



Does domestic violence legislation reduce permissive attitudes about intimate partner violence? Longitudinal evidence from men and women from 61 countries

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ABSTRACT

Introduction Intimate partner violence (IPV) is highly prevalent and has substantial implication for women's health. Changing IPV attitudes is one pathway to reduce IPV. While evidence suggests that interventions targeting individuals may change IPV attitudes, the effect of wider-scale interventions, such as legislation, remains unknown.

Methods We used individual-level IPV attitudes information collected between 1997 and 2020 by the Demographic and Health Surveys and the Multiple Indicator Cluster Surveys, which we linked with national-level domestic violence (DV) legislation information. We evaluated the effect of adoption of DV legislation on changes in IPV attitudes using a difference-in-differences study design that controlled for time-varying country-level confounding and accounted for staggered timing of legislation adoption.

Results Our sample included harmonised information across 61 countries, composed of 2 184 047 women from 60 countries and 390 877 men from 40 countries. After controlling for country-level time-varying confounders, adoption of DV legislation reduced IPV acceptability among women (average treatment effect among treated=−0.07, 95% CI: −0.16, 0.06) and men (average treatment effect among treated=−0.11, 95% CI: −0.22, 0.03) although estimates were imprecise and included the null.

Conclusions DV legislation may reduce permissive IPV attitudes, especially among men, although conclusions should be interpreted cautiously due to imprecise estimates.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Permissive attitudes about intimate partner violence (IPV) are a major driver of IPV. Ecological models identify large-scale structural factors, such as legislation, as a critical avenue to change permissive IPV attitudes.

WHAT THIS STUDY ADDS

⇒ There is little evidence on legal influences on IPV attitudes, despite domestic violence (DV) legislation having been adopted in over 100 countries since the year 2000.
⇒ Our study uses comprehensive longitudinal data from men and women from 61 countries, coupled with a difference-in-differences study design that accounts for inherent differences across countries, to provide the most rigorous evidence to-date on this relationship.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ We found that DV legislation resulted in modest reductions in permissive IPV attitudes among women and a slightly more pronounced reduction in permissive IPV attitudes among men, although estimates were imprecise. Given that the majority of IPV is perpetrated by men, coupled with the fact that IPV attitudes is a strong predictor of IPV perpetration, our results suggest that DV legislation may be one strategy to reduce IPV.



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INTRODUCTION

Intimate partner violence (IPV), highly prevalent in all regions of the world,¹ is widely acknowledged as a major threat to women's health and well-being. The ecological model of IPV posits that causes operate on many different levels, ranging from the individual to societal,² and development schemes have accordingly proposed prevention efforts that

confront factors on multiple levels.^{2 3} For example, a newly proposed framework to prevent violence against women put forth by the United Nations and the World Health Organisation (RESPECT) suggests a suite of comprehensive interventions targeting individuals (eg, changing attitudes about violence against women), relationships (eg, improving conflict management), communities (eg,

creating safe work environments) and structures (eg, availability of legal and social services for survivors of violence).³

Permissive attitudes towards IPV have been identified as an important intervention to reduce IPV. Such attitudes are linked to perpetration, affect women's recognition of violence, increase self-blame, reduce help-seeking, and lead to victim-blaming and leniency expectations from others.⁴⁻¹⁵ IPV attitudes are influenced by various factors experienced at different levels (eg, individual, community, structural), and accordingly, interventions targeting each of these levels are important. However, there is a dearth of evidence on structural-level interventions, with little evidence on legal influences in particular,⁴ despite domestic violence (DV) legislation having been adopted in over 100 countries since the year 2000.¹⁶

DV legislation, encompassing legal reforms such as criminal sanctions for perpetrators and civil remedies for victims, may have meaningful impacts on IPV attitudes through several mechanisms. First, laws have the potential to influence attitudes and behaviours.¹⁷ As argued by scholars of psychology and the law,¹⁷ a law can influence attitudes and behaviour when it serves as a persuasive source for information and morality, especially in situations of uncertainty, and has the potential to reflect group attitudes by shaping individual beliefs through social consensus and perceptions of their social standing. The law also influences behaviour beyond deterrence, through mechanisms like salience and social meaning. Additionally, the law can be used symbolically to express moral commitments, even if there is no realistic short-term influence on attitudes and behaviours.¹⁷ Frequently though, legal frameworks also obligate the state to train police and justice officers, provide victim services and promote public education.¹⁸ The process of legal reform involving advocates also frequently includes awareness raising efforts and collective action,^{18 19} increasing the likelihood of attitudinal and normative changes. A three-country comparative case study found "that legislative reform to combat domestic violence, particularly when rooted both in international human rights law and local contexts, is both necessary and generally effective for developing normative and legal standards, driving State accountability for protection from violence, and ultimately promoting social change."¹⁸

