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**RESEARCH ARTICLE**

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**INVESTIGATING MENTAL HEALTH CHALLENGES IN PAKISTANI CHILDREN WITH NEURODEVELOPMENTAL CONDITIONS AT A DEVELOPMENTAL ASSESSMENT SERVICE**

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**Abstract**

**Background:** Neurodevelopmental disorders (NDCs) profoundly affect children's emotional, social, and cognitive development, constituting a substantial proportion of child developmental challenges globally.

**Objective:** The research aimed to investigate past mental health concerns in children with neurodevelopmental conditions attending a developmental assessment service.

**Methodology:** A rigorous mixed-methods strategy is used in this research, which took place at Mardan Medical Complex, Mardan - Pakistan from January to December 2022, to look into mental health issues in 232 children (ages 3 to 12) who have neurodevelopmental abnormalities. Standardized tests, caregiver interviews, and inspections of medical records were all used in the data gathering process. Dissecting correlations between DSM-5 disorders, CBCL profiles, gender, and age is made easier using IBM SPSS statistical analysis tools.

**Results:** A significant gender gap was seen in a group of 232 children (ages 3–12) with 60% neurodevelopmental abnormalities in boys (n=139) and 40% in girls (n=93). ASD (n=63; 27.16%), ADHD (n=53; 22.84%), and Specific Learning Disabilities (n=47; 20.26%) were the most common diagnoses. Analysis showed that there were differences in symptom profiles according to age and gender; with female having greater internalizing scores (25.3) and male having, higher externalizing scores (45.8). The DSM-5 diagnoses and CBCL scores were shown to be significantly correlated, highlighting the intricate relationship between diagnostic and demographic characteristics that shapes the mental health profiles of this vulnerable group.

**Conclusion:** This study highlights the critical need for focused treatments and culturally aware methods to improve the general well-being of children with neurodevelopmental disorders in Pakistan by shedding light on the widespread mental health problems among this population.

**Keywords**: neurodevelopmental disorders, mental health concerns, developmental assessment service, children, Pakistan

**Introduction**

Neurodevelopmental disorders (NDCs), which impact children's emotional, social, and cognitive development, account for 10% of children's cases, which is a significant problem of child development [1,2]. These disorders, which include global developmental delay, attention-deficit hyperactivity disorder (ADHD), and autism spectrum disorder (ASD), thrust kids into a world of serious mental health issues and developmental obstacles [3]. Disturbing data shows that up to 80% of kids with NDCs have mental health problems, which have a significant negative impact on their general functional results and quality of life [4,5].

The connection between neurodevelopmental disorders and mental health problems is increasingly clearer when considering the whole world [6]. The World Health Organization (WHO) estimates that 10–20% of children globally suffer from mental health issues, with neurodevelopmental illnesses showing a greater frequency young illnesses have complex and multidimensional interactions that make young kids more susceptible to anxiety, depression, and behavioral problems [7,8]. Adding to these difficulties is the stigma that children with neurodevelopmental disorders often experience from society, which makes it more difficult for them to get the proper mental health care [9].

The unique dynamics within the Pakistani setting need deeper examination, even as the world becomes more aware of the connection between neurodevelopmental disorders and mental health [10,11]. Pakistan struggles with few resources and lack of access to specialist healthcare treatments, much like many other underdeveloped countries [12]. Children with neurodevelopmental disorders have a distinct set of challenges against this difficult background, ranging from delayed diagnosis to a lack of specialized therapies. Comprehending the frequency and kind of mental health issues within this demographic is essential for developing focused treatments and improving the general welfare of these kids [13].

**Objective**

The research aimed to investigate past mental health concerns in children with neurodevelopmental conditions attending a developmental assessment service.

**Methodology**

**Study Design**

The study uses a thorough mixed-methods approach and combines a prospective cohort design to explore the complex range of mental health issues among kids with neurodevelopmental disorders who visit the developmental assessment service at Mardan Medical Complex in Mardan, Pakistan. The project, which runs from January to December 2022, incorporates findings from a comprehensive cohort study that was carried out at the complex's Child Development Unit (CDU) with 232 kids.

**Study Location**

The Child Development Unit (CDU) at Mardan Medical Complex, a premier medical center offering developmental and diagnostic evaluation services to children, is the main study location. The research, which is limited in scope to the hospital's designated service areas, attempts to gather a representative sample of kids who come to the CDU, illustrating the range of neurodevelopmental disorders that exist in the community.

**Inclusion Criteria**

A purposefully selected sample of 232 children, ages 3 to 12, who used the developmental assessment program at Mardan Medical Complex are included in the research. Children with a variety of neurodevelopmental diagnoses, including global developmental delay, attention-deficit hyperactivity disorder (ADHD), and autism spectrum disorder (ASD), meet the inclusion criteria. This guarantees a varied portrayal of neurodevelopmental issues that are common among the young people in the area.

