Reilly, Kasey (2025) *Mental health challenges in the context of learning disabilities: a dual investigation of parental burnout and adolescent cyberbullying.* D Clin Psy thesis.

https://theses.gla.ac.uk/85452/

Mental Health Challenges in the Context of Learning Disabilities: A Dual Investigation of Parental Burnout and Adolescent Cyberbullying

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Submitted in partial fulfilment of the requirements for the degree of

Doctorate in Clinical Psychology

School of Health and Wellbeing

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April 2025

Table of Contents

List of Tables

List of Figures

Acknowledgements

I would like to express my sincere gratitude to the anonymous participants whose data contributed to this research. Their willingness to be part of the studies made this project possible. I am especially grateful to my supervisors, Dr Kirsty Dunn and Dr Deborah Cairns, and my research advisor Dr Laura Hughes, for their guidance and support throughout this process. Special thanks to Dr Paul Cannon, who provided essential support with the systematic review search strategy and guided me through the database processes with great patience and clarity.

Further, I want to thank my support system as they have been the reason I've made it this far. To my parents, Margaret Guthrie and Peter Reilly, you've always taught me I can do anything I set my mind to. Mum, thank you being by my side every step of the way (including the all-nighters). Your special hugs and the ability to know the exact right thing to say at the exact time, is unmatched and a skill I can only hope to learn. My mum has been the inspiration for my interest in psychology and if I can help half as many people in my professional life as she has, I will be very proud. Dad, thank you for your harsh but motivational pep talks when I need them. You have instilled in me a strong sense of determination and a need to prove people wrong when they doubt me, I truly believe I can do anything because you taught me I could.

To my wee sister Jay - my built-in best pal and lifelong cheerleader. I honestly can't imagine ever having gotten to this point without you. You've been there through it all, every high, low, snack break, and meltdown - right beside me. You've shown me what it means to be strong, resilient, and still have a laugh no matter what life throws. You always know when I need a deep chat, a sweet treat, or a break from the chaos (even if you still refuse hugs). You've been my constant, my comfort, and my reason – every step of the way.

To the friends I've made across college, university, support work, placements, and the DClinPsy - thank you for being my people. You've made this long journey a lot less lonely and a lot more bearable. You just *get it*.

And finally, to my fiancé Hammy. You've been by my side through eight years of studying - and somehow still want to marry me after all the meltdowns. Thank you for backing me every step of the way, for always making sure I was fed, for giving the best hugs, and for knowing when I needed a check-in to make sure I was *actually* studying. You bring the perfect balance to my life, fun, adventures, and the right amount of chaos, and I wouldn't have it any other way. I can't wait for many more years of it all with you.

I couldn't have done this without you all. Thank you - I love you more than you'll ever know.

Chapter 1

Exploring Experiences of Burnout in Parents of People with Developmental Disabilities: A Systematic Review

Prepared in accordance with the author requirements for Journal of Intellectual and Developmental Disabilities

https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=cjid20*

Abstract

Background: Parental burnout is underexplored in parents of individuals with developmental disabilities (DD), including learning disabilities (LD), autism spectrum disorder (ASD), and attention-deficit/hyperactivity disorder (ADHD).

Method: This systematic review followed PRISMA guidelines. Seven studies were identified through comprehensive database searches. A narrative synthesis was conducted, and all studies were appraised using the CASP checklist.

Results: Parents of individuals with DD reported consistently higher levels of burnout than those with typical development (TD), across subscales of emotional exhaustion, depersonalisation and personal accomplishment. Socioeconomic strain, especially low income and maternal unemployment, was a key predictor. Burnout was highest among parents of children with ASD, followed by LD. No studies included parents of children with ADHD, unless they had comorbid conditions.

Conclusions: Findings highlight the urgent need for tailored interventions. Future research should prioritise ADHD-specific analyses and adopt longitudinal designs to improve support strategies.

Keywords: parental burnout, developmental disabilities

Introduction

Prevalence and Nature of Developmental Disabilities

Developmental disabilities (DD) are lifelong conditions that emerge during the developmental period and are characterised by significant limitations in intellectual functioning and adaptive behaviour, which encompass conceptual, social, and practical skills (Schalock et al., 2010). These include learning disabilities (LD), autism spectrum disorder (ASD), and attention-deficit/hyperactivity disorder (ADHD), which often require lifelong, multi-domain support. Recent estimates highlight the global prevalence of these conditions and their impact on families. Autism spectrum disorder (ASD) affects approximately 1 in 100 children worldwide, according to a recent systematic review (Zeidan et al., 2022). Attention-deficit/hyperactivity disorder (ADHD) is one of the most common neurodevelopmental conditions globally, with an estimated prevalence of 5-8% in children and teenagers (Salari et al., 2023). Learning disabilities were found to affect 1.74% of individuals globally, although prevalence estimates vary significantly depending on diagnostic criteria and educational systems (Nair et al., 2022). These figures highlight the global reach of DD and the diverse challenges faced by affected individuals and their families, especially for parents who take on the primary caregiving role.

Living Arrangements

In the UK, a significant proportion of individuals with DD, especially those with LD, continue to live with their parents into adulthood. It is estimated that at least 50% of adults with LD remain in the family home, with around 29,000 living with parents aged 70 or older (Foundation for People with Learning Disabilities, 2023). Although national data for ASD and ADHD are limited, individuals with LD generally require more daily support and less likely to live independently compared to individuals with ASD or ADHD. This is largely due to the significant impairments in intellectual and adaptive functioning that characterize LD, which often necessitate lifelong support across various areas (Schalock et al., 2021). Historically, individuals with DD were institutionalised, though this practice declined as evidence mounted of its negative psychological and social impact (Mansell & Beadle-Brown, 2010). As a result, a widespread deinstitutionalisation movement emerged in the 1960s and 1970s, aiming to integrate individuals with disabilities into society. This led to improvements in quality of life (McCarron et al., 2018) but also shifted the responsibility of care back to families. This shift has placed growing emotional and practical strain on families, particularly ageing parents, who now carry much of the caregiving burden.

Caregiving Demands and Parental Mental Health

Caregiving challenges vary across DD diagnoses and contribute differently to parental mental health. The unique demands of ASD, LD and ADHD can lead to distinct mental health outcomes for parents, highlighting the need for tailored support. For example, parents of people with LD experience heightened levels of psychological distress, particularly depression and anxiety, and often report greater mental health challenges than those caring for people with ASD (Arnold & McPherson, 2023). In contrast, another study found that parents of children with ASD experienced significantly higher levels of psychological distress compared to those parenting children with LD (Marquis et al., 2020). These findings suggest that the mental health impact of caregiving may vary not only between DD and typically developing (TD) groups but also within DD diagnostic categories. Parents of those with ASD and ADHD reported significantly higher parenting stress than parents of TD children, though stress levels did not differ between diagnostic groups (Berenguer et al. 2024). These studies also identified condition-specific stressors, including child sleep and behavioural difficulties in ASD, and emotional challenges and limited social support in ADHD.

Overall, parenting a child with DD is consistently associated with elevated levels of depression, anxiety and psychological distress. One study found a sevenfold increase in psychological distress and greater likelihood of mental health diagnoses among parents of children with DD compared to parents of TD children (Hoyle et al., 2021; Marquis et al., 2020). These parents frequently overlook their own physical and emotional needs, contributing to the sustained exhaustion and emotional strain (Gérain & Zech, 2018). As such, they may be especially vulnerable to developing parental burnout, a distinct condition linked to chronic parenting stress that is increasingly recognised in this population (Mikolajczak et al., 2018).

Parental Burnout

Parental burnout is a stress response characterised by three key symptoms: exhaustion related to the parental role, emotional distancing from one's children, and a sense of reduced parental efficacy (Roskam et al., 2017). According to the Balance Between Risks and Resources Theory (Mikolajczak et al., 2018), burnout occurs when parenting demands consistently exceed available resources. Research has linked parental burnout to serious psychological outcomes, including escape and suicidal ideation, neglectful behaviours and persistent guilt (Liu et al., 2022; Mikolajczak et al., 2018; Roskam et al., 2022). Importantly, the effects of burnout extend beyond the parent. It is a risk factor for children's mental health, contributing to both internalising difficulties (e.g. anxiety) and externalising behaviours (e.g. hyperactivity) (Zhang et al., 2023; Chen et al., 2022).

Recent evidence further indicates that parental burnout is linked to increased emotional and behavioural problems in children, regardless of whether the child has a DD (Desimpelaere et al., 2023; Yakupova & Suarez, 2023). While any parent under chronic stress and with insufficient resources is vulnerable to burnout, those caring for children with disabilities face significantly greater risk (Dzielińska et al., 2023). Contributing factors include limited formal support, long wait times for services, age-related health concerns in parents, and, in some cases, the physical demands of caring for strong individuals with challenging behaviours (Baumbusch et al., 2017; Burke et al., 2017; Gallagher et al., 2014). While parental burnout is gaining recognition, much of the research in the context of DD has focused instead on professional caregivers.

Professional Burnout

While some research has examined parental burnout and its associated factors, most of the literature on burnout in the context of DD has focused on professionals in education, health, and social care who provide direct support. A U.S. study investigating burnout among staff supporting aggressive adults with DD in group residential homes found that approximately one-third of direct support staff left their roles within three months, with both retained and non-retained staff exhibiting high levels of burnout (Nevill & Havercamp, 2019). Similarly, a UK study reported that 60% of staff in additional support needs schools experienced significant emotional exhaustion and disengagement from their roles, indicating widespread burnout in educational settings for students with complex needs (Brittle, 2020). Further, nearly 60% of direct support workers caring for adults with ASD and LD reported a high loss of personal accomplishment, while over half experienced moderate to high emotional exhaustion (Couderc et al., 2021).

Although the mental health challenges faced by parents of children with DD are well recognised, there have been no systematic reviews specifically investigating parental burnout in this population. As such, this review will explore how parental burnout differs between parents of children with different DD and compared to parents of TD people.

Review Questions

Specific research questions are as follows:
1 - How does parental burnout affect parents of a person with a developmental disability (LD, ASD or ADHD)?

2 - How does parental burnout vary by type of developmental disability (LD, ASD or ADHD), or in comparison to no developmental disability?

Method

Selection of Studies

The review was registered with the International Prospective Register of Systematic Reviews (PROSPERO, registration number: CRD42024546948). This review followed the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) 2020 Guidelines (see Appendix A). The literature search was completed on 8th February 2025. The specific search strategy included relevant terms for parents, burnout and learning disabilities, using Boolean operators and truncation search techniques (see Appendix B). Electronic searches were conducted across four databases, CINAHL, EMBASE, Medline and PsycINFO, for studies in the English language published prior to February 2025. Reference lists of relevant studies were manually searched to ensure no potential studies were excluded. A PRISMA flow diagram was completed, detailing reasons for exclusion (Fig. 1).

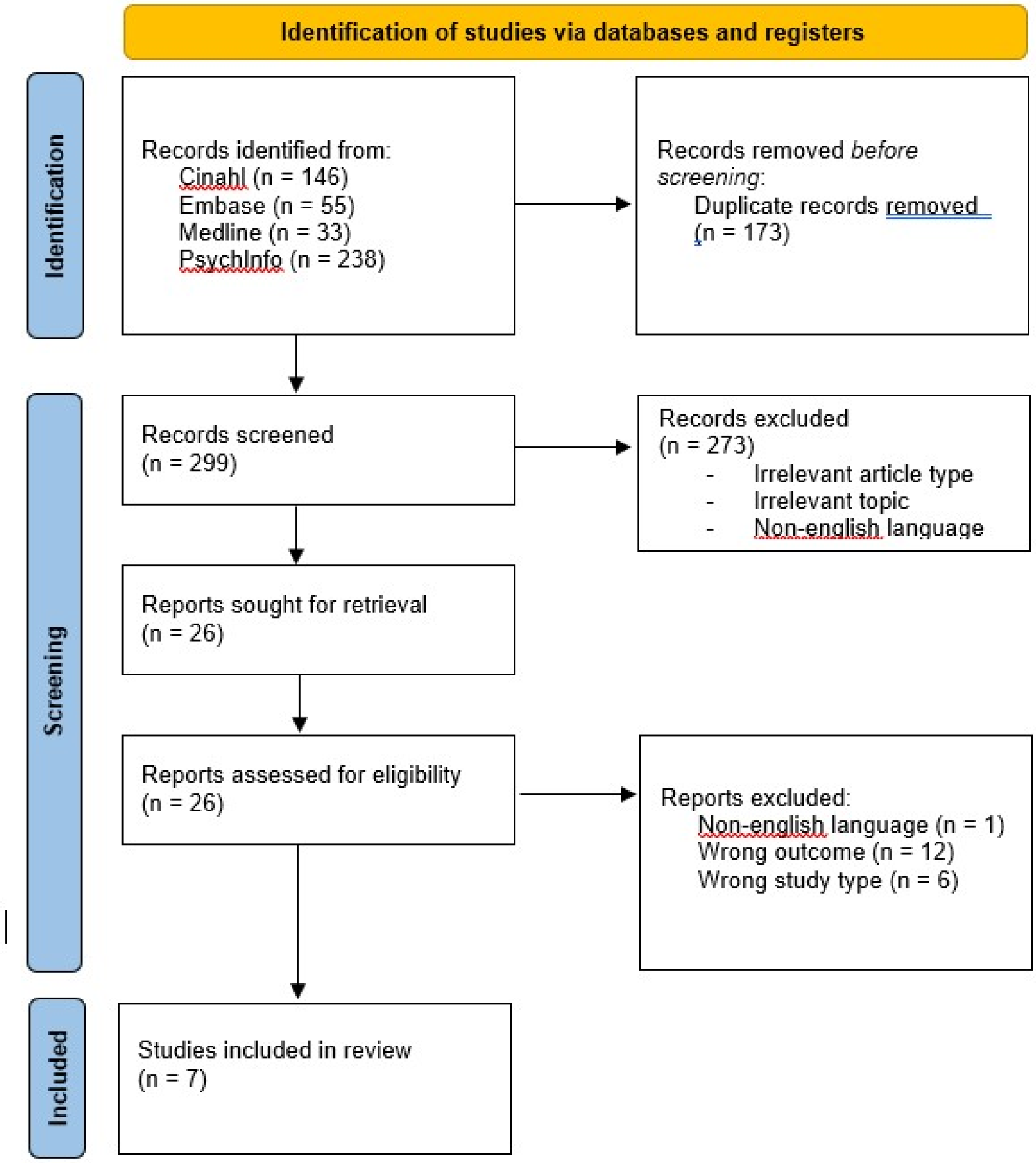

Figure 1: PRISMA (2020) Diagram (Haddaway, Page, Pritchard, & McGuinness, 2022) - Process from Identification to Inclusion

Inclusion and Exclusion Criteria

Studies included parents/carers of people with a LD, ASD and/or ADHD. Some studies included comparison groups of parents of children/adults with other DD diagnoses or of TD children. These studies explored burnout experiences of these parents and consisted of observational studies, such as cohort, case control and cross-sectional studies. Only peer-reviewed journals published in English were included. Excluded were studies with the data of caregivers not separately reported and studies that were focused on professional or formal caregivers of people with DD or did not include a focus on burnout experiences.