While DV legislation may offer an important avenue to change attitudes about IPV, we are aware of only three studies that have investigated this topic. Two exploratory studies used population-based data across a range of low-income and middle-income countries to estimate the cross-sectional association between multiple individual and contextual risk factors simultaneously, finding no overall association between DV legislation and IPV attitudes among men²⁰ or women.^{20 21} However, the lack of observed associations in these studies could be a result of investigating many determinants simultaneously, which may obscure relationships (eg, by overcontrolling for factors that are consequences of changes

in IPV attitudes, such as women's household decision-making), and cannot establish temporal ordering due to the cross-sectional nature of the data (eg, if countries with less permissive attitudes about IPV enacted legislation vs if legislation reduced permissive IPV attitudes). A third study, a longitudinal assessment of the impact of DV legislation on women's IPV attitudes across 22 sub-Saharan African countries, found that adoption of DV legislation corresponded to reductions in permissive IPV attitudes among women.²² This work provides strong evidence within one world region, yet effects among men (which evidence suggests perpetrate the majority of IPV)²³⁻²⁵ and effects beyond a sub-Saharan context were not investigated.

In this study, we help clarify the relationship between DV legislation and changes in IPV attitudes among both men and women. Using national-level policy data from the World Bank, linked with individual-level information from the Demographic and Health Surveys and the Multiple Indicator Cluster Surveys, we evaluate the longitudinal association between adoption of DV legislation and changes in attitudes about the acceptability of IPV among men and women. This work uses data over a 23-year period from 2.6 million adults from 61 countries and assesses the differential impact of legislation among specific demographic groups, providing the most comprehensive assessment to date of the impact of DV legislation on IPV attitudes.

METHODS

Study population

Our study used individual-level IPV attitudes data from the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS). The DHS and MICS are repeated cross-sectional surveys, typically administered every 5 years that collect information from reproductive age women and men in over 100 low-income and middle-income countries. The MICS and DHS survey designers collaborate closely to produce comparable, harmonised information, which can be combined to produce global datasets.²⁶ Standardised questions about IPV attitudes were first introduced in the DHS around 1997 and in the MICS around 2005, although administration of the DHS and the MICS, including the selection of specific questions and study participants, was at each country's discretion. Therefore, IPV attitudes information was not collected in each survey round in all countries, and additionally, some countries chose to collect information from only men or women; whereas, other countries collected information from both. We restricted our sample to countries that collected information about IPV attitudes from men or women in at least two survey rounds and had not adopted DV legislation before the study period (ie, before 1997). Our final sample included repeated cross-sectional information from 61 countries encompassing 60 countries for the women's sample and from 40 countries for the men's sample. We further

restricted our sample to participants who were currently or formerly married because some countries did not administer surveys to individuals who had never been married. Both the DHS and the MICS are population-based surveys that select men and women through a multistage sampling procedure, and we applied the weights supplied by the MICS and DHS to derive a longitudinal panel of nationally representative estimates of currently or formerly married men and women.

Study measures

Domestic violence (DV) legislation

Yearly country-level DV legislation information came from the World Bank's Women, Business and the Law (WBL) database.¹⁶ This database was created by WBL staff by surveying professionals with knowledge of local laws (eg, judges, lawyers, academics and non-governmental organisations providing gender-related services) about the presence of DV legislation and any amendments to existing law. WBL staff reviewed texts of relevant laws and regulations in each country to verify existence of two aspects of DV legislation: (1) protective orders for victims of domestic violence, and (2) criminal sanctions against domestic violence perpetrators, and they then classified countries fulfilling either criteria as having DV legislation and countries that offered neither as not having legislation.¹⁶ Major strengths of this database include confirmation of presence of legislation through review of source documents, and the application of the same criteria across time and countries. To our knowledge, this is the only DV legislation database that provides consistent information across time and country.

