

EpiCHILD assessment tool: identifying exposure to witnessed violence in children and adolescents

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Abstract

Introduction. Witnessed domestic violence is a widespread yet underrecognized form of childhood trauma, with serious consequences for the emotional, behavioral, and physical development of children and adolescents. In Italy, nearly half of domestic violence incidents occur in the presence of children, yet standardized tools for identifying affected minors remain scarce.

Objectives. This study presents the EpiCHILD assessment tool, designed to support the early identification of psychophysical vulnerabilities in children exposed to domestic violence and to guide targeted prevention and care strategies.

Methods. Developed within the ESMiVA study, EpiCHILD is a multidimensional electronic questionnaire composed of nine sections, incorporating validated instruments for PTSD (ITQ-CA), depression (CDI-2), and psychosocial functioning (SDQ-Ita). Administered by trained professionals in clinical and social service settings, the tool is GDPR-compliant and allows for flexible, child-centered use.

Conclusions. EpiCHILD enables systematic screening and early detection of children at risk due to violence exposure. It standardizes data collection across sectors and lays the groundwork for future research on the biological impact of trauma, including potential epigenetic markers, representing an innovative contribution to precision prevention in child mental health.

Key words

- witnessed domestic violence
- child and adolescent health
- psychological trauma
- early detection
- precision prevention

INTRODUCTION

Intrafamily assisted violence, also known as witnessed violence, is one of the most pervasive yet underrecognized forms of childhood trauma, with profound and lasting implications for a child's development and psychological well-being. Children and adolescents who witness acts of violence, particularly domestic violence within their homes, face an increased risk of a wide range of psychological, behavioral, and developmental problems. These effects may persist into adulthood, impacting not only mental and physical health but also relationships, academic performance, and future parenting practices.

The prevalence of witnessed violence among children is alarmingly high across multiple countries. In the United States, more than 15 million children live

in households where domestic violence has occurred at least once [1]. This staggering figure highlights the widespread nature of the issue: millions of children are exposed to violence in what should be their safest environment. Furthermore, studies show that 90% of children in such households are aware of the abuse [2], challenging the misconception that children are unaware of the violence occurring around them.

Globally, research confirms these trends. A meta-analysis by Mitchell *et al.* [3] estimates a prevalence of exposure to domestic and family violence between 11.1% and 23.3% for direct victimization, and between 8.2% and 26.3% for witnessing violence. In Australia, national surveys indicate that approximately 22% of adults report having either been abused or having witnessed parental violence before the age of 15 [4], un-

derlining the long-term impact of early exposure across populations.

The Italian context reveals similarly concerning patterns. According to Save the Children, more than 1.4 million women in Italy have reported being victims of domestic violence, and over 427,000 children have been direct or indirect witnesses to such violence against their mothers over a five-year period [5]. Among the more than 6.7 million Italian women who have experienced some form of violence over one in ten feared for their own lives or for their children's [6]. Notably, in nearly half (48.5%) of domestic violence cases, children directly witnessed the abuse, a figure that exceeds 50% in northwestern, northeastern, and southern regions of the country [5].

Figure 1 presents a conceptual framework outlining the multifaceted nature of this public health issue. It illustrates how the often-invisible, yet widespread phenomenon of child-witnessed violence contributes to a complex network of interconnected problems that require coordinated, multidisciplinary strategies for early identification and integrated intervention.

The consequences of witnessing violence are broad and severe. Children exposed to domestic violence are at a 1500% higher risk of also experiencing physical abuse or serious neglect compared to national averages [7]. They are six times more likely to attempt suicide and 50% more likely to engage in substance abuse [8]. These statistics underscore the devastating intergenerational cycle of trauma that unfolds when violence expo-

sure goes unrecognized and unaddressed. These effects can persist in adulthood, leading to psychological, behavioral, and developmental problems.

The concept of poly-victimization further emphasizes the complexity of these experiences. According to Finkelhor *et al.* [9], two-thirds of children exposed to violence have experienced two or more forms of victimization; 30% have experienced five or more, and 10% have endured more than ten.

