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# Prevalence, disparities, and trends in intimate partner violence against women living in urban slums in 34 low-income and middle-income countries: a multi-country cross-sectional study

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## Summary

**Background** Intimate partner violence (IPV) is a significant public health issue, closely tied to social and neighborhood environments. The impoverished, overcrowded, and stressful conditions in urban slums may heighten IPV risk, yet evidence remains limited. This study aims to assess the prevalence, disparities, and trends of IPV in urban slums across low- and middle-income countries (LMICs).

**Methods** This cross-sectional study used nationally representative Demographic and Health Surveys data from 2006 to 2023, focusing on countries with available domestic violence data for women aged 15–49. The outcomes measured include past-year exposure to any IPV (primary outcome) and physical IPV, sexual IPV, and psychological IPV (secondary outcomes). We examined both absolute and relative disparities between urban slums, non-slum urban, and rural areas using differences and ratios. Additionally, we used Fairlie decomposition analysis based on a multivariable logistic regression model to examine the contributions of IPV risk factors (i.e., poor partner relationships, gender inequality, and poverty) to the disparities. For countries with multiple surveys, we conducted trend analysis by assessing annual changes in IPV prevalence in urban slums and the disparities.

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**Findings** Among 283,658 women from 34 LMICs, 14,111 (5.0%) lived in urban slums. IPV prevalence in urban slums was notably high, with 18 of the studied countries above 30% for any IPV. Women in urban slums experienced higher IPV rates than those in non-slum urban and rural areas. For example, the prevalence of any IPV in urban slums was 31.4% (95% confidence interval [CI]: 30.7–32.2), which was 5.9 percentage points (95% CI: 5.1–6.7, P < 0.0001) higher than that in non-slum urban areas and 1.2 percentage points (95% CI: 0.4–2.0, P = 0.0022) higher than that in rural areas. Controlling behavior by husbands explained the largest proportion of disparities in all IPV types between urban slums and other areas. For example, 27.2% (95% CI: 25.1–29.3) of the any IPV disparities between urban slums and non-slum urban areas could be explained by this factor. In ten countries with multiple surveys, trend analysis showed rising any IPV prevalence in urban slums of four countries—Sierra Leone, Tanzania, Mali, and Nigeria—with Sierra Leone having the most significant increase (4.6 percentage points, 95% CI: 2.5–6.6, P < 0.0001).

**Interpretation** Our findings suggest that IPV is more prevalent in urban slums than other areas, underscoring the need for targeted public health strategies, such as addressing harmful partner's behaviors.

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**Keywords:** Intimate partner violence; Urban slums; Disparities; Low- and middle-income countries

### Research in context

#### Evidence before this study

We searched Google Scholar and PubMed using the search terms included (intimate partner violence OR partner violence OR domestic violence OR spousal violence OR marital violence) AND (slum* OR informal settlement OR informal solving OR township) AND (developing countr* OR lmic* OR low income countr* OR middle income countr*), with no language restrictions, and the final search was conducted on August 6, 2024. Prior research on IPV in urban slums has been limited to small-scale studies in specific locations, often without comparisons to non-slum areas. To date, no multi-country study has examined the IPV in urban slums across low- and middle-income countries (LMICs), including its prevalence, disparities, and trends.

#### Added value of this study

This study provides the first known multi-country analysis of IPV in urban slums compared to non-slum urban and rural areas, utilizing nationally representative data from 34 LMICs, representing 45% of women living in LMICs globally. It reveals a strikingly high prevalence of IPV in these regions, with over half of the countries studied reporting a prevalence exceeding 30% in urban slums, and four out of ten countries showing upward trends over time. Additionally, this study contributes to the limited knowledge on the driving factors behind IPV disparities between urban slums and other areas, highlighting the critical role of controlling behavior by husbands.

#### Implications of all the available evidence

Our multi-country analysis significantly advances the understanding of IPV in urban slums, underscoring the need for policymakers to prioritize these areas with targeted interventions. Specifically, efforts should focus on reducing husbands' controlling behaviors, promoting equitable partner relationships, and addressing systemic gender inequalities to lower the risk the risk of IPV among women in urban slums.

## Introduction

Urban slums, defined as communities living under the same roof that lack access to improved water, sanitation, adequate living space, durable housing, and secure tenure, represent one of the most pressing challenges of modern urbanization.[1,2] Despite the emphasis of Sustainable Development Goal (SDG) 11.1 on upgrading slums, approximately 1.1 billion people currently live in slums or slum-like conditions.[2] Even more alarming is the projection that this number will grow by an additional 2 billion by 2050, predominantly in low- and middle-income countries (LMICs).[2–4] This rapid expansion has heightened global attention to this vulnerable population, particularly about health risks and equity concerns.[4] Urban slum residents often endure subpar physical and social environments, including low socioeconomic status, lack of basic services, and stressful work and living conditions.[3] Due to these adverse and unstable conditions, residents of urban slums face greater health risks compared to other populations, particularly with an elevated likelihood of violence.[3,5]

Intimate partner violence (IPV), indicating physical, sexual, or psychological harm by an intimate partner or ex-partner, as a noteworthy form of violence, poses a substantial barrier to achieving SDG 5.2, which aims to eliminate all forms of violence against all women.[6–8] IPV

profoundly impacts the health of women and their children, including health issues such as mental disorder, injuries, adverse pregnancy outcome, and even death.[8] The rising prevalence of IPV in LMICs underscores the need for policymakers to identify high-risk populations and implement targeted interventions.[6,8] Among these populations, women living in urban slums are particularly vulnerable due to the social and environmental constraints.[9–11] Studies have shown a high prevalence of IPV in urban slums, reaching 53% in Kampala, Uganda; 54% in Kolkata, India; 58% in Ibadan, Nigeria; and 60% in Dhaka, Bangladesh.[10–13] Furthermore, women in urban slums also face greater obstacles in accessing psychological support and seeking help from authorities, exacerbating their risk of mental and physical health issues such as depression and post-traumatic stress disorder.[9–11]

The evidence on the degree to which physical and social environments in urban slums amplify vulnerabilities to IPV remains limited in LMICs.[9,10] Existing research on IPV in urban slums of LMICs is often restricted to small, localized studies, typically conducted at the subnational level or focusing on a single specific slum.[10–13] Moreover, most of these studies focus solely on the risks of IPV within urban slums without comparing them to non-slum areas in the same locales, thus providing limited insights into the disparity implications of areas of residence.[9,10,13] However, as populations of urban slums continue to expand in LMICs, comprehensive research is essential to understand the risks of IPV within this unique population, the factors driving disparities in IPV risk between urban slums and other areas, and the evolving trends in IPV prevalence in these regions. Such research is essential for shaping future policy interventions to address IPV in urban slums effectively.

This study aims to assess the prevalence, disparities, and trends of IPV in urban slums across LMICs using nationally representative data, offering crucial understanding into the unique vulnerabilities faced by women in these settings. Additionally, we examine how IPV risk factors contribute to these disparities, providing insights to inform targeted policies and interventions aimed at reducing IPV in these settings.

