

UNRAVELING THE ENIGMA OF APPROACH TO DIAGNOSIS AND MANAGEMENT OF PSYCHOGENIC NON-EPILEPTIC SEIZURES : LITERATURE REVIEW

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ABSTRAK

Kejang Non-Epileptik Psikogenik (PNES) memadukan aspek neurobiologis dan psikologis, sehingga menimbulkan tantangan diagnostik dan pengobatan. Meskipun sering terjadi, penelitian masih kurang sehingga menyebabkan kesalahan diagnosis dan perawatan yang tidak memadai. Studi ini melakukan tinjauan literatur menyeluruh, memeriksa artikel, uji coba, dan meta-analisis dari 20 tahun terakhir mengenai penyebab, diagnosis, dan pengobatan PNES dari database seperti PubMed dan PsycINFO. Hal ini menekankan perlunya pendekatan multidisiplin, menggabungkan penilaian neurologis dan psikologis. Stres dan trauma sangat penting dalam perkembangan PNES, sehingga menyarankan psikoterapi dan, bila diperlukan, pengobatan. Tinjauan tersebut menunjukkan tidak adanya standar diagnostik dan pengobatan yang seragam, sehingga menyoroti perlunya penelitian lebih lanjut. Ini menganjurkan tim multidisiplin dan perawatan yang berpusat pada pasien untuk meningkatkan hasil. Pekerjaan di masa depan harus fokus pada pembuatan pedoman manajemen PNES yang terstandarisasi, mempromosikan perawatan komprehensif yang memenuhi kebutuhan spesifik pasien.

Kata kunci : faktor neurobiologis, kejang psikogenik non epilepsi (PNES), penilaian psikologis

ABSTRACT

Psychogenic Non-Epileptic Seizures (PNES) blend neurobiological and psychological aspects, posing diagnostic and treatment challenges. Despite their frequency, there's a lack of research, leading to misdiagnoses and inadequate care. This study conducts a thorough literature review, examining articles, trials, and meta-analyses from the last 20 years on PNES' causes, diagnosis, and treatment from databases like PubMed and PsycINFO. It emphasizes the need for a multidisciplinary approach, combining neurological and psychological assessments. Stress and trauma are crucial in PNES' development, suggesting psychotherapy and, when necessary, medication. The review points out the absence of uniform diagnostic and treatment standards, highlighting the necessity for more research. It advocates for multidisciplinary teams and patient-centered care to enhance outcomes. Future work should focus on creating standardized PNES management guidelines, promoting comprehensive care that meets these patients' specific needs.

Keywords : *psychogenic non-epileptic seizures (PNES), neurobiological factors, psychological assessment*

INTRODUCTION

Psychogenic Non-Epileptic Seizures (PNES) represent a complex psychiatric disorder characterized by recurrent seizure-like episodes without the neurophysiological basis typically observed in epileptic seizures. Unlike epileptic events, which are underpinned by abnormal electrical discharges within the brain, PNES episodes lack this neuroelectrical hallmark. The etiology of PNES remains elusive, though prevailing hypotheses suggest a strong linkage to psychological stressors. These hypotheses posit that PNES may serve as a somatic manifestation of underlying psychological or emotional turmoil. Contemporary research endeavors are dedicated to elucidating the precise pathophysiological mechanisms underlying PNES, in an effort to rectify the prevailing societal underestimation of its severity and impact.

This ongoing research is crucial, as it contributes to a more nuanced understanding of PNES, facilitating improved diagnostic accuracy and therapeutic interventions.

METHOD

To elucidate the multifaceted etiology and optimal management strategies for Psychogenic Non-Epileptic Seizures (PNES), this study adopts a comprehensive literature review methodology, drawing from an extensive array of peer-reviewed journals, clinical trial reports, and meta-analyses. The review focuses on synthesizing current research findings concerning the neurobiological and psychological underpinnings of PNES, diagnostic challenges, and the efficacy of various treatment modalities. The search strategy involves querying multiple electronic databases, including PubMed, PsycINFO, and Scopus, using a combination of keywords related to PNES, such as "psychogenic non-epileptic seizures," "functional neurological disorder," "conversion disorder," "diagnosis," "neurobiological factors," "psychological assessment," "treatment," and "multidisciplinary approach." The search is refined to include studies published in the last two decades to ensure relevance and recency, with a focus on articles written in English. Inclusion criteria for the literature review are defined to select empirical studies, review articles, and clinical guidelines that provide significant insights into PNES.

