

ISAR Journal of Medical and Pharmaceutical Sciences

Volume 3, Issue 4, 2025 | Page: 1-7 *Abbriviate Title- ISAR J Med Pharm Sci* ISSN (Online)- 2584-0150 https://isarpublisher.com/journal/isarjmps

Understanding the Multifaceted Impact of Childhood Epilepsy: A Narrative Review

Bhawna Saini¹, Dimple Choudhry^{2*}, Kapil Bhalla³, Zafar Mohammad¹, Himanshi¹

¹MPT Scholar, College of Physiotherapy, Pt BDS PGIMS Rohtak.

²Associate Professor, College of Physiotherapy, Pt BDS PGIMS Rohtak.

³Professor, Department of Paediatrics, Pt BDS PGIMS Rohtak.

*Corresponding Author

Dimple Choudhry

Abstract: -

Associate Professor, College of Physiotherapy, Pt BDS PGIMS Rohtak.



Article History Received: 12.02.2025 Accepted: 26.03.2025 Published: 13.04.2025 **Background:** Epilepsy is one of the most common neurological disorders in children, characterized by recurrent seizures that can significantly impact their physical, cognitive, and emotional well-being. While seizure control is a primary focus of treatment, growing evidence suggests that epilepsy affects motor function, cognitive abilities, and overall Quality of Life (QoL) beyond seizure activity itself. Many children with epilepsy experience mobility and balance impairments, increasing their risk of falls and limiting their ability to engage in physical activities. Additionally, cognitive deficits, such as memory loss, attention difficulties, and executive dysfunction, can lead to academic challenges and developmental delays. The use of antiepileptic drugs (AEDs), while essential for seizure management, may contribute to these impairments by affecting brain function and processing speed. Furthermore, epilepsy can have significant impact on their QoL causing psychosocial consequences, including social isolation, anxiety, and emotional distress, which impact both the affected children and their families. Given these widespread challenges, it is essential to understand the broader impact of epilepsy on other outcomes beyond seizure control.

Objective: This study aims to examine the effects of epilepsy on balance, cognitive function, and QoL, highlighting key factors such as seizure frequency, AED use, and psychosocial challenges.

Study Selection: This narrative review is conducted on databases from PubMed, Google Scholar and Research Gate. This review includes 10 relevant studies analysing the impact of epilepsy on balance, mobility, cognitive performance, and QoL.

Conclusion: Children with epilepsy face significant challenges that extend beyond seizures, affecting their physical, cognitive, and emotional well-being. Motor impairments increase the risk of falls, cognitive deficits hinder academic performance, and psychosocial issues contribute to social difficulties and emotional distress.

Keywords: Epilepsy, children, motor impairment, balance, cognitive function, Quality of Life, Antiepileptic Drugs, seizure frequency.

Introduction

Epilepsy is one of the most common neurological disorders in children, affecting approximately 0.5% to 1% of the paediatric population worldwide.¹ It is characterized by recurrent, unprovoked seizures resulting from abnormal electrical activity in the brain. While seizure control is the primary focus of epilepsy management, the disorder often has broader implications that affect a child's overall well-being. Children with epilepsy commonly experience deficits in attention, balance, cognitive function, motor function and psychosocial health, leading to significant challenges

in their daily lives. These impairments can result from underlying brain abnormalities, repeated seizures, long-term use of antiepileptic drugs, and the emotional stress associated with having a chronic condition.²

One of the major concerns in children with epilepsy is balance and motor function impairment, which can significantly affect mobility and increase the risk of falls. Balance is a complex function that relies on multiple sensory systems, including the vestibular, proprioceptive, and visual systems, as well as motor control from the brain. Many children with epilepsy exhibit postural instability, which may stem from seizure-related brain dysfunction,

Cite this article:

Saini, B., Choudhry, D., Bhalla, K., Mohammad, Z., Himanshi., (2025). Understanding the Multifaceted Impact of Childhood Epilepsy: A Narrative Review. *ISAR Journal of Medical and Pharmaceutical Sciences*, *3*(4), 1-7.

