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Obstetric violence in the context of community violence: The case of Mexico

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ABSTRACT

This study examines the relationship between community violence and obstetric violence in Mexico, where the so-called "War on Drugs" has led to sustained high levels of homicides and one-third of pregnant people report experiencing abusive treatment from healthcare providers during childbirth. We combine unique nationally representative survey data on experiences of obstetric violence for births that occurred between 2016 and 2021 with administrative homicide data at the month-municipality level. Using fixed effects models, we investigate how different manifestations of obstetric violence relate to community violence in the short-, medium-, and long-term. Results suggest that the intensity of community violence matters for obstetric violence. Specifically, we find that sustained high-intensity homicidal violence is associated with an increased risk of mistreatment at childbirth, particularly in the form of physical abuse and non-consensual care. Associations are stronger among adolescent, low-educated, and urban respondents. Addressing obstetric violence requires recognising the structural role of sustained high-intensity community violence and the normalisation of violent behaviour that exposure to such environmental stressors may create.

1. Introduction

Childbirth is a powerful, life-changing event, but it is also a vulnerable experience that can be physically and emotionally challenging for the person giving birth, even under ideal circumstances (Hall et al., 2018). Since the early 20th century, childbirth has become increasingly medicalised, with a global shift from home- to facility-based delivery (Johanson et al., 2002). Facility-based delivery is promoted as crucial to improving the safety of new-borns and reducing maternal morbidity and mortality (WHO International Confederation of Midwives& Fédération internationale de Gynécologie et d'Obstétrique, 2004), but its increasing utilisation has generated concerns about the clinical and interpersonal quality of obstetric care (Bohren et al., 2015). Growing literature documents that childbirth experiences in health facilities can be characterised by mistreatment, including physical and verbal abuse, shaming, surrogate decision-making, neglect, and discrimination (e.g., Bohren et al., 2014; Smith-Oka, 2015). This wide range of problematic practices that pregnant persons may experience from healthcare providers has been defined as *obstetric violence* (OV).

OV is a manifestation of gender-based violence (GBV) and violence against women (VAW) (Savage and Castro, 2017). As such, it lies at the intersection of multiple human rights violations (Amorim et al., 2020) and bears significant long-term health consequences for victims and their children (Elmir et al., 2010). Experiencing OV deters people from seeking maternal healthcare, thereby increasing future risks of preventable delivery complications and maternal mortality (Kruk et al., 2009).

Increasing evidence of OV has given rise to calls to investigate its contextual and structural drivers (Bohren et al., 2014; Sadler et al., 2016). Researchers have highlighted the intersectional factors shaping OV, including socio-economic inequalities, patriarchal cultures, racism, organisational hierarchies in hospitals, and the social normalisation of violence (Faheem, 2021; Sen et al., 2018). The contributing role of community violence is an aspect that appears particularly salient given the worsening of maternal health outcomes (Jawad et al., 2021; Kotsadam and Østby, 2019) and the intensification of various forms of GBV in affected settings (Cockburn, 2004). However, evidence about the link between community violence and OV is limited to anecdotal reports

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provided by human rights groups (FDHRD, 2021; Human Rights Watch, 2023) and tangentially discussed in some qualitative studies (Dixon, 2015; Vargas et al., 2022). To date, no study has quantitatively examined whether and how community violence predicts OV.

Mexico provides an opportunity to examine how community violence relates to OV for multiple reasons. First, since the early 2000s, Mexico's levels of violence have been akin to those found in armed conflict, due to the combination of the presence of drug trafficking organisations, national policies, and international influences on drug cartel activities (Kalyvas, 2015). This sustained violence has worsened the health and well-being of the Mexican population (e.g., Aburto and Beltrán-Sánchez, 2019) and affected the country's health system performance, for example by obstructing recruitment and retention of medical personnel and/or interrupting services (Vargas et al., 2022). During the same time, growing activism and reports of OV have made the issue visible to the public, leading to the inclusion of the concept of *violencia obstétrica* into Mexico's national legislation on VAW (Comunicado 749, 2014) and, in some states, to its criminalisation (Aguilar et al., 2020). Despite this legal recognition, over one-third of Mexican women report experiencing some form of abuse during their latest birth (Castro and Frías, 2020). Moreover, Mexico is currently the only country offering nationally representative data on experiences of OV.

In this study, we utilise the 2021 National Survey on Household Relationship Dynamics (ENDIREH) for indicators of OV experienced by persons who gave birth in health facilities between 2016 and 2021, including overall measures and specific indicators of physical abuse, non-consensual, non-dignified, and neglectful care. We combine this information with data on homicide rates at the municipality-month level, an established proxy for community violence (Atuesta et al., 2019) and account for public health infrastructure and community-level factors. We construct several indicators of community violence, using different time lags and functional forms, and investigate their associations with various manifestations of OV in fixed effects models controlling for unobserved heterogeneity in Mexican municipalities and over time.

Our results suggest limited associations between forms of OV and the frequency of community violence, measured as the number of homicides per 100,000 population in a municipality. However, exposure to prolonged high-intensity violence is associated with a greater probability of experiencing OV, particularly physical abuse and non-consensual care. These relationships are stronger among adolescent, urban, and low-educated respondents.

This study makes four key contributions. As the first study documenting the nexus between community and obstetric violence, it adds to the literature on the consequences of protracted violence for individuals, families, and society at large. By providing insight into the implications of violence against pregnant people, our study expands the growing literature on GBV in violent contexts and casts light on the multi-victimisation facing women and girls where violence and crime have become ingrained in everyday life. Second, by uncovering how a structural determinant interplays with micro-level factors, our study adds to knowledge about the drivers of OV. Third, through the creative use of nationally representative data and rigorous exploration of various operationalisations of community violence and OV, we add to the empirical study of both forms of violence in terms of measurement and modelling. Finally, our results highlight how policymaking and intervention are needed to address structural causes of abuse and maltreatment in obstetric care.

