



Changing the mindsets? Education and the intergenerational spread of tolerance for physical violence against women in Zimbabwe

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ABSTRACT

We investigate the relationship between childhood exposure to interparental violence and adult tolerance for violent beliefs against women. For individuals who have witnessed parental violence in childhood, our analysis suggests a 14.3–15.2 percentage point (pp) increase in tolerance, highlighting the transmission of violent beliefs across generations. Leveraging Zimbabwe's 1980 education reform as a natural experiment through a regression discontinuity design, we explore the potential of increased education to disrupt this intergenerational transmission. The reform led to an approximately two-year increase in female education, with a more pronounced impact in rural areas. This educational boost is associated with an estimated 4.1–7.9 pp reduction in tolerance for violence, especially among those who witnessed parental violence in childhood. We identify four primary mechanisms contributing to this reduction in tolerance: enhanced access to information, increased help-seeking behaviours, improved labour market outcomes, and higher educational levels among partners. Our findings underscore the effectiveness of educational policies in reducing tolerance for violence against women within low-income contexts such as Zimbabwe, thereby disrupting its intergenerational transmission. Moreover, these results emphasise the potential of education-based interventions in addressing the broader issue of violence against women in low-income countries.

1. Introduction

Violence against women, specifically intimate partner violence (IPV), is a pervasive and corrosive societal issue shaped by a complex interplay of individual, relational, and societal factors. These factors include, but are not limited to, economic conditions, social norms, and individual psychological traits. This grave violation of human rights also poses a significant obstacle to achieving the Sustainable Development Goals (SDGs) (United Nations Development Programme, 2022). According to the World Health Organization (WHO), one in every three women worldwide has experienced some form of physical or sexual assault (Sardinha et al., 2022). The situation worsens in Africa, where more than one in every three women is affected (World Health Organization, 2021).

While some economic literature has explored the influence of institutional and economic factors such as employment, wages, and laws on IPV (Aizer, 2010; Akyol and Kırdar, 2022; Anderberg et al., 2015; Arenas-Arroyo et al., 2021; Buller et al., 2018; Erten and Keskin, 2018; Farmer and Tiefenthaler, 1997), the domain remains largely

underexplored, especially regarding the role of societal attitudes towards violence. Yet, despite the pressing nature of this issue and its complex, multifaceted determinants, scant attention has been paid to the role of societal attitudes in perpetuating violence, especially among women who have witnessed interparental violence during their formative years. Given the critical influence these factors can have on both individual and societal health, our study seeks to understand how education can act as a transformative lever to break the potential cycle of intergenerational tolerance for violence against women.

Attitudes toward violence against women play a pivotal role in shaping both the prevalence and acceptance of IPV, making it an urgent focus of academic enquiry. These deeply ingrained perspectives often act as both a catalyst for and a consequence of violence, creating a cycle that is challenging to break. Research underscores the alarming impact of this tolerance for violence in Africa, increasing the likelihood of violence against women by a staggering 45 percent (Cools and Kotsadam, 2017; Klugman et al., 2014). This heightened risk, coupled with the fact that women who witnessed interparental violence during childhood are 2.5 times more likely to experience IPV than those who

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did not witness parental violence (Klugman et al., 2014), plays a central role in shaping societal norms that, in turn, influence the incidence of IPV in multifaceted ways. First, these attitudes, held by both women and men, contribute to the creation of a social environment that either discourages or emboldens individuals prone to violence (Sardinha et al., 2022). Second, these deeply rooted perspectives can significantly influence women's ability to recognise and avoid potentially violent partners, thereby governing the dynamics of relationship formation and the likelihood of violence therein. Lastly, these ingrained viewpoints can dictate how much women, their families, and their communities proactively respond to IPV. A high tolerance for violence could reduce the likelihood of proactive interventions, such as reporting to authorities or seeking community support, thereby perpetuating the cycle of violence. Conversely, a societal shift toward non-tolerance could empower women to respond more effectively to acts of violence, contributing to its reduction. A prevailing tolerance for violence stifles preventive interventions, such as reporting to authorities or mobilising community support, thereby perpetuating the cycle of violence.

In this paper, we investigate whether increased education can effectively interrupt the intergenerational transmission of tolerance for violence against women in a low-income country where such abuse is prevalently accepted. Drawing from the health economics literature, we focus on two broad potential mechanisms that significantly influence decision-making and societal norms. First, education makes it easier for individuals to understand the broader economic and health-related consequences of violence against women (Grossman, 2006). This enhanced understanding leads to better choices in how people spend their time, effort, or money to mitigate these detrimental norms. Second, education makes people better at dealing with the issue of the violence itself. It equips them with the tools to challenge and change deeply ingrained patriarchal beliefs and cultural practices that endorse violence against women (Grossman, 2006). In other words, educated individuals are not only exposed to a diverse array of narratives that counter the normalisation of violence but are also better equipped to critically evaluate and internalise these perspectives (De Walque, 2007; Foster and Rosenzweig, 2010).

Our contributions to the economics literature encompass three key dimensions. First, we use nationally representative cross-sectional data to investigate the association between childhood exposure to interparental violence and subsequent tolerance for violent beliefs against women in adult relationships. This enquiry sheds light on the intergenerational transmission of tolerance for such attitudes. Second, we investigate whether expanded access to secondary education can disrupt this intergenerational transmission of tolerance for violent attitudes towards women. To achieve this, we employ a regression discontinuity (RD) design and leverage Zimbabwe's 1980 education reform as a natural experiment to examine the causal impact of education on the intergenerational transmission of tolerance for abuse toward women. Lastly, we delve into the potential mechanisms through which educational reform could disrupt the intergenerational transmission of tolerance for violent perspectives.

Our empirical strategy leverages a natural experiment created by Zimbabwe's 1980 education policy, which significantly increased access to secondary education. Before Zimbabwe gained its independence in 1980, the indigenous population faced numerous bottlenecks in their educational journeys, including limited grade progression and restricted transitions to secondary schools, among other systemic challenges. Post-independence educational reforms aimed to dismantle these longstanding barriers and ensure equitable access to education for all, irrespective of race, beliefs, or socioeconomic background. A vital feature of this policy is its age-specific design. During the implementation of this reform, children around the age of entering secondary school (i.e., 13 or younger) were more likely to benefit from increased access compared to those slightly older who may have missed this window of opportunity (Agüero and Ramachandran, 2010). Central to our investigation is the proposition that Zimbabwe's 1980 education reform, which

significantly increased educational access, may have disrupted the intergenerational cycle of tolerating physical violence against women. This hypothesis hinges on the understanding that, to the best of our knowledge, other concurrent societal changes did not exhibit an age-specific impact comparable to that of the educational policy. Accordingly, our study employs an RD design to leverage the age-dependent effects of this reform. The aim is to rigorously evaluate whether the increased access to education in Zimbabwe has been instrumental in reducing the acceptance of violence against women across generations.

Using three waves of the nationally representative Demographic and Health Survey (DHS) for Zimbabwe, collected in 2005/2006, 2010/2011, and 2015, we observe that school reform led to an increase in schooling among women by approximately 2.40 years. On average, individuals in rural areas experienced an extra 2.87 years of learning compared to their urban counterparts. Our findings present compelling evidence supporting the notion that exposure to parental violence in childhood significantly increases an individual's tolerance for violence against women. Through a series of robustness analyses, we establish that additional years of schooling are a mitigating factor in this intergenerational transmission of tolerance for violence against women. The reform is notably effective, reducing tolerance for violence by an estimated 4.1–7.9 percentage points, especially among those who have witnessed parental violence. We also reveal heterogenous effects by place of residence and household asset wealth category. Furthermore, we identify four principal mechanisms that explain how education disrupts this tolerance: improved access to information, enhanced help-seeking behaviours, favourable labour market or economic outcomes, and elevated educational levels of partners.

The remainder of this paper is organised as follows. Section 2 provides a brief review of the related literature; Section 3 provides the context and overview of the 1980 school reform in Zimbabwe; Section 4 describes the data and empirical strategy; Section 5 provides the results; Section 6 discusses the potential mechanisms, followed by a discussion of the results in Section 7, and finally, Section 8 concludes.

2. Related literature

Intimate partner violence (IPV) is a complex issue influenced by a myriad of factors, including economic conditions, social norms, and individual psychological traits. Our research focuses on a critical aspect of this issue: societal attitudes towards violence against women. The intersection of economics and behavioural sciences reveals that exposure to interparental violence during childhood has lasting implications. It affects not only psychological well-being but also academic performance and behaviour among peer groups (Carrell and Hoekstra, 2010). These early experiences serve as conduits for transmitting generational patterns that influence societal dynamics and resource allocation. Addressing these patterns is particularly crucial in regions like Africa, where the acceptance of violence against women is alarmingly widespread (Klugman et al., 2014). While psychological studies acknowledge education as a potential disruptor of the intergenerational transmission of disadvantage (Andersen et al., 2021; Black et al., 2010), they often fail to establish a causal link. Adding to this, current research has not explicitly focused on the role of education in changing attitudes towards violence against women across generations.

Our paper fills this gap in the existing economic literature by investigating the impact of education on the intergenerational transmission of attitudes toward violence. We focus on Zimbabwe, a low-income country where tolerance for violence against women is notably high. We argue that breaking this cycle is vital for uprooting deeply entrenched norms, fostering a healthier societal ethos, and ultimately reducing violence against women across generations. The profound impacts of witnessing parental violence are well-documented across disciplines, from psychology to psychiatry and social work (Fehringer and Hindin, 2009; Forke et al., 2019). Drawing on the social

learning theory model of marital violence, researchers posit that familial environments can inadvertently ‘teach’ acceptance of violence, much like market forces shape economic consumer behaviours (Mihalic and Elliott, 1997). Extensive studies indicate that witnessing parental violence as children predisposes individuals to accept or perpetrate violent acts in adulthood (Klugman et al., 2014; Murshid and Murshid, 2018; Widom and Wilson, 2015). This evidence underscores the cyclical nature of violence within families, as families pass down violence-related beliefs across generations. To effectively tackle violence against women, it is crucial to address its root causes rather than merely its symptoms. This perspective calls for a preventive strategy that concentrates on the underlying factors driving such behaviours instead of focusing exclusively on the behaviours themselves.

While much of the economic literature has probed the relationship between education and IPV, yielding mixed findings (Akyol and Kırdar, 2022; Erten and Keskin, 2018, 2022; Weitzman, 2018), there remains a conspicuous gap in understanding education’s role in the intergenerational transmission of violence or acceptance of violent beliefs, particularly in low-income countries. Additionally, the broader implications of violence in Zimbabwean society are multifaceted, influencing not only norms and behaviours but also health outcomes. Shemyakina (2021) investigates the health repercussions of political violence on children in Zimbabwe, highlighting how incidents from 2000 to 2005 led to measurable declines in child height-for-age z-scores. Such work complements the urgency to study violence through various societal lenses, as it suggests that the impact of violence extends beyond immediate social behaviours to more long-term and insidious effects like poor child health outcomes.

Furthermore, the mechanisms that facilitate the intergenerational transmission of abuse against women are not fully understood (Agüero et al., 2022). Early models, such as Pollak (2004), highlight how witnessing violence shapes behaviours that can persist across generations. These models suggest that education could play a transformative role in disrupting this cycle. Support for this idea comes from Erten and Keskin (2020), who emphasise the critical role of maternal education in Turkey in reducing child abuse, particularly among mothers who experienced abuse in their childhoods. Other studies also underscore the transformative potential of education in reshaping societal norms and behaviours, indicating that robust educational interventions could be particularly effective for women (Jewkes et al., 2015; Rivera-Garrido, 2022). However, the influence of education is likely to differ across cultures, underscoring the importance of regional studies, such as those conducted in Turkey and Uganda (Bukuluki et al., 2021; Erten and Keskin, 2020).

