Review Article

Pattern of Sedentary Activity among Persons with Neuro-developmental Disabilities: A Scoping Review

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ABSTRACT

Aim: The global prevalence of Neuro-developmental Disorders (NDDs) is alarming, with approximately 316.8 million cases identified. Individuals with NDDs are reportedly less physically active compared to their peers. However, reviews are limited, focusing on sedentary patterns of individuals with NDDs alongside disorder-specific data. This study aims to identify disorder-specific patterns and factors influencing sedentary lifestyles in this population.

Method: The review followed PRISMA-ScR guidelines and Arksey and O'Malley's framework, with study selection guided by the JBI Population–Concept–Context (PCC) approach. Searches were conducted in PubMed, Scopus, Web of Science, and Google Scholar using keywords such as "sedentary activity," "screen time," "sitting time," "neurodevelopmental disorders," "ASD," "ADHD," and "intellectual disability," combined with Boolean operators "AND" and "OR." Eligible studies were peer-reviewed articles examining sedentary patterns in individuals with NDDs. Review articles, studies on typically developing populations, and studies addressing only physical activity were excluded.

Results: A total of 19 articles were entitled for this study, involving 27,180 samples. Screen media usage was the most common form of sedentary activity among individuals with NDDs. Other sedentary activities were reading, imaginative play, playing with toys, crafting, indoor games, and playing musical instruments. Screen time was higher among individuals with Autism Spectrum Disorder (ASD) (2 to 7 hours/day) and Intellectual Disability (2 to 10 hours/day) compared to other groups. Moreover, sedentary time was higher on weekends compared to weekdays.

Conclusion: The findings indicate that individuals across all age groups with NDDs exceed the ideal screen time limits. Disorder traits, physical and socio-economic barriers, and quality of life influence sedentary behaviors. The limited exploration of disorders, aside from a few observational studies in this context, highlights the need for broader, more comprehensive research.

Keywords: Neurodevelopmental disorders; Sedentary activity; Screen time; Influencing factors.

INTRODUCTION

Neurodevelopment involves a complex interaction among genetic, neural, cognitive, emotional, and behavioural processes throughout development. Disruptions to this process, whether due to genetic or environmental risk factors, are strongly associated with neurodevelopmental disorders and impairments (Arora et al., 2018). Neurodevelopmental disorders (NDDs) are a diverse group of conditions that differ from one another (Damianidou et al., 2022). Autism Spectrum Disorder (ASD), Attention Deficit/Hyperactivity Disorder (ADHD), Cerebral Palsy (CP), and Intellectual Disability (ID) are common types of NDD that often exhibit early-onset impairments in physical, cognitive, social, and occupational domains, significantly affecting daily functioning and persisting across the lifespan (Koly et al., 2021; Yang et al., 2022; Naik et al., 2023). A range of factors, such as genetic influences, premature birth, metabolic or viral infections, nutritional deficiencies, physical injuries, and environmental exposures, can contribute to neurodevelopmental disorders (Tang et al., 1992).

The prevalence of NDDs in children and adolescents varies considerably across regions. Rates are higher in high-income countries compared to low- and middle-income countries (Lau et al., 2022). Globally, an estimated 316.8 million individuals are affected by developmental disorders, with boys showing greater rates than girls (Rahman et al., 2024). In some European regions, NDD prevalence rates range between 4.70% in Scotland and 55.5% in Norway. According to 2015 data from the National Centre for Health Statistics (NCHS), approximately 15% of children aged 3 to 17 years in the United States are affected by NDDs. Notably, the rate has approached 90% in Japan (Frances et al., 2023). The estimated prevalence rates of the most common NDDs are as follows: ADHD ranges from 7.9% to 9.5%; ASD from 0.7% to 2.2%; and motor coordination disorder from 1.4% to 19% (Frances et al., 2022).

