

Statistical biases, measurement challenges, and recommendations for studying statistical patterns of femicide in conflict

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Abstract

Collecting data on conflict mortality—including data on femicide—is difficult and can be dangerous. The resulting data is often incomplete and not statistically representative of the victim population. Data on femicide in conflict suffers from additional complications due to measurement challenges stemming from definitional and operational ambiguities. Despite these difficulties, as more and higher quality data on femicide becomes available, there are new opportunities to use statistical methods to study patterns of violence, which can help inform policy and accountability efforts. However, this data needs to be used carefully: drawing population level inferences from incomplete datasets risks misunderstanding the true underlying dynamics of the violence. This article explores the challenges and opportunities of collecting and analyzing data on femicide and offers four recommendations to data collectors and data analysts.

Keywords: femicide; feminicide; conflict; missing data; selection bias; reporting bias; measurement

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Introduction

The Guatemalan *Comisión para el Esclarecimiento Histórico* (CEH) documented 1,465 cases of sexual violence during the internal armed conflict from 1960–1996; in 25% of these cases, the victims—who were primarily Mayan women and girls—were subsequently executed (CEH 1999). Based on the available contextual information, most, if not all, of these killings could be classified as femicides.¹ These killings, however, likely only represent a partial accounting of all of the femicides that occurred during the conflict due to missing data; deducing statistical patterns of femicide using these data alone is likely to misstate the true underlying patterns of femicidal violence. In the case of femicide, missingness generally takes two forms: (1) instances where victims’ deaths are documented, but lack contextual information that allows them to be classified as femicides; and (2) instances where a death goes undocumented all together. The result often understates the magnitude of the violence that occurred, and has the potential to distort our understanding of patterns of violence.

This problem is not unique to femicide—it is a well-documented challenge that affects data collected in conflict settings²—although femicide poses additional challenges to documentation efforts. Additionally, the difficulty of missing data also affects femicide documentation in times of peace. Even in places where femicide or feminicide is explicitly criminalized, governments have largely failed to publish official statistics that are reliable, complete, and regularly updated. Furthermore, reporting femicide through official channels (e.g., through the police) is stigmatized and dangerous in many contexts, and cultures of impunity often prevent proper investigations when femicides are reported. Activists,

¹ Femicide (or feminicide) refers to the misogynistic killing of women and girls by men. The term femicide was formalized by Radford and Russell (1992). Building on this work, Lagarde y de los Ríos (2010) introduced the term feminicide in English (*feminicidio* in Spanish), which is commonly used in Latin America, to situate these killings as violations of women’s human rights and to highlight the role that the state plays in allowing this violence through impunity.

² While this article focuses on conflict, challenges with missing data can also be present in situations of high levels of violence not necessarily classified as conflict.

journalists, and civil society groups have begun assembling their own datasets of femicide victims to fill the voids left by official statistics.³ These new datasets have surpassed the utility of official government data in many contexts,⁴ but challenges with their use remain. Although these datasets are often more complete than the data made available by governments, they still suffer from missingness and are unlikely to be statistically representative of the entire population of victims. Drawing generalized conclusions from incomplete data risks misunderstanding the scale, scope, and patterns of violence. If quantitative methods are used to study femicide, the statistics that result must be correct. Anything less risks undermining our arguments and does a disservice to the victims, many of whose stories have not yet been told, and their families and loved ones.

Statistical biases in conflict data

Data that documents conflict mortality—including data on femicides in conflict—are often incomplete; they tell true, but partial, narratives about the violence. Would-be witnesses might face stigmatization or retribution for reporting, violence may leave no surviving witnesses, or a body might never be identified. Data collection may be limited to urban areas that are easily accessible, organizational capacities may limit the amount of data that can be collected, and violence may threaten the safety of those collecting the data. The resulting samples are usually neither a complete census of the violence that occurred, nor a carefully constructed random sample. These non-exhaustive, non-probability samples are often referred to as “convenience

³ María Salguero’s map of femicide victims in Mexico (<https://femicidiosmx.crowdmap.com/>), Helena Suárez Val’s project “Femicidio Uruguay” (Suárez Val 2021), and Rosalind Page’s project “Black Femicide - U.S.” (Vargas 2022) are some examples of activist data collection efforts. D’Ignazio and Klein (2020) provide further discussion of María Salguero’s mapping efforts, using them as an example of how missing data on femicides results from power imbalances.

