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Self-concept evaluation and migraine without aura in childhood

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Introduction: Self-esteem is related to the broadly understood concept of self-schemas and is a crucial mechanism for a correct psychological development in children and adolescents. The impact of the many psychological difficulties linked to the migraine without aura (MoA) and recurrent headache attacks, such as anger and separation anxiety, on self-esteem has not yet been well investigated. The aims of the present study were to assess self-esteem levels in an objective way and to verify their possible relationship and correlation with the frequency and intensity of migraine attacks, in a population of children and adolescents affected by MoA.

Methods: The study population was comprised of 185 children (88 males [M], 97 females [F]) aged between 6 and 12 years (mean 9.04 ± 2.41 years) referred consecutively for MoA to the Center for Childhood Headache, Clinic of Child and Adolescent Neuropsychiatry, Second University of Naples and of 203 healthy controls (95 M, 108 F) with mean age 9.16 ± 2.37 years, recruited from schools in Campania. The monthly headache frequency and the mean headache duration were assessed from daily headache diaries kept by all the children, and MoA intensity was assessed on a VAS (visual analog scale). To further evaluate their level of self-concept, all subjects filled out the Multidimensional Self-Concept Scale (MSCS).

Results: The two study groups were comparable for age ($P = 0.621$), sex ($P = 0.960$), and z-score BMI ($P = 0.102$). The MoA group showed a significant reduction in the MSCS total score ($P < 0.001$) and in the Social ($P < 0.001$), Affect ($P < 0.001$), Family ($P < 0.001$), and Physical ($P < 0.001$) domains of the MSCS compared with the control group. The Pearson's correlation analysis showed a significantly negative relationship between MoA clinical characteristics and MSCS scores, and similarly the frequency of attacks was significantly negatively related with the Social ($r = –0.3176$; $P < 0.001$), Competence ($r = –0.2349$; $P = 0.001$), Physical ($r = –0.2378$; $P = 0.001$), and total ($r = –0.2825$; $P < 0.001$) scores of the MSCS. On the other hand, the MoA duration was significantly negatively related with the Social ($r = –0.1878$; $P = 0.01$), Competence ($r = –0.2270$; $P = 0.002$), Physical ($r = –0.1976$; $P = 0.007$), and total ($r = –0.1903$; $P = 0.009$) scores of the MSCS.

Conclusion: Our study first identified differences in self-esteem levels, with an objective tool, in children affected by MoA compared with controls, suggesting the need for evaluation of self-esteem for better psychological pediatric management of children with migraine.

Keywords: children, self-esteem, MSCS

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Introduction

Migraine prevalence is around 15% in the European countries.[1,2] Migraine is a disabling condition in all ages and adversely affects patients' health-related quality of life (QoL) independently from comorbidities, such as mood or anxiety disorders,[3–6] and contributes to several difficulties in daily life. Because of this, the World Health

Organization (WHO) recognizes migraine as a high-priority public health problem.[7,8]

In fact, the disability associated with migraine seems to be strictly related to its severity and affects areas of function, such as communication, mobility, self-care, socialization, and relationships with peers[9] and with family members.[10,11]

Migraine without aura (MoA) is a primary headache that occurs frequently in childhood, with a prevalence ranging from 2% to17%.[12]

In general, during childhood, MoA is considered to be more than just a painful syndrome because it is often accompanied by many severe disabilities/impairments, such as low emotional functioning, school absenteeism, and impairment of academic performance and cognitive functioning,[12,13] motor coordination,[14] and sleep habits.[15–20]

Moreover, in the last 20 years, much attention has been paid to the presence of psychological difficulties and psychiatric comorbidity in children affected by primary headaches.[21–28]

To date, in clinical pediatric practice, many alternative therapies have been explored, such as weight loss,[29] nutraceuticals,[30–32] sleep hygiene,[33,34] psychotherapy, and generic psychological interventions,[35–37] and some have shown promise in the treatment of headache symptoms and/or comorbidities in affected children.

Among the many psychological difficulties reported to be associated with MoA and recurrent headache disorders in children, including anger and separation anxiety,[38] the quality of self-esteem remains underinvestigated.