2. Background

2.1. Introducing obstetric violence: concepts, definitions and evidence

Obstetric violence remains an under-researched form of VAW and GBV (d'Oliveira et al., 2002), partially due to a lack of consensus on how OV should be defined and thus operationalised, especially in quantitative research (e.g., Lappeman and Swartz, 2021; Lévesque and Ferron-Parayre, 2021). Although the term was circulating in the medical literature as early as the 19th century to characterise unnecessary medical interventions in obstetric care (Blundell, 1897), it gained public attention only in the early 2000s when Latin American activists adopted the term to describe forced procedures and the pathologisation of childbirth (O'Brien and Rich, 2022). The phenomenon was first acknowledged at the institutional level only in 2015, when the World Health Organization (WHO) conceptualised it in terms of disrespectful and abusive treatment during childbirth that include:

> *"(i) Outright physical abuse, (ii) profound humiliation and verbal abuse, (iii) coercive or unconsented medical procedures (including sterilisation), (iv) lack of confidentiality, (v) failure to get fully informed consent, (vi) refusal to give pain medication, (vii) gross violation of privacy, (viii) refusal of admission to healthcare facilities, (ix) neglecting women during childbirth to suffer life-threatening, avoidable complications, and (x) detention of women and their new-borns in facilities after childbirth due to an inability to pay"* (2015, p. 1)

This conceptualisation sparked critical discussions about what constitutes a healthy and respectful birth experience and the appropriateness of the term "obstetric violence", both among healthcare professionals and academics (Kaveri (2021) and Sen et al. (2018) for reflections on this debate).

OV is related to human, gender and reproductive rights, the socialisation of healthcare workers, and broader social structures in society (Briceño Morales et al., 2018; Castro and Erviti, 2003; Smith-Oka, 2015; Dixon, 2015; Savage and Castro, 2017; Williams, 2020). It can reflect underlying deficiencies in healthcare systems, for example, related to the perception of healthcare workers as morally superior, a lack of training, and reinforcements of social hierarchies in healthcare organisations (d'Oliveira et al., 2002). It has also been discussed as an expression of reproductive governance, sexism, and biopower in medicine that reinforce pejorative stereotypes about women and their subordination in society (Castro and Savage, 2019; Chadwick and Jace Mavuso, 2021; Nagle and Samari, 2021). As such, OV can interact with processes of social stratification, structural racism and discrimination, exposing those who are otherwise disadvantaged to a greater risk of abuse (e.g., Janevic et al., 2011).

Harmful obstetric practices are difficult to identify and address. Depending on local norms about what counts as disrespect and abuse, patients subjected to such behaviour may not perceive themselves as victimised (Sudhinaraset et al., 2016) or wish to report it (Dey et al., 2017). Obstetric caregivers may view traumatic birth experiences as routine, even when there are symptoms of post-traumatic stress after childbirth (Beck, 2004). In other words, OV is not always fully acknowledged by service providers or patients.

These complexities highlight the challenge of arriving at a definition that is globally accepted and adequately captures the range of abusive acts as well as their intentionality and socio-cultural dimensions (Freedman and Kruk, 2014). Here, we use "obstetric violence" as an umbrella term characterising the forms of abuse identified by the WHO, linked to a broader phenomenon of gender-based violence and reproductive governance as well as dimensions of power and inequality operating in the healthcare system (Chadwick and Jace Mavuso, 2021). This choice is further justified by the fact that the term *violencia obstétrica* dominates the Latin American discourse (Williams et al., 2018).

Although quantitative evidence on OV is still limited, there are growing efforts to generate data. Community-based surveys, small-scale, and site-/hospital-specific studies in both high-income and low-income countries have documented prevalence rates ranging from 20 to 60% (e.g., Garcia, 2023; Maung et al., 2022; Ravaldi et al., 2018). However, due to differences in operational definitions, sampling strategies, modes, and timing of data collection, studies are not comparable, nor can their

findings be generalised at the population level (Sando et al., 2017). In Latin America, the issue has mostly been examined through qualitative assessments and as a manifestation of population governance (e.g., Castro and Savage, 2019; Folch et al., 2017; Sadler et al., 2016), with limited attention to population-level patterns.

In Mexico, a module with items measuring OV based on the WHO's categories was first collected in the 2016 round of the ENDIREH, providing the first nationally representative quantification of OV and its correlates. This survey showed that over one-third of respondents experienced some form of OV at their latest birth—predominantly physical abuse and non-consensual care—with large variation by age, education, residence, and the type of delivery care facility (Castro and Frías, 2020).

2.2. Obstetric violence and community violence

Ample and growing research shows that exposure to violence influences maternal health outcomes and VAW/GBV rates (e.g., Jawad et al., 2021; Svallfors, 2024; Torrisi, 2023). There is thus reason to expect that community violence may also influence OV. However, the plausible direction of this relationship remains unclear. Moreover, any relationship is likely sensitive to the duration and intensity of community violence, and may differ by the type of OV.

On one side, we may expect increasing risks of OV in more violent areas due to intensified GBV and depletion of healthcare resources (Dixon, 2015). Researchers have argued that, like an infectious disease, violence can spread across communities and organisations, exacerbating social inequality and GBV (Dubow, 2013). Rich theoretical and empirical literature situates armed violence and increasing manifestations of various forms of GBV (e.g., rape, intimate partner violence (IPV), child marriage) along the same continuum (Cockburn, 2004; Hunersen et al., 2021; Stojetz and Brück, 2023). Armed conflict is also sometimes associated with condoning attitudes toward VAW, especially in the long-run (e.g., La Mattina and Shemyakina, 2020; Torrisi, 2023), albeit not always (Svallfors, 2023). If armed violence normalises GBV and acts as both a cause and consequence of social inequalities known to drive OV, abuse during childbirth may be more likely to occur, especially in the form of physical violence.

Greater vulnerability to OV could also stem from a deterioration in the capacity of health systems to provide quality care (Østby et al., 2018). Providing healthcare in violent settings is a perilous activity due to a lack of resources, staffing shortages, and attacks against healthcare workers (Bou-Karroum et al., 2020; Haar et al., 2021). Prior literature discusses factors such as heavy workloads, long hours, inadequate equipment and facilities, and personal danger as reasons why healthcare providers may perpetrate OV in general (d'Oliveira et al., 2002), and in times of crisis such as the COVID-19 pandemic (Sadler et al., 2020).

Indeed, provider stress has been connected to medically unnecessary C-sections (Facchini, 2022; Litorp et al., 2015) and local violence in Latin America has been associated with increased female sterilisation and C-sections (Svallfors, 2022, 2024), which could be represented by forced or uninformed procedures. In Mexico, ethnographic work in cities close to conflict-affected rural areas of Chiapas showed links between armed violence and the growing occurrence of C-sections, non-consensual tubal ligations, and insertions of IUDs (Murray de Lopez, 2015). Mexican health workers have expressed fear of becoming targets in the escalating drug-related violence and have raised concerns that OV may relate to the overall context of feminicides, high IPV rates, and legacies of inequalities based on gender, class, and race (Dixon, 2015; Vargas et al., 2022).