⁴ In her work reporting on femicide in Mexico, Alice Driver commented that “the most accurate records of femicide are still kept by individuals, researchers, and journalists, rather than by the police or a state or federal institution” (Driver 2015, p. 15).

samples,” and they are commonly used to study armed conflict.⁵ Some examples include testimonies presented to truth commissions or UN missions, service provision records from NGOs, and lists of victims compiled from media reports. The information provided by these sources is invaluable for conflict research, but an individual convenience sample is not appropriate for statistical inference on overarching patterns of violence because the data that are not recorded may be systematically different than the data that are recorded. This is the result of a statistical bias known as “selection bias,” where victims are differentially selected into the sample because some victims are more legible to the data collectors than others. As a result, the data often reflect trends in documentation, rather than true trends in violence. This is not a critique of the data nor the data collection organizations, but rather a caution against “basing conclusions on inadequate analyses of raw data” (Price and Ball 2014).

Selection bias in conflict data can take many forms.⁶ One example is event-size bias, the phenomenon by which large-fatality events generate more reports than small-fatality reports. As a result, the likelihood of documenting a particular death depends on the size of the event in which the victim was killed.⁷ Urban bias is another example. In this case, killings in urban areas are overrepresented because violence in rural areas could not be documented due to difficulties in physically accessing a location or disruptions to cellular or internet connectivity, among other factors. A final example relates to social visibility: individuals who are well-networked within their communities and whose work is known at the national or

⁵ For a more detailed overview about convenience samples and the complications of their use, see Price (2013).

⁶ Dawkins (2021) provides an overview of several other types of biases that may affect reporting of conflict mortality data. While Dawkins focuses on the biases affecting newswire data in the context of conflict in South Sudan, the points raised are relevant to conflict data broadly.

⁷ See Price and Ball (2014) and Carpenter, Fuller, and Roberts (2013) for further discussion, including empirical analyses of how event-size bias has impacted understanding of violence in conflicts in Syria and Iraq.

international level, such as activists, are much more likely to have their killings documented than individuals who are not known at this scale.⁸

“Reporting bias” is another type of statistical bias that affects data documenting violence both in conflict and in peace. Reporting bias refers to the process by which cases are identified and subsequently documented, “[describing] how some [data] points become hidden, while others become visible” (Price and Ball 2014). Reporting bias is especially relevant to news media reports as it affects which victims are covered and how their stories are told. This is of particular importance to the study of femicide because news media reports form the basis of many of the lists of femicide victims currently kept by journalists, activists, and civil society groups. Media reporting on femicide tends to systematically exclude already marginalized populations and portrays certain deaths as “expected” or “acceptable,” denying that these individuals should be considered victims. Examples of populations affected by these biases include indigenous women and girls (e.g., Grant et al. 2021), transgender and gender non-conforming individuals, sex workers, and individuals involved in drug trafficking (e.g., Velasco 2021). While lists of victims compiled from media sources provide valuable information, reporting biases underscore the need for caution when deducing statistical patterns from this data, particularly because reporting biases distort our understanding of violence perpetrated against highly vulnerable populations.

The difficulty of measuring femicide

Data that documents femicide is subject to additional challenges from definitional and operational ambiguities that complicate its use in quantitative analyses, both in conflict and

⁸ Analyses on violence in the internal armed conflict in Colombia provide a useful avenue to study the impact of social visibility on documentation. For example, in studying the killings of social movement leaders between 2016–2018, Rozo Ángel and Ball (2019) estimate that there was little under-documentation of these killings after aggregating information from all available sources. In contrast, other studies of violence related to the conflict have demonstrated much higher levels of under-documentation (e.g., Guberek et al. 2010; Ball and Reed 2016).

peace. These ambiguities are less common when studying homicides generally, but there are parallels to other types of conflict-related killings. Civilian casualties are one such example, as different documentation groups may operationalize who counts as a civilian in different ways. For example, one group might rely on the clothing the victim was wearing at the time they were killed, another group might ask whether there were any military symbols nearby, and still another group might try to match the victim to a list of known combatants. These different operationalizations of civilian status can result in different understandings of patterns of violence.