Exclusion criteria are set to omit editorials, commentaries, and studies with insufficient methodological details, ensuring the inclusion of high-quality, evidence-based research. Data extraction from the selected articles involves summarizing key findings related to the pathophysiology, diagnosis, and treatment of PNES, with particular attention to the role of stress and trauma, the impact of misdiagnosis, and the comparative effectiveness of psychotherapeutic and pharmacological interventions. The review also critically evaluates the evidence supporting the use of multidisciplinary treatment teams and the importance of the patient-therapist relationship in the management of PNES. The synthesis of the collected data aims to identify consistent patterns, discrepancies, and gaps in the current understanding of PNES. This comprehensive review intends to highlight emerging trends in research and clinical practice, advocate for a holistic treatment approach, and suggest directions for future research to address existing knowledge gaps, ultimately contributing to the optimization of care for individuals afflicted with PNES.

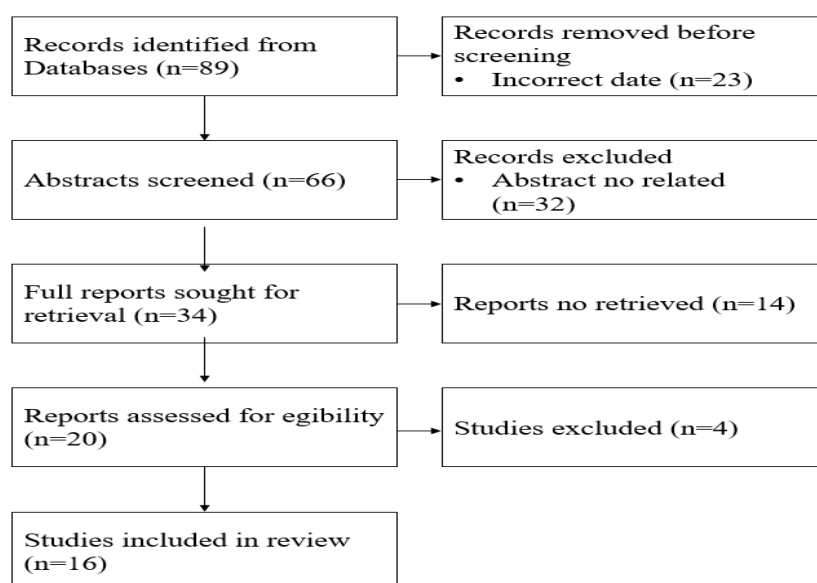


Figure 1. Article Search Flow Using PRISMA

RESULT

The results of the literature review on articles with a period of publication in 2020-2024, using English and overall research found 16 articles based on the topic of discussion of the literature review.

