

Visualizing Femicides: Comparing Argentina with Neighboring Latin American Countries

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Abstract. This paper explores the application of data visualization techniques to analyze femicides, conducting a comprehensive comparative study between Argentina and its neighboring countries. Through the application of visualization approaches, we aim to uncover patterns, trends, and critical insights that contribute to a deeper understanding of the prevalence, dynamics, and impact of femicides in these regions. In this article, we introduce a data visualization dashboard focused on femicides in Argentina and Latin America. Our study examines different facets of femicide in the region, exploring the connections between femicide rates and factors such as intimate partner violence, migration rates, unemployment, and educational attainment from 2017 to 2022.

Keywords: Temporal Data Visualization. Visual Data Analysis. Femicide. Migration. Unemployment.

1 Introduction

Gender-based violence, especially femicides, represents a severe violation of human rights in Latin America. Femicides represent an extreme manifestation of gender-based violence with profound economic, social, and political implications.

Data visualization plays a crucial role in understanding and addressing femicide. By transforming complex statistics into accessible visual representations, we can make the severity of this issue more understandable to a wider audience. Visualizations have the power to reveal patterns and trends that might otherwise remain hidden in raw data [1,2], providing valuable insights for researchers, policymakers, and activists. By enabling researchers, policymakers, and the public to grasp these patterns more readily, data visualization enhances our capacity to detect hotspots, temporal trends, and risk factors, ultimately contributing to more informed decision-making and targeted interventions.

In this paper, we explore the application of data visualization techniques to analyze femicides, focusing on a comparative study between Argentina and the

broader regions of Latin America. Using visual analytics, our goal is to uncover patterns, trends, and critical insights that contribute to a deeper understanding of the scope and impact of femicide in these regions during the period 2017-2022.

Our goal is to examine the situation in Argentina in comparison to their neighboring countries, investigating whether certain behavioral patterns associated with femicides correlate with factors such as perpetrator or victim unemployment, educational level, or migration status. Through this comprehensive analysis and visualization of femicide-related data, we aim to contribute valuable insights to the ongoing efforts to combat gender-based violence in Latin America, with a particular focus on Argentina's position within its regional context. In the following sections we will go into more detail about related work, proposed dashboard, the data sources, results and conclusions.

2 Related Work

Recent research emphasizes the importance of data visualization in understanding femicide patterns. The study in [3] combines statistical analysis with socio-cultural perspectives, examining data from official sources and activist organizations. The work in [4] describes how data visualization tools help participants understand gender-based violence and its consequences in Ecuador.

In [5], the authors explore how feminist activists produce “counterdata” to address underreporting and misrepresentation of feminicide in official statistics. These efforts, grounded in alternative epistemologies emphasizing care, memory, and justice, aim to increase visibility and support policy reforms. The work in [5] presents expert opinions on strategies for implementing an integrated femicide data collection system in Europe, developing a conceptual map of 69 strategies in 10 clusters fitting into “Political action” and “Technical steps” domains.

The work in [6] investigates the link between women's empowerment and intimate partner violence using data from the 2019 ENVIGMU survey in Ecuador. This study rates gender-based violence against women, including a high number of femicides compared to the region. To account for potential biases, an instrumental variable model was employed. The analysis confirms that increased empowerment for women is associated with a decrease in the occurrence of intimate partner violence.

Gender-related killings of women and girls, or femicide, have been the subject of increased global attention and advocacy efforts. Researchers have highlighted the need to strengthen data collection and improve responses to this pervasive form of violence, which is not inevitable but rather rooted in complex societal and structural factors.

3 The Dashboard

The designed dashboard is a coordinated multi-view data visualization tool developed with Power Bi [7] freely accessible from any browser⁴. We used various

⁴ <https://tinyurl.com/LatAmFemicides> (Spanish version)

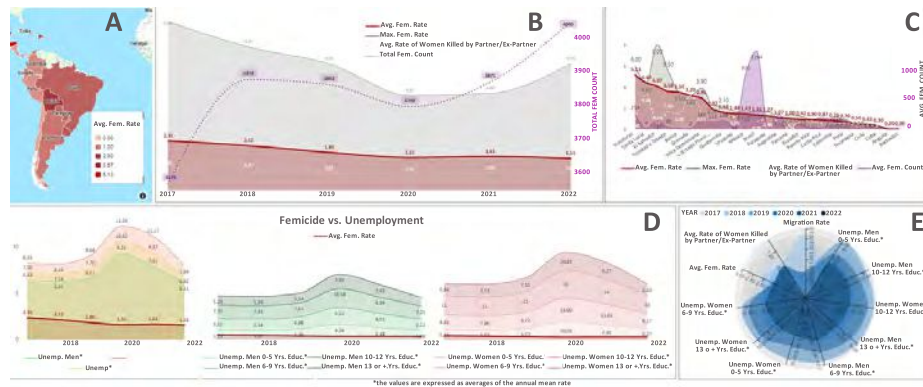


Fig.1: The Dashboard integrates a Choropleth Map (A), 3 Line Charts with shaded areas (B, C and D-left), 2 Stacked Area Charts (D-middle and D-right) and a Star Plot (E).

