



Gender-based violence and Women's mobility, findings from a medium-sized Colombian city: A quantitative approach

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ABSTRACT

Gendered mobility has attempted to understand the way in which mobility and gender are constantly shaped and built through travel choices, behaviors, and transport planning. This study sought to find a relationship between gender-based violence (sexual and street harassment and sexual abuse and assault) in mobility throughout Manizales, a medium-sized Colombian city, considering all modes of transport (walking, biking, driving private cars, motorcycles, and using public transit). Moreover, to measure the changes in travel choice and behaviors caused by violent incidents, a self-reported survey was designed and applied, through a mix of electronic and physical questionnaires, administered to users in Manizales. Furthermore, a chi-squared statistical test was conducted, so as to understand the relationships between variables, especially gender. Women reported higher incident rates of gender-based violence than men, as experienced in modes of transport such as public transit, walking, and bike riding. Women also tended to use private modes of transport (cars, motorcycles, or taxicabs) because of gender-based violence incidents. Those incidents limit individuals' rights to the city, as well as access to opportunities. If decision-makers want to implement successful, sustainable mobility projects, they must guarantee users' safety, as violent situations could boost changes in favor of private modes of transport, such as cars and motorcycles. Future investigations should consider minority groups, like LGBTIQ + communities, as they experience more dangerous cases of gender-based violence and discrimination in cities.

1. Introduction

Gender-based violence, especially against women, in public spheres, and the ways in which this affects their daily mobility has been studied rarely in Latin-American cities, where public transit and urban environment are vastly different from northern cities. Gender-based violence and mobility is an emerging topic in Colombia, and has been studied in larger cities, such as Bogota (Quinones, 2020; Ritterbusch, 2016). The case presented herein, conducted in a medium-sized city, adds to the growing body of literature on gender-based violence and mobility. Cities are multifaceted and multicultural settlements that cannot be designed or planned through a neutral subject, hypothetically capable of representing all inhabitants (Levy, 2013a; Naredo, 2010). This erroneous approach has

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been repeated over the years, in multiple cities around the world, making the "working man" the main planning model, leaving aside other individuals, including students, children, seniors, and especially women (Levy, 2013a). It is necessary to understand that there are individuals with different stories that are directly related to their mobility characteristics, as Schwanen calls them, "Homo Narrans" (Levy, 2013b; Schwanen, 2020). All of these have very different life dynamics than those commonly declared for men, who commute from home to work, and vice versa (Cresswell and Uteng, 2008; Gardner, 1995; Levy, 2013b; Moser, 1993). These erroneous planning processes have accentuated gender inequity in cities. In recent decades a transformation process has begun, around the world, which aims to study female dynamics, so as to create public policies to solve issues like gender-based violence in public spheres, especially as related to daily mobility (Moser, 2017). Gender-based violence is a social problem that may reinforce and co-produce inequalities in cities. As such, it is important to establish context, in order to analyze gender interaction on different scales (Cresswell and Uteng, 2008), considering the ways in which gender experiences change over time by location (Lee, 2016), as well as individuals' travel choices and behaviors (Levy, 2013a).

Women's forms of movement in urban environments, as well as their access to activities, has become particularly relevant to the achievement of just cities (Levy, 2016) and the successful implementation of sustainable mobility projects (Uteng and Turner, 2019). Traditional transport planning focused on the measurement and prediction of individuals' travel choices, without considering social variables such as gender, race, age, ethnicity, religion, class, or sexuality, among others (Levy, 2013b; Sweet and Ortiz Escalante, 2010). Women, for instance, make shorter trips, especially on foot or via public transit, due to their household activities, and are generally accompanied by dependents, such as children and seniors (de Madariaga, 2013; Levy, 2013a). On account of these specific travel patterns, the "gendered mobility" concept was established, in order to understand how mobility and gender are constantly shaped and built through travel choices, behaviors, and transport planning (Cresswell and Uteng, 2008; Hanson, 2010; Levy, 2013a). Some research has shown the importance of minority groups such as LGBTIQ + communities (Lubitow et al., 2020). Women and minority groups need security policies which concentrate on their care (de Madariaga, 2013), in which protection should be focused on the appropriation of their right to enjoy the city (Levy, 2016). As a matter of fact, violence against women and men is different (McIlwaine, 2016). Men are more likely to be victims of robbery, while women's fear is rooted in the experience of trying to mobilize in certain places (Day, 2001), by restricting their right to the city and their relationship within space and violence (Montoya Ruiz, 2013; Morales Alfonso et al., 2016; Sandberg and Rönblom, 2015). This fear results in an inability to move with the same freedom as men in public spaces (Levy, 2016; Soto Villagrán, 2017).

Fear is a subjective experience (Soto Villagrán, 2017), in the face of possible violent scenarios. Gender marks a significant difference in the ways in which fear affects the appropriation of public space, restricting women's freedom and enjoyment of public space (Day, 2001). Fear has been studied through the empirical perception of personal safety on public transport (Currie et al., 2013), which considered how women address their fear of crime in public spaces, such as trains (Yavuz and Welch, 2010). Furthermore, their study should consider context and time, e.g., geographical context is important to understanding women's safety. For example, in Mumbai, India (Parikh, 2018) the evening is especially perceived to be unsafe, and creates unease in individuals (Plyushteva and Boussaou, 2020). The violence discussed in this investigation focuses on what is commonly referred to as *Gender-based Violence* (GBV), which is recognized as an action, whether physical, sexual, or psychological, that occurs against females, whether in public or private spheres (McIlwaine, 2016; Sweet and Ortiz Escalante, 2014; WHO, 2012). Herein, GBV includes sexual harassment, street harassment, and sexual assault. Furthermore, GBV, in public spheres and women's everyday mobility, is studied in a medium-sized city in Colombia.

After the introduction, a brief literature review, related to gender-based violence and women's everyday mobility is conducted. This is followed by definitions of gender-based violence in Colombia and the case study context presentation. Later, the material and methods are described, after which a summary of research results are provided, and a discussion and conclusions are offered.

1.1. Gender-based violence and women's everyday mobility: a brief literature review

This section reviews the main body of literature and empirical research contributions on the topic of GBV and women's everyday mobility, based on the public spheres. Valentine (1989), on the topic, researched the way in which different groups of the population occupied public space, with women being those who showed the most fear, due to sexual or street harassment. Similarly, Gardner (1995), in an examination of public transit, carried out a study in Indianapolis (USA) where, from interviews of minority focus groups –women and Afro-Americans–, the degree of sexual abuse to which they were exposed via this mode of transport was established. Pain (1997) studied women's fear of violent crime in Edinburgh, through a mixed-method of self-reported questionnaires and in-depth interviews. Loukaitou-Sideris and Fink (2009) studied the fear of sexual abuse and safety on public transit, in the USA, through a survey of US public transit agencies, highlighting the importance of considering vulnerable groups when planning mobility. The above studies are most related to women's fear of crime, and the need to improve their access to public space and transit.

