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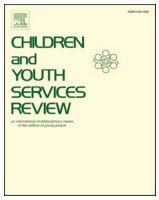

Prevalence and risk factors of violence against adolescents: Evidence from the two most populous and socio-economically disadvantaged states of India

Jayanta Kumar Bora [a,b,1,*], Nandita Saikia [c], Santosh Jatrana [d,e,f]

[a] VART Consulting(P) LTD, Mumbai 410218, India
[b] Institute for Sociology and Demography, University of Rostock, Rostock, Germany
[c] Department of Public Health and Mortality Studies, International Institute for Population Sciences, Mumbai 400088, India
[d] Centre for Rural and Remote Health, James Cook University, Mount Isa, Australia
[e] School of Demography, The Australian National University, Canberra, Australia
[f] Alfred Deakin Institute for Citizenship and Globalisation, Deakin University, Geelong, Australia

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ABSTRACT

Objectives: Violence against adolescents aged 10–19 has adverse short-term and long-term impacts. Yet, there is a shortage of studies investigating violence against Indian adolescents. This study aimed to investigate the magnitude of violence against adolescents in India's two most populous and socio-economically disadvantaged states, Bihar and Uttar Pradesh. It also identified the risk factors of violence against adolescents.

Data and method.

We used state-level representative data, viz. "Understanding the Lives of Adolescents and Young Adults" (UDAYA) survey program data was conducted with a sample of 10,141 adolescents in Uttar Pradesh and 10,433 adolescents in Bihar in 2015–2016. Violence against adolescents was defined as "Physically hurt by parents (for boys and girls) or by husbands (in case of married girls)" and "Emotional violence by husbands to the married girls." We used univariate, bivariate, and logistic regression analyses in this study.

Findings.

An estimated 38.9% of the adolescents reported lifetime physical violence by parents whereas 29.4% and 37% of the married adolescent girls reported emotional and physical violence by their husbands. Overall, married adolescent girls are exposed to the highest level of violence. In multivariate analysis, we identified about 11 risk factors, including potentially modifiable factors linked to income, education, and substance use. The likelihood of exposure to any type of violence is higher among adolescents with no education, low maternal education, from the poorest wealth quintile, and from deprived castes. Exposure to violence was positively associated with respondents' and their parents' substance use status. While there is no significant difference in physical violence by parents in Bihar and Uttar Pradesh, married girls' adolescents' emotional and physical violence is substantially higher in Bihar compared to Uttar Pradesh. Higher rates of spousal violence in Bihar may be linked to contextual factors such as higher prevalence of early marriage, lower female education, rural residence, and increased parental substance use, as shown in our multivariate analysis. This highlights regional differences and their underlying causes, providing targeted policy insights for violence prevention and adolescent well-being in India's most vulnerable areas.

Conclusions: Violence against adolescents is pervasive in our study area, particularly among married adolescents girls. Adolescents with deprived backgrounds, such as low-income, deprived castes, and substance consumers, carry double the burden of violence exposure. This study offers a unique comparison of adolescents at the state level in Bihar and Uttar Pradesh—India's two most populous and socioeconomically disadvantaged states. Unlike previous research, which often treats adolescents as a uniform group or narrowly focuses on adult women, this study breaks down data by age, gender, and marital status, identifies modifiable risk factors (such as education and substance use), and reveals important state-level differences. It provides detailed evidence to support

* Corresponding author.
E-mail address: jkbnwg@gmail.com (J.K. Bora).
[1] Present address (Institute for Sociology and Demography, University of Rostock, Rostock, Germany)

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targeted regional interventions and policies aimed at protecting adolescents. Any intervention to minimize violence should include both adolescents and their parents.

1. Introduction

About 1.2 billion adolescents aged 10–19 today make up 16 percent of the world's population (UN WPP, 2019). Adolescence is a period of rapid growth and development with physical, physiological, and behavioral changes. Since young adolescents are the potential leaders and drivers of growth, prosperity, and creativity, they deserve special attention from researchers and policymakers. Violence against children and adolescents is a global health and human rights issue, bringing significant hazards to the well-being of any society (UNICEF, 2013). The United Nations (UN) defines violence against children and adolescents as "all forms of physical or mental violence, injury, and abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse"(UNICEF, 1989). There are substantial pieces of evidence in multi-country setups that violence, exploitation, and abuse can, in the short and long term, have deleterious effects on the physical and mental health of the child or adolescents (Kashani & Allan, 1998), impair their ability to learn and socialize (Kliewer & Lepore, 2015), and has impacted adolescents' transition to adulthood with adverse effects later in life (Chapman et al., 2004). Exposure to violence during adolescence has long-lasting physical, mental, and emotional harm (poor mental health, suicide, self-intentional harm, stunting, lower educational performance, and adoption of risky behavior such as substance abuse, and perpetration of violence to others), impeding natural growth and development. Due to such an overwhelming impact of violence on population health, prevention of child maltreatment has become a priority all over the world (UNICEF, 2012). For example, UN Sustainable Development Goal 16 aims to "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" with target 16.2 of Goal 16 describes to "end abuse, exploitation, trafficking and all forms of violence and torture against children" (World Health Organization, 2020).

Adolescence in India, defined as the period between 10 and 19 years, is influenced by a complex interplay of biological, psychological, and cultural factors (Verma & Saraswathi, 2002). In India, approximately one in five individuals is an adolescent (10–19 years), and one in three is a young person (10–24 years) (National Health Mission, 2023). Investment in the 253 million adolescents, constituting nearly 21 % of the nation's population, is pivotal for capitalizing on India's demographic dividend. However, this demographic segment faces substantial health risks, including a dual nutritional burden (malnutrition and obesity), anaemia, substance abuse, mental health issues (with suicide being a predominant cause of death), road injuries, violence, and reproductive health concerns (Patton et al., 2016; World Health Organization, 2022).

The earlier studies in India found that the family system and societal norms significantly shape adolescent behavior, with distinct gender roles often dictating disparate experiences for boys and girls (Nayar, 2011). Early marriage remains a significant issue, particularly for girls, adversely affecting their education and health (Sarkar, 2024). Urban adolescents tend to benefit from better educational opportunities and exhibit more liberal attitudes compared to their rural counterparts. However, they also encounter immense pressure to excel academically (Patton et al., 2016). The proliferation of media and digital technology has exposed Indian adolescents to global cultures, which creates potential conflicts between traditional values and modern aspirations (World Health Organization [WHO], 2014). Health issues such as nutritional deficiencies, mental health challenges, and reproductive health concerns are prevalent and often exacerbated by cultural taboos surrounding discussions on sexual health. Thus, adolescence in India represents a multifaceted stage influenced by traditional values and modern influences, necessitating a nuanced understanding to effectively address the challenges faced by this demographic (Verma & Saraswathi, 2002; Nayar, 2011; Sarkar, 2024; Patton et al., 2016; World Health Organization, 2014).