Our research significantly contributes to the growing body of economic literature examining the causal relationship between education and the intergenerational transmission of violence. We offer the first robust economic evidence exploring the impact of education on the cycle of tolerance for violence against women, focusing specifically on Zimbabwe. In this low-income country, such violent beliefs are notably prevalent. The intricate nature of this intergenerational issue is further illuminated by a study from Hoehn-Velasco et al. (2021), which investigated the effects of COVID-19 stay-at-home orders on crimes against women in Mexico. Their research reveals a fascinating yet troubling pattern: such crimes decreased during lockdown but resurged to pre-pandemic levels once restrictions were lifted. This temporal fluctuation underscores the limitation of short-term interventions, pointing to the need for more enduring solutions like educational reforms to address the root causes of violence against women. Additionally, we delve into the potential mechanisms through which educational interventions could disrupt this vicious cycle. Our study complements and diverges from related empirical works that explore the impact of education on maternal health outcomes in sub-Saharan Africa (SSA) (for example, (Aguero and Bharadwaj, 2014; Behrman, 2015; Duflo et al., 2015; Makate and Nyamuranga, 2023)). While these studies similarly employ robust methodologies to uncover the causal effects of education, our

study distinctively investigates the mediating role of education. Specifically, we examine how educational reforms can serve as a pivotal tool in reversing the culturally entrenched cycle of tolerance for violence against women in Zimbabwe.

3. Context and overview of the 1980 school reform in Zimbabwe

Before 1980, the education system was marked by inequalities in access to learning and grade progression for black children, who had to pay for their education while white children received it for free. No black children were permitted to enrol in white-only schools, also known as “group A” schools in white-only zones (Zindi, 1996). Although white Europeans were a minority (less than 1% of the populace), funding for white education was more than ten times greater than funding for children from the rest of the populace (Dorsey et al., 1991). Given the stark educational disparities, the new government led by Robert Gabriel Mugabe, elected following the country’s independence from Britain in 1980, vowed to reverse the predominantly pro-white education policy.

The government’s initiatives to provide free education, eliminate restrictions, introduce vocational subjects, build schools in underserved areas, and train more teachers significantly increased primary and secondary school enrolment rates. According to Makate and Nyamuranga (2023), secondary school enrolment rates rose the most, possibly due to eliminating bottlenecks that had previously made it difficult for black students to advance to secondary education. Primary school enrolment increased rapidly, from approximately 800,000 in 1980 to slightly more than 2 million in 1987 to approximately 2.5 million in 1997 (Makate and Nyamuranga, 2023). Secondary school enrolment increased from 74,000 in 1980 to 700,000 in 1991. According to Makate and Nyamuranga (2023), the most notable changes in enrolment rates happened at the secondary level, where enrolment rates increased nine times from 1980 to 1990. Increased enrolment necessitated the construction of more classrooms and the hiring of more teachers. Adult literacy groups were also established to allow older children who might struggle to attend classes during the day to attend classes at night instead (Zindi, 1996), contributing to increased enrolment.

In Zimbabwe, children start their educational journey at six, beginning a seven-year primary school curriculum. Typically, those who progress through primary education without delay enter secondary school at around 13. This secondary education phase lasts four years, followed by two years of advanced-level studies. After completing these advanced studies, students can apply for university admission.

4. Data and methods

4.1. Data source

For the empirical analysis, we use the individual women’s data files from the standard demographic and health survey (DHS) conducted by the MEASURE DHS Project. We access this data through the Integrate Public Use Microdata Series (IPUMS) platform. Our analysis uses the three most recent individual women data files for Zimbabwe collected in 2005–2006, 2010–2011, and 2015 in which the domestic violence module was administered (Central Statistical Office [Zimbabwe] and Macro International Inc., 2006; Zimbabwe National Statistics Agency and ICF International, 2011, 2015). The DHS are nationally representative surveys conducted in over 90 developing countries, including Zimbabwe, and a trusted source for comprehensive demographic and health information on women and children, including household asset ownership, completed schooling, domestic violence, attitudes towards domestic violence, birth history and other household-level characteristics. In Zimbabwe, this survey is conducted in over 10,000 households and targets women aged between 15 and 49. The survey employs a two-stage cluster sampling approach in which the 2002 and 2012 Zimbabwe population censuses serve as the sampling frames for the

respective DHS surveys. A representative woman from each family was randomly selected and interviewed when their partner or husband was away with an assurance of confidentiality of their answers. A further description of the sampling approach can be accessed here (Zimbabwe National Statistics Agency and ICF International, 2015). For this analysis, we utilise data from the domestic violence module, specifically focusing on women selected for this module. The sample weights have been adjusted for pooling across multiple cross-sectional surveys and selection into the domestic violence module.

Table 1 provides survey-weighted summary statistics for selected variables in the analysis and uses a sample of women aged between 4 and 25 years in 1980. On average, women who witnessed parental violence in childhood have completed fewer years of schooling than their counterparts who never witnessed parental abuse as children. The secondary school completion rate is higher among women who never witnessed parental violence (51% vs 46%), with the difference being statistically significant at the 1% level. On average, women who never witnessed parental abuse get married around the age of 20 years compared to 19 years among those who witnessed parental violence. The average household size, number of children under five, employment rates in agriculture, marital status and the proportion living in urban areas are all comparable and not significantly different between the two groups. Individuals who witnessed parental violence are, on average, more likely to be in polygamous relationships (27% vs 21%).

4.2. Empirical approach

4.2.1. Witnessing parental violence and the tolerance of violent beliefs

To explore the association between witnessing parental violence in childhood and subsequent tolerance for violent behaviours towards women, we employ the following empirical model:

$$\text{AttVaW}_i = \beta_0 + \beta_1 \text{WitParV}_i + \delta X'_i + \varepsilon_i \quad (1)$$

where AttVaW_i measures individual i 's attitudes (tolerance) towards violence against women (AttVaW_i), WitParV is a dummy indicator that takes one if the respondent saw her own mother physically assaulted by her father while growing up as a child and zero otherwise. In this instance, the coefficient of interest β_1 , measures the acceptance of violent tendencies against women among individuals who witnessed parental violence, reflecting the intergenerational transmission of violent beliefs. We use several variables to assess attitudes towards domestic violence, including whether the woman believes that her husband or partner is entitled to beating her if she argues with him, burns food, goes out without telling him, declines to have sex, and neglects the children. We assigned a code of one if the respondent believes that it is acceptable for the husband or partner to beat her in any of the five circumstances and zero otherwise. Following Erten and Keskin (2020), we constructed a summary score that reflects a person's acceptance of violent tendencies towards women. This score is derived from the average of the z-scores of five indicators capturing various facets of attitudes towards domestic violence. Combining these indicators creates a composite score that is statistically superior to a simple additive score. Higher values of the composite score indicate a stronger inclination towards accepting domestic violence beliefs. The vector X'_i includes several controls associated with attitudes towards physical violence, including the age difference between partners or married couples, place of residence (urban or rural), year of birth fixed effects, religion, month and year of birth fixed effects, year of survey fixed effects, and region fixed effects (Erten and Keskin, 2020; Flood and Pease, 2009). The parameter ε_i is an idiosyncratic error term.

Witnessing parental abuse is based on a retrospective question in which a respondent was asked to recall if she had ever witnessed her father hit her mother at any point during her childhood. For our analysis, we follow Erten and Keskin (2020) and assume that witnessing parental violence is exogenous. In the DHS data, the exact point in time

when witnessing parental violence occurred is not known. Also, observing parental abuse in the family is usually a child's first exposure to violence which is an exogenous and random shock over which any child is susceptible and has no control over (Mihalic and Elliott, 1997).

4.2.2. Education and tolerance for physical violence beliefs

To investigate the effect of education on tolerance for physical violence against women, we follow previous related research and adopt an RD design. Apart from their exposure to the policy reform, we assume that no systematic differences exist between the cohort of individuals aged 13 years and younger (that is, those within secondary school starting age) at the time of the school reform in Zimbabwe in 1980 and the cohort of individuals aged 16 years and older at the time. In this case, assignment to the exposed cohort is equivalent to random assignment if the identifying assumption is correct. This approach has been employed in related studies and uses age-specific exposure to school reform as the identifying instrument for educational attainment (Aguero and Bhargava, 2014; Makate and Makate, 2018; Makate and Nyamuranga, 2023). The model's identification assumes that potential outcome distributions remain consistent or are smooth around the discontinuity point.¹ Following Makate and Nyamuranga (2023) and related literature in low-income countries, our empirical model takes a basic RD formulation of the form:

$$\text{AttVaW}_i = \alpha + \beta \text{educref}_i + f(a80_i) + \gamma X_i + \varepsilon_i \forall a80_i \in (c - h, c + h), \quad (2)$$

where educref_i is a dummy indicator representing exposure to the 1980 education reform and takes one if the respondent was aged 13 years and younger in 1980 (exposed) and zero otherwise; $a80_i$ is the respondent's age in 1980 and is our running variable calculated as the difference between the respondent's month-year of birth and the month-year of the school reform (January 1980). The parameter h is the bandwidth around the age cut-off point at c . We allow flexibility in the gradient to differ from above or below the age 13 cut-off by including the pre-policy and post-policy time trends. The vector X_i includes predetermined characteristics including the age difference between couples, indicators for the number of children under age five, dummy for the respondent's height below the average height of women in the cluster, survey month fixed effects, region fixed effects and region-birth year fixed effects. Finally, $f(a80_i)$ is a control function expressed as a linear function of the individual's age in 1980. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple waves and the inclusion in the domestic violence module.

4.2.3. Education and the intergenerational transmission of physical violence beliefs

After quantifying the intergenerational transmission of tolerance for violence against women, our next step is to delve into the possible influence of educational reforms on these attitudes. Specifically, we investigate whether the school reform that increased secondary school opportunities for children in Zimbabwe had differential impacts on the attitudes of those who witnessed parental abuse in their childhood than those who did not. We adopt an RD design model to address this question, similar to the approach described in Erten and Keskin (2020). The RD model we estimate takes the following form:

$$\text{AttVaW}_i = \beta'_0 + \beta'_1 \text{WitParV}_i + \beta'_2 \text{educref}_i + \beta'_3 (\text{WitParV}_i \times \text{educref}_i) + \dots$$

¹ In our preferred model specification, we exclude individuals aged 14 and 15 in 1980 since they are thought to have experienced partial exposure to the school reform. This approach mirrors past studies that employed a similar identification strategy using the 1980 school reform in Zimbabwe, though in varied contexts. Nonetheless, our primary findings remain consistent even when incorporating these individuals as well as to several alternative bandwidths.

Table 1
Weighted summary statistics for women who were aged 4–25 years in 1980.