In 2010, Hsin Ping Hsu addressed women's sexual harassment on public transit, through in-depth interviews, as well as personal and online focus groups with women in Taiwan and the United States. Hsu identified two types of women: those who had multiple modal choices, and those who had limited modal choices. Thus, if they were to experience a sexual harassment incident, the former could decide to change for a while, or permanently use a private vehicle, while the latter had to endure this type of situation, taking their own measures, such as changing schedules or routes on public transit. On the other hand, Rahman (2010) explored the situation of the women-only bus in Dhaka, Bangladesh using questionnaires, interviews, and focus groups. It was found that 41% of women were worried about sexual harassment. Similarly, in Tokyo (Japan), Horii and Burgess (2012) found that 48% of women had been groped or touched without their consent on trains. Furthermore, Dunckel-Graglia (2013, 2016) analyzed segregated transport strategies against GBV in Mexico City. They used questionnaires, surveys, interviews, and three years of ethnographic data, and found that 70% of women felt unsafe using public transit in the city. This research evaluated women-only services against sexual harassment, and all of

them coincided with those services that had minimal coverage and quality. Loukaitou-Sideris (2014), on the other hand, demonstrated, through interviews with focus groups, how fear and anxiety of being harassed or abused while moving geographically limited their region of interaction in the city. Asian cities, such as New Delhi (Dhillon and Bakaya, 2014) and Kathmandu (Neupane and Chesney-Lind, 2014), have become a research focus for sexual harassment on public transit, through mixed methods of surveys and interviews. Weaknesses were found in public policies for the protection of female users, being women who have to take action to prevent these episodes. Neupane and Chesney-Lind, for instance, found that 97% of female survey respondents had experienced at least one incident of sexual harassment on public transit.

Later, Soto Villagrán (2017) researched gender differences in mobility, in Mexico City, through questionnaires and interviews inside train wagons. She found remarkable results about fear and sexual harassment: 70% of women were afraid of sexual harassment on public transit, compared to 80% of men that felt safe. Moreover, a study carried out in Buenos Aires (Gutiérrez and Reyes, 2017) showed that mobility practices in spaces far from the urban center were affected by social inequality, since this increased the inadequacy of public transit, which impaired participation in the labor market and individuals' personal lives. Women, then, in most cases, could not afford to pursue their studies beyond secondary education, and almost 50% were dedicated homemakers (Gutiérrez and Reyes, 2017). In 2018, the Development Bank of Latin America (CAF) and FIA Foundation (Foundation for Automobiles and Society) conducted a study entitled *Ella se mueve segura* (She Moves Safely) that sought to measure the personal safety of women as they moved throughout three Latin American cities: Buenos Aires (Argentina), Santiago de Chile (Chile), and Quito (Ecuador), and with the intention to create policies to close the inequality gap in access to the city. In said study, it was found that women accounted for more than half of public transit users and that they suffered from higher levels of concern and distress from fear of sexual harassment. Also, the study revealed that women would migrate to safer modes of transport, such as private vehicles, if economic conditions permitted. Likewise, in Bolivia and Colombia, the levels of sexual harassment on public transit were measured through a survey conducted in El Alto and Bogota, resulting in 22% and 32.2% of female users affected by sexual harassment (Kash, 2019). On the other hand, Orozco-Fontalvo et al. (2019) conducted a study to register sexual harassment inside the BRT system (Bus Rapid Transit, a mass transit system like the Transmilenio in Bogota) in Barranquilla-Colombia, and risk perceptions in different situations, such as bus stops and on buses. It was found that women had been victims of sexual harassment more often than men. In 2020, Quiñones addressed the issue of sexual harassment on public transit through interviews and surveys conducted exclusively with women in Bogota. She reported that 84.3% of women have experienced episodes of sexual harassment while moving on public transit. In terms of the LGBTQ + community, Lubitow et al. (2020) studied GBV for transgender and nonconforming gender individuals in Portland, Oregon. They interviewed 25 people regarding their mobility, and "Frequent harassment and violence when trying to move through urban spaces using public transit" (p. 3) was reported. Additionally, Ritterbusch (2016) researched transgender women's displacement, as related to the armed conflict and (im)mobility in Bogota, Colombia. A qualitative approach was used, considering geo-ethnographic data collected during participatory action research. It was found that the everyday mobility of transgender sex workers was geographically limited by both fear and discrimination.

Mixed methods, using qualitative and quantitative techniques, are commonly used when researching this topic. Regularly, groups of young people are studied, mainly because of their prevalence in the zones under study, or convenience factors. On the other hand, investigations concentrate on women and their perceptions. Few studies about GBV and mobility consider other genders, such as men (CAF and FIA Foundation, 2018; Soto Villagrán, 2017) or LGBTQ + communities (Lubitow et al., 2020; Ritterbusch, 2016). In terms of modes of transport, public transit has been the focus, and other modal choices, such as walking, cycling, or taxicabs, have been left to the side. Most studies have been conducted in large cities (with over 1 million inhabitants, considering DNP (2014) and Scholl et al. (2021)), where transit and living conditions are different from medium (between 100 thousand and 1 million inhabitants considering DNP (2014) and Scholl et al. (2021)) or small cities (less than 100 thousand inhabitants considering DNP (2014) and Scholl et al. (2021)). Commonly, large Colombian cities rely upon mass-transit systems like Bus Rapid Transit (BRT) or subways. In contrast, public transit in medium and small cities in Colombia are based on buses or paratransit.

Researching GBV as associated with women's daily mobility in Manizales is the aim of this study. GBV could determine and limit women's mobility in cities, and must be addressed with specific interventions, considering the cultural, social, economic, and geographic context of cities (Levy, 2013a). In this case, women's daily mobility and GBV in the public sphere are studied through surveys with self-reported questionnaires, with particular attention paid to changes in transport mode choices and behaviors after violent incidents. In addition, the male survey was performed in order to conduct comparisons within gender groups, and to better-document differences in the ways in which men and women relate to everyday mobility and GBV (Lee, 2016). This study, conducted in a medium Latin American city with very different public transit characteristics than larger cities, and with a distinctive sample that considers both men and women, is novel in the literature reviewed on GBV and women's daily mobility.

1.2. Gender-based violence in Colombia: definitions

In Colombia, as in many countries around the world, GBV has not been granted a complete legal status or definition (Quinones, 2020). Although in previous studies, the GBV concept has been defined exclusively for women (McIlwaine, 2016). This investigation established GBV indistinctly, for both men and women, since one of the focuses is to verify its differences, as they relate to incidents and influences on daily mobility. GBV will be defined, considering sexual harassment, street harassment, and sexual assault/abuse. The Colombian Constitutional Court considers "harassment" to be anything that involves unwanted touching, signals, or conduct of a sexual nature (Corte Suprema de Justicia, 2018). In addition, sexual abuse, sexual assault, and rape must be differentiated (Corte Suprema de Justicia, 2018). Firstly, sexual abuse is characterized by an individual's power relationship over another (in most cases an individual close to the victim) who forces them to perform sexual acts in which physical repression is not necessarily used, as this may occur

through threats or manipulation. Secondly, there is sexual assault, which, unlike abuse, does involve the use of force and threats. Moreover, this is carried out, by a stranger, only once. Thirdly, there is rape, which refers to penetration or violent access, and can occur via a sexual organ or any other part of the body.

Considering the literature reviewed regarding gendered mobility and the above definitions provided by the Colombian Constitutional Court, the following terminology was established for the present investigation:

- *Street harassment*: Unauthorized comments about another person's appearance, in a public space, which do not necessarily contain sexual innuendo.
- *Sexual harassment*: Using verbal, non-verbal, or written language, towards others for non-consensual sexual purposes only.
- *Sexual abuse or assault*: A non-consensual sexual act, committed through violence.

In accordance with these definitions, sexual harassment and abuse are criminalized in Colombia, while street harassment is not. Therefore, those affected have no legal tools with which to defend themselves.