Violence-related events are increasing among adolescents globally (Mercy & Dahlberg, 2004; Munni & Malhi, 2006; Prevention, 2004; Smith-Khuri et al., 2004). The prevalence of violence against adolescents varies between countries and social groups (Turanovic, 2022). They have been reported in the range between 10–50 % (Decker et al., 2014, 2015). Despite being a worldwide problem due to its pervasive and debilitating nature, the issue of violence against adolescents, including family violence, has only received minimal research attention globally. Even less attention is paid to this issue in India. Various national and subnational survey data show that Indian adolescents suffer due to a lack of quality education as well as safe environmental space and health care experience, or socio-economic discrimination; they are also exposed to early marriage, pregnancy, and violence (IIPS & ICF, 2017; IIPS & ORC-Macro, 2007; Santhya et al., 2010; Speizer & Pearson, 2011; Susuman et al., 2016). This is surprising given the evidence that violence, including domestic violence, causes significant damage to them and that adolescents who are victims of violence also become perpetrators (Bentovim & Williams, 1998). In traditional societies such as India, adolescents and married girls depend on parents and husbands, respectively, for their economic and social support and are especially vulnerable to violence or abuse.

1.1. *Prevalence of violence against adolescents: a global and Indian perspective*

The prevalence of violence against adolescents varies significantly across different regions and contexts, influenced by diverse sociocultural factors and methodological variations in research studies (Gilbert et al., 2009; Kloppen et al., 2015; Pereda et al., 2014; Stoltenborgh, Bakermans-Kranenburg, & Van Ijzendoorn, 2013; Stoltenborgh, Bakermans-Kranenburg, Van Ijzendoorn, et al., 2013; Stoltenborgh et al., 2012). Globally, *meta*-analyses estimate the prevalence of physical abuse at 17.7 %, psychological abuse at 26.7 %, and neglect at 16.3 % (Stoltenborgh, Bakermans-Kranenburg, & Van Ijzendoorn, 2013; Stoltenborgh, Bakermans-Kranenburg, Van Ijzendoorn, et al., 2013; Stoltenborgh et al., 2012). In Spain, a community sample of adolescents reported victimization rates of 83 % for at least one type of victimization during their lifetime and 68.6 % during the last year (Pereda et al., 2014). Nordic countries report severe physical abuse prevalence ranging from 3 % to 9 % and witnessing domestic violence from 7 % to 12.5 % (Kloppen et al., 2015). In the US, a nationally representative study indicated that 10.2 % of children aged 0–17 experienced some form of maltreatment in 2008 (Finkelhor et al., 2009). During the COVID-19 pandemic, the global prevalence of physical child abuse was estimated at 18 % and psychological abuse at 39 % (Lee & Kim, 2022).

In Asia, a systematic review of 68 studies from China estimated that 26.6 % of children under 18 experienced physical abuse, 19.6 % emotional abuse, 8.7 % sexual abuse, and 26.0 % neglect (Fang, Fry, Ji, et al., 2015). In East Asia and the Pacific, a study aggregating data from 364 studies reported up to 40 % prevalence of neglect and 46 % of physical abuse (Fang, Fry, Brown, et al., 2015). In Taiwan, 83 % of adolescents experienced at least one form of maltreatment in the previous year (Feng et al., 2015). In addition, a study in South Korea found that 36.6 % of adolescents experienced physical abuse, and 30.8 % experienced psychological abuse (Kim et al., 2017).

Previous research on adolescent violence in India examines its prevalence, consequences, and prevention. Studies indicate high rates of

violence exposure among adolescents, including psychological, physical, and sexual forms. Bullying is also notably prevalent in schools. Gender plays a role in these experiences; girls are more susceptible to bullying and sexual violence, while boys are more frequently perpetrators and witnesses of violence. Older adolescents, girls, and those from lower socioeconomic groups face heightened risks of gender-based violence (GBV). Violence exposure negatively impacts adolescents' well-being, contributing to psychological distress, including anxiety, depression, and poor psychosocial adjustment. This can subsequently affect academic performance. Risk factors associated with adolescent violence encompass individual characteristics (e.g., aggression), family dynamics (e.g., poor parenting), and community influences (e.g., peer pressure, substance abuse). Conversely, protective factors include positive family relationships, school connectedness, and strong social support systems. Specific research explores sexual abuse and violence, with studies revealing high prevalence among both boys and girls in their early years.

In India, research indicates varying prevalence rates of violence against adolescents across different states and socio-economic contexts. A study reported that 23 % of adults and adolescents were exposed to domestic violence in the past year (Sarkar, 2010). The National Family Health Survey (NFHS-1998–99) data revealed that 20 % of married women aged 15–49 years experienced domestic violence in their lifetime (Ackerson & Subramanian, 2008). In Tripura, 20.9 %, 21.9 %, and 18.1 % of students aged 14–19 experienced psychological, physical, and sexual violence, respectively (Deb & Modak, 2010). Furthermore, a multicounty study found that among ever-partnered female adolescents aged 15–19, past-year intimate partner violence (IPV) ranged from 10.2 % in Shanghai (China) to 19.4 % in Delhi (India), 27.6 % in Baltimore (USA), 32.8 % in Ibadan (Nigeria), and 36.6 % in Johannesburg (South Africa) (Decker et al., 2014).

In India, the prevalence of violence differs significantly between urban and rural areas. Urban adolescents often face psychological abuse linked to academic pressures and exposure to diverse cultural norms through the media. In contrast, rural adolescents are more likely to experience physical violence and neglect due to traditional practices and lower socio-economic status (UNICEF, 2013). In a cross-sectional study conducted in a rural block of North India, Kumar et al. (2022) reported the prevalence of physical, sexual, and emotional violence among adolescent girls to be 6.6 %, 5.4 %, and 5.2 %, respectively. The study highlighted that adolescent girls from middle-class families experienced higher levels of emotional violence, while the prevalence of physical violence was most pronounced in the younger age group of 13–14 years. These findings are in contrast with previous studies by Daral et al. (2016) and Patel et al. (2021), which documented a higher prevalence of physical, sexual, and emotional violence among adolescent girls in Najafgarh, Delhi, and Bihar, respectively.

The existing literature underscores adolescence as a critical developmental stage, highlighting significant health risks faced by adolescents in India, including malnutrition, anaemia, obesity, substance abuse, mental health issues, road injuries, violence, and reproductive health concerns. Despite the urgency of this problem, there is a significant gap in comprehensive, empirical data on its prevalence and the risk factors that contribute to it. As noted earlier, the prevalence of violence among adolescents can vary significantly between different countries and communities, highlighting the need for more localized and comprehensive research to understand the true scope of the problem. Understanding the risk factors associated with violence against adolescents is crucial for developing preventive strategies. While the influence of societal factors such as the joint family system, early marriage, and gender roles on adolescent behavior and experiences is well-documented, risk factors can be multifaceted, including demographic, socioeconomic status, community environment, and individual psychological factors. There is a lack of detailed, region-specific studies that account for the diverse socio-cultural contexts within India and a need for more nuanced research on how cultural taboos impact adolescent health outcomes. Addressing these gaps through a focused study on the prevalence and risk factors of violence against adolescents is crucial for developing effective intervention strategies to support the health and well-being of adolescents in India.