Conversely, reductions in OV could plausibly occur in violent contexts. In Mexico, and many other Latin American settings, war-like levels of deadly violence are manifested as interpersonal-intergroup conflicts that are not necessarily driven by political agendas, unlike many civil wars (Kalyvas, 2015). As such, governments may still be able to allocate required resources to healthcare infrastructures (CONEVAL, 2023), attract foreign investment, non-governmental organisations, and skilled healthcare professionals that can sustain services in violent areas (Bezerra and Braithwaite, 2016; Lis, 2018; Murdie and Barney, 2023). Moreover, individuals may mitigate the negative consequences of violent stressors by adopting health-protective behaviours in times of violence, e.g., through increased contact with the healthcare system and workforce during pregnancy (Torche and Villarreal, 2014). This may reduce the impersonal nature of obstetric care and/or build a sense of empowerment in healthcare decision-making, which in turn could reduce the risk of being exposed to OV.

Finally, we may observe no relationship, or a negative one, if armed violence leads to greater normalisation of violence and hence a lower reporting of OV, to fertility reduction resulting in fewer births (Thiede et al., 2020), or if the people that are most vulnerable to both obstetric and community violence avoid institutional delivery in times of conflict (Montagu et al., 2011). Conversely, pregnant persons with greater means may be able to move—either temporarily or permanently—to safer areas and deliver in better-equipped facilities (Amnesty International, 2018; IACHR, 2017).

2.2.1. Research aims and hypotheses

The objective of this study is to investigate the association between women's exposure to community violence and OV in the context of Mexico. Due to the dearth of prior knowledge around this relationship, we explore this topic from multiple angles, including regarding:

(i) The *forms* of OV (i.e., is overall OV or some manifestations of it more likely to be influenced by community violence?);
(ii) The *duration* and *intensity* of community violence (i.e., is sustained violence or short-term/close-to-delivery violence more influential for OV? Does the frequency or intensity of exposure to such violence matter more?)
(iii) The *individual characteristics* of people giving birth (i.e., are there differences by sub-populations in the association between community violence and OV?)

Based on extant knowledge, suggesting multiple potential relationships between community violence and OV, we test the following opposing hypotheses, set against the null hypothesis of no relationship:

HP 1. Community violence is associated with *greater* risk of experiencing OV.

HP 2. Community violence is associated with *lower* risk of experiencing OV.

Assuming Hypothesis 1 holds, we further expect:

HP 3. The more intense the level of community violence, the higher the probability of experiencing OV.

Physical abuse and non-consensual care are conceptualised as part of structural GBV, which is likely to manifest over longer time periods, while non-dignified and neglectful care have been discussed as by-products of strained health systems, which may result from more immediate violence closer to the time of delivery. Accordingly, we also propose the following:

HP 4. *Sustained* community violence is associated with increased exposure to physical abuse and non-consensual care.

HP 5. *Shorter-term* community violence is associated with increased exposure to non-dignified and neglectful care.

Finally, in Mexico, experiences of both community violence and OV vary by age, education, indigeneity, and place of residence (Bronfman and Castro, 1989; Castro and Frías, 2020). We thus investigate how the relationships between community violence and OV vary across these sub-populations, expecting that:

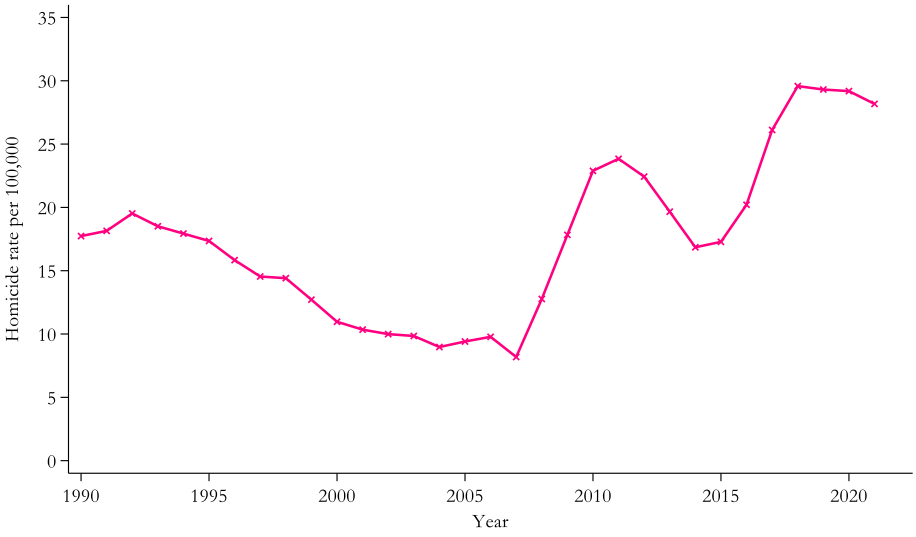

Fig. 1. Trends in homicides, Mexico 1990–2021.
Source: INEGI (2023).

HP 6. The association between community violence and OV is *stronger* among adolescents, low-educated, indigenous persons, and persons living in urban areas.

2.3. The Mexican context

Mexico has experienced a surge in interpersonal violence in the form of homicides since 2006, when the government launched a militaristic intervention against drug cartels known as the "War on Drugs". The intervention evolved into an internal conflict (Osorio, 2015), with major consequences for civilians' health and well-being (e.g., Aburto and Beltrán-Sánchez, 2019; Brown, 2018; Torche and Villarreal, 2014). After a short period of improvement, homicide rates have continued to rise since 2015 and today violence represents a daily reality for many Mexicans (Fig. 1).

The increase in violence has not spared health facilities, affecting the performance of an already unequal health sector, e.g., by aggravating issues of recruitment and retention of medical staff, interrupting mobile health services, vaccination and preventative health campaigns, through the relocation of private practices to safer areas or the forceful takeover by armed gang-affiliated members (Vargas et al., 2022).

Mexico's health system is highly segmented and decentralised (WHO, 2020). Maternal care and other service provision are tied to employment status, whether formal or informal, in the public or private sector. The Institute for Social Security and Services for State Workers (ISSSTE) provides health coverage for public-sector employees and their families (6% of the population), while the Institute of Social Security (IMSS) covers private-sector employees (36%) (Shamah-Levy et al., 2020). Private practices, deemed to offer superior services, are accessed through out-of-pocket expenditures. Mexicans who fall outside insurance arrangements (mostly unemployed, informal, or self-employed workers, estimated to be over 50 million) are entitled to health coverage through a voluntary public insurance scheme known as *Seguro Popular/INSABI* (WHO, 2020). This includes freely available delivery services in public hospitals, where the vast majority of childbirths occur (Sosa-Rubi et al., 2009).