	N	Overall sample	N	Witnessed parental violence in childhood	N	Did not witness parental violence in childhood	Difference
Age at survey date	5689	38.87	5689	38.89	3753	38.86	-0.03
Years of completed schooling	5688	7.88	5688	7.46	3753	8.10	0.64***
Completed secondary school	5689	0.50	5689	0.46	3753	0.51	0.06***
Completed higher education	5689	0.05	5689	0.04	3753	0.06	0.02***
Not employed	5689	0.47	5689	0.45	3753	0.48	0.03
Employed in agriculture	5689	0.16	5689	0.16	3753	0.15	-0.01
Age at first marriage	5530	19.81	5530	19.40	3625	20.02	0.62***
Divorced	5689	0.06	5689	0.06	3753	0.05	-0.00
Separated	5689	0.04	5689	0.04	3753	0.04	-0.00
Household size	5689	4.93	5689	4.93	3753	4.93	0.00
Number of children under five	5689	0.76	5689	0.74	3753	0.77	0.03
Witnessed parental physical violence as a child	5689	0.34					
Overall physical violence attitudes score	5689	0.96	1936	1.15	3753	0.86	-0.29***
Respondent believes that a husband is justified in beating her if she:							
Argues with him	5689	0.19	1936	0.23	3753	0.17	-0.06***
Burns food	5689	0.09	1936	0.11	3753	0.08	-0.03***
Goes out without telling him	5689	0.24	1936	0.30	3753	0.21	-0.08***
Refuses sexual intercourse	5689	0.20	1936	0.25	3753	0.18	-0.07***
Neglects the children	5689	0.23	1936	0.26	3753	0.21	-0.05***
Partner							
Partner completed secondary school	5689	0.49	1936	0.49	3753	0.49	0.00
Partner employed in professional services	5689	0.20	1936	0.17	3753	0.21	0.04***
Partner employed in agriculture	5689	0.19	1936	0.21	3753	0.18	-0.04**
Asset quintile 1 (poorest)	5689	0.20	1936	0.20	3753	0.20	-0.00
Asset quintile 2	5689	0.18	1936	0.20	3753	0.17	-0.03*
Asset quintile 3	5689	0.19	1936	0.20	3753	0.18	-0.02
Asset quintile 4	5689	0.22	1936	0.21	3753	0.22	0.02
Asset quintile 5 (richest)	5689	0.21	1936	0.19	3753	0.22	0.03*
Polygamous relationship	5689	0.23	1936	0.27	3753	0.21	-0.06***
Frequently read newspapers/magazines	5688	0.25	1936	0.23	3752	0.27	0.04**
Urban resident	5689	0.33	1936	0.32	3753	0.34	0.02

Notes: The table presents the survey-weighted estimates and number of observations for women who were aged between 4 and 25 years in 1980 and stratified by whether they had witnessed parental violence during childhood or not. The last column reports the difference between the means for individuals who had not witnessed parental violence compared to those who had witnessed parental violence. ***, **, * denote statistical significance at the 1%, 5%, and 10%, respectively. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

$$+f(a80_i) + \delta'X_i + e_i \forall a80_i \in (c - h, c + h), \tag{3}$$

where β_2 captures the impact of the school reform on attitudes towards violence against women, β_3 measures how exposure to school reform affected individuals who witnessed parental violence as children. Additionally, our model includes linear slopes on either sides of the age 13 cut-off, capturing pre- and post-policy trends, age difference between partners, indicator for below-average height, fixed effects for month of interview, region, and region-birth year interactions. For our estimation, we used a parametric approach aligned with Akyol and Kirdar (2022), employing several alternative bandwidths. We initiate this process with a 12-year bandwidth on each side of the cut-off, methodically narrowing it down in smaller increments to 6 years. While we present results from selected bandwidths within the noted range, our supplementary analysis shows that our main estimates are robust even with alternative bandwidths as low as three years on either side of the cut-off point. In our analysis, the running variable is the respondent’s age in 1980, determined by their month and year of birth relative to the month and year of the reform. Given the limited data points available on either side of the cut-off, we opt for lower-order polynomials, in line with the recommendations of Gelman and Imbens (2019). We cluster our standard errors at the month-year of birth level, adhering to the approach suggested by Lee and Card (2008). Additionally, we explore an alternative

two-way clustering at the region-age cohort level in 1980, as proposed by Agüero and Bharadwaj (2014) ².

4.3. Preliminary testing

Following the applied econometrics literature, we assess the key identifying assumption that stipulates that the outcome variable is smooth around the cut-off (Imbens and Lemieux, 2008). While we cannot directly test this assumption, we follow the previous econometrics literature and perform standard validations. These include (a) ensuring continuity of the running variable around the discontinuity or cut-off point, (b) verifying that no treatment effects exist on pre-treatment covariates, and (c) confirming no treatment impacts at fictitious or placebo cut-off points. First, we consider whether the density distribution of the running variable (respondent’s age in 1980) exhibits any discontinuities at the cut-off point. To this end, we perform the density check on the distribution of the running variable as suggested by McCrary (McCrary, 2008). This test does not reveal any evidence of manipulation in the running variable as depicted in Figure A1. The density distribution of the respondent’s age in 1980 is continuous around the age 13 threshold. Thus, we are confident that selection into the treatment cohort is not an issue of concern. We also provide the histogram of the running variable in Figure A2 which shows a smooth distribution of the respondent’s age in 1980 around the discontinuity

² We employ the age-region cluster to factor in the possible variations in the intensity of school building across the nation’s ten regions or provinces. This dual clustering accounts for the age-driven spatial correlations throughout the different regions or provinces, as discussed by Agüero and Bharadwaj (2014).

point.

Second, we examine the absence of a jump in the other covariates within the neighbourhood of the cut-off point. In supplementary appendix Figures A3 and A4 provide local means of each outcome in one-month bins plotted against the running variable. As the graphs show, there are no obvious discontinuities in these predetermined variables at the cut-off point. Additionally, in Table A1, we quantify the magnitudes of the jumps, or the RD treatment effects, alongside their p-values for all the pre-determined covariates. The majority of the pre-determined variables exhibit a good balance around the discontinuity point except for a select few showing statistical significance at the 10% level in alternative bandwidths.

Third, we performed placebo experiments in which we simulated the school reform taking place in 1974, 1975, 1976, or 1977, three to six years prior to the actual implementation. We might be concerned that exposure to the school reform may be picking up on other structural changes correlated with attitudes towards violence against women besides the 1980 school reform. Thus, it is probable that the discontinuity observed at age 13 in 1980 could have been observed in a fictitious reform year before 1980, rendering our conclusions invalid. The results for these checks are presented as supplementary materials. The coefficients for the placebo reform, as well as the interaction between the placebo reform indicator and witnessing parental violence, all showed statistical insignificance, lending credence to the robustness of our primary estimates.

5. Results

5.1. School reform and educational attainment

Fig. 1 plots the RD treatment effects of Zimbabwe’s 1980 school reform on the educational attainment of women in month-of-birth bins around the discontinuity point. The discontinuity point, indicated by the dotted vertical line, centres on individuals born in 1967 who were 13 years old in 1980. We present localised averages for the distribution of completed years of schooling and secondary school completion rates, plotted against the respondent’s age in 1980. Using pooled data from 2005/2006, 2010/2011, and 2015 DHS surveys for Zimbabwe, Fig. 1 highlights a significant discontinuity in both years of schooling and secondary school completion rates. Notably, the findings reveal that women aged 13 and younger at the time of Zimbabwe’s school reform have, on average, attained higher levels of education, both generally and at the secondary level, compared to their counterparts who were older than 13 in 1980. The distribution of educational attainment highlights the impact of this policy on educational outcomes for Zimbabwean women.

Table 2 displays the estimates from the RD models on the impact of school reform on educational attainment for women interviewed in 2005/2006, 2010/2011, and 2015 Zimbabwe DHS using several alternative bandwidths around the age cut-off. The results presented here are generated using several bandwidths: 12, 10, 9, 8, and 6 years on either side of the cut-off, and they are further differentiated for both rural and urban sub-samples. The results for the urban and rural sub-samples are generated using the sample of women aged 5–24 years in 1980 (i.e.,

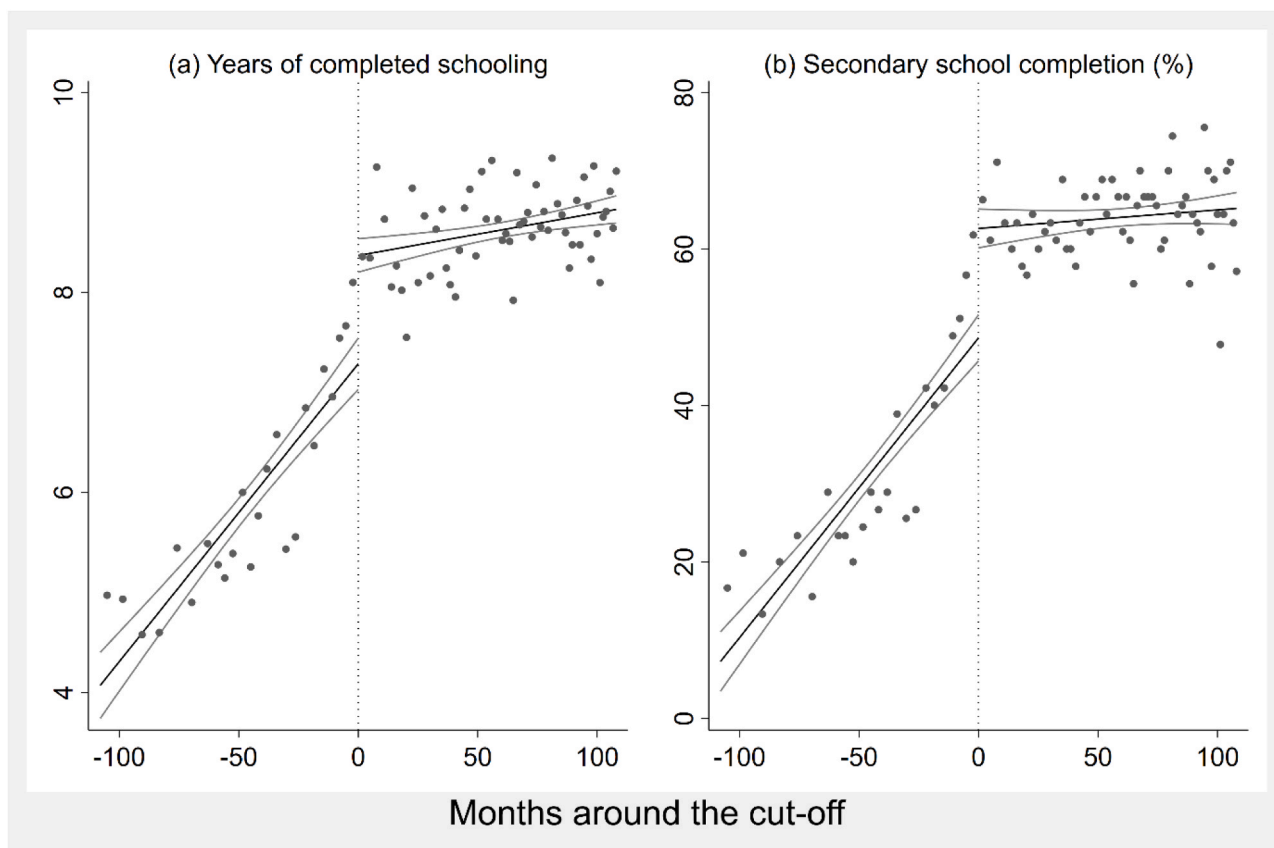


Fig. 1. The RD treatment effect of the 1980 school reform on female educational attainment in Zimbabwe. The panels provide plots of the average educational attainment in monthly bins against the month-year of birth of being born in 1967. The point of discontinuity is centred on individuals born in 1967 – those who were 13 years old at the time of the school reform in 1980. The x-axis measures the number of months relative to this pivotal year when the respondent was 13 years old. Grey lines represent the 95% confidence intervals. The complete definitions of the variables of interest are provided in appendix. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

Table 2
Regression discontinuity treatment effects of school reform on schooling outcomes of women.