Against this background, this study aims to address the gap in the literature by directly assessing the prevalence and the key individual-level and family-level factors associated with violence among adolescent boys and girls in the two states of India. The rationale for focusing on Bihar and Uttar Pradesh is compelling for several reasons. First, Bihar and Uttar Pradesh are home to a substantial portion of India's adolescent population. Together, they account for about 28.6 % of the country's adolescents, which translates to approximately seven million young people (ORGI, 2015). The sheer size of this demographic makes it imperative to understand their experiences and challenges, as interventions here can significantly impact the national adolescent population. Secondly, these states are not only populous but also face significant socioeconomic and demographic challenges. Bihar and Uttar Pradesh lag behind other Indian states in terms of development indicators, including higher levels of under-five mortality, widespread undernutrition, and inadequate infrastructure (International Institute for Population Sciences (IIPS) and ICF., 2021). These conditions create a precarious environment for adolescents, increasing their vulnerability to various forms of violence. A study focused on these regions will provide critical insights into how socio-economic and demographic factors contribute to violence, enabling more effective and targeted interventions. Thirdly, this study utilizes data from the *Understanding the Lives of Adolescents and Young Adults (UDAYA)* research program, which offers in-depth insights into the lives of adolescents in Bihar and Uttar Pradesh. UDAYA systematically captures the acquisition of critical developmental assets among young (10–14 years) and older adolescents (15–19 years), essential for ensuring a healthy, safe, and empowered transition to adulthood. Leveraging this rich, state-specific dataset allows our study to conduct a nuanced analysis of the determinants and patterns of adolescent violence within socio-culturally distinct contexts. The evidence generated can directly inform the National Health Policy by highlighting region-specific vulnerabilities and developmental needs, thereby supporting the design of more targeted, adolescent-responsive health and protection strategies.

We examine the prevalence and correlates of domestic violence/ spousal violence among married adolescent girls in these two states. We also examine separately the prevalence and correlates of different dimensions of violence (physical and domestic/ spousal) among adolescents. Specifically, we addressed three research questions in this study: (1) What is the prevalence of violence against adolescents and domestic violence among married adolescent girls in the study area? (2) Which socio-economic groups have a relatively higher level of violence and domestic violence among adolescents and married adolescent girls? (3) What are the correlates associated with violence against adolescents and domestic violence against married adolescent girls? We examined both the individual-level and family/parental-level factors associated with different types of violence against adolescents. In-depth research on the prevalence and determinants in the study area will help set policies and priorities for intervention, public discourse, and public awareness.

2. Data and methods

2.1. E**thics statement

This study uses secondary data in nature, and therefore, no institutional review board ethical approval is needed. The Population Council, New Delhi, approved the data collection for the UDAYA survey, and the questionnaire used in the fieldwork was approved by the Population Council, New Delhi's ethical review board.

2.2. Data

We used the "Understanding the Lives of Adolescents and Young Adults" (UDAYA) survey program data conducted in Bihar (10,433 adolescents) and Uttar Pradesh (10,141 adolescents) from January 2016 to July 2016, and September 2015 to January 2016, respectively. We combined both the individual-level datasets of Uttar Pradesh and Bihar and used them for the analysis. UDAYA interviewed a sample of unmarried girls, boys aged 10–19, and married girls aged 15–19 in both Bihar and Uttar Pradesh. The program is designed to understand and determine the levels, patterns, and trends in the lives of younger 10–14 and older 15–19 adolescents and assess the factors influencing the quality of transitions they make. It provides robust insights into how and where to make investments in adolescents to influence their course of life as long as they reach young adulthood and beyond, and helps various organizations better understand the transitions that adolescents in the country are making to adulthood.

The UDAYA design was directed by a Technical Advisory Committee composed of members from the Ministry of Health and Family Welfare, the Government of India, leading NGOs working with adolescents in India, and academia. The Population Council led the UDAYA study with financial support from the Bill and Melinda Gates Foundation and the David and Lucile Packard Foundation. A detailed description of the survey design of the UDAYA data is available in (Population Council, 2017), Individual-level data are available from the UDAYA data repository and can be accessed upon request.

2.3. Outcome variable

The definition of violence, abuse, punishment, aggression, and discipline can differ greatly from the country, time, and nature of the relationship between those who are using and experiencing different physical, sexual, and emotional behavioral acts (Devries et al., 2018). The disciplinary action (say slapping, hitting buttocks with a stick, etc) in one context (and therefore more acceptable) might be considered as "violence" in the same context at another time or in a different context. However, in general, it is found that exposure to any such physical/sexual/emotional violence has negative health and developmental outcomes (Devries et al., 2018). Therefore, in this study, we used the available information on physical and emotional violence, ignoring the level of acceptability in society. The main outcome variables used in this study are violence against adolescents and domestic violence against married adolescent girls. We use the terms 'spousal violence' and 'domestic violence' interchangeably.

2.4. Violence against adolescents

This outcome variable in this analysis was listed as (1) Are adolescents (boys and girls) (from the time of 10 years old) physically hurt (for example, beaten) by their parents? We coded "yes" as one and "no" as zero. A number of activities such as slapping, twisting an arm, pulling hair, punching with fists or something that hurts, kicking/dragging/beaten/trying to choke or burn on purpose, threatening/attacking with a gun/knife or any other weapon.

2.5. Domestic violence against married adolescent girls

Experience of domestic/spousal violence was measured by constructing two variables based on detailed information collected on the experience of specific acts of emotional and physical violence by their husbands. We defined our exposure for the analysis: any physical/emotional violence versus none. 2) For the emotional violence, we used the variable that asked the married girls aged 15–19, "Did your husband ever do something to humiliate you in front of others or threaten you to hurt or harm someone close to you?" We coded "yes" as one and "no" as zero. 3) For the physical violence exposed by married girls aged 15–19, we used the variable, "Do/did your husband ever do any of the following to you" (a) slap you. (b) twist your arm or pull your hair? (c) push you, shake you, or throw something at you? (d) punch you with his fist or with something that could hurt you (e) kick you, drag you, or beat you up? (f) try to choke you or burn you on purpose? (g) Threaten or attack you with a knife, gun, or any other weapon? If the respondent answered "yes" in any one of these, they were considered exposed to physical violence by the husband. We coded "yes" as one and "no" as zero.

2.6. Covariates

In our research, we have chosen a comprehensive set of covariates spanning individual, household, and parental levels to investigate their impact on adolescent health outcomes in Bihar and Uttar Pradesh. These variables are selected based on robust evidence from extensive literature highlighting their significant roles in shaping health behaviors, access to healthcare, and overall well-being among adolescents. Earlier studies documented that education level, type of occupation, and unemployment duration are associated with exposure to violence (Costa et al 2016; Stark et al 2017) and tertiary education plays a crucial role in reducing child abuse (Shaari et al., 2023). The use of substances by adolescents themselves or their parents is found to be associated with adolescents' violent behavior (Brook et al 2003). Another found that ethnicity, poor level of education, and use of alcohol are associated with exposure to violence (Otwombe et al 2015). A study based in India addressing intimate partner violence found that low or no education, low socioeconomic status, rural residence, a greater number of children, and separated or divorced marital status are associated with exposure to intimate partner violence (Sabri et al 2001). Husbands' problems with drinking, jealousy, suspicion, control, and emotionally and sexually abusive behaviours were also related to an increased likelihood of women experiencing severe IPV and injuries (Sabri et al 2014). Based on these studies, we included age, sex, individual's education, mother's education, religion, caste, wealth index of the household, place of residence, having mobile phone, number of family members, adolescents ever consumed tobacco products and alcohol, anyone in the family consumed alcohol, tobacco products, and drugs in our regression model. Religion and caste variables are used as socio-cultural factors and play roles in shaping social networks, access to resources, and health-related beliefs and practices.