Method of Synthesis

A narrative synthesis was used to systematically analyse and interpret the findings from the included studies. By organising the evidence thematically and identifying patterns across studies, narrative synthesis supports a clear and structured synthesis of heterogenous findings across study types. This method was chosen to provide a comprehensive and meaningful synthesis while considering variations in study design, interventions, and outcomes.

Data Extraction and Quality Appraisal

The following relevant data were extracted: (a) authors, year and country; (b) parent/carer characteristics; (c) comparison group demographics (age etc.); (d) son/daughter characteristics; (e) study design; (f) measures; (g) methodology; (h) results; (i) critique. To ensure reliability, 10% of the extracted data were independently reviewed by a second researcher, with discrepancies resolved through discussion. A descriptive synthesis of findings was used in the form of text and a data extraction table. Each study was appraised for methodological quality and/or risk of bias using the structured 12 item Critical Appraisal Skills Programme Checklist (CASP, 2017).

Results/Findings

Characteristics of Included Studies

Seven studies published between 2002 and 2023 were included, with the majority conducted in Turkey (n = 5) and one each in Italy and the United States (Table 1). All studies gathered data from parents, although combined sample size could not be calculated as one study did not record how many parents participated (Kütük et al., 2023). Participant age reporting varied across studies, with several inconsistencies. One study did not report any ages for parents or children (Aktan et al., 2020). Where reported, three studies indicated that parent respondents were aged 21-61 years (Gentile et al., 2023; Kurtoğlu & Özçırpıcı, 2019; Weiss, 2002). Child age ranges included 2-7 years (Weiss, 2002), 6-14 years (Kahrıman et al., 2019), and a late adolescents/early adult group who had a mean age of 21 years (Kütük et al., 2023).

Convenience sampling was used in all studies. Recruitment sites included special education schools (n = 3; Aktan et al., 2020; Kahrıman et al., 2019; Weiss, 2002), rehabilitation centres (Kurtoğlu & Özçırpıcı, 2019; Kahrıman et al., 2019), child psychiatry clinics (Kütük et al., 2023; Kütük et al., 2021), social media and online platforms (Gentile et al., 2023), and a state-wide DD conference (Weiss, 2002). Parents of TD children were recruited through paediatric well-child visits (Kütük et al., 2021) and parenting networks (Weiss, 2002).

Five studies included children with LD (Aktan et al., 2020; Gentile et al., 2023; Kurtoğlu & Özçırpıcı, 2019; Kahrıman et al., 2019, Weiss, 2002) and five included children with ASD (Aktan et al., 2020; Gentile et al., 2023; Kütük et al., 2023; Kütük et al., 2021; Weiss, 2002). Two studies compared groups of parents of children with LD, ASD and TD children (Gentile et al., 2023; Weiss, 2002). Some also included children with other diagnoses (e.g. physical, mental, or multiple disabilities, or chronic illness) but none explicitly included children with ADHD.

Six studies used the Maslach Burnout Inventory (Maslach et al., 1997), five of which applied the Turkish version (Aktan et al., 2020; Kurtoğlu & Özçırpıcı, 2019; Kahrıman et al., 2019; Kütük et al., 2023; Kütük et al., 2021). One study employed the Balance Between Risks and Resources (BR²) model, incorporating a 39-item self-report questionnaire and a framework analysing risk/resource balance (Gentile et al., 2023).

Table 1: Data extraction

Study Information: Author, title, publication year, country.	**Parent Characteristics** Sample size, relationship, age.	**Comparison Group**	**Child Characteristics** Condition, age and sex	**Study Design**	**Measures**	**Methodology** Data collection, sampling, analysis	**Main Results**	**Critique**
1. Aktan, Orakcı & Durnalı (2020) Investigation of the relationship between burnout, life satisfaction and quality of life in parents of children with disabilities Turkey	N = 538 Relationship: 186 mothers 352 fathers Age: Not reported	Yes Study compared parents of children with different disabilities.	Condition: LD (N=45) Mental disability (N=104) ASD (N=57) Physical disability (N=46) Multiple disabilities (N=253) Other disabilities (N=33) Age: Not reported Sex:	Cross-sectional	Maslach Burnout Inventory	Data collection: Convenience sampling Analysis: Pearson's Product Moment Correlation Coefficient and path analysis model.	No significant difference between burnout in parents of children with LD (M= 54.37, SD = 7.03) and ASD (M= 56.94, SD = 6.19). Parents of children with multiple disabilities had significantly higher burnout than those with LD (F = 9.278; $p < 0.05$; LD: M = 54.37, SD = 7.03, Multiple disabilities: M = 59.27, SD = 8.87).	No formal disability measure, child's disability status was reported by parent only. There were no definitions provided for the disabilities or inclusion criteria to determine which specific disabilities were included in each category.

			not reported				Burnout negatively correlated with life satisfaction and quality of life.	
2. Gentile, Polizzi, Giordano, Burgio & Alesi (2023) Parental Resources in Parents of Children with Special Needs (SNs) at the Time of COVID-19 Italy	N = 648 Relationship: 586 mothers 62 fathers Age: Range = 36-45	Yes Study compared parents of children who were typically developing and those with various disabilities.	Condition: 587 typically developing 23 LD 9 ASD 29 chronic illness Age: Not reported Sex: Male = 54.5%, Female = 45.5%	Cross-sectional	Balance Between Risks and Resources; BR^2 used to measure parent burnout, as well as a 39-point self-report questionnaire	Data collection: Convenience sampling through social media and online advertisement. Analysis: A multivariate analysis of variance (MANOVA) model was conducted. A Path analysis model was used to analyse Impact of children's condition on parental resources.	Parents of children with LD had significantly fewer resources and greater burnout risk than parents of TD (MD = 56.45, $p < .001$) or ASD children (MD = 62.79, $p = 0.01$). They also reported significantly lower scores on common and specific antecedents related to parental and occupational burnout than those with TD (common: MD = 22.28, $p <$	No formal disability measure, child's disability status was reported by parent only. Conducted during COVID-19, but the lack of pre-pandemic comparison data limits interpretability. BR^2 assesses the risk of parental burnout based on the balance between stressors and resources but

							0.001, specific = MD = 34.17, $p < .001$) and ASD children (common: MD = 24.03, $p = 0.01$; specific: MD = 38.76, $p = 0.02$).	does not measure burnout symptoms directly. It is conceptually grounded and emerging in the literature, though less widely validated than traditional burnout scales.
3. Kurtoğlu & Özçırpıcı (2008) A Comparison of Family Attention and Burnout in Families of Children with Disabilities and Families of Children without Disabilities	N = 194 97 mothers of children with disabilities Age: Mean = 32.71 Range = 21-53 97 mothers of children without disabilities	Yes Study compared mothers of children with disabilities and mothers of children without disabilities.	Condition: LD (18.60%) Physical disabilities (64.90%) Both LD and physical disabilities (16.50%) Age: Not reported Sex:	Cross-sectional	Maslach Burnout Scale – Turkish version.	Data collection: Convenience sampling Analysis: Kruskal-Wallis, Mann Whitney U, Chi-square and t-Test.	Mothers of children with disabilities reported significantly higher ($p<.001$) rates of emotional exhaustion than mothers of children without disabilities (M = 13.33, SD = 9.64 vs M = 7.43, SD = 7.56).	Differences between disability types (e.g., physical vs. intellectual) and the age and sex of the children were not reported. The study included only mothers, limiting generalisability.

Turkey	Age: Mean = 34.65 Range 21-61		Not reported				No significant difference in personal accomplishment between mothers of children with disabilities and without (M = 27.79, SD = 5.24 vs M = 26.86, SD = 4.82, *p*=.201). Significant difference in personal accomplishment scores with mothers of children with LD scored lower than those with physical disabilities only.	
4. Kahrıman, Polat and Gürol (2019)	N = 128 Relationship: All mothers	No	Condition: All LD only Age:	Cross-sectional	Maslach Burnout Inventory - Turkish version.	Data collection: Convenience sampling	Moderate to high burnout reported (MBI Total: M = 29.11, SD = 12.14; Emotional	There were inaccuracies in reporting statistical values within text

Determination of Perceived Social Support and Burnout Levels of Mothers of children with Intellectual Disability Turkey	Age: Not fully reported 40.6% were aged 40 and older		Mean = 11.3 (Range = 6-14) Sex: Male = 58.6% Female = 41.4%			Analysis: Pearson’s correlation analysis, independent samples t-test, one way analysis of variance (ANOVA) and the Tukey test.	Exhaustion, EE: M = 14.83, SD = 7.78; Depersonalisation, DP: M = 4.94, SD = 4.03; Personal Accomplishment, PA: M = 9.33, SD = 5.60). No difference in burnout reported across ages (20-30, 30-40, 40+). More than 50% of mothers reported “having difficulty in care of child” and had higher scores of emotional exhaustion (t = 2.106, *p* = 0.037) only. Those with financial problems reported	compared to the associated table. Only mothers were included, and the small sample size limits generalisability. No comparison group was used.

							significantly increased emotional exhaustion (F = 3.080 *p* = 0.033) and depersonalisation (F = 3.412, *p* = 0.022); and lower family income was associated with increased depersonalisation (r = -0.197, *p*=0.026).	
5. Kütük et al., 2023 Functional Outcome in Late Adolescence/Early Adulthood of Patients with Autism Spectrum Disorder and its Relationships with Parental Burnout and Depression: A	N = Not reported Age: Mothers Mean = 47.8 Father Mean = 52.3	Yes Study compared mothers' and fathers' experiences of parenting people with ASD.	Condition: ASD (261 adults) Sex: Female = 13.8%, Male = 86.2% Age: Mean = 21.4	Cross-sectional	Maslach Burnout Inventory - Turkish Version. Beck Depression Inventory-II (BDI-II).	Data collection: Convenience sampling. Recruited within the Child and Adolescent Psychiatry Departments from different geographical areas in Turkey.	Emotional exhaustion was significantly higher in mothers of children with ASD compared to fathers (M = 16.4, SD = 9.8, vs M= 13.0, SD = 8.9, *p* < .001). Mothers and fathers reported similar experiences of	Depended on clinical records which may limit consistency. A significantly higher proportion of fathers were included, potentially introducing gender imbalance in parental data.

preliminary multi-centre cross-sectional study Turkey						Analysis: Chi-square tests, Yates', Fisher's, and likelihood ratio corrections used as appropriate. Bivariate comparisons were conducted with t-tests and logistic regression (enter method).	personal accomplishment (M = 8.3, SD = 6.3, vs M = 9.4, SD = 7.7, *p* = 0.261). Mothers of children with both current and lifetime comorbid ASD and LD reported significantly elevated burnout (M = 13.7, SD ≈ 8.8). Burnout was also significantly higher in both mothers and fathers of children with ASD and additional neurodevelopmental or psychiatric comorbidities. Notably, maternal employment outside the home emerged	

							as the only significant predictor of better functional outcomes in offspring during adulthood.	
6. Kütük et al., 2021 High Depression Symptoms and Burnout Levels Among Parents of Children with Autism Spectrum Disorders: A Multi-Center, Cross-Sectional, Case-Control Study Turkey	N = 145 mothers of children with ASD Age: Mean = 34.9 N = 141 fathers of children ASD Age: Mean = 38.4 N = 145 mothers of typically developing children Age:	Yes Compared parents of children with ASD and children without.	Condition: 145 children with ASD Age: Mean = 7.2 Sex: Male = 117, Female = 28 127 typically developing children Age: Mean = 9.5 Sex:	Cross-Sectional	Maslach Burnout Inventory – Turkish version. Childhood Autism Rating Scale (CARS) Turkish version.	Data collection: Convenience sampling. Recruited from Child and Adolescent Psychiatry Departments across different geographical regions of Turkey and involved patients who were followed up for ASD in the study centres. Recruited control group from	Mothers reported higher burnout than fathers (Z = − 4.5, p < 0.01). Maternal burnout was associated with child's age (*r* = .16, *p* < .05), paternal depression (*r* = .52, *p* < .01), and both maternal burnout (*r* = .61, *p* < .01) and maternal depression (*r* = .41, *p* < .01). Parents of children with ASD had significantly higher total burnout than control parents	The group of children with ASD and their mothers were significantly younger than the TD group which may confound results. Children who had comorbid disorders such as LD, ADHD and epilepsy were included and these conditions were controlled for.

