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Rethinking Trauma Care for Children in Conflict Zones: The Imperative of Neuroimaging Insights

Çatışma Bölgelerindeki Çocuklar için Travma Bakımını Yeniden Düşünmek: Nörogörüntüleme Bulgularının Önemi

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ABSTRACT

Children living in conflict areas experience a covert traumatic crisis that affects them psychologically and neurologically. This study examines the importance of neuroimaging for understanding the effects of childhood trauma on the prefrontal cortex, amygdala, and hippocampus. This review, which draws on findings from functional magnetic resonance imaging research, focuses on quantifiable alterations linked to depression and post-traumatic stress disorder, including amygdala hyperactivity and hippocampal atrophy. These results highlight the dual nature of trauma as a neurological and mental health issue that calls for multidisciplinary, trauma-informed care. The transformative potential of eye movement desensitization and reprocessing and cognitive behavioral therapy, which have shown promise in enhancing brain function and alleviating psychological symptoms, is further explored in the study. Although there are many obstacles to care in conflict areas, such as a lack of resources and limited access to services, incorporating neuroimaging into trauma therapy presents a viable avenue for delivering individualised and effective care. This study promotes international cooperation to close the resource gap, implement culturally aware interventions, and prioritise neurobiologically informed care. Children in areas devastated by war can find hope and healing by addressing the complex effects of trauma through a comprehensive framework that combines neuroimaging and tailored therapy.

Keywords: Neuroimaging, trauma-informed therapy, childhood PTSD

ÖZ

Çatışma bölgelerinde yaşayan çocuklar, onları hem psikolojik hem de nörolojik olarak etkileyen gizli bir travmatik kriz yaşamaktadır. Bu çalışma, çocukluk çağı travmasının prefrontal korteks, amigdala ve hipokampus üzerindeki etkilerini anlamada nörogörüntülemenin önemini incelemektedir. Fonksiyonel manyetik rezonans görüntüleme araştırmalarından elde edilen bulgulara dayanan bu derleme, depresyon ve travma sonrası stres bozukluğu ile ilişkili ölçülebilir değişimlere, özellikle amigdala hiperaktivitesi ve hipokampal atrofiye odaklanmaktadır. Bu bulgular, travmanın nörolojik ve ruh sağlığıyla ilgili çift yönlü doğasını vurgulamakta ve disiplinlerarası, travma odaklı bir bakım yaklaşımını gerekli kılmaktadır. Çalışmada ayrıca, beyin fonksiyonlarını iyileştirme ve psikolojik semptomları azaltma konusunda umut vaat eden göz hareketleriyle duyarsızlaştırma ve yeniden işleme ile bilişsel davranışçı terapinin dönüştürücü potansiyeli ele alınmaktadır. Çatışma bölgelerinde kaynak yetersizliği ve hizmetlere sınırlı erişim gibi birçok engel bulunsa da, nörogörüntülemenin travma terapisine entegre edilmesi, bireyselleştirilmiş ve etkili bakım sunma açısından umut verici bir yol sunmaktadır. Bu çalışma, kaynak açığını kapatmak, kültürel olarak duyarlı müdahaleleri hayata geçirmek ve nörobiyolojik temelli bakımı önceliklendirmek için uluslararası iş birliğini teşvik etmektedir. Savaşın yıkıma uğrattığı bölgelerdeki çocuklar, nörogörüntüleme ve kişiselleştirilmiş terapileri birleştiren kapsamlı bir yaklaşım sayesinde umut ve iyileşme bulabilir.

Anahtar Kelimeler: Nörogörüntüleme, travma odaklı terapi, çocukluk çağı TSSB

Introduction

The psychological and physiological consequences of child victimization in conflict zones demand urgent attention, particularly in regions such as Afghanistan, Syria, Palestine, Kashmir, and parts of Africa, where ongoing violence, displacement, and trauma are rampant. Understanding these impacts requires a multifaceted approach that considers both the psychological suffering and the neurophysiological alterations in the brains of children exposed to these traumatic experiences. Trauma does not solely manifest as a mental health crisis but also as a physical one, fundamentally altering brain structure and function, especially in regions critical for executive control, emotional regulation, and memory.[1,2]

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Research has shown that childhood trauma, particularly exposure to violence, displacement, and repeated disruptions, places children at increased risk of developing severe mental health disorders, including post-traumatic stress disorder (PTSD) and depression.[1,3] These disorders affect children's emotional well-being and have long-term implications for their cognitive and neurological development. The neuroimaging data from various studies, particularly those involving functional magnetic resonance imaging (fMRI), provide invaluable insights into the direct impact of trauma on the developing brain. These studies reveal measurable changes in brain structures, such as the hippocampus, amygdala, and prefrontal cortex, all of which are crucial for memory processing, emotional regulation, and decision-making.[4,5] These neurophysiological shifts are often linked to impaired executive functioning and an inability to regulate emotions effectively, conditions commonly observed in children who have experienced trauma in conflict zones.

