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ADVANCING THE CLINICAL UNDERSTANDING AND THERAPEUTIC STRATEGIES FOR NON-EPILEPTIC SEIZURES IN PEDIATRIC PATIENTS

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Abstract: Psychogenic non-epileptic seizures (PNES) in children represent a functional neurological condition where seizure-like episodes occur without associated abnormal electrical brain activity. Often misdiagnosed as epilepsy, PNES result in delayed psychological intervention and unnecessary pharmacotherapy. This narrative review synthesizes current international and regional literature on the clinical features, diagnostic strategies, and therapeutic approaches for PNES, with specific emphasis on children aged 7–14 in Uzbekistan. The review underscores the role of psychosocial stressors, high rates of psychiatric comorbidities (e.g., anxiety, depression), and the utility of video-EEG in diagnosis. Multidisciplinary management—anchored in cognitive-behavioral therapy (CBT), psychoeducation, and family engagement—is associated with favorable outcomes. Tailoring diagnostic and therapeutic frameworks to the Uzbek context is essential to improve early identification and care quality for affected children.

Key words: Psychogenic non-epileptic seizures, PNES, pediatric neurology, Uzbekistan, EEG, functional neurological disorder, cognitive-behavioral therapy, child psychiatry, conversion disorder, stress-related seizures.

INTRODUCTION

Non-epileptic seizures (NES) in children – often psychogenic or “functional” in origin – are paroxysmal events resembling epileptic seizures but without the hallmark abnormal electrical discharges. These episodes can be physically dramatic, yet standard EEG monitoring shows no epileptic activity [1]. NES are frequently linked to psychosocial stressors or underlying psychiatric conditions (for example, anxiety, depression, trauma, or family conflicts) [2]. In many cases, children with NES are first diagnosed and treated for epilepsy, delaying the true diagnosis by years. Globally, PNES (psychogenic non-epileptic seizures) affect an estimated 2–33 per 100,000 people, and up to 75% of those individuals were initially misdiagnosed with epilepsy [4]. In Uzbekistan and Central Asia, the burden of seizures is significant – for example, Uzbekistan’s idiopathic epilepsy prevalence is among the highest in the region (473 per 100,000) [7] – underscoring the importance of differentiating true epilepsy from NES. Untreated or mismanaged NES can disrupt schooling, social development, and family life. This review summarizes the clinical features, psychosocial correlates, and management of pediatric NES, with recommendations for improving care, especially in the context of Uzbek children.

METHODS

We performed a comprehensive literature review focused on pediatric non-epileptic seizures and their management. Databases searched included PubMed, Google Scholar, and relevant organizational websites (e.g. ILAE, hospital neurology departments) using keywords such as “non-epileptic seizures,” “psychogenic seizures,” “pseudoseizures,” “children,” “treatment,” and “management.” No date or

language restrictions were applied, and emphasis was placed on studies describing clinical features, psychosocial factors, outcomes, and treatment approaches in children. Relevant guidelines and consensus statements were also included. Information from regional contexts and Uzbekistan was sought where available, but most evidence comes from international studies of pediatric NES. Key articles were critically analyzed to identify common findings and recommendations.

RESULTS

Clinical Presentation and Course of NES in Children

Children with NES often present with episodes of altered consciousness or abnormal movements that mimic epilepsy. Unlike epileptic seizures, NES typically occur in response to stress or emotional triggers [2]. Semiologically, the most frequent finding is prolonged unresponsiveness with minimal or subtle motor signs. For example, a study of 17 Indian children with psychogenic seizures found that 82% were unresponsive without major convulsive movements during the "ictal" events. On the other hand, vigorous movements (pelvic thrusting, thrashing, head shaking, or vocalizations) occur in a minority of cases. Importantly, NES episodes do *not* show epileptiform discharges on EEG [1]; prolonged video-EEG monitoring (vEEG) usually reveals normal brain activity during events, confirming the non-epileptic nature. In fact, international reviews report that video-EEG is the diagnostic gold standard in over 80% of pediatric PNES cases.