**Exclusion Criteria**

The complicating variables, with an emphasis on serious medical disorders that might make mental health evaluations less reliable are excluded. Additionally, in order to ensure homogeneity within the cohort for reliable analysis and result interpretation, the research eliminates children who fall outside of the defined age range (below 3 years or above 12 years).

**Data Collection**

A multifaceted strategy is used in data collecting, including caregiver interviews, standardized exams, and a careful examination of medical records. Internationally recognized instruments, like the Child Behavior Checklist (CBCL), guarantee the cross-cultural applicability, robustness, and reliability of the data gathered for evaluating mental health in kids with neurodevelopmental disorders. In order to provide complex insights into the participants' mental health condition, caregiver engagement is essential.

**Statistical Analysis**

We used IBM SPSS (version 27) for statistical analysis. Demographic traits and the frequency of mental health issues are captured by descriptive statistics. Pearson's correlations and chi-square tests methodically disentangle relationships between DSM-5 diagnoses, CBCL profiles, child gender, and age.

**Ethical Approval**

The research has been approved by the institutional review board at Mardan Medical Complex after careful assessment of ethical issues. The rights, welfare, and privacy of the participating children and their families are given first priority, and the research complies with established procedures. Procedures for opting out of consent have been put in place to encourage involvement while upholding personal freedoms.

**Results**

In this study, a total of 232 children, aged between 3 and 12 years, with an average age of 6.8 ± 1.5 years, actively participated; the children in this age range were not all alike (table 1). Males made up 60% of the study group (n = 139), while females made up 40% (n = 93, figure 1). This shows a glaring gender disparity, with a man to female ratio of 60:40.

**Table 1:** Demographic characteristics in the Study Population (N=232)

|  |  |  |
| --- | --- | --- |
| **Variable** | **Description** | **Value** |
| Sample Size | Total number of participants | 232 |
| Age Range (years) | Age range of participants | 3 - 12 |
| Mean Age+SD (years) | Average age of participants | 6.8+1.5 |

**Figure 1:** Gender based distribution in the Study Population (N=232)

In this research, 232 individuals (100%) showed signs of at least one neurodevelopmental disorder. The most common diagnosis was ASD (n=63; 27.16%), which was followed by ADHD (n=53; 22.84%) and Specific Learning Disabilities (SLD) at 20.26% (n=47). Less frequently occurring diagnoses included Language Disorders (n=28; 12.07%), Global Developmental Delay (n=18; 7.76%), Motor Disorders (n=14; 6.03%), and Epilepsy (n=9; 3.88%).

**Table 2:** Clinical characteristics of Neurodevelopmental Disorders in the Study Population (N=232)

|  |  |  |
| --- | --- | --- |
| **Condition** | **Number of Participants** | **Percentage (%)** |
| Autism Spectrum Disorder (ASD) | 63 | 27.16 |
| Attention-Deficit Hyperactivity Disorder (ADHD) | 53 | 22.84 |
| Global Developmental Delay (GDD) | 18 | 7.76 |
| Specific Learning Disabilities (SLD) | 47 | 20.26 |
| Language Disorders | 28 | 12.07 |
| Motor Disorders | 14 | 6.03 |
| Epilepsy | 9 | 3.88 |
| Total | 232 | 100 |

Examining age and gender differences in symptom profiles alongside preliminary insights into diagnosis-specific scores, this table 3 reveals: children with depression averaged 7.5 years old, while those with conduct disorder were 8.0 years old; females scored higher in internalizing (25.3) and males in externalizing (45.8) symptoms, both at an average age of 8.2 years; specific score patterns emerged for internalizing and total symptoms in depression and conduct disorder diagnoses, with externalizing scores only available for conduct disorder. Further data is needed for complete analysis.

**Table 3:** Exploring associations between CBCL scores, child age, gender, and DSM-5 diagnoses

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Relationship** | **Mean CBCL Internalizing Scores** | **Mean CBCL Externalizing Scores** | **Mean CBCL Total Scores** | **Mean Child Age** |
| CBCL Internalizing Scores & DSM-5 Depression |  | - | - | 7.5 (Average age with depression) |
| CBCL Externalizing Scores & DSM-5 Conduct Disorder | - | 20.7 (Average score for Conduct Disorder) | - | 8.0 (Average age with Conduct Disorder) |
| CBCL Total Scores & Child Gender | 25.3 (Avg. internalizing score for females) | 45.8 (Avg. externalizing score for males) | 8.2 (Overall average age) | - |
| CBCL Internalizing Scores & Child Age | 26.3 (Avg. internalizing score in 7-8 year olds) | - | - | 7.5 (Age group for Internalizing scores) |
| DSM-5 Depression & Child Gender | - | - | - | 7.5 (Average age with depression) |
| DSM-5 Conduct Disorder & Child Age | - | - | - | 8.0 (Average age with Conduct Disorder) |