A recent study by McCarthy *et al.* [10] on the development and validation of a national questionnaire on violence against children in the UK acknowledges witnessing domestic violence as a critical form of child maltreatment. Although the instrument addresses various forms of abuse (including physical, sexual, and emotional abuse, neglect, peer and dating violence, criminal exploitation, and community violence) it involves a dedicated section on witnessing domestic violence. This section contains seven items exploring experiences such as observing violence between cohabiting adults (e.g., parents or partners) and witnessing abuse directed at siblings. This approach reflects growing recognition of the significant psychological and emotional impact that such exposure can have on child development.

Despite the well-documented prevalence and consequences of witnessed domestic violence, standardized assessment tools for identifying affected children remain scarce and fragmented requiring multiple separate assessments to obtain a complete clinical picture. A recent systematic review identified only ten instru-

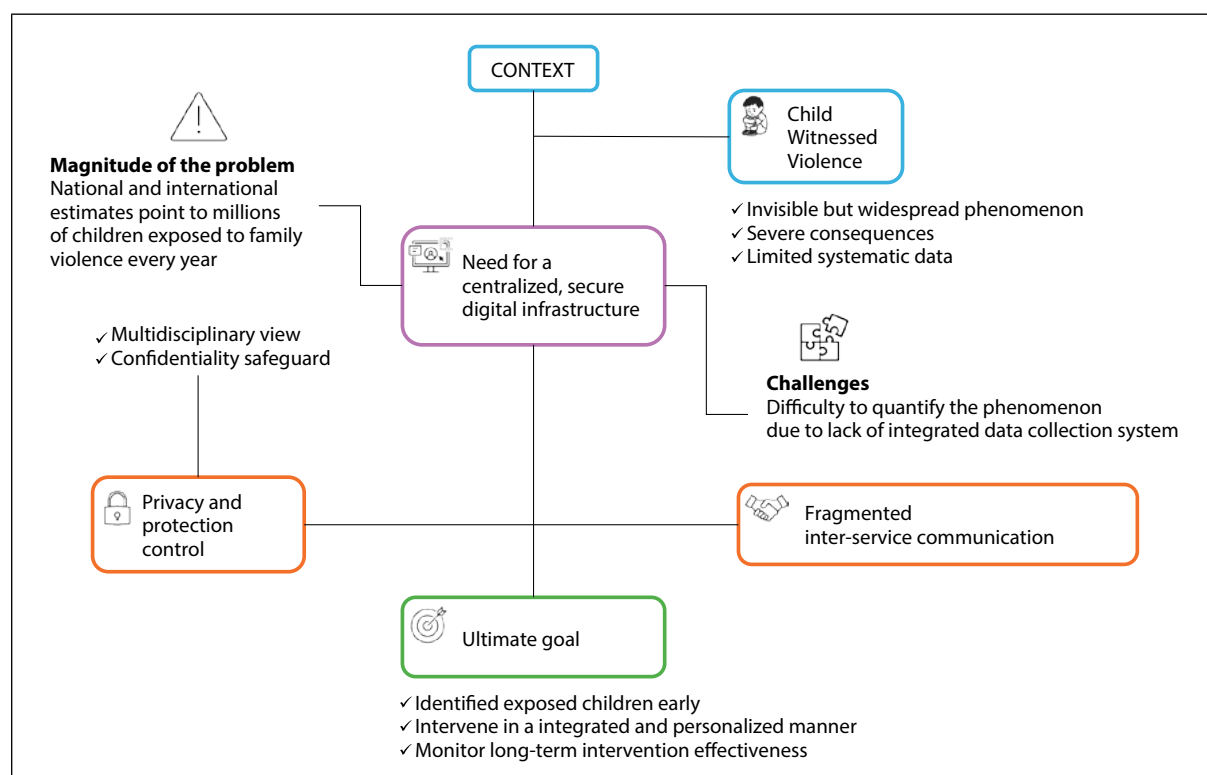


Figure 1

Conceptual framework for addressing child witnessed violence through multidisciplinary early identification and intervention. Original model developed by the Authors within the project "Violence against women: long-term health effects for precision prevention" funded by Ministry of Health (CCM-Centro Nazionale per la Prevenzione e il Controllo delle Malattie-Area Azioni Centrali).

ments specifically focusing on child exposure to domestic violence, most of which were validated exclusively in high-income countries, with only four demonstrating any cross-cultural applicability [11].