NES episodes may be brief or prolonged, and frequency varies. They often coincide with identifiable stressors: academic pressure, family conflict, bullying, or trauma (emotional or physical). Triggers commonly reported in children include familial distress (such as parental conflict or illness) and peer/social stress. In one Korean series, 40% of children had identifiable familial stressors and 24% had social stressors preceding the onset [2]. Many families also describe a chronic course: children may experience recurrent episodes over months to years.

Psychosocial and Psychiatric Features

Psychiatric comorbidities are highly prevalent in pediatric NES. In the Yonsei Med J series, 72% of children with PNES had at least one comorbid psychiatric diagnosis, most commonly depression (36%), anxiety, conduct disorder, or adjustment disorder [2]. Other studies similarly emphasize that emotional dysregulation and past trauma (e.g., abuse or bereavement) are frequent in children with NES. For instance, psychosocial stress is a defining characteristic: one Indian study reported children with NES had significantly more life stress events in the prior year than healthy or epileptic controls. Patients may not always articulate the stress consciously, but behaviors like social withdrawal, irritability, or somatic complaints (headaches, stomach aches) often accompany their episodes [5].

These observations align with the conceptualization of NES as a **conversion or dissociative disorder** – physical manifestations of psychological conflict. Importantly, children with NES are not "faking" symptoms. Clinical descriptions emphasize that seizures are involuntary, often accompanied by distress or shame afterwards. Thus, a caring, nonjudgmental approach is critical when engaging families, to avoid stigmatizing the child.

Diagnosis and Differential Considerations

Differentiating NES from epileptic seizures is paramount because management differs radically. Key distinguishing features include: (1) **EEG findings:** epileptic seizures produce abnormal EEG signals, whereas NES do not; (2) **Clinical semiology:** NES often involve gradual onset, longer duration, side-to-side head shaking (rather than tonic-clonic), pelvic thrusting, or asynchronous limb movements, and the child's eyes may be closed during an NES, unlike many epileptic seizures; (3) **Responsiveness:** during an NES, vital signs are typically normal and post-ictal confusion or amnesia (common after true seizures) is often absent. Nonetheless, overlap can occur and definitive diagnosis often relies on captured events.

Clinical guidelines recommend thorough history-taking, including eyewitness descriptions, medical/trauma history, and psychosocial context [3, 5]. Video-EEG monitoring is the gold standard:

over 80% of pediatric PNES studies use vEEG for diagnosis. In settings without vEEG, clinicians may rely on "probable" diagnostic criteria: consistent semiology, normal interictal EEG, and resolution of episodes with psychotherapy. Importantly, invasive provocative tests or deceptive maneuvers (e.g. telling patients that an intervention will stop seizures when it cannot) are strongly discouraged [3]. Once NES is diagnosed, practitioners should continue neurological follow-up and avoid abrupt withdrawal of all medications unless certain epilepsy has been ruled out.

Management and Treatment Outcomes

Management of pediatric NES is multidisciplinary. The cornerstone is **psychoeducation**: clearly explaining to the child and family that the seizures are real but stress-related, not signs of an untreatable neurological disease [4]. This often requires patience to overcome stigma about "mental" illness. Treatment then focuses on addressing underlying stressors and teaching coping strategies.

Psychotherapy is the mainstay. Cognitive-behavioral therapy (CBT) – including relaxation training, emotional awareness, and coping skills – is often recommended as first-line, especially because it has evidence of efficacy in pediatric PNES [6]. Other modalities like supportive psychotherapy, family therapy, or psychotherapy for trauma (if present) may be used. One patient guide note that more than half of children stop having seizures shortly after starting appropriate therapy [5]. Similarly, long-term outcome studies report favorable results: in a series of 25 children, 80% were event-free and 12% improved after ~2.5 years of combined psychotherapy (and medications when needed). Another pediatric study found 82% of children had >50% reduction or complete cessation of NES within 3–6 months of therapy [1]. In general, children tend to recover better and faster than adults once the diagnosis is made and treatment begins.

Medication has a limited role. Anti-epileptic drugs are usually tapered off unless there is co-existing epilepsy. However, pharmacotherapy may be indicated for comorbid conditions: for example, antidepressants or anxiolytics can help treat severe anxiety or depression that may underlie the seizures. Medication by itself does not cure NES, but may augment psychotherapy for certain patients.