Table 1. Literature Review

No.	Author(s)	Year	Study Design	Key Findings
1	Tolchin B et al.	2020	Review	Explored neuropsychiatric aspects of epilepsy, emphasizing the psychological and cognitive impacts.
2	Kholi H et al.	2020	Survey	Investigated the distinction between psychogenic status epilepticus and epileptic seizures among neurologists.
3	Liampas A et al.	2021	Case Study	Addressed diagnostic challenges in patients with concurrent PNES and epilepsy.
4	Jones M et al.	2021	Observational Study	Focused on differentiating PNES from epileptic seizures using VEEG.
5	Balachandran N et al.	2021	Research	Explored the link between stress-induced neural responses and mental health in patients with PNES post-TBI.
6	Yeom JS et al.	2021	Review	Debunked myths and presented facts about pediatric PNES.
7	Baslet G et al.	2021	Committee Report	Offered evidence-based guidelines for assessing psychogenic nonepileptic seizures.
8	Anzellotti F et al.	2020	Review	Discussed the management challenges of distinguishing PNES from pseudo-refractory epilepsy.
9	Lanzillotti AI et al.	2021	Review	Provided an updated overview on diagnosing and managing PNES.
10	Espinosa-Garcia C et al.	2021	Mini Review	Examined the role of stress and neuroinflammation in epilepsy.
11	Nahvi RJ, Sabban EL	2020	Review	Investigated gender differences in the neuropeptide Y system and its implications for stress-related disorders.
12	Gupta R et al.	2020	Case-Control Study	Analyzed psychiatric comorbidities and factors associated with PNES.
13	Radmanesh M et al.	2020	Research	Studied the activation of functional brain networks in children with PNES.
14	Gilmour GS et al.	2021	Systematic Review and Meta-analysis	Evaluated the diagnostic accuracy of clinical signs and symptoms for PNES versus epileptic seizures.
15	Aybek S, Perez DL	2022	Review	Discussed the diagnosis and management strategies for functional neurological disorders.
16	Lehn A et al.	2021	Observational Study	Highlighted the treatment of PNES as epileptic seizures in emergency settings.

DISCUSSION

Psychogenic Non-Epileptic Seizures

Psychogenic Non-Epileptic Seizures (PNES), often termed "dissociative seizures," represent a disorder predominantly rooted in psychological factors rather than physiological anomalies. The designation "psychogenic" underscores the psychological genesis of the condition, contrasting starkly with the neurophysiological origins of epileptic seizures, which are characterized by overt electrical disturbances within the brain. Patients experiencing PNES frequently harbor underlying emotional stressors, which may not be readily apparent to them, contributing to the complexity of diagnosis and management. The term "dissociative seizures" is attributed to the observable detachment from the immediate environment exhibited by individuals during an episode, further distinguishing PNES from epileptic phenomena. The pathophysiological underpinnings of PNES remain incompletely understood, with current evidence hinting at potential aberrations in neuronal activity across specific brain regions.

However, the lack of a definitive mechanistic explanation necessitates further scientific inquiry to elucidate the condition's etiology fully. Clinically, PNES presents a broad spectrum of manifestations that can closely mimic those of epilepsy, ranging from convulsive movements to more subtle motor abnormalities, thereby posing significant challenges in differential diagnosis. Remarkably, a substantial proportion of individuals initially diagnosed with epilepsy are subsequently found to exhibit PNES, underscoring the imperative for meticulous clinical evaluation. Therapeutic interventions for PNES primarily target the amelioration of the contributory psychological stressors, with a multidisciplinary approach encompassing psychotherapy and, when necessary, psychiatric support forming the cornerstone of management. Accurate differentiation between PNES and epileptic seizures is paramount, as it informs the appropriate therapeutic pathway and optimizes patient outcomes.

Studies exploring the mechanisms through which PNES occur is key in having a deeper understanding of what the disorder is and how it can be treated. However, there is another important reason why learning about the mechanisms of PNES are important and this is in the accurate diagnosis of the disorder. Unlike what some people might assume, PNES is not diagnosed based on the presence of abnormal brain activity. Instead, it is diagnosed based on the identification of certain psychological stressors or maladaptive psychological response to acute stressors, in the recorded events.

What this means is that, for doctors to effectively diagnose someone with PNES, they have to rely on identifying certain psychological indicators in the observed seizures. This is because unlike in epilepsy, the seizures in PNES are not caused by abnormal electrical discharges in the brain. Instead, they are caused by the learned neurological responses to stress, which are then shaped and reinforced by previous experiences and learning. This is the reasons why patients with PNES can show a wide range of seizure manifestations, depending on the different stressors and psychological factors that influence the disorders. However, not all doctors who treat seizure disorders are aware of the importance of identifying the psychological component in the seizure in diagnosing PNES.