data visualization techniques to analyze femicide data from Argentina and compare it with data from its neighboring countries. We begin by defining a clear objective: to analyze potential trends, patterns, or relationships between femicide rates, migration rates, and unemployment rates, disaggregated by educational levels, during the period 2017 to 2022 in Argentina and its neighboring countries. This objective aims to address the following questions:

- Q1** Is the behavior of femicides in Argentina similar to its neighboring countries? Are there any patterns among these countries?
- Q2** How do various unemployment rates for women correlate with femicide rates according to the educational level between Argentina and its neighboring countries?
- Q3** How do migration rates, gender-specific unemployment rates, educational levels, and femicide rates change over the analyzed period?

4 The Data

In this work, data sources were integrated from the Economic Commission for Latin America and the Caribbean (CEPAL⁵), specifically from CEPALSTAT⁶, which includes databases and statistical publications. These data were chosen based on the hypothesis that education, unemployment, and mobility may impact femicides. The specific data sources used are:

- **Femicide Rate** [8]: This is the annual quantification of the total number of women aged 15 and over killed for gender-related reasons, divided by the female population, expressed per 100,000 women. National legislations refer to this as femicide, feminicide, or gender-based aggravated homicide.

⁵ <https://www.cepal.org/es>

⁶ <https://statistics.cepal.org/portal/cepalstat/>

- **Number of Femicides or Feminicides** [9,10]: The annual quantification of the total number of women aged 15 and over killed for gender-related reasons. In Argentina, this data is collected by *Corte Suprema de Justicia de la Nación, Registro Nacional de Femicidios de la Justicia Argentina* [11].
- **Migration Rate** [12],[13]: It is the ratio between the annual net migration balance (the annual average difference between immigrants and emigrants in a population) for a specific period and the average population for the same period, expressed by 1,000 inhabitants. Population estimates and projections are elaborated by CELADE - Population Division of CEPAL and the United Nations Population Division.
- **Unemployment Rate by Sex and Education** [14]: It is the ratio of the urban unemployed population aged 15 and over who sought employment during the period to the economically active urban population of the same age group, disaggregated by years of education and sex.

To geographically locate all countries in Latin America, the datasets were processed integrating country codes ⁷ and latitudes, and longitudes ⁸. All the datasets have been processed, cleaned, and integrated using Power Query Editor.

4.1 The Views

As shown in figure 1, the dashboard was designed as a combination of seven views, described as follows:

- *Choropleth Map*: These are a form of quantitative cartography used to represent discrete phenomena associated with units such as countries or provinces, applying colors or surface symbols according to their value [15]. Different shades or colors are used in these areas following the principle of “the greater the quantity, the darker the color”. In this particular case, the map displays Latin American and Caribbean countries colored based on the average femicide rates recorded for each country (see figure 1.A). The femicide rate is per 100,000 women.
- *Line Charts*: These charts display data points connected by lines. They are used to show trends over time or across categories. Line charts are useful for tracking changes and identifying patterns in data, providing a clear view of how values evolve. For this case, we decided to combine the standard line chart with filled-in areas below the lines. We use these line charts with shaded areas in 3 views. To display the average femicide rate, maximum femicide rate, the average rate of women killed by their partner or ex-partner, and the total number of femicides in figure 1.B. To display the average annual unemployment rate, the average annual unemployment rate for men and for woman and the average femicide rate in figure 1.D (left). To display the average femicide rate, maximum femicide rate, the average rate of women

⁷ <https://gist.github.com/brenes/1095110#file-paises-csv>

⁸ <https://datos.canarias.es/catalogos/general/dataset/paises-del-mundo-en-2016-delimitaciones-territoriales-para-fines-estadisticos-en-canarias>

killed by their partner or ex-partner and the total number of femicides by country in figure 1.C).