Attitudes about intimate partner violence (IPV)

Attitudes about the acceptability of IPV were captured in the DHS and the MICS by asking men and women if they believe a husband is justified beating his wife in five specific scenarios: (1) if a wife goes out without telling her husband, (2) if a wife neglects the children, (3) if a wife argues with her husband, (4) if a wife refuses to have sex with her husband or (5) if a wife burns the food. For each question, response options include 'agree', 'disagree' or 'don't know'. We classified a person as having permissive attitudes about IPV if they selected 'agree' to at least one of the five scenarios. We aggregated responses to the year and country level using sampling weights provided by the DHS and the MICS, thus providing prevalence estimates representative at the country level.

County-level control variables

Country-level information that may predict adoption of DV legislation and may also affect IPV attitudes were considered potential confounders. Variables include female labour force participation rates (% of women aged 15 or older in the labour force, provided by the International Labour Organisation),²⁷ literacy rates (% of people aged 15 or older who can read and write, provided by the World Bank),²⁸ educational attainment gap between men

and women (% of men with at least a primary education minus % of women with at least a primary education, calculated from data provided by the World Bank)²⁸ and gross domestic product (log) (per capita values for gross domestic product expressed in current international dollars converted by purchasing power parity conversion factor and expressed on the natural logarithm scale, provided by the World Bank).²⁸ Within countries, data was missing for some years. In these instances, we used linear interpolation to estimate missing values in models stratified by country.

Analytic approach

We evaluated the effect of DV legislation on men and women's attitudes about IPV using a difference-in-differences (DID) approach,^{29–33} a quasi-experimental study design that estimates the causal effect of policies on health. This approach provides less biased effect estimates than a traditional approach that controls for confounding by regression modeling³⁴ and can be thought of as mimicking a randomised trial.²⁹ A DID study design models changes in an outcome over time among countries that adopted legislation ('treatment group') compared with countries that never adopted legislation ('control group'). Many countries recently adopted DV legislation,¹⁶ offering a unique opportunity to use this strong study design to evaluate legislative effects.

A DID approach estimates the impact of a policy by estimating the average treatment effect among treated (ATT) in two steps. First, the change in an outcome before and after adoption of legislation is calculated among the treatment group, and the change in the outcome over this same time period is also calculated among the control group (called the 'first difference'). Next, the difference in estimated changes over time between treatment and control groups is calculated (called the 'second difference'). Thus, a DID study design estimates impact through the estimation of two differences. Estimation of DID in its simplest form includes two timepoints and two groups, which can be expressed as:

$$\hat{\tau}_2 = (\bar{Y}_{t=2, X=1} - \bar{Y}_{t=1, X=1}) - (\bar{Y}_{t=2, X=0} - \bar{Y}_{t=1, X=0})$$

where $\bar{Y}_{t=x}$ is the estimated sample mean in each treatment group x in each time period t'.

Strengths of this study design include control for time-invariant characteristics that may differ across countries (eg, world region, religion) by estimating changes within country (ie, fixed effects), and inclusion of a control group to account for secular trends in investigated outcomes.^{29–31–33} However, an important assumption of this study design is that the trend in the control group is parallel to the trend in the treatment group, had no legislation been adopted ('parallel trends' assumption), as this information is used to infer a counterfactual trend among the treatment group.³¹ In addition, the main effect estimate of a DID approach, the ATT, is a localised estimate of the impact of legislation among countries that adopted legislation. Accordingly, estimated impact



Figure 1 Domestic violence legislation status and survey availability by country and year for women's sample.

may not be generalisable to study countries that did not adopt legislation.

A DID study design typically includes more groups and time points and is most commonly implemented with ordinary least squares regression models that include an indicator (dummy) variable for time and country. Called two-way fixed effects (TWFE) models, these models have come under scrutiny recently, with new methodological work suggesting that such models may produce biased study results, especially in evaluations with staggered adoption of treatment.^{35–37} Given that the countries included in our study implemented DV legislation in a staggered fashion between 2007 and 2021, a TWFE approach may result in biased study results. Therefore, we used a specialised, newly developed DID estimation procedure, called the interactive fixed effects counterfactual estimator, that has been demonstrated to produce less biased estimates than a TWFE model in the presence of staggered adoption of legislation and is specifically designed for repeated cross-sectional data.³⁸ Briefly, this approach uses observations among control countries to predict counterfactual trends among treated countries (called counterfactual estimators), which are then used to derive the average treatment effect on the treated (ATT).