The prevalence of NDDs in children and adolescents in low- and middle-income countries (LMICs) is substantial, yet under-evaluated, according to mounting data (Kipkemoi et al., 2025). Although it is challenging to pinpoint the precise incidence because of methodological differences and a lack of data, research indicates that NDDs such as ADHD, autism spectrum disorder, and intellectual disability are common. The prevalence of stigma, substantial care barriers, and increased exposure to risk factors are just a few of the complex issues that children in LMICs face in comparison to their counterparts in high-income nations (Kipkemoi et al., 2025; Olusanya et al., 2023; Namazzi et al., 2019).

Worldwide, changes in economic, educational, cultural, and technological developments have contributed to lifestyle changes, leading to a rise in sedentary behavior (Abonie & Ackah, 2024). Sedentary behavior (SB) refers to waking activities or minimal physical activities characterized by low energy expenditure (≤1.5 METs), typically performed while sitting or lying down (Meneses-Echavez et al., 2025). Examples of SB include using electronic devices (e.g., tablets, mobile phones, TVs, or computers), reading, sketching, and painting, completing homework, or sitting at school (Krol et al., 2024). These habits are associated with approximately 6–10% of non-communicable diseases and contribute to 9% of premature deaths. The World Health Organization (WHO) recommends at least 60 minutes of moderate-to-vigorous physical activity (MVPA) each day for children and adolescents aged 5 to 17 years and 75 to 300 minutes of MVPA in a week for adults, with sedentary behavior (SB) limited to less than 2 hours (Yuan et al., 2022). According to the reports, children and adolescents are found highly inactive in recent years (Abonie & Ackah, 2024; McCoy et al., 2020; Hossain et al., 2022).

Children with NDDs are consistently less physically active and more sedentary compared to their typically developing peers. Studies indicate that they not only engage in fewer physical activities but also spend significantly more time being inactive, which may increase the risk of cardiometabolic complications and obesity (Sit et al., 2016; Lynch et

al., 2025). For example, parents of children with specific learning disabilities report that their children engage in minimal physical activity and spend approximately nine hours per day engaged in sedentary pursuits (Ariapooran et al., 2022). A study conducted in Thailand revealed that children with ASD watched television more than twice as much as their typically developing peers. Similarly, a study in the United States found that children with ASD watched an average of 3.8 hours of television per day (Must et al., 2014). Furthermore, even physically independent children with cerebral palsy (CP) in Ireland were found to spend a substantial portion of their day being idle rather than engaging in physical activity (Alamoudi et al., 2024). In contrast, reports indicate that less than 10% of adults with intellectual disabilities meet the physical activity guidelines by WHO (Safi et al., 2024).

Sedentary lifestyles are increasingly recognized as a critical public health concern, particularly for individuals with NDDs who face unique cognitive, behavioral, and environmental challenges to physical activity. Recent studies have underscored the lack of disorder-specific evidence in these populations (Nakhostin-Ansari et al., 2023), emphasizing the need for comprehensive reviews to better understand and address sedentary lifestyles among individuals with NDDs (Peng et al., 2022; Liu et al., 2024). Existing studies suggest a common pattern of being inactive across all age groups of individuals with NDDs; however, most of them focused on individuals with physical disabilities or on specific neurodevelopmental disorders and primarily examined screen time, leaving a gap in synthesized evidence on SB among individuals with NDDs (Ophir et al., 2023; Ganz et al., 2021).To address these gaps, the present study adopts a scoping review approach to systematically map the existing empirical literature on sedentary activities among individuals with NDDs. This study aims to identify disorder-specific patterns and influencing factors related to sedentary lifestyles in the NDD population. Such reviews seek to inform future research and support the development of targeted interventions and public health strategies that can be integrated into disability-inclusive policies in low- and middle-income countries (LMICs), where formal disability support services are often limited.

METHODS

This scoping review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco et al., 2018). and the five-stage methodological framework established by Arksey and O'Malley (Arksey et al., 2005). This framework encompasses (1) research question identification, (2) relevant study identification, (3) study selection, (4) data charting, and (5) data collation, summarization, and reporting.