- *Stacked Area Charts* These typically allow the visualization of how a measure, observed through multiple category values, changes over time. The category series are each plotted as an area and stacked on top of each other. This chart therefore visualizes contributions from different category values along with their total[16]. In this dashboard, we decided to use stacked area charts in 2 views. To display the average annual unemployment rate for men with different years of education and average femicide rate in figure 1.D (middle). To display the average annual unemployment rate for women with different years of education and average femicide rate in figure 1.D (right).
- *Star Plot*: A star plot is a graphical representation of multivariate data where each variable is represented by an axis radiating from a central point. Each axis corresponds to a different variable, and the data for each variable is plotted along its respective axis. The points are then connected with lines to form a polygon, in this case, curved lines are used. We use a star plot to compare and analyze the behavior of different variables across different years (see figure 1.E).

The dashboard is implemented using coordinated views, where a selection made in one view affects the other views, allowing users to relate all available variables. This interactive feature enables a comprehensive analysis of the data, as changes in one visualization are reflected across the entire dashboard. The dashboard supports filtering by various parameters, including year, femicide rate, migration rate, and annual average unemployment rate. These filters can be applied individually or in combination, providing users with the flexibility to focus on specific aspects of the data or explore broader trends. By adjusting these filters, users can dynamically update all visualizations, revealing patterns and correlations across different variables and time periods.

5 Results

In Argentina and its neighboring countries, there are characteristics relevant to the study. Therefore, to answer **Q1**, we analyze femicide rates by country and their temporal evolution, comparing rates across countries and examining trends from 2017-2022. Figure 2(A) shows the countries addressed in this work. Figure 2(B) shows that for Argentina and its neighboring countries, the average femicide rate (red line) has a downward trend, peaking in 2018. Figure 2(C) compares femicide rates across Latin American countries, ranked highest to lowest. Red dots represent Argentina's neighboring countries, indicating Argentina's relative position among its bordering nations.

Looking at this group of countries, one might conclude that femicide cases are decreasing in Argentina and its neighbors. However, Figure 3 shows individual country trends, revealing distinctly different patterns for each nation. Argentina's femicide rate remains relatively constant (1-1.1) until a slight decrease in 2021. Uruguay shows peaks in 2018 and 2022, with rates between 1.10-1.70,

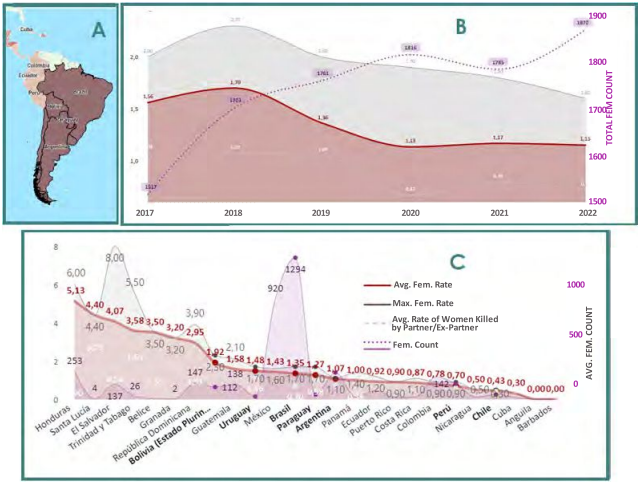


Fig. 2: Femicide rates in Latin America. **(A)** Choropleth Map where Argentina and its neighboring countries are selected. **(B)** Average femicide rate in countries bordering Argentina. **(C)** Line graph of femicide rates in Latin American countries, ranked from highest to lowest.

notably higher than Argentina despite lower population. Chile’s femicide rate peaks in 2021, while total female deaths remain constant (0.4-0.5). Bolivia’s highest femicide rate and most female deaths occurred in 2018. The rate was between 1.5 and 2.3, very high considering its population is smaller than Argentina’s. Paraguay peaks in 2018, then declines varying between 1.0 and 1.7. Brazil’s rate peaks in 2018, then decreases significantly, but total female deaths continue to rise. Femicide rates range from 1.2-1.7, comparable to Argentina despite higher population density.

Based on this analysis, we conclude that the pattern of femicides in Argentina is not entirely similar to that of its neighboring countries. Each country has distinct patterns and trends regarding femicide rates, making it difficult to generalize a common behavioral pattern among all of them. The differences in the trends suggest that various factors, potentially including legal, social, and cultural differences, influence femicide rates uniquely in each country.