The caste system in India is a deeply entrenched form of social stratification that continues to shape individuals' access to resources, opportunities, and protections. Originating over three thousand years ago, this hereditary and hierarchical structure divides society into rigid groups, or *jatis*, based on the ancient *varna* system: Brahmins (priests), Kshatriyas (warriors), Vaishyas (traders), Shudras (laborers), and the Ati-Shudras or "untouchables" (Deshpande, 2001; Shinde, 2005). Contemporary classifications—Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs), and General Castes—guide state policies and reflect the ongoing marginalization of disadvantaged groups. SCs and STs, officially recognized by the Constitution, continue to experience systemic exclusion, stigma, and violence despite affirmative action policies (Trivedi et al., 2016). Caste-based discrimination, particularly among adolescents, manifests through restricted access to education, health care, and social inclusion, increasing their vulnerability to various forms of violence. Adolescents from marginalized castes are more likely to face emotional abuse, physical harm, and social exclusion in both familial and institutional settings (Deshpande, 2011; Thorat & Newman, 2012). This period of identity formation is further strained by caste-based stigma, which exacerbates psychological distress and social alienation (Banerjee et al., 2013). As SCs and STs collectively represent over 25 % of the Indian population as per the census of India, 2011, addressing caste as a structural determinant is critical to formulating inclusive adolescent protection strategies.

Household economic status, assessed through a wealth index derived

from asset ownership and access to amenities, provides insights into economic disparities and their implications for health disparities. By incorporating these well-documented factors, our study aims to provide a thorough and nuanced understanding of the determinants of violence against adolescents in these states.

2.7. Statistical analysis

We used univariate, bivariate, and logistic regression analysis in this study. At the univariate level, we carried out the descriptive analysis to examine the sample characteristic distribution of the respondents. At the bivariate level, we conducted cross-tabulation. Pearson's chi-square test was performed to investigate the association between outcome variables and the selected variables. We calculated the prevalence rate of violence against adolescents by different socio-economic characteristics. We carried out a logistic regression analysis with all covariates to see the association between violence against adolescents and various risk factors. However, for brevity, we present the coefficient in the Adjusted Odds Ratio (AOR) with a 95 % confidence interval. We employed three logistic regression models: Model 1 examined experiences of physical violence by parents; Model 2 assessed emotional violence among married adolescent girls; and Model 3 analyzed physical violence experienced by married girls, using selected covariates. We also tested key interaction effects—such as gender and wealth, and caste and substance use—to explore potential effect modification. However, these interactions were not statistically significant and did not meaningfully alter the main effects. Therefore, they were excluded from the final models to maintain clarity and parsimony. The data were analyzed using STATA 16.0 (Stata Corporation, College Station, TX, USA) software.

Table 1
Distribution of adolescents by different characteristics of Uttar Pradesh and Bihar, 2015–16.

Characteristics	Unmarried boys aged 10–19		Unmarried girls aged 10–19		Married girls aged 15–19		Total	
	N	%	N	%	N	%	N	%
Gender								
Boys	5,969	100.0	0	0.0	0	0.0	5,969	29.0
Girls	0	0.0	9,419	100.0	5,206	100.0	14,625	71.0
Religion								
Hindu	4,908	82.2	6,899	73.2	4,391	84.3	16,198	78.7
Muslim	1,039	17.4	2,478	26.3	801	15.4	4,318	21.0
Others	22	0.4	42	0.4	14	0.3	78	0.4
Caste								
General	1,203	20.2	2,183	23.2	537	10.3	3,923	19.0
SC/ST	1,415	23.7	1,959	20.8	1,515	29.1	4,889	23.7
OBC	3,351	56.1	5,277	56.0	3,154	60.6	11,782	57.2
Wealth index of the household								
Poorest	556	9.3	941	10.0	860	16.5	2,357	11.4
Poorer	912	15.3	1,290	13.7	1,022	19.6	3,224	15.7
Middle	1,209	20.3	1,748	18.6	1,239	23.8	4,196	20.4
Richer	1,600	26.8	2,588	27.5	1,289	24.8	5,477	26.6
Richest	1,692	28.3	2,852	30.3	796	15.3	5,340	25.9
Respondent's education								
None	203	3.4	623	6.6	1,422	27.3	2,248	10.9
1–7 years	2,448	41.0	2,651	28.1	1,177	22.6	6,276	30.5
8–11 years	2,677	44.8	4,707	50.0	2,000	38.4	9,384	45.6
12 years and above	641	10.7	1,438	15.3	607	11.7	2,686	13.0
Mother's education								
None	3,870	64.8	6,184	65.7	4,327	83.1	14,381	69.8
1–7 years	648	10.9	1,036	11.0	427	8.2	2,111	10.3
8–9 years	541	9.1	790	8.4	240	4.6	1,571	7.6
10 years and above	910	15.2	1,409	15.0	212	4.1	2,531	12.3
Place of residence								
Urban	2,832	47.4	4,505	47.8	1,942	37.3	9,279	45.1
Rural	3,137	52.6	4,914	52.2	3,264	62.7	11,315	54.9
Both parents co-reside with the respondent								
No	1,108	18.6	1,836	19.5	0	0.0	2,944	14.3
Yes	4,861	81.4	7,583	80.5	5,206	100.0	17,650	85.7
Having a mobile phone								
Having own mobile	2,639	44.2	944	10.0	1,868	35.9	5,451	26.5
Access a family member's mobile	2,696	45.2	7,221	76.7	3,078	59.1	12,995	63.1
No	634	10.6	1,254	13.3	260	5.0	2,148	10.4
Number of household family members								
1–3	443	7.4	554	5.9	1,325	25.5	2,322	11.3
4–6	3,432	57.5	4,961	52.7	2,000	38.4	10,393	50.5
7–10	1,704	28.5	3,248	34.5	1,515	29.1	6,467	31.4
More than 10 members	390	6.5	656	7.0	366	7.0	1,412	6.9
Adolescents have ever consumed tobacco products	870	14.6	141	1.5	156	3.0	1,167	5.7
Adolescents have ever had alcohol	312	5.2	13	0.1	14	0.3	339	1.6
Anyone in the family consumed alcohol	1,452	24.3	2,717	28.8	1,935	37.2	6,104	29.6
Anyone in the family consumed tobacco products	4,128	69.2	6,445	68.4	3,893	74.8	14,466	70.2
Anyone in the family consumed drugs	163	2.7	366	3.9	330	6.3	859	4.2
State								
Uttar Pradesh	3,136	52.5	5,227	55.5	1,798	34.5	10,161	49.3
Bihar	2,833	47.5	4,192	44.5	3,408	65.5	10,433	50.7
Total	**5,969**	**100.0**	**9,419**	**100.0**	**5,206**	**100.0**	**20,594**	**100.0**

SC-Scheduled caste, ST-Scheduled tribe, OBC-Other backward class.

