La presencia de la mujer ante la necesidad urbana de la movilidad cotidiana y el impacto en el hogar

The presence of women in the face of the urban need for daily mobility and the impact on the home

A presença da mulher diante da necessidade urbana de mobilidade diária e o impacto no lar

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Resumen
El objetivo de este trabajo fue visualizar el involucramiento de la mujer en la apremiante y urgente necesidad del desplazamiento urbano, específicamente consistió en relacionar el género, las características socioeconómicas y el modo de transporte como factores de la movilidad, así como el gasto que representó esta actividad. Se tomaron como referente los datos de viajes de la Encuesta Origen Destino en Hogares de la Zona Metropolitana del Valle de México (EOD) 2017. El tamaño de la muestra fue de 66 625 viviendas y la encuesta se diseñó con un factor que reflejó todos los viajes en toda la Zona Metropolitana del Valle de México (ZMVM), aunque aquí solo se consideraron los hechos entre semana. Los resultados señalan que, en cuanto a género, las mujeres (0.697) realizan más viajes que los hombres (0.668) y también que el modo de solo caminar lo utilizan los estratos bajo (0.327) y medio bajo (0.720), mientras que el transporte público lo utiliza el estrato medio alto (0.771) y el privado (0.875) el estrato alto. En los mapas, los gráficos de barras muestran de manera descriptiva que es en la periferia de la ZMVM donde las mujeres realizan más viajes. En cuanto a los viajes por estratos socioeconómicos, el estrato bajo representa 0.9 %, el medio bajo 54.5 %, el medio alto 31.2 % y el alto 13.4 %. En las conclusiones, se destaca que el rol de la mujer en la dinámica del hogar es muy activo, independientemente del estrato socioeconómico, por el gran número de funciones en las que se involucra.

Palabras clave: estrato socioeconómico, gasto en el hogar, género, movilidad urbana y tipos de transporte.

Abstract
The objective of this work was to visualize the involvement of women in the pressing and urgent need of urban displacement, specifically it consisted of relating gender, socioeconomic characteristics and the mode of transport as factors of mobility, as well as the expense that this represented. activity. The travel data from the Encuesta Origen Destino en Hogares de la Zona Metropolitana del Valle de México (EOD) 2017 were taken as a reference. The sample size was 66 625 homes, but the survey was designed with a factor that reflected all trips in the entire Metropolitan Area of the Valley of Mexico (ZMVM). The survey captured trips made on weekdays and on Saturdays, but for this research only trips made only on weekdays were considered. The results indicate that, in terms of gender, women (0.697) make more trips than men (0.668) and also that the walk-only mode is used by the low strata (0.327) and medium low (0.720), while public
transport is used by the medium high stratum (.771) and private (.875) by the high stratum. In the maps, the bar graphs descriptively show that it is in the periphery of the ZMVM where women make the most trips. Regarding the trips by socioeconomic strata, the low stratum represents 0.9 %, the low medium 54.5 %, the high medium 31.2 % and the high 13.4 %. It is concluded that the role of women in the dynamics of the home is very active, regardless of the socioeconomic stratum, due to the large number of functions in which it is involved.

**Keywords:** socioeconomic status, household spending, gender, urban mobility and types of transport.

**Resumo**

O objetivo deste trabalho foi visualizar o envolvimento das mulheres na necessidade premente e urgente de deslocamento urbano, especificamente consistiu em relacionar gênero, características socioeconômicas e o modo de transporte como fatores de mobilidade, bem como o gasto que isso representava. Foram tomados como referência os dados de viagem da Pesquisa Origem Destino nos Domicílios da Área Metropolitana do Vale do México (EOD) 2017. O tamanho da amostra foi de 66.625 domicílios e a pesquisa foi desenhada com um fator que refletia todas as viagens na Zona Metropolitana de o Vale do México (ZMVM), embora aqui tenham sido considerados apenas os eventos da semana. Os resultados indicam que, em termos de gênero, as mulheres (0,697) fazem mais viagens do que os homens (0,668) e também que o modo de caminhar é utilizado pelos estratos baixo (0,327) e médio-baixo (0,720), enquanto o público o transporte é utilizado pelo estrato médio superior (0,771) e privado (0,875) pelo estrato superior. Nos mapas, os gráficos de barras mostram de forma descritiva que é na periferia da ZMVM onde as mulheres fazem mais viagens. Em relação às viagens por estratos socioeconômicos, o estrato baixo representa 0,9%, o médio baixo 54,5%, o médio alto 31,2% e o alto 13,4%. Nas conclusões, destaca-se que o papel da mulher na dinâmica familiar é muito ativo, independentemente do nível socioeconômico, devido ao grande número de funções em que está envolvida.

**Palavras-chave:** situação socioeconômica, gastos das famílias, gênero, mobilidade urbana e tipos de transporte.

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Introduction

Urban mobility is a human need. It is precisely in large cities where this condition is most evident in their daily dynamics. In Mexico City (CDMX) 16.4 million trips are made daily, according to the 2019 Mobility and Transportation Survey (National Institute of Statistics and Geography [Inegi], 2019). Trips by private car represent 22.1%, those made on foot represent 37.5% and the remaining 40.4% are made in other modes of transport. Of the 16.4 million trips, 55% are made by women (Suárez, Galindo and Reyes, 2019).