	Number of years on either side of the cut-off point										Rural	Urban	
	12	10	9	8	6								
Years of completed schooling													
Exposure to school reform	2.436*** (0.094)	2.401*** (0.079)	2.371*** (0.080)	2.329*** (0.136)	2.146*** (0.112)	2.870*** (0.150)	0.735*** (0.098)						
Mean of the dependent variable	8.050	7.894	7.796	7.714	7.421	6.882	9.636						
Pre-policy trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Post-policy trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Survey month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Observations	6831	5685	5096	4411	3393	3423	1673						
Completed secondary school													
Exposure to school reform	0.284*** (0.012)	0.291*** (0.015)	0.287*** (0.021)	0.279*** (0.025)	0.262*** (0.031)	0.319*** (0.032)	0.180*** (0.011)						
Mean of the dependent variable	0.568	0.548	0.538	0.532	0.499	0.418	0.780						
Pre-policy trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Post-policy trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Survey month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Observations	6831	5685	5096	4411	3393	3423	1673						

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The estimates in the rural and urban columns are derived from analyses conducted with the defined sample of women who were aged 5–24 years in 1980 (i.e., bandwidth of 9 years on either side of the cut-off). Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. We excluded individuals who were partially exposed to the school reform, especially those aged 14–15 in 1980, in line with previous studies that employed the same identification strategy. All regressions also include the following variables as additional controls: pre-policy and post-policy trends, survey fixed effects and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

bandwidth of 9 years on either side of the cut-off). The results indicate that the school reform led to an additional 2.401 years of schooling, representing an approximate increase of 30.47% compared to the sample average for women in our analysis. When using alternative bandwidths, the results vary: from 2.146 (with a 6-year bandwidth on either side of the cut-off) to 2.436 (with a 12-year bandwidth on either side of the cut-off). The results across the various bandwidths remain statistically significant at the 1% level. The reform had a particularly pronounced influence on women in rural areas, with an impact of 2.870, representing an estimated 36.65% increase compared to the overall average years of completed schooling. Additionally, the school reform significantly enhanced the chances of completing secondary education. Among the rural sample, the probability of finishing secondary school was considerably higher at 0.319 than the urban sample with 0.180 and was statistically significant at the 1% level. For added robustness, we also provide results considering bandwidth sizes of 11, 7, 5, and 3 years on either side of the cut-off, as well as results from low and high asset wealth sub-samples (Table A3). Our primary estimates remain strongly robust, even to several alternative bandwidths that we had not reported in the main analysis, and to both low and high asset wealth sub-samples. Specifically, our data shows that women living in the lowest asset wealth quintiles acquired an additional 2.68 years of schooling compared to their higher asset wealth counterparts, who averaged an additional 1.22

years. All these findings are statistically significant at the 1% level.

5.2. Witnessing parental violence, attitudes, and violence against women

The results presented in Table 3, generated using Eq. (1), provide compelling evidence of the intergenerational transmission of tolerance for violence against women. This intergenerational effect manifests in two key dimensions: first, it catalyses normative acceptance of violent behaviours, and second, it fosters the direct witnessing of such acts within the family context. In the overall sample, the coefficients indicate that witnessing parental violence yields a substantial increase in the index measuring tolerance for violence by 11 percentage points (pp) ($p < 0.01$). Witnessing interparental violence is also significantly associated with an increased probability of experiencing physical violence (12.1 pp, $p < 0.01$), sexual violence (13.1 pp, $p < 0.01$), and financial control (8.4 pp, $p < 0.01$). Witnessing parental violence is significantly associated with greater acceptance of beliefs that justify violence in specific circumstances, such as arguing with a partner (12.3 pp, $p < 0.01$), burning food (8.8 pp, $p < 0.01$), leaving the house without telling him (12.6 pp, $p < 0.01$), refusal of sexual intercourse (11.3 pp, $p < 0.01$), and neglecting children (10.1 pp, $p < 0.01$). These effects are more pronounced in rural areas than urban areas and the sub-sample of women from low asset wealth families compared to their counterparts

Table 3
Effects of witnessing parental violence on women’s tolerance and experience of violence.

	Tolerance for violence index	Respondent believes partner violence is justifiable in the following circumstances:					Spousal violence		
		Argues with him	Burns the food	Goes out without telling him	Refuses sexual intercourse	Neglects the children	Physical violence index	Sexual violence index	Financial control index
Overall sample									
Witnessed parental violence	0.110***	0.123***	0.088***	0.126***	0.113***	0.101***	0.121***	0.131***	0.084***
	(0.019)	(0.023)	(0.016)	(0.033)	(0.022)	(0.018)	(0.021)	(0.013)	(0.014)
Observations	20058	20058	20058	20058	20058	20058	16049	16050	10206
Urban sample									
Witnessed parental violence	0.077***	0.102**	0.050*	0.077*	0.082**	0.076***	0.139***	0.166***	0.067***
	(0.023)	(0.038)	(0.022)	(0.034)	(0.027)	(0.022)	(0.029)	(0.012)	(0.013)
Observations	7487	7487	7487	7487	7487	7487	5581	5582	3155
Rural sample									
Witnessed parental violence	0.125***	0.133***	0.106***	0.148***	0.126***	0.111***	0.112***	0.113***	0.093***
	(0.020)	(0.019)	(0.018)	(0.038)	(0.026)	(0.017)	(0.027)	(0.018)	(0.018)
Observations	12571	12571	12571	12571	12571	12571	10468	10468	7051
Low asset wealth sample									
Witnessed parental violence	0.119***	0.109***	0.108**	0.156***	0.124*	0.101***	0.111***	0.112***	0.133***
	(0.028)	(0.030)	(0.034)	(0.039)	(0.049)	(0.024)	(0.034)	(0.029)	(0.026)
Observations	7245	7245	7245	7245	7245	7245	6185	6185	4223
High asset wealth sample									
Witnessed parental violence	0.085***	0.119***	0.060**	0.076***	0.088***	0.079***	0.128***	0.130***	0.056
	(0.019)	(0.036)	(0.019)	(0.023)	(0.024)	(0.019)	(0.034)	(0.025)	(0.033)
Observations	9347	9347	9347	9347	9347	9347	7076	7077	4118
Survey month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the region level. All regressions include the following variables as additional controls: age difference of woman and her partner, number of children below age five in the household, whether respondent’s height is below the average height of women in her cluster, an indicator for being in a polygamous union, dummy for urban residence, survey month and year fixed effects and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

from high asset wealth families. For example, in the rural sub-sample, the coefficient for justifying violence when the woman neglects the children stands at 11.1 pp, as compared to 7.6 pp in the urban cohort. Regarding wealth-based differences, the low-asset wealth group shows a coefficient of 11.9 pp for the overall tolerance for violence compared to 8.5 pp in the high-asset wealth group. These findings underscore that both rural areas and economically disadvantaged groups exhibit stronger acceptance of violent norms, revealing their greater vulnerability to intergenerational transmission of tolerance for violence.

5.3. Education and tolerance for violence against women

Fig. 2 visualises the RD treatment effect on tolerance for violent tendencies against women. The figure illustrates local averages of tolerance for violence among females in month-of-birth bins centred around the cut-off point. While the graph reveals some discontinuity in acceptance of violence at the cut-off (panel a), the shift is not well pronounced. However, when we delve into individual indicators measuring attitudes towards violence, subtle jumps become evident around the cut-off for specific outcomes, notably in panel (c) and panel (e). Conversely, in panels (b), (d), and (f), even though a clear jump is

not discernible, a notable change in slope at the discontinuity point emerges, indicating a declining trend in overall acceptance of violent tendencies. While the graphs may not visibly demonstrate a direct and immediate impact, we contend that education is pivotal in altering attitudes towards violence. This role may not be immediately discernible from the figures but is particularly relevant among women who witnessed parental violence during their formative years. It is essential to recognise that graphical representations might not fully convey the depth and nuances of this relationship.

To better understand how education influences attitudes towards violence against women, we provide in Table 4 the regression results estimated using equation (2). We report estimates from OLS using years of completed education as the key independent variable, reduced-form RD treatment effects of exposure to school reform, and two-stage least squares (2SLS) using exposure to school reform as an instrumental variable for education. We ran three regression models for each of our six dependent variables (all standardised as z-scores) that indicate tolerance for violent tendencies against women. We only report the coefficient estimates from the key variables of interest for brevity. All regressions are weighted using sample probability weights and include controls for linear age slopes on either side of the cut-off, survey month