Research Questions:

This scoping review was guided by the following research questions:

1. What are the patterns of sedentary activity among individuals with neurodevelopmental disorders (NDDs)?
2. Do sedentary patterns differ across various types of NDDs?
3. What factors are associated with influencing sedentary behavior in individuals with NDDs?

Identifying Relevant Studies

A comprehensive and systematic search strategy has been designed to identify literature examining patterns of sedentary activity among individuals with neurodevelopmental disorders. In this study, "patterns of sedentary activity" refers to the specific types of SB in which individuals frequently engage in (e.g., screen time, reading, playing sedentarily, sitting). For each type of sedentary activity, we primarily extracted information on frequency (number of sessions per day or week) and, where reported, duration of engagement to characterize habitual participation. The search was conducted across

multiple electronic databases, including PubMed, Scopus, Google Scholar, and Web of Science. The search strategy was based on two main concepts: sedentary activity and neurodevelopmental disorders. For sedentary activity, the search terms included "sedentary activity," "sedentary behavior," "screen time," and "sitting time." For neurodevelopmental disorders, the search terms included "autism spectrum disorder," "attention-deficit/hyperactivity disorder," and "intellectual disability." Within each concept, terms were combined using **OR**, and the two concepts were linked using **AND**. For example: *("sedentary activity" OR "screen time" OR "sitting time") AND ("autism spectrum disorder" OR "attention-deficit/hyperactivity disorder" OR "intellectual disability")*. Full search strings for each database are provided in Annex 1 (A1).

The review included articles if they met the following criteria: peer-reviewed articles published in English; published between 2000 and 2024; focused on sedentary activities among individuals with neurodevelopmental disorders; and primary empirical research using either quantitative or qualitative study designs. The language was restricted to English because the research team did not have sufficient proficiency in other languages and lacked access to reliable translation resources. The study did not provide many restrictions on the publication year; however, it did take into account the rise of neurodevelopmental issues and the influence of digital media on reducing physical activity in the 21st century.

Studies were excluded if they were review articles, including systematic reviews, narrative reviews, or meta-analyses; did not present primary empirical data; had undefined sources; focused on typically developing individuals rather than persons with neurodevelopmental disorders; or were studies that addressed only physical activity without discussing sedentary pattern. While qualitative reviews can be informative for identifying factors influencing SB, this was not the primary aim of the present review. Our objective was to summarize empirical evidence on patterns of sedentary activity among individuals with neurodevelopmental disorders. Moreover, secondary sources from review articles could have led to duplication of data and biased interpretations.

Selection of Studies

This study selection was guided by the JBI-recommended Population–Concept–Context (PCC) framework, which informed the development of the eligibility criteria. The population included individuals diagnosed with NDDs, such as ASD, ADHD, intellectual disability, CP, developmental delay, cognitive developmental delay, specific learning disorder (SLD), or others with developmental, behavioral, and emotional issues. The concept focused on sedentary activity patterns (e.g., screen time, sitting time, sedentary or imaginary play). The context was kept broad, with no restrictions on geographic location or study setting, consistent with JBI scoping review methodology. Both the population and context were maintained broadly due to the limited research on SB among individuals with NDDs, ensuring that all relevant evidence could be captured. Moreover, this review did not have a pre-registered protocol on a public registry such as the Open Science Framework (OSF).

The literature search was conducted between February 2025 and May 2025 across all selected databases. Two reviewers independently screened all titles and abstracts, followed by independent full-text screening for studies that met the initial criteria. Disagreements were resolved through group discussion, and consensus was reached on the final inclusion of 19 eligible studies. "EndNote" was used for the screening and data management process.

