

Executive functions, anxiety and their relation to social participation and quality of life among children with Migraine during COVID-19

Background:

Headaches are a frequent occurrence in children and adolescents, making them the most commonly reported pain complaint when seeking medical attention. (Genizi 2013) The prevalence of migraine shows an increase from 3% during the preschool years to 23% during high school years. (Al-Twajiri 2002) The COVID-19 pandemic has profoundly affected the well-being of children and adolescents, impacting various facets of their physical and mental health. Disrupted routines, prolonged periods of social isolation, increased screen time, and heightened stress and anxiety related to the pandemic have raised concerns about the potential amplification in frequency and severity of childhood migraines. Numerous studies have documented an upsurge in migraine symptoms and frequency among children during the pandemic.(Bonuccelli 2023, Dedeoglu 2023 Caronna 2023) Factors such as changes in sleep patterns, dietary habits, physical activity levels, and emotional stress contribute to the worsening of migraine in this population. (Powers 2003, Riva 2006) Additionally, restricted access to healthcare services and disrupted follow-up care during the pandemic pose challenges for the management and treatment of childhood migraine. (Apetti 2020, Verhagen 2021, Reyes-Alvarez 2023) It is imperative for healthcare professionals to acknowledge these difficulties and provide appropriate support and interventions to mitigate the pandemic's impact on children with migraine. Future research should delve into the underlying mechanisms connecting pandemic-related

factors to the exacerbation of migraine, enabling the development of targeted strategies for prevention and management.

Our study aimed to explore COVID-19 pandemic on the executive functions (EF) , and quality of life of children with migraine and healthy controls .

We compared EF between children with migraine and healthy controls. Then, both groups were further divided to children who were affected by COVID-19 those who were not affected by COVID-19. Comparisons within and between groups of EF, anxiety, participation and QOL were performed. Among children with migraine, we examined the implications of COVID-19 restrictions on EF; we examined the correlations between EF, anxiety, participation and QOL. Based on the correlations results, we examined whether EF, anxiety, migraine severity and participation predicted QOL.

Research Objective:

Our hypotheses were that: (1) children with migraine would have significantly lower EF, higher anxiety, lower participation and QOL than healthy controls. (2) When comparing children affected by COVID-19 those who were not affected by COVID-19 within and between groups: children with migraine who were affected by COVID-19 would have the lowest EF, highest anxiety, lowest participation and QOL. (3) Among children with migraine: significant correlations would be found between migraine severity (Ped MIDAS), EF, anxiety, participation and QOL; (4) EF, anxiety, migraine severity and participation would significantly predict QOL.

Study Population:

The research will include 75 children between the ages of 6 and 18 years, diagnosed with Migraine, who are under follow-up at the Pediatric Neurology Clinic in Bnei Zion.

A control group of 75 children without Migraine, headache or other chronic diseases, assessed during routine visits at the Pediatric Neurology Clinic or for other reasons, will also be included.

Research Methods:

For the study group only:

Medical Assessment: A prospective medical history including a thorough headache history and physical and neurological assessment by a pediatric neurologist, were done in all children, during the visit at the pediatric neurology clinic. All children met the diagnostic criteria for migraine, according to the International Classification of Headache Disorders, 3rd edition (ICHD-3) (++).

PedMIDAS: Headache related disability was evaluated by the PedMIDAS questionnaire. It was developed to assess migraine disability in pediatric and adolescent patients and has been tested and validated for ages 4 to 18 (++).

For all participants:

Health status questionnaire- A thorough questionnaire about the general health of all participants, including information about COVID-19 – as whether the child was infected by the virus.

Behavior Rating Inventory of Executive Functions (BRIEF) - The BRIEF is a behavioral rating measure for children and youth aged 5-18 years, that aims to

measure the child's EF as expressed in daily life situations (for example: "becomes upset with new situations"; "has a messy desk"; "disturbed by change of teacher or class"; "does not check work for mistakes"; "has trouble concentrating on chores, schoolwork"). In the present study we used the BRIEF parents' report. The BRIEF includes 86 items that measure various EF and are summarized into two scales: Behavioral Regulation Index (BRI) (which includes the inhibition, shifting and emotional control scales), and the Metacognition Index (MI) (which includes the initiation, working memory, planning, organization of materials and monitoring scales). The Global Executive Composite (GEC) total score is generated from both BRI and MI scores. Parents rate how frequent the child express the behavior described in each BRIEF item on a Likert scale that ranges from 1 (infrequently) to 3 (often). All raw scores are converted to a standard scores. A total cut-off standard score of 65 indicates deficiencies in executive functions. As higher is the scores, the worse are the EF. The BRIEF has good psychometric properties (Gioia et al., 2015; Gioia, Isquith, Guy, & Kenworthy, 2000; McGill & Snow, 2021).

The State-Trait Anxiety Inventory for Children (STAIC) (Spielberger, C. D., Edwards, C. D., Montouri, J., & Lushene, R. (1973) distinguishes between a general proneness to anxious behavior rooted in the personality and anxiety as a fleeting emotional state. The STAIC S-Anxiety scale consists of twenty statements that ask children how they feel at a particular moment in time. The STAIC T-Anxiety scale also consists of 20 item statements, but subjects respond to these items by indicating how they generally feel. The instrument is designed to be used with upper elementary or junior high school aged children. Higher mean score represents lower anxiety.

The Child and Adolescent Scale of Participation (CASP) (Bedell, 2011) - measures the extent to which children participate in home, school, and community activities

compared to children of the same age as reported by family caregivers. The content and methods used in the CASP and CFFS were informed by the International Classification of Functioning (ICF, WHO, 2001), research addressing participation of children / youth with a range of disabilities and factors related to the child, family and physical and social environment that support and or hinder participation. The CASP consists of 20 ordinal-scaled items and four subsections: 1) Home Participation (6 items), 2) Community Participation (4 items), 3) School Participation (5 items), and 4) Home and Community Living Activities (5 items). The 20 items are rated on a four-point scale: “Age Expected (Full participation),” “Somewhat Restricted,” “Very Restricted,” “Unable.” A “Not Applicable” response is selected when the item reflects an activity in which the child would not be expected to participate due to age (e.g., work). Most items are applicable to children who are five and older. Higher scores reflect greater age-expected participation. The CASP has reported evidence of test re-test reliability (Intraclass Correlation Coefficient = 0.94), internal consistency ($\alpha \geq 0.96$) and construct and discriminant validity.

The Pediatric Quality of Life Inventory (PedsQL) (++) - We used Version 4.0 the child’s report, which profiles children’s Health-Related Quality of Life (HRQoL) in four dimensions: (1) Physical Functioning (eight items), (2) Emotional Functioning (five items), (3) Social Functioning (five items) and (4) School Functioning (five items). A higher order dimension of the Psychosocial Health dimension encompasses emotional and social functioning. The child marks the frequency of problems which occurred in the past one month on a five-point response Likert scale (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem). Items are then transformed into a 0-100-point scale (0

= 100; 1 = 75; 2 = 50; 3 = 25; 4 = 0) to present the HRQoL percentage. A higher percentage indicates a better HRQoL.

Inclusion Criteria:

Children between the ages of 6 and 18 years with Migraine.

Exclusion Criteria:

Children unable or unwilling to complete the questionnaires, and those with secondary headaches or other chronic illness.

Informed Consent:

Participants aged 11 and older will provide informed consent, while younger children will receive oral explanations, and their parents will provide informed consent.

References:

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