Mechanism of Occurrence of Psychogenic Non-Epileptic Seizures

Psychological Factors

Effective management of Psychogenic Non-Epileptic Seizures (PNES) necessitates an understanding of the neurobiological underpinnings and symptomatology, presenting a diagnostic challenge within clinical settings. PNES, predominantly of psychological origin, represent complex neurophysiological responses to psychological stressors. Research conducted at the University of Florida in Gainesville has highlighted the utility of employing

trauma intensity inventories for the assessment of PNES, particularly in individuals with histories of rape or sexual abuse, who exhibit an increased frequency of seizures. This correlation underscores the importance of integrating trauma-informed approaches in the diagnostic and therapeutic frameworks for PNES, facilitating more targeted interventions.

Furthermore, the research delineates the potential role of traumatic brain injuries and significant stress-inducing life events as triggers for PNES in individuals without epilepsy, suggesting a biological linkage between stress responses and the manifestation of PNES. Additional studies suggest that individuals with PNES may engage in seizure behaviors as a maladaptive coping mechanism to attenuate emotional distress associated with life adversities. The process of grieving, precipitated by significant losses such as employment, financial stability, or personal relationships, may exacerbate psychological conflicts, potentially leading to an increased incidence of PNES. The establishment of support systems is highlighted as a crucial component of the therapeutic regimen for individuals experiencing PNES, facilitating coping mechanisms and resilience in the face of psychosocial stressors. This comprehensive approach, encompassing both medical and psychological interventions, is pivotal in addressing the multifaceted nature of PNES, ensuring a holistic and evidence-based therapeutic strategy.

Neurobiological Factors

The etiology and persistence of Psychogenic Non-Epileptic Seizures (PNES) are not fully elucidated, with current neurobiological insights remaining preliminary. Nevertheless, extensive research endeavors aim to delineate the neurobiological underpinnings of PNES, with the objective of identifying viable therapeutic targets. Fukuda et al. have contributed to this body of knowledge through their review, which delves into various neurobiological facets such as higher-order cognitive/affective functions, epileptiform activity, and stress response systems' involvement. A central hypothesis posited by Fukuda et al. revolves around the potential deficiency in prefrontal regulation over limbic structures, particularly the amygdala complex, suggesting a neurobiological foundation for psychogenic seizure phenomena. Complementary to this, Schmeing et al. presented findings from an innovative cued fear conditioning task, revealing that individuals with PNES exhibited markedly diminished electrodermal responses to fear-conditioned stimuli. This observation points towards an impairment in autonomic arousal regulation, implicating amygdala and insular dysfunction, which are pivotal in emotional experience generation.

The discourse encompasses the phenomenon of maladaptive plasticity in response to stress, characterized by detrimental alterations in synaptic function and structure that lead to sustained aberrant neurotransmission, potentially contributing to epileptogenesis. Neurobiological investigations in animal models subjected to stress and individuals with chronic stress have led to the classification of Psychogenic Non-Epileptic Seizures (PNES) as a stress-related disorder by certain scholars. Research conducted by Dyb et al. on the pathophysiological processes predisposing individuals to PNES following traumatic brain injury has highlighted a reduction in the efficacy of the hypothalamic-pituitary-adrenal (HPA) axis in pediatric populations, emphasizing the role of stress response mechanisms in the pathogenesis of PNES.

Additionally, Ljubisavljevic et al. have reviewed studies on potential genetic predispositions to PNES, particularly in the context of stress and trauma, suggesting that polymorphisms in corticosteroid receptors, which are integral to HPA axis-mediated stress responses, may increase the risk of PNES following trauma. The expanding field of neurological research on PNES is uncovering a variety of potential pathogenetic mechanisms and pathways, highlighting the complex interplay between neurobiological and psychological factors. This multidisciplinary approach resonates with the historical concept of "hysteria" as described by Freud, introducing the contemporary term "holohysterical" to emphasize the

parallels between classical hysteria and modern interpretations of PNES, thereby underscoring the disorder's multifaceted nature.