ISAR J Med Pharm Sci; Vol-3, Iss-4, 2025

medication side effects, or damage to brain regions responsible for motor coordination. Studies have reported that AEDs such as phenytoin, carbamazepine, and valproate can affect motor control by impacting cerebellar function and vestibular processing, leading to balance deficits. Additionally, certain epilepsy syndromes, such as temporal lobe epilepsy and frontal lobe epilepsy, have been associated with gait abnormalities, impaired postural reflexes, and reduced coordination.³

Assessing balance in children with epilepsy is crucial, as balance deficits can contribute to reduced physical activity, social withdrawal, and decreased independence. The Timed Up and Go (TUG) test is a widely used tool to evaluate functional mobility and balance. It measures the time a child takes to stand up from a chair, walk a short distance, turn around, and sit back down. A longer completion time in the TUG test suggests poor balance control, muscle weakness, or coordination issues, which may indicate the need for targeted motor interventions. Understanding balance deficits in epileptic children can help develop rehabilitation strategies to improve mobility, prevent falls, and enhance overall physical functioning.⁴

Cognitive impairment is another significant issue in children with epilepsy, affecting domains such as memory, attention, executive function, and language processing. Cognitive deficits in epilepsy can result from underlying brain pathology, repeated seizure activity, or the neurotoxic effects of prolonged AED use.⁵ Seizures, particularly those originating in the frontal and temporal lobes, can interfere with the normal development of neural networks, leading to delays in cognitive processing and difficulties in learning. Additionally, AEDs, while essential for seizure control, can sometimes cause sedation, slow reaction times, and impair memory function, further exacerbating cognitive difficulties.

Cognitive decline in children with epilepsy can have long-term consequences on academic performance, social interactions, and emotional well-being. Poor cognitive function may result in learning disabilities, reduced attention span, and difficulties in problem-solving, making it harder for children to keep up with their peers in school. The Montreal Cognitive Assessment (MoCA) and Trail Making Test (TMT) are standardized tool used to evaluate cognitive abilities in various domains, including visuospatial skills, attention, memory, language, and executive function. It provides a comprehensive screening of cognitive function and helps identify children who may require further neuropsychological evaluation or cognitive interventions. Early detection of cognitive impairments allows for timely educational support and cognitive therapy, which can improve academic outcomes and daily functioning.⁶

Beyond motor and cognitive deficits, epilepsy also has a profound impact on a child's QoL. The experience of living with epilepsy can be emotionally distressing, as children may face challenges such as social stigma, anxiety about seizures, and restrictions in daily activities. Many children with epilepsy report feelings of low self-esteem, depression, and social isolation, which can significantly reduce their overall well-being. The QoL in Epilepsy-31 Inventory (QOLIE-31) questionnaire is a widely used tool designed to assess the impact of epilepsy on various aspects of life, including seizure-related concerns, emotional well-being, cognitive difficulties, social functioning, and medication effects. It provides a structured way to evaluate how epilepsy affects a child's daily life and overall happiness.

Assessing QoL in children with epilepsy is essential because it provides insights into how the disorder affects their mental and emotional health. Even if seizures are well-controlled, children may still experience difficulties in school, friendships, and self-confidence, which can diminish their overall life satisfaction.⁷ By measuring QoL, healthcare providers can develop comprehensive treatment plans that address not only seizure control but also emotional and social well-being. Interventions such as counselling, peer support programs, and lifestyle modifications can help children with epilepsy lead more fulfilling lives.

Methods:

Studies are searched from the following search engine PubMed, Google Scholar, Research Gate to review the literature. Studies include the effects of epilepsy on balance, coordination and quality of life. Keywords used Epilepsy, children, motor impairment, balance, cognitive function, QoL, AEDs, seizure frequency.