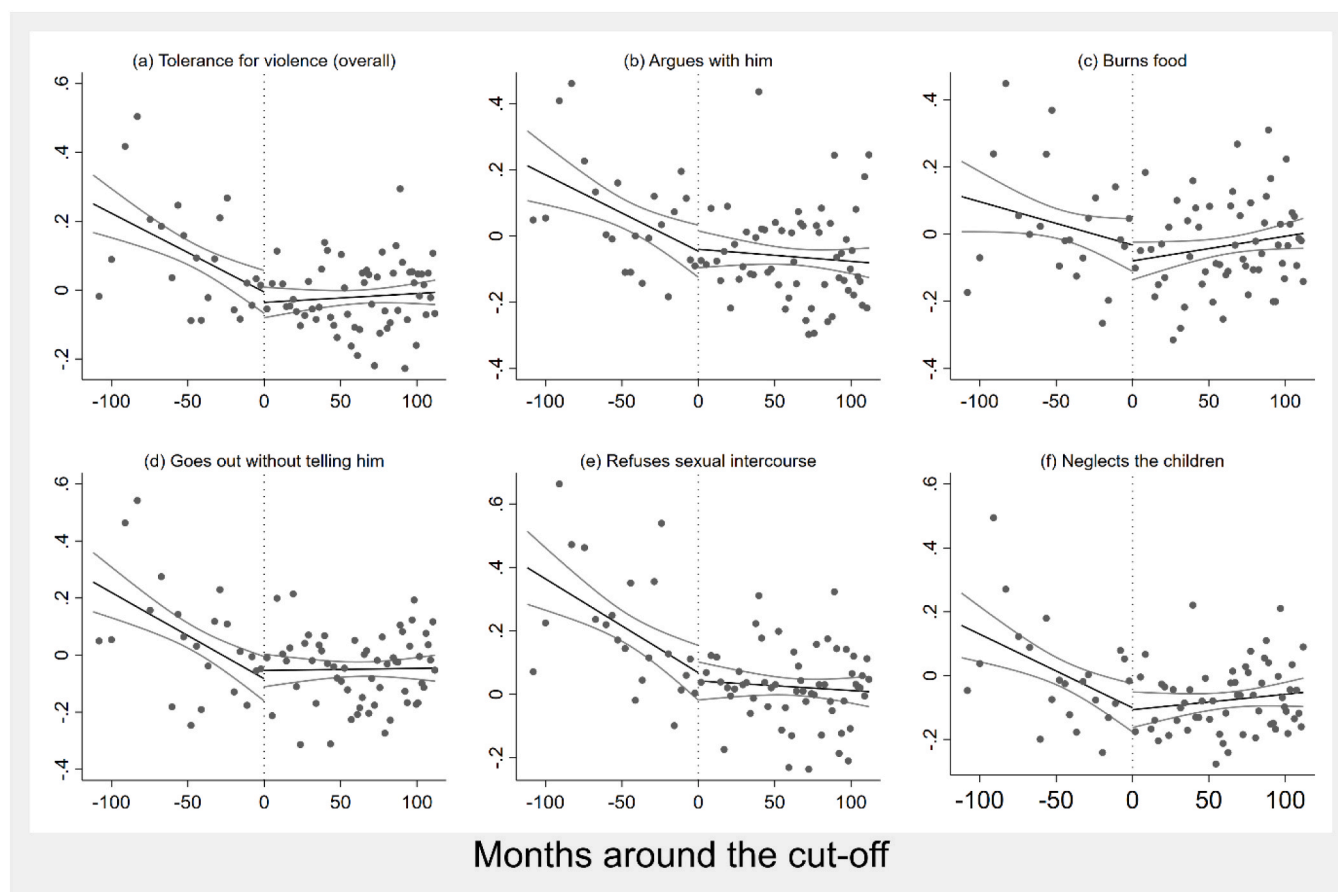


Fig. 2. The RD treatment effect of the 1980 school reform on tolerance for violent beliefs in Zimbabwe. Outcomes are expressed as z-scores (definitions are provided in the appendix). The panels provide plots of the average tolerance for violent beliefs in monthly bins against the month-year of birth of being born in 1967. The point of discontinuity is centred on individuals born in 1967 – those who were 13 years old at the time of the school reform in 1980. The x-axis measures the number of months relative to this pivotal year when the respondent was 13 years old. Grey lines represent the 95% confidence intervals. The complete definitions of the variables of interest are provided in appendix. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

fixed effects, region-birth year fixed effects, age difference between partners, and an indicator for whether the respondent's height was below the average height of women in her cluster.

In Panel A of Table 4, the dependent variable is an overall measure of tolerance for violence against women, which we construct by incorporating the various circumstances under which a woman believes that violence from her husband or partner is justified, as noted in Panels B-F. The OLS estimates consistently indicate a statistically significant negative correlation between years of schooling and the overall tolerance index for violence, with coefficients ranging from -0.043 to -0.046 . The RF estimates, which reflect the direct effects of exposure to school reform, show a similar pattern with slightly larger effects. They offer coefficients between -0.071 and -0.096 , indicating that exposure to school reform significantly decreased the tolerance for violent tendencies. The 2SLS estimates corroborate these findings and suggest that a one-year increase in schooling corresponds to an approximate 3.6–4.4 pp reduction in overall tolerance for violence against women, all statistically significant at the 1% level. Given the average tolerance level of violence in our analysis sample, the 3.6 pp to 4.4 pp decrease corresponds to an approximate 3.75–4.58% reduction in tolerance for violence against women. These results indicate that an increase in education is associated with reduced acceptance of violence in situations when the woman argues with her partner, burns food, goes out without notifying him, refuses sexual intercourse, or neglects the children.

Panel B in Table 4 reports the results from modelling the likelihood that a woman agrees that arguing with a partner justifies physical abuse. The OLS results demonstrate that increased education is inversely

related to this belief, supported by coefficients ranging from -0.043 to -0.047 , all significant at the 1% level. The RF model results, however, are statistically insignificant, except for estimates from the specification using bandwidths 12 and 10 years on either side of the cut-off, which show statistical significance. This observation suggests a rather weakly robust effect of school reform on this particular belief. The 2SLS estimates align with the RF estimates and indicate a negative but weaker effect, with coefficients ranging from -0.005 and -0.012 , displaying variations in statistical significance. The 2SLS model estimates also show statistical significance with bandwidths of 12 and 10 years. In Panel C, which examines burning food as a trigger for abuse, the OLS model consistently indicates that additional years of schooling are associated with reduced tolerance for violence, particularly in holding the belief that violence is justified when the woman burns food. Similarly, the RF model consistently shows that exposure to school reform is associated with reduced tolerance for violence in this specific context. The 2SLS results further reinforce this observation, with coefficients ranging from -0.058 to -0.078 . Notably, the estimates from the model using a bandwidth size of 12 are statistically insignificant, while estimates from other bandwidths show statistical significance.

Panel D of Table 4 presents the results for the outcome variable concerning the acceptability of physical abuse when a woman leaves the house without informing her partner. The OLS and RF models indicate a general decline in this belief with increased education or exposure to reform, although RF estimates vary. The 2SLS model shows mixed results. In the bandwidths 12–9, the results indicate that a one-year increase in schooling corresponds to an approximate 3.7 pp to 4.1 pp

Table 4
Effects of education on tolerance for violent tendencies against women.

	Model type	Number of years on either side of the age cut-off									
		12	10	9	8	6					
A. Tolerance for violence (overall score)											
Years of schooling	OLS	-0.044***	(0.003)	-0.044***	(0.003)	-0.045***	(0.004)	-0.046***	(0.005)	-0.043***	(0.005)
Exposure to school reform	RF	-0.082***	(0.020)	-0.096***	(0.024)	-0.091***	(0.023)	-0.083***	(0.018)	-0.071*	(0.018)
Years of schooling	2SLS	-0.036***	(0.010)	-0.044***	(0.012)	-0.042***	(0.012)	-0.039***	(0.010)	-0.036***	(0.010)
B. Argues with him											
Years of schooling	OLS	-0.045***	(0.001)	-0.044***	(0.001)	-0.045***	(0.002)	-0.047***	(0.004)	-0.043***	(0.004)
Exposure to school reform	RF	-0.011***	(0.002)	-0.025***	(0.001)	0.003*	(0.001)	0.002	(0.006)	-0.003	(0.015)
Years of schooling	2SLS	-0.005***	(0.001)	-0.012***	(0.001)	-0.000	(0.001)	0.001	(0.003)	-0.003	(0.008)
C. Burns food											
Years of schooling	OLS	-0.032***	(0.003)	-0.033***	(0.002)	-0.034***	(0.004)	-0.034***	(0.004)	-0.031***	(0.004)
Exposure to school reform	RF	-0.103*	(0.051)	-0.130*	(0.056)	-0.147**	(0.052)	-0.156***	(0.036)	-0.159***	(0.002)
Years of schooling	2SLS	-0.045	(0.024)	-0.058*	(0.027)	-0.066*	(0.026)	-0.073***	(0.019)	-0.078**	(0.024)
D. Goes out without telling him											
Years of schooling	OLS	-0.043***	(0.003)	-0.042***	(0.003)	-0.043***	(0.004)	-0.044***	(0.005)	-0.042***	(0.004)
Exposure to school reform	RF	-0.086***	(0.008)	-0.091***	(0.012)	-0.080***	(0.013)	-0.030	(0.020)	0.017	(0.030)
Years of schooling	2SLS	-0.038***	(0.004)	-0.041***	(0.007)	-0.037***	(0.007)	-0.015	(0.011)	0.007	(0.014)
E. Refuses sexual intercourse											
Years of schooling	OLS	-0.050***	(0.003)	-0.051***	(0.003)	-0.052***	(0.004)	-0.054***	(0.006)	-0.050***	(0.004)
Exposure to school reform	RF	-0.174***	(0.013)	-0.184***	(0.019)	-0.177***	(0.021)	-0.182***	(0.028)	-0.182***	(0.034)
Years of schooling	2SLS	-0.079***	(0.007)	-0.085***	(0.010)	-0.083***	(0.012)	-0.088***	(0.016)	-0.093***	(0.020)
F. Neglects the children											
Years of schooling	OLS	-0.040***	(0.003)	-0.043***	(0.003)	-0.045***	(0.004)	-0.046***	(0.005)	-0.044***	(0.005)
Exposure to school reform	RF	-0.037	(0.029)	-0.050	(0.030)	-0.054	(0.028)	-0.048***	(0.012)	-0.027***	(0.000)
Years of schooling	2SLS	-0.015	(0.013)	-0.021	(0.014)	-0.024	(0.013)	-0.020***	(0.005)	-0.013***	(0.001)
Survey month fixed effects	Yes		Yes		Yes		Yes		Yes		Yes
Region fixed effects	Yes		Yes		Yes		Yes		Yes		Yes
Observations		6831		5685		5096		4411		3393	

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. We excluded individuals who were partially exposed to the school reform, especially those aged 14–15 in 1980, in line with previous studies that employed the same identification strategy. All regressions also include the following variables as additional controls: pre-policy and post-policy trends, age difference of woman and her partner, number of children below age five in the household, whether respondent’s height is below the average height of women in her cluster, survey fixed effects and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

reduction in acceptance of violence in the instance when the woman leaves the house without notifying the husband, all statistically significant at the 1% level. The results presented in Panel E of Table 4 depict the findings from modelling the likelihood that a woman believes refusing sexual intercourse justifies physical abuse from her husband or partner. Across all the models, we observe a strong negative relationship between education and acceptance of that belief. The RF estimates indicate that exposure to school reform strongly reduces tolerance to the belief that refusal of sex can be a justifiable reason for physical abuse, with coefficients ranging from -0.174 to -0.184, all significant at the 1% level. The results from the 2SLS model indicate that a one-year increase in schooling is associated with a 7.9 pp to 9.3 pp reduction in accepting the belief that violence is justifiable when the woman refuses sexual intercourse. Panel F evaluates that neglecting children could be a justifiable reason for physical abuse. The OLS model consistently shows decreased tolerance for abuse with additional years of schooling. However, the 2SLS coefficients display a less clear pattern, ranging from -0.013 to -0.020, with variations in the levels of statistical significance. Notably, coefficient estimates from models that use bandwidth sizes of 6 and 8 years show statistical significance at the 1% level.

5.4. Education and the intergenerational spread of tolerance for violence against women

Our findings in Table 3 reveal a significant correlation: exposure to parental violence during childhood substantially elevates one’s acceptance or tolerance of violent tendencies against women. In this section, we focus on education as a potential mitigating factor. Specifically, we examine whether an education reform has the potential to disrupt this intergenerational transmission of tolerance for violence against women.

To capture the potentially disruptive effect of education, we include an interaction term between education reform and witnessing parental violence according to the specification in equation (3). We present the findings in Table 5 where, we report the estimates from a naïve OLS regression model in panel A followed by the RF estimates in panel B and the IV/2SLS or fuzzy RD results in panel C. The dummy variable representing exposure to school reform serves as the instrumental variable for education in the IV models. The OLS results reaffirm the highly significant correlation between witnessing parental violence and tolerance for violent beliefs across various bandwidths. Also, increased schooling is negatively associated with tolerance for violent beliefs. The interaction coefficient between witnessing parental violence and years of schooling ranges from -0.011 to -0.013 and is statistically significant at the 1% level across all bandwidths. This result suggests that an additional year of schooling is associated with a significant reduction in tolerance for violence among women who have witnessed interparental violence as children.