Statistical analysis

Using a DID estimation procedure designed for repeated cross-sectional data and staggered adoption of treatment (interactive fixed effects counterfactual estimator),³⁸ we conducted analyses with a panel data setup that aggregated information to the country and year level and then modelled changes within countries over time. Models controlled for country fixed effects included a binary variable indicating presence or absence of national-level DV legislation (exposure), and controlled for time-varying country-level confounders, including female labour force participation rate, literacy rate, educational attainment gap between men and women, and gross domestic product (log). Due to the relatively small number of treatment units, variances were estimated using a bootstrap procedure. We tested if the 'parallel trends' assumption was met with equivalence tests.^{39 40}

Contextual factors affect men and women's IPV attitudes differently,²⁰ and therefore, we estimated separate effects in sex-stratified models. In addition, we hypothesised that certain demographic groups may be more affected by DV legislation, including younger adults (because they may be more impressionable or more flexible/ready to change their minds), those with higher educational attainment (because they may be more likely

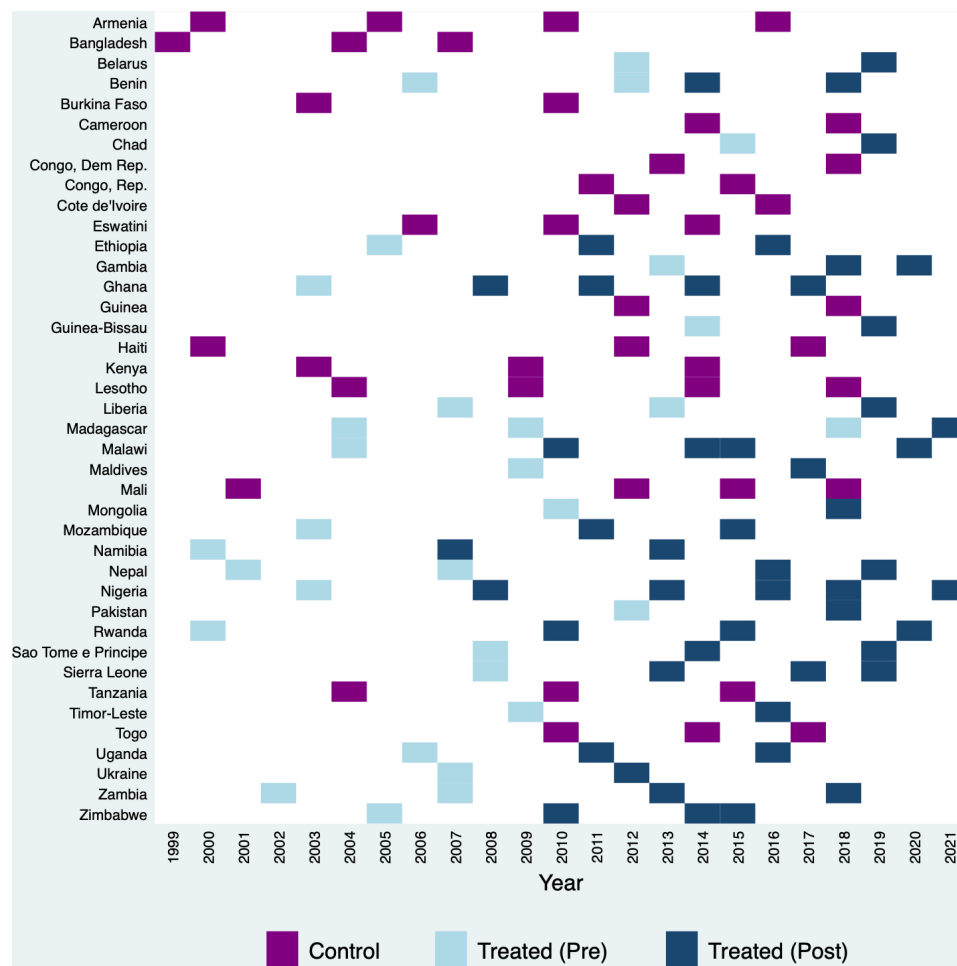


Figure 2 Domestic violence legislation status and survey availability by country and year for men's sample.

to have knowledge of legislation and may have the means to leverage the new law, if needed) and those living in urban areas (because legislation may be more robustly enacted in this setting). Therefore, in additional analyses, we estimated effects among specific demographic groups, including by age (15–29 years, 30–40 years, and 41 years or older), educational attainment (primary education or less, secondary education or higher) and location (urban, rural). We formally tested heterogeneity among demographic groups with Cochran's Q test.⁴¹

Sensitivity analyses

In a sensitivity analysis, we used TWFE models to estimate impact of DV legislation, which we compared with results from our main analyses. If TWFE results are similar to our main results, this will indicate that a simpler approach was sufficient; whereas, if results diverge, it will indicate that a more advanced method was warranted.