	Mean = 37.4 N = 138 fathers of TD children Age: Mean = 39.2		Males = 98, Females = 29			parents taking children to routine “Well-Child Visits” in the Departments of Paediatrics in the study centres. Analysis: Descriptive statistics, bivariate comparisons (Z-test), correlation analyses, and multiple linear regression.	(Mothers: Mdn = 23.0 vs. 16.0; Fathers: Mdn = 20.0 vs. 13.0; both $Z = -5.0$, $p < .001$). Presence of functional speech in the child was a significant predictor of lower maternal burnout ($\beta = 0.2$, $p = .03$) Unskilled or temporary paternal vocation as a predictor of higher paternal burnout ($\beta = 0.3$, $p = .02$)	
7. Weiss (2002) Hardiness and social support as	N = 120 Relationship:	Yes Study compared mothers of	Condition: ASD (N = 40) LD (N = 40) TD (N = 40)	Cross-sectional	Maslach Burnout Inventory	Data collection: Convenience sampling.	Significant group differences were reported on burnout overall ($F = 6.55$, p	The sample was predominantly white and middle class, limiting generalisability.

predictors of stress in mothers of typical children, children with autism, and children with mental retardation New Jersey, USA	40 mothers of children with ASD 40 mothers of children with LD 40 mothers of TD children Age: Range = 24-48	children with ASD, LD and mothers of TD children.	Age: Range 2-7 Sex: Not reported			Recruited mothers of children with ASD from two “special” schools and a statewide developmental disabilities conference. Recruited mothers of children with LD from a service-providing organisation and the DD conference. Recruited mothers of TD children through a parent networking organisation.	<0.01) and on EE, DP and PA subscales. The three groups differed on emotional exhaustion subscale (F = 3.83, *p* <0.04), de-personalisation (F = 6.16, *p*<0.001) and feelings of personal accomplishment (F = 78.69, *p*<0.001). Emotional exhaustion was found to be predicted by depersonalisation in parenting, anxiety symptoms and a sense of personal accomplishment in parenting (multiple R = 0.801, *p* < 0.001). Parents of	ASD and LD had been diagnosed using the DSM-III-R. Absence of specific IQ data for children in ASD and LD groups.

						Analysis: A MANOVA reported between-group differences. Regression analyses were computed to assess best predictors of each dependent variable.	children with ASD and LD reported less personal accomplishment than parents of typically developing children. Mothers of children with ASD reported higher levels of burnout than parents of children with LD and TD, across emotional exhaustion and depersonalisation.	

Quality Appraisal

The quality of included studies was assessed using the CASP (2024) checklist for cross-sectional studies. CASP does not provide scores but recommends classifying studies as high, moderate, or low quality. All seven studies used convenience sampling, limiting generalisability. Most did not define disability categories or provide inclusion/exclusion criteria, relying instead on parent-reported diagnoses, increasing the risk of misclassification bias, especially for LD, which is often misunderstood. All studies used self-report questionnaires to measure burnout, which may introduce social desirability bias. However, six used validated measures such as the Maslach Burnout Inventory, supporting comparability and internal consistency. Effect sizes were reported in only four studies, limiting understanding of practical significance. Ethnicity data were mostly missing, and cultural generalisability is restricted as five studies were conducted in Turkey. None of the studies included power calculations, though some had large sample sizes. Few studies controlled for confounding variables. Only one controlled for socioeconomic status explicitly, and none controlled for disability severity or parental mental health history, both key factors likely to influence burnout. See Table 2 for a summary of the CASP appraisal.

Table 2: CASP Checklist

CASP Item	Aktan et al. (2020)	Gentile et al. (2023)	Kurtoğlu & Ozcirpici (2008)	Kahrıman et al. (2019)	Kütük et al. (2023)	Kütük et al. (2021)	Weiss (2002)
1. Clearly focused issue	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Appropriate method	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Acceptable recruitment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Measures reduce bias	No	No	No	No	No	No	No
5. Data collection appropriate	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. Enough participants	Can’t tell	Can’t tell	Can’t tell	Can’t tell	Can’t tell	Can’t tell	Can’t tell
7. Results and main finding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8. Rigorous data analysis	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9. Clear statement of findings	Yes	Yes	Yes	Can’t tell	Yes	Yes	Yes
10. Applicability to local population	No	Can’t tell	Can’t tell	Can’t tell	Can’t tell	Can’t tell	No
Overall Quality Rating	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Moderate

Research Question One: How does parental burnout affect parents of a person with a developmental disability (LD, ASD or ADHD)?

Parental burnout was consistently associated with reduced life satisfaction and increased psychological distress across the included studies (Aktan et al., 2020; Kütük et al., 2023; Kütük et al., 2021). Aktan et al. (2020) found that burnout was negatively predicted by quality of life and, in turn, by life satisfaction, with higher burnout reported among lower-income families. Kütük et al. (2023) identified financial strain, lower educational attainment, and the severity of the child’s condition as key stressors, especially for mothers. Similarly, Kütük et al. (2021) found maternal burnout was primarily linked to the child’s developmental challenges, while paternal burnout was more associated with employment and financial pressure.

Emotional exhaustion was a dominant theme. Kurtoğlu & Özçırpıcı (2019) and Kahrıman et al. (2019) found that extensive caregiving demands, particularly for mothers, limited rest, employment, and personal time. While Kurtoğlu & Özçırpıcı (2019) observed stable levels of personal accomplishment, Kahrıman et al. (2019) reported diminished accomplishment and high emotional exhaustion among mothers of children with LD.

Burnout was also influenced by parental resources and social support. Gentile et al. (2023) noted that parents of children with LD reported the lowest resource levels, correlating with more negative perceptions of their children’s abilities. Kahrıman et al. (2019) found that social support, although helpful, was insufficient to fully buffer against burnout. Weiss (2000) supported this, showing that parents with higher personal resilience (hardiness) experienced lower emotional exhaustion.

Burnout was further linked to adverse mental health outcomes, including depression, anxiety, and psychiatric medication use. Kütük et al. (2021) reported clinically significant depressive symptoms in over a third of mothers and many fathers, with maternal depression related to children's speech and educational difficulties. Similarly, Kütük et al. (2023) found that ongoing burnout contributed to persistent depression and family conflict. Kurtoğlu & Özçırpıcı (2019) also noted increased psychiatric medication use in parents experiencing emotional burnout.

Research Question Two: How does parental burnout compare depending on the type of the person’s developmental disability or lack of developmental disability?

Parent burnout levels varied across disability types, with the highest levels consistently reported by parents of children with ASD and multiple disabilities. For example, one study (Aktan et al., 2020) reported significantly higher burnout scores for this group (M = 59.27, SD = 8.87) compared to parents of children with LD (M = 54.37, SD = 7.03), however, the lack of detail on what constituted “multiple disabilities” limited the interpretability of these findings.

When comparing ASD and LD, results were mixed. One study (Aktan et al., 2020) found no significant difference in burnout between parents of children with ASD (M = 56.94, SD = 6.19) and LD (M = 54.37, SD = 7.03). In contrast, Gentile et al. (2023) found that parents of children with ASD reported significantly higher overall burnout than those with LD (MD = 62.79, *p* = 0.01). These parents also exhibited greater imbalances between risk and resources, particularly on common antecedents, which included general life stressors such as difficulties balancing work and family responsibilities, and on specific antecedents, which captured parenting-related stressors like lack of time for oneself due to caregiving demands. The higher scores for ASD parents on both types of antecedents (common: MD = 24.03, *p* = 0.01; specific: MD = 38.76, *p* = 0.02) suggest that this group may experience a more complex and multifaceted burden, potentially compounding the effects of burnout. These findings were supported by Weiss (2000) who reported that parents of children with ASD had higher levels of emotional exhaustion (M = 31.26, SD = 2.26 vs. M = 27.75, SD = 2.42 for LD) and depersonalization (M = 9.53, SD = 1.7 vs. M = 6.25, SD = 1.64 for LD). Notably, Weiss observed that parents of children with ASD also reported slightly higher personal accomplishment (M = 21.98, SD = 2.45 vs. M = 20.5, SD = 3.09 for LD) (F = 6.55, p < 0.01) than other groups. Taken together, these findings suggest that parents of children with ASD may experience greater emotional strain and burnout than those of children with LD, particularly in dimensions such as emotional exhaustion and depersonalization.

Although Aktan et al. (2020) found comparable levels, both Gentile et al. (2023) and Weiss (2000) identified more pronounced burnout among ASD parents, potentially due to greater caregiving complexity and fewer resources. Burnout levels were consistently higher in parents of children with DD compared to those TD children. Gentile et al., (2023) found that parents of children with LD had significantly higher burnout scores than those of TD children (MD = 56.45, *p* < 0.001), as well as on both common and specific antecedents (MD = 22.28, *p* < 0.001; MD = 34.17, *p* < 0.001, respectively). This was further supported when Kurtoğlu & Özçırpıcı (2019) showed that mothers of children with disabilities had significantly higher emotional exhaustion scores (M = 13.33, SD = 9.64) than those of TD children (M = 7.43, SD = 7.56; *p* < 0.001), although, personal accomplishment scores were similar between groups (M = 27.79, SD = 5.24 vs. M = 26.86, SD = 4.82; *p* = 0.201).

Weiss (2002) offered further detail, showing burnout levels decreasing from ASD to LD to TD groups. Emotional exhaustion was highest among mothers of children with ASD (M = 16.42, SD = 9.48), followed by LD (M = 12.50, SD = 8.59) and TD children (M = 7.43, SD = 7.56; *p* < 0.001). However, personal accomplishment remained relatively stable across groups (*p* = 0.201), reinforcing the idea that while burnout levels are high, many parents still maintain a sense of purpose in their caregiving responsibilities. Hardiness and social support were identified as protective factors (Weiss, 2002), with higher resilience linked to lower burnout.

Overall, these findings indicate that parental burnout is significantly greater in parents of children with developmental disabilities, particularly ASD and LD, compared to those with TD children. While parents of children with LD report higher burnout than those of TD peers, their levels remain lower than parents of children with ASD. Emotional exhaustion and depersonalization appear most affected, while personal accomplishment is relatively preserved.

Discussion

This systematic review synthesised current evidence on parental burnout in parents of individuals with DD, with a particular focus on LD, ASD and ADHD. Despite ADHD being one of the most common developmental disorders, only one study (Kütük et al., 2021) included it as a comorbid diagnosis within an ASD sample, and none conducted separate analyses, limiting insight into ADHD-specific caregiver experiences of burnout and highlighting a key gap in the literature.

Research Question One

The first research question explored how parental burnout affects parents of people with DD, specifically LD, ASD and ADHD. Of the studies included in this review, three explicitly examined the effects of burnout on parental well-being.

Impact of Burnout on Parental Well-being

Across the included studies, burnout was consistently associated with reduced life satisfaction and quality of life (Aktan et al., 2020), elevated psychological distress (Kütük et al., 2023), and higher rates of depressive symptoms (Kütük et al., 2021). This was especially true for parents of children with multiple disabilities, who reported the highest levels of burnout and the lowest life satisfaction. Mothers of children with ASD frequently reported higher emotional exhaustion than fathers, particularly when ASD co-occurred with LD, a combination linked to more severe behavioural challenges

(Totsika et al., 2010) and a fourfold increase in difficulties compared to LD alone (McCarthy et al., 2010).

Maternal burnout was significantly associated with the child’s lack of functional speech and need for specialist services, while paternal burnout was more closely linked to employment and vocational challenges (Kütük et al., 2021). In both studies by Kütük et al., burnout levels were consistently higher in mothers than fathers, underscoring a consistent gender disparity in caregiving burden. Similarly, heightened maternal burnout was shown to be linked to the cumulative stress of caregiving that extends into adolescence and early adulthood (Kütük et al., 2023). Additionally, maternal employment outside the home was identified as a protective factor against parental burnout and improved functioning in adult children.

While mothers consistently reported higher emotional exhaustion, this disparity may be understood through the lens of gender role theory, which suggests that women are more likely to assume primary caregiving responsibilities due to entrenched societal expectations (Eagly, 2013). This unequal caregiving distribution often results in greater disruption to mothers’ employment, well-being, and personal identity (Lee & Tang, 2015).

The Role of Socioeconomic Status

Findings from this review showed that socioeconomic status consistently influenced parental burnout, with low income and educational attainment identified as strong predictors, particularly among mothers (Kütük et al., 2023). One study also found parents with financial difficulties reported significantly higher emotional exhaustion and depersonalisation, with lower family income specifically linked to increased depersonalisation (Kahrıman et al., 2019). Maternal burnout appeared to be more influenced by caregiving demands and the child’s developmental needs, while paternal burnout was more closely associated with financial and employment pressures (Kütük et al., 2021). These differences suggest that while socioeconomic strain contributes to burnout in both mothers and fathers, the pathways differ: caregiving intensity and disrupted employment for mothers, and financial provider stress for fathers. This may also reflect sample differences, as Kütük et al. (2021) focused on parents of younger children, while Kütük et al. (2023) studied parents of adolescents and young adults.

Further, mothers of adults with DD experience ongoing financial stress from employment disruption, privately funded healthcare costs, and difficulties meeting basic needs (Banda et al., 2024). Notably, Kütük et al. (2023), also found that maternal employment outside the home was the only significant predictor of better functioning in adult offspring. This finding suggests that continued workforce participation may serve as a protective factor for both parents and children.

These findings suggest that socioeconomic strain not only contributes to parental burnout but also shapes the caregiving experience differently for mothers and fathers, highlighting a need for tailored support mechanisms. They also align with the demand-resource imbalance model (Mikolajczak et al., 2018), which suggests that burnout occurs when caregiving demands exceed available personal, financial, and systemic resources.