The RF results shown in Panel B of Table 5 indicate that women who have witnessed parental violence are likely to tolerate violent tendencies from their partners, with effects ranging from 14.3 pp ($p < 0.01$) to 15.2 pp ($p < 0.01$). Exposure to school reform significantly reduces this likelihood by an effect ranging from about 4.1 pp ($p < 0.10$) in the narrower bandwidth of 6 years on either side of the age cut-off to 7.7 pp ($p < 0.10$) in the bandwidth of 9 years) and 7.9 pp ($p < 0.01$) in the broader bandwidth of 12 years on either side of the cut-off. The 2SLS estimates in Panel C align with the linear RD results but indicate a smaller disruptive effect of increased schooling. Specifically, we show that a one-year increase in schooling among those who witnessed parental violence reduces tolerance for violent beliefs by an effect ranging from 2.3 pp ($p < 0.10$) to 3.2 pp ($p < 0.01$). Additionally, we

Table 5
Education and the intergenerational transmission of tolerance for violence against women.

	Number of years on either side of the age cut-off									
	12	10	9	8	6					
A. OLS estimates										
Years of schooling	-0.038***	(0.002)	-0.038***	(0.003)	-0.039***	(0.004)	-0.039***	(0.005)	-0.038***	(0.006)
Witnessed violence	0.186***	(0.004)	0.198***	(0.002)	0.189***	(0.015)	0.207***	(0.005)	0.198***	(0.008)
Years of schooling × witnessed violence	-0.013***	(0.000)	-0.013***	(0.001)	-0.012***	(0.001)	-0.013***	(0.001)	-0.011***	(0.002)
Observations	6831		5685		5096		4411		3393	
B. Reduced form estimates										
Exposure to school reform	-0.005	(0.007)	-0.010***	(0.002)	-0.022	(0.016)	-0.018***	(0.000)	-0.020*	(0.008)
Witnessed violence	0.148***	(0.002)	0.152***	(0.000)	0.148***	(0.001)	0.143***	(0.005)	0.144***	(0.004)
School reform × witnessed violence	-0.079***	(0.014)	-0.076***	(0.020)	-0.077*	(0.031)	-0.058*	(0.027)	-0.041*	(0.018)
Observations	6831		5685		5096		4411		3393	
C. IV estimates										
Years of schooling	-0.017***	(0.002)	-0.020***	(0.003)	-0.025***	(0.006)	-0.020***	(0.002)	-0.019***	(0.003)
Witnessed violence	0.350***	(0.035)	0.346***	(0.041)	0.341***	(0.060)	0.317***	(0.060)	0.299***	(0.053)
Years of schooling × witnessed violence	-0.032***	(0.005)	-0.031***	(0.007)	-0.031**	(0.010)	-0.026**	(0.010)	-0.023*	(0.009)
Observations	6834		5688		5099		4413		3394	
First stage F-statistic [p-value]	196.617	0.021	207.749	0.022	194.189	0.022	165.796	0.020	145.063	0.017
Survey month fixed effects	Yes		Yes		Yes		Yes		Yes	
Region fixed effects	Yes		Yes		Yes		Yes		Yes	

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The dependent variable here is the tolerance for violence index (z-score). Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. We excluded individuals who were partially exposed to the school reform, especially those aged 14–15 in 1980, in line with previous studies that employed the same identification strategy. All regressions also include the following variables as additional controls: pre-policy and post-policy trends, age difference of woman and her partner, number of children below age five in the household, whether respondent’s height is below the average height of women in her cluster, survey fixed effects and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

explored the impact of education on the intergenerational transmission of tolerance for violence, specifically focusing on whether women believe that violence can be justified under certain circumstances, including instances when she argue with him, burn food, leave the house without informing him, refuses sexual intercourse, or neglects the children. The results, which we provide in the supplementary appendix in Table A5, indicate that exposure to school reform significantly decreases the acceptance of violent tendencies, especially among women who have witnessed interparental violence. These findings collectively underscore the utility of school reforms and education as potentially effective tools for changing or reshaping societal norms that condone violence against women.

Considering the possibility of heterogeneous effects of education on the intergenerational transmission of tolerance for violence against women, we investigated whether our results might differ depending on the place of residence or whether a respondent came from a low or high asset wealth family. These findings are provided for the low and high wealth sample and across two different bandwidths of 8 and 9 years on either side of the cut-off in Tables A6 and A7. In Table A6, the OLS estimates in the low-asset wealth sample show an interaction coefficient of -0.014 ($p < 0.10$), suggesting that the negative impact of schooling on tolerance for violence is stronger among those who have witnessed interparental violence. For the high asset wealth, the interaction coefficient is -0.01 and -0.009 , both significant at the 1% level. These results also suggest that schooling has a stronger impact on tolerance for violence for those who have witnessed violence among parents. However, the effect size is slightly smaller than the low-asset wealth group. The RF estimates are not statistically significant across both sub-samples and bandwidths. In the 2SLS estimates, the interaction term in the low asset wealth is -0.025 and significant at the 1% level, suggesting a beneficial effect of schooling in reducing tolerance for violent beliefs among witnesses of parental violence. Conversely, the interaction coefficient for the high asset wealth sample did not reach statistical significance, suggesting a differential impact of schooling based on asset wealth.

In Table A7, the OLS estimates reveal that exposure to school reform leads to an estimated 1.5 pp and 1.4 pp reduction in tolerance for violence among rural women who have witnessed parental violence and

statistically significant at the 1% level. In contrast, the estimates for the urban sub-sample are smaller and lack statistical significance. The RF estimates display interaction coefficients of -0.07 and -0.034 for the rural sample, all statistically significant at the 1% level. These results imply a differential effect of school reform in reducing tolerance for violence among those who witnessed parental violence. The 2SLS estimates show a consistent pattern for the rural sample. Precisely, one additional year of schooling corresponds to a 1.8 pp and 3.2 pp reduction in tolerance for violence among women who have witnessed parental violence, and these results are statistically significant at the 1% level. These findings strongly suggest that education and school reforms can serve as effective tools to break the cycle of intergenerational tolerance for violence against women, particularly in rural settings. These results point to the imperative for contextually tailored policy measures that directly address and disrupt the cycle of tolerance toward violence against women. Such strategic interventions, leveraging the transformative power of education and societal norms, are crucial in the broader campaign to eradicate violence against women.

We carry out a series of sensitivity analyses to validate our estimates. As demonstrated in Appendix Table A4, our primary findings in Table 5 appear robust across alternative bandwidths – specifically, 11, 7, 5, and 3 years on either side of the age cut-off. Our overarching conclusions remain broadly consistent even when we narrow the sample size to smaller bandwidths, such as three years on either side of the age cut-off. Our sensitivity analyses, encompassing a range of alternative bandwidths, reinforce the robustness of our primary findings. These consistent results, even under varying sample sizes and bandwidth conditions, underscore the reliability and significance of our conclusions.

6. Mechanisms of influence: a closer look

In this part of the paper, we investigate the potential channels through which school reform in Zimbabwe could influence the spread of tolerance for physical abuse against women. We posit that the following broad outcomes could serve as potential avenues for school reform to mitigate the spread of violent ideologies: (i) access to information, (ii) seeking help to stop violence, (iii) labour market or economic outcomes, and (v) partner characteristics.

6.1. Improved information access

People in low-income countries, especially in rural areas, often have limited access to information. Having a radio or television or living near someone who does can give women better access to information, including messages about violence prevention and gender equality. Social networks and community connections can also advance social change and influence attitudes toward violence. Access to electricity further enables better information availability (Urquieta and Alwang, 2012). Table 6 displays the effects of education on modern amenities and access to information, presenting estimates from OLS, RF, and 2SLS models. In the OLS model, our findings indicate that each additional year of schooling increases the likelihood of having electricity by 3.6 pp (p < 0.01), owning a mobile phone by 4.1 pp (p < 0.01), living near a neighbour with a radio by 0.7 pp (p < 0.01), and owning a television by

Table 6
Effects of education on modern amenities and access to information.

	Has electricity	Telephone/ mobile phone	Neighbor owns a radio	Owns a television
OLS estimates				
Years of schooling	0.036*** (0.001)	0.041*** (0.000)	0.007*** (0.000)	0.035*** (0.002)
Witnessed violence	0.012 (0.010)	0.009 (0.008)	0.012*** (0.000)	0.024* (0.012)
Years of schooling × witnessed violence	-0.001 (0.002)	-0.000 (0.000)	-0.002*** (0.000)	-0.002 (0.001)
Observations	5684	5685	5685	4379
Reduced form estimates				
Exposure to school reform	0.067*** (0.008)	0.096*** (0.017)	0.022*** (0.003)	0.027*** (0.001)
Witnessed violence	-0.012 (0.013)	-0.002 (0.002)	-0.001 (0.003)	-0.014*** (0.004)
School reform × witnessed violence	0.025*** (0.008)	0.013*** (0.000)	-0.001 (0.001)	0.031*** (0.004)
Observations	5684	5685	5685	4379
IV estimates				
Years of schooling	0.024*** (0.007)	0.041*** (0.006)	0.009*** (0.001)	0.008*** (0.002)
Witnessed violence	-0.060*** (0.018)	-0.027*** (0.001)	-0.019*** (0.001)	-0.088*** (0.013)
Years of schooling × witnessed violence	0.006* (0.003)	0.005*** (0.001)	0.002*** (0.000)	0.010*** (0.002)
Survey month fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Observations	5687	5688	5688	4382
First stage F-statistic	224.7	223.8	223.8	157.9
P-value	0.0226	0.0226	0.0226	0.0218

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. Coefficient estimates presented in all columns are based on data from women aged 4-25 in 1980, which is our preferred bandwidth. This bandwidth excludes those who had partial exposure to the school reform, specifically ages 14-15 in 1980 as noted in previous studies using the same identification strategy. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

3.5 pp (p < 0.01). However, the interaction term between years of schooling and witnessing violence is not statistically significant, suggesting that the positive effects of education on access to these amenities are consistent regardless of whether individuals have witnessed violence during childhood or not.

Exposure to school reform significantly improves access to essential amenities such as electricity, mobile phones, and television (p < 0.01). Notably, the reform has a differential impact on those who witnessed parental violence, further benefiting this vulnerable group. In IV estimates, each extra year of schooling enhances access to these amenities and mitigates the adverse effects of witnessing interparental violence. Specifically, for individuals who witnessed parental violence during childhood, an additional year of schooling increases the likelihood of having electricity by 0.6 pp (p < 0.1), a mobile phone by 0.5 pp (p < 0.01), and a television by 1 pp (p < 0.01). These findings suggest that education may play a crucial role in altering the trajectory of those exposed to parental violence in childhood. Education could potentially disrupt the transmission of violent norms by significantly enhancing access to key amenities such as electricity, mobile phones, and television. These results highlight possible mechanisms through which schooling might influence life outcomes, particularly for those from challenging backgrounds.