Relationship with Trauma

The etiological exploration of Psychogenic Non-Epileptic Seizures (PNES) is crucial for comprehending its underlying mechanisms. A considerable volume of research indicates a strong prevalence of traumatic experiences among individuals diagnosed with PNES, pointing towards a potential correlation between trauma and the onset of seizures. Despite variability in findings, a consensus is emerging among researchers regarding the existence of this association. Notably, a distinction has been observed in psychiatric co-morbidity rates and the frequency of complex seizures between individuals with a history of trauma and those from non-traumatic backgrounds. However, some studies challenge this distinction, suggesting no significant difference in PNES manifestation related to personal versus familial trauma exposure. The concept of retrospective bias complicates the interpretation of these findings, as individuals diagnosed with PNES might be more inclined to recall and report traumatic events compared to those without such a diagnosis. This factor notwithstanding, advancing research continues to unveil the intricate interplay between physiological and psychological processes in the transmutation of trauma into PNES.

This transformation is thought to be mediated by biochemical pathways involving the Hypothalamic-Pituitary-Adrenal (HPA) axis, which regulates stress responses, and the Limbic system, central to processing fight/flight reactions, anger, and fear. Building on Putnam's hypothesis, the phenomenon of kindling, or the accumulation of sub-threshold stress events, may converge at a certain juncture to precipitate multiple episodes of PNES. This insight holds profound implications for the formulation of treatment protocols, emphasizing the need to address unresolved psychological traumas and develop proactive early intervention strategies. However, the therapeutic landscape for PNES is complicated by the observation of a type C response, as documented by Boehnert et al., where the seizure manifestations themselves trigger a fight/flight response, potentially diminishing the effectiveness of conventional treatment approaches. This response underscores the complexity of PNES and the challenge it poses to treatment paradigms. Given the existing knowledge gaps and ongoing debates within the scientific community, there is a palpable need for further research to elucidate the multifaceted nature of PNES, enhance diagnostic accuracy, and refine therapeutic interventions, thereby improving patient outcomes in this challenging and multifactorial disorder.

Role of Stress

Stress is widely recognized as a predominant trigger for Psychogenic Non-Epileptic Seizures (PNES), with the body's defense mechanisms playing a central role in elucidating the stress-PNES nexus. The Hypothalamic-Pituitary-Adrenal Axis (HPAA) is instrumental in mediating the body's response to stress, primarily through the activation of the hypothalamus-corticotropin-releasing hormone (H-CRH)-adrenocorticotrophic hormone (ACTH)-cortisol pathway. This cascade of biochemical events culminates in the release of cortisol, the pivotal hormone in orchestrating the stress response, which in turn, engages in a negative feedback loop aimed at regulating HPAA activity within defined thresholds. Chronic stress exposure can precipitate a state of cortisol resistance, wherein cellular responsiveness to cortisol diminishes, leading to sustained HPAA activation due to impaired negative feedback. This dysregulation has been implicated in various stress-related pathologies, including cardiovascular diseases, highlighting the systemic impact of prolonged stress exposure. Furthermore, cortisol exerts significant modulatory effects on neuronal activity, particularly within the limbic system, which is central to emotional processing. G-protein coupled receptors (GPCRs), key

modulators of intercellular signaling in the brain, are influenced by cortisol. Research indicates that cortisol can enhance the expression of G-protein coupled receptor kinases, which in turn facilitates the desensitization of GPCRs, with a pronounced effect observed within limbic structures. This differential expression and receptor modulation in the limbic system are critical, given its integral role in psychological responses. The limbic system's heightened sensitivity to stress-induced modulation is posited to contribute to an increased propensity for PNES. During stressful encounters, individuals prone to PNES may exhibit amplified limbic system activation, thereby elevating the risk of seizure occurrences. This neurobiological perspective underscores the intricate relationship between stress, neuroendocrine responses, and PNES, highlighting the necessity for therapeutic strategies that address the complex interplay of stress physiology and emotional regulation in the management of PNES.