To address **Q2**, we analyze the women unemployment and femicide rates in Argentina, Bolivia, and Uruguay. Reviewing Figure 4, we observe that in Argentina, the highest unemployment rate for women occurred in 2020, particularly affecting those with 10-12 years of schooling, followed by those with 6-9 years of schooling and affecting the least those with more than 13 years of schooling. Despite this peak in unemployment, the femicide rate remained consistent with the previous three years. In 2021, while both rates decreased, the femicide rate only slightly declined, whereas the unemployment rate dropped significantly below 2017 levels for all educational levels among women. At this

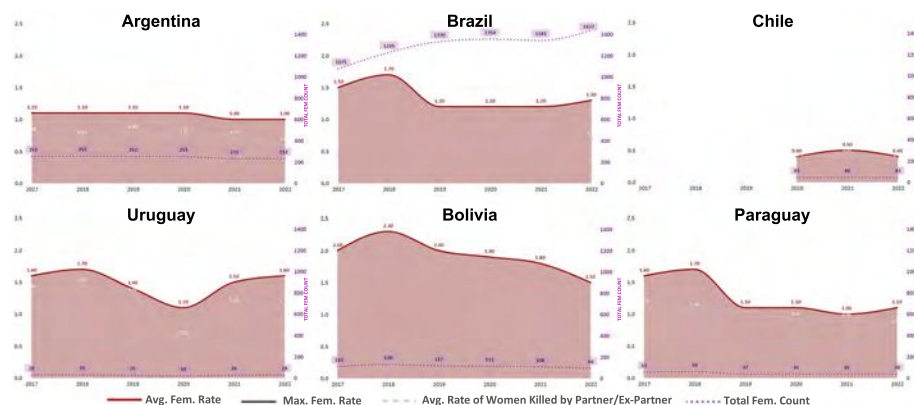


Fig. 3: Femicide rate patterns in countries bordering Argentina.

point, it would be interesting to have data on the employment situation of women who were victims of violence. While overall unemployment rates for woman in Argentina shows a slight correlation with femicide rates (2020-2021), examining the specific employment situations of women who were victims of violence could provide crucial insights into the complex relationship between economic factors and gender-based violence. In Bolivia, from 2018 to 2020, the femicide rate gradually decreased as the unemployment rate increased, indicating an inverse relationship between femicide and unemployment rates, regardless of educational level. In Uruguay, the femicide rate showed a minimum inflection point in 2020, while the unemployment rate peaked, especially among those with 10-12 years of schooling. This suggests that the femicide and unemployment rates in Uruguay exhibit opposite trends. Overall, the data do not show a consistent correlation between unemployment and femicide rates across these countries. Each country exhibits different patterns, indicating that other factors may be influencing these rates.

Regarding **Q3**, we selected Argentina and all its neighboring countries on the choropleth map. This selection impacted all the other views, including the star plot. Figure 5 shows that, for these countries, the migration rate in 2018 and 2019 is zero, while the unemployment rate for women with 10-12 years of schooling is the highest. In 2020 and 2021, the migration rate is around 0.5 for all countries, maintaining similar unemployment rates across all years of schooling and gender.

We also performed the same analysis selecting each country separately, as shown in Figure 6. The highest average femicide rate occurred in 2018 and tends to decrease from there. In general, we observe a high unemployment rate in these countries in 2020, reaching an average of 11.45, marked by the period of social isolation caused by the COVID-19 pandemic. For the years 2021 and 2022, we note a decrease in unemployment, reaching levels similar to 2018, around 7.96. Those most affected by unemployment are women with low education (6 to 9

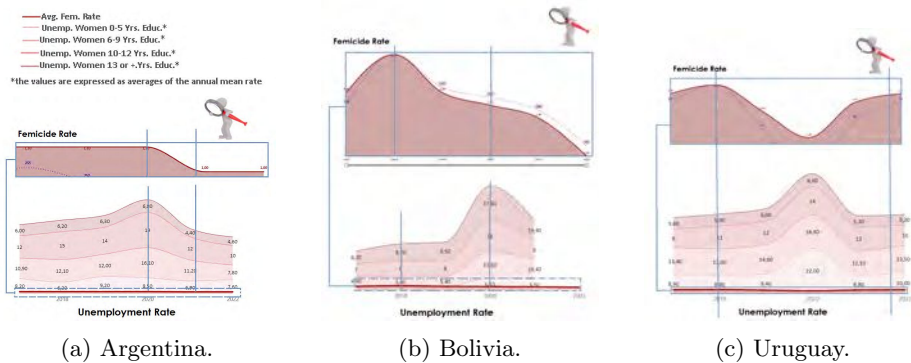


Fig. 4: Comparison of femicide rate vs unemployment rate.

years of schooling), who have a rate of 18 per 100,000 women. Migration has a particular pattern in Argentina’s neighboring countries, with generally low migration compared to other analyzed countries. Among these countries, Chile stands out with a migration rate between 5 to 6 between the years 2020 and 2021, being the largest migration values, but they have the lowest femicide rates in the region. On the other hand, Bolivia has negative migration rates of -0.8 and -0.76, but the femicide rates are the highest in the region, being 2.3 and 2 in 2018 and 2019 respectively.