Since the term was redefined by Diana Russell in 1976 at the International Tribunal on Crimes against Women, many different conceptualizations of femicide have emerged (Corradi et al. 2016). Similarly, incorporation of femicide into the legal sphere has not been uniform across the globe. For example, in Latin America, some countries have defined femicide or feminicide as an offense separate from homicide or manslaughter, whereas others instead added aggravating circumstances to existing crimes (ECLAC 2014). Even among the countries where femicide is criminalized as its own offense, the specific definition of the crime varies across the region, such that a crime that is considered a femicide in one country may not be considered as such in another country. There may also be variation in classification over time within the same jurisdiction. In the EU-27 countries and the UK, there is no uniform legal treatment of femicides in legal code, and femicides are instead classified as intentional homicides, non-intentional homicides, or manslaughter depending on national legal definitions (EIGE 2021). Related to data collection, femicide is also operationalized differently across documentation groups. As a result, even when documenting the same killings, different documentation groups can come to distinct conclusions depending on how femicide was operationalized (i.e., the criteria for classification) and the type of information that was

collected.⁹

Nicaragua provides a useful case study to examine the impact of definitions on documentation because it is the only country in the world where the definition of femicide has been changed after being introduced into the penal code (Neumann 2022). The original definition passed in 2012 defined femicide as the murder of a women by an intimate partner, family member, or stranger that happened in public or in private.¹⁰ Two years later, a presidential executive order revised the definition to be limited to murders that occur in the context of an existing intimate relationship.¹¹ This definitional change subsequently altered the way that femicides were documented in government statistics. Perhaps unsurprisingly, the government found that the femicides declined after the definition was amended; in reality, many of the femicides that occurred in subsequent years were reallocated to other categories of lethal violence, ignoring the gendered dynamics of the killings (Neumann 2022). Femicides were not necessarily decreasing, but they certainly were more hidden in government reporting. Feminist organizations have continued collecting data on femicides using the original definition and have observed large disparities between the numbers reported in government statistics and their own counts (Neumann 2022).

Considerations about what forms of violence are considered to be femicides are also inherent to defining and operationalizing femicide. Although intimate or sexual femicide is often emphasized in the literature, femicide is not a monolith and can refer to a broad range of violence ranging from the targeted killings of activists to unintended deaths due to female genital mutilation or forced abortions. Different documentation groups may intentionally or

⁹ See EIGE (2021) for a variety of comparisons between femicide measurement as conceptualized by governmental apparatuses, public femicide monitors, and NGOs. In particular, note that different organizations across Europe and internationally employ different definitions of femicide, collect different types of information, and have different criteria for classifying femicides.

¹⁰ See *Ley Integral contra La Violencia hacia las Mujeres* (Law 779) Article IX.

¹¹ See Decreto 42-2014 in Nicaragua.

unintentionally focus on particular types of femicide and as a result measure the overarching phenomenon of femicide differently. Framing femicide as a repertoire of violence practices, rather than a singular form of violence, is a useful way to address some measurement challenges and allows for a richer study of femicidal violence. Many taxonomies of femicide already exist (e.g., EIGE 2021; Etherington and Baker 2015; Fuentes Flores and Salas 2010 p. 417; Monárrez 2010), but there remains a need for a taxonomy adapted to consider the specific types of femicide that occur in conflict, which may differ from those that occur in times of peace. Following Gutiérrez-Sanín and Wood (2017), for each specific form of femicide that is documented, we should also consider the frequency at which that form was used, the particular technique used, as well as whether the violence was targeted against specific social groups. This approach has been used to disambiguate different forms of sexual violence in armed conflict (Dumaine et al. 2021), and studies of femicide are likely to also benefit from this approach.

Returning to the Guatemalan conflict, sexual femicide—or perhaps femigenocide (Segato 2014)—formed part of the repertoire of femicide used by government forces. These femicides were often perpetrated by members of the Army, primarily targeted against Mayan women and girls, and were widespread/systematic in nature (CEH 1999; Leiby 2009; Cumes 2021). What other types of femicide formed part of the repertoires of violence used by the government forces? Did the repertoire change over time and were different forms of violence used in different places? How do these repertoires differ from those used by the paramilitaries or the guerrillas? Furthermore, do the patterns of femicide observed during the conflict differ from those pre- and post-conflict?¹² What are the underlying causal mechanisms driving these changes? The answers to these questions provide an opportunity to establish a more nuanced

¹² For example, Morales Trujillo (2010) discusses how the Guatemalan conflict normalized a culture of violence such that many of the same forms of sexual violence (and femicide) have persisted even after peace accords were signed in 1996. Analyses comparing data on femicide pre-, during, and post-conflict could help understand the enduring effects of conflict on femicide.

understanding of the impacts of femicide, as well as an opportunity for more precise comparisons of femicidal violence across time, space, perpetrators, and conflicts.