Nevertheless, entitlement to coverage does not imply that medical attention is available, accessible, or of good quality. Instead, the segmented nature of Mexico's health system has led to inefficiencies in resource allocation and access, particularly for maternal and child health services (Leslie et al., 2019; Rodríguez-Aguilar, 2018). The different levels of OV observed across childbirth institutions are reflective of these issues. Although non-negligible levels of OV are observed across all facility types, the risk of OV is higher in state(s) public hospitals (Castro and Frías, 2020).

Prior studies have highlighted the use of authoritarian, repressive and discriminatory behaviours among Mexican healthcare providers against persons giving birth (Smith-Oka, 2015). Women are sometimes discouraged from making complaints to avoid compromising future medical care and often do not know who is providing care, especially during a high rotation of providers. This makes it harder to identify who mistreated them (Castro and Erviti, 2003). Yet, Mexican women have not been passive to OV, but have adopted strategies and practices to counter (threats of) violent practices during childbirth, including verbalising needs and forming support groups (Espinoza-Reyes and Solís, 2020). In 2007, women's activism led to the inclusion of the concept of OV in Mexico's regulations on VAW and the criminal codes of a few states (Aguilar et al., 2020).

3. Data and measures

The data for this study come from two main sources. The first is the National Survey on the Dynamics of Household Relationships (*Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares*, ENDIREH), conducted in October–November 2021 by the National Institute of Statistics and Geography (*Instituto Nacional de Estadística y Geografía*, INEGI). In addition to providing data on socio-demographic characteristics and experiences of other forms of violence in family and public settings, the ENDIREH is the first nationally representative survey–in Mexico and worldwide–that includes a module on OV (Castro and Frías, 2020).

The OV module was administered in Spanish language (with the support of indigenous language translators when necessary) to female respondents aged 15–49 who had their last live birth in the five years before the survey (Oct. 2016–2021), except those reporting that nobody helped them during the delivery ($n = 64$). This sample included 19,144 women (30% of the total sample). Respondents were asked 13 questions related to OV during their latest childbirth. Each item reflected the WHO (2015) categories and areas of priority identified by prior research on Mexico (Castro and Frías, 2020), i.e., physical abuse, non-dignified, neglectful, and non-consensual care (Table A1, Appendix).

While the module was first introduced in the 2016 ENDIREH, this first wave recorded only the year of the respondent's latest childbirth. By contrast, the 2021 wave asked about both *the month* and *year* of

respondents' latest childbirth, thereby providing precise information on timing. This enabled us to link the survey data to our second data source: municipality-month-level homicide data calculated using INEGI death certificate microdata and population counts.

3.1. Dependent variables

Given the limited prior quantitative measurement of OV, we rely on the WHO (2015) categorisation and approach the operationalisation of OV in an exploratory, step-wise manner. First, we construct overall measures of OV. These include: (i) a binary indicator for whether the respondent experienced any OV, (ii) a continuous indicator for the number of experienced dimensions of OV, and (iii) a binary indicator for whether the respondent experienced all forms of OV. Next, we examine each manifestation using indicators of (i) physical abuse, (ii) non-consensual care (including for births delivered by C-sections), (iii) non-dignified and (iv) neglectful care.

3.2. Independent variables

We use data on monthly municipality-level homicide rates per 100,000 constructed from INEGI's vital statistics database and interpolated population counts. The dataset is accessible in a public repository (see: Gargiulo et al., 2023), and a description of variable construction is provided in the Appendix. Next, we merged homicide rates with ENDIREH respondents spatially by their residence municipality at survey time, and temporally by different time lags related to the month of the birth. Specifically, we created indicators of the average frequency of homicide rates in one's municipality in the *short*- (3 months before partum), *medium*- (1 and 3 years), and *long*-term (5 years before partum). We selected these lags based on prior literature examining the consequences of local violence on maternal and birth outcomes (e.g., Torche and Villarreal, 2014) and after exploring a suite of alternatives.

To capture the intensity of community violence, we create categorical independent variables for each time lag, distinguishing between no, low, medium, and high levels of homicides. We select these cut-offs based on the quantile distributions of each continuous indicator and because these provided the best model fit among the various alternatives explored to categorise the variables.

We tested the robustness of our estimates using logistic regression for binary outcomes and count models, measures of homicide rates based on the standard deviation, log-transformations, the inverse hyperbolic sine (IHS) function, and check for multiple testing using Romano and Wolf's (2016) step-down procedure. Since the ENDIREH does not collect migration information, all estimates are based on the assumption that respondents gave birth in the municipality where they were interviewed.

3.3. Covariates

We control for several individual-level socio-demographic and childbirth-related indicators as well as for essential municipality-level characteristics.

Known individual-level covariates of OV victimisation were drawn from the ENDIREH and include respondents' residence type, educational level, indigeneity as measured by whether the respondent reported speaking an indigenous language (Castro and Frías, 2020), employment, civil status, parity and age at last childbirth, and the type of facility used for delivery (community healthcare centre, public, private healthcare facility or other). We also control for whether the respondent received *Prospera*, a public cash transfer aimed at alleviating poverty that, due to its conditionality criteria including regularly attending a state clinic while pregnant, has been argued to increase risks of OV (Gil-García, 2016). Finally, we adjust for prior exposure to interpersonal violence that could confound reporting, by using an indicator for whether the respondent reported witnessing or being a victim of family violence during childhood.

To control for the availability of healthcare, we create municipality-level indicators for the total number of public clinics, labour beds, obstetrics and gynaecologists, midwives and *parteras tradicionales* (traditional midwives) per 1,000 inhabitants in the year of delivery. Other municipality-level covariates include the share of people (above age 15) that are illiterate, live in housing without electricity, without piped water, and with some level of overcrowding, and the share of households that earn less than two minimum wages. Data for these municipality-level covariates was obtained from the Mexican Ministry of Health (2023) and the National Population Council of Mexico (CONAPO,

Table 1
Sample descriptive statistics.

