling.^{15,16,49} In addition, previous studies conducted in Bogotá found that those who reported participating in Ciclovía were more likely to use bicycles for transportation.⁵⁰

Our results also suggest that the Ciclovía program could play an important role in increasing LTPA among Bogotá's inhabitants, which should be a priority, as currently only 18% meet the recommendation in leisure time.⁵¹ Furthermore, our findings strengthen the theory that LTPA and transportation PA have different determinants.⁵² In this case, the participants of a recreational program showed increased levels of LTPA and the users of a transportation program increased levels of cycling for transportation. Thus, different approaches and policies are essential to promote LTPA and transportation PA.

We acknowledge a possible overlap between the users of the 2 programs; however, it was not greater than 50% in our study as 42.8% of Cicloruta users reported participating in the Ciclovía and 52% of Ciclovía participants reported using the Cicloruta for transportation over the past 12 months. These findings support the hypothesis that these programs are complementary and can contribute to increasing PA levels, regardless of user overlap.

Another key finding of the study was the substantial difference in the safety perceptions of the participants of the 2 programs. Especially important to note is that Cicloruta users had worse crime-related safety perceptions than Bogotá's inhabitants overall, who already feel pretty unsafe.⁵³ According to a citywide survey, 38% of the Bogotá residents feel unsafe in the city and 32% in their neighborhood.³⁶ Our analysis demonstrates the need of strategies to decrease theft and crime in the Cicloruta, which is the main concern of the users. For instance, more lighting and police presence⁵⁴ may increase the number of bicycle trips in Bogotá, which is currently only 2.2% of the total number of trips in the city,⁵⁴ and may also increase the number of Cicloruta users, which

is estimated to be 200 000 per day, and, according to our findings, limited to mainly men from the lower SES categories, who may not have other mobility alternatives.⁵⁵ Other strategies to improve Cicloruta's traffic safety—such as appropriate traffic signals, better connectivity with TransMilenio (Bogotá's bus rapid transit system), and education programs for drivers, cyclists, and pedestrians⁵⁴—have already been recognized. In addition, a qualitative study will help us to learn more about Cicloruta users' safety concerns and perceptions.

We found that the Ciclovía users, in contrast with Cicloruta users, feel considerably safer in the program (42.4%). Possible explanations include the presence of more people on the streets (instead of cars), and people engaging in positive activities such as active recreation. In addition, it shall be recalled that the Cicloruta data were collected on weekdays (when it is more widely used for transportation), when congestion and stress is higher in the city, whereas the Ciclovía data were collected on Sundays, days in which the program is implemented, and when the city is calmer. Previous research found higher safety perceptions among users of parks and other recreational facilities,^{25,34} and suggests that the users of these facilities had higher safety and higher SC perceptions.³⁴

We found that Ciclovía participants had higher mean SC level and interesting differences across 3 aspects of SC including shared values (the only aspect that was higher among Cicloruta users), trust, and willingness to help each other (both, particularly willingness to help each other, were higher among Ciclovía users). Perhaps these differences could be explained largely by Bogotá's insecurity, which may reduce trust even among people in the same networks (in this case Cicloruta or Ciclovía users). The high level of solidarity (willingness to help others in specific situations) observed in participants of Ciclovía, where we found that people feel safer, indicate that such program could enable positive social norms—unlike Cicloruta, whose users' low perception of solidarity matched their low perception of safety.

Regular users' higher SC perceptions in Ciclovía are relevant to the inequality and insecurity in Bogotá. City statistics show that 41% of Bogotá residents believed that most inhabitants are not willing to help each other.⁵³ Thus, a program in which citizens perceive

TABLE 4—Characteristics of Cicloruta Use Related to Meeting Physical Activity Recommendation Through Cycling for Transportation, Bogotá, Colombia, October 2009

Variable	OR (95% CI)
Gender	
Male	1.9* (1.2, 3.2)
Female (Ref)	1.0
Socioeconomic status ^a	
1–2	1.5 (0.4, 4.9)
3–4	1.3 (0.4, 4.1)
5–6 (Ref)	1.0
Motorized vehicle at home	
No	1.5 (1.0, 2.3)
Yes (Ref)	1.0
Frequency of Cicloruta use ^b	
Regular	10.2* (6.1, 16.8)
Frequent	1.7 (1.0, 3.0)
Infrequent (Ref)	1.0
Participation in the Ciclovía over the past 12 mo	
Yes	1.6* (1.1, 2.2)
No (Ref)	1.0

Note. CI = confidence interval; OR = odds ratio. Model adjusted by gender, age, marital status, education, and occupation.

^a1 = lowest socioeconomic status; 6 = highest socioeconomic status.

^bRegular = 5–7 days per week; frequent = 2–4 days per week; infrequent = from at least once per year to once per week.