3. Results

3.1. Sample description

Table 1 presents the sample distribution of characteristics of adolescents in Uttar Pradesh and Bihar, encompassing 5,969 unmarried boys aged 10–19, 9,419 unmarried girls aged 10–19, and 5,206 married girls aged 15–19. The majority identified as Hindu (78.7 %), with Muslims comprising 21.0 %, and a small minority from other religions (0.4 %). Caste distribution showed a predominant presence of Other Backward Classes (57.2 %), alongside significant representation from SC/ST (23.7 %) and General categories (19.0 %). Household wealth varied across quintiles: richest (25.9 %), richer (26.6 %), middle (20.4 %), poorer (15.7 %), and poorest (11.4 %). Educationally, most adolescents had completed 8–11 years of schooling (45.6 %), followed by 1–7 years (30.5 %), 12 years and above (13.0 %), and no formal education (10.9 %). Maternal education levels revealed a significant portion without formal education (69.8 %), with smaller proportions having 1–7 years (10.3 %), 8–9 years (7.6 %), and 10 years and above (12.3 %). The majority resided in rural areas (54.9 %) compared to urban areas (45.1 %), with a high proportion living with both parents (85.7 %). Regarding mobile phone ownership, 26.5 % had their own device, 63.1 % used family members' phones, and 10.4 % lacked access altogether. Household sizes were predominantly 4–6 members (50.5 %) and 7–10 members (31.4 %), with smaller percentages in households of 1–3 members (11.3 %) and more than 10 members (6.9 %). Substance use among adolescents included 5.7 % reporting tobacco use and 1.6 % alcohol use, while family substance use rates were 29.6 % for alcohol, 70.2 % for tobacco, and 4.2 % for drugs. Geographically, the sample was evenly distributed between Uttar Pradesh (49.3 %) and Bihar (50.7 %).

It is worth noting that the background characteristics of married adolescent girls are different from unmarried adolescent boys and girls. The share of the disadvantaged population in the sample of married adolescents is higher than that of unmarried girls. Say, more than 50 % of the unmarried adolescents were from richer families, and about 60 % of the married adolescents were from less wealthy families. About 27.3 % of married girls do not have any education compared to 3.4 % among unmarried boys and 6.6 % among unmarried girls. The share of OBC or SC/ST caste girls is higher among married adolescents compared to unmarried adolescents. Urban-rural residence patterns showed a higher proportion of married girls residing in rural areas (62.7 %) compared to unmarried girls (52.2 %) and unmarried boys (52.6 %). Mobile phone ownership also varied, with a lower percentage of married girls having their own mobile phone (35.9 %) compared to unmarried boys (44.2 %).

Fig. 1 reveals adolescents' distribution to all types of violence in Uttar Pradesh and Bihar, 2015–16. About 38.9 % (39.5 % in Uttar Pradesh and 38.4 % in Bihar) of adolescents were hurt physically by their parents. Around 29 % of the married adolescent girls aged 15–19 experienced emotional violence. Noticeably, emotional violence is higher in Bihar (34.3 %) than the Uttar Pradesh (20.3 %). It is also seen that exposure to physical violence by married adolescent girls aged 15–19 by their husbands was higher in Bihar (40.6 %) than the Uttar Pradesh (30.2 %).

Table 2 illustrates the distribution of violence exposure among adolescents in Uttar Pradesh and Bihar during 2015–16, segmented by various sociodemographic characteristics. Boys aged 10–19 report higher incidences of being physically hurt by parents (56.3 %) compared to girls (31.8 %). Among married girls aged 15–19, 29.4 % experience emotional violence, and 37.0 % are exposed to physical violence. Younger boys (10–14 years) face more physical harm from parents (66.8 %) than older boys (15–19 years, 50.7 %), while younger girls (10–14 years) experience more (48.3 %) compared to older girls (15–19 years, 29.0 %). Hindu adolescents show higher rates of emotional (30.6 %) and physical violence (37.7 %) than Muslims and those of other religions. SC/ST adolescents have the highest exposure to physical harm by parents (44.0 %), emotional violence (33.1 %), and physical violence (41.4 %) among married girls. Economic status inversely correlates with violence exposure, with the poorest households reporting the highest rates. Adolescents with 12 years or more of education report the lowest violence rates across all types.

Mothers with no education report higher incidences of violence. Rural adolescents report more physical harm (41.5 %) compared to urban adolescents (35.7 %). Adolescents without access to a mobile phone report a higher violence rate compared to those with their own or a family member's mobile phone. The distribution of violence exposure varies with household size. Adolescents from smaller households (1–3 members) report lower rates of physical harm by parents (33.0 %) but higher rates of emotional (33.6 %) and physical violence (43.4 %) among married girls aged 15–19. Larger households (7–10 members) report the highest physical harm by parents (40.5 %), but the lowest

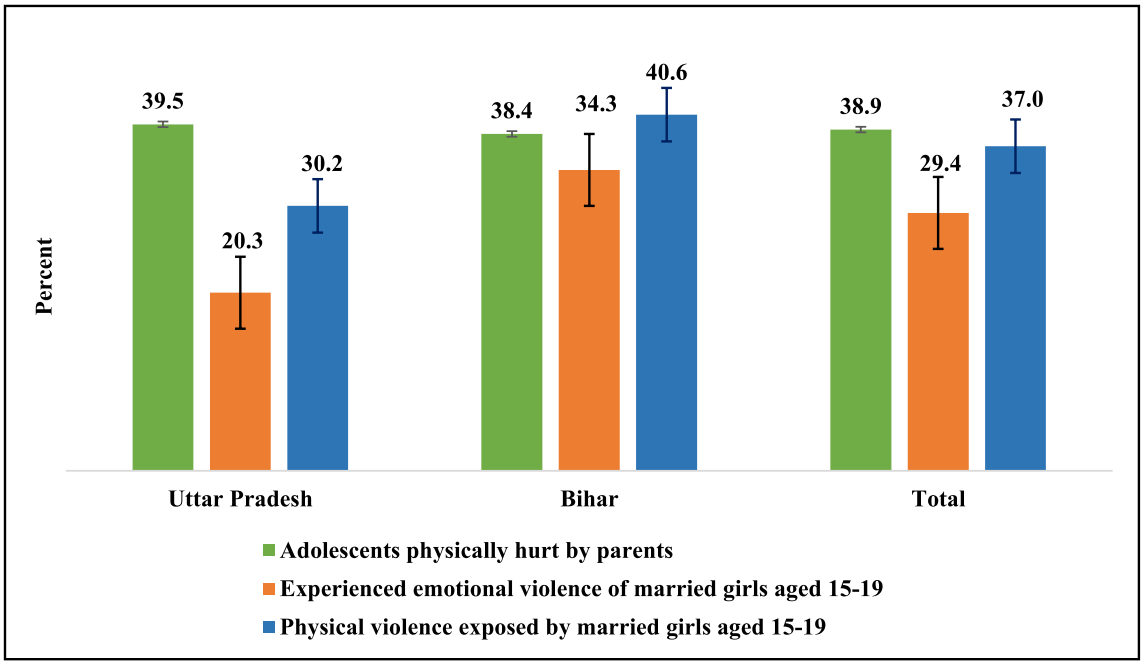

Fig. 1. Distribution of adolescents exposed to all types of violence in Uttar Pradesh and Bihar, 2015–16.