Author, journal,ye ar	Objectives	Design	Characteristics of participants and sample size	Materials & method	Outcome measures	Results
Schraegle WA et al. 2016 ⁷	The purpose of the study was to determine the extent to which executiv e dysfunction pr edicts health- related quality of life (HRQoL) in youth with epilepsy.	Observational study	130 children and adolescents between the ages of 6 years and 18 years, 4 months referred for epilepsy treatment at a tertiary care center.	Parental ratings on the Behavior Rating Inventory of Executive Function (BRIEF) and the Quality of Life in Childhood Epilepsy (QOLCE) questionnaire for 130 children and adolescents with epilepsy.	Behavior Rating Inventory of Executive Functioning (BRIEF) and Quality of Life in Childhood Epilepsy (QOLCE).	The study found that 49% of children with epilepsy had executive dysfunction. Working memory was the main predictor of HRQoL Moderate-to-large correlations were identified between the BRIEF and the QOLCE subscales of well- being, cognition, and behavior. The working memory subscale on the BRIEF emerged as the sole significant predictor of HRQOL.
Camara- Lemarroy CR et al. 2017 ⁴	The purpose of this study was to evaluate mobility and balance in people with epilepsy (PWE).	Cross- sectional observational study	Included 66 participants (33 with cryptogenic epilepsy and 33 controls), matched for age and sex. Demographic data included age (mean: 36.7 years), gender, marital status, education, and professional status. Epilepsy data included seizure type, frequency, AED use, and neuroimaging/E EG results.	Only patients with cryptogenic epilepsy were included. All eligible patients had a brain MRI and an electroencephalogram (EEG). A control group (n = 33) including age- and sex-matched healthy individuals was used as comparator.	Tinetti Mobility Test (TMT) evaluated balance, the Activities- specific Balance Confidence (ABC) scale measured confidence, and the Timed Up and Go (TUG) test measured walking speed.	PWE had poor performance in 60.6% of cases in the TUG and in 48.5% of cases in the TMT, compared to none in the control group. There was good correlation between the three instruments. TUG scores were correlated with epilepsy duration, but not age, seizure control or AED use. On multivariate logistic regression, poor performance TMT was significantly associated with poor confidence in balance, according to the ABC.
Nau AL et al. 2018 ⁸	The objective of this study was to assess cognitive performance and QoL of People with Epilepsy (PWE) in Zambia and to explore differences in PWE with and without Neurocysticerc osis (NCC)	Cross- sectional case- control-study	52 PWE, 28 of whom had NCC. After exclusions, 47 PWE and 50 healthy controls, matched for age, sex, and schooling, completed neuropsychologi cal tests and QoL assessments (sample size=97)	Cognitive function was assessed using the Mini- Mental State Examination (MMSE), Selective Reminding Test (SRT), Spatial Recall Test (SPART), Digit Span Test, and Test of Attentional Performance (TAP). Quality of life (QoL) was measured using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) and a visual analogue scale.	Cognitive performance: working memory, spatial memory, verbal memory, verbal learning, orientation, speech and language reception, visuoconstru ctive ability, attentional performance	People with epilepsy (PWE) showed significantly reduced working memory, spatial memory, verbal memory, verbal learning, orientation, language reception, visuoconstructive ability, and attention ($p <$ 0.05). QoL was significantly lower in psychological, social, environmental, and overall domains ($p <$ 0.05). No significant cognitive or QoL differences were found between PWE with and without NCC.

Wang L et al. 2020 ⁹	The objective of this study	Retrospective cross-	138 males and 119 females on	Mini-Mental State Examination (MMSE),	QoL: psychologica l domain, social domain, environmenta l domain, overall QoL, physical QoL Orientation, memory,	Cognitive performance in epilepsy was affected by
	was to analyse factors for cognitive impairment in epileptic patients	sectional design study	basis of age (mean age of 23.92 years), educational level, disease duration, seizure frequency, seizure types, kinds of AEDS, degree of anxiety, and depression. (Sample size= 257)	Montreal Cognitive Assessment (MoCA), Digit Symbol Test (DSy), Verbal Fluency Test (VFT), Digit Span Test (DSp), Hamilton Anxiety Scale (HAMA), and Hamilton Depression Scale (HAMD), compared with normal reference ranges.	attention, short-term memory, verbal memory, cognitive function, anxiety, and depression	multiple factors. Higher education was linked to better scores, while increased seizure frequency, AED use, and depression were associated with poorer cognitive outcomes. Longer disease duration and older age also negatively impacted specific test scores. Generalized seizures resulted in worse cognitive performance compared to other seizure types.
Bjørke AB et al. 2021 ¹⁰	The objective of this study was to evaluate whether cognitive performance is affected in newly diagnosed temporal lobe epilepsy (TLE) and to determine the most vulnerable cognitive domains	Baseline longitudinal study	The study included 42 participants (21 with non- lesional temporal lobe epilepsy and 21 controls) aged 18-59, diagnosed with TLE via MRI and EEG. Exclusions were brain abnormalities, psychiatric disorders, and prior surgery. Data was collected through medical history, MRI, EEG, and neuropsychologi cal assessments	The Rey Auditory Verbal Learning Test (RAVLT) assessed verbal memory, and the Aggie Figures Learning Test (AFLT) measured visual memory. Attention and working memory were evaluated using the Digit Span and Spatial Span tests from the Wechsler Memory Scale-Third Edition (WMS-III). Processing speed was measured using the Trail Making Test-Part 2 (TMT2) and Color- Word Interference Test (CWIT). Executive functions were assessed with Verbal Fluency, TMT-Part 4, and CWIT subtests from the Delis- Kaplan Executive Function System (D- KEFS). Emotional well- being was assessed using the Emotional Subscale of the Quality of Life in Epilepsy Inventory-89 (QOLIE-89).	Cognitive functions like memory, attention, working memory, executive functions, and emotional well-being	Patients performed significantly worse than the control group in delayed visual memory and $(p = 0.013)$ and executive function tasks, specifically in the trail making test and verbal fluency shifting $(p = 0.025 \text{ and } p = 0.03)$. No significant differences were found in verbal learning and memory, attention/working memory, processing speed, and other executive functions.
Lin F et al. 2021 ¹¹	The objective of this study was to predict	Retrospective study	Thestudyincluded433epileptic	The Random Forest (RF) algorithm, combined with Redundancy Analysis	MMSE and MoCA.	The RF algorithm best predicted MMSE and MoCA outcomes, with key