1.3. Case study context: Manizales

In this study, GBV (sexual and street harassment and sexual abuse) was measured among Manizales' inhabitants, while mobile, to define whether the declared situations led to changes in users' usual mobility choices. A self-reported questionnaire survey was conducted, through paper and digital means, to reach segments of the population of all ages and socioeconomic levels (Marshall et al., 2017). Socioeconomic information corresponds to the social stratification applied in Colombia (Law 142/1994), which classifies households in accordance with their location and physical housing physical conditions. Stratifications range from strata 1 (S1: lowest income level) to strata 6 (S6: highest income level). This category has been verified as a correct proxy for income for Colombian transport research (Cantillo-García et al., 2019). In Manizales, the lowest income strata (S1 and S2) are located mainly in peripheral areas, far from the centers of major economic and social activity. This study, taking a medium Colombian city as a case study, makes a significant contribution to the national and global literature, as most studies on this topic focus on developed countries with mass transit systems that structure urban mobility (Gardner et al., 2017; Kash, 2019; Quinones, 2020).

Manizales is a central-western Colombian city (see Fig. 1) with 405,324 inhabitants in its urban area, of which 52.8% are women (DANE, 2018). According to the origin-destination survey, conducted in 2017, 749,634 trips are made, daily, within the urban area, with an average of 2.11 journeys per inhabitant, per day. In this case, gender inequity in mobility is evident, as while males make an average of 2.85 trips per day, women make only 1.85. Likewise, this value decreases as socioeconomic levels decrease, such that

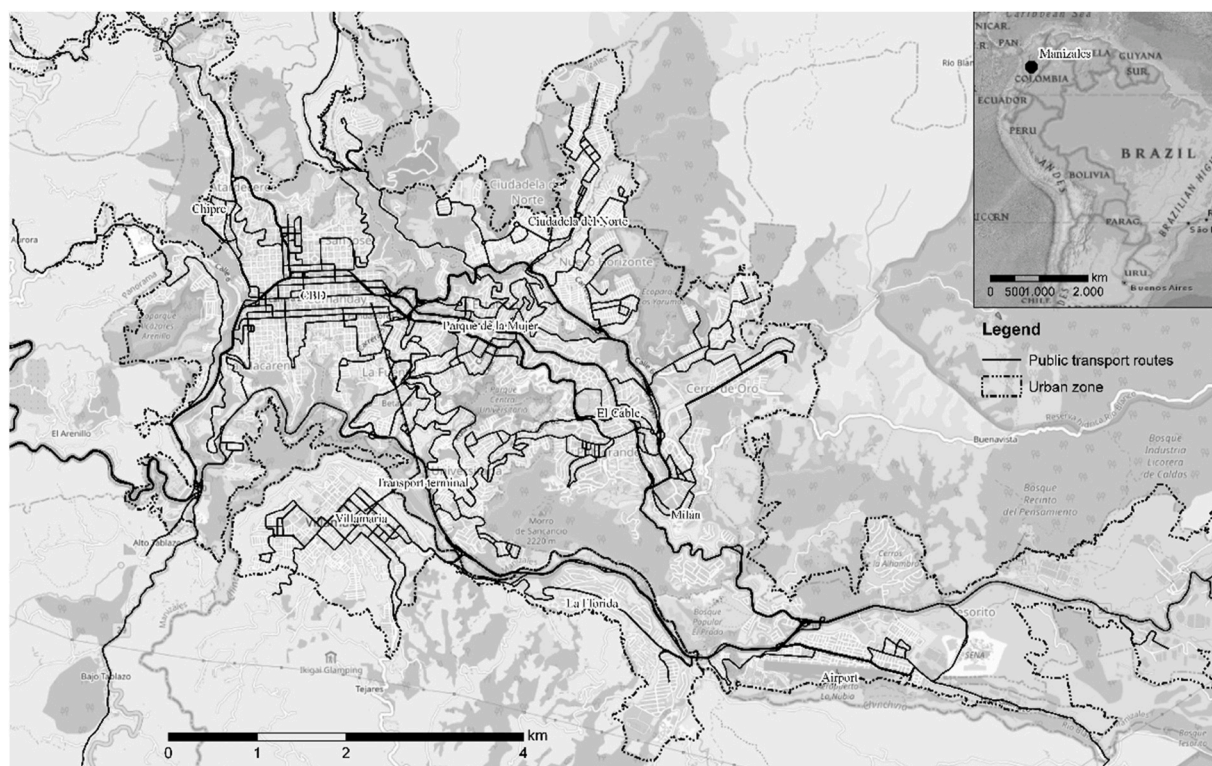


Fig. 1. Manizales' geographical location. Source: Authors.

lower-income women make fewer journeys (Alcaldía de Manizales, 2017). Further, women walk and use public transit more (65%) than men (50%).

In Manizales, public transit operates by way of 71 bus lines and two aerial-cable car lines (see Fig. 1), which cover most of the city, planned monocentrically, based on the urban center, and with capacities of no more than 35 people per bus and 10 per aerial-cable car cabin. Although this mobility diagnosis revealed gender inequity, the formulation of the Manizales Mobility Master Plan did not consider these variables for the period between 2017 and 2031. On the other hand, despite having the Secretary for Women, Gender Equity and Equality, there is no in-depth diagnosis of mobility with a gender perspective, or the implications of GBV towards users - especially women - in travel. This would allow for the creation of forceful and accurate public policies on the issue. The "Taxi Seguro" (Safe Taxi) project has provided safe mobility conditions. A total of 180 taxi drivers were trained to offer adequate, safe, and professional services to all users.

2. Materials and methods

The methodology used was composed of five consecutive phases: 1) Survey design, 2) Sample calculations, 3) Survey application, 4) Analysis of results, and 5) Discussion and conclusions.

2.1. Survey design

The survey design was conducted based on a literature review of major research related to GBV and women's daily mobility, carried out in the region (Gardner et al., 2017; Kash, 2019; Quinones, 2020). It consists of 15 questions, distributed into four parts, which are described below.

- The first part consisted of six multiple-choice questions that inquired about sociodemographic variables, such as socioeconomic strata, highest educational level achieved, age groups, the gender with which individuals identified, and the main purpose and mode of transport by which individuals moved.
- The second part related to situations of GBV (sexual and street harassment and sexual abuse) in which they had been involved while moving around the city. They were then asked to list the episodes, described on a closed list of options, that could be completed by the respondent. Finally, they were asked whether these situations had been reported, and to describe why this had not been done, if they answered negatively.
- The third part of the survey sought to determine whether normal mobility habits were modified, due to the incidents described in the second part. Therefore, it was asked whether they had modified their normal mobility behavior, and if not, why. Finally, in case their mode of transport had changed, it was defined which mode of transport they continued to use, and how their habits had been modified. Those questions were self-reported, through an open-ended format.
- The fourth part was related to the knowledge of public policies for GBV incidents reduction in the public sphere. Therefore, it was asked whether they were aware of governmental or civil initiatives that sought to reduce GBV in the study area, and if they believed that these initiatives had been successful.

The survey was designed in such a way that the last three parts were restricted to respondents who answered yes to the episodes of GBV described in the second part.

2.2. Sample size calculation

The survey's appropriate size was calculated using Equation (1), which has been recommended and employed by different authors in sociodemographic and mobility studies, when the size of the population exceeds 100,000 individuals (Bartlett II et al., 2001; Naing et al., 2006).

$$n = \frac{Z^2 * P(1 - P)}{d^2} \quad (1)$$

As shown, Z corresponds to the statistical z -value of the chosen confidence level, which, in this case, was 95% ($Z = 1.96$). Likewise, P is the percentage of heterogeneity or diversity in the universe, which maximizes the sample when it is 50% -a value used herein. Finally, d stands for the percentage of maximum permissible error, which, in this particular study, was set at 5%. It should be clarified that the values of P and d should be applied in the equation as percentages. Finally, in accordance with the values mentioned above, the appropriate sample size obtained was 384 individuals.