Table 2
Distribution of violence exposure by different characteristics in Uttar Pradesh and Bihar, 2015–16.

Characteristics	Physically hurt by parents of girls and boys aged 10–19	Experienced emotional violence of married girls aged 15–19	Physical violence exposed by married girls aged 15–19
Gender			
Boys	56.3	na	na
Girls	31.8	29.4	37.0
Age			
10–14 years boys	66.8	na	na
15–19 years boys	50.7	na	na
10–14 years girls	48.3	na	na
15–19 years girls	29.0	na	na
15–19 married girls	30.8	29.4	37.0
Religion			
Hindu	39.8	30.6	37.7
Muslim	36.1	23.7	33.2
Others	24.4	14.3	28.6
Caste			
General	35.5	20.0	27.0
SC/ST	44.0	33.1	41.4
OBC	38.0	29.3	36.5
Wealth index of the household			
Poorest	45.1	36.1	44.7
Poorer	43.4	33.6	40.1
Middle	41.7	31.3	40.4
Richer	38.0	27.0	34.2
Richest	32.3	18.5	24.1
Respondent's education			
None	34.7	36.5	45.3
1–7 years	50.7	30.7	39.9
8–11 years	35.8	27.1	33.8
12 years and above	25.8	17.5	21.4
Mother's education			
None	39.7	30.5	38.3
1–7 years	41.2	28.3	34.2
8–9 years	40.9	22.0	27.8
Ten years and above	31.1	18.8	24.9
Place of residence			
Urban	35.7	30.4	38.0
Rural	41.5	28.8	36.3
Having a mobile phone			
Having own mobile	37.8	29.1	36.5
Access a family member's mobile	39.0	28.9	36.5
No	41.7	37.3	45.2
Number of household family members			
1–3	33.0	33.6	43.4
4–6	39.4	29.5	36.5
7–10	40.5	26.7	33.1
More than ten members	37.7	24.3	30.4
Adolescents have ever consumed tobacco products	56.8	36.4	60.3
Adolescents have ever had alcohol	62.2	64.3	78.6
Anyone in the family consumed alcohol	44.2	37.2	45.6
Anyone in the family consumed tobacco products	41.3	30.9	39.0
Anyone in the family consumed drugs	55.6	49.7	55.3
State			
Uttar Pradesh	39.5	20.3	30.2
Bihar	38.4	34.3	40.6
Total	**38.9**	**29.4**	**37.0**

na- not applicable, SC-Scheduled caste, ST-Scheduled tribe, OBC-Other backward class.

emotional (26.7 %) and physical violence (33.1 %). Thus, larger family sizes are generally associated with lower emotional and physical violence among married girls, but not necessarily with physical harm by parents. Substance use is linked to a heightened risk of experiencing violence. Adolescents who have ever consumed tobacco report high incidences of physical harm by parents (56.8 %), emotional violence (36.4 %), and physical violence (60.3 %). Alcohol consumption shows even higher rates, with 62.2 % physically hurt by parents, 64.3 % experiencing emotional violence, and 78.6 % exposed to physical violence. Adolescents from families where members consume alcohol or drugs also report higher rates of violence. Adolescents in Bihar report higher emotional (34.3 %) and physical violence (40.6 %) rates than those in Uttar Pradesh during the study period.

3.2. Association of adolescents (unmarried girls and boys aged 10–19 and married girls aged 15–19) exposure to violence and risk factors

Table 3 presents the adjusted odds of experiencing three types of violence (physically hurt by parents by girls and boys aged 10–19, experienced emotional violence by married girls aged 15–19, and experienced physical violence by married girls aged 15–19). The regression results show that the adolescent's likelihood of being physically hurt by parents is significantly lower among female adolescents (OR: 0.24, CI: 0.21–0.27, $p < 0.01$) than among male adolescents. Compared to males aged 10–14 years, 15–19-year-old males experienced a lower likelihood of physically hurt (OR: 0.63, CI: 0.55–0.72, $p < 0.01$), whereas females of 10–14 years have a higher likelihood of physically hurt (OR: 1.91, CI: 1.68–2.18, $p < 0.01$).

Compared to Hindu adolescents, adolescents of other religions are less likely to be exposed to physical violence by their parents. However, the association between religion and emotional or physical violence is not statistically significant for married adolescent females. Adolescent girls from deprived castes like SC/ST and OBC experience higher odds of exposure to emotional and physical violence than the forward or general caste adolescents in the study area. Irrespective of the type of violence, the odds of violence against adolescents of richer or richest families are substantially lower among adolescents of poor economic backgrounds. Likewise, compared to no education, adolescents who have at least eight or more years of education have the lowest likelihood of violence exposure. Also, the odds of Adolescents' exposure to violence consistently decrease as their educational attainment increases. The educational attainment of mothers is significantly associated with violence exposure among unmarried adolescents, but not always for married girls. The odds of being physically hurt by parents (OR: 1.13, CI: 1.06–1.21, $p < 0.01$) are higher in rural areas, whereas the likelihood of emotional violence (OR: 0.86, CI: 0.75–0.99, $p < 0.05$) and physical violence (OR: 0.87, CI: 0.76–1.00, $p < 0.1$) to married girls adolescents was lower in rural areas compared to urban areas.

Accessing mobile phones is also significantly associated with exposure to adolescent violence. Regression results also reveal a significant association between the household's total family members and exposure to adolescent violence. The odds of physical violence against adolescents by parents were higher in large families compared to families with 1 to 3 members in the household. In contrast, violence against married adolescent girls is lower in large families.

Substance use significantly increases the odds of violence, with adolescents who have consumed tobacco or alcohol showing higher vulnerability. Family consumption of these substances also correlates with increased violence. Another notable observation is that the odds of emotional violence (OR: 1.81, CI: 1.56–2.10, $p < 0.01$) and physical violence (OR: 1.42, CI: 1.24–1.63, $p < 0.01$) for married adolescent girls was higher in Bihar compared to those in Uttar Pradesh during the study period.

Table 3
Association of adolescent exposure to Violence and different risk factors in Uttar Pradesh and Bihar, 2015–16.