Research Question Two

The second research question explored how parental burnout vary by type of developmental disability (LD, ASD or ADHD), or in comparison to no developmental disability?

Burnout in LD

Among the studies included in this review, Weiss (2002) found that mothers of children with LD reported significantly lower personal accomplishment compared to mothers of TD, although their levels of emotional exhaustion and depersonalisation were not as elevated as those reported by parents of children with ASD.

Supporting this, Aktan et al. (2020) reported that burnout was highest among parents of children with multiple disabilities, many of whom had co-occurring LD. Gentile et al. (2023) also found that parents of children with LD reported significantly lower levels of parental resources compared to those caring for children with ASD, chronic illness, or TD. These included lower total BR^2 scores, fewer burnout antecedents, and reduced access to support resources.

The lower personal accomplishment scores observed among parents of children with LD, compared to those of TD children, may be explained by broader research on disability visibility. LD has been described as a form of “invisible disability” - often misunderstood, questioned, or overlooked by society (Javaid & Yusuf, 2024). Parents in this context may struggle to have their child’s needs acknowledged, receive less validation for their caregiving efforts, and experience heightened emotional isolation. These dynamics can undermine their sense of efficacy and achievement, contributing to reduced personal accomplishment.

Burnout in ASD

Across the included studies, parental burnout was consistently highest in families of children with ASD. Weiss (2002) reported significantly greater emotional exhaustion and total burnout in parents of children with ASD compared to both parents of children with LD and TD. Similarly, Kütük et al. (2021) observed elevated burnout scores among parents of children with ASD, with maternal burnout particularly associated with the child's lack of functional speech and the need for specialised services. This pattern was also evident in wider research as Liu et al. (2025), found that over half of parents of children with ASD fell into moderate or high burnout profiles, with mothers, those caring for younger children, and those managing more severe symptoms at greatest risk. Included in this review, Kütük et al. (2023) further demonstrated that burnout and depressive symptoms were especially pronounced when ASD co-occurred with LD or ADHD, highlighting the cumulative effects of behavioural challenges and caregiving intensity.

While mothers reported more emotional exhaustion, personal accomplishment was not significantly different between mothers and fathers of individuals with ASD. Gentile et al. (2023) reported that parents of children with ASD had reduced parental resources compared to those with TD children, though these scores were slightly higher than those of parents of children with LD. Collectively, these findings illuminate the substantial and sustained caregiving demands placed on families affected by ASD, particularly mothers. The higher emotional exhaustion among mothers is consistent with broader literature showing that women continue to assume more day-to-day caregiving responsibilities (Sharabi & Marom-Golan, 2018). Many fathers of children with ASD perceive their caregiving role as highly meaningful and report high levels of satisfaction and self-efficacy (Rudelli et al., 2021). This increasing paternal involvement may help explain why personal accomplishment scores did not significantly differ between mothers and fathers, despite ongoing disparities in emotional burden.

Burnout in ADHD

ADHD was mentioned only as a comorbid condition in one of the included studies (Kütük et al., 2023) and was not analysed as a distinct group. In the Kütük et al. (2023) sample, over 30% of children had co-occurring ADHD, yet subgroup analyses were not conducted. This reflects a broader pattern in the literature, where ADHD is frequently underexamined in relation to parental burnout, despite its high prevalence.

However, existing research does suggest that parents of children with ADHD are at elevated risk of psychological strain. For instance, Wiener et al. (2015) found that both mothers and fathers of adolescents with ADHD reported significantly higher parenting stress across multiple domains, including role restrictions, social isolation, and feelings of guilt and incompetence, compared to parents of adolescents without ADHD.

Similarly, a meta-analysis concluded that parents of children with ADHD reported much higher levels of parenting stress than controls, with stress levels influenced by the severity of ADHD symptoms, externalising behaviours, and parental mental health (Theule et al. 2013). These findings indicate that caregivers of children with ADHD may be particularly vulnerable to burnout, underscoring the need for future studies to analyse ADHD separately and explore targeted interventions.

Comparison with TD Children

All studies comparing parents of children with DD and TD children reported significantly higher levels of burnout among the former group. Parents of children with ASD and LD scored higher on emotional exhaustion and lower on personal accomplishment than those with TD children (Weiss, 2002; Kütük et al., 2021). This pattern was echoed by findings that families of children with multiple disabilities experienced the highest burnout and lowest life satisfaction (Aktan et al., 2020). Mothers of children with disabilities, especially LD, also reported significantly higher emotional exhaustion compared to mothers of TD children (Kurtoğlu & Özçırpıcı, 2019). Additionally, parents of TD children had greater access to parental resources, highlighting the buffering role of systemic and emotional support (Gentile et al., 2023).

These differences may reflect more than clinical demands. Parents of children with DD often face a loss of typical parenting experiences, such as developmental milestones and social recognition, which can reduce their sense of efficacy and emotional reward (Nurullah, 2013). Isolation, disrupted identity, and undervalued caregiving may further contribute to the higher burnout levels seen in this group compared to parents of TD children.

Summary of Key Findings and Implications

Parental burnout is shaped by both the type and complexity of the child’s developmental disability. It is most severe in caregivers of children with ASD, particularly when co-occurring with LD or ADHD. Parents of children with LD may experience a more subtle but persistent form of burnout, often marked by low personal accomplishment and limited systemic support. These findings note that burnout risk depends less on diagnosis and more on the interplay of caregiving demands, co-occurring conditions, and access to support (Kahrıman et al., 2019; Aktan et al., 2020; Kütük et al., 2023).

This suggests that diagnosis alone does not determine burnout risk; rather, it is the interplay of caregiving demands, co-occurring conditions, and access to support that shapes outcome (Kahrıman et al., 2019; Aktan et al., 2020; Kütük et al., 2023). This highlights the need for more nuanced assessments and interventions that reflect the lived complexity of caregiving.

The caregiving burden is also shaped by how well families are supported, emotionally, financially, and structurally. These findings emphasise the importance of tailored, diagnosis-sensitive interventions and policies, as well as early screening and support for high-risk families.

Limitations of Included Studies

Interpretation of these findings should be considered alongside several limitations. Most included studies (five of seven) were conducted in Turkey, which may limit generalisability to other cultural or healthcare contexts. This concentration likely reflects regional research trends and systemic differences in caregiving support (Kütük et al., 2021). The complete absence of studies on parents of individuals with ADHD, despite its inclusion in the criteria, represents a major gap in literature. Study quality was generally low, with none rated as high-quality by the CASP checklist (CASP, 2024), and several failed to clearly define learning disabilities or distinguish them from other developmental conditions, limiting cross-study comparability. All studies used cross-sectional designs, which restricts causal inference and limits understanding of how burnout evolves over time (Maslach & Leiter, 2016).

Strengths and Limitations of Review

This review was methodologically robust. A systematic, librarian-assisted search aligned with the review's aims, and PRISMA guidelines were followed. It was registered with PROSPERO, and study quality was assessed using the CASP checklist, with 10% of studies double rated to ensure consistency. Data extraction was structured and cross-checked, and inclusion of diverse comparison groups allowed for a nuanced synthesis. The narrative approach facilitated integration of complex, heterogeneous findings.

However, the review also has limitations. Only English-language, peer-reviewed studies were included, which may introduce publication and language bias. Study designs, sampling methods, and burnout measures varied, limiting direct comparisons and increasing reliance on interpretive synthesis. Lastly, focusing only on ASD, LD, and ADHD excluded other developmental and co-occurring conditions.

Conclusion

This review synthesised current evidence on parental burnout in the context of DD with a focus on ASD and LD. Parents of individuals with ASD and LD consistently reported higher levels of burnout than those with TD children, particularly in emotional exhaustion and reduced personal accomplishment. Socioeconomic factors, especially income and maternal employment, emerged as key predictors of burnout, stressing the impact of structural disadvantage. However, no studies focused on ADHD, highlighting a major evidence gap. Methodological issues, definitional inconsistencies, and varied measurement tools further limited comparability. Despite this, the review provides a strong foundation for future research and policy by identifying key risk factors and gaps. Future studies should prioritise longitudinal designs, consistent definitions, and more inclusive sampling to better inform support strategies and improve caregiver outcomes.

Declaration of Interest Statement

No potential conflict of interest was reported by the author(s).

Data Availability Statement

All data supporting the findings of this systematic review are available within the article and its supplementary materials. The primary data used in the review consist of previously published studies, which are cited in the reference list. No new datasets were generated or analysed during the current study.

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Chapter 2

Associations of Cyberbullying and the Mental Health of Adolescents with a Learning Disability: The Moderating Role of Sex and Socioeconomic Status

Prepared in accordance with the author requirements for Journal of Intellectual and Developmental Disabilities

https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=cjid20*

Plain Language Summary

Title: Associations of Cyberbullying and the Mental Health of Adolescents with a Learning Disability: The Moderating Role of Sex and Socioeconomic Status

Background: The development of social media that can be accessed through mobile phones has led to their being an increase of cyberbullying amongst young people. The impact of cyberbullying has been well-researched, and it is found to make mental health worse. However, there has been limited research exploring the effects of cyberbullying on young people with learning disabilities (LD). As some studies have shown that people with LD are more likely to get cyberbullied and, often have poorer mental health outcomes than their peers, it is important to find out how cyberbullying impacts people with LD. This study also explored whether sex (being male or female) or socioeconomic status (how much money and resources a family has) changes the impact of cyberbullying on mental health. Further, this study compared whether the impact of traditional bullying and cyberbullying on mental health was different for those with LD.

Aims and Questions: The aim of this study is to explore the effects of cyberbullying on the mental health of a teenagers with LD. These are the research questions:

1) Are experiences of being cyberbullied at age fourteen associated with mental health, behavioural and emotional problems aged seventeen?
2) Do sex differences and SES change the impact of cyberbullying (at age fourteen) on mental health, behavioural and emotional problems (aged seventeen)?
3) Do experiences of cyberbullying have a unique impact on mental health outcomes compared to traditional bullying?

Methods: Data from the Millennium Cohort Study was used. This study has been collecting longitudinal data since 2000–2002 on a nationally representative cohort of 18,818 children born in the UK. It has measures on bullying experiences, mental health outcomes and their socioeconomic status.

Main findings and conclusions: The findings showed that, in this sample, cyberbullying was not strongly linked to later mental health problems. However, traditional bullying was associated with more emotional and behavioural difficulties. Females in the study were more likely than males to report poor mental health overall. Neither sex nor socioeconomic status changed the effect that cyberbullying had on outcomes. These findings suggest that larger studies are needed to better understand the impact of cyberbullying in teenagers with LD. Schools and mental health services should continue to focus on supporting young people with learning disabilities who face traditional bullying, especially girls who may be more vulnerable to psychological distress.

Abstract

Background: This study investigated the impact of cyberbullying on mental health outcomes in adolescents with learning disabilities (LD), a group underrepresented in bullying research.

Method: Using longitudinal data from the UK Millennium Cohort Study, the study examined whether cyberbullying at age 14 predicted psychological distress (K6) and emotional/behavioural difficulties (SDQ) at age 17. It also tested moderation by sex and socioeconomic status (SES) and compared effects of cyberbullying and traditional bullying. The final sample included 138 adolescents with LD.

Results: Cyberbullying was not significantly associated with later mental health outcomes. However, sex significantly predicted distress and difficulties, with females reporting worse outcomes. Neither sex nor SES moderated the effects of cyberbullying. Traditional bullying was associated with greater emotional and behavioural difficulties.

Conclusions: While cyberbullying showed no significant effects, traditional bullying had measurable impacts. Findings highlight the need for targeted anti-bullying interventions and further research with larger LD sample

Keywords: cyberbullying, adolescents, learning disabilities

Introduction

Increased adolescent social media use has made cyberbullying a growing concern for parents, educators, and mental health professionals (Kaur et al., 2022; Monks et al., 2016; Ranjith et al., 2024). Cyberbullying refers to bullying via digital technology (Wright, 2017), including offensive messages, false information, and non-consensual sharing of personal content (Rodríguez-Enríquez et al., 2019). Recent UK data indicate that 17–18% of adolescents reported cyberbullying within two months (Ditch the Label, 2020), and in 2023, one in five reported experiences such as online name-calling, rumour-spreading, and harmful posts (Office for National Statistics, 2024). Notably, 28% of these victims had disabilities compared to 18% of their non-disabled peers, yet most research overlooks disabled adolescents. This study addresses that gap by focusing on adolescents with learning disabilities (LD), a group underrepresented in cyberbullying research.

Adolescence is a critical period for identity formation, emotional regulation, and social development (Patton et al., 2016), making young people more vulnerable to peer pressure, low self-esteem, and stress-related mental health issues (Orben et al., 2019). These risks may be heightened for adolescents with LD, who are more vulnerable to victimisation, exploitation, and under-reporting (Maïano et al., 2016; Olenik-Shemesh et al., 2013). Cyberbullying often peaks around ages 14–15 (Kowalski et al., 2014; Pichel et al., 2021), underlining the importance of research during this period. Yet most studies are cross-sectional, with few examining long-term effects (Camerini et al., 2020; Marciano et al., 2020). Longitudinal research is essential for understanding lasting impacts and informing interventions.

Traditional Bullying and Cyberbullying

Despite the recent phenomenon of cyberbullying, it is important to note that traditional bullying continues to be problematic, and these behaviours tend to co-exist and overlap (Modecki et al., 2014). A recent meta-analysis of mostly cross-sectional studies found that traditional bullying was twice as prevalent as cyberbullying and that one third of people who experienced cyberbullying were also victims of traditional bullying (Li et al., 2022). A multinational study across thirty-seven countries concluded that around 45.8% of victims of cyberbullying have also been traditionally bullied (Cosma et al., 2020).