2.3. Survey's implementation

Two survey instruments were used, so as to reach as many sectors of the population as possible (Marshall et al., 2017). An electronic survey was designed on Google's free forms platform (Google Forms) and disseminated through mass mailings on the Universidad Nacional de Colombia platform and on social networks (Facebook, Twitter, Instagram, LinkedIn). It is important to clarify that the electronic survey was complemented with a question that sought to determine whether the person lived in or had ever moved to the study area, in an effort to keep the sample in the described context. On the other hand, the paper survey was distributed at mass events,

such as university conferences, and the participation of individuals who hypothetically had more limited access to the internet and social networks, such as older adults, was requested.

Following survey implementation, an analysis of the results obtained was carried out, with specific interest placed on statistical correlations between the variables, through chi-square tests.

3. Results

3.1. Socio-demographic context

Table 1 shows the socio-demographic and mobility variables researched in the survey. There were 442 respondents, of whom 438 had lived in or moved to the study area. The survey respondents were 67.6% women. Note that the sample was concentrated at 57.3% in the 18–25 age range. Likewise, 59.8% of those surveyed were in the middle strata (strata 3 and 4). Concerning the maximum level of study achieved, the sample contained a high percentage of individuals who are studying for or had completed an undergraduate (54.5%) or postgraduate degree (23.8%).

In terms of the travel purposes, education (51.5%) and work (39.8) represented the largest numbers. In addition, note that woman made almost three times as many trips, for social and home-related reasons, as men. Finally, public transit was the main mode found to have been used in the sample (48.7%), followed by walking (19.5%), and car use (18.1%). Among these, women used public transit more than men, in percentage terms, while men use cars and walked more.

3.2. Gender-based violence in Manizales mobility

Table 2 shows GBV, disaggregated by gender and age group, socioeconomic strata, travel purpose, and mode of transport. A total of 53.9% of respondents reported having experienced some type of GBV. It was also notable how this was a gender issue (chi-squared $X^2(2, N = 438) = 140.18, p < 0.001$.), given that 73.3% of women claim to have experienced such things while this percentage reached

Table 1
Socio-demographic results.

Variable		Female		Male		I prefer not to specify	Total	
Gender		296	67.60%	137	31.30%	5	438	100.00%
Age	Under 18	10	3.40%	10	7.40%	0	20	4.60%
	18–25	164	55.60%	83	61.00%	3	250	57.30%
	26–35	61	20.70%	28	20.60%	2	91	20.90%
	36–45	34	11.50%	9	6.60%	0	43	9.90%
	46–60	23	7.80%	5	3.70%	0	28	6.40%
	Over 60	3	1.00%	1	0.70%	0	4	0.90%
	Total	295	100.00%	136	100.00%	5	436	100.00%
Strata	1	10	3.40%	7	5.10%	0	17	3.90%
	2	43	14.60%	25	18.20%	1	69	15.80%
	3	115	39.10%	56	40.90%	4	175	40.10%
	4	58	19.70%	28	20.40%	0	86	19.70%
	5	32	10.90%	11	8.00%	0	43	9.90%
	6	36	12.20%	10	7.30%	0	46	10.60%
	Total	294	100.00%	137	100.00%	5	436	100.00%
Level of education	Primary School	1	0.30%	1	0.70%	0	2	0.50%
	Secondary School	28	9.50%	14	10.20%	1	43	9.80%
	Technical	35	11.90%	10	7.30%	1	46	10.50%
	Degree	3	1.00%	0	0.00%	0	3	0.70%
	Bachelor's degree	148	50.20%	87	63.50%	3	238	54.50%
	Graduate degree	79	26.80%	25	18.20%	0	104	23.80%
	None	1	0.30%	0	0.00%	0	1	0.20%
	Total	295	100.00%	137	100.00%	5	437	100.00%
Travel purpose	Household matters	12	4.10%	2	1.50%	0	14	3.20%
	Social meetings	17	5.80%	3	2.20%	0	20	4.60%
	Education	142	48.10%	79	58.50%	3	224	51.50%
	Job	122	41.40%	50	37.00%	1	173	39.80%
	All of the above	2	0.70%	1	0.70%	1	4	0.90%
	Total	295	100.00%	135	100.00%	5	435	100.00%
Transport mode	Walking	55	18.60%	29	21.20%	1	85	19.50%
	Cycling	7	2.40%	6	4.40%	2	15	3.40%
	Private vehicle	53	18.00%	26	19.00%	0	79	18.10%
	Motorcycle	19	6.40%	10	7.30%	1	30	6.90%
	Taxis	10	3.40%	1	0.70%	0	11	2.50%
	Public transit	149	50.50%	63	46.00%	1	213	48.70%
	Private bus (jeob)	2	0.70%	2	1.50%	0	4	0.90%
	Total	295	100%	137	100%	5	437	100%

Table 2

Gender-based violence, disaggregated by gender and age group, socioeconomic strata, travel purpose, and mode of transport.

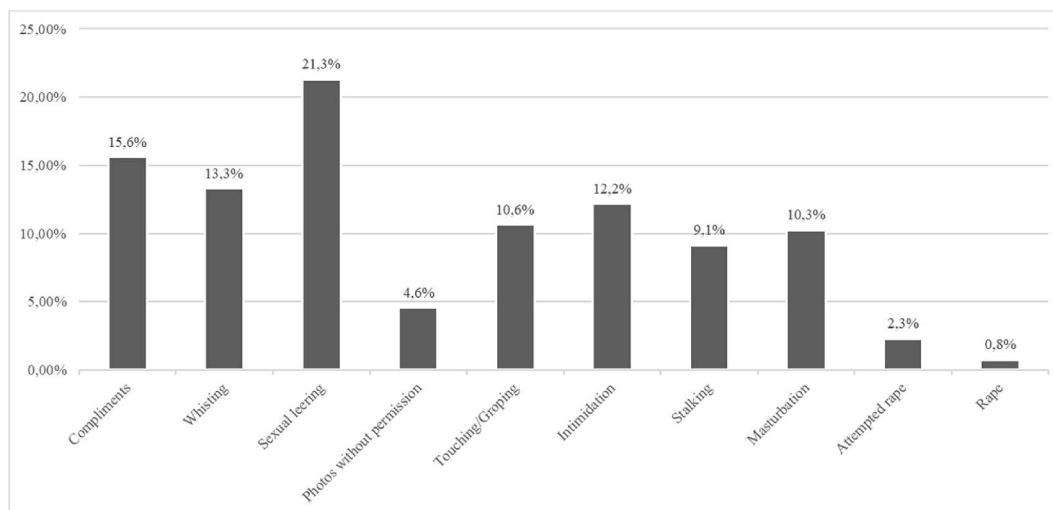
Gender-based violence = "Yes"							
General		53.9%					
Gender**		Women	73.3%		Men	12.4%	
Age group							
		Under 18	18–25	26–35	36–45	46–60	Over 60
General *		45%	60%	47.3%	48.8%	42.9%	0%
Gender	Women **	80%	82.9%	63.9%	61.8%	52.2%	0%
	Men	10.0%	15.7%	10.7%	0%	0%	0%
Socio-economic strata							
		1	2	3	4	5	6
General *		35.3%	44.9%	52.0%	51.2%	69.8%	69.6%
Gender	Women	60%	69.8%	72.2%	70.7%	84.4%	77.8%
	Men*	0%	4%	10.7%	10.7%	27.3%	40.0%
Travel purpose							
		Education	Work	Household matters		Social	
General *		58.5%	46.8%	42.8%		75.0%	
Gender	Women **	83.8%	61.5%	50.0%		82.4%	
	Men	13.9%	10%	0.0%		33.3%	
Mode of transport							
		Walking	Public transit	Taxi	Bicycle	Motorcycle	Car
General *		58.8%	58.7%	54.5%	46,7%	46.7%	41.8%
Gender	Women *	85.5%	77.2%	60.0%	71,4%	68.4%	56.6%
	Men	10.3%	15.9%	0.0%	16,7%	0.0%	11.5%

*p-value < 0.05, ** p-value < 0.001.

a scant 12.4% in men. A strong connection was found, given the chi-square statistical test results, which considered age ($X^2(5, N = 436) = 12.49, p = 0.029$), e.g., the percentage of GBV within the 18–25 age group was 60%, more than a half of respondents had experienced an incident, while people over 60, as a whole, stated that they had not suffered any form of GBV. These results changed drastically when the analysis was performed on a gender basis (see Table 2), as the statistical tests resulted in high ratios for women ($X^2(5, N = 295) = 26.47, p < 0.001$), as opposed to men ($X^2(5, N = 136) = 3.04, p = 0.694$). Over half of all age ranges in women (except over 60 years) had suffered GBV, and the most affected groups were those under 18 (80%), and those between 18 and 25 years of age (82.9%).