Prior to the 2019 Mobility and Transportation Survey, Inegi conducted the 2017 Origin Destination Survey in Households in the Valley of Mexico Metropolitan Area (EOD). It should be noted that the Valley of Mexico Metropolitan Area (ZMVM) is made up of CDMX and 59 conurbation municipalities of the State of Mexico, in addition to a municipality of the state of Hidalgo. Now yes, the EOD 2017 indicates that 34.56 million trips were made on a weekday, of which 20.6% were in private transport, 32.3% were made on foot and 47.1% of the trips were made in other modes of transport (Inegi, 2017).

For its part, the National Survey of Household Income and Expenditure 2020 [Enigh] carried out by Inegi (2020) indicates that in the current quarterly monetary expenditure in households in Mexico in the category of "Transportation and communications" it was 18.6 %. In 2018, the same item represented 20%. Here are included the costs of acquisition, maintenance, accessories and services for vehicles; transportation expenses and also communications (Inegi, 2020). Table 1 shows the percentage that this item of "Transportation and communications" represents in the expenses of households in CDMX and the State of Mexico.

The Enigh 2020 indicates that of the quarterly average monetary current expenditure for the 20 main expense items, public transport represented 5.2% in 2018 and 3.3% in 2020 (Inegi, 2020). Table 2 indicates the percentage of the components of this item, among which is public transportation. Table 3 indicates the percentage of households in the ZMVM that have some type of vehicle.
Table 1. Percentage of quarterly average current monetary spending by federal entity, according to major spending items, 2018 and 2020. Item: “Transportation and communications”

| Entidad          | 2018  | 2020  |
|------------------|-------|-------|
| Nacional         | 20%   | 18.6% |
| Ciudad de México | 18.0% | 15.2% |
| Estado de México | 19.9% | 19.6% |

Source: Own elaboration based on Inegi (2020)

Table 2. Percentage of quarterly average monetary current expenditure by federal entity according to components of the category "Transportation and communications", 2018 and 2020

| Entidad          | 2018  | 2020  |
|------------------|-------|-------|
| Nacional         |       |       |
| Transporte público | 5.2% | 3.3%  |
| Transporte foráneo | 0.6% | 0.3%  |
| Adquisición de vehículos de uso particular | 2.5% | 2.4%  |
| Refacciones, partes, accesorios, mantenimiento, combustibles y servicio para vehículos | 7.2% | 6.8%  |
| Comunicaciones   | 4.5%  | 5.7%  |
| Ciudad de México |       |       |
| Transporte público | 5.0% | 3.2%  |
| Transporte foráneo | 0.5% | 0.2%  |
| Adquisición de vehículos de uso particular | 2.9% | 0.8%  |
| Refacciones, partes, accesorios, mantenimiento, combustibles y servicio para vehículos | 4.8% | 4.6%  |
| Comunicaciones   | 4.8%  | 6.2%  |
| Estado de México |       |       |
| Transporte público | 8.4% | 5.7%  |
| Transporte foráneo | 0.4% | 0.1%  |
| Adquisición de vehículos de uso particular | 0.8% | 2.3%  |
| Refacciones, partes, accesorios, mantenimiento, combustibles y servicio para vehículos | 5.8% | 5.6%  |
| Comunicaciones | 4.5 % | 5.8 % |
|----------------|-------|-------|

Source: Own elaboration based on Inegi (2020)

**Table 3. Availability of vehicle and type in households in the ZMVM**

| Condición                  | Porcentaje |
|----------------------------|------------|
| No disponen de vehículos   | 46.8 %     |
| Si disponen de vehículos   | 53.2 %     |

| Tipo de vehículo | Porcentaje |
|------------------|------------|
| Automóviles      | 77.0 %     |
| Motocicletas     | 10.0 %     |
| Bicicletas       | 35.9 %     |

Source: Own elaboration based on Inegi (2017)

The movement of individuals is determined by factors such as gender, age and ethnicity, among others. Space, time and money alone do not explain mobility and cities, especially where inequality is present; they must observe the interdependence of all factors as an aid to transport policies (Jirón, Carrasco and Rebolledo, 2020). Socioeconomic status, as well as the availability of transportation modes, must also be observed. Jiron et al. (2020) even explain that decisions regarding mobility may depend on people other than the person making the trip, due to the interdependence between family members, employees, etc.

Women, for example, are in less contact with productive spaces, since they are the ones who mainly dedicate themselves to the "social reproduction of daily life" referring to the home and that is why they move less frequently in the city (Díaz 1989; Fagnani 1977; Ferré and Serra, 2006; Sabaté 1984, all cited in Riquelme, 2016). In addition, the characteristics of the city determine the space and time of women, since they carry out more tasks and more trips when there are children in the home (Jirón et al., 2020; Olivieri and Fageda, 2021; Rodríguez and García, 2012, cited in Riquelme, 2016). Because the sexual division of labor still reigns and the propensity to consider certain activities as related to women, mobility shows patriarchal dominance (Riquelme, 2016). The primordial debate on transport should no longer consider gender mobility as a “women's problem” (Jirón et al., 2020).