Existing measures generally fall into three main categories, each with distinct limitations. Exposure-specific tools, such as the Child Exposure to Domestic Violence Scale (CEDV), provide detailed assessment of exposure events but focus primarily on descriptive rather than clinical outcomes [12]. Broad victimization inventories, such as the Juvenile Victimization Questionnaire-Revised (JVQ-R2), offer comprehensive coverage of multiple forms of victimization but include only limited items on domestic violence specifically [13]. Conflict perception scales, such as the Children's Perception of Interparental Conflict Scale (CPIC), capture children's subjective experiences of interparental conflict but may overlook the broader dynamics and severity of domestic violence scenarios [14].

They also differ substantially in how they conceptualize and operationalize domestic violence exposure, complicating cross-study comparisons and hindering the development of standardized interventions [11].

Furthermore, no currently available instrument has been designed to align with precision medicine approaches that could support future integration with biological markers. As emerging evidence links trauma exposure to potential epigenetic modifications, there is a growing need for tools that can systematically collect multidimensional clinical and sociodemographic data while maintaining compatibility with biological sampling protocols.

Given the profound and multifaceted effects of witnessed violence, early identification of affected children is essential. Developing and implementing validated, specialized assessment tools is vital to equip health-care professionals, educators, social workers, and other frontline providers with the means to identify and assist these children. Such tools must be sensitive, developmentally appropriate, and culturally informed to ensure timely intervention, disrupt cycles of trauma, and promote resilience and recovery.

The EpiCHILD assessment tool was developed within the framework of the following study: "Administration of a questionnaire to minors exposed to witnessed violence and domestic crimes as a screening tool for the identification of predisposing factors for PTSD and other stress-related disorders: a prospective study (ESMiVA: Health Outcomes in Minors from Witnessed Violence)".

This research is part of a collaborative agreement between the Puglia Region, the Italian National Institute of Health (Istituto Superiore di Sanità), and the Ministry of Health, under the CCM project – Central Actions Area "Violence against women: long-term health effects for precision prevention". This initiative addresses the urgent need for systematic screening and identification of children exposed to witnessed violence in both clinical and community settings. It seeks to bridge the gap between research and practice by providing professionals with evidence-based tools to support vulnerable children and families.

The longitudinal design will allow not only the evaluation of the questionnaire's predictive and incremental validity but also the monitoring the long-term outcomes of violence exposure and assessing the success of potential psychotherapeutic and support interventions that the instrument aims to guide and facilitate. Furthermore, this approach opens doors to exploring transgenerational epigenetic inheritance and the transmission of trauma-related biological changes to future generations.

DEVELOPMENT OF EpiCHILD QUESTIONNAIRE FOR MINORS EXPOSED TO DOMESTIC VIOLENCE

The EpiCHILD interview-based questionnaire was developed to systematically, safely, and comprehensively collect data on minors exposed to witnessed violence and domestic crimes. Its primary objective is to provide an integrated and multidimensional assessment that supports the early detection of psychophysical vulnerabilities, facilitates targeted care, and contributes to the understanding of the biological and psychological impacts of such traumatic experiences.

Moreover, the tool aims to consolidate all relevant information concerning the child's or adolescent's exposure to violence into a single evaluation instrument. This integration enables health and social services to deliver tailored support while identifying early indicators of potential chronic conditions. EpiCHILD aligns with a precision medicine framework and is designed to: *i*) centralize clinical, familial, and behavioral data on the child; *ii*) support professionals in developing individualized therapeutic pathways; *iii*) provide foundational data for future epigenetic studies; and *iv*) standardize the assessment of Post-Traumatic Stress Disorder (PTSD) and depressive symptoms.