Charting the Data

By using a standardized charting form, data were systematically extracted from the selected studies. This form recorded important facts about:

- Study characteristics: author(s), year, country, and study design.
- Participant characteristics: sample size, age, gender, and type of neurodevelopmental disorder.
- Methods: tools used to assess sedentary behavior and types of sedentary activities measured.
- Outcomes: patterns of sedentary behavior, associated factors, or determinants
- Key findings and conclusions
- Notes on limitations and recommendations

Two reviewers independently charted the data to ensure accuracy, with any disagreements resolved through discussion. After that, the data were arranged to facilitate the synthesis of evidence in a descriptive and thematic manner.

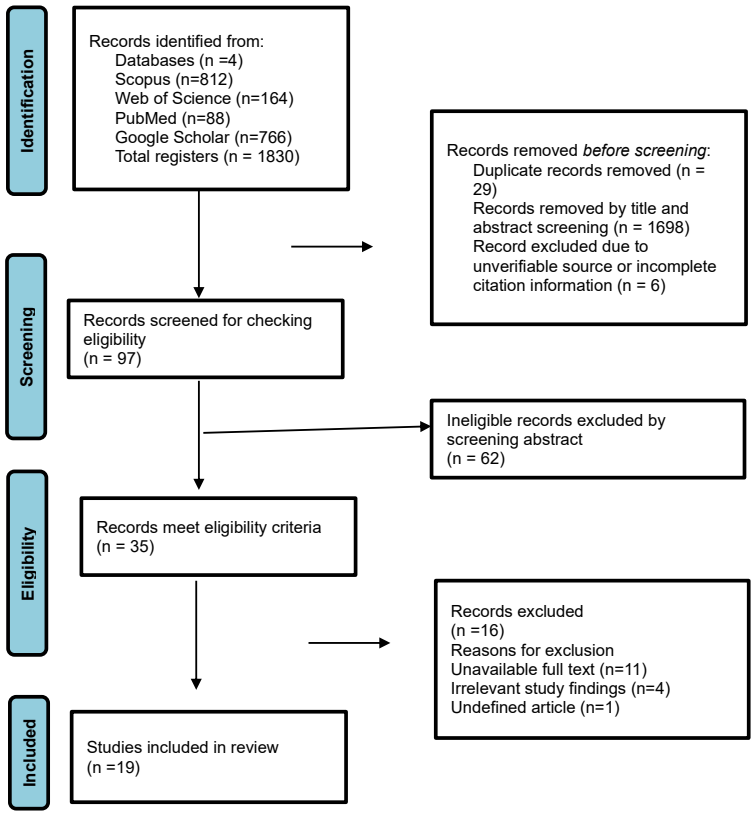
Collating, Summarizing, and Reporting the Results

In this stage, the review provided a comprehensive quantitative summary of the included studies. Specifically, it outlined the total number of studies, participant details, study designs, publication years, measurement tools, and geographic locations. The analysis also included key characteristics of the study populations, including age groups and types of neurodevelopmental disorders. Furthermore, the types of inactivity examined and associated factors identified were systematically summarized. This structured synthesis facilitated the identification of research trends, gaps in the literature, and areas for future investigation.

Ethical Approval:

Ethical approval and informed consent were not required for this study. This scoping review was conducted using data derived solely from previously published studies. No new data were collected, and there was no direct involvement of human participants or use of identifiable personal information.

Figure 1: PRISMA Flow Diagram of Study



RESULTS

The database search identified 1,830 records across four databases. After the removal of 1,733 records during title and abstract screening, 97 full-text articles were assessed for eligibility. Only 35 articles met the inclusion criteria. In total, 19 studies were included for data charting and synthesis (Figure 1).

The review consists of 17 descriptive studies, 1 cohort study, and 1 case-control study. These studies collectively involved 27,180 participants. Among them, individuals with cognitive disorders (approximately 11,000) and ASD (14,400) formed the largest groups. Additionally, 1,039 participants had ID, 418 had CP, and 231 were identified with Specific Learning Disorders (SLD). The fewest participants were reported in studies involving Attention-Deficit/Hyperactivity Disorders (ADHD), developmental delay, and behavioral dysregulation. Participants ranged in age from 1 to 55 years. Most studies focused on children (n = 11), followed by adolescents (n = 6) and adults (n = 2).