In a study in the Metropolitan area of Montevideo, Uruguay, Olivieri and Fageda (2021) perceived a slight difference in travel patterns in terms of gender, since women travel less and at a
shorter distance than men and their workplace is mostly near the place of residence. Daily mobility is shorter, but more frequent if they have children. In addition, women who participate to the same extent in the household income are mobilized in the same way as women in households where men are the main providers. Due to the other factors that must be observed in mobility studies (age, ethnicity, socioeconomic status, etc.), women's trips may differ from each other (Jirón et al., 2020; Olivieri y Fageda, 2021; Riquelme, 2016).

Regarding transportation modes, Etminani and Ardeshiri (2015) indicate that lifestyle, socioeconomic status, and the availability of private cars can determine the choice of transportation mode on non-work-related trips. Li, Lo and Guo (2018), observed, as part of the results of the binary logistic regression applied in their study, that having a car, monthly income and gender are relevantly related to the choice of transport mode in shopping trips.

Returning to Olivieri and Fageda (2021), they point out that families with children are likely to travel by car; women use it to reduce travel times, although women are less likely to travel by car. The predominance of the use of public transport by women affects their mobility in areas where there is less supply of this transport. They also indicate that the socioeconomic has an important weight in mobility. And along these lines, Riquelme (2016) mentions that families with economic precariousness find it necessary to seek "mobility strategies", such as walking, and Suárez et al. (2019) mention that in CDMX walking is the most frequent among those with low income and using the car occurs with greater incidence the higher the income.

In the present work, we started from the hypothetical inference that the presence of women in urban mobility is very representative, since they are directly involved in the administration of the home, where their socioeconomic status and the type of transport used have a direct impact on its dynamics and behavior.

**Mobility**

Defined as the action of displacement in the territory, it encompasses and manifests objective and subjective factors, in addition to alluding to "trips made, feasible and conceived" (Gutiérrez, 2012, p. 71). In mobility analyses, even those who do not move are studied: inaccessibility (Di Ciommo, 2017; Gutiérrez, 2012; Joshi, Bailey and Datta, 2021; Montezuma, 2003); and it should also be considered that the trip, as a line between origin and destination, does not in itself satisfy the needs that motivate this transfer, since the needs may require several trips, places or times, that is, "travel networks" (Gutiérrez, 2012).
The gender

In mobility studies it becomes important, since mobility needs have been shown to be different (Carta and De Philippis, 2018; Di Ciommo, 2017; Olivieri and Fageda, 2021), even if factors such as differences in employment or access to services are ruled out. private vehicle (Havet, Bayart and Bonnel, 2021). But also between socioeconomic strata the needs or access to transport are different (Li et al., 2018; Riquelme, 2016).

Socioeconomic strata

In the present work, the categorization of socioeconomic strata present in the methodological document of the EOD 2017 (Inegi, 2017) was used: 1) low, 2) medium low, 3) medium high and 4) high. This stratification is due to the sociodemographic characteristics of individuals, as well as the quality and equipment within and around the homes they inhabit.

Transportation modes

Whether public (such as concession or mass transport), private (private car) or active (walking), among the factors that encourage the decision to use one or the other are the quality of transport, security (Gori, Silva, Venâncio and Dias, 2020), socioeconomic characteristics (Suárez et al., 2019), even the perceived mobility needs according to the complexity of activities of each individual (Thorhauge, Kassahun, Cherchi and Haustein, 2020), such as doing activities while traveling to make that time productive (Malokin, Circella y Mokhtarian, 2019).

Mobility spending

This can be public or private, such as the financial costs of travel systems and services, those linked to accidents, congestion costs and the individual costs that each individual spends when traveling (Cabrera, Velásquez and Orozco, 2015; Sánchez, 2011; World Business Council for Sustainable Development [WBCSD], 2004). The classification of modes of transport in this work is also part of the methodology of the EOD 2017 (Inegi, 2017, p. 54).
**Methodology**

With a quantitative approach, thematic maps of the type of choropleths were made, with information from the EOD 2017, to detect the number of trips originating in different areas of the ZMVM according to gender, socioeconomic status and type of transport in the area that they traveled.

Table 5 describes the variables considered in the model (see also figure 1).