Diagnosis and Treatment

The issue of diagnostic variability presents a significant challenge in medical environments, critically impacting the fidelity of patient records and diagnostic accuracy. Misclassification of conditions such as 'somatoform disorders' without adequate medical validation may compromise the quality of care. Additionally, the diversification of diagnostic formats may adversely affect the precision of patient diagnoses. Empirical studies have underscored the utility of neurologically centered approaches in patient evaluation, significantly improving the differentiation between Psychogenic Non-Epileptic Seizures (PNES) and epileptic seizures. This evidence underscores the necessity of an inclusive diagnostic strategy that integrates diverse considerations and viewpoints. However, discrepancies in diagnostic practices between neurologists and psychologists have been observed, with a tendency among neurologists to diagnose PNES more frequently. This trend may indicate a relative undervaluation of psychological factors in the neurological assessment, potentially affecting the diagnostic accuracy and patient care quality. These observations highlight the critical need for interdisciplinary collaboration and communication in the healthcare sector. An integrated approach ensures a comprehensive and detailed diagnostic process, covering both neurological and psychological aspects. The amalgamation of expertise across different medical specialties is crucial for maintaining the highest standards of patient care, advocating for a harmonized diagnostic approach that addresses the complex nature of conditions like PNES.

Challenges in Diagnosis

Recent advancements in research have underscored the complexities associated with the utilization of diagnostic tools and methodologies for identifying neurological anomalies, specifically Psychogenic Non-Epileptic Seizures (PNES). The conventional approach to diagnosing non-epileptic seizures predominantly involves the collection and neurologist-led analysis of long-term video-electroencephalogram (video-EEG) data. This method, while instrumental in distinguishing PNES from epileptic seizures, often necessitates pre-recording sleep deprivation for one to two days to optimize the likelihood of capturing relevant brain electrical activity, presenting a considerable challenge for patients.

Additionally, the period of video-EEG monitoring is frequently accompanied by heightened patient anxiety in anticipation of a seizure episode under clinical observation. Prior studies have indicated that enhancing the probability of seizure occurrence during video-EEG monitoring augments the diagnostic efficacy of the procedure. However, the ethical and psychological ramifications of intentionally inducing seizure-provoking conditions warrant critical examination, raising concerns regarding the reliability and ethical integrity of the video-EEG methodology. The economic implications of extensive video-EEG diagnostics further compound the challenges associated with the timely and accurate identification of PNES. The

substantial costs incurred during the diagnostic process pose a financial barrier, potentially delaying the initiation of appropriate psychiatric interventions for PNES. This delay, coupled with the risk of misdiagnosis, may subject patients and their families to prolonged distress and exacerbate the psychological burden associated with incorrect epilepsy treatment regimens. The potential for misdiagnosis to precipitate psychological trauma and diminish the effectiveness of subsequent treatment modalities underscores the imperative for the development of more accessible, cost-effective, and ethically considerate diagnostic tools and protocols. Such advancements are crucial for mitigating the challenges currently faced in the accurate diagnosis and treatment of PNES, thereby enhancing patient care and treatment outcomes.

Psychological Assessment

The incorporation of psychological assessment constitutes a pivotal component in the comprehensive diagnostic and therapeutic framework for Psychogenic Non-Epileptic Seizures (PNES). Following preliminary medical evaluations conducted by a neurologist, a detailed psychological assessment is undertaken to elucidate the patient's psychological well-being. This assessment is imperative, as it furnishes healthcare providers with critical insights into the patient's psychological requisites. The significance of psychological evaluation lies in its capacity to illuminate the underlying psychological etiologies of PNES, notably psychological trauma. By delineating the patient's psychological landscape, clinicians are better positioned to tailor management strategies that address the root cause of PNES. This personalized approach facilitates the selection of suitable therapeutic modalities, ranging from pharmacological interventions to alternative treatments such as psychotherapy, which primarily targets psychological restoration.

Various psychiatric assessment instruments may be employed to discern the nature and extent of psychogenic non-epileptic seizures. Among these, the Minnesota Multiphasic Personality Inventory (MMPI) is frequently utilized due to its comprehensive scope and established reliability in psychological profiling. The application of such diagnostic tools plays an instrumental role in the accurate diagnosis and effective management of PNES, underscoring the interdependence of neurology and psychology in the holistic care of individuals afflicted with this condition.

