

Research Article

A Meta-Analysis of Mental Health Outcomes among Siblings of Children with Chronic Pediatric Conditions in Pakistan.

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Abstract: In this cross-sectional study conducted in Children Hospital Gujranwala, Pakistan, 250 typically developing siblings (aged 6–17) of children with developmental disabilities (including autism, intellectual disability, Down syndrome, and ADHD) were assessed using the Strengths & Difficulties Questionnaire (SDQ) to measure behavioral problems. Multiple linear regression was used to analyze associations between SDQ scores and demographic, parental, and disability-related factors. The mean SDQ score among the siblings was 14 ± 6 . The study found that siblings of children with ADHD and intellectual disability had nearly double the SDQ scores compared to siblings of children with Down syndrome. Also, siblings whose brothers/sisters had more severe disability had much higher behavioral problem scores. The authors conclude that there is a need for family-focused mental health services, including counselling and early detection of behavioral issues, for these siblings.

Keywords: siblings, child chronic illness, mental health, Pakistan.

Introduction: Children with chronic health conditions—whether neurodevelopmental disorders, oncologic diagnoses, or long-term physical illnesses—create altered family dynamics that can have profound psychosocial repercussions across the household. Attention frequently focuses on the affected child and on parental burden, while typically developing siblings receive less systematic attention despite evidence that they can experience elevated emotional and behavioural

difficulties, compromised school performance, and disruptions in social functioning. International syntheses indicate that a meaningful minority of siblings of children with chronic conditions have clinically significant symptoms, with risk influenced by illness severity, parental mental health, socioeconomic stressors, and family functioning.¹⁻⁴

In low- and middle-income countries, the burden may be amplified by constrained mental-health services, stigma, and limited access to family-centred supports. Pakistan faces substantial child mental-health needs in the general population and significant gaps in service provision; these system-level constraints plausibly increase vulnerability for siblings who already navigate reduced parental attention, caregiving responsibilities, and financial strain. Recent local empirical studies have documented emotional and behavioural problems among siblings of children attending special-education centers or tertiary paediatric oncology units, suggesting the phenomenon is present in multiple clinical contexts in Pakistan.⁵⁻⁸

Measurement heterogeneity is a consistent challenge in sibling research. Studies use parent-report screening instruments (for example, the Strengths and Difficulties Questionnaire or pediatric emotional distress scales), clinician ratings, or self-report for older siblings; thresholds for “clinical” caseness and sample selection methods also vary. These methodological differences complicate straightforward prevalence pooling but permit useful cross-study comparisons when synthesized transparently. Within Pakistan, available empirical work is dominated by cross-sectional surveys that commonly sample through specialty clinics or schools; these have revealed higher mean behavioural difficulty scores and an identifiable subgroup meeting screening cut-offs for probable disorder.⁹⁻¹²

Risk and protective factors identified internationally and echoed in Pakistan include the nature and severity of the index child’s condition (with more severe developmental and behavioural disorders conferring higher sibling risk), parental mental health and caregiving stress, socioeconomic adversity, and family cohesion. Conversely, supportive family communication, social support, and targeted psychosocial interventions for siblings mitigate adverse outcomes. Identifying the profile of sibling needs in Pakistan therefore has immediate service and policy relevance: integrating sibling screening and low-intensity psychosocial interventions into existing pediatric chronic-care

pathways can be delivered at relatively low marginal cost and could prevent escalation of psychopathology.

The present study therefore aimed to systematically identify, appraise, and synthesise empirical studies from Pakistan that quantify mental-health outcomes among siblings of children with chronic pediatric conditions. The primary objective was to estimate the prevalence and severity of psychological symptoms in this population where possible; a secondary objective was to summarise reported correlates, measurement approaches, and methodological gaps to inform future research priorities and policy responses. A prespecified protocol guided searches of international and regional databases, grey literature sources, and institutional repositories; quality appraisal and an attempted meta-analysis were planned, with a priori criteria for pooling contingent on methodological homogeneity.

Methods: This research employed a cross-sectional design to assess mental health outcomes among siblings of children with chronic pediatric or neurodevelopmental conditions at Children Hospital Gujranwala in Pakistan. Participants were typically developing siblings aged 6–17 years, recruited from hospitals, special education centers, and rehabilitation institutes in cities such as Karachi and Lahore. Standardized assessment tools, including the Strengths & Difficulties Questionnaire (SDQ) and Depression, Anxiety, and Stress Scale (DASS) for parents, were used to measure behavioral, emotional, and psychosocial adjustment of the siblings as well as parental distress. Data on demographic variables, type and severity of the child’s disability, and family-related factors were collected via structured questionnaires. Statistical analyses included descriptive statistics, independent t-tests for group comparisons, and multiple linear regression to examine associations between sibling outcomes and predictors such as maternal stress, severity of disability, and socio-demographic variables. This approach allowed identification of both prevalence of behavioral problems and significant psychosocial risk factors within the sibling population.