Specifically, self-esteem could be defined as "a positive or negative attitude toward a particular object, namely, the self"[39] and in general, can be considered more precisely related to the concept of self-schemas, broadly understood as "cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information contained in the individual's social experiences."[40]

The aims of the present study were to assess self-esteem levels in an objective way and to verify the possible relationship and correlation of self-esteem with the frequency and intensity of migraine attacks, in a large population of children and adolescents affected by MoA.

Materials and methods

Study population

Data were collected from a pilot group (ten with MoA, and ten control children) and used to perform the sample size calculation. The desired power was set at 0.80 and error at 0.05. The sample size was calculated using online software (http://www.dssresearch.com/toolkit/sscalc/size_a2.asp). The sample size required was found to be 39 subjects for each group, but there was the opportunity to recruit more patients in order to strengthen our findings. Therefore, the study population consisted of 185 children (88 males [M], 97 females [F]), aged between 6 and 12 years (mean 9.04 ± 2.41 years) consecutively referred for MoA to the Center for Childhood Headache, Clinic of Child and Adolescent Neuropsychiatry, Second University of Naples. The diagnosis of MoA was made according to the pediatric criteria of the International Headache Society Classification 2004.[1]

Exclusion criteria were neurological (ie, epilepsy, all type of headache except MoA) or psychiatric symptoms (Attention-Deficit Hyperactivity Disorder [ADHD], depression, or behavioral problems), mental retardation (IQ ≤ 70), borderline intellectual functioning (IQ ranging from 71 to 84),[41,42] overweight (body mass index [BMI] ≥85th percentile) or obese (BMI ≥ 95th percentile), or anticonvulsant or psychoactive drugs administration.

Following recruitment, there was a 4-month run-in period to verify headache characteristics.

At that end of the run-in period, monthly headache frequency and mean headache duration were assessed from daily headache diaries kept by all the children. Headache intensity was assessed on a visual analog scale (VAS), as previously reported.[30–32]

Children affected by MoA from at least 8 months were eligible for this study, and the minimum frequency was four attacks monthly, each lasting for a duration of one hour, according to the International Classification of Headache Disorders (ICHD)-II criteria.[1]

The results were compared with the findings obtained in a sample of 203 healthy controls (95 M, 108 F; mean age 9.16 ± 2.37 years) randomly selected from schools in the Campania region.

The subjects in both groups were recruited from the same urban area; participants were all Caucasian and were of middle-class socioeconomic status (between class 2 or class 3, corresponding to 28,000–55,000 euros/year to 55,000–75,000 euros/year, respectively, according to the current Italian economic legislation parameters). All parents gave their written informed consent. The Departmental Ethics Committee of the University of Palermo approved the design study.

The study was conducted according to the criteria of the Declaration of Helsinki.[43]

Main outcome measures

Multidimensional Self-Concept Scale

The Multidimensional Self-Concept Scale (MSCS)[44] measures global self-concept and six specific domains of self-concept: Social, Competence, Affect, Academic, Family, and Physical. Each domain consists of 25 items. Each item is scored from 1 (strongly agree) to 4 (strongly disagree). Negatively worded items are reverse scored. The raw global score and domain scores are calculated as sums of all items or of domain-specific items. The global and domain scores are then standardized (IQ metric) using the standard score conversions available in the user manual. A higher score indicates a more positive self-concept.

The MSCS was used to assess global and domain-specific self-concepts. The MSCS is a 150 item self-report inventory that is appropriate for either individual or group administration to youth between the ages of 9 and 19 years, inclusive. The MSCS provides a total score, as well as standard scores (mean = 100; standard deviation = 15) for each of six domain-specific scales (ie, Social, Competence, Affect, Academic, Family, and Physical).

Each of the six MSCS subscales is comprised of 25 items; thus each scale contributes equally to the total scale. The MSCS is based on a more comprehensive context-dependent, multidimensional model of social emotional adjustment and assessment.