	Model 1. Experienced physically hurt by parents by girls and boys aged 10–19 OR (95 % CI)	Model 2. Experienced emotional violence by married girls aged 15–19 OR (95 % CI)	Model 3. Experienced physical violence by married girls aged 15–19 OR (95 % CI)
Gender			
Boys (Ref)			
Girls	0.24***(0.21–0.27)	–	–
Age for boys			
10–14 years boys (Ref)			
15–19 years boys	0.63***(0.55–0.72)	–	–
10–14 years girls	1.91***(1.68–2.18)	–	–
15–19 years girls	1.02(0.94–1.12)	–	–
Religion			
Hindu (Ref)			
Muslim	1.01(0.93–1.10)	0.85(0.70–1.04)	0.95(0.79–1.14)
Others	0.61*(0.36–1.05)	0.38(0.08–1.81)	0.72(0.20–2.52)
Caste			
General (Ref)			
SC/ST	1.08(0.98–1.20)	1.22(0.93–1.60)	1.29**(1.00–1.65)
OBC	0.97(0.89–1.06)	1.25*(0.98–1.60)	1.27**(1.01–1.59)
Wealth index of the household			
Poorest (Ref)			
Poorer	0.89*(0.80–1.00)	1.03(0.83–1.26)	0.95(0.78–1.16)
Middle	0.87**(0.78–0.98)	0.96(0.78–1.18)	1.03(0.85–1.26)
Richer	0.78***(0.70–0.87)	0.80**(0.64–1.00)	0.83*(0.67–1.02)
Richest	0.65***(0.58–0.74)	0.65***(0.49–0.86)	0.67***(0.52–0.87)
Respondent's education			
None (Ref)			
1–7 years	1.24***(1.10–1.39)	0.85*(0.71–1.01)	0.87(0.74–1.03)
8–11 years	0.98(0.88–1.10)	0.82**(0.69–0.97)	0.77***(0.65–0.90)
12 years and above	0.73***(0.64–0.84)	0.55***(0.42–0.72)	0.47***(0.37–0.61)
Mother's education			
None (Ref)			
1–7 years	1.16***(1.05–1.28)	1.11(0.87–1.41)	1.03(0.82–1.29)
8–9 years	1.19***(1.06–1.34)	0.82(0.59–1.15)	0.82(0.60–1.13)
10 years and above	0.89**(0.80–1.00)	0.71*(0.49–1.05)	0.79(0.56–1.13)
Place of residence			
Urban (Ref)			
Rural	1.13***(1.06–1.21)	0.86**(0.75–0.99)	0.87*(0.76–1.00)
Having a mobile phone			
Having own mobile (Ref)			
Access a family member's mobile	1.14***(1.05–1.24)	0.88*(0.77–1.01)	0.87**(0.76–0.99)
No	0.91(0.80–1.02)	1.27(0.94–1.71)	1.15(0.86–1.53)
Number of household family members			
1–3 (Ref)			
4–6	1.12**(1.01–1.24)	0.86*(0.73–1.01)	0.77***(0.66–0.90)
7–10	1.20***(1.07–1.34)	0.78***(0.65–0.94)	0.67***(0.56–0.79)
More than 10 members	1.13(0.98–1.32)	0.80(0.59–1.07)	0.68***(0.52–0.90)
Adolescents have ever consumed tobacco products (Ref no)	1.38***(1.20–1.58)	1.52**(1.06–2.16)	2.69***(1.91–3.80)
Adolescents ever had alcohol (Ref no)	1.33**(1.04–1.71)	3.40**(1.09–10.61)	4.59**(1.24–17.07)
Anyone in the family consumed alcohol (Ref no)	1.22***(1.14–1.32)	1.47***(1.26–1.72)	1.50***(1.29–1.73)
Anyone in the family consumed tobacco products (Ref no)	1.15***(1.07–1.24)	1.13(0.96–1.35)	1.24***(1.06–1.46)
Anyone in the family consumed drugs (Ref no)	1.84***(1.59–2.14)	1.80***(1.40–2.32)	1.58***(1.22–2.03)
State			
Uttar Pradesh (Ref)			
Bihar	0.95(0.89–1.01)	1.81***(1.56–2.10)	1.42***(1.24–1.63)
Constant	1.35***(1.08–1.69)	0.31***(0.21–0.46)	0.53***(0.37–0.75)
Observations	**20,594**	**4,901**	**4,901**
Log-Lik Full Model:	−12716.133	−2806.638	−3047.639
McFadden's Adj R2:	0.073	0.041	0.043
Cragg & Uhler's R2:	0.131	0.092	0.097
AIC*n:	25528.266	5699.276	6181.278
BIC':	−1800.088	−106.499	−140.351

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, Ref: Reference category, –: not applicable, OR: Odds ratio, CI: Confidence interval.

4. Discussion and conclusion

The present study aims to document the prevalence and risk factors of violence against adolescents in the two most populous yet socio-economically lagging behind states of India. The UDAYA survey included questions on exposure to physical and emotional violence to adolescents since age ten or throughout married life. The UDAYA survey enabled a comparison between victims of violence and non-victims. Thus, the key strength of the present study is the self-reported data on violence exposure by adolescents in the state-level representative sample in Bihar and Uttar Pradesh, designed to understand the lives of adolescents and young adults.

The current study's findings on adolescent violence in Bihar and Uttar Pradesh reveal a high prevalence of physical and emotional violence, aligning with various global studies, yet also highlighting critical methodological differences. The UDAYA survey provides a comprehensive dataset documenting self-reported experiences of violence among adolescents in two Indian states. However, comparing these findings with those from other regions requires careful consideration due to differing measures and definitions of violence used in various studies. For instance, Peltonen et al. (2010) conducted a study in Denmark and Finland, finding that approximately 40 % of adolescents experienced verbal aggression or physical violence from their parents. This figure is comparable to the 37 % of married adolescent girls and 39 % of unmarried adolescents in Bihar and Uttar Pradesh reporting physical violence in our study. However, the definitions of violence used in the Nordic study may encompass different severities and types of violence compared to those in the UDAYA survey. This discrepancy underscores the need for standardized definitions and measurement approaches in studying adolescent violence to ensure more accurate cross-cultural comparisons. Without such standardization, the comparability of our results with other studies remains limited, highlighting the importance of context-specific interpretations and the cautious application of findings across different regions and cultures.

The literature also indicates that socio-economic factors significantly influence violence exposure. Blum et al. (2003) and Hunter et al. (2000) emphasize that low maternal education and poverty are crucial risk factors, which is consistent with our findings that adolescents from lower socio-economic backgrounds and deprived castes experience higher levels of violence. These socioeconomic disparities highlight the compounded vulnerability of certain adolescent groups, necessitating targeted interventions.

A comparison of unmarried and married (state-level representative) sample composition shows that married adolescents' socio-economic characteristics are systematically disadvantaged than those of unmarried adolescents. It hints at an early marriage of girls from lower socio-economic backgrounds. The study demonstrates that adolescents from a lower socio-economic background have a disproportionate burden of exposure to any type of violence. Adolescents from the lower wealth index, with no education, mothers without education, and from deprived castes, experienced a higher level of violence than the rest. Low maternal education and poverty have been associated with other risk factors, as found in previous literature (Blum et al., 2003; Hunter et al., 2000). Since exposure to violence has adverse cognitive and health outcomes, a higher level of exposure to violence by deprived adolescents may create a vicious cycle of underdevelopment. Thus, adolescents from more impoverished socio-economic backgrounds require special intervention from both government and non-government stakeholders. Also, efforts are needed to improve the socioeconomic conditions of such families through governmental intervention.