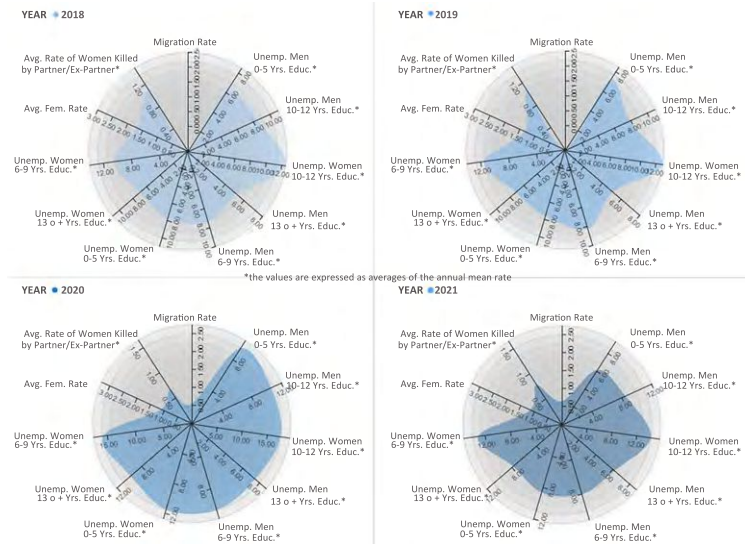


Fig. 5: Variation of the variables taking into account Argentina and the neighboring countries as a whole.

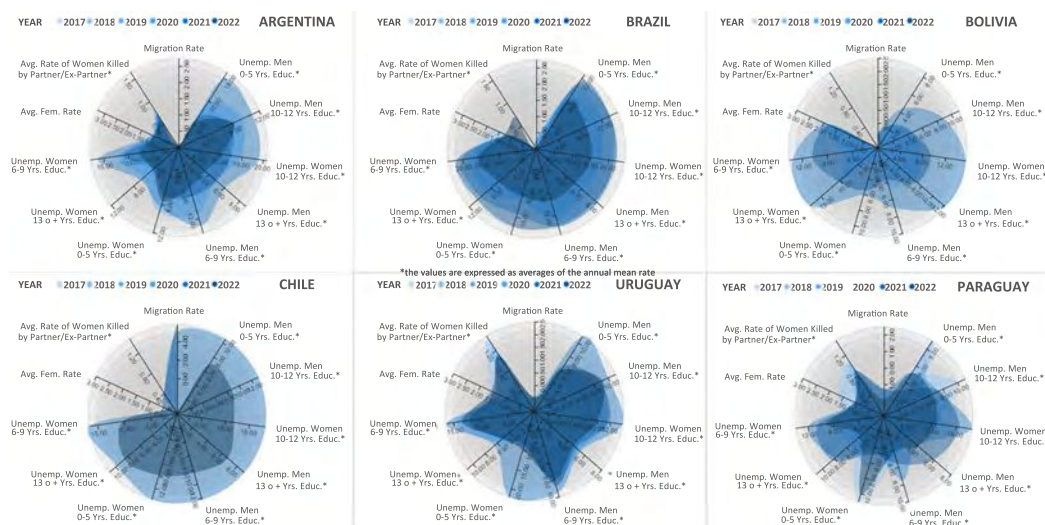


Fig. 6: Country trends in femicide, migration and unemployment by educational level.

6 Conclusions

In this work, we developed a data visualization dashboard for Argentina and its neighboring countries. The aim is to identify trends or behavioral patterns among variables that may affect the femicide rate, such as the unemployment rate by the highest level of education achieved and the population migration rate. When analyzing trends between Argentina and its neighboring countries, we obtain very general responses that are not representative of all the countries due to their diverse behaviors. Therefore, it is not possible to draw joint conclusions; each country must be analyzed individually, considering its own characteristics of unemployment, migration, and various aspects of gender-based violence. This is a preliminary data visualization work. We have all the data and we have designed dashboards to continue exploring and analyzing more trends to detect potential patterns.

A limitation in studying these social issues is the lack of commitment from various states to update official data. This results in many cases where information is either unavailable or outdated for certain topics across all Latin American countries. As future work, we plan to expand the number of questions, as the developed dashboard is believed to provide many other answers that may be of great interest. Additionally, we plan to develop a behavior model of the variables involved in this work and also to develop an agent-based simulation tool that allows representation of the characteristics of the analyzed databases to evaluate the impact of different strategies and policies aimed at mitigating femicide cases.

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