We estimated TWFE models with ordinary least squares regression that modelled individual-level data. Models include country and year indicator (dummy) variables, covariates measured at both the country level (labour force participation rate, literacy rate, educational gap between men and women, gross domestic product) and individual level (age, educational attainment, urban or

rural location) and estimated variances to account for clustering at the country-level. Models were stratified by sex (men vs women).

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plan of our research.

RESULTS

Our study included 2 184 047 women from 60 countries and 390 877 men from 40 countries. Online supplemental table 1 shows the sample size in each country and the percentage of men and women who believed IPV is justified. Prevalence of the acceptability of IPV was high in our sample among both men (28.0%) and women (43.7%), although prevalence ranged considerably across countries and years. Among men, acceptability ranged from 5.0% in Malawi (in 2014) to 85.1% in Timor-Leste (in 2009), and among women, from 2.1% in Serbia (in 2019) to 94.0% in Afghanistan (in 2011).

Many countries adopted DV legislation over the study period. Among the women's sample, 39 of 60 countries adopted legislation (figure 1), and among the men's sample, 25 of 40 countries adopted legislation (figure 2).

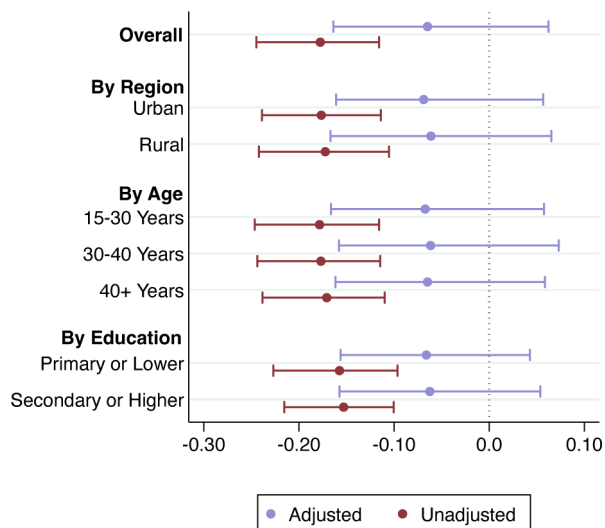


Figure 3 Effect of adoption of domestic violence legislation on changes in attitudes about IPV among women (n=2184 047 women from 60 countries). Note: Adjusted models controlled for country-level female labour force participation rate, literacy rate, educational gap between men and women, and gross domestic product (log). Models investigating effects in specific demographic groups (location, age, education) are jointly stratified by sex and demographic groups. Bars represent the 95% CI. IPV, intimate partner violence.

There was a strong correlation between presence of DV legislation and lower prevalence of permissive IPV attitudes among both men ($r=-0.28$) and women ($r=-0.23$).

Figures 3 and 4 show results of the longitudinal analysis evaluating the effect of adoption of DV legislation

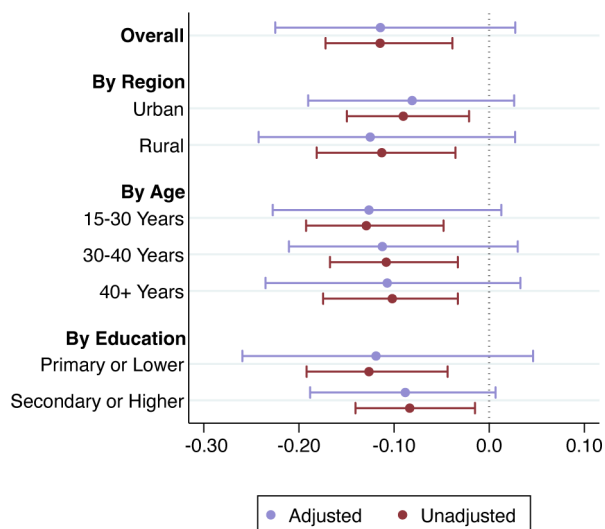


Figure 4 Effect of adoption of domestic violence legislation on changes in attitudes about IPV among men (n=390877 men from 40 countries). Note: Adjusted models controlled for country-level female labour force participation rate, literacy rate, educational gap between men and women, and gross domestic product (log). Models investigating effects in specific demographic groups (location, age, education) are jointly stratified by sex and demographic groups. Bars represent the 95% CI. IPV, intimate partner violence.