* $P < .001$.

higher SC on a weekly basis is a very important finding for the city, because, as other studies have documented, higher SC perception is positively associated with well-being and perceived health.^{24,56} Furthermore, previous research has shown that high levels of perceived collective efficacy could buffer some of the effects of social inequalities and even decrease crime rates^{31,33} in given geographic areas, which could be the case every Sunday for the Ciclovía circuit and nearby areas.

Studies have also indicated that SC can encourage positive social norms and minimize antisocial behaviors that make individuals feel unsafe⁵⁷ and that increased pedestrian traffic can enhance neighborhood safety by generating natural surveillance.⁵⁸ Such evidence may

be an alternative explanation for why Ciclovía users feel safer on the streets closed for the program. Similarly, studies have shown a positive association between SC and PA level,^{25,34} which indicates that the Ciclovía could also provide environments that encourage Bogotá residents to be more physically active, and thus have better health and quality of life.

Regarding equity, we found that the participants of the Ciclovía and Cicloruta are mainly from the low- and middle-income groups and representative of the city, where 51% of the population live in SES categories 1 and 2, 43.2% live in SES categories 3 and 4, and only 4.2% live in the high-SES categories of 5 and 6.⁴⁸ A study in the United States showed that lower-income and ethnic minority areas were less likely to have access to recreational facilities where they could be physically active with no extra cost and while not necessarily practicing sports.⁵⁹ In Bogotá, too, inequalities in the quality and availability of recreational resources have been acknowledged.^{60,61} The locations of many parks and recreational facilities result in decreased access for those who live in more distant areas.⁶²

Our results suggest that programs such as Ciclovía and Cicloruta may contribute to bridging the access gaps highlighted previously, because more than 50% of Cicloruta users live in the lowest SES categories and more than four fifths do not have a car. Cicloruta represents a key mobility alternative accessible to vulnerable population of the city. In addition, both the Ciclovía and Cicloruta are considerably extensive and distributed throughout the city, connecting socioeconomically diverse neighborhoods, which could contribute to buffer the spatial and access inequalities present in the city. Nonetheless, future studies should include a spatial analysis to assess access.

Our results also underline gender disparities among the participants and users of the Ciclovía and Cicloruta, showing a considerably higher male participation in both cases. This finding is consistent with previous research that indicates low levels of LTPA⁵⁰ and cycling for transportation among women in Bogotá.⁶³ City leaders should consider strategies to encourage women to participate in PA programs such as physical activity classes, which are more attractive and culturally adapted for women.

Moreover, our study shows decision-makers that the implementation of environmental

and policy approaches like the Ciclovía and Cicloruta, which were originally originated to promote PA and recreation and to enhance mobility in the city, can have a further impact on many fundamental issues of the city, including safety, equity, and social environments.

Limitations and Strengths

The main limitations of this study are its cross-sectional design and the lack of control groups of nonusers of the 2 programs. In addition, because we had not studied SC in this type of program before, our study relied on self-reported measures adapted from validated international instruments. Future studies of these programs should address these limitations.

Strengths of this study include that it is the first study to our knowledge to illustrate the importance of programs such as Ciclovía and Cicloruta in promoting better social environments and equitable opportunities for recreation, socialization, and PA. The sample size for each survey was representative of the number of users of the program, and this is the first time that the 2 programs have been thoroughly described and compared. For these reasons, this study represents an important effort to better understand these programs and their potential public health outcomes, such as PA and SC, which could be the basis for future studies. Our findings also affirm the importance of implementing recreation, public space usage, and transportation policies, as well as built environment changes such as Ciclovía and Cicloruta in urban settings, to have a population-based impact in various aspects of public health, such as PA, SC, safety, and equity.

Conclusions

Ciclovía and Cicloruta represent 2 policy and environmental approaches that have the potential to equitably promote PA and provide a mobility alternative in complex urban settings such as Bogotá. Specifically, the Ciclovía program also provides enhanced social environments in which participants feel safer. Ciclovía and Cicloruta are important health promotion interventions that should be considered as potential multilevel large-scale approaches to address social and environmental determinants of health-related behavior at the population level. Thus, policymakers should continue to support both programs and evaluate them regularly. Special attention should be devoted

to the safety issues surrounding the Cicloruta to increase cycling for transportation. ■

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Contributors

A. Torres performed data analysis and interpretation, and was the main writer of the article. O. L. Sarmiento participated in study and data collection design and coordination, provided feedback on the analysis and interpretation of the results, and contributed to the article writing. C. Stauber provided feedback on the data analysis and interpretation of the results, and contributed to the article writing. R. Zarama performed grant writing, provided feedback on sampling, and designed the instruments to collect the information for the study.

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Human Participant Protection

The study was originally approved by the Research Ethics Committee from Universidad de los Andes in May 2008. The surveys were de-identified and analyzed in a secondary analysis that was approved by the Georgia State University institutional review board on March 28, 2011.

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