METHODS

The questionnaire is structured into nine standalone sections and is designed for use with minors under 18 years of age, including both children and adolescents (Figure 2).

Each section of the EpiCHILD questionnaire is designed to capture a specific dimension of the child's or adolescent's experience, health status, and psychosocial environment (*see Supplementary material available online*). This modular structure ensures a comprehensive and nuanced assessment of vulnerability factors, while allowing professionals to tailor the administration to the specific context and emotional readiness of the minor. Below is a detailed overview of the questionnaire's structure:

- *Section 1 General data collection*: facility code, child identification code, questionnaire date;
- *Section 2 Sociodemographic data*: gender, age, educational level of child and parents, parental employment, citizenship, household structure, duration of exposure to violence;
- *Section 3 Health and behavioral conditions*: physical and behavioral issues such as asthma, obesity, emotional dysregulation, ADHD, self-harm, etc.;
- *Section 4 Medication intake*: includes listing of any medications taken, especially psychotropics;

- *Section 5 Psychological/psychiatric care*: ongoing therapy, referrals to child psychiatry, or social support interventions;
- *Section 6 Description of violence*: relationship with the perpetrator, perpetrator's gender and age range, type and frequency of violence;
- *Section 7 PTSD assessment (ITQ-CA)*: International Trauma Questionnaire - Child and Adolescent version [15, 16];
- *Section 8 Depression assessment (CDI-2)*: self-report inventory to assess depressive symptoms in children [17, 18];
- *Section 9 Caregiver evaluation (SDQ-Ita)*: Strengths and Difficulties Questionnaire completed by the caregiver [19].

The selection of validated instruments for EpiCHILD was guided by several key criteria: alignment with the International Classification of Diseases, 11th Revision (ICD-11) diagnostic frameworks, established psychometric properties in pediatric populations, cultural adaptation for the Italian context, and complementary assessment approaches combining self-report and caregiver perspectives. All selected instruments demonstrate solid psychometric evidence supporting their use in pediatric populations, with validation studies spanning diverse settings and languages.

The International Trauma Questionnaire – Child and Adolescent version (ITQ-CA) was selected for the standardized assessment of (PTSD) in children and adolescents, recognizing the high prevalence of PTSD in this trauma-exposed population. The questionnaire is specifically designed to capture both PTSD and Complex PTSD (CPTSD) as per ICD-11, making it particularly suitable for complex traumas such as witnessed violence. Multiple studies confirm the ITQ-CA's robust

two-factor structure of CPTSD, clearly distinguishing between PTSD symptoms and Disturbances in Self-Organization (DSO) dimensions [15, 16] demonstrating excellent internal consistency across symptom clusters and strong convergent validity and correlating well with related symptoms including depression, anxiety, and dissociation.

The ITQ-CA has been validated across diverse trauma-exposed populations and cultural contexts, including foster children, clinical outpatient samples, and abuse-exposed youth. Notable validation includes a study of 135 foster children in Austria, where confirmatory factor analyses supported the ICD-11 model structure [16]. The instrument showed strong psychometric properties across various language versions, including German, Danish, Chinese, and Farsi, supporting its cross-cultural adaptability. A complementary caregiver version (ITQ-CG) has also shown strong validity and good agreement with child self-reports. In the Italian context, the adult version of the ITQ has already been validated in late adolescents affected by the 2009 L'Aquila earthquake in Central Italy, supporting the six first-order correlated-factors model and providing national prevalence estimates for PTSD and CPTSD [17].