**Figure 1. Model variables**

![Diagram of variables](image)

Source: self made

**Instrument**

In its methodology, the 2017 EOD (Inegi, 2017) used the district as the geographic unit to divide the ZMVM. These districts are made up of groups of contiguous blocks and grouped according to socioeconomic characteristics, so they have a different territorial extension. The total number of districts in the survey is 194 (table 4).
Table 1. Number and name of districts per entity

| Distritos de Ciudad de México | 001 | 002 | 003 | 004 | 005 | 006 | 007 | 008 | 009 | 010 | 011 | 012 | 013 | 014 | 015 | 016 | 017 |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Number and name of districts per entity | Centro Histórico | Buenavista-Reforma | Tlatelolco | Morelos | Moctezuma | Balbuena | Obrera | Condesa | Nápoles | Vertiz Narvarte | Reforma Iztacihuatl | Palacio de los Deportes | San Andrés Tetepilco | Portales | Del Valle | Chapultepec-Polanco | Panteones |
| 023 | 024 | 025 | 026 | 027 | 028 | 029 | 030 | 031 | 032 | 033 | 034 | 035 | 036 | 037 | 038 | 039 |
| Reclusorio Norte | Ticomán | Nueva Industrial Vallejo | Instituto Politécnico | Tepeyac | La Villa | Nueva Atzacoalco | San Felipe de Jesús | Deportivo los Galeana | San Luis de Anaya | Bondojito | San Juan de Aragón | Aeropuerto | Pantitlán | Zaragoza | UPIICSA | Central de Abastos | UAM Iztapalapa |
| 045 | 046 | 047 | 048 | 049 | 050 | 051 | 052 | 053 | 054 | 055 | 056 | 057 | 058 | 059 | 060 | 061 | 062 |
| Culhuacán CTM | Campestre Churubusco | Viveros | Pedregal de Santo Domingo | Xotepingo | Estadio Azteca | Ciudad Universitaria | Olivar de los Padres-San Jerónimo | Las Águilas | Santa Lucía | Molinos | Santa Fe | Observatorio | Las Lomas | Cuajimalpa | San Lorenzo Acopilco | San Bartolo-San Mateo | |
| Código | Localidad                          | Código | Localidad                          | Código | Localidad                          | Código | Localidad                          |
|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|
| 018    | Tezozomoc                         | 040    | Escuadrón 201                     | 062    | Cerro del Judío                   | 084    | Santa Cruz Meyehualco             |
| 019    | El Rosario                        | 041    | Parque Cerro de la Estrella       | 063    | La Magdalena Contreras           | 085    | Ejército Constitucionalista       |
| 020    | Industrial Vallejo                | 042    | Lomas Estrella                    | 064    | Villa Olímpica                    |        |                                  |
| 021    | La Raza                           | 043    | Canal Nacional                     | 065    | Padierna                          |        |                                  |
| 022    | Cuautepec                         | 044    | Coapa                             | 066    | San Pedro Martir                  |        |                                  |

### Distritos del Estado de México

| Código | Localidad                          | Código | Localidad                          | Código | Localidad                          | Código | Localidad                          |
|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|
| 100    | Localidades Pte Chamapa-Lechería   | 128    | La Quebrada-Parques Industriales  | 156    | CC Center Plazas-Nueva Aragón     | 184    | Parque Industrial Izcalli          |
| 101    | CC Interlomas-Lomas de Tecamachalco| 129    | Industrial Sin Nombre-Buenavista 2.ª Secc | 157    | Héroes de la Independencia-San Agustín | 185    | San Lorenzo-Xochitencó            |
| 102    | Club de Golf Lomas-Campo Militar Naucalpan | 130    | Tultitlán (centro)                | 158    | La Costeña-Olimpia Jajalpa       | 186    | CC Patio Chimalhuacán-Barrio La Rosita |
| 103    | San José de los Leones             | 131    | Melchor Ocampo-Joyas de Cuautitlán| 159    | Jardines de Sta Clara-Super Plaza Ecatepec | 187    | Barrio Labradores-Jardines Acuitlapilco |
| 104    | San Rafael Chamapa                  | 132    | Coyotepec-Teoloyucan              | 160    | Multiplaza Aragón-Cd Azteca      | 188    | Talladores-Central de Abastos ChicoLoapan |
| 105    | Fracc Industrial Naucalpan Poniente | 133    | Huehuetoca                        | 161    | Jardines de Morelos               | 189    | ChicoLoapan de Juárez             |
| 106    | Naucalpan de Juárez-Centro y Lomas-| 134    | Tequixquiac-Apaxco                | 162    | Central de Abastos Ecatepec      | 190    | Sta Ma Nativitas                  |
| 107    | Las Huertas                        | 135    | Zumpango                          | 163    | Héroes Tecámac y Ecatepec        | 191    | Lomas de Buena Vista-Sta Rosa     |
| 108 | CC Lomas Verdes-Cerro de Moctezuma | 136 | Tultepec (cabecera) | 164 | Los Héroes Tecámac-Bosques y Jardines- | 192 | Valle de los Reyes |
| 109 | Cd Satélite Poniente | 137 | Central de Abastos Tultitlán-Santiago Teyahualco | 165 | Ojo de Agua | 193 | Metro La Paz-Los Reyes |
| 110 | CC Cd Satélite-Industrial Alce Blanco | 138 | Chilpan-Buenavista Tultitlán | 166 | Base Aérea Sta Lucía-Cuahtlalpan | 194 | CEDIS San Gregorio-Cerro El Elefante |
| 111 | Condados de Atizapán-México Nuevo | 139 | TAD San Juan Ixhuatepec | 167 | Tecámac (cabecera) | 195 | Geovillas de Ayotla-Unión Antorchista |
| 112 | Periférico Barrientos-Mundo E | 140 | Lázaro Cárdenas-Lomas de Tepeolulco | 168 | Ciudad Cuauhtémoc | 196 | Ixtapaluca centro-Acozac |
| 113 | Zonas Industriales Tlalnepantla | 141 | Coacalco (cabecera) | 169 | Termoeléctrica del Valle de Méx | 197 | Pueblos de Ixtapaluca |
| 114 | Zona Industrial Tabla Honda y San Pablo Xalpa | 142 | Villa de las Flores-Héroes Coacalco | 170 | San Salvador Atenco-Paje Pirámides | 198 | CC Sendero y Galerías Ixtapaluca |
| 115 | Fracc Industrial Barrientos | 143 | Potrero-La Laguna | 171 | Carr Pirámides-Tulancingo | 199 | CC Sendero Valle de Chalco-Santiago |
| 116 | Club de Golf Hacienda | 144 | Pueblo San Pablo de las Salinas | 172 | Texcoco Norte-Tepexpan | 200 | Alfredo Baranda |
| 117 | U.H. Adolfo López Mateos-Cental de Abastos Atizapán | 145 | U.H. de San Pablo de las Salinas | 173 | Nuevo AICM | 201 | Xico |
| N°  | Localidad                  | Código | Actividad                               | Municipio                          |
|-----|---------------------------|--------|-----------------------------------------|------------------------------------|
| 118 | Emiliano Zapata-Lomas de San Miguel | 146    | Guadalupe-Victoria-Recursos Hidráulicos | Texcoco Centro-Chapingo             |
| 119 | Vista Hermosa             | 147    | San Cristóbal-Ecatepec                  | San Miguel Tlaixpan                 |
| 120 | Villa Nicolás Romero      | 148    | La Presa-Tulteatl                       | Chalco de Díaz-Covarrubias          |
| 121 | Cahuacán-Himno Nacional   | 149    | Teleférico-Navo                       | San Martín Cuautitl                 |
|      | Tepotzotlán-Villa del Carbón | 150    | Parques Industriales-Industriales       | San Gregorio-Tlalmanalco            |
| 123 | Lago de Guadalupe         | 151    | Villa de Guadalupe-Xalostoc            | Tramo Amecameca-Cuautla             |
| 124 | Industrial Cuamatla-San Francisco Tepojaco | 152    | Valle de Aragón                          | Benito Juárez                       |
| 125 | Industrial Tres Ríos-Infonavit Norte | 153    | Bosques de Aragón                         | Metropolitana                      |
| 126 | Centro Urbano-CC Cuautitlán Izcalli | 154    | Granjas Independencia                   | La Perla                           |
| 127 | San Martín Obispo         | 155    | Valle de Aragón 3.ª Secc               | CC Plaza Neza                       |