The importance of neuroimaging in trauma care cannot be overstated, as it offers a critical tool for understanding the full scope of trauma's effects on children. Neuroimaging techniques, such as fMRI, can provide real-time data on how trauma alters the brain's neural pathways, thereby allowing clinicians to better tailor interventions based on each child's specific needs.[4] By incorporating neurological assessments into trauma-informed therapies, healthcare providers can address both the psychological and physiological aspects of trauma, offering a more holistic approach to care. This is particularly important in conflict zones, where access to mental health services is often limited and where children may face compounded challenges due to ongoing violence, displacement, and scarcity of resources.[6]

Furthermore, neuroimaging can enhance the efficacy of existing therapies, such as cognitive-behavioral therapy (CBT) and eye movement desensitization and reprocessing (EMDR), by providing evidence of how these therapies affect brain activity. Studies have shown that both CBT and EMDR can significantly alter neural activity in the brain regions associated with trauma.[4,5] This opens up new avenues for integrating neurofeedback and other brain-based therapeutic approaches into trauma treatment, potentially accelerating the healing process for children affected by conflict.

Despite the promising potential of neuroimaging in trauma care, significant barriers persist to the provision of adequate mental health services in conflict zones. In many parts of the world, including those affected by war and instability, the availability of mental health professionals, particularly those trained in neuroimaging, is extremely limited. This creates a critical need for international efforts to bridge gaps and to provide children in these regions with access to high-quality trauma care. Programs that facilitate cross-border cooperation and telemedicine initiatives could provide a pathway for delivering trauma-informed, brain-based therapy to children in need, even in the most remote and conflict-affected areas.[7]

Overall, there is a growing recognition of the importance of neuroimaging in understanding and treating childhood trauma, particularly in conflict zones. This research advocates for the integration of neuroimaging into trauma-informed therapies to provide a more comprehensive and practical approach to healing. The ultimate goal is to develop an interdisciplinary treatment framework that addresses the complex psychological and physiological impacts of trauma and offers hope and recovery to children affected by conflict worldwide.

The Hidden Crisis of Childhood Trauma in Conflict-Affected Areas

The need for a sustained and globally coordinated response to the psychological and neurological impact of conflict on children in Afghanistan, Syria, Palestine, Kashmir, and countries in Africa cannot be overstated.[8-10] Children residing in conflict zones experience ongoing exposure to violence, forced migration, and chronic instability, thereby significantly increasing their vulnerability to persistent psychiatric disorders, including PTSD and depression.[11,12]

Research utilizing neuroimaging, especially fMRI, has provided compelling evidence of the profound impact of trauma on children's psychological and neurobiological development. These studies have revealed measurable alterations in brain structures critical for emotional regulation and cognitive functions. For instance, trauma has been linked to decreased hippocampal volume—a brain region essential for memory processing and emotional regulation—and heightened amygdala activity, which is associated with fear and threat responses.[13,14] Such findings underscore the severe neurological toll that trauma exacts on children in these environments.

MRI studies focusing on conflict-affected children across multiple regions provide further insights into the neurobiological signature of trauma. Palestinian children exposed to sustained violence exhibit significant reductions in hippocampal volume (average reduction, 12%) and increased amygdala activity (14-30%).[15-17] These structural and functional changes are not merely academic findings; they closely correlate with clinical manifestations of PTSD, such as hypervigilance, emotional dysregulation, and difficulty in forming secure attachments.

The evidence from conflict-affected areas, particularly Kashmir, mirrors these global trends. Studies conducted in the region highlight the pervasive psychological impact on children exposed to prolonged violence and insecurity, further validating the necessity for targeted interventions.[6,18] Neuroimaging studies in this context have demonstrated similar patterns of hippocampal atrophy and hyperactive amygdala responses, further affirming the universal neurobiological impact of trauma across cultural and geographical boundaries.