The Children's Depression Inventory 2 (CDI-2) was included for the objective and standardized assessment of depressive symptoms. Depression is a significant and well-documented comorbidity in children and adolescents exposed to violence, with long-term impacts on their well-being [18, 19]. The CDI-2 offers age-appropriate language and content, making it suitable for the wide age range targeted by EpiCHILD. The CDI-2 was standardized on a normative sample of over 1,100 children and adolescents aged 7-17 years [18]. It demonstrates good internal consistency (Cronbach's α typically ranging from 0.80 to 0.90) and adequate test-retest reliability over 2-4 weeks ($r \approx 0.80$) [18]. This tool demonstrates sensitivity to developmental and cultural variations, and its use in national pediatric settings is further supported by the availability of standardized Italian norms.

The Strengths and Difficulties Questionnaire – Italian version (SDQ-Ita) was selected to capture caregiver perspectives on psychosocial functioning. The SDQ-Ita has been validated on 1,917 Italian school-aged children [20]. The original five-factor structure was confirmed through factor analyses demonstrating good internal consistency for the total difficulties score ($\alpha \approx 0.73$) and acceptable reliability for individual subscales ($\alpha \approx 0.62-0.76$), as well as appropriate test-retest reliability. Age- and sex-specific Italian norms are available, and cross-informant agreement between parents and teachers has been established. Completed by the caregiver, it provides an external and complementary perspective to the self-report, crucial for a holistic picture of the child's and adolescent's well-being and is widely validated. Although the SDQ is translated into Italian, it is primarily utilized in our context for a broader assessment of psychosocial functioning rather than as a formally validated PTSD-specific instrument for the Italian population. This multi-informant approach (child self-report for internal experiences, caregiver report for observable

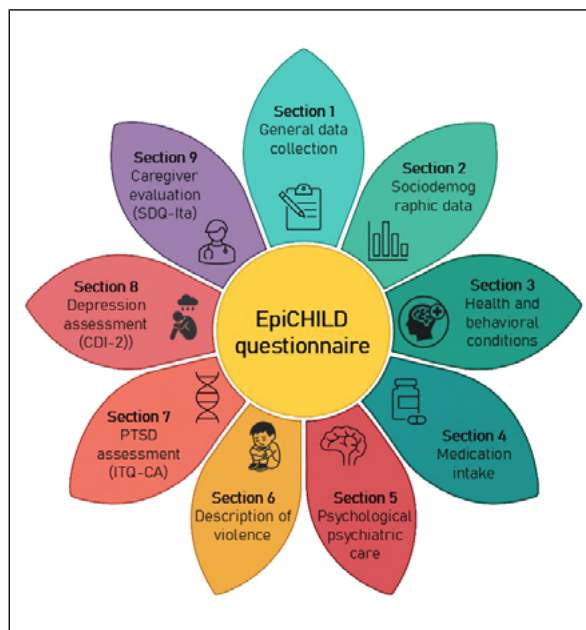


Figure 2

Schematic representation of the EpiCHILD questionnaire structure showing its nine thematic sections for assessing minors exposed to domestic violence and witnessed violence.

behaviors) strengthens the comprehensiveness and validity of the assessment while acknowledging developmental considerations in symptom recognition and reporting.

These psychometric properties support the inclusion of ITQ-CA, CDI-2, and SDQ-Ita as reliable and valid components of the EpiCHILD assessment tool.

The administration of the entire EpiCHILD interview can take place in healthcare settings or during social service consultations. Its flexible design ensures it can be used when the child is emotionally stable and willing to engage. For very young children (0-5 years), assessment must necessarily be based on caregiver reports, given the impossibility of obtaining reliable direct information from the children themselves. For school-aged children (6-12 years) and adolescents (13-18 years), the transition requires a shift in the diagnostic paradigm to account for increased self-report capabilities. On average, completion of the full questionnaire takes 20-30 minutes, though this may vary depending on the child's condition and responsiveness. Crucially, the modular structure allows for partial completion, accommodating the child's pace and comfort.

All data are collected electronically and stored in secure digital environments, in strict compliance with the EU General Data Protection Regulation (GDPR). Access is restricted to authorized personnel only, ensuring the confidentiality and ethical management of sensitive information.