	Percent/mean (sd)	N *(unweighted)*
Obstetric violence		
Any obstetric violence	31.48%	5,860
Number of abuses	0.72 (1.42)	19,144
Experienced all forms of abuse[a]	1.80%	356
Physical abuse	9.77%	1,858
Non-dignified care	12.82%	2,311
Abandonment and neglect	13.89%	2,644
Non-consensual care (excluding C-section-related abuses)	13.00%	2,425
Non-consensual care (including C-section-related abuses)	17.81%	3,253
Community violence		
Homicide rate 3 months before childbirth	29.25 (39.05)	19,144
Homicide rate 12 months before childbirth	28.46 (32.29)	19,144
Homicide rate 3 years before childbirth	25.90 (26.85)	19,144
Homicide rate 5 years before childbirth	23.65 (23.65)	19,144
Individual characteristics		
Woman's age at last childbirth		
13-19	14.77%	2,263
20-24	27.00%	4,874
25-29	26.13%	5,474
30-39	29.42%	6,014
40+	2.69%	519
Educational level		
Primary or below	14.03%	2,429
Secondary/vocational	67.25%	12,842
Tertiary	18.72%	3,873
Residence type		
Rural	29.94%	5,849
Urban	70.06%	13,295
Speaks indigenous language		
No	91.62%	17,563
Yes	8.38%	1,581
Currently employed		
No	57.72%	11,091
Yes	42.28%	8,053
Current marital status		
Cohabiting	43.21%	8,547
Married	37.00%	7,832
Separated or divorced	10.45%	1,552
Single	8.63%	1,087
Widowed	0.72%	126
Receives state benefit (Prospera)		
No	91.73%	17,508
Yes	8.27%	1,636
Experienced/witnessed family violence in childhood	51.54%	9,979
Time since last birth (in years)	2.31 (1.54)	
Parity at last birth	0.24 (0.55)	
Facility used for last childbirth		
Public clinic	63.50%	12,482
Private clinic	25.03%	4,448
Community clinic	7.54%	1,519
Other	3.93%	695
Observations		19,144

Source: 2021 ENDIREH and INEGI. *Note*: percent/means are weighted using survey weights. The "Other" category for place of birth includes "at home" births with (traditional) birth attendants.

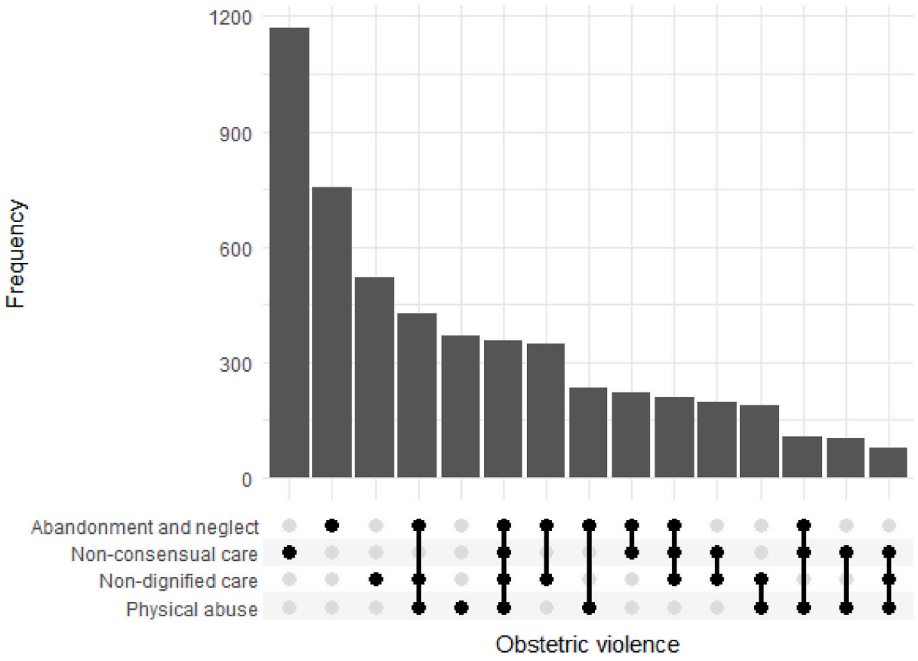

Fig. 2. Frequency distributions of forms of obstetric violence and their combinations.
Source: ENDIREH (2021). *Notes:* Non-consensual care includes C-section-related abuses.

2022).

4. Methods

We study the relationship between community violence and OV between 2016 and 2021 across 2,454 Mexican municipalities using the following fixed effects linear probability models:

$$ObstetricViolence_{imt} = \alpha + \beta HomRate_{m,t-n} + \theta' X_i + \eta' S_{mt} + \gamma_m + \delta_t + \varepsilon_{imt}$$

where $ObstetricViolence_{imt}$ is an outcome related to OV (i.e., any OV, number of abuses, physical abuse, neglectful care, etc.) for respondent i who gave birth in month t in municipality m. Our independent variable, $HomRate_{m,t-n}$, is either a continuous indicator capturing the frequency of the average homicide rate, or a categorical variable measuring the intensity of violence, in the municipality at different time-lags before partum, as described above. X_i and S_{mt} are vectors of individual-level and time-varying municipality-level covariates. Finally, γ_m and δ_t are municipality-level and year-of-childbirth fixed effects that absorb sources of unobserved time-constant municipality or national-wide temporal confounding, e.g., cultural traits, long-term characteristics of local economies, fertility, and geographic features. We cluster standard errors by municipality and apply survey weights.

5. Results

5.1. Descriptive statistics

Table 1 presents descriptive statistics for respondents who had their last birth between 2016 and 21. 31% reported at least one abuse from healthcare providers during childbirth. Respondents experienced an average of one and up to 11 dimensions of OV. 2% experienced all four forms of OV, with non-consensual and neglectful care being the most frequently reported (Fig. 2). Respondents were exposed to an average of 29 homicides per 100,000 people in the 3 months before childbirth. While more extended lags had lower frequencies in exposure to homicides, the mean levels were all above 20 per 100,000 people.

No immediate patterns emerge when we visually juxtapose the overall prevalence of OV (Fig. 3, Panel A) against homicide rates (Panel B) across Mexican municipalities between 2016 and 21, nor when we examine basic correlations between the frequency of community violence and measures of OV (Fig. A1). While all obstetric abuses are positively correlated, the relationships with community violence are weak and, if anything, negative. Since these seemingly null correlations may be confounded by individual- and municipality-level characteristics, we test if they hold using multivariate fixed effects regression models.