The MSCS was normed on a national sample of 2,501 students, which was matched closely to national demographics. The scale was normed in 17 sites drawn from all four regions of the United States. Analysis of the MSCS data according to age, race, and sex have found only minor differences across the eleven age levels, both sex groups, and racial groups. Consistent with other self-concept measures, the MSCS appears to assess a robust construct that is fairly invariant across various demographic variables.

The MSCS examiner manual reports the total scale internal consistency at 0.98 for the entire sample; the internal consistency of the six scales ranges from 0.87 to 0.97 (median = 92). The MSCS total scale stability over a 4-week interval is 0.90, and the subscale stability coefficients range from 0.73 to 81. Fort this study, we used the Italian version of the MSCS.[45]

Statistical analysis

In order to compare the characteristics (age, sex, and z-score BMI) and the MSCS results between MoA children and controls, Chi-square test and *t*-test, where appropriate, were applied.

Then, to explore the relationship between MSCS scores and clinical aspects of MoA, such as frequency and severity of attacks, Pearson's correlation test was applied.

For all statistical analysis, significant *P*-values <0.05 were considered.

All data were coded and analyzed using the commercially available STATISTICA 6.0 package for Windows (StatSoft, Inc, Tulsa, OK, USA).

Results

No significant differences between the two study groups were found for age (9.04 ± 2.41 in MoA group versus 9.16 ± 2.37 in the control group) ($P = 0.621$), sex (ratio M/F 88/97 in the MoA group versus 95/108 in the control group) ($P = 0.960$), and z-score BMI (0.46 ± 0.31 in the MoA group versus 0.51 ± 0.29 in the control group) ($P = 0.102$).

Among the MoA clinical characteristics, in the MoA group, the attacks occurred with a mean frequency of 9.01 ± 2.81 times monthly, a mean duration of 6.22 ± 2.61 hours, and a mean intensity of 7.33 ± 2.67, according to VAS parameters.

The MoA group showed a significant reduction in MSCS total score and in the Social, Affect, Family, and Physical domains ($P < 0.001$) compared with the control group (Table 1).

Moreover, the Pearson's correlation analysis showed a significantly negative relationship between MoA clinical characteristics and the MSCS scores. Particularly, the MoA frequency was significantly negatively related with the Social ($r = –0.3176$) ($P < 0.001$), Competence ($r = –0.2349$) ($P = 0.001$), Physical ($r = –0.2378$) ($P = 0.001$), and total ($r = –0.2825$) ($P < 0.001$) scores of the MSCS.

On the other hand, the MoA duration was significantly negatively related with the Social ($r = –0.1878$) ($P = 0.01$),

Table 1 MSCS scores, in patients with MoA and controls

	MoA (N = 185)	Controls (N = 203)	*P*-value
Social	65.712 ± 24.791	96.073 ± 18.591	<0.001
Competence	91.426 ± 18.295	90.971 ± 19.011	0.811
Affect	76.049 ± 11.914	98.856 ± 12.087	<0.001
Academic	91.094 ± 11.381	93.014 ± 11.948	0.107
Family	71.643 ± 12.426	99.815 ± 13.041	<0.001
Physical	67.931 ± 21.653	92.057 ± 19.762	<0.001
Global score	68.629 ± 23.016	94.182 ± 16.849	<0.001

Notes: The table shows the comparison of mean distribution in specific domains and in the global score of the MSCS, between subjects with MoA and typically developing subjects (controls). The *t*-test was applied. *P*-value ≤0.05 was considered statistically significant.

Abbreviations: MoA, migraine without aura; MSCS, Multidimensional Self-Concept Scale.

Competence ($r = -0.2270$) ($P = 0.002$), Physical ($r = -0.1976$) ($P = 0.007$), and total ($r = -0.1903$) ($P = 0.009$) scores of the MSCS.