Psychotherapy Approaches

While classifications of psychotherapy for Psychogenic Non-Epileptic Seizures (PNES) provide a structured approach, it is crucial to acknowledge that the specific therapeutic needs of a patient may transcend these classifications. The therapeutic alliance, or the patient-therapist relationship, is widely recognized as a cornerstone of effective psychotherapy. This dynamic and collaborative partnership is adaptable, allowing for the integration of diverse therapeutic modalities tailored to the evolving needs of the patient throughout the treatment process. The significance of the therapeutic alliance is underscored by its potential to facilitate profound self-awareness in patients, enhancing their understanding of self-perception and interpersonal dynamics. This aspect of psychotherapy has been extensively validated by empirical research, demonstrating its efficacy across a spectrum of mental health conditions. Moreover, the modality of delivery, whether individual or group-based psychotherapy, does not appear to significantly influence treatment outcomes, with efficacy remaining consistent across various formats and independent of symptom duration. However, challenges in the treatment pathway for PNES are highlighted by research, such as the study conducted by LaFrance et al., which points to a predisposition among PNES patients towards seeking immediate, symptom-focused medical interventions. This inclination is particularly pronounced in medical psychology outpatient settings, which often maintain close affiliations

with neurology departments, potentially predisposing the referral and treatment processes towards neurological rather than psychiatric evaluations. This scenario underscores a potential impediment to the timely and accurate diagnosis of PNES, with a neurological bias possibly prolonging the journey to appropriate psychiatric treatment. The findings advocate for a more integrated and nuanced approach to the referral and diagnosis process, ensuring that patients presenting with seizure-like symptoms are evaluated comprehensively for both neurological and psychiatric etiologies, thereby facilitating timely access to the most effective treatment modalities.

Pharmacological Interventions

Pharmacological interventions have gained recognition as a potential treatment avenue for Psychogenic Non-Epileptic Seizures (PNES), particularly in light of evidence indicating that individuals with PNES frequently exhibit a variety of psychiatric symptoms. This multifaceted symptomatology suggests that pharmacological treatments may offer significant benefits, potentially surpassing the efficacy of psychotherapy alone. Various medications, including antidepressants and anti-anxiety agents, have been explored for their utility in managing PNES, with selective serotonin and noradrenaline reuptake inhibitors (SSRIs and SNRIs) receiving particular attention. These medications have demonstrated some degree of effectiveness in comparison to placebos in numerous studies. Benzodiazepines, such as clonazepam and lorazepam, are also commonly utilized due to their anxiolytic and muscle-relaxant properties, which are thought to contribute to a reduction in the frequency and severity of seizure episodes. Despite some promising outcomes, the evidence base supporting the significant effects of these pharmacological treatments remains inconclusive.

The literature often highlights a lack of minimal efficacy success across various medications and a lower tolerance among participants in drug trials compared to placebos. The notion that placebos may serve as an effective treatment modality for some individuals arises from the comparative ineffectiveness of active drugs in clinical trials. However, the scope and rigor of research evaluating the efficacy of pharmacological interventions for PNES have been critiqued for methodological limitations, suggesting that the potential of these treatments may not have been fully realized due to insufficient empirical scrutiny. This critique underscores the necessity for more comprehensive and methodologically sound research to accurately assess the therapeutic potential of pharmacological interventions for PNES. The current state of evidence implies that an integrative treatment approach, encompassing both neurological and psychological strategies, may be required to achieve optimal patient outcomes. The complexity and inherent multifactorial nature of PNES necessitate a holistic consideration of treatment modalities, underscoring the importance of continued exploration and evaluation of both existing and novel therapeutic interventions.