Four recommendations for data collectors and analysts

Despite the challenges associated with femicide data collection, the growing availability of quantitative data offers new opportunities to study patterns of violence, inform policies aimed at violence prevention, and further efforts to advance accountability and justice. To respond to these difficulties and produce the most rigorous quantitative analyses possible, the community of practice will need to adjust both data collection and data analysis methods.

Collect contextual information regarding the circumstances of the killing whenever possible

Contextual information is critical for identifying and studying femicides—both in conflict and in peace—and databases documenting human rights abuses in conflict should be designed with these needs in mind. Gutiérrez-Sanín and Wood (2017) expand a provocation from Ball (1996) that offers a useful organizational framing for datasets seeking to capture information to document patterns of violence in conflict in general: “Who did what to whom, and... how and how often?” (Gutiérrez-Sanín and Wood 2017, p. 26). The “who”, “what”, and “whom” elements capture information on three different units of analysis—the perpetrators(s), violent event(s), and victims(s)—which Walby et al. (2017) identify as essential components for capturing varying aspects of femicidal violence. The “how” and “how often” elements specifically support the documentation of repertoires of violence.

For databases documenting femicide, either alone or alongside other human rights abuses, this organizational practice should be complemented by additional contextual information to aid in distinguishing femicides from other types of violence. Many different

types and combinations of femicide-relevant variables have been suggested (e.g., Fumega 2019; Walby et al. 2017; Dawson and Carrigan 2021; EIGE 2021). Some examples of proposed contextual variables include: gender and sex of the victim, gender and sex of the perpetrator, relationship between the victim and the perpetrator, whether there is evidence of sexual violence, and whether the victim had previously denounced the perpetrator. Qualitative research should be used to help inform the selection of contextual variables to be included in the database (Weil 2017); this is especially important if the dynamics of femicide in conflict differ from those observed in times of peace.

Collect data in the most disaggregated way possible

The lack of universally accepted definitions and operationalizations of femicide make harmonizing data from different sources and drawing comparisons between the data collected by different organizations and in different contexts difficult. Collecting data with an emphasis on disaggregation would benefit efforts to harmonize data and facilitate comparisons between data sources. By “disaggregation,” I mean that data should be collected in the most granular way possible. The European Institute for Gender Equality (EIGE; 2021) offers one example of a minimum set of variables that should be considered when documenting femicides in data systems. Their framework includes information on three levels of analysis—victims, perpetrators, and violent events—as suggested by Walby et al. (2017), and includes a substantial set of variables documenting the specific context of the killings, rather than lumping everything under the umbrellas of “female homicide” or “femicide” without noting potential differences.

One of the strengths of this approach is that it allows data users to identify cases that are consistent with their particular working definition of femicide or related to a specific form of femicide relevant to their analysis. Importantly, this does not require that everyone agree on

a particular operationalization of femicide nor that everyone focuses on the same forms of femicide. Additionally, disaggregated data offers an opportunity to conduct sensitivity analyses on findings. By varying the criteria used to identify femicide cases (essentially recoding the data), the robustness of patterns of violence can be examined. One potential use case for this type of analysis would be to examine whether legal conceptualizations of violence are sufficiently covering the types of femicide being perpetrated. This information could then be used to help identify specific types of violence that have been overlooked by laws and policies. Returning to the example of Nicaragua, this is essentially what the feminist organizations did after the femicide law was changed. By continuing to collect data according to the original definition, they could identify that many femicides were occurring outside the context of existing intimate relationships and show how the changed law was impacting the government's reporting.

Use data from multiple sources when available

When multiple datasets documenting violence exist, they are likely to present different narratives about patterns of violence. This is true for conflict-related homicides generally, and femicides specifically, and can also be observed in times of peace (e.g., Suárez Val 2020; Tavera Fenollosa 2008). Some of these differences are likely attributable to differences in how femicide is measured, while others are due to the statistical biases that each dataset is subject to. What results is a “war of statistics”: each dataset tells a different story about patterns of violence.¹³ Selecting one source over another changes our understanding of the violence, which has implications for policy making, historical memory, and justice.