Discussion

The study of the psychological characteristics of children with migraines dates back half a century. As reported in a recent meta-analysis by Balottin et al,[46] in 1955, Vahlquist[47] identified neurovegetative instability, ambition and perfectionism, and anxiety in these children, and Bille[48] described children affected by migraine headache as more anxious, sensitive, deliberate, cautious, fearful, vulnerable to frustration, tidy, and less physically enduring than control group children. Moreover, a few years later, Koch and Melchior[49] found signs of nervousness, mental instability, and immaturity compared with healthy controls, in children affected by migraine, suggesting "a decreased resistance to psychological stress and conflict situations, rather than overt psychological disorder, or endogenous disease." Maratos and Wilkinson,[50] more than a decade later, found higher rates of anxiety and depression associated with "disturbed parental relationships" in children with migraine; an emotional upset was the most frequently reported headache trigger in this study. Subsequently, Guidetti et al[51] identified the presence of feelings of exclusion from the family group and repressed hostility toward important figures, in children with migraine, while Lanzi et al[52,53] observed a neurotic, borderline personality organization or "white relation" in juvenile migraine- and chronic tension-type-headache sufferers. Cahill and Cannon,[54] in a population-based study, pinpointed that "migraine should be a headache subtype of particular interest for psychiatrists" given the significant association between stress, personality traits, psychiatric disorders, and migraine.

On the other hand, to the best our knowledge, this study was the first to investigate, in children affected by MoA, the self-concept that could impact QoL.

Alternatively, a preponderance of studies on the QoL of children with migraine have emphasized assessment of psychological difficulties, such as depression and anxiety,[55–60] that could also be related to low self-concept,[61] such as was reported in our sample (MSCS total score $P < 0.001$). In addition, we should also consider that psychological factors and/or personality traits may impact QoL, considering that anxiety levels could tend to be higher in children with migraine than in controls.[62]

Given the unpredictable nature and intensity of migraine pain and its associated symptoms, it is not surprising that there is concern about the impact of migraine on the day-to-day lives of affected children, as shown in our sample in the Social ($P < 0.001$) and Physical ($P < 0.001$) self-concept domains, particularly.

Conversely, the disruption in school attendance and in academic performances has been one of the most consistently noted consequences of chronic headache;[63] however, attention to migraine-associated disability has expanded to include participation in leisure activities with peers.[64] However, our results failed to show significant differences in the Academic domain of self-esteem compared with the controls (91.094 ± 11.381 versus 93.014 ± 11.948) ($P = 0.107$), probably because of the enhanced verbal activity for subjects affected by MoA, as reported in a previous study.[13] Subsequently in this light we could suggest that improving the school integration could support the high self-concept level in the Academic domain.

On the other hand, recently, behavioral disorders have been reported as more common in children who experienced headache than in controls.[65]

The QoL of children with headaches is significantly affected by their health condition, and the impact of headaches on QoL is similar to that found for other chronic illness conditions, with impairments in school and emotional functioning being the most prominent.[66]

At the same time, the frequent school absenteeism may be interpreted also as a significant stressor affecting academic performance, social interactions with peers, and in general, level of self-esteem, thus also aggravating and worsening pain perception.[67]

Moreover, the school absenteeism relevance is not only a consideration in lack of learning, but also in emotional and social development.[68] In this light, the frequency and intensity of migraine attacks may be held responsible for the reduction in the Social (65.712 ± 24.791 versus 96.073 ± 18.591) ($P < 0.001$) and Physical (67.931 ± 21.653 versus 92.057 ± 19.762) ($P < 0.001$) domains and in the total self-esteem levels (68.629 ± 23.016 versus 94.182 ± 16.849) ($P < 0.001$), probably due to an awareness of being different from other children and due to a perception of illness.

Although knowledge about QoL and function as well as the self-esteem of children affected by primary headache is still lacking and inconclusive and while to date, the few studies in this field have provided information on only a restricted number of domains, in fact, the impact of headache in children and adolescents may be considered as extending all the aspects of life.[12]

In this perspective, as suggested by Ballottin et al, childhood migraine should be understood and managed as a

neuropsychiatric disorder, with an important role played by both biological and psychological factors.[69]

In conclusion, our study is the first to identify differences in self-concept levels, in children affected by MoA compared with controls, suggesting the need for evaluation of self-concept for better psychological pediatric management of children with migraine.

Disclosure

The authors report no conflicts of interest in his work.

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