Short and Long-Term Mental Health Effects

Traditional bullying is consistently linked with increased psychological distress, anxiety, depression, and reduced resilience in adolescents (Demir & Donmez, 2022). Both traditional and cyberbullying are associated with poorer well-being and elevated internalising and externalising symptoms (Klomek et al., 2015; Zych et al., 2015). A longitudinal study showed that both traditional and cyberbullying victimisation predicts emotional problems and self-harm within a year (Jantzer et al., 2022). Experiences of traditional bullying has been linked to adult depression (Sigurdson et al., 2015) and increased use of mental health services up to midlife (Evans-Lacko et al., 2017). Whilst cyberbullying, specifically, has been associated with anxiety, depression, emotional distress, and heightened suicide risk (Palermiti et al., 2017; Gao et al., 2021; O'Reilly, 2020). Victims of cyberbullying also reported persistent emotional problems, and longitudinal data show sustained symptoms months later (Ortega et al., 2012; Gámez-Guadix et al., 2013). A recent meta-analysis found cyberbullying victimisation significantly predicted later depression, anxiety, and distress, especially among adolescents (Lee et al., 2025).

Evidence from the Millennium Cohort Study (MCS) supports these patterns. Traditional bullying victimisation at age 11 was associated with increased mental health difficulties at 17, including internalising and externalising problems (Tsomokos & Slavich, 2024). Similarly, peer and sibling traditional bullying from 11 to 14 predicted heightened depressive symptoms three years later (Sharpe et al., 2022). Another MCS study linked cyberbullying at age 14 with emotional and behavioural symptoms at age 17 (Creese et al., 2023). Psychological distress related to traditional bullying, was also observed in youth across care settings, with no difference between those in care and those living at home (Yubero et al., 2019). These findings are echoed by broader research indicating that both traditional and cyber-bullying experiences increase psychological distress from early to late adolescence (Sampasa-Kanyinga et al., 2018; Schneider et al., 2012). However, these studies primarily involve typically developing adolescents, leaving a critical gap in understanding the impact on young people with learning disabilities.

Bullying in LD

Although cyberbullying research is expanding, few studies examine its impact on adolescents with LD, despite evidence linking bullying with increased mental health risk in this group (Martínez-Cao, 2021). A learning disability is defined by an IQ below 70, significant impairment in adaptive functioning, and onset in childhood (NICE, 2015).

A study comparing students from an Additional Support Needs (ASN) school and a mainstream school found that 17% of students aged 12–19 with serious emotional disorders and/or LD reported experiencing cyberbullying two or three times, compared to 9% of typically developing (TD) peers (Barringer-Brown, 2015). However, the generalisability of this study is limited, as it did not specify the proportion of students with LD and was confined to an urban sample. Underreporting may further obscure prevalence rates as students with additional support needs were less likely to report bullying than TD peers (Heiman & Olenik-Shemesh, 2013). Despite lower social media use, cyberbullying frequency among students with LD was comparable to their peers (Iglesias et al., 2019).

Some studies report no direct link between LD and increased bullying risk, instead identifying emotional and behavioural difficulties as key predictors (Blake et al., 2016; Mayes et al., 2014; Tipton-Fisler et al., 2018). Nonetheless, a systematic review found that bullying and cyberbullying significantly impact the psychological health of youth with LD (Martínez-Cao et al., 2021), with some evidence suggesting more severe effects compared to those without disabilities (Berg et al., 2015; Stewart et al., 2017; Tipton-Fisler et al., 2018). Although recent research has begun to examine cyberbullying in this group (Karagianni et al., 2022; Touloupis, 2024), there remains a considerable gap regarding its psychological consequences. Addressing the mental health effects of bullying and cyberbullying in adolescents with LD is therefore imperative.

Sex Differences

As the association between cyberbullying and poor mental health becomes clearer, evidence suggests that females may be at higher risk than males. Among adolescents aged 11–20, females were more likely to report cyberbullying in the past 12 months (22% vs. 15%) and more adverse outcomes, including poor mental health (20% vs. 10%), psychological distress (35% vs. 17%), and suicide attempts (4.6% vs. 1.8%) (Sampasa-Kanyinga, Lalande & Colman, 2020). However, as cyberbullying and mental health measures in this study were collected at the same time, it remains unclear whether poor mental health preceded or followed victimisation, highlighting the need for longitudinal studies. One explanation for these sex differences may be that males are less likely to report mental health difficulties or seek help (Seidler et al., 2016; Yousaf, Popat & Hunter, 2015).

Cyberbullying was significantly associated with poor mental health in both sexes, but differences in symptom expression were observed: females exhibited more internalising symptoms such as anxiety and depression, while males showed more externalising behaviours like risk-taking and substance use (Kim et al., 2018). Sex moderated the psychological impact of cyberbullying in this study. There is currently limited research on how these sex differences manifest among adolescents with learning disabilities. Further investigation is needed to determine whether these patterns hold across populations, which could better inform inclusive bullying prevention strategies.

Socioeconomic Status Differences

In addition to sex differences, socioeconomic status (SES) plays a significant role in bullying experiences and related psychological outcomes. Children aged 4–18 from the lowest income households were found to be at a 20% greater risk of being bullied compared to those from the highest income households (Campbell et al., 2019). Internationally, children growing up in poverty had a 40% increased risk of victimisation (Tippett & Wolke, 2014), though these studies did not isolate cyberbullying. These trends are well documented in typically developing populations, but research exploring how SES influences the relationship between bullying and mental health in individuals with LD remains limited. As such, this study will explore these links within an adolescent LD population. Addressing this gap is essential for informing policies and interventions that are both inclusive and effective in reducing bullying and promoting well-being among adolescents with LD.

This study uses data from the Millennium Cohort Study, a UK longitudinal birth cohort tracking 18,818 children born between 2000–2002. The dataset includes detailed information on development, health, education, and bullying, making it ideal for examining the long-term effects of bullying and cyberbullying on adolescents with LD.

Aims and Research Questions

The aim of this study is to explore the effects of cyberbullying on the mental health of an adolescent population with LD. The research questions that will be explored are as follows:

Are experiences of being cyberbullied at age fourteen associated with mental health, behavioural and emotional problems aged seventeen?

Do sex differences and SES moderate the impact of cyberbullying (at age fourteen) on mental health, behavioural and emotional problems (aged seventeen)?

Do experiences of cyberbullying have a unique impact on mental health outcomes compared to traditional bullying?

Method

Design

Secondary data analysis of longitudinal data using the Millennium Cohort Study (MCS, 2017). The MCS has been collecting longitudinal data since 2000–2002 on a nationally representative cohort of 18,818 children born in the UK. The MCS has collected data at various time points throughout the young people's early lives: Sweep 1 (9 months), Sweep 2 (age 3), Sweep 3 (age 5), Sweep 4 (age 7), Sweep 5 (age 11), Sweep 6 (age 14), Sweep 7 (age 17), and most recently at Sweep 8 (age 22).

The MCS provides multiple measures on the individuals' physical, socio-emotional, cognitive and behavioural development over time, as well as information on relationships, economic circumstances, bullying experiences and psychological well-being.

Participants were originally recruited from Child Benefit records, using a two-stage, disproportionate stratified clustered sampling design. Stratification involved dividing the UK population by area-level characteristics to enable targeted oversampling. In England and Wales, three strata were used: ethnic minority areas (more than 30% of residents were ethnic minority), disadvantaged areas (lowest 25% on the Child Poverty Index) and all others. In Scotland, Wales and Northern Ireland, only disadvantaged and advantaged strata were used due to low ethnic diversity. This allowed the study to oversample families from ethnic minority and socioeconomically disadvantaged areas. In a separate step, clustering was used to select specific electoral areas as primary sampling units. Some clusters were intentionally chosen from areas with high proportions of target groups, further supporting over-representation at the design stage. Clustering was not used as a weighting procedure and, instead, was used to support efficiency and contextual analysis. As MCS Data is managed by the Centre for Longitudinal Studies at University of London, it is available to researchers registered with the UK Data Service and was readily accessible.

Measures

Bullying Experiences: Experiences of bullying were assessed in MCS Sweep 6 (MCS6) via the Young Person Questionnaire. One item related to victim experience of cyberbullying "How often have other children sent you unwanted or nasty emails, texts or messages or posted something nasty about you on a website?" and one item related to victim experience of traditional bullying "How often do other children hurt you or pick on you on purpose?" Responses to these items allowed classification of participants based on their exposure to cyberbullying or traditional bullying (1 = most days, 6 = never). These variables were recoded into binary variables to indicate presence or absence of bullying experiences. Responses 1-5 (any frequency of bullying) were coded as 1 = had experienced bullying, while response 6 (never) was coded as 0 = not experienced bullying. This approach was used to distinguish between those who had any exposure to bullying and those who had none, reflecting the study's primary aim of comparing mental health outcomes across different bullying exposure groups. The binary classification supported clear group comparisons and moderation and interaction analyses.

Sex: This was recorded at birth and documented in the MCS Household Grid Questionnaire.

Socioeconomic Status (SES): This was measured using the Organisation for Economic Co-operation and Development (OECD) equivalised income quintiles (EIQ) (UK whole) from MCS 6. This variable provides an adjusted measure of household disposable income by accounting for both the size and composition of the household using the OECD-modified equivalence scale. Specifically, weights are assigned as follows: 1.0 for the first adult in the household, 0.5 for each additional adult, and 0.3 for each child under the age of 14. These adjustments allow for more accurate comparisons of income across households with differing structures. Based on these adjusted income figures, the MCS team generated quintiles that categorise families into five income-based groups, reflecting relative SES across the UK population. This measure is widely recognised as a valid and robust indicator of socioeconomic position in population-level research, and it has been commonly used in previous studies employing MCS data (e.g. Mireku & Rodriguez, 2020).

People with Learning Disabilities (LD): Young people with LD were identified using cognitive assessment data collected at ages 3, 5, and 7. These standardised assessments were administered by trained interviewers and used to calculate a general cognitive ability score. Participants who scored at least two standard deviations below the mean on this composite at age 7 were classified as having an LD. If age 7 data were unavailable, assessments from ages 3 or 5 were used. For participants missing all cognitive assessments, additional information was utilised: parent and teacher reports of special educational needs, and teacher ratings indicating the child was performing “well below average” in five key academic areas. This multi-source classification approach, adapted from Totsika et al. (2020), identified 555 participants with LD across the cohort, reflecting a weighted prevalence of approximately 2.7%.

Mental Health Outcomes

Mental health outcomes, in MCS7, were measured using the Cohort Member Questionnaire, which included multiple validated self-reported questionnaires which explored “Physical and Mental Health and Wellbeing”. To assess mental health difficulties, the study used the Kessler Psychological Distress Scale (K6; Kessler et al., 2002), a short screening tool designed to measure general psychological distress in the general population. The K6 asks participants how frequently they experienced six symptoms of emotional distress over the past 30 days, such as feeling nervous, hopeless, worthless, depressed, restless, or that everything was an effort. Responses are scored on a scale from 0 (“none of the time”) to 4 (“all of the time”), producing a total score ranging from 0 to 24, with higher scores indicating greater distress. In the context of this study, scores were treated as a continuous variable. Its concise format, strong psychometric properties, and demonstrated validity in adolescent populations make it a practical and appropriate choice for examining mental health within the Millennium Cohort Study (Kessler et al., 2002).

To measure emotional and behavioural difficulties, the Strengths and Difficulties Questionnaire (SDQ; Goodman et al., 2000) was used. The SDQ consists of 25 items across five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviour. The first four subscales (emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems) were summed to create a total difficulties score, with higher scores indicating greater levels of emotional and behavioural difficulties. The SDQ has previously been validated in populations with LD. Emerson (2005) found that the child, parent, and teacher versions of the SDQ demonstrated acceptable internal consistency, validity, and showed no evidence of response bias in a representative sample of 98 adolescents with LD. This supports the use of the SDQ as a measure of emotional and behavioural difficulties in young people with LD at a group level.

Participant data was collected from sweeps 3 through 7 of the MCS. LD status was determined using cognitive assessments from sweeps 3, 4, and 5 (ages 3, 5, and 7), as per measures reported below. Cyberbullying and traditional bullying exposure and sex were measured at sweep six (age 14), while mental health outcomes and SES were drawn from sweep seven (age 17). Participants were included in the analysis if they met the following criteria: (1) identified as having an LD based on cognitive assessments or educational need indicators across MCS3-MCS5; (2) had complete data on cyberbullying experiences and sex (MCS6); and (3) provided responses on two measures of mental health outcome and SES (MCS7). Participants with missing data on any of these variables were excluded.

Statistical Analysis

Data was analysed using SPSS Statistics 24.0. Prior to conducting any analyses, data was checked for missing values, outliers, and assumptions of normality. The distribution of scores was examined for skewness, kurtosis, and visual inspection of histograms, and no extreme violations of normality were found. Continuous variables were mean-centred to improve interpretability of the interaction and reduce multicollinearity, while dichotomous variables, such as sex (coded as 0 = male, 1 = female), were not centred.

To address research question one, independent samples t-tests were conducted to compare K6 and SDQ scores between adolescents who had been cyberbullied (n = 29) and those who had not (n = 109). Prior to conducting the t-tests, assumptions of homogeneity of variance were checked using Levene's test, indicating that equal variances could be assumed. Simple linear regressions were conducted to test whether cyberbullying predicted K6 and SDQ scores; with sex and SES included as covariates.

For research question two, moderation analyses were conducted using Hayes' PROCESS macro (Model 1) to explore whether sex and SES moderated the relationship between cyberbullying and K6 and SDQ scores.

To explore research question three, two linear regression analyses were conducted: one for psychological distress (K6 scores) and one for SDQ total scores, to compare the effects of cyberbullying and traditional bullying on mental health outcomes.