Rather than considering a single source, which is likely a convenience sample, to be the

¹³ Tavera Fenollosa (2008) aptly uses this phrase (in Spanish) to describe the controversy that has emerged in Mexico, where every institution has its own interpretation of the size and scope of femicide.

“truth,” analysts should combine data from multiple sources. Each individual data source likely documents some (or many) unique cases that other data sources do not. Integrating these different data sources together, which would be easier if every source collected the same minimum information, helps provide a more complete understanding of the documented violence. While this combined dataset will still be missing information about victims whose stories were never documented—and thus not suitable for population-level inference—it is an important step towards accounting for missing data and calculating rigorous statistical estimates of patterns of violence.

Use statistical methods that account for missing data when conducting analyses

Understanding patterns about missingness in femicide data is essential to answering questions about patterns of femicidal violence. Failing to account for missing data in our analyses risks incorrectly answering those questions. Multiple systems estimation (MSE; also known as capture-recapture in many disciplines) is one statistical method that could be applied to study femicides in armed conflict. In the context of lethal violence, MSE models use multiple incomplete lists of victims—like those that are emerging from femicide documentation efforts—in order to estimate the likely number of killings that were not documented by any of the sources. This method has previously been applied to study patterns of conflict-related homicides in other contexts (e.g., Lum et al. 2010; Hoover Green and Ball 2019; Rozo Ángel and Ball 2019), but has not yet been used to study femicide largely due to difficulty in obtaining data. As more and higher quality data on femicide becomes available, MSE has the potential to clarify crucial questions of fact necessary to understand the impacts of femicide.

MSE uses information about the documentation patterns of the recorded victims in order to make inferences about the size of the population that was never documented by any of

the available sources.¹⁴ For a documented killing, both the number of sources the victim appears on and specific pattern of documentation (e.g., the victim appeared on lists A and B, but not on list C) provide useful information used to estimate the size of the total victim population—both the femicides that have been documented and those that have not.¹⁵ Estimating what is missing from available data allows us to draw more accurate conclusions about the patterns of violence and allows for statistically valid comparisons. Additionally, the use of statistical models allows for the quantification of uncertainty around estimates, allowing for more transparency around the range of plausible patterns of violence.

Discussion

Studying statistical patterns of femicide, both in conflict and in peace, is difficult, but for all its challenges, the growing availability of quantitative data provides many opportunities to study key questions of fact that have previously gone unanswered. Related to policy, statistical analyses—particularly those that address the missing data issues present in femicide documentation—provide at least three distinct use cases. First, having robust statistics about the magnitude and scope of femicides makes the problem more difficult to ignore. Second, quantification allows for the identification of populations that are at higher risk for femicide perpetration or victimization. This is an important consideration for resource and service allocation, especially in settings where resources are heavily constrained. Finally, quantifying the problem allows for the evaluation of policies or interventions aimed at reducing violence.

¹⁴ For readers interested in learning more about MSE, Bird and King (2018) provide an overview of how MSE has previously been used to study human populations and inform public policy, Ball and Price (2018) provide an example of how MSE has previously been used for accountability efforts, and Chao (2001) provides a technical introduction to MSE models.

¹⁵ MSE is one example of a statistical model capable of estimating the size of unknown victim populations that seems particularly appropriate for the current landscape of femicide data, but it is not the only method that can be used for these types of analyses. Retrospective mortality surveys (e.g., Silva and Ball 2006; Alburez-Gutierrez 2019) are another tool that have been used to study conflict-related mortality. Additionally, public health researchers often rely on excess deaths calculations, however these may prove challenging in conflict settings because accurate measurements pre- and post-conflict are required.

We cannot know if a policy is effective at reducing femicides if we do not understand the nature of the problem before the policy was implemented. As more data sources become available, we find ourselves closer to answers to these questions. Future quantitative research on femicide might consider the use of alternative data sources, such as digital trace data, the development of tools to facilitate femicide documentation (e.g., D’Ignazio et al. 2020), and the creation of statistical models to identify deficiencies in femicide registration.

Quantitative analyses, however, are not the only way of understanding femicide: they are part of a broader dialogue of approaches and are not a substitute for other types of analyses. The most powerful statistical analyses of patterns of femicide are likely to result from mixed methods work that relies on the strengths of both quantitative (e.g., generalizability and providing population-level context) and qualitative¹⁶ (e.g., contextual understanding and case identification) approaches.

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¹⁶ See Weil (2017) for further discussion about the use of qualitative methods to study femicide.

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