5.2. Fixed effects models

We first examine the relationship between OV and the *frequency* (i.e., continuous indicators) of community violence at various time lags before childbirth (Table A2). Results from these models generally suggest null relationships with a few exceptions; exposure to community violence in the 3 months preceding childbirth is negatively associated with the number of reported abuses, the probability of experiencing all four forms of OV jointly and with physical violence (Cols. 2–4). The latter two outcomes also have slight negative associations with long-term community violence (5-years before birth). However, these associations do not hold when using transformed measures of community violence (Tables A3–A4) or measures based on the standard deviation and multiple-testing adjusted p-values (not shown). Thus, continuous measures capturing the *frequency* of community violence do not seem to predict experiences of OV.

We thus turn to evaluate the hypothesis that the *intensity* of community violence is related to the risk of experiencing OV, by replacing continuous indicators of homicide rates with categorical measures. Estimates from these models, displayed in Table 2, show patterns that continuous indicators concealed. Specifically, we find positive associations between sustained exposure to high-intensity community violence and both overall measures of OV and specific abuses.

In support for Hypotheses 1 and 3, respondents exposed to high levels of community violence in the 5 years preceding delivery are more likely to experience both any form of OV (Column 1) as well as a greater number of abuses (Column 2) compared to unexposed women. Meanwhile, exposure close to childbirth is associated with a higher probability of experiencing all forms of OV (Column 3).

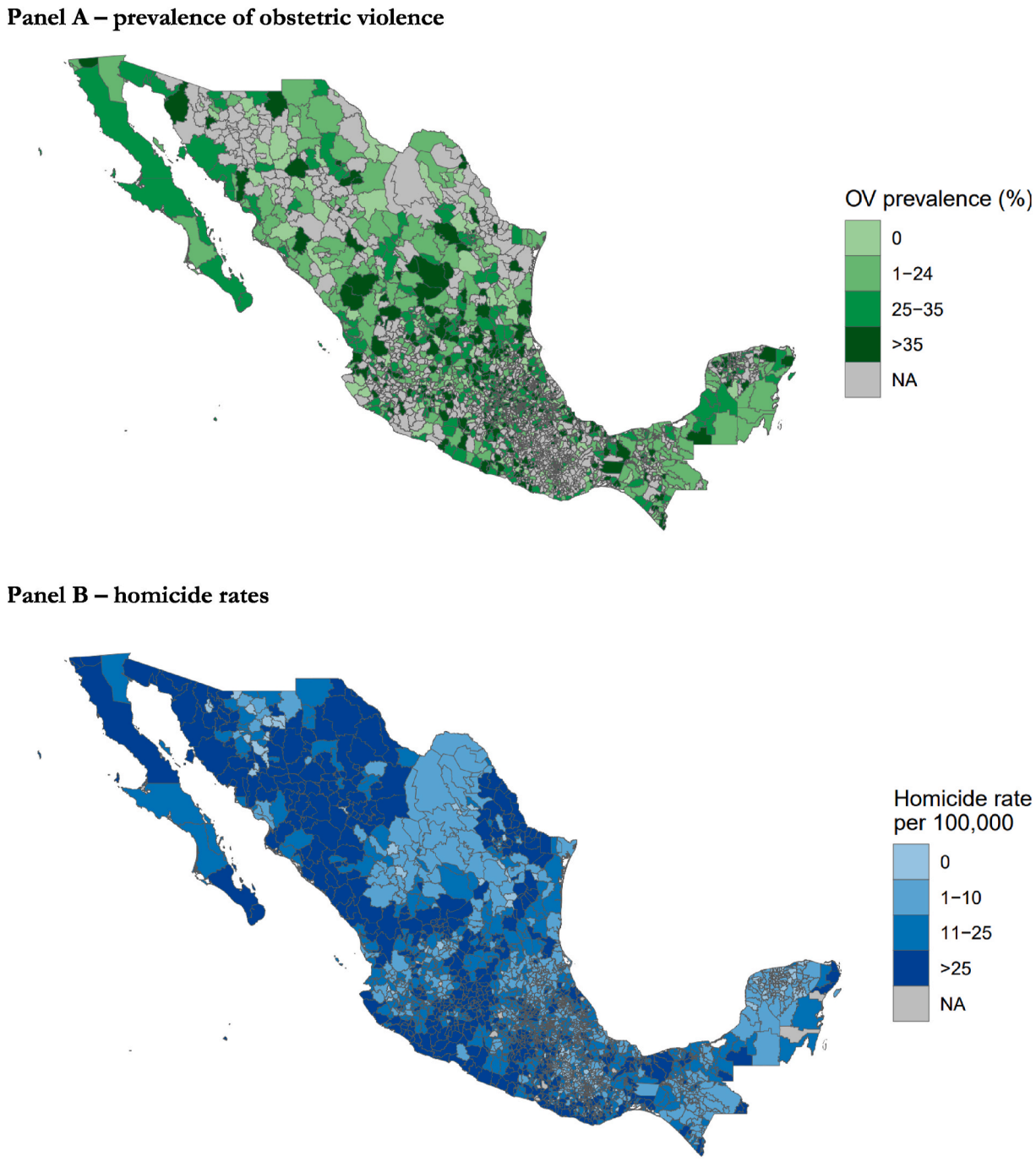

Fig. 3. State-level prevalence of obstetric violence and homicide rates, 2016–2021.
Source: ENDIREH (2021) and INEGI (2023).

Consistent with Hypothesis 4, long-term exposure to community violence is linked to forms of OV that involve physical maltreatment and non-consensual care (Cols. 4–5). For example, the probability of experiencing physical abuse during delivery is, respectively, 7.7 and 13 percentage points higher among respondents in municipalities characterised by high-intensity violence over the prior 3 and 5 years, as compared to the unexposed. For non-consensual care, there are some positive associations with the intensity of violence close to childbirth (3 months prior), but these are unstable to adjustments for multiple testing. Abuses involving contraceptive coercion practices (items 1–2, Table A1) drive the associations.

We do not find support for Hypothesis 5, as our models show that community violence intensity is unrelated to greater neglectful or non-dignified care (Cols. 6–7).

5.3. *Subgroup analyses*

In Mexico, OV is disproportionately documented among adolescent, low-educated, indigenous, and urban individuals (Castro and Frías, 2020). We thus investigate how the relationships between community violence and OV vary across these sub-populations.

Consistent with Hypothesis 6, we find that the positive associations observed in areas with protracted high-intensity violence are stronger

Table 2
Fixed-effects linear models with community violence predicting the probability of experiencing obstetric violence in Mexico, 2016–2021.