Neuroimaging as a Perspective on Trauma's Neurobiological Signature

Neuroimaging studies have provided invaluable insights into the profound and specific impact of trauma on children's developing brains. Functional and structural imaging modalities such as fMRI and MRI have revealed measurable alterations in key brain regions, including the prefrontal cortex, amygdala, and hippocampus, which are pivotal for memory processing, emotional regulation, and executive functioning.[19,20]

These studies demonstrate that trauma is not merely a psychological construct but a neurobiological phenomenon with distinct patterns of brain dysfunction. For example, the prefrontal cortex, responsible for higher-order cognitive processes and impulse control, often shows reduced function in children exposed to chronic stress and violence, resulting in impaired decision-making and heightened emotional reactivity. Similarly, the amygdala, which governs fear and threat responses, shows hyperactivity in trauma-exposed children, a hallmark of PTSD symptomatology that includes hypervigilance and emotional dysregulation.[20]

Hippocampal atrophy is another consistent finding in neuroimaging studies. This brain region, essential for memory consolidation and for distinguishing real from perceived threats, exhibits significantly reduced volume in children affected by trauma. Studies focusing on Palestinian children exposed to protracted conflict report a 12% average hippocampal volume loss and a 14-30% increase in amygdala activity.[15-17] These structural changes are not isolated phenomena but are closely correlated with clinical manifestations such as impaired memory recall, avoidance behaviors, and exaggerated fear responses.

The alignment between neurobiological abnormalities and clinical symptoms strengthens the case for integrating neuroimaging into trauma-focused therapeutic approaches. For instance, hyperactivity of the amygdala observed in conflict-affected children may underlie their heightened emotional arousal and difficulties with emotion regulation. At the same time, the diminished hippocampal volume underscores challenges in memory retention and processing. This neurobiological perspective provides a foundation for tailoring therapeutic interventions, ensuring they address not only the psychological but also the neurological dimensions of trauma.

Therapeutic Interventions and the Potential for Neurobiological Recovery

Evidence from neuroimaging also emphasizes the potential for neurobiological recovery through focused therapy approaches. CBT and EMDR have been associated with improvements in brain structure and function.[21] Clinical studies suggest that CBT leads to increased hippocampal volume, decreased amygdala reactivity, and substantial reductions in PTSD and depression symptoms, with reported decreases of 35% and 28% for PTSD and depression, respectively.[22-24]

EMDR

EMDR is primarily used to treat children with trauma or PTSD. This method facilitates the processing of distressing memories by engaging the brain's natural healing mechanisms, often leading to more rapid symptom relief. A significant advantage of EMDR is its reduced reliance on verbal communication, making it particularly suitable for younger children or those who struggle to articulate their feelings. However, it is not without challenges. EMDR can evoke strong emotions during processing, requiring therapists to manage sessions carefully and to have specialized training in working with children. EMDR is effective in alleviating specific PTSD symptoms, including avoidance, hyperarousal, and re-experiencing.

However, children with severe developmental challenges or those unable to cope with the intense emotional content of trauma may not benefit as much from EMDR. In studies from Kashmir, EMDR contributed to a 33% reduction in PTSD symptoms and a 28% reduction in depressive symptoms.[25] These rates primarily reflect improvements in hyperarousal and re-experiencing symptoms, although detailed symptom-level data require further exploration.

CBT

CBT is a versatile and evidence-based therapeutic method effective for a wide range of mental health concerns, such as anxiety, depression, and behavioral issues. It focuses on teaching children coping mechanisms and problem-solving skills, contributing to their long-term mental well-being. Although adaptable to different age groups, CBT requires verbal communication and cognitive understanding; these requirements may limit its applicability for young children or those with developmental delays. CBT has demonstrated significant efficacy in addressing specific symptoms, including

Anhedonia, Negative Thinking Patterns, Hyperarousal and Emotional Regulation

In the same studies conducted in Kashmir, CBT was associated with a 33% reduction in PTSD symptoms and a 28% reduction in depressive symptoms.[25] These effects were particularly evident in reducing children's anhedonia and negative cognitive patterns.

Comparative Inclusion and Exclusion Criteria

To optimize therapy selection, explicit inclusion and exclusion criteria should be established:

- EMDR is suitable for children with trauma histories, especially those who struggle with verbal communication or who experience avoidance behaviors and hyperarousal. It is less appropriate for children with severe developmental impairments or for those who may find the emotional intensity overwhelming.