	cognitive impairment in outpatients with epilepsy using machine learning techniques.		patients aged 12+ from Fujian Medical University (2015-2019), diagnosed with ILAE criteria and assessed using EEG, MRI, MMSE, and MoCA. Data was split into 70% training and 30% validation sets.	(RDA), was used for feature selection. RF predicted MMSE, (MoCA) outcomes in epileptic patients. External traceability was assessed using follow-up data. The top ten important features for MMSE and MoCA, ranked by RF, were identified, analyzed to determine the optimal combination for prediction.		markers like sex, age, onset age, seizure frequency, brain MRI abnormalities, epileptiform discharge in EEG, and drug usage identified as predictors of cognitive function in epileptic patients.
Rozensztr auch A et al. 2022 ¹²	The main objective of this study was to assess QoL in children with diagnosed epilepsy and the impact of a child's disease on the functioning of the family.	Cross- sectional survey	103 parents/guardian s of children with epilepsy mean diagnosis age of 3.5 years, with 63% having partial seizures. Seizure frequency varied, with 78.8% having seizures at least once a year.	The Pediatric Quality of Life Inventory (PedsQL) 4.0 measures health- related QoL in children (2-18 years). The PedsQL 2.0 Family Impact Module evaluates family impact, and an authors' questionnaire collected sociometric and clinical data.	QoL in children, family functioning, and sociodemogr aphic data including the child's age, gender, comorbidities , and parent's details.	The study found reduced QoL in children with epilepsy, especially in school/work. Younger children had better QOL, and comorbidities negatively affected it. Social and cognitive functioning, age, and family size were key predictors of QOL.
Sırtbaş G et al. 2021 ¹³	The objective of this study was to identify physical fitness and activity levels, and health- related quality of life of children with epilepsy in turkey and compare the results with their healthy peers.	Observational study	21 children with epilepsy (with no seizures and not taking anti- epileptic drugs for at least a year) & 20 healthy peers.	The Trunk-Lift Test, Flamingo Balance Test, 6- Minute Walk Test, pedometer, and Pediatric Quality of Life Inventory (PedsQL) assessed core strength, balance, endurance, physical activity, and overall QoL.	Core strength, balance, overall fitness, Endurance,w alking ability, Daily activity levels Overall well- being, including both physical and psychosocial aspects.	The physical fitness assessments including the trunk-lift test and flamingo balance test results were significantly lower in the children with epilepsy ($p <$ 0.05). Physical activity, physical performance, and quality of life results were significantly lower in children with epilepsy ($p <$ 0.05).
Hasegawa N et al. 2022 ¹⁴	To investigate whether the Trail Making Test (TMT) can clarify cognitive dysfunction in focal epilepsy with unknown etiology.	Cross- sectional observational study	125 patients with focal epilepsy without any structural abnormalities intellectual disability, psychiatric disorders, or medications that might interfere	Trail Making Test (TMT) assessed cognitive functions in focal epilepsy patients, with TMT-A evaluating visuoperceptual abilities and TMT-B measuring cognitive flexibility.	Cognitive dysfunction focusing on executive function, visuopercept ual abilities, and cognitive flexibility	Longer TMT-B times were linked to older age at the last seizure, while shorter TMT- A and TMT-B times were associated with fewer antiseizure medications, longer education duration, and left non-temporal or right temporal epileptic discharge.