Furthermore, the increase in violence exposure among adolescent girls after marriage, as observed in our study, aligns with broader literature indicating that gender plays a significant role in the prevalence and type of violence experienced (Peltonen et al., 2010). This gender disparity points to the need for gender-specific policies and interventions to address the unique challenges faced by adolescent girls. Our findings also resonate with those of Hurt et al. (2001), Lai (1999), Mollen et al. (2004), Purugganan et al. (2000), and Singer et al. (1999), who documented various forms of violence in Western contexts. The similarities in prevalence rates suggest common underlying factors influencing adolescent violence globally, despite cultural and regional differences.

Another crucial finding of the study is the positive association between risk-taking behaviors such as alcohol consumption, drug abuse, and tobacco use and all types of violence, consistent with previous research (Smith-Khuri et al., 2004; Vermeiren et al., 2003). Furthermore, parental substance use is also positively correlated with adolescents' exposure to violence. This correlation indicates that parental behavior significantly impacts adolescent well-being, making it essential to address family dynamics in intervention strategies. Including parents in the intervention process can help break the cycle of substance use and violence within families, provide role models for healthy behavior, and create a supportive environment for adolescents. By involving parents, interventions can be more comprehensive and effective in reducing the overall levels of violence among adolescents.

Despite similar health and socio-economic indicators between Bihar and Uttar Pradesh, a notable disparity in adolescents' violence exposure exists between these two states. While there is no significant difference in physical violence by parents toward unmarried adolescents in Bihar and Uttar Pradesh, the levels of emotional and physical violence experienced by married adolescent girls are markedly higher in Bihar compared to Uttar Pradesh. These findings were consistently observed in regression analyses, even after controlling for other socio-economic factors affecting adolescents. Married adolescent girls in Bihar appear to face higher levels of violence than their counterparts in Uttar Pradesh due to a combination of socio-cultural and structural factors. Bihar remains among the states with the highest rates of child marriage in India, which increases the likelihood of early and unequal relationships that often involve power imbalance and limited agency for girls. Compared to Uttar Pradesh, Bihar also has lower female literacy rates and less access to education and employment, further reducing adolescent girls' autonomy and ability to seek support. Weak enforcement of protective laws and inadequate institutional mechanisms, such as shelters, legal aid, or inaccessible reporting systems, may continue to sustain a culture of impunity around gender-based violence in the state (Bajwa et al., 2019).

State-level differences in the experience of violence among married adolescent girls between Bihar and Uttar Pradesh reflect a complex mix of cultural, social, and economic factors. In Bihar, deeply rooted patriarchal norms support strict gender hierarchies, where male dominance and control over women are often socially accepted. Child marriage remains more common, placing adolescent girls in early unions where disparities in age, autonomy and power increase their vulnerability to violence. Dowry practices in Bihar are also more coercive, with unmet demands often leading to emotional, physical, or financial abuse. Socially, violence against women is often justified as a form of discipline, and adolescent girls face tighter restrictions on mobility and fewer opportunities to access education, peer contact, or institutional support. Economically, Bihar's higher levels of poverty and male unemployment exacerbate household stress, while weaker enforcement of legal protection and limited access to services diminish reporting and accountability. Although Uttar Pradesh shares some of these issues, targeted gender-equity initiatives, slightly higher education levels, and better integration of support services in certain regions may offer some protective benefits. Overall, these structural disadvantages in Bihar increase adolescent girls' risk of violence and underscore the need for a tailored, context-specific policy response.

Family violence against children or adolescents is a social problem in India, where in-depth research is still missing. Violence has a direct and indirect negative impact on children and adolescents in physical and psychological development. Family violence damages the quality of family life, not only for the victim but also for the entire family.

Adolescents become the silent sufferers of this violence, having a long-lasting impact on them. Even though most societies denounce violence, the reality is that many societies sanction violence under the cover of cultural practices and norms of misinterpretation of religious tenets. Since violence has both short- and long-term negative consequences, it calls for urgent protection. Like adult men, adolescent boys need access to services to help them deal with any violent behavior they may have experienced or been exposed to. Support services need to address associated behavior patterns, such as drug and alcohol problems or risky sexual behavior, in which adolescent girls and boys may indulge because of being victimized.

To better understand the causal pathways linking socio-economic disadvantage to violence against married adolescent girls in Bihar and Uttar Pradesh, future research should explore the structural and contextual mechanisms that drive this relationship. While both states face similar socio-economic challenges, the significantly higher levels of reported violence in Bihar suggest the presence of deeper, context-specific factors. Longitudinal studies are necessary to establish temporality and causality, particularly concerning parental substance use, economic instability, and early marriage, and how these factors accumulate over time to elevate adolescent girls' risk of violence. In-depth, mixed-method research across diverse socio-economic and cultural settings could further clarify how poverty, limited education, and restricted autonomy intersect to create conditions of increased vulnerability. Additionally, assessment of community and family-based interventions, along with comparative studies across other South Asian regions, would offer valuable insights into which approaches most effectively disrupt the cycles of disadvantage and violence. Such evidence is crucial for guiding targeted, sustainable policies and programmes.

Several limitations should be considered when interpreting the findings of this study. Firstly, the study's scope was confined to two states in India, limiting the generalizability of the findings beyond these specific regions. Secondly, the cross-sectional design of the study hinders the ability to establish causal relationships between the factors studied and adolescent violence. Future research employing longitudinal designs could provide more clarity on these relationships. Thirdly, reliance on self-reported and retrospective data in the survey introduces potential biases such as non-systematic reporting and recall bias. For married adolescent girls, the question was throughout their married life. However, there may be underreporting of lifetime exposure to violence due to recall errors. Therefore, it is suggested to collect and quantify the violence exposure one year before the survey date (Ruiz-Pérez et al., 2007). Similarly, we do not have any control over the reporting bias that may arise across socio-economic groups. Lastly, the regression models were constrained by the availability of variables in the dataset, excluding other socio-cultural, social desirability bias and behavioral factors that may influence violence outcomes. Also, the survey did not collect the different types of "physical violence/hurts" data. Detailed information on physical violence/hurt should be collected in future rounds of the study. Future studies should aim to include a more comprehensive set of variables to enhance understanding of these complex dynamics. Our measures of domestic violence against married adolescent girls are based on detailed self-reported experiences of physical and emotional abuse by husbands. While these indicators offer important insights, they do not encompass the full spectrum of violence, particularly sexual violence. Sexual violence was excluded from our analysis due to limitations in the UDAYA dataset. Although the survey collected some data on sexual violence, it was not available in a form suitable for consistent, reliable, or disaggregated analysis within the scope of this study.

In conclusion, adolescent exposure to and experience of family violence are influenced by the strength and vulnerability of individual adolescents, the character of the family setting they live in, and how they connect to their outside family and social world. However, to reach these hidden victims, all agencies, institutions, and service providers for children and adolescents must increase efforts to identify adolescents exposed to family violence and provide assistance to counsel them accordingly. Thus, changes in social policy, effective law enforcement, evaluation of rehabilitation programs, family life education, and training can help combat the problem to some extent. A multilevel effort to improve families' capacity to build relationship bonds, social controls coupled with positive and enriching school experience, and reduced opportunities for engaging in crime and other risk behaviors can prove beneficial in the long run.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT3.5 in order to improve the writing of the paper. After using this tool/service, the author(s) reviewed and edited the content as needed and take (s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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