The relationships between certain CBCL scores and diagnoses are shown in Table 4, along with less significant but still potentially significant associations with other variables. Significant correlations between CBCL scores and particular diagnoses were found using chi-square tests: internalizing levels were associated with depression (p<0.001), while externalizing scores were associated with conduct disorder (p=0.012). Certain scores and possible factors showed weak positive correlations: internalizing with gender (r=0.15), externalizing with conduct disorder (r=0.36), and internalizing with depression (r=0.42). Notably, there was a negative association (r=-0.14) between internalizing scores and age, indicating that scores declined with age. Although age and conduct disorder (p=0.034) and gender and depression (p=0.32) did not significantly correlate, the correlation data for these associations was absent.

**Table 4:** Chi-square tests and Pearson's correlations revealing associations between CBCL scores, diagnoses, child age, and gender.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Association Tested** | **Chi-Square** | **P value** | **Pearson's** | **P value** |
| CBCL Internalizing Scores & DSM-5 Depression | 15.23 | 0.001 | 0.42 | 0.176 |
| CBCL Externalizing Scores & DSM-5 Conduct Disorder | 8.76 | 0.012 | 0.36 | 0.129 |
| CBCL Total Scores & Child Gender | 3.1 | 0.078 | 0.15 | 0.022 |
| CBCL Internalizing Scores & Child Age | 2.89 | 0.089 | -0.14 | 0.019 |
| DSM-5 Depression & Child Gender | 0.98 | 0.32 | - | - |
| DSM-5 Conduct Disorder & Child Age | 4.52 | 0.034 | - | - |

**Discussion**

Our study's findings highlight how common neurodevelopmental disorders (NDCs) are among children in Pakistan who are receiving developmental assessment services. The research population included 232 children aged 3 to 12 years. The demographic profile of the subjects indicated a notable gender gap, with 40% (n=93) being female and 60% (n=139) being male.

The distribution of genders differs from certain international research that generally suggest a greater frequency of non-diagnostic cancers in men [14–16]. The gender gap that we found in our research calls for further investigation to identify possible causes, such as societal effects or particular healthcare-seeking practices that are particular to Pakistan.

Our results are consistent with the worldwide prevalence of neurodevelopmental disorders, especially the increased frequency in boys, when compared to other research studies [17–19]. According to our research study, men are diagnosed with illnesses such Specific Learning Disabilities (SLD) at 20.26% (n=47), ADHD (n=53; 22.84%), and ASD (n=63; 27.16%) more commonly than females. Variations in the distribution of genders across people and locations, however, highlight the necessity for nuanced interpretations and the taking of contextual and cultural aspects into account.

In our research, children with conduct disorder averaged 8.0 years old, compared to 7.5 years for those with depression. At an average age of 8.2 years, gender disparities were seen, with females displaying greater internalizing scores (25.3) and males displaying heightened externalizing scores (45.8). These results are in line with earlier research [20], highlight the need of taking gender and age differences into account when interpreting mental health symptoms, and support the use of customized methods for evaluating and treating the wellbeing of kids with neurodevelopmental disorders.

Our research study explores associations between CBCL scores, diagnoses, child age, and gender through chi-square tests and Pearson's correlations. Significant links include internalizing levels with depression (p < 0.001) and externalizing scores with conduct disorder (p = 0.012). Weak positive correlations were observed, such as internalizing with gender (r = 0.15), externalizing with conduct disorder (r = 0.36), and internalizing with depression (r = 0.42). Additionally, a negative association (r = -0.14) indicated potential declining internalizing scores with increasing age. These results highlight the intricate interplay of demographic and diagnostic factors shaping the mental health profiles of children with neurodevelopmental disorders [21].

**Conclusion**

This study illuminates the significant mental health difficulties experienced by kids with neurodevelopmental abnormalities who go to a developmental assessment center in Pakistan. The high frequency of disorders like ASD and ADHD, together with the gender gap that has been found, highlight the urgent need for specialized therapies in a setting with limited resources. The research not only advances our knowledge of neurodevelopmental disorders globally, but it also highlights the significance of culturally sensitive approaches in managing the intricate interactions between diagnostic and demographic variables that impact these kids' mental health. These understandings are essential for developing focused therapies, dispelling social stigmas, and eventually enhancing the general wellbeing of this susceptible group in the particular setting of Pakistan.

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