**Distritos de Hidalgo**

| N°  | Distrito                  |
|-----|---------------------------|
| 300 | Tizayuca                  |

Source: Own elaboration based on Inegi (2017)
The travel data tables of the EOD 2017, which include the districts of origin and destination of these trips, gender, socioeconomic status and type of transport, were obtained from the Inegi website and the files containing the maps. of the ZMVM were obtained from the website of the Transport and Logistics Engineering Research Group of the National Autonomous University of Mexico (UNAM).

With the data obtained from the 2017 EOD, the data tables were prepared for each variable: dependent = Mobility; independent = Trips by gender, Trips by socioeconomic stratum and Trips by type of transport, as shown in table 5.

**Table 5. Variables**

| Variable               | Conceptualización                              | Dimensión  | Indicador | Parámetro de Medición |
|------------------------|------------------------------------------------|------------|-----------|-----------------------|
| Movilidad              | Variable dependiente (desplazamiento)          | CDMX-ZMVM  | Desplazamiento | EOD 2017             |
| Gasto                  | Variable independiente (inversión monetaria)   | Ídem       | Público Privado | Ídem                 |
| Género                 | Variable independiente (género humano)         | Ídem       | Hombre Mujer | Ídem                 |
| Estrato socioeconómico | Variable independiente (clasificación estratificada) | Ídem       | Bajo Medio-bajo Medio-alto Alto | Ídem |
| Tipo de transporte     | Variable independiente (Modalidad Vehicular)   | Ídem       | Público Privado Mixto Bicicleta | Ídem |

Source: self made
**Results**

Pearson's correlational analysis was used with the help of IBM SPSS version 22 software.