	Any abuse	Number of abuses	All abuses	Physical abuse	Non-consensual care	Non-dignified care	Neglectful care
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	B/SE	B/SE	B/SE	B/SE	B/SE	B/SE	B/SE
Homicide level 3m (ref: None)							
Low	0.030	0.090	0.012*	0.001	0.040*	0.008	0.014
	[0.023]	[0.062]	[0.005]	[0.014]	[0.019]	[0.015]	[0.015]
Medium	0.026	0.064	0.009*	−0.001	0.042*	0.009	0.005
	[0.020]	[0.055]	[0.004]	[0.013]	[0.017]	[0.014]	[0.014]
High	0.008	0.021	0.008	−0.017	0.025	0.003	0.012
	[0.023]	[0.066]	[0.004]	[0.014]	[0.019]	[0.015]	[0.016]
Homicide level 12m (ref: None)							
Low	0.030	0.062	0.003	0.017	0.001	0.021	0.007
	[0.030]	[0.085]	[0.008]	[0.018]	[0.024]	[0.021]	[0.022]
Medium	0.028	0.092	0.001	0.013	0.015	0.027	0.010
	[0.031]	[0.090]	[0.008]	[0.019]	[0.025]	[0.022]	[0.023]
High	0.034	0.012	−0.005	0.001	−0.009	0.027	0.012
	[0.034]	[0.108]	[0.008]	[0.022]	[0.028]	[0.025]	[0.027]
Homicide level 3yr (ref: None)							
Low	0.088	0.214	0.017	0.063	0.031	0.058	0.010
	[0.051]	[0.138]	[0.016]	[0.035]	[0.044]	[0.042]	[0.036]
Medium	0.066	0.264	0.016	0.069	0.027	0.056	0.011
	[0.055]	[0.150]	[0.016]	[0.037]	[0.047]	[0.044]	[0.039]
High	0.098	0.319	0.014	0.077*	0.042	0.069	0.023
	[0.059]	[0.160]	[0.017]	[0.039]	[0.049]	[0.046]	[0.041]
Homicide level 5yr (ref: None)							
Low	0.193*	0.602*	0.049	0.114*	0.190**	0.069	0.055
	[0.080]	[0.252]	[0.031]	[0.049]	[0.070]	[0.065]	[0.063]
Medium	0.197*	0.665*	0.041	0.124*	0.184*	0.085	0.063
	[0.083]	[0.262]	[0.032]	[0.051]	[0.072]	[0.067]	[0.066]
High	0.205*	0.700**	0.040	0.130*	0.177*	0.102	0.060
	[0.085]	[0.267]	[0.032]	[0.052]	[0.074]	[0.068]	[0.067]
Individual-level controls	YES	YES	YES	YES	YES	YES	YES
Municipality controls	YES	YES	YES	YES	YES	YES	YES
Observations	19,144	19,144	19,144	19,144	19,144	19,144	19,144

*p < 0.05; **p < 0.01; ***p < 0.001.
Source: 2021 ENDIREH. All models control for individual-level socio-demographic and childbirth-related variables, municipality-year level socio-demographic and health system infrastructure characteristics, municipality and year of birth fixed effects. Estimates are weighted using survey weights. Standard errors in brackets are clustered at the municipality level.

among adolescents and urban residents (Fig. 4). For adolescents, there are associations with most forms of OV (Table A5), and the size of the coefficients increases as high-intensity violence perdures. Among urban residents and, in part, low-educated respondents, we find that long-term exposure to high-intensity violence is associated with a greater probability of both overall measures and specific forms of OV, particularly physical violence and non-consensual care (Fig. 4, Tables A6–A7). We find no consistent relationships in the subgroup of indigenous respondents (not shown).

6. Discussion and conclusion

This is the first study to document quantitatively the relationship between obstetric and community violence. Using the first nationally representative data source on experiences of OV combined with detailed measures of municipality-level homicides, we found that in Mexico long-term exposure to high levels of violence is associated with experiencing abusive treatment during childbirth.

Sustained high-intensity violence correlates with increased risks of physical abuse and non-consensual care, two manifestations of OV theorised as resulting from structural and patriarchal forces (Sadler et al., 2016). These findings suggest that the combination of protracted and intense community violence can reinforce power structures and normalise the use of aggressive behaviour in various social realms, including medical institutions. We find little association with neglectful and non-dignified care, which might indicate that increased infrastructural stress (e.g., rigid routines, staff shortages, etc.) does not explain the overall increase in OV in times of greater insecurity and violence (Vargas et al., 2022). As our data did not allow for directly testing these potential mechanisms, more research is needed to fully comprehend the relationship between community violence and OV, including infrastructural stress.

Our results further suggest that risks of multi-victimisation to community violence and abuse in the delivery room intersect with social inequality. In areas affected by prolonged violence, adolescents appear to be the most vulnerable to mistreatment during childbirth. This is of concern since girls already have a higher probability of experiencing other forms of GBV in violent settings (Stark et al., 2021) and because adolescent pregnancy is associated with medical, economic, educational and social challenges that can pass across generations (Diaz and Fiel, 2016; Ganchimeg et al., 2014). Since young age is a risk factor during pregnancy, certain treatments such as non-consensual care may be perceived as legitimate and necessary by health providers. Nevertheless, it is relevant to know if obstetric care is more often carried out in ways that are perceived as abusive by youths, particularly in violent areas. In this sense, our findings point to interventions focused on improving communication and rapport-building between service providers and young users (Burrowes et al., 2017).

The stronger positive associations between high-intensity community violence and OV observed among urban residents may be related to the greater opportunities women have to identify and report abuses in these areas, despite processes of violence normalisation (Castro and Frías, 2020). It may also be due to larger facilities in urban areas providing less personalised and respectful care and/or that urban clinics are overcrowded, which in turn is linked to more provider stress and OV (Murray de Lopez, 2015). Examining whether urban/rural differences