The implementation of EpiCHILD offers several advantages. It promotes systematic identification of clinical and behavioral indicators associated with exposure to domestic violence. By incorporating internationally validated instruments (ITQ-CA, CDI-2, SDQ), it ensures the reliable assessment of PTSD, depressive symptoms, and psychosocial functioning.

Furthermore, the tool facilitates early activation of protection and care pathways for at-risk children and lays the foundation for future research on the biological impacts of trauma, including potential epigenetic effects. Its closed-ended questions reduce cognitive and emotional strain on the child, enhance clarity and consistency of responses, and streamline statistical analysis of the collected data.

DISCUSSION

According to the World Health Organization, one in three women globally has experienced intimate partner violence (IPV). Among children living in households where IPV occurs, 85% directly witness violent episodes, and up to 50% are subjected to direct abuse, predominantly by fathers or other male family members [21]. In Europe, survey data reveal that 19% of Italian women have experienced physical or sexual violence by a partner, and 38% have reported repeated psychological abuse [22]. Alarming, 65% of these women stated that their children had witnessed at least one violent episode [6].

A growing body of evidence highlights that witnessing domestic violence can have serious, long-term effects on children's emotional, behavioral, and developmental well-being, effects comparable to those of direct abuse [23, 24].

Such exposures are associated with negative health outcomes, including neurobiological, immune, metabolic, and cardiometabolic issues, and can lead to high levels of inflammation [25-27]. Studies have shown that exposure to psychosocial stress, particularly early in life, can alter brain development and promote chronic inflammation, an important mechanism that increases susceptibility to a wide range of negative physical and mental health conditions, including chronic diseases such as asthma, diabetes, and cardiovascular disease [28].

Despite the increasing implementation of laws aimed at combating domestic violence, there remains a critical gap in research regarding the actual impact of these legislative measures on children's health and recovery. Recent studies argue that future research should explore whether these laws achieve their intended goals (deterrence, protection, rehabilitation) and whether they result in tangible benefits or unintended consequences for children and families [29]. This gap underscores the need for evidence-based evaluations of legal and policy approaches to domestic violence.

The health consequences of witnessing violence often mirror those of direct victimization. In the absence of visible physical injuries, these children and adolescents may be overlooked by healthcare providers and social services, leading to a further layer of psychological trauma. Centralizing clinical data through standardized electronic tools like EpiCHILD is essential for longitudinal tracking and for understanding the cumulative effects of witnessed violence.

Assessing, contextualizing, and monitoring the short-, medium-, and long-term effects of exposure to violence is vital. Such efforts enable the acquisition of contextual information that can be linked in the future to molecular profiles. The health and well-being of children are investments in society's future; thus, identifying both risk and resilience factors is critical. It is now well established that trauma can affect genome functioning through epigenetic mechanisms, including DNA methylation, histone acetylation, and non-coding RNAs. In parallel research involving adult women exposed to violence (and in some cases their mothers) such epigenetic modifications are being studied as potential biomarkers for long-term health outcomes.

Extending this approach to minors could illuminate the biological underpinnings of trauma and provide new avenues for precision prevention. Investigating epigenetic profiles in children may help develop tailored protocols to prevent the early onset of non-communicable, chronic, and disabling conditions.

One particularly urgent issue is the plight of children orphaned by femicide, who often lose both parents in the aftermath, one to death, the other to incarceration. These children face profound psychological and emotional shock, which can have enduring consequences for their mental and physical health. There is an urgent need to establish national and regional protocols for long-term psychosocial and healthcare support to mitigate trauma and foster resilience. The development of a dedicated electronic assessment tool such as EpiCHILD is a significant step toward standardized data

collection and comprehensive monitoring of violence-related impacts on children.

Gender-specific dynamics must also be considered. In the context of witnessed domestic violence, boys are more frequently exposed to physical aggression, while girls are more often subjected to sexual victimization [30]. These differences can shape how trauma is processed and manifested. Studies suggest that gender influences identification patterns and behavioral modeling: males who witness maternal abuse are ten times more likely to become perpetrators themselves, while females raised in abusive households are six times more likely to experience sexual violence later in life [9].