6.2. Seeking help to stop violence

Education is pivotal in empowering women to seek help to end violence (Paul, 2016). This educational empowerment aids women who experienced parental violence as children, equipping them to recognise and address violence in their lives and relationships. Education provides vital information about their rights and available resources and challenges traditional gender norms and attitudes that condone or minimise violence. Education not only empowers women to confront and address violence but also impacts who they turn to for help, according to the data presented in Table 7. The OLS estimates show that each additional year of schooling increases the likelihood of seeking help from a family member by 1.2 pp (p < 0.05) and from a friend by 1.4 pp (p < 0.01). Legal help also seems more accessible with more schooling, as evidenced by a 3.5 pp (p < 0.01) increase. Turning to religious leaders and social service organisations also increases significantly, by 1.4 pp and 2.5 pp, respectively (p < 0.01). The RF estimates also provide compelling evidence that supports the critical role of education in shaping the avenues through which women seek help for violence. According to the RF estimates, exposure to school reform leads to a statistically significant increase in the likelihood of seeking help from friends by 7.77 pp (p < 0.01) and from legal sources by 3.7 pp (p < 0.01). Interestingly, there is a significant decrease in seeking help from religious leaders by 9.1 pp (p < 0.01). The interaction terms in the RF estimates between exposure to school reform and witnessing violence are particularly noteworthy. Among those who witnessed parental violence, exposure to school reform led to a 1.9 pp increase in seeking help from current or former partners (p < 0.01), a significant 15.6 pp increase from family members (p < 0.01), and a 2.2 pp (p < 0.01) increase in seeking help from friends. The IV estimates corroborate the findings from the RF estimates and show significant interactions for almost all categories: seeking help from a current or former partner increased by 1.8 pp (p < 0.01), from family members by 3.5 pp (p < 0.01), and from friends by 0.3 pp (p < 0.05) for each additional year of schooling among those who have witnessed parental violence. The interaction terms for seeking help from a lawyer, religious leader, or social service organization were also positive but did not reach statistical significance. Indeed, greater access to resources, including affordable housing, legal assistance, and counselling services, can help break the generational spread of tolerance for violence against women (Weitzman, 2018). These results suggest that education not only increases the overall likelihood of seeking help for those who have witnessed violence but also shapes the specific avenues of help that women pursue, reinforcing its role as a critical factor in breaking the

Table 7
Effects of education on seeking help to stop violence.

	From whom have you sought help to stop violence?					
	Current or former husband/partner	Family member	Friend	Lawyer	Religious leader	Social service organisation
OLS estimates						
Years of schooling	-0.001 (0.008)	0.012** (0.004)	0.014*** (0.002)	0.035*** (0.007)	0.014*** (0.001)	0.025*** (0.003)
Witnessed violence	0.015 (0.069)	0.100 (0.055)	0.072*** (0.017)	-0.036 (0.074)	-0.025 (0.045)	-0.149*** (0.014)
Years of schooling × witnessed violence	0.001 (0.008)	-0.012 (0.007)	-0.002 (0.002)	0.001 (0.010)	-0.003*** (0.000)	0.015*** (0.004)
Observations	2251	2251	2251	2251	2251	2251
Reduced form estimates						
Exposure to school reform	0.007 (0.018)	-0.005 (0.018)	0.077*** (0.020)	0.037*** (0.004)	-0.091*** (0.021)	0.176*** (0.010)
Witnessed violence	0.008 (0.009)	-0.118** (0.039)	0.045 (0.030)	-0.098*** (0.028)	-0.102*** (0.002)	-0.034 (0.043)
School reform × witnessed violence	0.019*** (0.002)	0.156*** (0.048)	0.022*** (0.006)	0.091 (0.048)	0.070 (0.054)	0.009 (0.066)
Observations	2251	2251	2251	2251	2251	2251
IV estimates						
Years of schooling	-0.008 (0.005)	-0.013 (0.013)	0.037*** (0.010)	0.010 (0.008)	-0.044*** (0.002)	0.062*** (0.014)
Witnessed violence	-0.113*** (0.023)	-0.261*** (0.069)	0.050 (0.026)	-0.225* (0.092)	-0.215** (0.070)	-0.122 (0.111)
Years of schooling × witnessed violence	0.018*** (0.001)	0.035*** (0.010)	0.003** (0.001)	0.025 (0.013)	0.019 (0.015)	0.013 (0.018)
Survey month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2252	2252	2252	2252	2252	2252
First stage F-statistic	159.1	159.1	159.1	159.1	159.1	159.1
P-value	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. Coefficient estimates presented in all columns are based on data from women aged 4–25 in 1980, which is our preferred bandwidth. This preferred bandwidth excludes those who had partial exposure to the school reform, specifically ages 14–15 in 1980 as noted in previous studies using the same identification strategy. All regressions also include controls for pre-policy and post-policy trends, survey and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

cycle of tolerance for violence against women.

6.3. Changes in the labour market or economic outcomes

Another avenue through which school reform may influence attitudes towards violence against women is by enhancing labour market or economic outcomes. While previous related research did not find a significant effect of compulsory education policies on labour market outcomes in Turkey (Erten and Keskin, 2020), our study examines whether increased opportunities for secondary schooling may notably affect the labour market and economic outcomes of those who witnessed parental violence during childhood. Table 8 shows that educational attainment has a multifaceted impact on the economic well-being of women, particularly those who have witnessed parental violence in their early years. The OLS estimates suggest that an additional year of schooling increases the likelihood of current employment by 2.8 pp (p < 0.01), being employed in professional services by 3.9 pp (p < 0.01), having high asset wealth by 4.6 pp (p < 0.01), and decreases the probability of having low asset wealth and being multi-dimensionally deprived by 4.6 and 3.7 pp, respectively (both p < 0.01). The interaction between years of schooling and witnessing violence is not statistically significant in most domains, except for low-asset wealth.

The RF estimates show that exposure to school reform significantly increases the probability of current employment by 8.4 pp (p < 0.05), employment in professional services by 4.4 pp (p < 0.01), and high asset wealth by 6.7 pp (p < 0.01). Additionally, increased education decreases the chances of having low-asset wealth and being multi-dimensionally deprived by 9.9 and 4.9 pp, respectively (p < 0.01). The interaction between exposure to school reform and witnessing violence is statistically significant for current employment, professional employment, high-asset wealth, and being multi-dimensionally deprived. Among

women who witnessed violence, school reform increases the probability of current employment, professional services, and high asset wealth by 2.7 pp (p < 0.01), 0.7 pp (p < 0.1), and 2.5 pp (p < 0.1), respectively. It also decreases the likelihood of being multi-dimensionally deprived by 3.5 pp (p < 0.01). The IV estimates show that each additional year of schooling increases the probability of current employment by 3.1 pp (p < 0.05), employment in professional services by 1.2 pp (p < 0.01) and having high asset wealth by 1.9 pp (p < 0.01). Increased schooling also decreases the likelihood of low asset wealth and being multi-dimensionally deprived by 3.0 and 1.8 pp, respectively (p < 0.01). For women who have witnessed violence, each additional year of schooling increases the probability of current employment by an extra 1.3 pp (p < 0.01), professional employment by an extra 0.4 pp (p < 0.05), and high asset wealth by an extra 0.9 pp (p < 0.05). These women are also less likely to be multi-dimensionally deprived by an additional 0.9 pp (p < 0.01). Based on these findings, education significantly enhances labour market and economic outcomes for women, particularly for those who have witnessed parental violence. The improvements in employment status, professional opportunities, and asset wealth, along with reduced likelihood of multidimensional deprivation, indicate that education could serve as a potent mechanism to disrupt the intergenerational transmission of tolerance for violence against women.

6.4. Changes in partner's characteristics

The selection of life partners emerges as a potential vector through which education can reshape the intergenerational transmission of attitudes towards violence against women. Increased education paves the way for relationships with potential partners with specific educational and professional attributes while being less expensive (Hahn et al., 2018). Education significantly influences the dynamics of partner

Table 8
Effects of education on labour market and economic outcomes of women.

	Currently employed	Employed in professional services	High asset wealth	Low asset wealth	Multidimensionally deprived
OLS estimates					
Years of schooling	0.028*** (0.000)	0.039*** (0.001)	0.046*** (0.001)	-0.046*** (0.000)	-0.037*** (0.001)
Witnessed violence	0.002 (0.012)	0.014 (0.020)	0.013 (0.014)	-0.034*** (0.004)	-0.014 (0.018)
Years of schooling × witnessed violence	-0.001 (0.002)	-0.001 (0.003)	-0.001 (0.001)	0.003*** (0.000)	0.000 (0.002)
Observations	5685	5685	5685	5685	5684
Reduced form estimates					
Exposure to school reform	0.084** (0.026)	0.044*** (0.004)	0.067*** (0.002)	-0.099*** (0.007)	-0.049*** (0.003)
Witnessed violence	-0.024*** (0.003)	0.002 (0.009)	-0.012 (0.012)	-0.011 (0.008)	0.015* (0.006)
School reform × witnessed violence	0.027*** (0.000)	0.007* (0.003)	0.025* (0.012)	-0.005 (0.016)	-0.035*** (0.004)
Observations	5685	5685	5685	5685	5684
IV estimates					
Years of schooling	0.031** (0.011)	0.012*** (0.002)	0.019*** (0.001)	-0.030*** (0.002)	-0.018*** (0.003)
Witnessed violence	-0.073*** (0.004)	-0.037* (0.016)	-0.099*** (0.028)	0.054 (0.033)	0.080*** (0.011)
Years of schooling × witnessed violence	0.013*** (0.000)	0.004** (0.001)	0.009* (0.004)	-0.006 (0.004)	-0.009*** (0.002)
Survey month fixed effects	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	5685	5688	5688	5688	5687
First stage F-statistic	228.9	223.8	223.8	223.8	224.7
P-value	0.0224	0.0226	0.0226	0.0226	0.0226

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. Coefficient estimates presented in all columns are based on data from women aged 4–25 in 1980, which is our preferred bandwidth. This preferred bandwidth excludes those who had partial exposure to the school reform, specifically ages 14–15 in 1980 as noted in previous studies using the same identification strategy. All regressions also include controls for pre-policy and post-policy trends, survey and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

selection, making it a credible pathway for disrupting the cycle of violence against women. The OLS estimates presented in Table 9 suggest that increased education correlates with a lesser age gap by 0.259 years ($p < 0.01$) and reduces the likelihood of having a partner who drinks alcohol by 1.1 pp ($p < 0.01$). These findings are consistent with the IV estimates, where each year of schooling further narrows the age gap by 0.035 years ($p < 0.01$) and lessens the likelihood of partners who consume alcohol by 1.6 pp ($p < 0.01$). In the RF model, exposure to school reform positively impacts partner selection, increasing the probability of a partner completing secondary school or higher by 4.3 pp ($p < 0.01$). The interaction terms in the IV model show that the educational benefits extend to individuals who have witnessed violence. Specifically, each additional year of schooling significantly mitigates the negative effect of witnessing parental violence on a partner's education level by 2.1 pp ($p < 0.01$). The RF estimates show a 4.1 pp increase in the probability of having a partner who completed primary school or higher among women who witnessed parental violence. Thus, the selection of partners emerges as a potential mechanism through which increased education can help reshape intergenerational transmission of tolerance for violence against women.

7. Discussion

One of the objectives of our study was to examine the link between witnessing interparental violence in childhood and the propensity to hold beliefs that condone violence against women in adult relationships. We aimed to present suggestive evidence on the intergenerational transmission of tolerance for violence against women, focusing initially on individuals exposed to parental violence during their formative years. It is important to note that these initial results are associative, indicating correlations rather than direct causal relationships. Building on this foundation, we then leverage Zimbabwe's 1980 education

reform as a natural experiment, employing a regression discontinuity design to causally identify the mitigating impact of additional years of schooling on this transmitted tolerance for violence. Our estimates indicate a substantial reduction in tolerance for violence, ranging from 4.1 to 7.9 pp, particularly among those who have witnessed parental violence. We observe heterogeneous effects based on socioeconomic background: education significantly lowers tolerance for violence more among women from low-asset wealth families and in rural areas. Our study highlights four potential mechanisms through which education might work to break down this tolerance: education enhances access to information and encourages help-seeking behaviour, improves labour market outcomes, and elevates educational levels among partners. Our conclusions are further substantiated through a series of sensitivity analyses and falsification tests, reinforcing the robustness of our primary estimates.