on changes in IPV attitudes using a DID study design. We found that DV legislation resulted in a 7% reduction in the prevalence of permissive IPV attitudes among women (ATT=-0.07, 95% CI: -0.16, 0.06) and an 11% reduction among men (ATT=-0.11, 95% CI: -0.22, 0.03) in models that controlled for country-level time-varying confounders. However, estimates were imprecise and included the null value. Unadjusted models showed stronger and more precise effects among women (18% reduction in prevalence) (figure 3), with adjustment for GDP (log) producing the greatest attenuation on women's effect size. Among men, unadjusted and adjusted estimates had similar effect sizes, although adjusted estimates were more imprecise (figure 4). Equivalence tests indicate that the parallel trends assumption was met.

In additional analyses stratified by specific demographic groups hypothesised to be more affected by DV legislation (ie, urban, younger or more educated adults) (figures 3 and 4), we found that effects did not differ among demographic groups in either the men or women's sample, as indicated by Cochran's Q test ($p>0.5$ for all tests within demographic groups).

In a sensitivity analysis, we used a TWFE estimation procedure to estimate impact (online supplemental table 2). We found that results generated from TWFE models diverged from our main analysis. Specifically, TWFE models found that DV legislation resulted in a slight decrease in permissive IPV attitudes among men (ATT=-0.03, 95% CI: -0.07, 0.01) and an increase in permissive IPV attitudes among women (ATT=0.02, 95% CI: -0.02, 0.06) in models that controlled for time-varying country-level factors. Further adjustment for individual-level covariates had very little impact on effect estimates. Given the divergence between TWFE models and the estimation procedure used in our main analysis, both regarding magnitude and direction of effects, this sensitivity analysis indicates that our more advanced estimation procedure was warranted.

DISCUSSION

Development schemes to reduce IPV have strongly emphasised confronting structural determinants, yet empirical evidence on which factors prevent IPV is lacking.⁴² This study helps fill this crucial evidence gap by leveraging longitudinal country-level information, coupled with an innovative, rigorous estimation strategy, to evaluate the effect of one structural factor identified as a major determinant of IPV: men and women's IPV attitudes. This work provides the most comprehensive assessment to date of the relationship between DV legislation and permissive IPV attitudes. We found that adoption of DV legislation corresponded to a 7% reduction in the prevalence of permissive IPV attitudes among women and an 11% reduction in prevalence among men. While these results suggest legislation may lead to meaningful reductions in IPV attitudes, estimates were imprecise and CIs included the null, precluding firm conclusions.

The imprecision of estimates, despite a fairly large sample size, may suggest substantial effect heterogeneity due to various contextual factors (eg, IPV norms, status of women) that may amplify or diminish the effect of DV legislation. The ‘sticky norms problem’ posits that when legislation deviates substantially from norms, judges, police officers, juries and community members will be less likely to enforce, implement or support the law, resulting in less effective legislation.^{17 43} For example, in the USA, mandatory arrest laws for perpetrators of DV were not universally adopted due to the belief among some police departments that DV was a relationship issue and not criminal matter,⁴⁴ and extreme laws addressing other social issues, including polygamy and inheritance rights for women, were found to be less effective than more moderate laws that align more closely with local norms.⁴⁵ Accordingly, DV legislation may only be effective in environments where legislation aligns with local norms about violence against women. In addition, attitudes on the acceptability of IPV are multifactorial,^{4 46} and the presence of multiple structural factors may be necessary to substantially change IPV attitudes, such as structural determinants that act on IPV attitudes more broadly by changing perceptions about women’s role in society (eg, policies to promote women’s economic empowerment) or promote women’s freedom from violence (eg, perceptions about the acceptability of divorce). While our study design, a modified difference-in-differences approach, allowed us to rigorously isolate the effect of DV legislation, this approach has limited ability to estimate the joint effect of multiple contextual or structural factors because estimating joint effects requires grouping countries by these additional factors (eg, the effect of adoption of DV legislation among countries with high permissive IPV attitudes). Given the relatively small number of countries in this study, stratified analyses investigating additional country characteristics were not feasible. Future studies that include more countries, or estimate effects within geographic regions within individual countries, could clarify the influence of contextual environments on DV legislation.