The result obtained is shown in table 6.

|         | Transporte público | Transporte privado | Mixto | Bicicleta | Otro | Caminar | Hombre | Mujer |
|---------|--------------------|--------------------|-------|-----------|------|---------|--------|-------|
| **Bajo** | Correlación de Pearson | 0.029 | -0.072 | -0.036 | 0.120 | 0.162 | 0.327** | 0.057 | 0.080 |
|         | Sig. (bilateral) | 0.731 | 0.394 | 0.672 | 0.156 | 0.125 | 0.000 | 0.502 | 0.345 |
|         | N                  | 143 | 143 | 142 | 141 | 91 | 143 | 143 | 143 |
| **Medio bajo** | Correlación de Pearson | 0.629** | 0.368** | 0.368** | 0.504** | 0.481** | 0.720** | 0.668** | 0.697** |
|         | Sig. (bilateral) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
|         | N                  | 196 | 196 | 195 | 192 | 123 | 196 | 196 | 196 |
| **Medio alto** | Correlación de Pearson | 0.771** | 0.703** | 0.599** | 0.056 | 0.201* | 0.114 | 0.738** | 0.712** |
|         | Sig. (bilateral) | 0.000 | 0.000 | 0.000 | 0.443 | 0.026 | 0.110 | 0.000 | 0.000 |
|         | N                  | 196 | 196 | 195 | 192 | 123 | 196 | 196 | 196 |
| **Alto** | Correlación de Pearson | 0.614** | 0.875** | 0.569** | 0.020 | 0.192* | -0.092 | 0.651** | 0.625** |
|         | Sig. (bilateral) | 0.000 | 0.000 | 0.000 | 0.781 | 0.035 | 0.199 | 0.000 | 0.000 |
|         | N                  | 195 | 195 | 194 | 191 | 122 | 195 | 195 | 195 |
| **Transporte público** | Correlación de Pearson | 1 | 0.825** | 0.722** | 0.255** | 0.405** | 0.360** | 0.982** | 0.948** |
|         | Sig. (bilateral) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
|         | N                  | 196 | 196 | 195 | 192 | 123 | 196 | 196 | 196 |
| Transporte privado | Correlación de Pearson | 0.825** | 1 | 0.709** | 0.184* | 0.359** | 0.077 | 0.867** | 0.834** |
|--------------------|------------------------|---------|---|---------|--------|---------|-------|---------|---------|
| Sig. (bilateral)   |                        | 0.000   | 0.000 | 0.011  | 0.000  | 0.281  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 196     | 196 | 195    | 192    | 123    | 196   | 196     | 196     |
| Mixto              | Correlación de Pearson | 0.722** | 0.709** | 1 | 0.166* | 0.275** | 0.090 | 0.713** | 0.688** |
| Sig. (bilateral)   |                        | 0.000   | 0.000 | 0.022  | 0.002  | 0.209  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 195     | 195 | 195    | 191    | 122    | 195   | 195     | 195     |
| Bicicleta          | Correlación de Pearson | 0.255** | 0.184* | 0.166* | 1 | 0.365** | 0.444** | 0.329** | 0.375** |
| Sig. (bilateral)   |                        | 0.000   | 0.011 | 0.022  | 0.000  | 0.000  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 192     | 192 | 191    | 192    | 120    | 192   | 192     | 192     |
| Otro               | Correlación de Pearson | 0.405** | 0.359** | 0.275** | 0.365** | 1 | 0.349** | 0.451** | 0.440** |
| Sig. (bilateral)   |                        | 0.000   | 0.000 | 0.002  | 0.000  | 0.000  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 123     | 123 | 122    | 120    | 123    | 123   | 123     | 123     |
| Caminar            | Correlación de Pearson | 0.360** | 0.077 | 0.090  | 0.444** | 0.349** | 1 | 0.427** | 0.546** |
| Sig. (bilateral)   |                        | 0.000   | 0.281 | 0.209  | 0.000  | 0.000  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 196     | 196 | 195    | 192    | 123    | 196   | 196     | 196     |
| Hombre             | Correlación de Pearson | 0.982** | 0.867** | 0.713** | 0.329** | 0.451** | 0.427** | 1 | 0.972** |
| Sig. (bilateral)   |                        | 0.000   | 0.000 | 0.000  | 0.000  | 0.000  | 0.000 | 0.000   | 0.000   |
| N                  |                        | 196     | 196 | 195    | 192    | 123    | 196   | 196     | 196     |
| Mujer              | Correlación de Pearson | 0.948** | 0.834** | 0.688** | 0.375** | 0.440** | 0.546** | 0.972** | 1 |
In the correlation it is visible, regarding gender, that women (0.697) make more trips than men (0.668), mainly in the low (0.327) and medium-low (0.720) strata. In the medium-high (0.703) and high (0.875) strata, private transport is used more.

As can be seen, in the descriptive analysis the relationship was presented with a higher incidence of women, since she performs an active occurrence of mobility, but in a lesser extent of displacement and in the lower middle stratum, where it is more appreciated.

Source: self made

The sample size was 66,625 households, but the survey was designed with a factor that reflects all trips throughout the ZMVM. The survey captured trips made on weekdays and on Saturdays, but only trips made on weekdays were selected for this research.
The Arcmap program was used to link these data tables with the maps containing the polygons of each district. Figure 2 shows the map with the number of trips by district of origin in ranges separated by the natural breaks method.

**Figure 2.** Trips by district (thousands of trips)

Note: the names of the districts are found in table 4.

Source: Own elaboration based on Inegi (2017)
In the maps it was necessary to discard the trips that did not have a specified district. Table 8 shows the amount of the population that made trips in the ZMVM, with or without an assigned district, as well as the number of trips made by gender, and it is observed that women made more trips. Figure 3 shows the map with the trips by district of origin separated by gender and in ranges by natural breaks, which are generally similar in each map.