## Methods

### Study design and data sources

This was a cross-sectional study. We conducted the study between December 14, 2023 and October 11, 2024 using Demographic and Health Surveys (DHSs) data from January 1, 2006 to June 30, 2023. DHSs are nationally representative surveys conducted in LMICs. The DHSs employed a two-stage stratified cluster sampling procedure to ensure the national representativeness of the sample. Specifically, in the first stage, within each subnational region of the country, strata are generated by separating urban and rural areas. Within each stratum, enumeration areas (EAS) are randomly selected as the basic sampling units using a method of probability proportional to size. In the second stage, all households within the randomly selected EAS are listed, and approximately 20–30 households are randomly selected for interviews within each EAS. More information about the detailed sampling procedure can be found in previous studies.[6,14]

The DHS utilizes standardized questionnaires to collect health and demographic information from household members, including all women aged 15–49, as well as housing-related information. Data on domestic violence modules are collected by a subset of countries in the DHS. These data are collected by trained interviewers who conduct individual interviews with women currently or previously married or in a partnership, in the absence of other household members. To ensure privacy, the domestic violence module was not administered to all women in the sample; instead, only one woman per selected household was eligible to participate in this module. If there is more than one eligible woman in the household, one respondent is randomly selected using a Kish grid, a method commonly employed to randomly select household members for interviews.[15] Prior to addressing questions related to domestic violence, interviewed women reaffirm their informed consent, and disclosure of relevant behaviors is voluntary, based on the women's own discretion.

### Study population and sample size

We generated separate samples for current status and trend analyses. To investigate the current prevalence and disparities of IPV, we included countries with the most recent surveys conducted between 2010 and 2023, ensuring the data reflects the most up-to-date information while maximizing the number of countries included in the analysis. There were a total of 61 countries with available surveys. Among them, we excluded 12 countries without valid information on IPV and another 15 countries with less than 50 of the interviewees living in urban slums to ensure the statistical stability of the results. Our final sample consisted of 34 countries, with 283,658 women aged 15–49 years old interviewed for the IPV module. The flow chart and the summary table of our sample characteristics are shown in Appendix Table S1 and Appendix Figure S1.

Given that the widely used definition of urban slums was introduced by the United Nations Human Settlements Programme (UN-Habitat) in 2006 and thereafter,[16] we identified ten countries that have conducted at least two rounds of surveys since 2006 to further assess changes in prevalence and disparities over time. For countries with only two rounds, we included both surveys, while for countries with three or more rounds, following previous practice,[6] we selected the earliest

survey and the latest survey for trend analysis. The detailed information about the sample included in the trend analysis is shown in Appendix Table S2.

### Outcomes

In our study, the primary outcome was any IPV, while the three secondary outcomes were physical IPV, sexual IPV, and psychological IPV. All outcomes were all dichotomous, with 1 indicating that women experienced this type of IPV from their husbands or partner in the past 12 months, and 0 indicating otherwise. Consistent with previous studies,[6] any IPV was defined as women who ever experienced at least one type of physical IPV, sexual IPV, and psychological IPV. Physical IPV was defined as a woman experiencing "being pushed, shaken, or having things thrown", "slapped", "punched, kicked, or beaten with harmful objects", "being kicked or dragged", "being strangled or burned", "threatened with a knife, gun, or other weapon", or "having arms twisted or hair pulled". Sexual IPV was defined as a woman experiencing "physically forced into unwanted sex", "forced into other unwanted sexual acts", or "physically forced to perform sexual acts that the respondent didn't want to". Psychological IPV was defined as a woman experiencing "insults", "threats of harm", or "being humiliated or made to feel bad".

### IPV risk factors

Drawing from the framework for the drivers of IPV proposed by the Lancet Psychiatry Commission, theoretical-conceptual hierarchical framework of risk factors of IPV, and previous studies,[6,8,9,12,13,17,18] we identified three domains of risk factors contributing to IPV—poor partner relationship, gender inequality, and poverty. Considering these previous frameworks and the availability of DHS data, we selected nine risk factors within three domains. In the poor partner relationship domain, we included women's mothers with IPV experience, women's husbands with drunk behavior, and women's husbands with controlling behavior. The gender inequality domain encompassed level of attitude to violence, level of social independence, and level of decision making. The poverty domain included women's household wealth level, women's employment status, and women's education level. The detailed information about the definitions of risk factors were shown in Appendix Table S3.

### Exposure

We categorized areas of residence into urban slums, non-slum urban areas, and rural areas. The classification of urban and rural was based on the type of residence defined by DHS, following boundaries established by the national authorities of each country.

We further defined urban slums within urban areas following criteria established by the UN-Habitat in 2006 and previous studies.[19–21] Specifically, we defined urban slums as lacking at least one of the following characteristics: (1) adequate living space (less than three persons sharing a room); (2) durable housing (floor of the house constructed with durable materials); (3) access to improved and sufficient safe drinking water (e.g., connected to a piped system within the house or plot, public tap/standpipe, tube well/borehole, and protected dug well); and (4) improved sanitation facilities (e.g., flush or pour-flush to piped sewer systems, septic tanks, or pit latrines with ventilation improvements). Following previous practice,[19] if more than 50% of households in the sampling unit were lacking two or more characteristics, all households in this sampling unit were considered to be residing in an urban slum.

### Statistics

Firstly, we estimated the prevalence of various types of IPV in urban slums, non-slum urban areas, and rural areas, along with their 95% confidence intervals (CIs). The national prevalence was calculated using the original DHS sampling weights, which adjust for differences in sampling probabilities and non-response rates, ensuring representativeness for each country's surveyed population. For the global weighted prevalence, we recalibrated the sampling weights based on each country's population size in the survey year. Following previous studies,[6,22] we calculated a country-specific weight as the ratio of the total population to the number of surveyed sample, and multiplied this by the original DHS weights. This adjustment ensures that countries with larger populations contribute proportionally more to the global estimate. Additionally, we measured absolute disparities in IPV prevalence by calculating the differences between urban slums and non-slum urban, as well as between urban slums and rural areas. Relative disparities were assessed by calculating the prevalence ratios for these comparisons.

Secondly, we used Fairlie decomposition analysis based on a multivariable logistic regression model to examine the contributions of IPV risk factors to disparities in IPV prevalence between women in urban slums and those in non-slum urban areas, as well as between women in urban slums and rural areas. Fairlie decomposition analysis is a widely used method for decomposing the differences between groups into the contributions of various risk factors.[23,24] Based on probit or logit models, it quantifies the contribution of a specific risk factor (e.g., women's mothers with IPV experience) to explaining group differences by calculating the difference in predicted probabilities for one group (e.g., urban slums) using the regression coefficients derived from another group (e.g., non-slum urban areas), relative to the predicted probabilities for the same group (e.g., urban slums) using its own regression coefficients.[24] The detailed information about Fairlie decomposition analysis is presented in Appendix Text S1. Missing values for IPV risk factors were addressed using multiple imputation.

Thirdly, to investigate whether and how the disparities in IPV varied across different population groups, we conducted stratified analyses by women's age (i.e., 15–24, 25–34, and 35–49 years) and country income level, categorizing countries as low-income countries (LICs), lower-middle-income countries (LMCs), and upper-middle-income countries (UMCs), according to the World Bank's 2022 classification.[25] Additionally, to explore whether and how different IPV risk factors varied across these population groups, we employed Fairlie decomposition analysis in each subgroup to assess the contributions of IPV risk factors to the IPV disparities between women in urban slums and those in other areas.