Most of the studies were conducted in the USA (n = 5), with others from China, Australia, and Iran (n = 2 each). Single studies were conducted in Japan, Germany, Taiwan, Poland, Singapore, India, and Canada. One multinational study included participants from seven countries: the USA, Brazil, Finland, Hong Kong, China, Singapore, and South Korea. A detailed overview of the reviewed literature has been provided in Supplementary 1.

To assess sedentary activity patterns, most studies relied on subjective measurement approaches. Seven studies used parent-reported questionnaires, and one study employed an adapted questionnaire. Several studies used objective measures, including ActiGraph accelerometers (models WGT3X+BT and GT1M). A variety of validated instruments were also applied to capture sedentary activities, such as the Children's Leisure Activities Study Survey (CLASS), the Screen Viewing Time (SVT) Questionnaire, the Youth Screen Time Survey, the Modified Sedentary Behavior Questionnaire, the Child Weekly Screen Time Scale, and self-reported time logs. Qualitative and developmental assessment tools, including semi-structured pro forma, the Critical Incident Technique, and the Gesell Developmental Schedule, were used in a smaller number of studies. One study combined objective accelerometer data with self-reported logs to quantify both total sedentary time and specific activities, including television viewing, computer use, and reading. Table 1 presents a summary of the charted data, including study characteristics, participant characteristics, measurement instruments, and key findings related to sedentary behavior patterns.

Sedentary Activities in Individuals with ASD

This scoping review identified consistent patterns of SB among children, adolescents, and adults with ASD, based on findings from 13 studies. Screen media usage was the most common form of sedentary activity across all age groups, ranging from approximately 2 to 7 hours per day. Watching TV emerged as the most frequently reported screen activity, followed by playing video games and using computers, tablets, or smartphones. Mean screen time for children and adolescents ranged from 2 to 5 hours per day, while adults with ASD spent an estimated 6 to 7 hours daily on screen-based activities (Kushima et al., 2022; Must et al., 2015; Stiller et al., 2019; Must et al., 2014; Dong et al., 2021; Thomas et al., 2020; Haegele et al., 2024; Nakhostin-Ansari et al., 2023; Pan et al., 2021; Dong et al., 2023; Kiing et al., 2024; Must Aviva et al., 2023; and Lee et al., 2024).

Along with screen use, other sedentary activities included imaginative or quiet play, playing with toys, doing homework or reading, playing indoor games, crafting, and listening to or playing music. These activities typically accounted for approximately 1 ± 0.5 hours per day (Must et al., 2014; Thomas et al., 2020; Nakhostin-Ansari et al., 2023; Pan et al., 2021). Five studies compared SB between weekdays and weekends, showing that individuals with ASD tended to spend 1 to 1.5 hours more on sedentary activities on

weekends than on weekdays (Must et al., 2015; Must et al., 2014; Pan et al., 2021; Kiing et al., 2024; Lee et al., 2024).

Sedentary Activities in Individuals with Intellectual Disability

Three studies specifically assessed the sedentary activity patterns among individuals with intellectual disabilities, highlighting that screen media is the most prevalent SB across all age groups, with usage ranging from 2 to 10 hours per day. Children and adolescents spent more time on screens on weekends (3.85 hours/day) compared to weekdays (3.38 hours/day). Adults reported the highest screen usage (5–10 hours/day), while children and adolescents reported usage ranging from 2 to 3.6 hours/day (Wyszyńska et al., 2017; Nakhostin-Ansari et al., 2023; Safi Sana et al., 2024).

Other slothful habits among children and adolescents included homework, reading, indoor play, listening to music, and imaginative play, with each activity averaging around 0.5 hours/day (Nakhostin-Ansari et al., 2023; Safi Sana et al., 2024). In contrast, adults spent more time on similar activities such as reading, arts and crafts, knitting, and listening to music, ranging from 0.5 to 4.5 hours/day (Safi Sana et al., 2024).