Importance of Multidisciplinary Approach

The efficacy of treatment pathways for individuals diagnosed with Psychogenic Non-Epileptic Seizures (PNES) is significantly influenced by the composition and approach of the diagnostic team. Classified within the DSM-IV-TR as a 'somatoform' or 'conversion disorder', and akin to 'functional neurological symptom disorder' (FND) in the DSM-V, PNES are characterized by the transmutation of psychological stresses into physical manifestations. Huston et al. highlight the intricate and resource-intensive nature of care for patients presenting with functional neurological symptoms within primary and emergency healthcare contexts, underscoring the potential for misdiagnosis and the consequential employment of unnecessary and costly interventions when patient care is siloed within specific medical disciplines such as neurology or psychology. The intricacies and potential redundancies inherent in a unidisciplinary approach underscore the necessity for a 'patient-centered' multidisciplinary

team model. Such teams amalgamate the expertise of neurologists, psychiatrists, clinical psychologists, and psychotherapists, fostering a cohesive and holistic clinical perspective under the guidance of a lead physician. This collaborative model not only consolidates the legitimacy of the diagnosis, thereby mitigating patient apprehension but also integrates diverse professional insights, enhancing the comprehensiveness of care.

Gelauff et al. advocate for the multidisciplinary modality as the cornerstone of modern, effective treatment for PNES, emphasizing the pivotal role of collaboration and patient autonomy in care delivery. The multidisciplinary team is conceptualized as a unified entity endowed with collective expertise in managing PNES, where the preservation of a meaningful doctor-patient relationship, complemented by teamwork, propels patient-informed treatment decisions. This approach is heralded as 'modern' due to its patient-centric orientation, facilitating informed patient choices in treatment under the team's guidance. This paradigm of patient-centered care and multidisciplinary management aligns with the evidence-based recommendations of the National Institute for Health and Care Excellence (NICE), which advocates for the involvement of liaison mental health professionals in conjunction with neurologists or psychiatrists. Such an integrative model endorses a comprehensive understanding and application of best practices across a spectrum of therapeutic interventions, tailored to meet the individual needs of the patient, thereby exemplifying the amalgamation of multidisciplinary expertise and patient-specific care considerations in the treatment of PNES.

CONCLUSION

In conclusion, Psychogenic Non-Epileptic Seizures (PNES) present a multifaceted clinical challenge that necessitates a nuanced understanding of its psychological and neurobiological dimensions. The disorder's etiological complexity, characterized by the absence of neurophysiological markers typical of epileptic seizures, underscores the importance of a comprehensive diagnostic approach that integrates both psychological assessments and neurobiological insights. The integration of diverse therapeutic modalities, including psychotherapy and pharmacological interventions, within a patient-centered care framework, emphasizes the importance of tailoring treatment strategies to the individual needs of the patient.

The therapeutic alliance, reinforced by a collaborative multidisciplinary team, facilitates a holistic treatment pathway that accommodates the complex interplay of psychological and neurobiological factors inherent in PNES. The challenges associated with diagnostic variability and the potential for misdiagnosis further accentuate the need for enhanced collaboration and communication among healthcare professionals across disciplines. The adoption of a multidisciplinary team approach not only validates the patient's experience but also ensures a comprehensive evaluation and treatment plan that leverages the collective expertise of neurologists, psychiatrists, clinical psychologists, and psychotherapists. Future research endeavors must continue to explore the underlying mechanisms of PNES, with a focus on refining diagnostic criteria and therapeutic interventions to improve patient outcomes. The evolution of treatment paradigms for PNES will undoubtedly benefit from ongoing advancements in our understanding of the disorder, emphasizing the critical role of interdisciplinary collaboration in navigating the complexities of this challenging condition.

ACKNOWLEDGEMENT

The authors would like to extend their heartfelt gratitude to dr. Riri Gusnita Sari, Neurologist at Wongsonegoro KRMT Hospital, for her invaluable contributions to this research. dr. Sari's expertise, dedication, and meticulous attention to detail have significantly

enriched the academic merit and clinical relevance of this study. The authors express their appreciation for dr. Sari's insightful observations, thoughtful insights, and prompt responses to inquiries throughout the course of this study. Her constructive criticism and suggestions have been instrumental in refining the manuscript and enhancing its coherence and clarity. This research would not have been possible without dr. Sari's unwavering commitment to excellence and her willingness to collaborate. The authors look forward to future opportunities for collaboration and extend their sincere thanks for dr. Sari's invaluable contributions to this work.

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