- CBT: Ideal for children who can engage in dialogue and cognitive restructuring, particularly those with anxiety or depression manifesting as anhedonia or negative thought patterns. However, it may not be suitable for children with significant cognitive impairments or those requiring rapid symptom relief.

A comprehensive assessment by a qualified mental health professional is essential to determine the most appropriate therapy tailored to each child's unique needs. By understanding the symptom-specific advantages and limitations of EMDR and CBT, clinicians can enhance treatment outcomes. Further research and clinical insights are necessary to refine inclusion criteria and better understand the symptom-level impacts of these therapies. Studies should aim to provide detailed symptom-specific data, clarifying which approach is more beneficial for PTSD symptoms (e.g., avoidance, hyperarousal) and depressive symptoms (e.g., anhedonia). These efforts will

ultimately support the development of more personalized, effective therapeutic interventions for children facing diverse mental health challenges (Table 1).[25]

The Imperative for Integrating Neuroimaging in Trauma-Centered Care

The evolving field of neuroimaging has the potential to transform trauma-centered care, particularly in conflict-affected settings. By providing precise, measurable insights into the neurobiological impact of trauma, neuroimaging technologies such as fMRI and MRI enable clinicians to monitor changes in brain structure and function over time. These advancements are not merely diagnostic tools but also foundational for developing adaptive therapy models tailored to the individual neurobiological consequences of trauma.[26]

One of the most compelling applications of neuroimaging is its ability to elucidate the relationship between key brain regions affected by trauma, such as the amygdala and the prefrontal cortex. In children exposed to chronic conflict, the amygdala often exhibits hyperactivity, leading to heightened fear responses and emotional dysregulation. Simultaneously, the prefrontal cortex, responsible for higher-order cognitive functions and emotional regulation, shows reduced functionality due to the chronic stress associated with traumatic experiences. Functional imaging studies in war-affected populations have demonstrated that therapeutic interventions, such as CBT, can enhance connectivity between these two regions. This enhancement is associated with improved emotional regulation and a reduction in PTSD symptoms, offering a neurobiological basis for the observed clinical improvements (Table 2).[27]

Beyond its role in understanding trauma's impact, neuroimaging facilitates the development of guided therapies that target specific brain abnormalities. For instance, interventions such as EMDR and trauma-focused CBT have shown measurable changes in brain activity. Studies have shown that these therapies can normalize hyperactive amygdala responses and improve prefrontal cortex function, thereby reinforcing resilience and emotional stability among children in conflict zones. Such findings underscore the importance of integrating neuroimaging into trauma care not only to assess baseline impairments but also to evaluate treatment efficacy over time.[26]

Moreover, neuroimaging allows for a personalized approach to therapy, moving beyond a one-size-fits-all model. By identifying the specific neural pathways affected in each child, clinicians can design targeted interventions that address both the psychological and neurological dimensions of trauma. This individualized care model is particularly critical in conflict-affected settings, where the intensity and nature of trauma can vary widely among children.

Overcoming Barriers to Access: Addressing Resource Gaps in Conflict Zones

Despite the transformative potential of neuroimaging-informed therapy, significant barriers impede its application in conflict-affected areas. These challenges are particularly pronounced in regions plagued by prolonged violence, forced displacement, and systemic instability, where mental health care remains critically under-resourced. While adjustment disorders and PTSD are expected consequences in such settings, the lack of infrastructure, trained professionals, and essential resources creates substantial obstacles to delivering comprehensive, trauma-focused care.[28]

The urgency of addressing these barriers is underscored by cross-sectional MRI findings from Afghan and Syrian youth, which reveal PTSD prevalence rates as high as 47% and significant neural alterations, including hippocampal volume reduction and hyperactivity in the amygdala. These neurobiological changes directly correlate with the severity of trauma and highlight the necessity for individualized, targeted interventions that address both psychological symptoms and underlying brain dysfunctions.[28] Without adequate support, children in these environments face a heightened risk of long-term cognitive, emotional, and behavioral impairments.