			with cognitive function.			
Sinanoglu B et al. 2023 ¹⁵	To evaluate the functional mobility, balance, and executive functions in children with epilepsy.	Case-control study	42 children, with 21 diagnosed with epilepsy (no additional comorbidities) and 21 healthy controls, all aged 6-12 years, with no significant age difference between the groups.	Functional mobility was assessed with the TUG and Stair Climb Test (SCT), balance with the Pediatric Berg Balance Scale (PBBS), and executive functions with the Behavior Rating Inventory of Executive Function-Parent Form (BRIEF-P).	Functional mobility, balance, executive functions, balance, and executive functions	The study found children with epilepsy had lower functional mobility and executive function scores than healthy peers, with no significant difference in balance ($p > 0.05$). Executive functions explained 71.8% and 72.5% of the variation in TUG and SCT scores, respectively.

Discussion

Epilepsy affects multiple aspects of a child's life, including motor function, cognitive abilities, and overall QoL. Studies have shown that children with epilepsy often experience balance and mobility impairments, leading to an increased risk of falls and physical inactivity. These impairments may result from brain dysfunction, seizure-related damage, or the side effects of AEDs. Cognitive impairments are another major concern, with children showing deficits in memory, attention, and executive function. Factors such as frequent seizures, AED use, and MRI abnormalities contribute to cognitive decline. Beyond physical and cognitive challenges, epilepsy significantly impacts the child's emotional well-being and social interactions. Several researchers have explored the effects of epilepsy on children, focusing on motor function, cognitive impairment, and QoL.

A study by Camara-Lemarroy CR et al. (2017)⁴ examined balance and mobility in PWE and found that 60.6% performed poorly on the TUG test, while 48.5% had deficits in the TMT. In contrast, none of the healthy controls exhibited such impairments. Hence it is suggested that epilepsy significantly affects motor function, increasing the risk of falls and reduced physical activity. Sinanoglu B et al. (2023)¹⁵ found a statistically significant difference in mobility but not in balance which suggests that while epilepsy affects movement efficiency, balance itself may not always be significantly impaired. Schraegle WA et al. (2016)⁷ found that children with epilepsy had T scores above 65, indicating significant impairment in problem-solving, planning, and cognitive flexibility. These deficits can negatively impact academic performance and daily functioning, highlighting the need for cognitive training and educational support. Nau AL et al. (2018)⁸ emphasized that cognitive decline in epilepsy is a global issue and is influenced by seizure frequency, AEDs, and socioeconomic factors. A study by Wang L et al. (2020)⁹ found the lower education, frequent seizures, and long-term AED use were strongly linked to cognitive decline and underscore the importance of optimizing seizure management and limiting AED side effects to protect cognitive function. Lin F et al. (2021)¹¹ applied machine learning to predict cognitive decline in children with epilepsy. The model identified seizure frequency, MRI abnormalities, and AED use as the strongest predictors of cognitive impairment which highlights the potential of AI-based assessments for early intervention. A study by Bjørke AB et al.

(2021)¹⁰ concluded that full-dose AEDs had a negative impact on verbal fluency, while lower doses had less cognitive impact which reinforces the need for careful AED dosage adjustments to balance seizure control and cognitive preservation. Sırtbaş G et al. (2021)¹³ assessed the QoL in children with epilepsy and found a low overall QoL score (46.42/100), indicating a significant negative impact which highlights the effect of epilepsy on family dynamics, emphasizing the emotional and social burden of the condition. Baberwal et al. (2025)¹⁶ demonstrated the effectiveness of Sensory Integration Therapy (SIT) in children with Down Syndrome, showing marked enhancement in attention span and gross motor skills. Since attention, coordination, and motor control issues are common in children with epilepsy, SIT may be used as an adjunct intervention to enhance these areas.