Results

Participants

555 children were identified as having an LD. After cases were excluded due to missing data, the final sample consisted of 138 young people identified as having an LD, drawn from across the United Kingdom. Most participants were from England (76.1%), with smaller proportions from Wales (13.8%), Scotland (5.1%) and Northern Ireland (5.1%). The sample included 81 males (58.7%) and 57 females (41.3%). A post hoc power analysis was conducted using G*Power 3.1 to determine the smallest effect size that could be detected given the sample size available for moderation analysis (N = 138). The analysis was based on a linear multiple regression model with four predictors (cyberbullying, sex, SES, and the interaction term), an alpha level of .05, and desired power of .80. Results indicated that the study was powered to detect a minimum effect size of $f^2 = 0.090$, which corresponds to a small-to-medium effect (Cohen, 1988). Smaller effects may not have been detectable**,** and it is therefore possible that weak but meaningful associations, such as subtle long-term effects of cyberbullying may have gone undetected due to sample size limitations.

In terms of socioeconomic status, as measured by the OECD equivalised income quintiles, just over half of the sample (52.9%) fell within the lowest income quintile, while only 5.8% were in the highest income quintile, indicating a predominance of lower-income households. With respect to experiences of cyberbullying, 21% of participants reported being cyberbullied, while 40.6% reported experiencing traditional forms of bullying.

To assess the representativeness of the final LD sample (after removing cases with missing data), key demographic variables were compared with the broader LD group. The distributions of SES and sex were highly similar. For example, in the broader LD group, 48.8% were in the lowest income quintile compared to 52.9% in the final LD subset, and the proportion of males was 62.6% versus 58.7%. Differences across other income quintiles were small (within 3 percentage points). These minimal differences suggest the final sample remains broadly representative of the initial LD group in terms of SES and sex.

Results of research question 1: Are experiences of being cyberbullied at age fourteen associated with mental health (as measured by Kessler score), behavioural and emotional problems (as measured by SDQ scores) aged seventeen?

Psychological Distress (Kessler Scale)

An independent samples t-test found no significant difference in K6 scores between participants who had been cyberbullied at age 14 (M = 7.52, SD = 5.19) and those who had not (M = 7.05, SD = 5.62), $t(136) = -0.41$, $p = .684$. The effect size was very small ($d = -0.085$), suggesting negligible practical differences in psychological distress between the groups.

A linear regression was conducted to determine whether cyberbullying at age 14 predicted K6 scores at age 17, while controlling for sex and SES. The overall model was significant, $F(3,134) = 6.04$, $p < .001$, and explained approximately 11.9% of the variance in K6 scores ($R^2 = .119$). Among the predictors, sex was a significant contributor to the model ($B = 3.847$, $p < .001$), indicating that females reported higher levels of psychological distress than males. However, cyberbullying ($B = 0.626$, $p = .570$) and SES ($B = -0.034$, $p = .923$), were not significant predictors of K6 scores after accounting for the other variables.

Behavioural and Emotional Difficulties (SDQ)

An independent samples t-test indicated that cyberbullied individuals (M = 36.93, SD = 5.32) did not report significantly higher SDQ scores than those who were not cyberbullied (M = 36.28, SD = 4.80), $t(136) = -0.63$, $p = .530$, $d = -0.13$. The effect size was small, indicating that the difference in SDQ total scores between groups was negligible in practical terms.

A regression model predicting SDQ scores was significant, *F*(3,134) = 4.70, *p* = .004, R² = .095. Sex was the only significant predictor, with males reporting higher SDQ scores (*B* = 2.79, *p* < .001). Cyberbullying (*p* = .386) and SES (*p* = .302) were not significant.

Taken together, the findings do not provide evidence that experiences of cyberbullying at age 14 are significantly associated with increased psychological distress or behavioural/emotional difficulties at age 17. While mean scores on both the Kessler and SDQ scales were slightly higher among individuals who had been cyberbullied, these differences were small and non-significant. Regression analyses further confirmed that cyberbullying was not a significant predictor of mental health outcomes when controlling for sex and socioeconomic status. Therefore, the data does not support a direct association between cyberbullying and later mental health problems in this sample. However, sex emerged as a significant predictor in both models, suggesting that sex differences may be more relevant than cyberbullying in shaping adolescent mental health outcomes in this sample.

Results of research question 2: Do sex differences and SES (as measured by Equivalised Income Quintiles (EIQ) moderate the impact of cyberbullying at age fourteen on mental health, behavioural and emotional problems aged seventeen?

All assumptions were assessed prior to moderation regression. Visual inspections of histograms, P–P plots, and scatterplots supported normality, linearity, and homoscedasticity. There were no extreme outliers, and residuals were independent (Durbin-Watson: Kessler = 1.648; SDQ = 1.716). Tolerance values ranged from .108 to .795, with all VIFs < 10, indicating no multicollinearity.

Sex as a Moderator

Moderation analyses using Hayes' PROCESS macro (Model 1) tested whether sex moderated the relationship between cyberbullying at age 14 and mental health at age 17, controlling for SES. For K6 scores, the overall model was significant (R² = .135, *F*(4, 133) = 5.20, *p* = .001), with sex as a significant predictor (b = 3.12, SE = 1.02, T = 3.07, *p* = .003, 95% CI [1.11, 5.14]), indicating higher psychological distress among females. However, neither cyberbullying (*b* = -4.25, SE = 3.29, *t* = -1.29, *p* = .200, 95% CI [-10.75, 2.25]) nor the interaction (*b* = 3.52, SE = 2.24, *t* = 1.57, *p* = .118, 95% CI [-.91, 7.94]) were significant. For SDQ scores, the model was also significant (R² = .098, F(4, 133) = 3.62, *p* = .008). Again, sex predicted scores (*b* = 2.51, SE = 0.92, *t* = 2.73, *p* = .007, 95% CI [.69, 4.34]), with females reporting greater emotional and behavioural difficulties. The main effect of cyberbullying (*b* = -1.00, SE = 2.98, *t* = -.34, *p* = .738, 95% CI [-6.90, 4.34]) and its interaction with sex (*b* = 1.34, SE = 2.03, *t* = .66, *p* = .509, 95% CI [-2.67, 5.35]) were both non-significant. As such, sex did not moderate the effect of cyberbullying on outcomes, though it was consistent predictor.

SES as a Moderator

Prior to analysis, regression assumptions were assessed and met. Normality was supported by visual inspection of histograms and P–P plots, with no extreme outliers. Linearity and homoscedasticity were acceptable based on residual scatterplots. Multicollinearity was not a concern (tolerance = .271–.838, all VIFs < 10), and residuals were independent (Durbin–Watson = 1.85 for K6; 1.861 for SDQ). Moderation analyses were conducted using Hayes' PROCESS macro (Model 1) to test whether SES moderated the relationship between cyberbullying at age 14 and mental health outcomes at age 17, controlling for sex. For psychological distress (K6), the overall model was significant, R^2 = .12, F(4, 133) = 4.53, *p* = .002. Sex was a significant predictor, with females reporting greater distress than males (*b* = 3.85, SE = 0.92, *t* = 4.20, *p* < .001, 95% CI [2.04, 5.66]). However, cyberbullying (*b* = 0.69, SE = 1.12, *t* = 0.62, *p* = .54, 95% CI [−1.52, 2.90]), SES (b = −0.09, SE = 0.38, *t* = −0.23, *p* = .82, 95% CI [−0.85, 0.67]), and their interaction (*b* = 0.35, SE = 0.97, *t* = 0.36, *p* = .72, 95% CI [−1.56, 2.27]) were not significant. For SDQ scores, the model was also significant (R^2 = .098, *F*(4, 133) = 3.60, *p* = .008). Sex again significantly predicted higher emotional and behavioural difficulties (*b* = 2.80, SE = 0.82, *t* = 3.40, *p* = .001, 95% CI [1.17, 4.42]). Cyberbullying (*b* = 0.96, SE = 1.00, *t* = 0.95, *p* = .34, 95% CI [−1.03, 2.95]) and its interaction with SES (*b* = 0.53, SE = 0.87, *t* = 0.61, *p* = .54, 95% CI [−1.92, 2.26]) were not significant.

These results suggest that, while sex is a significant predictor of both psychological distress and emotional and behavioural difficulties, SES does not moderate the relationship between cyberbullying and mental health outcomes.

Results for Research Question 3: Does the impact of cyberbullying on mental health and emotional/behavioural difficulties differ significantly from the impact of traditional bullying?

Assumptions for regression were met. The Durbin–Watson statistics (K6 = 1.45; SDQ = 1.79) indicated independent errors. Multicollinearity was not a concern (VIFs = 1.01–1.13; tolerance = .88–.99). Residual plots showed no major violations of linearity or homoscedasticity.

A linear regression comparing bullying types showed that traditional bullying was marginally associated with greater psychological distress (*B* = 1.89, *p* = .051) while cyberbullying was not (*B* = -0.13, *p* = .912). Group comparisons also revealed no significant difference in K6 scores (*B* = 1.67, *SE* = 1.98, *t* = 0.85, *p* = .400). For SDQ scores, a linear regression found that traditional bullying was significantly associated with greater emotional and behavioural difficulties (*B* = 3.88, *SE* = 1.82, *t* = 2.068, *p* = .043). In a model with both bullying types, only traditional bullying remained a significant predictor (*B* = 2.11, *SE* = .85, *t* = 2.48, *p* = .015); cyberbullying did not (*B* = 0.015, *SE* = 1.03, *t* = 0.01, *p* = .989). The findings indicate that although psychological distress did not significantly differ between adolescents exposed to traditional versus cyberbullying, traditional bullying was more strongly linked to emotional and behavioural difficulties, as reflected in higher SDQ scores.

Discussion

This study explored the relationship between cyberbullying and mental health outcomes in adolescents with LD using longitudinal data from the Millennium Cohort Study. Specifically, it aimed to determine whether cyberbullying at age 14 predicted psychological distress and emotional or behavioural difficulties at age 17, and whether sex and SES moderated these relationships. A final research question examined whether cyberbullying had a unique impact on outcomes when compared with traditional bullying.

Summary of Key Findings

Overall, the findings revealed that experiences of cyberbullying were not significantly associated with either psychological distress (as measured by the K6) or emotional and behavioural difficulties (as measured by the SDQ) at age 17. However, sex emerged as a significant predictor in both models, with females reporting higher levels of distress and difficulties than males. Neither sex nor SES moderated the relationship between cyberbullying and mental health outcomes. Finally, traditional bullying was found to be associated with emotional and behavioural difficulties, whereas cyberbullying was not.

Interpretation of Findings

Cyberbullying

The absence of a significant relationship between cyberbullying and mental health outcomes in this LD sample contrasts with a growing body of literature demonstrating negative effects of cyberbullying in the general adolescent population (Gámez-Guadix et al., 2013; Lee et al., 2025; Palermiti et al., 2017). There are several possible explanations for this discrepancy. One potential factor is the under-reporting of cyberbullying in adolescents with LD. Prior research has shown that students with LD may be less likely to disclose bullying experiences due to embarrassment, fear of escalation, or difficulties with communication (Olenik-Shemesh et al., 2013; Ditch the Label, 2020). Adolescents with LD may also experience difficulties in recognising or interpreting social cues, linked to deficits in theory of mind or executive functioning, which may limit their ability to identify or report experiences of cyberbullying as harmful (Liu et al., 2018). Additionally, young people with LD tend to use social media less frequently than their typically developing peers (Iglesias et al., 2019), which could reduce both the likelihood and the perception of cyberbullying experiences. This pattern may be further compounded by limited access to digital technology, as over half of the sample (52.9%) fell within the lowest income quintile. Such economic constraints may limit access to devices and reduce exposure to both positive and negative online interactions (Gracia et al., 2023).

This digital divide disproportionately affects low-income households and may consequently reduce opportunities for both positive and negative online experiences, including cyberbullying (van Dijk, 2020). It is also possible that the impact of cyberbullying in this population may not be adequately captured through standardised measures such as the K6 or SDQ. Additionally, the use of single-item, dichotomous measures of cyberbullying may not capture the complexity, frequency, or perceived severity of online harm (Olweus, 2012). As Martínez-Cao et al. (2021) noted, these effects may require more nuanced methods, such as qualitative or multi-informant approaches, to be accurately assessed.

Traditional Bullying

In contrast to the findings for cyberbullying, traditional bullying was significantly associated with higher SDQ scores, indicating greater emotional and behavioural difficulties for adolescents with LD. This supports previous research suggesting that traditional bullying may have a stronger or more sustained impact on mental health than cyberbullying (Modecki et al., 2014; Li et al., 2024; Creese et al., 2023). This may be due to the persistent and visible nature of traditional bullying, which often occurs in shared environments such as school and may be more difficult to avoid or ignore. School environments may not always accommodate the social and learning needs of adolescents with additional support needs, potentially making them more vulnerable to traditional bullying and social exclusion (Humphrey & Hebron, 2015). For adolescents with LD, who may already face challenges in social interactions, traditional bullying could be particularly damaging due to its interpersonal nature and potential impact on self-esteem, social integration, and academic engagement (Stewart et al., 2017).

Sex and SES as Predictors and Moderators

Sex was a consistent predictor of poorer outcomes in both K6 and SDQ scores, with females reporting significantly greater difficulties than males. These results align with previous findings that suggest females are more likely to internalise distress and experience higher levels of anxiety and depression following peer victimisation (Sampasa-Kanyinga et al., 2018; Kim et al., 2018). It is possible that these elevated scores reflect internalising difficulties, such as anxiety and low mood. However, the absence of significant moderation effects indicates that, while sex differences have an impact on reported mental health outcomes, they do not alter the relationship between cyberbullying and those outcomes. One possible reason for this may be that, in adolescents with LD, the effects of sex may be more strongly shaped by other factors, such as communication difficulties, reduced social awareness, or broader emotional and behavioural vulnerabilities, which could diminish or mask the differential effects typically observed between sexes (Martínez-Cao et al., 2021; Blake et al., 2016).