Family and school involvement is crucial. Educating parents, teachers, and peers can create a supportive environment. Care plans should ensure the child feels safe and understood. For instance, Henry Ford Health emphasizes a coordinated plan involving family, therapists, and school personnel, all working together with the same goals. Simple measures – like allowing a child to lie down if a seizure occurs, or reducing academic stress temporarily – can be helpful.

Modern consensus guidelines reflect these approaches. An international task force (ILAE Pediatric Psychiatric Issues) generated recommendations for pediatric PNES management in 2023, based on a scoping review and expert Delphi consensus [3]. Key points include thorough psychosocial assessment (history, stressors), using video-EEG when possible, and involving epilepsy-trained neurologists in follow-up. The guidelines stress that children with PNES should be screened for mental health and developmental issues, and that education (for patients and families) is a core part of treatment. Treatment plans should be individualized according to the child's age, cognitive level, and family context, but must always include psychological therapy and support [1, 3]. In sum, evidence-based management of child NES combines neurology and mental health care, with the goal of restoring normal function.

DISCUSSION

Non-epileptic seizures in children are a complex, but treatable, phenomenon. Recognizing their characteristic features and triggers is the first step to avoiding misdiagnosis. In Uzbekistan, as elsewhere, pediatric neurologists and pediatricians should consider NES in any child (especially older ones, ages 7–14) who has "seizures" unaccompanied by EEG changes or who does not respond to epilepsy drugs. This is particularly relevant given the high prevalence of epilepsy in Uzbekistan (e.g. ~473/100k idiopathic epilepsy in 2021) [7]; without vigilance, many functional seizures may be wrongly labeled as drug-resistant epilepsy.

Improving treatment outcomes in the Uzbek context may involve several strategies. First, increasing **awareness and training** among healthcare providers is vital. Workshops or guidelines in Uzbek or Russian for doctors could highlight the red flags of NES and the importance of early referral to mental health services. Second, **access to diagnostic tools** should be enhanced: if video-EEG is not available locally, training clinicians to use scalp EEG with careful observation (or even smartphone video recordings of events) can help raise suspicion of NES. Third, **integrating psychological care** into pediatric neurology services is key. Uzbekistan's healthcare system emphasizes public psychiatric care, so building collaboration between neurology clinics and child psychiatrists/psychologists would allow children with NES to get counseling and therapy. Since mental health is a public priority in Uzbekistan, leveraging existing school psychology programs or UNICEF-sponsored child support initiatives might provide avenues for delivering stress-management and family counseling to affected children.

In terms of therapeutic improvements, Uzbek practitioners can adopt the approaches proven abroad: standardized psychoeducation materials (explaining NES as a stress response), cognitive-behavioral therapy adapted for local culture, and involvement of families in therapy sessions. A multidisciplinary team might include a neurologist (to monitor seizures), a child psychiatrist or psychologist (to treat emotional issues), and when possible, social workers or school counselors. Novel therapies – such as mindfulness-based stress reduction or biofeedback – could also be introduced as adjuncts if resources allow. Importantly, addressing cultural stigmas is necessary: families should understand that NES are **real and reversible** conditions, not willful misbehavior.

Finally, **research and data collection** in the region should be encouraged. Currently there are no published studies on pediatric NES in Central Asia to our knowledge. Local data on prevalence, common stressors (which could differ culturally), and treatment barriers would guide more tailored interventions. In the meantime, adherence to international best practices (as summarized above) offers the best path to care.

CONCLUSION

Non-epileptic seizures in children are common and debilitating if unrecognized, but highly responsive to proper treatment. Clinicians in Uzbekistan and beyond should maintain a high index of suspicion for NES in school-aged children with atypical seizures or psychosocial difficulties. Accurate diagnosis (principally via EEG) and prompt psychosocial intervention – primarily psychotherapy and education – lead to marked improvement in the majority of cases [1, 2]. Developing coordinated care pathways, training healthcare providers, and reducing stigma will improve outcomes. By combining neurologic and psychiatric expertise, the healthcare system can ensure that Uzbek children with NES reclaim normal developmental trajectories and quality of life.

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