In the case of the GBV analysis, considering socio-economic strata and gender (see Table 2), the chi-squared test was generally significant ($X^2(5, N = 137) = 12.08, p = 0.015$), and for males, was ($X^2(5, N = 137) = 12.08, p = 0.033$), while non-significance was found for females ($X^2(5, N = 294) = 3.81, p = 0.577$). In general, harassment case percentages grew in high socioeconomic strata (strata 5 and 6). On the other hand, the percentage of reported cases of harassment among women as above 60.0%, reaching 84.4% for strata 5, indicating that, regardless of their socio-economic level, women suffered from high percentages of harassment.

Considering travel purposes, it was found that those who commuted to study (58.5%) suffered more GBV than those who traveled for work (46.8%) (chi-square test $X^2(4, N = 435) = 9.68, p = 0.046$). Women experienced additional harassment, and so this variable was directly related (chi-square test $X^2(4, N = 295) = 21.44, p < 0.001$), which did not happen for the male gender (chi-square test

**Fig. 2.** Reported gender-based violence toward women.

$X^2(4, N = 135) = 2.04, p = 0.728$). Finally, regarding modes of transport, harassment, and gender (see Table 2), women experienced more incidents (chi-square test $X^2(6, N = 295) = 14.63, p = 0.023$), especially when walking (85.5%), on public transit (77.2%), and cycling (71.4%). In the case of men, the percentages of harassment are all below 17%, regardless of the mode of transport.

3.3. Types of gender-based violence and non-reporting among women

Fig. 2 shows the GBV reported by the women surveyed. Unsolicited complements, whistling, sexual leering, photos without consent, touching/groping, intimidation, stalking, and masturbation were all types of sexual of street harassment, while attempted rape or rape constituted types of sexual assault. The data show that women exclusively reported attempted rape and rape, while men only reported insults and bullying. In addition, sexual leering, unsolicited compliments, and whistling were represented to a greater extent in women's sexual harassment situations.

These incidents went unreported for 93.1% of women and 82.4% of men. Among women (see Table 3), the main reason for non-reporting was the inefficiency of the judicial system (32.3%), as it has not been clearly defined by it which situations could be reported. On the other hand, the normalization and minimization of these incidents, by society, were the second-most reported reasons for not reporting these occurrences (20.8%).

3.4. How gender-based violence affected mobility

Respondents were asked whether their mobility had been affected or changed as a result of the GBV incident. For women, 47.0% ($n = 217$) changed their normal travel habits, in some way, when incidents occurred. An open-ended question was also asked, for an explanation of the reasons for which their mobility habits had not changed (see Table 4), depending on the case. Lack of transport mode or route (38.6%) alternatives was the main reason that women did not change their normal travel behavior, followed by downplaying the situation (30.1%).

On the other hand, women who changed their usual mobility habits in some way were asked how they had changed them, and which mode of transport they elected to use after the incident, through an open-ended question. Answers showed that public transit and walking had negative impacts on GBV incidents, while women users tried to use taxicabs and private vehicles (car or motorcycle) more often. Taxicabs were chosen in particular because private cars were not always available.

Table 5 shows the ways in which women changed their behavior to address GBV incidents. Behavior changes related to choosing longer walking routes, where women felt safer, avoiding using public transit when it was empty or full, changing usual waiting places, or modifying usual modes of transport were the most reported (55.6%) changes. Additionally, women sought to be accompanied (12.1%), or to sit on the first row on public transit, in the aisle seat, or next to another woman (7.3%). Finally, they also reported perceived changes in their clothing habits (6.5%), and some individuals bought non-lethal weapons or even responded to aggressors.

3.5. Policies against gender-based violence in the study area

Inquiring into the knowledge of civil or government initiatives that sought to reduce such episodes ($n = 437$), only 5.2% of respondents were aware of these. A total of 2.5% of women, who had not experienced such episodes, were aware of initiatives, while 4.2%, who had experienced these incidents had some initiative knowledge. On the other hand, men had higher percentages of initiative awareness, which reached 7.5% among those who had not suffered harassment and 5.9% among those who had.

Among the initiatives which sought to reduce harassment on public transit or in public space, in the study area, which were most familiar to respondents ($n = 17$), were those promoted by feminist platforms in the city, universities, the city's Secretary for Women, Gender Equity, and Equality (52.9%), and Taxi Seguro (41.2%). Likewise, among these, respondents were asked whether they believed that the initiatives had been successful ($n = 20$), and responses were equally affirmative and negative.

Those respondents who believed that initiatives had been unsuccessful said that the results of Taxi Seguro and the way in which drivers have been educated were unknown. Furthermore, they stated that the problem was more structural, societally, and that basic solutions must be taken to change these attitudes and prevent further standardization. On the other hand, those who believed that the initiatives had been successful claimed that taxis had become safer, in the case of Taxi Seguro, and that the pedagogy towards women had empowered their freedom of movement throughout the city.

Table 3
Reasons for non-reporting, by gender.

Reasons for non-reporting	Female ($n = 226$)
Lack of knowledge	12.39%
Lack of efficiency of the judicial system	32.30%
Lack of information about the offender	13.27%
Fare	6.64%
They did not care	14.60%
Normalization	20.80%

Table 4
Women's reasons for retaining mobility modes.

Reason for retention of mobility mode	Percentage
They did not care	30.12%
No other options	38.55%
Infrequency	12.05%
Life must go on	6.02%
Safety	2.41%
It will continue to happen	7.23%
They empowered themselves	3.61%

Table 5
Women's mobility changes.

Mobility changes	Percentage
Confronting the harassers	0.81%
Changing clothing	6.45%
Traveling accompanied	12.10%
Choosing to sit in public transit	7.26%
Avoiding the use of bicycles at night	1.61%
General pattern changes	55.65%
Not going out for a while	0.81%
Carrying non-lethal weapons	1.61%
Using taxicabs	7.26%
Using/buying private vehicles	6.45%
Total	100.00%

4. Discussion

This investigation addresses the issue of GBV and women's daily mobility among the inhabitants of Manizales, a medium Colombian city. Studies related to safety concerns or women's mobility are scarce in the developing world (Uteng and Turner, 2019). Generally, these studies are approached with mixed methods, combining quantitative (questionnaire surveys and statistical data) with qualitative (interviews and focus groups) methods (Kash, 2019; Loukaitou-Sideris and Fink, 2009; Quinones, 2020). Ethnographic methods have recently been employed in several regions (Fleischer and Sanabria, 2020; Jirón et al., 2020; Ritterbusch, 2016). A questionnaire survey method was chosen for this study, as it is the first study related to GBV and women's daily mobility to be carried out in the study area. Future research in the area should consider the inclusion of qualitative methods, in order to study, in-depth, women's daily mobility patterns on different modes of transport, which is beyond the scope of the present document. In addition, qualitative research techniques, such as geo-ethnographic constructs, used in previous research on mobility in Colombia by Ritterbusch (2016), could help to improve the understanding of minority group situations, such as that of the LGBTQ + community.