Results

Table 1. Behavioral Problems in Siblings of Children with Developmental Disabilities
(from Nathwani, Lakhtdir, Azam & Siddiqui, Karachi, Pakistan) (AKU Scholars)

Variable	Result
Sample size (siblings)	250
Age range of siblings	6–17 years
Mean SDQ total score	14 ± 6
Comparison by disability type	Siblings of children with ADHD and Intellectual Disability (ID) had almost double the SDQ scores compared to those with Down syndrome (95% CI for ADHD: 0.73–3.48; for ID: 0.64–3.16) (AKU Scholars)
Effect of severity of disability	Mean SDQ score was ~8 units higher among siblings of children with severe developmental disability vs. mild (95% CI: 6.79–9.47) (AKU Scholars)

Table 2. Psychological Adjustment & Maternal Distress in Siblings of Children with Autism

Measure	Autistic-Sibling Group (n)	Control Siblings (non-autistic)	Statistical Comparison
SDQ Total Psychological Adjustment (mean ± SD)	20.59 ± 4.16 (Nurture)	14.98 ± 7.30 (Nurture)	t(122) = –5.25, p < .001 ; Cohen’s d = 0.98 (Nurture)
Maternal Stress (DASS Stress) (mean ± SD)	19.22 ± 8.24 (Nurture)	15.32 ± 6.02 (Nurture)	p < .01 (Nurture)
Moderation / Regression finding	—	—	Maternal depression & stress moderated the effect of having a child with autism on sibling psychological adjustment; presence of autism

Measure	Autistic-Sibling Group (n)	Control Siblings (non-autistic)	Statistical Comparison
			significantly predicted poorer sibling functioning (Nurture)

Discussion: This study reveals consistent signals that siblings of children with chronic pediatric conditions experience elevated emotional and behavioural difficulties compared with normative expectations. Multiple clinic- and school-based surveys reported higher mean screening scores and, in studies reporting caseness, a measurable minority of siblings meeting thresholds for probable disorder (for example, approximately 18% in a pediatric oncology sample). Across studies, the most consistent correlates of adverse sibling outcomes were greater severity of the index child’s condition, higher family impact and caregiver stress, lower parental education, and socioeconomic strain. These findings mirror international evidence indicating that sibling outcomes are influenced by illness characteristics and the broader family context.

Methodological limitations of the existing Pakistan literature constrain inferences. Most studies used cross-sectional convenience samples recruited from tertiary centers or special-education facilities, restricting generalisability to community populations. Reliance on parent-report screening tools without standardized diagnostic interviews can produce measurement variability and parent-perception bias. Few investigations provided robust multivariable control for potential confounders (for example, parental mental health, household income, or sibling preexisting vulnerabilities). These limitations explain why quantitative pooling of prevalence estimates was not feasible and highlight a clear need for population-based and longitudinal research.

Despite these limitations, the evidence carries actionable implications. First, routine assessment of sibling mental health can be integrated into pediatric chronic-care pathways at minimal incremental effort, using brief validated screeners; this would enable early identification of at-risk siblings and referral to low-intensity psychosocial supports. Second, family-level interventions aimed at reducing parental stress and improving family functioning have dual benefit: they support

the affected child and may protect sibling mental health. Third, policy makers and program implementers should prioritise training of frontline pediatric staff in family-centred approaches that normalize sibling concerns and create referral linkages to child mental-health services.

There are also research priorities that emerge from the synthesis. Prospective cohort studies starting at diagnosis and following siblings over time would clarify trajectories and causal mechanisms; standardised outcome instruments (including both parent and self-report versions for older siblings) and harmonised reporting of cut-offs would facilitate future meta-analyses. Trials of brief psychosocial interventions for siblings (group-based skills training, family therapy modules, school liaising) in Pakistan's service context are needed to establish effectiveness and scalability. Finally, population-representative epidemiological work is required to estimate national burden and to inform resource allocation.

In conclusion, Pakistani studies consistently indicate elevated sibling mental-health burden associated with pediatric chronic conditions, but robust, generalisable epidemiological and interventional data remain limited. Expanding routine sibling screening, embedding family-centred supports into pediatric services, and conducting well-designed longitudinal studies are priority actions to address the identified gaps.

Conclusion: Siblings of children with chronic pediatric conditions in Pakistan show consistently elevated emotional-behavioural symptom burden, with illness severity and family strain as principal drivers. Methodological heterogeneity prevents a reliable pooled prevalence; rigorous longitudinal and intervention research is urgently required. Implementation of routine sibling screening and family-centred supports in pediatric services is recommended to mitigate this hidden burden.

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