Fourthly, we assessed trends in IPV across urban slums, non-slum urban areas, and rural areas by calculating the absolute annual change in IPV prevalence (difference between the earliest and latest surveys divided by years) and using Poisson regression with robust error variance to estimate the average annual rates of change (AARC).[6] In the Poisson regression, we adjusted for age, and the AARC was calculated as $100 \times [\exp(\beta) - 1]$, where $\beta$ is the regression coefficient for calendar year. The 95% CIs for the AARC were calculated as $100 \times [\exp(\beta \pm 1.96\,\sigma) - 1]$, where $\sigma$ is the standard error of $\beta$. A negative value indicates a decline, while a positive value indicates an increase in IPV.

Finally, for each country, we calculated the difference in the absolute disparity index and the ratio of the relative disparity index between the earliest and latest surveys to assess temporal trends in disparities. According to the previous study,[26] we standardized these indicators based on the number of years elapsed between the earliest and latest surveys, with the method detailed in Appendix Text S1. A difference value greater than 0 indicates increasing absolute disparities, while a value less than 0 indicates decreasing absolute disparities. A ratio value greater than 1 reflects increasing relative disparities, whereas a value less than 1 implies decreasing relative disparities.

We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines. We used Stata version 17 software for all analyses. P values less than 0.05 were considered indicative of statistical significance. To address the potential impact of multiple comparisons, we additionally applied the Bonferroni correction to adjust the alpha level for testing multiple exposure-outcome pairs. The adjusted significance thresholds were $P < 0.0125$ (4 outcomes) for the pooled analysis, $P < 0.0041$ (4 outcomes and 3 subgroups) for the subgroup analysis, $P < 0.0004$ (4 outcomes and 34 countries) for the country-level analysis, and $P < 0.0013$ (4 outcomes and 10 countries) for the trend analysis.

### Ethics

This study was approved by the Tsinghua Institutional Review Board (Project No. 20220005). Informed consent was waived as the study utilized publicly available data.

### Role of the funding source

The funders of the study had no role in the design, collection, analysis, or interpretation of data, nor in the writing of the report.

## Results

We included 283,658 women from 34 countries in this study, as presented in Table 1. Among them, there were 14,111 women (5.0%) living in urban slums, approximately one-third (86,126, 30.4%) residing in non-slum urban areas, and the remainder living in rural areas (183,421, 64.6%). In eight countries, the proportion of urban slum residents exceeded 10% of the national sample, with the highest in Angola (16.9%), followed by Chad (16.7%), the Democratic Republic of Congo (16.1%), and Benin (15.0%). IPV was widespread in urban slums, with 31.4% (95% CI: 30.7–32.2) of women having experienced any IPV. Among the 34 countries studied, 18 reported a prevalence of any IPV exceeding 30% in urban slums, with Papua New Guinea having the highest prevalence (70.6%, 95% CI: 65.9–75.2), followed by Sierra Leone (68.3%, 95% CI: 57.4–79.1). Urban slums in Papua New Guinea also had the highest prevalence of physical IPV (60.0%, 95% CI: 55.0–65.0), sexual IPV (35.8%, 95% CI: 30.9–40.7), and psychological IPV (60.7%, 95% CI: 55.8–65.7).

Fig. 1 and Appendix Table S4 showed the prevalence and disparities of different types of IPV by area of residence. Overall, women living in urban slums were more likely to experience IPV than women in non-slum urban and rural areas. The prevalence of any IPV in urban slums was 5.9 percentage points (95% CI: 5.1–6.7, $P < 0.0001$) higher than that in non-slum urban areas and 1.2 percentage points (95% CI: 0.4–2.0, $P = 0.0022$) higher than that in rural areas. Likewise, the prevalence of sexual and psychological IPV in urban slums was significantly higher compared to the other two areas. For instance, women from urban slums had a 3.2 percentage points (95% CI: 2.8–3.7, $P < 0.0001$) higher prevalence of sexual IPV than non-slum urban areas and 1.3 percentage points (95% CI: 0.8–1.8, $P < 0.0001$) higher than rural areas. Regarding physical IPV, the prevalence in urban slums was significantly higher than in non-urban slums by 2.6 percentage points (95% CI: 1.9–3.3, $P < 0.0001$) but less than that in rural areas, with a difference of –0.8 percentage points (95% CI: –1.5 to –0.1, $P = 0.0303$). The findings using the relative disparities index showed a similar pattern (Appendix Table S4). The results of the multivariable logistic regression model also indicated that the prevalence of IPV was significantly higher among women in urban slums compared to those in non-slum urban areas (Appendix Table S5). For instance, the risk of experiencing any IPV in non-slum urban areas was significantly lower than that in urban slums, with an adjusted odds ratio of 0.88 (95% CI: 0.80–0.97,