Conclusion

Epilepsy in children affects not only seizure control but also motor skills, cognitive function, and overall QoL. Mobility issues increase the risk of falls, cognitive impairments hamper learning and emotional challenges lead to social isolation. Emotional and social burden on both children and their families significantly lowers QoL. Addressing these challenges requires an early interventions and modified support systems that can significantly improve functional independence and well-being in children with epilepsy. There is need for a multidisciplinary approach that goes beyond seizure control to support motor, cognitive, and psychosocial development in children with epilepsy. Thus, the conclusion can help in further studies to explore the preventive measures and design considerations to mitigate these effects.

References

- Fisher, R. S., Acevedo, C., Arzimanoglou, A., Bogacz, A., Cross, J. H., Elger, C. E., ... & Wiebe, S. (2014). ILAE official report: a practical clinical definition of epilepsy. *Epilepsia*, 55(4), 475-482.
- 2. Wirrell, E. C. (2013). Predicting pharmacoresistance in pediatric epilepsy. *Epilepsia*, 54, 19-22.
- Nolan, M. A., Redoblado, M. A., Lah, S., Sabaz, M., Lawson, J. A., Cunningham, A. M., ... & Bye, A. M. (2003). Intelligence in childhood epilepsy syndromes. *Epilepsy* research, 53(1-2), 139-150.

- Camara-Lemarroy, C. R., Ortiz-Zacarías, D., Peña-Avendaño, J. J., Estrada-Bellmann, I., Villarreal-Velázquez, H. J., & Díaz-Torres, M. A. (2017). Alterations in balance and mobility in people with epilepsy. *Epilepsy & Behavior*, 66, 53-56.
- Arslan, G., & Demir, B. (2024). Cognitive impairment in epilepsy patients and its correlations. *Applied Neuropsychology: Adult, 31*(6), 1405-1410.
- Montaño-Lozada, J. M., López, N., Espejo-Zapata, L. M., Soto-Añari, M., Ramos-Henderson, M., Caldichoury-Obando, N., & Camargo, L. (2021). Cognitive changes in patients with epilepsy identified through the MoCA test during neurology outpatient consultation. *Epilepsy & Behavior*, 122, 108158.
- Schraegle, W. A., & Titus, J. B. (2016). Executive function and health-related quality of life in pediatric epilepsy. *Epilepsy & Behavior*, 62, 20-26.
- Nau, A. L., Mwape, K. E., Wiefek, J., Schmidt, K., Abatih, E., Dorny, P., ... & Blocher, J. (2018). Cognitive impairment and quality of life of people with epilepsy and neurocysticercosis in Zambia. *Epilepsy & Behavior*, 80, 354-359.
- 9. Wang, L., Chen, S., Liu, C., Lin, W., & Huang, H. (2020). Factors for cognitive impairment in adult epileptic patients. *Brain and behavior*, *10*(1), e01475.
- Bjørke, A. B., Østby, Y., Grahl, S. G., Larsson, P. G., Olsen, K. B., Nævra, M. C. J., ... & Heuser, K. (2021). Cognition in

adult patients with newly diagnosed non-lesional temporal lobe epilepsy. *Epilepsy & Behavior*, *116*, 107771.

- Lin, F., Han, J., Xue, T., Lin, J., Chen, S., Zhu, C., ... & Huang, H. (2021). Predicting cognitive impairment in outpatients with epilepsy using machine learning techniques. *Scientific Reports*, 11(1), 20002.
- Rozensztrauch, A., & Kołtuniuk, A. (2022). The Quality of Life of Children with Epilepsy and the Impact of the Disease on the Family Functioning. *International journal of environmental research and public health*, 19(4), 2277.
- 13. Sırtbaş, G., Yalnızoğlu, D., & Livanelioğlu, A. (2021). Comparison of physical fitness, activity, and quality of life of the children with epilepsy and their healthy peers. *Epilepsy research*, *178*, 106795.
- Hasegawa, N., & Annaka, H. (2022). Cognitive features of adult focal epilepsy with unknown etiology revealed by the trail making test. *Epilepsy & Behavior*, 129, 108625.
- Sinanoglu, B., & Ozdemir, F. (2023). Evaluation of functional mobility, balance, and executive functions in children with epilepsy. *Epilepsy & Behavior*, 143, 109230.
- Baberwal, M., Choudhry, D., Kumari, A., JHANDAI, M., & Bhardwaj, P. (2025). Effect of Sensory Integration Therapy on Attention Span and Gross Motor Skills in Children with Down Syndrome: A Quasi-experimental Study. *Journal of Clinical & Diagnostic Research*, 19(2). YC36–YC40.