Socialised gender norms may also discourage emotional expression in boys, especially among adolescents with LD, leading to underreporting and underestimated need (Seidler et al., 2016; Yousaf et al., 2015). As such, while sex remains an important predictor of overall mental health, its moderating role may be less pronounced in this population due to the complex interplay of additional risk factors.

The finding that SES did not significantly predict, or moderate mental health outcomes is somewhat unexpected, as lower SES has been consistently linked to both increased risk of bullying victimisation and poorer psychological outcomes (Tippet & Wolke, 2014; Campbell et al., 2019). One potential explanation may be that adolescents with LD might have a different awareness or understanding of their family's socioeconomic circumstances, particularly if parents or caregivers actively buffer them from financial stress or provide compensatory support (Green, 2007). In such cases, the psychological impact of SES may be less directly perceived or internalised by adolescents with LD, even though the material consequences, such as reduced access to resources or support, may still be present. Moreover, families of children with LD often face additional financial pressures related to care and support needs, meaning that income alone may underestimate their level of socioeconomic strain (Emerson et al., 2010). It is also possible that limited SES variation in this sample reduced the ability to detect its effect. A larger, more representative LD sample with more varied reports of income may provide a more accurate reflection of SES as a potential moderator.

Strengths and Limitations

A key strength of this study lies in its use of a nationally representative longitudinal dataset, which allows for the examination of temporal associations and reduces the limitations of cross-sectional designs. The inclusion of validated and widely used mental health measures (K6 and SDQ) and a robust multi-method approach to identifying LD further enhances the validity of the findings. Additionally, the focus on an under-researched and vulnerable population, adolescents with LD, contributes to the existing literature on cyberbullying and its impact on mental health.

However, several limitations must be acknowledged. Firstly, despite the large original cohort size, only 555 children were identified as having an LD, and of those, just 29 both experienced cyberbullying and completed the mental health outcome measures at age 17. It could be beneficial for future research to explore these research questions with a larger sample size to determine whether different results would be reported.

It should also be noted that the severity of LD was not reported, which limits the generalisability of findings across the LD spectrum. As both bullying and mental health outcome measures were self-reported and self-completed, participants would have required reading and writing ability, suggesting that this sample primarily included individuals with mild to moderate LD. It is therefore unlikely that this study includes adolescents with moderate to severe or profound LD. Not only does the self-completion aspect of measures exclude those with severe LD, it also creates risk of inaccurate reporting due to varying levels of comprehension and cognitive ability. This is particularly relevant for the bullying item which does not provide a definition or example of bullying. Further concerns should be noted around the phrasing of the cyberbullying item, which refers to "websites" but does not mention more contemporary forms of online harm such as social media platforms, gaming, streaming services and memes/short videos/pictures. Such wording may have led some participants to underreport experiences that fall outside the narrow phrasing of the question.

Equality, Diversity and Inclusion Considerations

Finally, the generalisability of these findings may be limited to similar cohorts within the UK, as cultural or contextual factors in other countries may influence the reporting and experiences of bullying and mental health difficulties. A broader international sample could help determine whether these patterns hold across different educational and healthcare systems.

In terms of equality, diversity and inclusivity, the study only accounts for birth sex, which may exclude or misrepresent young people who no longer identify with their assigned sex at birth. This could lead to feelings of exclusion or discrimination and introduces a gap in capturing the experiences of transgender or gender-diverse adolescents. Future research should also consider intersecting identities, such as gender identity, and disability status, as these may compound the risk of bullying and mental health difficulties (Priest et al., 2016).

Implications

These findings have several implications for research, practice, and policy. First, the significant association between traditional bullying and poorer emotional and behavioural outcomes highlights the importance of continued efforts to address traditional bullying in schools, particularly for adolescents with LD. School-wide anti-bullying interventions should consider the specific needs and vulnerabilities of students with LD and ensure that these individuals are included in efforts to promote safe and inclusive learning environments.

Second, the consistent predictive role of sex, emphasises the need for gender-sensitive approaches to mental health support. Female adolescents with LD may require additional support in managing internalising symptoms and processing peer-related stress. Alternatively, it may be that male adolescents require the same support but under-report experiences of bullying and emotional difficulties, leading to underestimation of their needs in the data.

Third, the absence of significant findings regarding cyberbullying highlights the need for better identification, measurement, and understanding of online victimisation in adolescents with LD. Schools, caregivers, and clinicians should be aware of the unique barriers that may prevent young people with LD from disclosing or recognising online harm.

Future Research

Future research should aim to replicate these findings in larger and more diverse samples of adolescents with LD to enhance generalisability and statistical power. Studies should consider using multi-informant reports (e.g., from parents, teachers, and peers) to complement self-reported experiences of bullying and mental health. Qualitative research could provide further insights into how adolescents with LD perceive and respond to cyberbullying and why they may be less likely to report it. Additionally, future studies should explore the role of protective factors, such as social support, emotional regulation skills, and inclusive school environments, that may buffer the impact of bullying in this population. Finally, it would be beneficial to adopt an intersectional framework in future work to explore how overlapping identities and vulnerabilities (e.g., LD, gender, socioeconomic disadvantage) contribute to mental health trajectories and responses to bullying.

Conclusion

This study adds to the limited body of research examining the long-term impact of cyberbullying in adolescents with LD. While no significant associations were found between cyberbullying and later mental health outcomes, the findings underline the greater psychological impact of traditional bullying and the importance of considering sex differences in mental health experiences. These results highlight the need for targeted, inclusive support strategies and more nuanced research approaches that reflect the complex realities of adolescents with LD.

Declaration of Interest Statement

No potential conflict of interest was reported by the author(s).

Data Availability Statement

his study uses data from the Millennium Cohort Study, which is managed by the Centre for Longitudinal Studies at University College London. The data are available to bona fide researchers through the UK Data Service (https://ukdataservice.ac.uk/) under the End User Licence. Access requires registration and adherence to data use agreements. The authors did not have any special access privileges.

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Appendices

Appendix A – PRISMA 2020 Checklist

Appendix A – PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	9
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	10
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	11-13
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	13
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	15
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	14
Search	7	Present the full search strategies for all databases, registers and websites, including any filters and	90

Section and Topic	Item #	Checklist item	Location where item is reported
strategy		limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	15-16
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	16
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	n/a
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	n/a
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	16
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	18-28

Section and Topic	**Item #**	**Checklist item**	**Location where item is reported**
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	16-18
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n/a
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n/a
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	17
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n/a
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	n/a
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	n/a
RESULTS			
Study	16a	Describe the results of the search and selection process, from the number of records identified in	16

Section and Topic	Item #	Checklist item	Location where item is reported
selection		the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	n/a
Study characteristics	17	Cite each included study and present its characteristics.	18-28
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	18-28
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	18-28
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	18-28
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	n/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	18-28
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n/a
Reporting	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each	82-97

Section and Topic	Item #	Checklist item	Location where item is reported
biases		synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	18-28
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	59-61
	23b	Discuss any limitations of the evidence included in the review.	62
	23c	Discuss any limitations of the review processes used.	62
	23d	Discuss implications of the results for practice, policy, and future research.	63
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	14
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	14
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	n/a
Competing	26	Declare any competing interests of review authors.	39

Section and Topic	Item #	Checklist item	Location where item is reported
interests			
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	39

Appendix B – Search Strategy

MEDLINE

S1 (MH "Learning Disabilities") OR (MH "Intellectual Disability")
75,323
S2 AB ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") OR TI ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*")
64,152
S3 S1 OR S2
108,805
S4 (MH "Caregivers") OR (MH "Parents") OR (MH "Single Parent")
139,179
S5 AB (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad")
1,833,668
S6 S4 OR S5
1,872,723
S7 (MH "Burnout, Psychological") OR (MH "Caregiver Burden")
3,313
S8 AB (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome")
23,878
S9 S7 OR S8
24,943
S10 S3 AND S6 AND S9
33

PsychINFO

S1 (DE "Learning Disabilities") OR (DE "Intellectual Development Disorder") 65,708
S2 TI ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") OR AB ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") 57,765
S3 S1 OR S2 83,087

S4 DE "Parents" OR DE "Single Parents" OR DE "Foster Parents" OR DE "Adoptive Parents" OR DE "Caregivers" 117,279

S5 TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR AB (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad" 723,872

S6 S4 OR S5 745,459

S7 DE "Burnout" OR DE "Caregiver Burden" 10,430

S8 TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR AB (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") 19,190

S9 S7 OR S8 27,007

S10 S3 AND S6 AND S9 238

CINAHL

S1 (MH "Intellectual Disability") OR (MH "Persons with Intellectual Disabilities") 28,953

S2 TI ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") OR TI ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") OR AB ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") OR TI ("learning disab*" OR "mental retardation" OR "intellectual disab*" OR "learning impair*") 25,766

S3 S1 OR S2 39,400

S4 (MH "Parents") OR (MH "Parents of Children with Disabilities") OR (MH "Single Parent") OR (MH "Adoptive Parents") OR (MH "Foster Parents") OR (MH "Biological Parents") 62,583

S5 TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR AB (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR AB (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR AB (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") OR TI (mum OR dad OR family OR parent* OR parental OR "birth mother" OR "birth father" OR mother OR father OR "birth mum" or "birth dad") 488,392

S6 S4 OR S5 502,262

S7 (MH "Caregiver Burden") 11,748

S8 burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR AB (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR AB (urnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR AB (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome") OR TI (burnout OR "burn out" OR burn-out OR "parent* burnout" OR "psychological burnout" OR "carer burnout" OR "caregiver burnout" OR "burnout syndrome" 29,926

S9 S7 OR S8 34,605

S10 S3 AND S6 AND S9 165

Embase

1	learning disorder/	37948
2	intellectual impairment/	44820
3	("learning disab*" or "mental retardation" or "intellectual disab*" or "learning impair*").ab,ti.	91511
4	1 or 2 or 3	131596
5	caregiver/	129030
6	adoptive parent/ or parent/ or single parent/	121542

7 (mum or dad or family or parent* or parental or "birth mother" or "birth father" or mother or father or "birth mum" or "birth dad").ab,ti. 2559580

8 5 or 6 or 7 2651995

9 caregiver burnout/ or burnout/ 29926

10 (burnout or "burn out" or burn-out or "parent* burnout" or "psychological burnout" or "carer burnout" or "caregiver burnout" or "burnout syndrome").ab,ti. 29749

11 9 or 10 39103

12 4 and 8 and 11 55

Appendix C – CASP Checklist

Study	**Item**	**Response** Yes/No/ Can't Tell	**Details**	**Quality**
1. Aktan, Orakcı & Durnalı (2020) "Investigation of the relationship between burnout, life satisfaction and quality of life in parents of children with disabilities" Turkey	1. Did the study address a clearly focused issue?	Yes	The research questions clearly identified the target population and outcome measures they were exploring (burnout, life satisfaction and quality of life).	Moderate
	2. Did the authors use an appropriate method to answer their question?	Yes	A cross-sectional design was appropriate for addressing the stated research questions.	
	3. Were the subjects recruited in an acceptable way?	Yes	Participants were recruited using convenience sampling through, through ASN schools and also recruited participants who were receiving services from the Guidance Research Centre.	
	4. Were the measures accurately measured to reduce bias?	No	A validated burnout measure was used but the disability status of child was reported subjectively by parents. There is no report on how the groups of disabilities were defined which could lead to inaccurate reporting.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Questionnaires were used to measure burnout and other outcomes.	

	6. Did the study have enough participants to minimise the play of chance?	Can’t tell	No power calculation was detailed in the study. An a priori power analyses conducted using G*Power with a medium effect size (r = 0.3), an alpha level of 0.05 and a desired power of 0.80, the minimum sample size of 84 would be required. As there were 538 participants, it is likely that there were enough participants to minimise the play of chance.	
	7. How are the results presented and what is the main result?		Results are presented as a correlation and a comparison between groups of disabilities. It also considers burnout as a mediating role between two other well-being outcomes. The main result is that there is a significant negative correlation between burnout and life satisfaction for parents of disabled children.	
	8. Was the data analysis sufficiently rigorous?	Yes	The analysis process was well-described and appropriate statistical analyses were completed. Effect sizes were not reported.	
	9. Is there a clear statement of findings?	Yes	Findings are explicit and discussed relating to the research question, however, there was minimal discussion on limitations of the findings/study. There were also additional reports of findings for significant results only.	
	10. Can the results be applied to the local population?	No	No report of how disability status was defined or characterised means that results cannot be applied to other people who identify as having a specific disability.	

	11. How valuable is the research?		Despite the worthwhile contribution to research exploring how burnout, life satisfaction and quality of life impact parents of children with disabilities, these results must be interpreted with caution due to the lack of information reported about how the disabilities were defined.	
2. Gentile et al., 2023 Parental Resources in Parents of Children with Special Needs (SNs) at the Time of COVID-19 Italy	1. Did the study address a clearly focused issue?	Yes	Aims were clearly identified, and three separate hypotheses were stated.	Moderate
	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional was appropriate to answer the question.	
	3. Were the subjects recruited in an acceptable way?	Yes	Convenience sampling was used to recruit through social media and online advertising, it should be noted that this would exclude anyone who does not have internet access.	
	4. Were the measures accurately measured to reduce bias?	No	The burnout measure was reported to be extremely reliable. No formal measures or definitions for disability conditions were used which may limit accuracy.	