| Country | Number of participants, n | Sample size in areas of residence, n (%) | | | Prevalence of intimate partner violence (IPV) in urban slums, % (95% confidence interval) | | | |
|---|---|---|---|---|---|---|---|---|
| | | Urban slums | Non-slum urban | Rural | Any IPV[a] | Physical IPV | Sexual IPV | Psychological IPV |
| Afghanistan | 21,324 | 1394 (6.5) | 3912 (18.3) | 16,018 (75.1) | 38.5 (35.9, 41.1) | 29.5 (27.1, 31.9) | 2.9 (2.0, 3.7) | 27.2 (24.9, 29.6) |
| Angola | 7669 | 1297 (16.9) | 3046 (39.7) | 3326 (43.4) | 36.6 (33.9, 39.2) | 26.4 (24.0, 28.8) | 7.5 (6.1, 9.0) | 25.7 (23.4, 28.1) |
| Benin | 4488 | 675 (15.0) | 1255 (28.0) | 2558 (57.0) | 33.7 (30.2, 37.3) | 14.9 (12.2, 17.6) | 7.9 (5.9, 10.0) | 30.9 (27.4, 34.4) |
| Burkina Faso | 10,009 | 416 (4.2) | 2278 (22.8) | 7315 (73.1) | 17.1 (13.5, 20.7) | 12.4 (9.2, 15.6) | 3.2 (1.5, 4.9) | 7.9 (5.3, 10.5) |
| Burundi | 7366 | 230 (3.1) | 985 (13.4) | 6151 (83.5) | 31.9 (25.9, 38.0) | 17.4 (12.5, 22.4) | 23.1 (17.6, 28.6) | 15.1 (10.4, 19.8) |
| Cameroon | 4690 | 159 (3.4) | 2179 (46.5) | 2352 (50.1) | 24.1 (17.4, 30.9) | 18.3 (12.2, 24.4) | 4.9 (1.5, 8.3) | 13.1 (7.8, 18.5) |
| Chad | 3814 | 637 (16.7) | 197 (5.2) | 2980 (78.1) | 26.4 (22.9, 29.8) | 19.8 (16.7, 22.9) | 7.0 (5.1, 9.0) | 17.6 (14.6, 20.6) |
| Colombia | 24,890 | 850 (3.4) | 17,306 (69.5) | 6734 (27.1) | 39.2 (35.9, 42.5) | 34.3 (31.1, 37.5) | 8.7 (6.8, 10.6) | 19.8 (17.1, 22.5) |
| Comoros | 2529 | 240 (9.5) | 798 (31.6) | 1491 (59.0) | 6.2 (3.1, 9.3) | 4.7 (2.0, 7.4) | 0.5 (0.0, 1.4) | 5.1 (2.3, 7.8) |
| Congo, Dem. Rep.[b] | 5691 | 914 (16.1) | 708 (12.4) | 4069 (71.5) | 45.9 (42.6, 49.1) | 27.9 (25.0, 30.8) | 20.5 (17.9, 23.2) | 27.1 (24.2, 30.0) |
| Cote d'Ivoire | 5018 | 94 (1.9) | 1749 (34.9) | 3175 (63.3) | 24.7 (15.8, 33.6) | 17.7 (9.8, 25.5) | 1.9 (0.0, 4.8) | 11.9 (5.3, 18.6) |
| Ethiopia | 4720 | 356 (7.5) | 855 (18.1) | 3509 (74.3) | 16.2 (12.3, 20.0) | 9.4 (6.4, 12.5) | 2.9 (1.1, 4.6) | 13.0 (9.5, 16.6) |
| Gabon | 4147 | 131 (3.2) | 2457 (59.2) | 1559 (37.6) | 49.8 (41.1, 58.4) | 40.4 (31.9, 48.9) | 17.3 (10.7, 23.8) | 34.3 (26.1, 42.5) |
| Guatemala | 6512 | 78 (1.2) | 2630 (40.4) | 3804 (58.4) | 6.1 (0.7, 11.6) | 4.7 (0.0, 9.6) | 0.0 (0.0, 0.0) | 5.8 (0.5, 11.1) |
| Haiti | 4322 | 155 (3.6) | 1314 (30.4) | 2853 (66.0) | 36.8 (29.1, 44.5) | 18.7 (12.5, 25.0) | 14.2 (8.7, 19.8) | 29.6 (22.4, 36.9) |
| Honduras | 12,494 | 850 (6.8) | 3960 (31.7) | 7684 (61.5) | 29.2 (26.1, 32.2) | 14.4 (12.0, 16.7) | 3.3 (2.1, 4.5) | 26.3 (23.4, 29.3) |
| India | 63,851 | 564 (0.88) | 14,924 (23.3) | 48,363 (75.7) | 24.3 (20.7, 27.8) | 23.9 (20.3, 27.4) | 2.0 (0.9, 3.2) | 5.9 (3.9, 7.8) |
| Kenya | 4519 | 467 (10.3) | 1177 (26.0) | 2875 (63.6) | 40.0 (35.6, 44.5) | 27.4 (23.3, 31.5) | 12.2 (9.2, 15.2) | 29.4 (25.3, 33.6) |
| Liberia | 2331 | 180 (7.7) | 615 (26.4) | 1536 (65.9) | 46.2 (38.9, 53.6) | 42.8 (35.5, 50.1) | 9.6 (5.2, 13.9) | 34.2 (27.2, 41.2) |
| Mali | 3356 | 210 (6.3) | 729 (21.7) | 2417 (72.0) | 31.6 (25.2, 37.9) | 8.8 (4.9, 12.6) | 8.4 (4.6, 12.2) | 22.9 (17.2, 28.6) |
| Mauritania | 3307 | 313 (9.5) | 1145 (34.6) | 1849 (55.9) | 8.8 (5.6, 11.9) | 3.0 (1.1, 4.9) | 3.8 (1.7, 5.9) | 6.3 (3.6, 9.0) |
| Mozambique | 5824 | 698 (12.0) | 1280 (22.0) | 3846 (66.0) | 47.0 (43.3, 50.7) | 31.4 (27.9, 34.8) | 9.4 (7.2, 11.6) | 34.1 (30.6, 37.7) |
| Myanmar | 3425 | 190 (5.5) | 642 (18.7) | 2593 (75.7) | 12.1 (7.4, 16.7) | 8.0 (4.1, 11.9) | 2.4 (0.2, 4.6) | 9.4 (5.2, 13.6) |
| Namibia | 1449 | 160 (11.0) | 603 (41.6) | 686 (47.3) | 32.3 (24.7, 39.8) | 25.8 (18.8, 32.9) | 11.3 (6.2, 16.4) | 23.4 (16.5, 30.2) |
| Nepal | 3826 | 405 (10.6) | 1975 (51.6) | 1446 (37.8) | 15.3 (11.8, 18.9) | 14.5 (11.0, 17.9) | 2.9 (1.2, 4.5) | 8.4 (5.7, 11.1) |
| Nigeria | 8910 | 603 (6.8) | 2963 (33.3) | 5344 (60.0) | 28.0 (24.4, 31.6) | 11.8 (9.2, 14.3) | 5.6 (3.8, 7.5) | 25.9 (22.4, 29.4) |
| Pakistan | 4085 | 197 (4.8) | 1781 (43.6) | 2107 (51.6) | 17.9 (12.4, 23.4) | 12.0 (7.3, 16.7) | 4.7 (1.7, 7.8) | 16.2 (10.9, 21.6) |
| Papua New Guinea | 3955 | 372 (9.4) | 441 (11.2) | 3142 (79.4) | 70.6 (65.9, 75.2) | 60.0 (55.0, 65.0) | 35.8 (30.9, 40.7) | 60.7 (55.8, 65.7) |
| Philippines | 13,215 | 188 (1.4) | 4148 (31.4) | 8879 (67.2) | 15.5 (10.3, 20.7) | 3.7 (1.0, 6.4) | 4.0 (1.1, 6.8) | 12.9 (8.0, 17.7) |
| Sierra Leone | 4055 | 74 (1.8) | 1189 (29.3) | 2792 (68.9) | 68.3 (57.4, 79.1) | 54.8 (43.2, 66.4) | 10.6 (3.4, 17.7) | 55.0 (43.4, 66.6) |
| Tanzania | 7597 | 175 (2.3) | 1862 (24.5) | 5560 (73.2) | 48.5 (41.0, 56.0) | 37.9 (30.6, 45.1) | 15.7 (10.3, 21.2) | 34.3 (27.2, 41.4) |
| Togo | 5376 | 66 (1.2) | 1782 (33.1) | 3528 (65.6) | 29.2 (17.9, 40.4) | 10.9 (3.2, 18.6) | 3.5 (0.0, 8.0) | 27.4 (16.4, 38.5) |
| Uganda | 7536 | 443 (5.9) | 1112 (14.8) | 5981 (79.4) | 45.2 (40.5, 49.8) | 24.7 (20.6, 28.7) | 17.5 (14.0, 21.1) | 37.0 (32.5, 41.6) |
| Zambia | 7358 | 330 (4.5) | 2129 (28.9) | 4899 (66.6) | 38.9 (33.6, 44.2) | 25.4 (20.6, 30.1) | 14.2 (10.4, 18.0) | 28.2 (23.3, 33.1) |
| Pool analysis | 283,658 | 14,111 (5.0) | 86,126 (30.4) | 183,421 (64.6) | 31.4 (30.7, 32.2) | 20.4 (19.8, 21.1) | 8.4 (7.9, 8.8) | 22.1 (21.4, 22.8) |