Electronic and paper forms were used herein, in an attempt to achieve greater coverage within age groups, especially for those without permanent access to the internet (seniors) (Marshall et al., 2017). However, respondents within the 60+ age groups were under-represented. New methods should be developed and designed to attract different age groups, especially older generations, to respond GBV surveys. The anonymity involved in responses was fundamental to obtaining honest answers, especially on sensitive issues, such as harassment and abuse. Although the sample was designed using statistical equations to achieve representativeness for the study area, there were difficulties in attracting people over 36 years of age, and the chosen promotion channels limited the representativeness of the present study to young people in the university context. Manizales boasts nearly 46,000 university students (10% of the total population) and seeks to consolidate its position as the university capital of Colombia, making this investigation highly relevant for the achievement the city's development objectives.

A total of 73.3% of women reported incidents of GBV while traveling in the study area. These results are lower than those reported by Quinones (2020) for Transmilenio users in Bogota (84.3%), as well as women reported by Neupane and Chesney-Lind (2014), in Kathmandu (97%). However, these studies focused on public transit, whereas this study explored GBV as related to women's daily mobility, encompassing additional modes of transport, such as walking and cycling. On the other hand, 12.4% of male respondents reported GBV incidents, but there is no previous data found in the study area or other contexts for comparison. It is important to document differences in daily mobility between women and men, so as to obtain a comprehensive and holistic view of urban mobility (Lee, 2016).

Similarly, no link was found between women's GBV incidents and socio-economic strata, which suggests that this is a phenomenon that occurs regardless of the social or economic sphere to which women belong. Among women with higher education levels, however, more GBV incidents were reported. Consequently, it could be hypothesized that higher education levels among women produce higher rates of reports, as they are more easily able to identify those incidents. This makes education a fundamental variable for GBV incidents identification in the future, which could increase reporting to authorities.

Women reported in a higher percentage of GBV incidents while walking (85.5%), using public transit (77.2%), and cycling (71.4%). Harassment assessment has been separated in previous research, when individuals used public transit (Gardner et al., 2017; Quinones,

2020) or moved on the street (Dhillon and Bakaya, 2014; Logan, 2015). This article highlights that women experience this type of behavior while moving, regardless of their mode of transport, especially when using sustainable mobility modes, such as public transit, walking, or cycling. Therefore, city planners and decision-makers must comprehensively consider this dimension to provide equity in mobility (Levy, 2016; Uteng and Turner, 2019). They must consider the ways in which incidents related to GBV, especially for women, affect levels of public transport use. On the other hand, the same information could be applied to build and plan cycling infrastructure for women that is safe and free from street and sexual harassment incidents. Understanding the importance of individual safety of women and minority groups, while walking in cities, in order to adapt and construct safer streets for everyone must be a priority. Measuring and preventing GBV, by mode of transport, must be a critical dimension for the successful implementation of sustainable mobility policies and projects.

The literature, in this regard, has shown the different types of GBV that people, especially women, have experienced as they move into cities (Dhillon and Bakaya, 2014; Gardner, 1995; Gardner et al., 2017; Kash, 2019; Logan, 2015; Quinones, 2020). One of the most striking findings was that women exclusively reported attempted rape and rape, while men only reported insults and bullying. Therefore, this could be a gendered difference in the way that people report and describe GBV. There may be taboos surrounding men reporting GBV (sexual or street harassment and sexual violence or abuse). Considering this, as well as the high percentages of GBV incidents reported in the study area (staring, groping, intimidation, pursuit, and masturbation in public places), all of this is similar to data recorded in comparable studies conducted in Latin America (CAF & FIA Foundation, 2018; Kash, 2019; Quinones, 2020). Consequently, women have been constantly educated to foresee these situations and move in fear within cities, broadly limiting their freedom (Dunckel Graglia, 2016; Moser, 2017; Sweet and Ortiz Escalante, 2014).

This survey continues to register high levels of non-reporting to the authorities by those affected (93.1%), with results similar to other research, in which the ineffectiveness of authorities, societal normalization of such behavior, and the lack of knowledge of legal procedures were the main reasons that these incidents remained unreported (Quinones, 2020; Hsu, 2010). On the other hand, the survey showed that a high percentage of women decided to ignore these events, normalizing the incidents themselves.

The influence of transport choice, as related to GBV, is a scarcely studied topic in the literature. Previous research has specifically asked about actions, but has tended to avoid harassment and whether this has changed victims' mode of movement around cities (Gardner et al., 2017; Hsu, 2010; Kash, 2019). Strikingly, 47% of women changed their usual mode of transport choice and mobility behaviors in some way. Among the main reasons for non-modification of habits was that they lacked options to do so, and others downplayed the importance of the incident. Structural and traditional urban mobility planning stemmed from women's lack of modal choice, as compared men (Levy, 2013a).

GBV has caused public transit and walking to lose users, while the use of taxicabs, motorcycles, and cars has increased. Those results are similar to those found in the literature. In Hsu (2010), women reported a preference for using private vehicles to avoid sexual harassment. Women had to seek alternatives to feel safe such as changing their usual routes and usual outfits, requesting companionship, sitting at the front of public transit, on the aisle, and/or next to a woman, and in some cases buying a private vehicle (Loukaitou-Sideris, 2014; Loukaitou-Sideris and Fink, 2009; Quinones, 2020). These behaviors, consequences of GBV incidents, are undesired for cities, as women are shifting from sustainable modes of transport (public transit, walking, or bicycling) to individual or private modes of transport, such as taxicabs, cars, and motorcycles. In Mexico, women tend to ride-hail more than men, an interesting finding by Sabogal-Cardona et al. (2021) that could be explained due to rates of (in) safety in Latin American cities. Governments must ensure safety for all users, while moving around the city, especially in public transit, while walking, and cycling if it wants to encourage sustainable mobility behaviors in the population.

Finally, there was a general lack of knowledge about government public policies and civil initiatives that seek to reduce GBV while people move around the city, on the part of respondents. Initiatives such as "Taxi Seguro" should be assessed to determine their relevance and definition of safety. On the other hand, among the researchers' most advocated alternatives to mitigate GBV growth is education (especially in terms of sexual and street harassment, incidents which are constantly normalized), especially among men, so that they understand the fear that it produces in women who experience this. Women must also be well-informed about what can be considered GBV and how to act accordingly (Gardner et al., 2017; Hsu, 2010).

5. Conclusions

This study clearly shows the incidence and types of GBV experienced by users in a medium Colombian city, considering gender and other socio-demographic variables. Similar studies have traditionally been located where mass transit systems (such as subways, metros, or BRTs) are the main mode of transport. This investigation constitutes a reference for medium-sized cities in Latin America, as well as in low- and middle-income countries, where public transit, based on buses, is the most-used mode of transport, in contrast to a mass transit system like BRT (e.g., Transmilenio in Bogota or Transmetro in Barranquilla).

The results also show changes in women's modal choice and travel habits, following GBV incidents. These are surprising, as at least half of them temporarily changed their mode of transport, and some decided to move forward using individual modes of transport, such as taxicabs, motorcycles, and cars. It is essential to analyze these modal choices in sustainable mobility, as they concern encouraging the use of public transit, cycling, and walking, where GBV incidents are highest. Understanding and measuring the loss of users for these modes of transport, due to GBV incidents while commuting, is crucial for the successful implementation of sustainable mobility systems (Uteng and Turner, 2019).