To bridge these gaps, the International Mental Health Framework advocates for a paradigm shift towards early, trauma-informed care that integrates neurobiological evaluations with culturally sensitive approaches. This framework emphasizes the need to establish community-based services supported by a multidisciplinary team of specialists, including mental health practitioners, neurologists, and social workers. Such teams can provide holistic, evidence-based interventions tailored to the unique needs of conflict-affected populations.[29]

Table 1. Therapeutic approaches and their applications

Aspect	Cognitive behavioral therapy	Trauma-informed care	Eye movement desensitization and reprocessing
Application	Addresses maladaptive thoughts and behaviors; involves psychoeducation and skill-building.	This approach recognizes trauma's impact and focuses on safety, trust, and empowerment.	Uses bilateral stimulation (eye movements) to desensitize and reprocess traumatic memories.
Typical duration	8-20 sessions, depending on complexity and severity of symptoms.	Continuous; integrated into all therapeutic practices rather than fixed-duration sessions.	6-12 sessions for most cases; varies based on trauma severity.
Target population	Suitable for all age groups, including children with trauma-related symptoms.	Applicable to all age groups; particularly effective in systemic and relational contexts.	Effective for children and adults with post-traumatic stress disorder or complex trauma.
Core focus	Modifies dysfunctional beliefs, improves emotional regulation, and builds coping skills.	Emphasizes understanding trauma's effects and fostering resilience.	Focuses on resolving unprocessed trauma and reducing distress.

Additionally, advancements in mobile neuroimaging technologies and telehealth platforms offer promising avenues for overcoming logistical constraints in resource-limited settings. Portable MRI and fMRI units, combined with remote access to trained neuroimaging analysts, can extend diagnostic and therapeutic capabilities to regions previously inaccessible to such services. These innovations also facilitate ongoing monitoring of treatment outcomes, enabling clinicians to refine interventions and ensure their effectiveness over time.

Research and Intervention in Future Directions for Students Labelled Learning Disabled

The intersection of trauma, neurodevelopment, and learning disabilities represents a critical frontier in neuroimaging research. Future research must expand the application of neuroimaging techniques in diverse conflict-affected populations, with particular focus on children identified as having learning disabilities attributable to trauma-related cognitive and emotional impairments. These efforts aim to elucidate the "neurobrisance" of injury—that is, how trauma disrupts neural development and functional capacity—and to inform targeted interventions.

Longitudinal studies are essential to understanding the long-term impact of trauma on the neural architecture and cognitive functioning of these children. Such research can reveal how therapeutic interventions, such as CBT and pharmacological treatments, influence the trajectory of brain development. For instance, studies involving Palestinian children exposed to chronic conflict have shown that six months of combined CBT and pharmacological therapy leads to significant neurobiological changes, including increased hippocampal volume and decreased amygdala hyperactivity. These findings underscore the potential for therapy to facilitate neurobiological recovery and improve learning and emotional regulation outcomes (Table 3).[30,31]

Table 2. Brain areas involved in trauma

Brain area	Amygdala	Prefrontal cortex
Primary role	Emotion regulation, especially fear and threat responses.	Higher-order cognitive functions, including decision-making, planning, and personality.
Impact of trauma	Hyperactivity in response to triggers can lead to heightened fear and anxiety.	Reduced functionality affects impulse control and emotional regulation.
Relevance to therapy	Targeted to down-regulate hyperactivity via desensitization (e.g., in eye movement desensitization and reprocessing).	Aims to strengthen functionality through coping strategies and cognitive restructuring (e.g., in cognitive behavioral therapy).

Table 3. Pharmacological treatment

Symptom	Medication class	Common medications	Remarks
Persistent sadness or low mood	Selective serotonin reuptake inhibitors (SSRIs)	Fluoxetine (prozac), sertraline (zoloft)	Fluoxetine is Food and Drug Administration-approved for children 8+ for major depressive disorder.
Loss of interest in activities	SSRIs	Escitalopram (lexapro)	May improve motivation and enjoyment in daily activities.
Irritability	SSRIs or atypical antidepressants	Fluoxetine, bupropion (wellbutrin)	Bupropion is sometimes used off-label for adolescents.
Sleep disturbances (insomnia)	Sedative-hypnotics or SSRIs	Trazodone, fluoxetine	Trazodone may be prescribed in low doses to improve sleep.
Appetite changes	SSRIs or appetite stimulants	Mirtazapine (remeron)	Mirtazapine can help with weight gain and sleep, especially if there is weight loss.
Fatigue or lack of energy	SSRIs or atypical antidepressants	Bupropion, sertraline	Bupropion may help with energy levels and focus.
Difficulty concentrating	SSRIs or stimulants	Fluoxetine, methylphenidate (ritalin)	Stimulants may be used in cases of comorbid attention deficit hyperactivity disorder.
Feelings of worthlessness or guilt	SSRIs	Fluoxetine, escitalopram	Early therapy combined with medication can help address these cognitive symptoms.
Thoughts of self-harm or suicide	SSRIs (closely monitored)	Fluoxetine, sertraline	Requires immediate intervention and monitoring for suicidal ideation.
Psychomotor agitation or retardation	SSRIs	Fluoxetine	Can reduce restlessness or slow movements.
Severe cases with lack of response	Combination therapies (SSRIs + others)	Fluoxetine + risperidone (antipsychotic)	Used in severe or treatment-resistant depression.