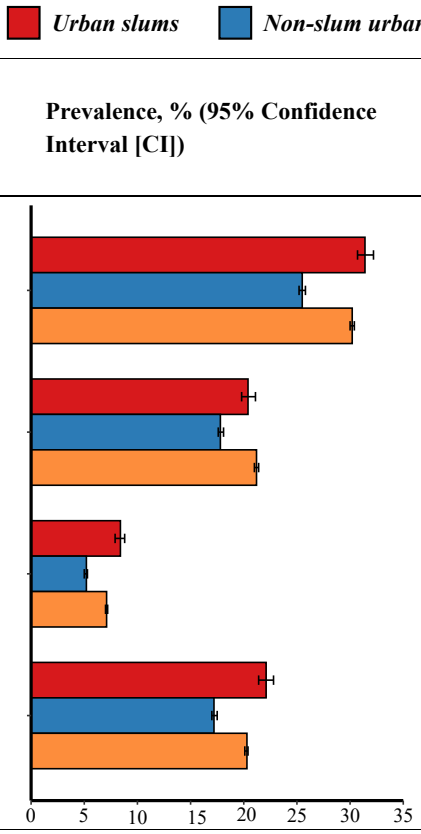
[a]Any IPV was defined as a woman having experienced at least one type of physical IPV, sexual IPV, or psychological IPV. [b]Congo, Dem. Rep. referred to the Democratic Republic of Congo.

*Table 1:* **Summary table of countries included in this study.**

P = 0.0118). For any IPV in rural areas compared to urban slums, the difference was not statistically significant after adjusting for IPV risk factors.

Fig. 2 showed the results of the decomposition analysis. All risk factors within the domains of poor partner relationships and gender inequality (excluding women with low levels of decision-making power) significantly explained the disparities in the prevalence of any IPV between women in urban slums and non-slum urban areas. Among these factors, husbands' controlling behavior accounted for the largest proportion of the difference, explaining 27.2% of the disparities (95% CI: 25.1–29.3, P < 0.0001), followed by women's education level within the poverty domain (7.1%, 95% CI: 1.0–13.3, P = 0.0233). Similarly, risk factors in the poor partner relationships domain were key in explaining the disparities in any IPV prevalence between urban slums and rural areas, with husbands' controlling behavior being the largest contributor (80.6%, 95% CI: 74.5–86.8, P < 0.0001). For other types of IPV, husbands' controlling behavior was also the factor that explained the largest percentage of the disparity in IPV prevalence between urban slums and non-slum urban areas, as well as between urban slums and rural areas, as detailed in Appendix Table S6.

Subgroup analyses by different ages and country income levels are presented in Appendix Figure S2 and Appendix Table S7. Our findings indicated that IPV




| | Prevalence, % (95% Confidence Interval [CI]) | Disparities between urban slums and other areas | |
|---|---|---|---|
| | | Difference[1], percentage points (95% CI) | Ratio[2], (95% CI) |
| **Any IPV[3]** | | | |
| Urban slums | | | |
| Non-slum urban | | 5.9 (5.1, 6.7) * | 1.23 (1.20, 1.26) * |
| Rural | | 1.2 (0.4, 2.0) * | 1.04 (1.01, 1.07) * |
| **Physical IPV** | | | |
| Urban slums | | | |
| Non-slum urban | | 2.6 (1.9, 3.3) * | 1.15 (1.10, 1.19) * |
| Rural | | -0.8 (-1.5, -0.1) | 0.96 (0.93, 1.00) |
| **Sexual IPV** | | | |
| Urban slums | | | |
| Non-slum urban | | 3.2 (2.8, 3.7) * | 1.63 (1.53, 1.73) * |
| Rural | | 1.3 (0.8, 1.8) * | 1.18 (1.12, 1.25) * |
| **Psychological IPV** | | | |
| Urban slums | | | |
| Non-slum urban | | 4.9 (4.1, 5.6) * | 1.28 (1.24, 1.33) * |
| Rural | | 1.8 (1.1, 2.5) * | 1.09 (1.05, 1.12) * |

***Fig. 1:*** **Prevalence and disparities of intimate partner violence (IPV) by areas of residence**. Note: Fig. 1 illustrates the prevalence and disparities of IPV by area of residence. In the "Prevalence" column, the x-axis represents the prevalence of IPV, while the y-axis denotes different types of IPV and areas of residence. Bars indicate the prevalence of IPV, with red representing urban slums, blue representing non-slum urban areas, and orange representing rural areas. Error bars indicated the 95% CIs. 1: Difference = Prevalence of IPV in urban slums - Prevalence of IPV in non-slum urban or rural; 2: Ratio = Prevalence of IPV in urban slums/Prevalence of IPV in non-slum urban or rural; 3: Any IPV was defined as a woman having experienced at least one type of physical IPV, sexual IPV, or psychological IPV. * indicated P value < 0.0125. Besides, All P values in this figure were less than 0.05.

challenges faced by women in urban slums were most pronounced among adolescent girls and young women aged 15–24, who experienced significantly higher prevalence of nearly all IPV types compared to their peers in non-slum urban and rural areas. Our subgroup analyses by country income levels revealed that in LMCs, IPV prevalence was consistently higher in urban slums compared to non-slum urban and rural areas across nearly all types of IPV. Yet, in UMCs, IPV prevalence in urban slums was higher than in rural areas but similar to non-slum urban areas. However, in LICs, only the prevalence of any IPV and sexual IPV in urban slums was significantly higher than in non-slum urban areas. Across subgroups, results of decomposition analysis were consistent with the main analysis, where controlling behavior by husbands explained the largest proportion of disparities in almost all IPV types between urban slums and other areas. The only exception was in LICs, where poor household wealth accounted for the largest share of disparities in any IPV (41.9%, 95% CI: 13.1–70.7, P = 0.0043) and sexual IPV (20.6%, 95% CI: 8.9–32.2, P = 0.0005) between urban slums and non-slum urban areas (Appendix Table S8).

Disparities in IPV for each country between urban slums and non-slum urban areas, as well as between urban slums and rural areas, were presented in Fig. 3 and Appendix Table S9. We found that the prevalence of IPV in urban slums was higher than in non-slum urban areas in 15 countries for any IPV, 15 for physical IPV, 11 for sexual IPV, and 9 for psychological IPV, all with P values less than 0.05. Similarly, the prevalence in urban slums was higher than in rural areas in 11 countries for any IPV, 12 for physical IPV, 6 for sexual IPV, and 10 for psychological IPV. The difference in the prevalence of any IPV exceeded 10 percentage points, with P values below 0.0004, in Burundi, Papua New Guinea, Tanzania, and Uganda when comparing urban slums to non-slum urban areas, and in Haiti, Papua