Table 8. Number of traveling population by gender and by place of residence; and number of trips made by gender (millions)

| Área geográfica     | Población viajera por género y lugar de residencia | Viajes realizados por género |
|---------------------|---------------------------------------------------|----------------------------|
|                     | Total    | Hombres | Mujeres | Total | Hombres | Mujeres |
| ZMVM                | 15.62    | 7.72    | 7.91    | 34.56 | 16.29    | 18.26    |
| Ciudad de México    | 6.93     | 3.38    | 3.56    |       |          |          |
| Municipios conurbados | 8.69    | 4.34    | 4.35    |       |          |          |

Source: Own elaboration based on Inegi (2017)

Figure 3. Trips by district of origin and gender

Note: the names of the districts are found in table 4.
Source: Own elaboration based on Inegi (2017)
In the map of figure 4, with the gender comparison for each district, it is noticeable that the graphs have mostly the same or more number of trips made by women.

**Figure 4.** Trips by district of origin and with a comparative graph according to gender

Note: the names of the districts are found in table 4.

Source: Own elaboration based on Inegi (2017)

Regarding the socioeconomic strata of the 2017 EOD, the low stratum represents 0.9%, the lower middle 54.5%, the upper middle 31.2% and the high 13.4%. Figure 5 shows a map with the trips by district and by socioeconomic strata, where it is perceived that the low stratum has a much lower number of trips compared to the other strata, although this is explained because it is less than 1% in the ZMVM.
Figure 5. Trips by district of origin according to socioeconomic status

Note: the names of the districts are found in table 4.

Source: Own elaboration based on Inegi (2017)

In figure 6 the maps are separated by stratum and it is notorious that the trips of low and medium-low strata originate mainly in the periphery, while those of medium-high and high stratum have their origin mostly in central districts.
**Figure 6.** Trips by district of origin according to socioeconomic status (map by status)

Note: the names of the districts are found in table 4.

Source: Own elaboration based on Inegi (2017)

Figure 7 presents a comparative map of transport types by district. Private and public transport have priority use in the central districts, while towards the periphery the mode of walking is used mostly, followed by private (which does not refer only to private cars, since on the map this mode includes motorcycles).
Figure 7. Comparison of types of transport used in each district

Note: the names of the districts are found in table 4.

Source: Own elaboration based on Inegi (2017)

This can also be seen in figure 8 with the maps separated by type of transport (the maps with “Mixed” and “Other” modes are omitted, since the maximum number of trips per district with these modes is 12,600 and 4,600, respectively).
Figure 8. Trips by district of origin according to type of transport

Note: the names of the districts are found in table 4.
Source: Own elaboration based on Inegi (2017)
The results observed in the maps and in the statistical analysis show how in the periphery of the ZMVM women make more trips. It was also observed that it is in the periphery where the trips of the low and medium-low strata mainly originate and it is also there where the walking and private modes are mostly used, compared to public transport, which is used to a much lesser extent. In the maps it was necessary to discard the trips that did not have a specified district of origin; if they had been clear, their inclusion would have provided more precise results, however, the correlation analyzes confirm the hypothesis about the representative presence of women in mobility and the relationship with socioeconomic status and mode of transport.

Proposal

Given the responsibility carried out by the woman inherited or awarded in the home, it is recommended, especially for the low and medium-low strata, to carry out immediate and mediate mobility planning in the home.

The use of digital tools that exist in the market and that are also free is suggested. Use applications that directly involve concessioned transport to streamline urban mobility and reduce impact on cost and time. This through government regulation, to reduce and mitigate the abuse of bidders, by the policies applied and that benefit the entrepreneur (see table 9).
Table 9. Home Mobility Management Proposal

| Propuesta                                      | Responsable | Acción                                                                 |
|-----------------------------------------------|-------------|------------------------------------------------------------------------|
| Planeación de movilidad cotidiana             | Mujer       | Utilizando las herramientas tecnológicas y aplicaciones comerciales existentes en el mercado: Google Maps, Waze, Mapquest, Maps.me, Apple Maps, entre otras, vinculándolas con el transporte concesionado Uber, Didi, Cabify, Beat, entre otros. |
| - Mediano plazo                               |             |                                                                        |
| - Corto plazo                                 |             |                                                                        |
| - Disruptivo (Casos imprevistos)              |             |                                                                        |
| Convenio con el transporte concesionado       | Gobierno y transporte concesionado | Firmar acuerdos de respeto y buenas prácticas de movilidad urbana, apoyando a la población (clientes). Señalar políticas específicas para evitar violentar al usuario y evitar malas prácticas de los concesionados. |
| Talleres de uso y servicio del transporte público vinculado con aplicaciones digitales | Gobierno y empresas dueñas del transporte concesionado | Certificaciones en el uso de las aplicaciones y beneficios como corresponsables de su uso y asegurar una cartera considerable de clientes. |

Source: self made

Discussion

In the study by Suárez et al. (2019) on mobility in CDMX, it was observed that 55% of trips were made by women. The results observed in the maps of the present study show how women also make more trips in the periphery of the ZMVM, which suggests that the mobility of women in the periphery is for tasks other than or alternative to going to the work centers located in CDMX, a situation exposed by Fagnani (1977), Sabaté (1984), Díaz (1989) and Ferré and Serra (2006), all of them cited in Riquelme (2016), and something similar to the study in the Montevideo Metropolitan area of Olivieri and Fageda (2021). This would also be explained by the tasks they perform, mainly related to home and family (Carta and De Philippis, 2018), because, despite...
changes in recent decades, gender roles and mobility persist. Those distinctions still occur (Havet et al., 2021).