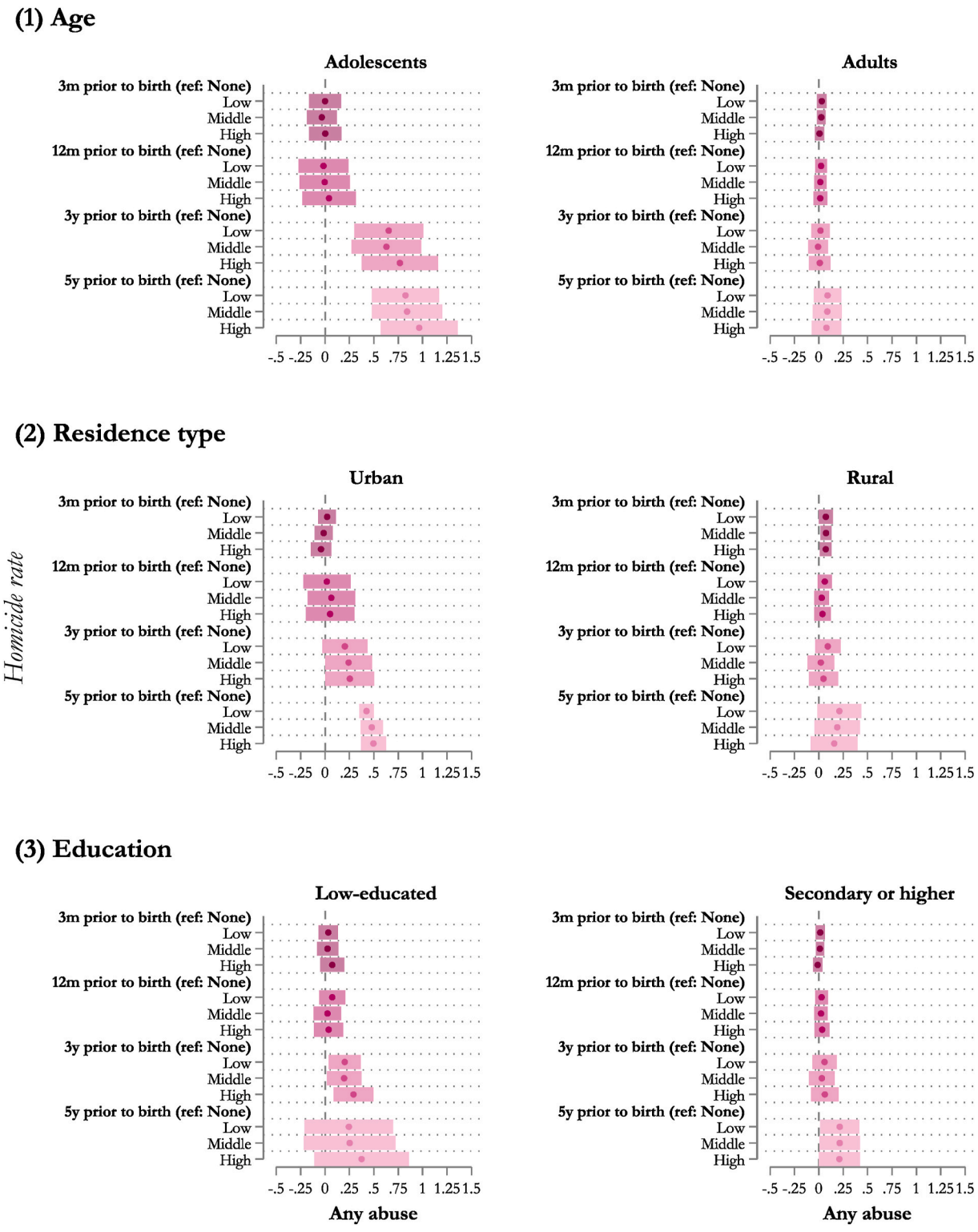

Fig. 4. Relationships between any obstetric violence and intensity of community violence by sub-populations.
Source: ENDIREH (2021). *Notes:* Tabular information in Tables A5–A7, Appendix.

are due to these factors or to differential responses to rising local violence (e.g., increased home births/unassisted births) in rural areas are important next steps for research.

Our data did not allow for investigating specific facility- or provider-level mediating factors leading providers in violent settings to engage (or not) in harmful behaviour. In-depth qualitative work exploring, for example, whether and how violence influences provider-patient norms such as rapport in obstetric care would be valuable and suited to unpacking the specific mechanisms at the provider-level. In the absence of standardised definitions and measurements of both obstetric and community violence, we cannot rule out that our operationalisations suffer from some measurement errors, including reporting bias. Under-reporting of OV is well-known (Freedman et al., 2018), and lower expectations on healthcare, lack of awareness, and/or the normalisation of

VAW in violent areas may worsen the problem (Kaveri, 2021).

INEGI's administrative records of homicides are underreported because bodies need to be found and identified for inclusion in the data (Mobayed Vega and Gargiulo, 2024) and only represent one aspect of community violence Mexicans are subjected to. Nevertheless, INEGI's homicide data are considered to be the most accurate data on violence in Mexico because of consistent definitions across states, low underreporting, and high correlation with other violent crimes, e.g., robberies (Atuesta et al., 2019; Fajnzylber et al., 2002). Our calculations thus provide lower-bound indications. Due to a lack of data on migration, we had to assume that respondents gave birth in their municipality of residence. Finally, more data collection and research are required to assess the generalisability of our findings.

Despite these limitations, our study is the first to consider the interplay between obstetric and community violence. We provided a granular investigation of the relationship from multiple angles, by linking survey respondents to homicide-related data at the month-municipality level, using different lags and intensities, testing violence indicators capturing different functional forms, and controlling for confounding factors at multiple levels. Thus, this study contributes to two emerging fields of research: the micro- and macro-level determinants of OV (Garcia, 2023; Perrotte et al., 2020), and the consequences of local violence on reproductive health outcomes more broadly (Leone et al., 2019; Svallfors, 2024; Torrisi, 2024).

Our study carries important policy implications. Primary prevention of OV requires reducing women's exposure to all kinds of interpersonal and structural violence in healthcare settings. This includes awareness raising in medical training as well as tackling structural conditions and social norms that enable sexist abuse and disrespect in maternity wards. Secondary prevention involves establishing clear pathways for people experiencing OV to report and get help without re-victimisation or stigmatisation, especially since experiencing OV is a known deterrent from seeking future care. More broadly, combatting OV requires a recognition of the stressors and attitudinal shifts that a violent community environment may create and exacerbate—both for healthcare providers and users. Our study contributes to that effort.

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Ethical approval statement

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. No ethical approval was required for this study as all research data are publicly available and can be accessed at the following links:

-ENDIREH SURVEY: https://en.www.inegi.org.mx/programas/endireh/2021/
-DEATH VITAL STATISTICS: https://osf.io/u8dc3/

CRediT authorship contribution statement

Orsola Torrisi: Writing – review & editing, Writing – original draft, Visualization, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Signe Svallfors:** Writing – review & editing, Writing – original draft, Resources, Data curation, Conceptualization. **Maria Gargiulo:** Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest statement

The authors have no conflict of interest to declare.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2024.117348.

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