Understanding the gendered manifestations of intra-familial violence is essential for effective assessment and intervention. While men are more often the aggressors, both men and women can be victims or enablers of violence. Gender-sensitive approaches must account for power imbalances, challenge harmful stereotypes, and provide inclusive, trauma-informed care. Intra-familial assisted violence comprises a spectrum of abusive behaviors, including coercion, neglect, and complicity, and necessitates the implementation of comprehensive, culturally responsive interventions. The EpiCHILD tool integrates these perspectives providing a foundational platform for long-term, data-driven interventions. By supporting early diagnosis and enabling future research into trauma's biological and psychological impacts, it serves both public health and child protection goals, helping to break the intergenerational cycle of violence and contribute to understanding psychophysical vulnerabilities.

While EpiCHILD integrates well-established validated instruments, its use as a unified battery requires comprehensive empirical validation. Future studies should examine its predictive validity by assessing its ability to forecast clinical outcomes, treatment response, and long-term developmental trajectories in children exposed to domestic violence. Research is also needed to evaluate its incremental validity, determining whether the integrated multidimensional assessment adds clinically meaningful information beyond existing approaches. Longitudinal studies will be crucial to assess its sensitivity to change, refine age-specific administration protocols, and define evidence-based cutoff scores to guide clinical decision-making.

CONCLUSIONS AND OUTLOOK

As outlined in this study, the EpiCHILD electronic questionnaire serves not only as a tool for early detection but also as a gateway to understanding the long-term biological and psychological consequences of witnessed violence in childhood. Emerging research suggests that domestic violence may leave lasting molecular traces, or "epigenetic scars", that alter gene expression through mechanisms such as DNA methylation, histone modification, and non-coding RNA regulation. Preliminary findings from our EpiWE pilot study revealed increased DNA methylation in PTSD-related genes among women who experienced violence [31]. When integrated with psychological assessments, these epigenetic markers may become powerful tools for de-

veloping targeted therapies within a precision medicine framework, potentially mitigating the long-term impact of trauma by addressing its biological roots [32]. Extending this line of research to children is essential. Investigating whether similar epigenetic modifications occur in the offspring of women exposed to violence could help unravel the complex molecular architecture of PTSD and other trauma-related disorders in childhood and adolescence. The prevalence of PTSD among children and adolescents is estimated at 16.6%, making this a significant area for research and clinical intervention [33].

The identification of epigenetic markers in minors could enable the design of novel therapeutic targets and preventive interventions. Moreover, it opens the door to exploring transgenerational epigenetic inheritance, the transmission of trauma-related biological changes to future generations. This field redefines our understanding of heredity, psychological vulnerability, and the intergenerational impact of violence.

Long-term monitoring and support for affected children are crucial. By collecting longitudinal data on pediatric cohorts, we can gain insights into the enduring effects of violence and develop more effective, personalized prevention strategies. Such efforts contribute not only to improved individual outcomes but also to the reduction of broader societal and economic pressures on healthcare systems.

The EpiCHILD tool is an important step toward this vision. It exemplifies how child-centered, science-driven approaches can strengthen public health systems, inform clinical practice, and empower caregivers and professionals alike. Through early identification, interdisciplinary collaboration, and integration with emerging research in epigenetics, we can move toward a model of precision prevention, protecting the health and futures of the most vulnerable children and adolescents of our society.

Ethics Committee

The EpiCHILD assessment tool was approved by the Local Ethics Committee of the Puglia Region, Italy (Protocol Number: 734 of 29/07/2025 – Substantive amendment No. 1 – Prot. 2235/CEL-Studio ESMiVA).

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Authors' contributions

AC, MG, SG and MGFB conceived and designed the study and wrote the manuscript. EC and VM revised and edited the manuscript. All Authors revised the manuscript for important intellectual content and agreed with this article's contents.

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Conflict of interest statement

The Authors declare no competing interests.

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