Public policies on gender mobility have not been implemented at the national level, as they are missing in the public policy on gender equity (Conpes 191 of 2013) and the public policy on urban and regional mobility (Conpes 3991 of 2020), which should contain the basic guidelines for their implementation. In addition, feminist movements and researchers have promoted initiatives in this area,

and so contributing in this way moves the debate in Colombia forward. Particularly in Manizales, a public policy on gender mobility has not been promoted, as basic mobility studies have not considered the particular mobility characteristics of women, or those cases of GBV that limit their mobility in the city. It is expected that this study will lay the foundations for public policy development on gender mobility in both Manizales and its metropolitan area.

Research limitations are related to the representativeness of the sample and lack of qualitative methods, such as interviews or focus groups. Future research on this topic may be related to carrying out mixed-method research with careful survey implementation in order to ensure population representativeness. Additionally, this research could be expanded to medium Colombian and Latin American cities with comparable transport systems. In addition, changes to women's daily mobility patterns should be approached through behavior choice modeling, through the implementation of a specific declared preference survey. Furthermore, the municipality government should continue to carry similar surveys each year to build a database regarding GBV and mobility in cities or include GBV questions within origin-destination surveys. Finally, gender mobility studies worldwide must begin to pay special attention to the LGBTQ + community, considering its vulnerability to violence in cities. Previous studies on this topic (Lubitow et al., 2020; Ritterbusch, 2016) show the importance to lend geographical context to the analysis. Therefore, exploration of LGBTQ + community mobility in Manizales could be the next step.

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A conflict of interest may exist when an author or the author's institution has a financial or other relationship with other people or organizations that may inappropriately influence the author's work. A conflict can be actual or potential. At the end of the text, under a subheading 'Disclosure Statement', all authors must disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three (3) years of beginning the work submitted that could inappropriately influence (bias) their work. Examples of potential conflicts of interest which should be disclosed include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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References

- Bartlett II, J.E., Kotlik, J.W., Higgins, C.C., 2001. Organizational research: determining appropriate sample size in survey research. *Inf. Technol. Learn. Perform. J.* 19, 43–50. <https://doi.org/10.1007/BF00471876>.
- CAF, FIA Foundation, 2018. Ella se mueve segura - Un estudio sobre la seguridad personal de las mujeres y el transporte público en tres ciudades de América Latina. Caracas. Retrieved from: <https://www.fiafoundation.org/connect/publications/ella-se-mueve-segura-she-moves-safely> or scioteca.caf.com.
- Cantillo-García, V., Guzmán, L.A., Arellano, J., 2019. Socioeconomic strata as proxy variable for household income in transportation research. *Evaluation for Bogotá, Medellín, Cali and Barranquilla*. DYNA 86, 258–267. <https://doi.org/10.15446/dyna.v86n211.81821>.
- Corte Suprema de Justicia, 2018. ¿Hasta dónde llega el acoso Sexual? Retrieved from: <http://www.cortesuprema.gov.co/corte/index.php/2018/03/09/hasta-donde-llega-el-acoso-sexual-esto-dice-la-corte-suprema/>.
- Cresswell, T., Uteng, T.P., 2008. Gendered mobilities: towards an holistic understanding. In: Uteng, T.P., Cresswell, T. (Eds.), *Gendered Mobilities*, pp. 1–12. London.
- Currie, G., Delbosc, A., Mahmoud, S., 2013. Factors influencing young peoples' perceptions of personal safety on public transport. *J. Public Transp.* 16, 1–19. <https://doi.org/10.5038/2375-0901.16.1.1>.
- Departamento Administrativo Nacional de Estadística-DANE, 2018. Colombia -Censo Nacional de Población y Vivienda – CNPV – 2018. Retrieved from: http://microdatos.dane.gov.co/index.php/catalog/643/get_microdata.