	5. Were the data collected in a way that addressed the research issue?	Yes	Questionnaires were used for parents to self-report.	
	6. Did the study have enough participants to minimise the play of chance?	Can’t tell	The study did not report on a power analysis. An a priori power analysis was conducted, for an expected medium effect size ($f^2 = 0.0625$, alpha = 0.05 and power 0.80) the analysis indicated a minimum sample size of 88 was required. As such, it was sufficiently powered.	
	7. How are the results presented and what is the main result?		The results show the mean difference in burnout scores, as well as on the common antecedents and specific antecedents. Parents of children with LD reported significantly higher risk of burnout compared to parents of ASD and typically developing children.	
	8. Was the data analysis sufficiently rigorous?	Yes	There was an in-depth description of the analysis process and findings were well-supported by the statistics.	
	9. Is there a clear statement of findings?	Yes	There was a clear statement of findings which were linked back to the hypotheses of the study. The aim was to assess differences between parents of various groups, in terms of parental resources within the period of COVID-19, which was completed.	
	10. Can the results be applied to the local population?	Can’t tell	It is likely that it could be applied to the local population relatively well, however, recruitment limited those without internet access which may mean that results are	

			not generalizable to those with lower socioeconomic status.	
	11. How valuable is the research?		Results only measure risk of burnout and, as such, it cannot be assumed how many of this population are or will experience subsequent burnout. However, it does provide an indication of chance of burnout in these populations.	
3. Kurtoğlu & Özçırpıcı (2008) A Comparison of Family Attention and Burnout in Families of Children with Disabilities and Families of Children without Disabilities Turkey	1. Did the study address a clearly focused issue?	Yes	The study aimed to compare the burnout level and general family functioning of mothers of children with disabilities to that of mothers of children without disabilities.	Low
	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional design was appropriate.	
	3. Were the subjects recruited in an acceptable way?	Yes	Mothers of children with disabilities from 20 rehabilitation centres (selected from 54) in the province at random. Through a demographic questionnaire including socioeconomic characteristics, data-matching was completed and home visits were made to families in various neighbourhoods (of Gaziantep) on the basis of their socio-economic status to recruit mothers without disabilities.	

	4. Were the measures accurately measured to reduce bias?	No	Validated measure was used: Maslach’s Burnout Scale – Turkish version. No disability definitions.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Questionnaires were used.	
	6. Did the study have enough participants to minimise the play of chance?	Can’t tell.	The study did not report on a power analysis. An a priori power analysis was conducted, for an expected medium effect size (d = 0.5, alpha = 0.05 and power 0.80) the analysis indicated a minimum sample size of 128 was required. As such, it was sufficiently powered.	
	7. How are the results presented and what is the main result?		Results are presented with mean scores of the subscales Emotional Exhaustion and Personal Achievement. Mothers of children with disabilities report significantly higher rates of emotional exhaustion but not for personal achievement.	
	8. Was the data analysis sufficiently rigorous?	Yes	Analysis process well described and findings were supported. It would have been beneficial to have a breakdown of scores for the specific types of disabilities.	
	9. Is there a clear statement of findings?	Yes	Findings are well explained and there is lengthy discussion around demographic variables of the groups,	

			including whether they want more children, marital status etc.	
	10. Can the results be applied to the local population?	Can’t tell	It seems that the results can be applied to the local population due to the method of recruitment matching for socioeconomic factors for the groups. It would be beneficial to understand how LDs were defined and potentially more around the inclusion criteria for disability group.	
	11. How valuable is the research?		This research is valuable as it provides important evidence about the levels of burnout for mothers of children with and without LDs. It is particularly interesting that those with children of disabilities scored higher on emotional exhaustion but not on the personal achievement subscale as it was proposed that these mothers feel they are achieving well due to the level and complexity of care that they need to provide for their children with disabilities.	
4. Kahrıman, Polat and Gürol (2019)	1. Did the study address a clearly focused issue?	Yes	The aim of the study was to determine the correlation between perceived social support and burnout levels of mothers with LD children and to explore whether these experiences differ depending on socio-demographic variables experienced by mothers and their relationships.	Moderate

Determination of Perceived Social Support and Burnout Levels of Mothers of children with Intellectual Disability Turkey	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional was appropriate.	
	3. Were the subjects recruited in an acceptable way?	Yes	Convenience sampling was used. Mothers were recruited through special education and rehabilitation centres when their children were receiving regular physiotherapy and rehabilitation. Data collected through questionnaires.	
	4. Were the measures accurately measured to reduce bias?	No	Maslach Burnout Inventory (Turkish version) was found to be reliable and valid. No measure of disability.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Convenience sampling was used to recruit mothers of children with LD who were receiving regular physiotherapy and rehabilitation in special education and rehabilitation centres, which was appropriate. Pilot study was completed beforehand to test level of acceptance and comprehension of questionnaire measures.	
	6. Did the study have enough participants to minimise the play of chance?	Can’t tell	The study did not report on a power analysis. An a priori power analysis was conducted, for an expected medium effect size (d = 0.5, alpha = 0.05 and power 0.80) the analysis indicated a minimum sample size of 34 was required. As such, it was sufficiently powered.	

	7. How are the results presented and what is the main result?		Results are presented as mean total scores for the MBI measure, as well as mean scores for the sub-scales. Main findings reported that relationships with husbands and healthy children were negatively affected, despite these not being statistically significant; and only effect of relative relationships being significant.	
	8. Was the data analysis sufficiently rigorous?	Yes	The data analysis was detailed and described in full. The study reported that there was a significant correlation between mothers who reported having difficulty in care of child and scores of depersonalisation, however, in the statistics table provided this was reported to be (t = 1.972, *p*=0.051) which indicates inconsistencies in reporting.	
	9. Is there a clear statement of findings?	Can’t tell	There were clear statements of findings but this did not always match up to the tables provided. Conclusions drawn from results included nonsignificant results.	
	10. Can the results be applied to the local population?	Can’t tell	Appropriate methodology seems that the results can be applied more widely. Not sure of disability definitions.	
	11. How valuable is the research?		The research adds weight to the evidence-base that mothers of children LD tend to have high levels of burnout and reported on some of the factors which can	

			affect experiences of burnout, such as financial circumstances.	
5. Kütük et al., 2023 Functional Outcome in Late Adolescence/Early Adulthood of Patients with Autism Spectrum Disorder and its Relationships with Parental Burnout and Depression: A preliminary multi-centre cross-sectional study Turkey	1. Did the study address a clearly focused issue?	Yes	Study focused on evaluating sociodemographic features and functional outcomes of Turkish early adults with ASD diagnosed in childhood, to determine predictors of favourable functional outcomes and to assess self-reported burnout and depression levels among their parents.	Moderate
	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional was appropriate for this study but they highlighted that future longitudinal studies could explore these issues to ensure more accuracy in the reporting of parents' presentation.	
	3. Were the subjects recruited in an acceptable way?	Yes	Convenience smapling used to recruit through Child and Adolescent Psychiatry Departments. However, results may be biased due to dependence on clinical records	
	4. Were the measures accurately measured to reduce bias?	No	The MBI Turkish version is well validated. Again, no measure of disability.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Questionnaires using self-report from parents was appropriate.	

	6. Did the study have enough participants to minimise the play of chance?	Can’t tell	The study did not report a power analysis. The study also did not report how many parents were involved in the study. There would have been a minimum of 261 parents, assuming one parent was recruited for each early adult, so it is likely that there were enough to minimise chance.	
	7. How are the results presented and what is the main result?		Results were presented as means with standard deviations. The main result is that mothers of early adults with ASD report significantly elevated levels of burnout than fathers. Both mothers and fathers of early adults with ASD and LD report significantly elevated levels of burnout compared to those without comorbid LD.	
	8. Was the data analysis sufficiently rigorous?	Yes	Data analysis well described and rigorous.	
	9. Is there a clear statement of findings?	Yes	Findings are clearly stated across all measured domains.	
	10. Can the results be applied to the local population?	Can’t tell	They study attempted to increase representativeness, by enrolling participants from 22 centres across seven regions in Turkey, although not according to population density. Their discussion highlighted that their results may be biased as three of these areas had higher human development indices along with greater populations, which could bias results.	

			It recommended that future studies may enroll larger samples of adults with ASD from both sexes, reflecting urban/rural population distributions and using both clinical and community samples. These results are from Turkey so may not generalise to other cultures/countries/populations.	
	11. How valuable is the research?		This study was the first to evaluate functioning among a large sample of adults with ASD from Turkey and burnout levels among their parents. The data contributes to literature on impact of ASD and LD on parents and their burnout experiences.	
6. Kütük et al., 2021 High Depression Symptoms and Burnout Levels	1. Did the study address a clearly focused issue?	Yes	Aimed to determine self-reported depression and burnout levels among parents of children ASD compared to those with typically developing children. Also aimed to identify predictors of self-reported symptoms of depression and burnout among parents of children with ASD. Further research questions were clearly stated.	Moderate
	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional study was appropriate to answer this question.	

Among Parents of Children with Autism Spectrum Disorders: A Multi-Center, Cross-Sectional, Case-Control Study	3. Were the subjects recruited in an acceptable way?	Yes	Convenience sampling was appropriate.	
	4. Were the measures accurately measured to reduce bias?	No	Maslach Burnout Inventory valid and reliable.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Self-report questionnaires were effective in addressing the research questions.	
	6. Did the study have enough participants to minimise the play of chance?	Can’t tell	An a priori power analysis was conducted, for an expected medium effect size (d = 0.5, alpha = 0.05 and power 0.80) the analysis indicated a minimum sample size of 128 was required. As such, it was sufficiently powered.	
	7. How are the results presented and what is the main result?		Both mothers and fathers of children with ASD reported significantly elevated depressive and burnout symptoms compared to those with TD children. Mothers reported significantly higher scores of burnout than fathers, and fathers reported elevated scores of depression.	

	8. Was the data analysis sufficiently rigorous?	Yes	Appropriate statistical analaysis was completed and well-described within the study.	
	9. Is there a clear statement of findings?	Yes	Findings are clearly stated and related back to the research question and study aims.	
	10. Can the results be applied to the local population?	Can’t tell	It seems as though the results can be applied to the local population, however, as it is a Turkish sample this may not be generalizable across other populations/cultures.	
	11. How valuable is the research?		The research provides important insight into the differences between maternal and paternal burnout symptoms and the predictors of these.	
7. Weiss, (2002) Hardiness and social support as predictors of stress in mothers of typical children, children with autism, and children with mental retardation	1. Did the study address a clearly focused issue?	Yes	The study was designed to assess the roles of hardiness and social support in the amelioration of stress (depression, anxiety and burnout) for mothers of typical children and mothers of children with developmental disabilities.	Moderate
	2. Did the authors use an appropriate method to answer their question?	Yes	Cross-sectional study was appropriate.	
	3. Were the subjects recruited in an acceptable way?	Yes	Participants were recruited through convenience sampling, there were no significant differences in demographics between groups.	

New Jersey, USA	4. Were the measures accurately measured to reduce bias?	No	MBI is reliable and validated.	
	5. Were the data collected in a way that addressed the research issue?	Yes	Questionnaires using self-report from the mothers' seemed to address the research issue.	
	6. Did the study have enough participants to minimise the play of chance?	Can't tell.	An a priori power analysis was conducted, for an expected medium effect size (d = 0.0625, alpha = 0.05 and power 0.80) the analysis indicated a minimum sample size of 114 was required. As such, it was sufficiently powered.	
	7. How are the results presented and what is the main result?		Results were presented as means and standard deviations of group differences and predictors of the dependent variables were explored. The main results were that both mothers of children with ASD and LD reported significantly higher burnout (across emotional exhaustion, depersonalisation and personal achievement) than mothers with TD children. Further, those with children with ASD reported elevated burnout compared to those with LD.	
	8. Was the data analysis sufficiently rigorous?	Yes	Yes, data analysis was well-described, and method of analysis was appropriate.	

	9. Is there a clear statement of findings?	Yes	Statement of findings relates back to research aims which are clearly defined.	
	10. Can the results be applied to the local population?	No	The sample of the study were mostly white, middle-class women, which could skew results. It would be more appropriate to have a more mixed population to ensure generalisability.	
	11. How valuable is the research?		Research builds on existing evidence base that parents with children with additional support needs are more likely to experience burnout than those who do not. Additionally, it supports some research that ASD parents are more likely to experience stress than those with LD.	

Appendix C – STROBE Statement—Checklist of items that should be included in reports of cohort studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	45
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	47
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	48-51
Objectives	3	State specific objectives, including any prespecified hypotheses	51-52
Methods			
Study design	4	Present key elements of study design early in the paper	52
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	52
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up (*b*) For matched studies, give matching criteria and number of exposed and unexposed	52
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	52-54
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of	52-54

		methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	n/a
Study size	10	Explain how the study size was arrived at	52, 55
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	52-54
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	54-55
		(*b*) Describe any methods used to examine subgroups and interactions	54-55
		(*c*) Explain how missing data were addressed	55
		(*d*) If applicable, explain how loss to follow-up was addressed	n/a
		(*e*) Describe any sensitivity analyses	n/a
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	55
		(b) Give reasons for non-participation at each stage	n/a
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic,	55

		clinical, social) and information on exposures and potential confounders	
		(b) Indicate number of participants with missing data for each variable of interest	n/a
		(c) Summarise follow-up time (eg, average and total amount)	n/a
Outcome data	15*	Report numbers of outcome events or summary measures over time	56-57

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.

Appendix D – Final Approved MRP Proposal

https://osf.io/9xdb7

Appendix E – MRP Data Analysis Plan

https://osf.io/u6q3y

Appendix F – Syntax and Output

Research Question 1 Syntax – https://osf.io/syqx9

Research Question 2 Syntax - https://osf.io/ej3zm

Research Question 2 Output of Hayes' PROCESS - https://osf.io/hg4n8

Research Question 3 Syntax - https://osf.io/7sq8t