Sedentary Activities in Individuals with Cerebral Palsy (CP)

SB among individuals with CP was primarily reported in two of the included studies**.** One study found that children and adolescents with cerebral palsy spent an average of 2.2 hours per day on screen media, while another study reported that adolescents engaged in recreational screen-based activities for an average of 4.07 hours per day (Nakhostin-Ansari et al., 2023). The same study further reported that screen time was higher on weekends (5.97 hours per day) compared to weekdays (3.46 hours per day) (Carol et al., 2007).

In addition to screen media, one study highlighted other forms of idleness among children and adolescents with CP, including homework, reading, and art-related activities (approximately 2 hours/day); sitting activities (1.2 hours/day); and a range of low-frequency sedentary pursuits such as playing with toys or board games, listening to music or playing musical instruments, and engaging in imaginative play, which ranged from 0.2 to 0.53 hours per day.

Sedentary Activity Patterns in Other Neurodevelopmental Disorders

Three studies separately identified patterns of sedentary activity among individuals with cognitive developmental disorders, ADHD, and SLD, all consistently highlighting screen media as the most prevalent form of inactivity. Among individuals with cognitive developmental disorders, the average daily screen time was 3.8 ± 3.07 hours. Youth spent significantly more time on screen media during weekends (4.64 ± 3.61 hours/day) compared to weekdays (3.47 ± 3.1 hours/day) (Yang Anyi et al., 2022).

In contrast, the study on the ADHD population revealed that the average daily screen time was 2.83 ± 2.13 hours per day. Television (98.2%) was the most commonly used screen-based activity, followed by mobile phones (87.3%), tablets (17.9%), and laptops (10.7%) (Vaidyanathan et al., 2021).

The estimated screen time among children with specific learning disorders was 4.39 hours per day. However, screen time on weekdays (4.42 hours per day) and weekends (4.3 hours per day) among the participants was quite similar. TV watching (2.43 hours/day) was the most common motionless activity, followed by playing with handheld devices (0.67 hours/day) and playing mobile games without internet (0.65 hours/day). Other screen-based activities, such as watching DVDs, playing video games, and using computers with or without internet, ranged from 0.18 to 1.58 hours/day (Ariapooran et al., 2022).

Factors Associated with Sedentary Activity

Among the 19 studies, 6 highlighted factors contributing to sedentary activities. Identified key factors were disorder trait (Must et al., 2023; Vaidyanathan et al., 2021), physical and socio-economic barriers (Must et al., 2015), parenting style (Ariapooran et al., 2022), and quality of life (Lee et al., 2024 & Safi et al., 2024)

DISCUSSION

Pattern of Sedentary Activity

This scoping review mapped evidence from 19 studies and demonstrated that screen-based SB was the most prevalent form of sedentary activity across neurodevelopmental disorders, with particularly high levels observed among individuals with ASD and intellectual disabilities, and greater sedentary time was reported on weekends compared with weekdays. Screen media use, including television viewing, smartphone use, video gaming, and other digital activities, was consistently identified as the most frequently reported SB, especially among children with ASD. These findings are consistent with previous reviews indicating substantially higher screen time among children with ASD, reaching up to 430 minutes per day (Jones et al., 2017). In contrast, participation in non-screen-based sedentary activities, such as reading, imaginative play, playing with toys, crafting, indoor games, and playing musical instruments, was limited. Evidence suggests that limited parental education and guidance may be associated with higher screen use and an increased risk of digital device dependence among children with ASD (Dong et al., 2021). Additionally, higher levels of SB among individuals with intellectual disabilities have been linked to greater disorder severity (Oppewal et al., 2008).

Although screen media use is commonly reported across childhood, adolescence, and adulthood, adults with ASD and individuals with ID exhibit higher screen time. However, existing evidence does not consistently demonstrate a consistent increase in screen use with age, suggesting that elevated screen usage may not be associated with age (Oppewal et al., 2008).