It was also observed that it is in the periphery where the trips of the low and medium-low strata mainly originate and it is also there where the modes of walking and private are mostly used compared to public transport, which is used to a much lesser extent. The use of the walking mode agrees with the observation of Suárez et al. (2019): those with low income are the ones who use it the most. But the private mode is also used in the periphery over public transport, which could be explained by what was stated by Rodríguez and García (cited in Riquelme, 2016) about how the characteristics of the city influence the type of transport used, because it is in the periphery where there is less public transport (Olivieri and Fageda, 2021), both mass and concession.

Using the private mode in the periphery between the low and medium-low sectors indicates that these households spend a significant amount of money on mobility, since the category of transportation and communications represented, in the state of Mexico, 19.9% of household spending on mobility. In 2018 and 19.6% in 2020 and includes the acquisition, maintenance, accessories and services for vehicles, in addition to expenses in other types of transportation and expenses in communications (Inegi, 2018, 2020). This can be explained by the fact that transportation is offered where there is more population density, and in the ZMVM the density is ten times greater in the urban centers than towards its limits (Lara, Estrada, Zentella and Guevaram 2017).

The individual expense that involves mobility, and to a greater extent in the conurbation municipalities of the ZMVM (Inegi, 2020), as well as the probability that satisfying the needs requires multiple trips (Gutiérrez, 2012), add to the urgent need that transport policies focus on solving mobility in the periphery. All this agrees with what was stated by Jirón et al. (2020) on the various factors involved in mobility. And the fact that in the classification of the travel purposes of the 2017 EOD is found to "take someone or pick someone up" makes it clear that the interdependence between individuals also influences.

In other studies on mobility and gender, the distinction in mobility between men and women was also observed (Carta and De Philippis, 2018; Di Ciommo, 2017; Havet et al., 2021; Olivieri and Fageda, 2021; Riquelme, 2016), but even among women of different socioeconomic status (Riquelme, 2016), so if the various factors involved may be socioeconomic status, lifestyle, personal decisions about the choice of transport mode, the purpose of the trip (Etminani and Ardeshiri, 2015; Li et al., 2018), the structure of the city, the offer of modes of transport, the relationships between individuals and also the gender of the traveler, agrees with Jirón et al. (2020)
in that transport policies must take into account all these factors and that gender-related transport is not a “women's problem”. Because certain gender roles are still reproduced (Riquelme, 2016), mobility affects women differently, so it is suggested that these differences be considered in transport policies, as Di Ciommo (2017) also suggests, but with a view to education contributing to the reduction of these gender distinctions.

In the maps it was necessary to discard the trips that did not have a specified district of origin; Had they been clear, as already mentioned, their inclusion would have provided more precise results, however, the correlation analyzes confirm the hypothesis about the representative presence of women in mobility and the relationship with socioeconomic status and mode of transport. It is suggested, then, that obtaining mobility data be more precise so that spatial relationships provide information that helps decision-making in these transport policies.

**Conclusions**

The present study aimed to relate gender, socioeconomic characteristics and mode of transportation as factors in mobility. The results showed that, in terms of gender, the periphery of the ZMVM is where women make more trips than men, and it is also in the periphery from where the low and medium-low socioeconomic strata make trips, but the use of transport public is minimal. Regarding the socioeconomic strata of the 2017 EOD, the low stratum represents 0.9%, medium low 54.5%, medium high 31.2% and high 13.4%. Considering the trips by district and by socioeconomic strata, it is perceived that the low stratum has a much lower number of trips compared to the other strata, although this is explained because the low is less than 1% in the ZMVM. Something that worries us is the need to use private transport in the periphery of the low and medium-low sectors, for which, it is inferred, these households have to allocate a greater expense to be able to carry out the necessary mobility, including the expense of some supplies.

Another important aspect to consider is the individual expense to cover the needs of mobility and multiplication of trips that mainly involve women, due to their main role of participating directly in this family activity. It is proposed that women who are heavily involved in urban mobility and home management assertively use existing digital tools on the market and consider them essential to plan their daily activities that require necessary and daily travel and thus seek to reduce costs and optimize time.
Future lines of research

Currently, the life choices of young people and their relationship with the choice of transport modes are analyzed (Zhang and Jiang, 2020), so performing an analysis involving the ages of users can provide data on mobility distinctions between age groups in addition to gender, which would help to carry out a forecast of the needs for the provision of transport services, as well as dissemination and education on mobility issues in search of the quality of life of the population.

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