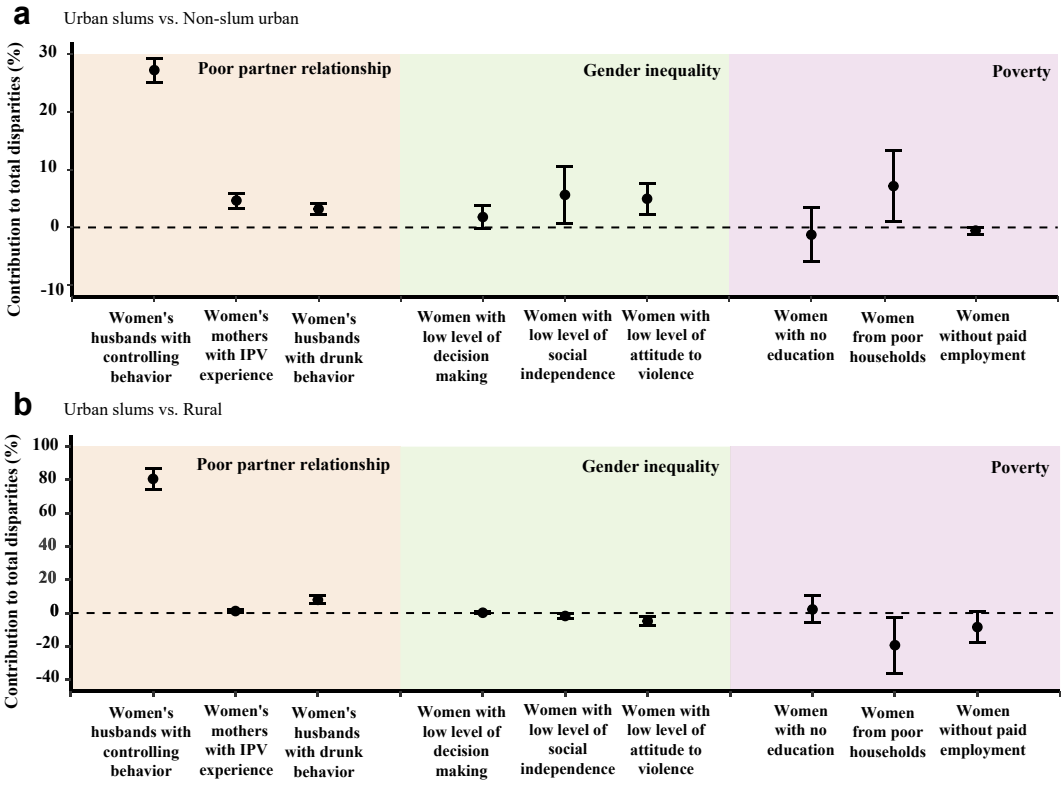



***Fig. 2:*** **Fairlie decomposition analysis of intimate partner violence (IPV) risk factors contributing to disparities of any IPV between urban slums and other areas**. Note: Fig. 2 presents the results of the Fairlie decomposition analysis. The x-axis represents different IPV risk factors, while the y-axis shows the percentage of the total disparity explained by each risk factor. Error bars indicate the 95% CIs. The Fairlie decomposition analysis is based on a multivariable logistic regression model to examine the contributions of IPV risk factors (such as poor partner relationships, gender inequality, and poverty) to the IPV disparity between women in urban slums and other areas. A positive result (e.g., a%) indicates that a% of the IPV disparity is explained by the factor, while a negative result (e.g., –b%) shows that the factor reduces the disparity by b%. Due to the lack of data on gender inequality in Colombia and on husbands' drinking behavior in Mauritania, these two countries were excluded from this analysis, which was conducted using data from the remaining 32 countries. a. Urban slums vs. Non-slum urban. b. Urban slums vs. Rural.

New Guinea, and Sierra Leone when comparing urban slums to rural areas.

The trends in IPV prevalence and disparities in each country were shown in Fig. 4, Appendix Tables S10 and S11. Among the 10 countries included in the trend analysis, urban slums in Sierra Leone showed a significant increase in the prevalence of any IPV (4.6 percentage points, 95% CI: 2.5–6.6, P < 0.0001); three other countries—Tanzania, Mali, and Nigeria—also exhibited increasing trends in any IPV, though not statistically significant. Urban slums in Sierra Leone also saw significantly increases in physical IPV (3.3 percentage points, 95% CI: 1.2–5.5, P = 0.0025) and psychological IPV (3.7 percentage points, 95% CI: 1.6–5.8, P = 0.0007). When examining changes in disparities, we found that these disparities widened for at least one type of IPV in four countries: Sierra Leone, Mali, Tanzania, and the Philippines. For example, in Tanzania, the difference in physical IPV between urban slums and non-slum urban areas increased from 0.8 percentage points (95% CI: –6.1 to 7.7, P = 0.8163) in 2010 to 13.9 percentage points (95% CI: 6.4–21.3, P = 0.0003) in 2015, reflecting an absolute annual rise of 2.6 percentage points (95% CI: 0.6–4.6, P = 0.0118). Conversely, in India, disparities in all types of IPV significantly narrowed—the absolute annual changes of disparities ranged from –0.2 percentage points (95% CI: –0.4 to –0.1, P < 0.0001) for sexual IPV between urban slums and rural areas to –0.8 percentage points (95% CI: –1.1 to –0.5, P < 0.0001) for any IPV between urban slums and non-slum urban areas (Appendix Table S11).

## Discussion

To our knowledge, this is the first multi-country analysis of IPV in urban slums within LMICs, revealing three salient findings. First, IPV was prevalent among women living in urban slums, with over half of the 34 countries

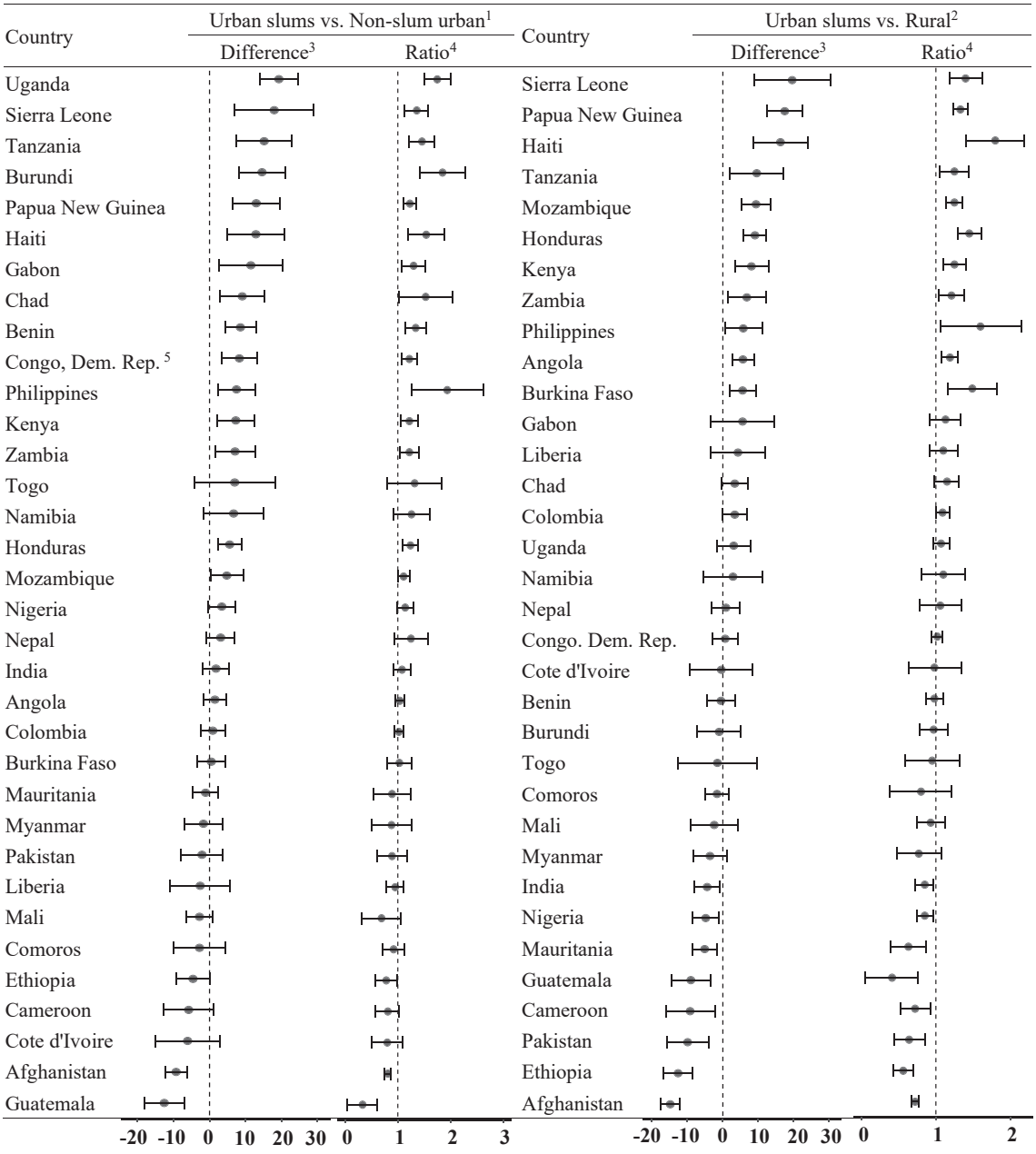
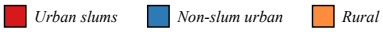
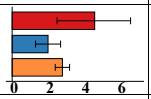
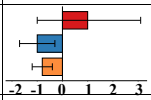
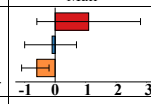
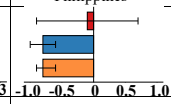
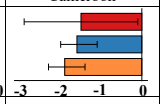