Additionally, neuroimaging-assisted interventions offer promising avenues for addressing the mental health needs of children from military families, who often face unique stressors related to frequent relocations, familial separations, and exposure to conflict. Research in this domain highlights the efficacy of neuroimaging-guided therapeutic approaches in enhancing emotional resilience and cognitive performance. These methods can identify specific neural deficits, such as reduced prefrontal cortex activity or impaired hippocampal functioning, and tailor interventions accordingly.

A key area for future investigation is the relationship between trauma-induced neurobiological changes and the academic performance of students labeled as learning-disabled. By integrating neuroimaging with educational assessments, researchers can better understand how trauma impacts executive functioning, memory, and attention—core skills essential for learning. Such insights can drive the development of neurobiologically informed educational strategies, including trauma-sensitive pedagogical frameworks and individualized learning plans.

Moreover, improving access to neuroimaging technologies in low-resource settings is imperative. Portable imaging devices and telehealth platforms can enable researchers and clinicians to extend their reach to underserved populations, ensuring that children in conflict-affected areas receive timely and effective interventions.

A Call to Rethink Trauma Care for Conflict-Affected Children

The growing body of neuroimaging research underscores the urgent need for a systematic, evidence-based approach to trauma care for children living in conflict zones. Neuroimaging not only highlights the profound neurobiological impacts of trauma but also offers a roadmap for targeted interventions that address both structural and functional brain impairments. These findings make it imperative to integrate psychological counseling with neurobiologically informed treatments, transforming how trauma is managed globally.

The integration of therapies such as CBT and EMDR into trauma care offers two advantages. These evidence-based approaches not only repair critical brain regions, such as the hippocampus and prefrontal cortex, but also alleviate psychological symptoms, such as hyperarousal, avoidance behaviors, and anhedonia. For instance, CBT has been shown to improve hippocampal volume and prefrontal cortex function, enhancing memory, emotional regulation, and executive control. Similarly, EMDR facilitates the desensitization of traumatic memories, normalizing hyperactivity in the amygdala and promoting resilience.[22,23]

To truly address the multifaceted needs of trauma-affected children, a reimagined global framework for trauma care is essential. This framework must prioritize:

- **Evidence-based interventions:** Ensuring widespread access to therapies like CBT and EMDR, which have demonstrated effectiveness in improving both mental health outcomes and neurobiological recovery.
- **Holistic treatment models:** Combining psychological therapies with neurobiological evaluations to create individualized care plans tailored to each child's specific needs.
- **Global funding and policy support:** Mobilizing resources to build infrastructure, train clinicians, and deploy neuroimaging technologies in conflict-affected regions.
- **Research and innovation:** Supporting longitudinal studies and clinical trials to refine existing treatments and explore novel therapeutic approaches.

The opportunity to revolutionize trauma care lies at the intersection of science, empathy, and collaboration. By committing to a multidisciplinary, globally coordinated approach, we can address the diverse requirements of trauma-affected children and foster long-term recovery and resilience. This commitment entails robust funding mechanisms, the dissemination of evidence-based, reproducible practices, and a focus on equity to ensure that even the most underserved populations benefit from advancements in trauma care.

Conclusion

Brain imaging provides an overview of the neural basis of trauma and supplies important data to inform rehabilitation approaches. Investments in early, neurobiologically-based therapies and in the promotion of holistic healthcare are not just useful but essential. Now is the time to leverage advances in science, global resources, and empathetic, tailored treatments to restore good health, adaptability, and opportunities for children who are persistently affected by violence.

Footnotes

Authorship Contributions

Concept: M.M.A., Design: M.M.A., Data Collection or Processing: M.M.A., Analysis or Interpretation: M.M.A., J.J., Literature Search: M.M.A., J.J., Writing: M.M.A., J.J.

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