A clear weekday–weekend difference was observed. Each group, including children, adolescents, and adults across most NDD categories, engages in more sedentary time on weekends than on weekdays. However, children with SLD demonstrate similar durations of inactivity across weekdays and weekends, suggesting minimal variation in inactivity patterns. However, This scoping review indicates that individuals with neurodevelopmental disorders across all age groups exceed these recommended limits, which are as follows: no screen time (except video chatting) for children under 2 years, 0.5 to 1 hour per day for children aged 3–7 years, 1 hour for ages 7–12, 1.5 hours for adolescents aged 12–15, and 2 hours per day for those aged 16 years and above (Muppalla et al., 2023). These findings highlight the need for parent- and caregiver-focused educational strategies to improve understanding of age-specific screen-time guidelines. Healthcare professionals and educators can play a key role in supporting families by integrating screen-time counselling into regular clinical follow-up visits.

Among screen-based sedentary activities, television viewing emerged as the most common form of SB among children and adolescents with NDDs, particularly those with ASD, ADHD, and SLD. Mobile phone use was the second most common screen activity. Previous studies have indicated that children with neurodevelopmental disorders are exposed to television viewing before 2 years of age, while prolonged screen exposure, specifically watching television, may increase disorder severity (Pons et al., 2022; Melchior et al., 2022). In contrast, other sedentary activities, such as doing homework, reading, arts and crafts, sitting activities, or less frequently reported leisure activities (e.g., playing with toys or board games, listening to music, or engaging in imaginative play) accounted for considerably less time. These activities were typically reported as lasting less than one hour per day, showing that screen use dominates sedentary patterns in these groups.

However, insufficient evidence exists regarding non-screen-based habits to support detailed reporting.

Additionally, this scoping review included four studies comparing screen time between typically developing children and children with ASD. These studies revealed that screen time is higher among children with ASD than their typically developing peers, and that may be negatively affecting their behavioral outcomes, socialization, sleep, and brain development (Dong, H. Y., Wang, B. et al., 2021; Dong, H. et al., 2023).

By mapping a broad spectrum of sedentary activities and accounting for disorder-specific differences across multiple neurodevelopmental disorders, this review advances existing literature that has largely focused on total sedentary time or individual disorder groups (Melville et al., 2017; Oppewal et al., 2008; Jones et al., 2017). This comprehensive perspective may inform the development of tailored interventions and guide disorder-specific recommendations. Furthermore, the findings may assist policymakers in developing inclusive home- and school-based play environments, such as accessible and engaging playgrounds and adaptive play areas, which may help reduce SB and promote physical activity.

Influencing Factors Associated with Sedentary Behavior

Traits related to poor self-regulation, associated with ASD and ADHD, are key contributing factors. For example, children with ASD often present repetitive behaviors, such as repeatedly playing the same games or watching the same videos, which may contribute to prolonged screen time. In contrast, children with ADHD may find structured, task-oriented play more challenging than engaging with screen-based media, reflecting difficulties with sustained attention (Must et al., 2023; Vaidyanathan et al., 2021).

Furthermore, barriers such as motor difficulties, low self-confidence, limited access to facilities, and high program costs often prevent individuals with ASD from engaging in physical activity, making screen use a more accessible alternative (Must et al., 2015). In children with SLD, screen use is influenced by the appeal of and easy access to digital devices, and shaped by parenting style (Ariapooran et al., 2022). For adults with intellectual disabilities and ASD, SB is influenced by financial hardship, discrimination, safety concerns, and limited social support (Lee et al., 2024; Safi et al., 2024). In this context, Community-Based Rehabilitation (CBR) programs, which emphasize health, inclusion, functional independence, and equitable access to participation, may serve as an important strategy to improve physical activity opportunities, enhance community engagement, and address systemic barriers faced by individuals with disabilities (Lankester et al., 2019).