***Fig. 3:*** **Disparities of any intimate partner violence (IPV) for each country between urban slums and non-slum urban areas, as well as between urban slums and rural areas**. Note: Fig. 3 displays disparities in any IPV across countries between urban slums and other areas. In the "Difference" column, the x-axis represents the absolute difference in any IPV prevalence between urban slums and other areas, measured in percentage points. In the "Ratio" column, the x-axis represents the prevalence ratio of any IPV between urban slums and other areas, without units. The y-axis lists the countries, and error bars indicate the 95% CIs. 1: Urban slums vs. Non-slum urban: Difference = Prevalence of IPV in urban slums - Prevalence of IPV in non-slum urban; Ratio = Prevalence of IPV in urban slums/Prevalence of IPV in non-slum urban. 2: Urban slums vs. Rural: Difference = Prevalence of IPV in urban slums - Prevalence of IPV in rural; Ratio = Prevalence of IPV in urban slums/Prevalence of IPV in rural. 3: A 95% CI of difference above 0 indicates significantly higher IPV prevalence in urban slums, below 0 indicates significantly lower prevalence, and including 0 suggests no significant difference; 4: A 95% CI of ratio above 1 indicates significantly higher IPV prevalence in urban slums, below 1 indicates significantly lower prevalence, and including 1 suggests no significant difference; 5: Congo, Dem. Rep. referred to the Democratic Republic of Congo.




| Country | | Sierra Leone | Tanzania | Mali | Philippines | Cameroon |
|---|---|---|---|---|---|---|
| Absolute annual change of prevalence, percentage points (95%CI) [1] | Urban slums<br>Non-slum urban<br>Rural |  |  |  |  |  |
| Absolute annual change of disparity, percentage points (95%CI) [2] | Urban slums vs. Non-slum urban[3] | 2.6 (0.4, 4.7) * | 2.0 (-0.1, 4.2) | 1.2 (-0.6, 3.1) | 0.7 (-0.1, 1.5) | 0.1 (-1.4, 1.5) |
| | Urban slums vs. Rural[4] | 1.8 (-0.3, 3.9) | 1.9 (-0.2, 3.9) | 1.7 (0.0, 3.4) | 0.7 (-0.1, 1.5) | 0.4 (-1.1, 1.8) |

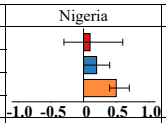
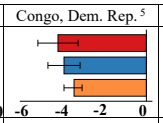
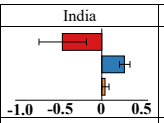
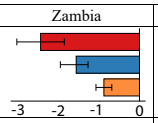
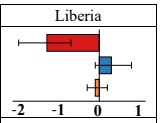
| Country | | Nigeria | Congo, Dem. Rep.[5] | India | Zambia | Liberia |
|---|---|---|---|---|---|---|
| Absolute annual change of prevalence, percentage points (95%CI) [1] | Urban slums<br>Non-slum urban<br>Rural |  |  |  |  |  |
| Absolute annual change of disparity, percentage points (95%CI) [2] | Urban slums vs. Non-slum urban[3] | -0.1 (-0.6, 0.4) | -0.3 (-1.6, 1.0) | -0.8 (-1.1, -0.5) * | -0.9 (-1.6, -0.2) * | -1.7 (-2.5, -0.9) * |
| | Urban slums vs. Rural[4] | -0.4 (-0.8, 0.1) | -0.8 (-1.9, 0.3) | -0.5 (-0.8, -0.2) * | -2.5 (-3.1, -1.9) * | -1.3 (-2.0, -0.5) * |

***Fig. 4:* Absolute annual change of prevalence and disparity in prevalence of any intimate partner violence between urban slums and other areas of residence, percentage points (95% Confidence Interval [CI])**. Note: Fig. 4 illustrates the absolute annual change in the prevalence of any IPV and the disparity in prevalence between urban slums and other areas. In each country's bar chart, bars represent the absolute annual change in IPV prevalence for each area, with red indicating urban slums, blue indicating non-slum urban areas, and orange indicating rural areas. The x-axis shows the absolute annual change in IPV prevalence (percentage points), while the y-axis represents different areas. Error bars indicate the 95% CIs. 1: Absolute annual change of prevalence = (Prevalence in the latest survey- Prevalence in the earliest survey)/number of years elapsed between the earliest and latest surveys; 2: Absolute annual change of disparity = (Difference in the latest survey- Difference in the earliest survey)/number of years elapsed between the earliest and latest surveys; 3: Urban slums vs. Non-slum urban indicated "difference between urban slums and non-slum urban"; 4: Urban slums vs. Rural indicated "difference between urban slums and rural"; 5: Congo, Dem. Rep. referred to the Democratic Republic of Congo. * indicated P value < 0.05.

studied reporting a prevalence exceeding 30% for any IPV. Second, women in urban slums are more likely to experience IPV than those in other areas, with the prevalence of any IPV significantly higher in urban slums compared to non-slum urban areas in half of the countries and higher than in rural areas in one-third of the countries. Additionally, controlling behavior by husbands explained the largest proportion of disparities in all IPV types between urban slums and other areas. Lastly, the prevalence of IPV in urban slums was significantly increasing in some countries, and the disparities between urban slums and other areas were also widening in multiple countries.