In line with human capital theory, which posits that education enhances individual decision-making capacity (Becker, 2009), our study underscores the transformative power of education in altering harmful attitudes toward violence against women. We find that witnessing parental violence can lead to a significant 14.3–15.2 pp increase in tolerance for violence in adult relationships. However, education acts as a vital counterbalance in this troubling intergenerational transmission of tolerance for violence. Specifically, an additional year of schooling effects a 2.3–3.2 pp reduction in such tolerance for violent beliefs. Among those who have witnessed parental violence, exposure to school reforms is incredibly impactful, yielding a 4.1–7.9 pp reduction in tolerance levels. Our data also highlights nuanced impacts, revealing more potent effects among individuals from low-asset wealth families and those from rural settings. We pinpoint four primary mechanisms that facilitate this transformative change: (i) improved access to information, facilitated by utilities like electricity and technologies like mobile phones and televisions; (ii) an uptick in help-seeking behaviours, particularly from

Table 9
Effects of education on partner's characteristics.

	Age difference	Partner drinks alcohol	Skilled manual worker	Professional/managerial work	Completed primary school or higher
OLS estimates					
Years of schooling	-0.259*** (0.029)	-0.011*** (0.002)	0.002*** (0.000)	0.030*** (0.001)	-0.024*** (0.000)
Witnessed violence	-0.853** (0.305)	0.098** (0.032)	0.014*** (0.004)	-0.002 (0.007)	-0.002 (0.014)
Years of schooling × witnessed violence	0.027 (0.045)	-0.007*** (0.002)	0.001*** (0.000)	-0.001 (0.001)	0.003 (0.002)
Observations	5685	3676	4836	4836	4010
Reduced form estimates					
Exposure to school reform	-0.174 (0.095)	-0.026*** (0.002)	-0.013 (0.011)	0.038*** (0.002)	0.043*** (0.003)
Witnessed violence	-0.356 (0.309)	0.050 (0.035)	0.019 (0.020)	-0.012 (0.010)	-0.005 (0.018)
School reform × witnessed violence	-0.378 (0.479)	-0.010 (0.016)	0.003 (0.020)	0.000 (0.009)	0.041** (0.013)
Observations	5685	3676	4836	4836	4010
IV estimates					
Years of schooling	-0.035*** (0.003)	-0.016*** (0.001)	-0.010*** (0.001)	0.015*** (0.001)	0.019*** (0.001)
Witnessed violence	0.851 (0.938)	0.108 (0.068)	-0.012 (0.045)	-0.024 (0.018)	-0.113** (0.039)
Years of schooling × witnessed violence	-0.175 (0.131)	-0.008 (0.007)	0.003 (0.005)	0.000 (0.002)	0.021*** (0.004)
Observations	5688	3676	4838	4838	4011
First stage F-statistic	223.8	129.6	1856.7	1856.7	3515.1
P-value	0.0226	0.0209	0.0228	0.0228	0.0203

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors for coefficient estimates are displayed in parentheses and are clustered at the birth month-year cohort level. Coefficient estimates presented in all columns are based on data from women aged 4–25 in 1980. This bandwidth excludes those who had partial exposure to the school reform, specifically ages 14–15 in 1980 as noted in previous studies using the same identification strategy. All regressions also include controls for pre-policy and post-policy trends, survey and region fixed effects. All regressions are weighted using sample weights that have been adjusted to account for pooling across multiple survey waves and the inclusion in the domestic violence module. Source: Data are from the 2005/2006, 2010/2011, and 2015 Zimbabwe demographic and health surveys.

partners, family, and friends, (iii) favourable shifts in the labour market or economic outcomes, such as current and professional employment; and (iv) changes in partner characteristics, including educational levels. Sensitivity analyses and falsification tests lend additional credence to the robustness of these findings.

The first mechanism we identify is improved access to information facilitated by access to utilities such as electricity and modern technologies like mobile phones and televisions. The pivotal role of information access in facilitating social change is well grounded in information economics theory (Stiglitz, 2000). Adding further empirical weight to this argument, Jensen and Oster (2009) discovered that the introduction of cable television in rural India led to significant improvements in women's status, including reduced acceptance of domestic violence and increased women's autonomy. In a similar vein, ubiquitous technologies like mobile phones and televisions in Zimbabwe serve as platforms for challenging entrenched cultural norms surrounding domestic violence by exposing women to new perspectives and empowering them to participate more fully in household decision-making.

The second pathway we identify involves education's effect through encouraging help-seeking behaviour, particularly from partners, family, and friends. This mechanism is grounded in social support and network theory (Smith and Christakis, 2008; Umberson and Karas Montez, 2010) and the educational system's capacity to foster social capital (Helliwell and Putnam, 2007). In the Zimbabwean context, where communal and kinship ties have traditionally been robust (Nina, 2017), education can serve as a cornerstone for cultivating interpersonal trust and civic participation, thereby enhancing social capital. Previous research demonstrates that leveraging well-connected individuals within closely-knit communities can significantly improve the dissemination of anti-violence information campaigns (Banerjee et al., 2019). These relationships serve as double-edged swords: they can either perpetuate

harmful norms or act as catalysts for change. Our research findings show that, especially in rural Zimbabwe, effectively leveraging these robust networks can transform prevailing attitudes and stimulate proactive stances against violence towards women.

The third pathway through which increased education might disrupt the intergenerational transmission of tolerance for violence against women is through changes in the labour market or economic outcomes. Our findings indicate that increased education in Zimbabwe significantly impacts labour market outcomes, especially for women who have witnessed parental violence. Such education enables these women to secure employment in professional or managerial positions, increasing their economic independence and autonomy (Doepke et al., 2012; Duflo, 2012). Our results are consistent with broader economic literature, which suggests that better job opportunities and financial independence reduce women's vulnerability to abusive relationships (Stevenson and Wolfers, 2007). Several studies, including that of Autor et al. (2019), indicate that changes in economic standing can substantially alter familial and societal dynamics, thereby reducing tolerance for domestic abuse. In addition, economic self-reliance gives women bargaining power within households, allowing them to establish new norms that condemn violence against women (Lundberg and Pollak, 1996).

As a fourth mechanism, we identified changes in partner characteristics as an important pathway through which increased schooling could disrupt the intergenerational transmission of tolerance for violence against women. Education correlates with spouse selection through a phenomenon often referred to in economics as assortative mating (Chiappori et al., 2009). As women acquire additional education, they tend to select partners who are also well-educated and less likely to engage in violent behaviour (Mansour and McKinnish, 2014). Additionally, higher education levels increase the likelihood of selecting partners who hold more egalitarian views on gender roles, thus reducing

the acceptance of violence within relationships (Oreopoulos and Salvanes, 2011). As corroborated by Banerjee et al. (2019), well-connected individuals within communities can effectively disseminate anti-violence norms, providing a potent lever for societal change. This role of well-connected individuals is particularly relevant in the Zimbabwean context, where our findings show that education serves as a vehicle for transforming prevailing attitudes and norms, especially against the backdrop of witnessed parental violence.

7.1. Limitations of the study

Our analysis data comes from women who participated in and were alive during the Zimbabwe DHS. This restriction on the data potentially introduces sample selection bias, as women of childbearing age who had been deceased are not part of the survey. Thus, our empirical estimates may likely be underestimations, presenting what could be a lower bound of the actual effect size. Another potential source of bias arises from non-responses to the domestic violence module; however, less than 1% were not interviewed due to privacy concerns or other reasons, suggesting that such bias is probably negligible. Additionally, there may be measurement errors in variables such as witnessing parental violence in childhood. While subject to potential recall bias, these variables are central to our objective of understanding the long-term implications on adult attitudes towards violence against women. Our study seeks explicitly to ascertain if there is an intergenerational transmission of tolerance for violence, focusing on how these early experiences influence attitudes in later life. Furthermore, our data do not capture the intensity of the witnessed violence, an essential factor that could influence the extent of intergenerational transmission. Finally, education variables could also contain measurement errors, especially if some respondents still needed to complete their education, as observed at the time of the Zimbabwe DHS. Despite these potential limitations, our study significantly contributes to the literature on low-income countries. It highlights the utility of expanding secondary education opportunities in developing countries as a viable strategy for disrupting the intergenerational transmission of attitudes endorsing physical violence.

8. Conclusion

This paper contributes a novel dimension to the extant economics literature by examining how witnessing parental violence influences an individual's tolerance for violence against women. This enquiry delves into the potential long-term effects on attitudes and the intergenerational transmission of tolerance for violence, offering new insights into the dynamics of behavioural economics. Our analysis reveals that exposure to parental violence is associated with an increase in tolerance for violence against women, ranging from 14.3 to 15.2 percentage points. We then leverage Zimbabwe's 1980 educational reform as a natural experiment, employing an RD design to investigate education's role in disrupting this intergenerational cycle of tolerance for violence against women. Our analysis shows that each additional year of education contributes to a reduction in tolerance for violence among individuals who witnessed parental violence as children, ranging from 2.3 to 3.2 percentage points. Furthermore, exposure to educational reforms reduces tolerance for violence against women, estimated at 4.1–7.9 percentage points, particularly among those who witnessed parental violence in childhood. Our heterogeneity analysis unveils more pronounced effects for individuals from low-asset wealth families and rural areas.

Furthermore, we identify four potential mechanisms through which education exerts its influence: it enhances access to information, encourages help-seeking behaviours, leads to favourable shifts in labour market outcomes, and improves educational levels among partners. We affirm the robustness of our primary estimates through a series of sensitivity analyses and falsification tests. Our conclusions align with human capital theory, suggesting that education fundamentally

reshapes individual decision-making processes. These findings highlight the pivotal role of education in transforming detrimental cultural norms and attitudes toward violence against women, particularly for those who have witnessed interparental violence in childhood. Our research's broad social and economic implications are in step with several United Nations Sustainable Development Goals, particularly in promoting gender equality and enhancing social well-being.

Several policy implications emerge from our study, particularly relevant for low-income countries where tolerance for violence is highly prevalent. Firstly, there is a pressing need for proactive measures to enhance educational opportunities, focusing on underserved and marginalised communities. This call to action holds special significance for areas like Zimbabwe's rural regions and low-asset wealth communities, where access to quality education is notably limited. Secondly, given the critical role of information accessibility, policy measures should consider expanding utilities such as electricity and enhancing network coverage to facilitate the dissemination of information via technologies like mobile phones in rural areas. Thirdly, considering the potent influence of improved labour market outcomes on diminishing tolerance for violence, policy strategies should focus on vocational training and job placement programmes, emphasising increased opportunities for women. Our findings underscore the critical importance of expanding educational opportunities as a potentially effective lever for transforming attitudes that tolerate and perpetuate violence against women. This need for education is particularly crucial in low-income countries like Zimbabwe, where tolerance for such violence remains alarmingly high, signalling an urgent need for comprehensive interventions to combat violence against women.

CRediT authorship contribution statement

Marshall Makate: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Software, Visualization, Writing – original draft. **Chamunorwa Nyamuranga:** Project administration, Investigation, Data curation, Writing – original draft.

Data availability

The data for this study come from the Zimbabwe Demographic and Health Survey. Access to the Zimbabwe DHS data requires authorization from MEASURE DHS. Researchers can find the steps for securing authorization and accessing the raw data at: <https://dhsprogram.com/data/Access-Instructions.cfm>.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ehb.2023.101345](https://doi.org/10.1016/j.ehb.2023.101345).

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