- Day, K., 2001. Constructing masculinity and women's fear in public space in Irvine, California. *Gend. Place Cult.* 8, 109–127. <https://doi.org/10.1080/09663690120050742>.
- de Madariaga, I.S., 2013. From women in transport to gender in transport: challenging conceptual frameworks for improved policymaking. *J. Int. Aff.* 67, 43–65.
- de Manizales, Alcaldía, 2017. Plan Maestro de Movilidad de Manizales - Línea base y diagnóstico.
- Dhillon, M., Bakaya, S., 2014. Street Harassment: A Qualitative Study of the Experiences of Young Women in Delhi, vol. 4. SAGE Open. <https://doi.org/10.1177/2158244014543786>.
- Departamento nacional de Planeación -DNP-, 2014. Documento CONPES 3819, Política Nacional para consolidar el sistema de ciudades en Colombia. Retrieved from http://sistemas002.sdp.gov.co/sites/default/files/conpes_3819.pdf.
- Dunckel-Graglia, A., 2013. Pink transportation in Mexico City: reclaiming urban space through collective action against gender-based violence. *Gend. Dev.* 21, 265–276. <https://doi.org/10.1080/13552074.2013.802131>.
- Dunckel-Graglia, A., 2016. Finding mobility: women negotiating fear and violence in Mexico City's public transit system. *Gend. Place Cult.* 23, 624–640. <https://doi.org/10.1080/0966369X.2015.1034240>.
- Fleischer, F., Sanabria, I.S.S., 2020. 'Like sardines in a can'. gender, stratification and mobility in the lives of female household employees in Bogotá, Colombia. *Transp. Sustain.* 12, 85–102. <https://doi.org/10.1108/S2044-994120200000012008>.
- Gardner, C.B., 1995. *Passing by: Gender and Public Harassment*. University of California Press, Indianapolis.
- Gardner, N., Cui, J., Coiaetto, E., 2017. Harassment on public transport and its impacts on women's travel behaviour. *Aust. Plan.* 54, 8–15. <https://doi.org/10.1080/07293682.2017.1299189>.
- Gutiérrez, A.I., Reyes, M.L., 2017. Mujeres entre la libertad y la obligación. Prácticas de movilidad cotidiana en el Gran Buenos Aires. *Rev. Transp. y Territ.* 147–166, 0.
- Hanson, S., 2010. Gender and mobility: new approaches for informing sustainability. *Gend. Place Cult.* 17, 5–23. <https://doi.org/10.1080/09663690903498225>.
- Horii, M., Burgess, A., 2012. Constructing sexual risk: "Chikan": collapsing male authority and the emergence of women-only train carriages in Japan. *Heal. Risk Soc.* 14, 41–55. <https://doi.org/10.1080/13698575.2011.641523>.
- Hsu, H.P., 2010. How does fear of sexual harassment on transit affect women's use of transit?. In: *Women's Issues in Transportation: Summary of the 4th International Conference*, pp. 85–94.
- Jirón, P., Carrasco, J.A., Rebolledo, M., 2020. Observing gendered interdependent mobility barriers using an ethnographic and time use approach. *Transport. Res. Part A Policy Pract.* 140, 204–214. <https://doi.org/10.1016/j.tra.2020.08.018>.
- Kash, G., 2019. Always on the defensive: the effects of transit sexual assault on travel behavior and experience in Colombia and Bolivia. *J. Transport Health* 13, 234–246. <https://doi.org/10.1016/j.jth.2019.04.004>.
- Lee, A., 2016. Gender, everyday mobility, and mass transit in urban asia. *Mobil. Hist.* 8, 85–93. <https://doi.org/10.3167/mih.2017.080110>.
- Levy, C., 2013a. Travel choice reframed: "deep distribution" and gender in urban transport. *Environ. Urbanization* 25, 47–63. <https://doi.org/10.1177/0956247813477810>.
- Levy, C., 2013b. Transport, diversity, and the socially just city: the significance of gender relations. In: Dávila, J.D. (Ed.), *Urban Mobility and Poverty: Lessons from Medellín and Soacha, Colombia*. Development Planning Unit, UCL & Faculty of Architecture, Universidad Nacional de Colombia (Medellín campus) Book, pp. 23–29.
- Levy, C., 2016. Routes to the just city towards gender equality in transport planning. In: Moser, C.O. (Ed.), *Gender, Asset Accumulation and Just Cities*. Routledge, pp. 135–149.
- Logan, L.S., 2015. Street harassment: current and promising avenues for researchers and activists. *Soc. Compass* 9, 196–211. <https://doi.org/10.1111/soc4.12248>.
- Loukaitou-Sideris, A., 2014. Fear and safety in transit environments from the women's perspective. *Secur. J.* 27, 242–256. <https://doi.org/10.1057/sj.2014.9>.
- Loukaitou-Sideris, A., Fink, C., 2009. Addressing Women's Fear of Victimization in Transportation Settings: A Survey of U.S. Transit Agencies. *Urban Affairs Review*. <https://doi.org/10.1177/1078087408322874>.
- Lubitow, A., Abelson, M.J., Carpenter, E., 2020. Transforming mobility justice: gendered harassment and violence on transit. *J. Transport Geogr.* 82, 102601 <https://doi.org/10.1016/j.jtrangeo.2019.102601>.
- Marshall, W.E., Piatkowski, D., Johnson, A., 2017. Scofflaw bicycling: illegal but rational. *J. Transp. Land Use* 10, 805–836. <https://doi.org/10.5198/jtlu.2016.871>.
- McIlwaine, C., 2016. Gender-based violence and assets in just cities Triggers and transformation. In: Moser, C.O. (Ed.), *Gender, Asset Accumulation and Just Cities*. Routledge, pp. 150–163.
- Montoya Ruiz, A.M., 2013. Seguridad humana para las mujeres en las ciudades reflexiones para políticas públicas urbanas con enfoque de género. *Rev. Estud. Socio-Jurídicos* 15, 115–137.
- Morales Alfonso, L., Quiroz del Pozo, N., Ramírez Iglesias, G., 2016. Acoso sexual en lugares públicos de Quito: retos para una "ciudad segura. *Rev. Latinoam. Estud. Secur.* 19, 21–36.
- Moser, C., 1993. *Gender Planning and development: Theory, Practice and Training*.
- Moser, C., 2017. Gender transformation in a new global urban agenda: challenges for Habitat III and beyond. *Environ. Urbanization* 29, 221–236. <https://doi.org/10.1177/0956247816662573>.
- Naing, L., Winn, T., Rusil, B.N., 2006. Practical issues in calculating the sample size for prevalence studies. *Arch. Orofac. Sci.* 1, 9–14. <https://doi.org/10.1016/j.dld.2018.11.003>.
- Naredo, M., 2010. El miedo de las mujeres como instrumento del patriarcado. Claves para una política pública de seguridad ciudadana que incorpore las necesidades y demandas de las mujeres. *Papeles Relac. ecosociales y cambio Glob.* 79–86.
- Neupane, G., Chesney-Lind, M., 2014. Violence against women on public transport in Nepal: sexual harassment and the spatial expression of male privilege. *Int. J. Comp. Appl. Crim. Justice* 38, 23–38. <https://doi.org/10.1080/01924036.2013.794556>.
- Orozco-Fontalvo, M., Soto, J., Arévalo, A., Oviedo-Trespalacios, O., 2019. Women's perceived risk of sexual harassment in a Bus Rapid Transit (BRT) system: the case of Barranquilla, Colombia. *J. Transport Health* 14, 100598. <https://doi.org/10.1016/j.jth.2019.100598>.
- Pain, R., 1997. Social geographies of women's fear of crime. *Trans. Inst. Br. Geogr.* 22, 231–244.
- Parikh, A., 2018. Politics of presence: women's safety and respectability at night in Mumbai, India. *Gend. Place Cult.* 25, 695–710. <https://doi.org/10.1080/0966369X.2017.1400951>.
- Plyusheva, A., Boussauw, K., 2020. Does night-time public transport contribute to inclusive night mobility? Exploring Sofia's night bus network from a gender perspective. *Transport Pol.* 87, 41–50. <https://doi.org/10.1016/j.tranpol.2020.01.002>.
- Quinones, L.M., 2020. Sexual harassment in public transport in Bogotá. *Transport. Res. Part A Policy Pract.* 139, 54–69. <https://doi.org/10.1016/j.tra.2020.06.018>.
- Rahman, M.S.-U., 2010. Bus service for "women only" in Dhaka city: an investigation. *J. Bangladesh Inst. Plan.* 3, 17–32.
- Ritterbusch, A.E., 2016. Mobilities at gunpoint: the geographies of (im)mobility of transgender sex workers in Colombia. *Ann. Assoc. Am. Geogr.* 106, 422–433. <https://doi.org/10.1080/00045608.2015.1113112>.
- Sabogal-Cardona, O., Oviedo, D., Scholl, L., Crotte, A., Bedoya-Maya, F., 2021. Not my usual trip: ride-hailing characterization in Mexico City. *Travel Behav. Soc.* 25, 233–245. <https://doi.org/10.1016/j.tbs.2021.07.010>.
- Sandberg, L., Rönnblom, M., 2015. 'I don't think we'll ever be finished with this': fear and safety in policy and practice. *Urban Stud.* 52, 2664–2679. <https://doi.org/10.1177/0042098014550453>.
- Scholl, L., Bedoya-Maya, F., Sabogal-Cardona, O., Oviedo, D., 2021. Making the Links between Ride-Hailing and Public Transit Riderships: Impacts in Medium and Large Colombian Cities. *IDB-WP*, 01237.
- Schwanen, T., 2020. Towards decolonial human subjects in research on transport. *J. Transport Geogr.* 88, 102849 <https://doi.org/10.1016/j.jtrangeo.2020.102849>.
- Soto Villagrán, P., 2017. Diferencias de género en la movilidad urbana. Las experiencias de viaje de mujeres en el Metro de la Ciudad de México. *Transp. y Territ.* 127–146. <https://doi.org/10.34096/rtt.i16.3606>.

- Sweet, E.L., Ortiz Escalante, S., 2010. Planning responds to gender violence: evidence from Spain, Mexico and the United States. *Urban Stud.* 47, 2129–2147. <https://doi.org/10.1177/0042098009357353>.
- Sweet, E.L., Ortiz Escalante, S., 2014. Bringing bodies into planning: visceral methods, fear and gender violence. *Urban Stud.* 52, 1826–1845. <https://doi.org/10.1177/0042098014541157>.
- Uteng, T.P., Turner, J., 2019. Addressing the linkages between gender and transport in low- and middle-income countries. *Sustain. Times* 11, 4555. <https://doi.org/10.3390/su11174555>.
- Valentine, G., 1989. The Geography of Women's Fear. *Area*, pp. 385–390.
- World Health Organization - WHO, 2012. Violence against Women: Intimate Partner and Sexual Violence against Women. Fact Sheet. No. 239 (November). Retrieved from. <http://www.who.int/mediacentre/factsheets/fs239/en>.
- Yavuz, N., Welch, E.W., 2010. Addressing fear of crime in public space: gender differences in reaction to safety measures in train transit. *Urban Stud.* 47, 2491–2515. <https://doi.org/10.1177/0042098009359033>.