Our study highlights the high prevalence of IPV in urban slums, aligning with localized studies in Kolkata (India), Ibadan (Nigeria), Kampala (Uganda), and Dhaka (Bangladesh), where rates frequently exceed 50%.[10–13] The elevated IPV prevalence for women in urban slums is influenced by a combination of individual level factors and the broader social environment. For women, higher levels of gender inequality, such as limited social independence and economic dependence, might increase their vulnerability to IPV.[6,18] Studies indicate that reduced autonomy in economic matters is not only closely associated with higher rates of IPV, but also makes it more difficult for women to escape abusive relationships, trapping them in a cycle of violence.[27,28] For men, living in the marginalized context of resource-limited, unequal urban slums—characterized by housing instability, overcrowding, and limited access to services—can increase frustration and powerlessness, leading to harmful behaviors like controlling women and alcohol abuse, which raise women's IPV risk.[12,17,29–31] In a broader context, urban slums are not only characterized by social disadvantages and stressful living conditions but also by deeply rooted gender inequalities. Such environments may contribute to the normalization or tolerance of IPV, where women, in particular, may internalize violence as part of their lived experience, thereby reinforcing the cycle of violence.[9,10] This cycle is further exacerbated by weak support systems, limited access to essential services, and insufficient accountability for perpetrators, all of which undermine efforts to foster community awareness and disrupt patterns of violence.[9,10,32] Consequently, these conditions discourage help-seeking behavior and perpetuate a pervasive sense of powerlessness among women.[9,10,12] Besides, children who witness their mothers experiencing IPV are more likely to perpetuate violence in adulthood, exacerbating the cycle of violence in urban slums and fostering an environment where horizontal violence thrives.[30] In conclusion, addressing IPV in urban slums requires not only enhancing women's empowerment and regulating partner behaviors but also focusing on the broader systemic inequalities and marginalization faced by these communities.[30,31,33,34]

Our analysis indicates that women in urban slums experience a higher prevalence of IPV compared to

those in other areas, with poor partner relationships—particularly controlling behaviors by husbands—playing a key role in this increased risk. These behaviors reflect underlying power imbalances within households, which in patriarchal societies are often employed by men to assert dominance over the family.[35,36] Controlling behavior is closely linked to IPV, with a study in Nigeria showing that women whose husbands exhibit controlling behaviors are four times more likely to experience physical violence than those whose husbands do not.[35] Worse still, the resource-limited environments, broader systemic inequalities, and the patriarchal structures prevalent in urban slums not only foster the emergence of controlling behaviors but also strengthen the link between these behaviors and IPV, thereby significantly increasing the risk of women experiencing IPV.[35–37] Additionally, the disadvantaged environments of urban slums increase the likelihood of substance use among partners, which not only directly affects brain mechanisms that drive aggressive behavior but also disrupts relationship dynamics, creating a foundation for IPV.[38] While rural settings continue to experience higher levels of IPV compared to urban non-slum areas,[39] our study underscores the equally critical need to address IPV in urban slums. Both settings require targeted interventions, such as promoting responsible partner behaviors and reducing inequalities. Tackling IPV in these disadvantaged areas is crucial for advancing SDG 5 of gender equality and SDG 3 of improving health and well-being for all.

Our findings indicate that in some countries, such as Sierra Leone, IPV has increased rapidly in urban slums, outpacing other areas; while in India, the gap has been narrowing over time. Previous studies often link the rising trend of IPV in Sierra Leone to the lingering effects of the civil war, which, along with rapid urbanization, has expanded urban slums.[6,40] Residents in urban slums were more vulnerable to floods, disease outbreaks, and pervasive poverty creating a more hostile environment that likely contributes to the surge in IPV.[41,42] Conversely, in India, disparities in IPV appear to be narrowing, likely due to several targeted initiatives in urban slums, such as the Society for Nutrition, Education and Health Action in the urban slums of Mumbai, and the Ghya Bharari Ekatra intervention in the urban slums of Pune.[43,44] These programs reduce harmful behaviors among men and empower women through education, while offering support and counseling services to promote mutual respect and a safe environment. We call for other countries to draw lessons from the policy experiences of these interventions, advocating for the implementation of educational and counseling initiatives to regulate male behavior and prevent further deterioration of IPV in urban slums.

This study has several limitations. First, this study only included countries that administered the domestic violence module in their DHS surveys. This inclusion criterion may skew the representativeness of the findings towards countries whose governments prioritize addressing IPV and therefore opted to include this module. Due to these limitations in data availability, our analysis covered only 34 LMICs for the current status assessment and 10 LMICs for time trend analysis. Thus, our estimates and findings may not be representative of LMICs. Second, due to limitations in the data provided by the DHS, we were unable to include indicators of financial IPV. However, we recognize the importance of these indicators in fully understanding IPV. Future research should focus on improving data collection in this area to provide a more comprehensive assessment of the IPV faced by women in urban slums. Third, consistent with the limitations of previous studies using DHS data for IPV analysis,[6,7,18] the sensitive nature of IPV and cultural variations across countries may introduce reporting bias when relying solely on women's self-reports. Additionally, the lack of comprehensive domestic violence data for all women in the sample could result in selection bias in the findings. Forth, although we used the widely accepted definition of urban slums provided by UN-Habitat,[19,20] this definition may be not applicable to some countries. Given this, cross-country comparisons may be limited, introducing potential classification bias. Future research should adapt the definition of urban slums to the specific circumstances of certain countries. Finally, when conducting trend analysis, it's important to note that even though both rounds are based on nationally representative samples, urban slums could change over time in terms of location and scale. Consequently, the comparisons may not be made on the same urban slums.

Despite these limitations, our multi-country analysis significantly enhances our understanding of IPV in urban slums. The higher prevalence of IPV in these areas, compared to non-slum locations, highlights the need for targeted interventions. Future policies should not only promote responsible partner relationships but also address the adverse conditions and entrenched gender inequalities in urban slums, which would be crucial for reducing IPV among women in these areas.[33,34] The rising prevalence and widening disparities in some countries suggest that, without focused efforts, IPV may continue to escalate, threatening the health of women and children. We advocate for sustained research and monitoring of health issues in urban slums, particularly the IPV faced by women, which aligns with the SDG 5 of gender equality and SDG 11 of sustainable cities and communities. Addressing IPV in these areas could not only improve mental health, enhance women's empowerment, and promote women's health and well-being, but also help reduce inequality, strengthen social cohesion, and contribute to broader societal goals, such as poverty reduction (SDG 1) and ensuring good health and well-being (SDG 3). Our findings highlight the need to continue addressing IPV in rural areas while

equally prioritizing urban slums in efforts to advance the SDGs.

#### Contributors

All authors had access to the data in the study. SC, ZL, YQ, NM, and YK were responsible for the integrity and accuracy of the data analysis and verified the underlying data. ZL, YQ, SC, and NM conceptualized and designed the study. SC, ZL, and YQ led the data analysis and interpretation. SC, ZL, and YQ wrote the initial manuscript. SC, ZL, YQ, NM, YK, ZC, JLN, PK, HMM, MAZ, MNK, MP, AIA, RK, FC, YS, CL, SVS, and PG contributed to the data analysis, interpretation of the results, and the writing. All authors contributed to the critical revision of the manuscript for important intellectual content. ZL and YQ provided overall supervision of the study. All of the authors approved the final submission of the study.

#### Data sharing statement

The data used in this study is publicly available and can be obtained after requesting from DHS (https://dhsprogram.com/).

#### Declaration of interests

The authors declare no competing interests.

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#### Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.eclinm.2025.103140.

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