Existing Research Gaps and Future Directions

A large proportion of studies included in the review relied on self-reported questionnaires to assess SB, which introduces the potential for recall bias or data misinterpretation (Kushima et al., 2022; Must et al., 2015; Must et al., 2014; Pan et al., 2021; Must et al., 2023; Ariapooran et al., 2022). The use of observational methods, such as camera monitoring, may provide more reliable data in future studies.

Disorders except ASD are often underrepresented in existing literature, highlighting a notable gap in fully understanding the sedentary patterns in those groups. Notably, no study identified that explored sedentary behavior among individuals with Down syndrome, despite its relatively high prevalence (1 in every 336 babies), according to the NCARDRS Congenital Anomaly Official Statistics Report-2021. Additionally, there is limited evidence on the adult population with NDD, including gender-specific analysis and exploration of the relationship between socio-demographic data and SB (Dong et al., 2021).

Future research may explore the impact of screen time on psychological well-being, the effectiveness of interventions aimed at reducing screen use before bedtime, and the types of screen-media content, targeting the population with NDD (Stiller et al., 2019; Haegele et al., 2024; Dong et al., 2023).

CONCLUSION

The scoping review provided a comprehensive overview of sedentary activity patterns among individuals with NDD. The review highlighted screen time as the predominant form of sedentary activity across all groups, with reading, imaginative play, playing with toys, and crafting as the least frequently reported activities. Furthermore, sedentary time was higher on weekends compared to weekdays.

The review also examined factors associated with SB. NDD traits, such as repetitive behavior in young people with ASD and poor concentration in individuals with ADHD, were some of the key factors associated with higher sedentary screen time. In contrast, excessive screen usage in adults with NDD was often linked to poor quality of life.

This review underscores the need for organizations involved in Community-Based Rehabilitation (CBR) to prioritize individuals with NDDs. Strengthening CBR initiatives to include inclusive physical activity programs, environmental modifications, and community participation opportunities could help address the unique barriers faced by this population and support more active and engaging daily routines.

Limitations

A key limitation of this review is the absence of a preregistered protocol, which may reduce methodological transparency and increase the potential for bias. Additionally, there were limited studies focusing specifically on individuals with ADHD, SLD, cerebral palsy, Down syndrome, cognitive impairments, and other neurodevelopmental conditions. Moreover, most included studies emphasized screen time, with limited attention given to other forms of SB. Future reviews should address these limitations by including a broader range of databases to increase study coverage and enhance the comprehensiveness and transparency of the evidence base.

Data Availability: This scoping review did not generate or collect primary data. All data were extracted from studies published in peer-reviewed journals and other publicly available sources.

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Annex

A1.Table 1: Databases and Search Strategies

Database	Search Strategy
PubMed	(Autism Spectrum Disorder OR ASD OR Attention Deficit Disorder with Hyperactivity OR ADHD OR Neurodevelopmental Disorders OR Cerebral Palsy OR Speech and Language Disorder OR Developmental Disabilities) AND (Sedentary behavior OR sedentary activity OR screen time)
Scopus	(Autism OR Attention Deficit Disorder with Hyperactivity OR Neurodevelopmental Disorders OR Cerebral Palsy OR Developmental Disabilities OR Intellectual Disabilities) AND (Sitting activity OR sedentary activity OR screen time)
Web of Science	(Neurodevelopmental disorders OR Developmental delay OR Autism Spectrum Disorder OR Attention Deficit Hyperactivity Disorder OR Cerebral Palsy OR Intellectual disabilities) AND (Sedentary play OR sedentary activity OR screen Time OR sitting time)
Google Scholar	Neurodevelopmental disorder OR sedentary activity

Note: In the case of Google Scholar, screening was limited to 100 pages. Google Scholar orders results by relevance rather than date; studies beyond 100 pages appear to be duplicates or low in relevance. Screening restriction is consistent with methodological guidance for scoping reviews and maintains feasibility without compromising comprehensiveness.