Our study investigated the impact of adoption of DV legislation, which was summarised as presence or absence of legislation using previously collected data that applied the same classification schemes across country and time. While this harmonised information allowed for a cross-national policy evaluation, the simplification of DV legislation into presence or absence obscured nuances related to the degree of implementation within countries. The comprehensiveness of legislation varies across countries, including which forms of violence are addressed through legislation (eg, physical, sexual, financial, emotional abuse, etc) and the type of criminal penalties for perpetrators (eg, civil vs criminal penalties).⁴⁷ Implementation of these various components of DV legislation may be slow and uneven^{19 48} and can vary considerably across countries and regionally within countries.^{49 50} Our study could not investigate degree of implementation or

components of legislation due to a dearth of harmonised, longitudinal information measuring this granular information, and we could not evaluate if legislation was only effective after a certain number of years due to limited repeated cross-sectional surveys within countries. Additionally, legislation may take many years to have an impact on attitudes, and the relatively short period of follow-up after adoption of legislation in our study (on average, the women’s and men’s sample measured IPV attitudes 5.5 years post policy adoption) may not allow enough time to detect changes. Future research could investigate which components of legislation (or combination of components) are most effective at changing IPV attitudes, assess if certain implementation thresholds are necessary to affect change, and evaluate the impact of legislation longevity on IPV attitudes.

Our study has additional limitations. First, the psychometric properties of the IPV attitudes questions used in this study may vary across time or country. These differences may be a potential source of study bias, and a psychometric assessment of these measures could be an additional area of future research. Second, our study used data from a selected group of low-income and middle-income countries that had information from at least two DHS or MICS surveys, and among these selected countries, our estimation strategy did not use information from countries that always had DV legislation. Thus, the study population was composed of a selected group of countries, and results may not be generalisable to countries beyond this subset. Third, our DID study design estimates impact by assuming that treatment and control countries would have similar trends in the outcome, had legislation not been implemented among treatment countries (ie, the ‘parallel trends’ assumption). We tested this assumption by comparing trends among control countries and treatment countries (pre-treatment), and our equivalence tests indicated pre-treatment trends were similar; however, due to the limited number of repeated cross-sectional surveys in each country, including some treatment countries with only one survey pre-treatment, this test was conducted using limited survey rounds.

Despite these limitations, our work provides the most comprehensive assessment to date on the link between DV legislation and women and men’s IPV attitudes. Understanding specific pathways that may result in reductions in violence—at the individual, relational, community and structural level—is imperative to effectively reduce violence. Our work helps fill this evidence gap by clarifying the role of one structural determinant, DV legislation, on changing IPV attitudes. Future research could investigate structural determinants that act more broadly on gender equitable attitudes, which may reveal new pathways for reducing permissive IPV attitudes.

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Contributors RAR conceptualised the study and wrote the first draft of the report. RAR, NRP and TB contributed to the study design. ARH, KW and RAR constructed harmonised datasets. RAR conducted statistical analysis. RAR, CJC, TB, ARH and NRP contributed to the interpretation of results. FJ, RAR and CJC conducted the literature review. FJ, CJC and ARH contributed to the writing of the report. RAR accepts full responsibility for the finished work and/or the conduct of the study, had access to the data and controlled the decision to publish. All authors provided critical feedback of manuscript drafts, and reviewed and approved the final manuscript.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study used data previously collected by the MICS and DHS. DHS data collection procedures were reviewed and approved by the ICF Institutional Review Board (IRB) and typically also by an IRB in the host country. MICS data collection procedures were reviewed and approved by an IRB in each host country. The MICS and DHS have repositories of this data and offer de-identified data for public use, which was used in this study through a data use agreement. The IRB at Emory University determined that the research conducted in this study is non-human subjects research due to the de-identified nature of the data. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. The data that support the findings of this study are available from the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available.

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