

ID-Migraine test for pediatric population: preliminary results from the Italian validation

Ilaria Frattale,¹ Laura Papetti,² Fabiana Ursitti,² Giorgia Sforza,² Gabriele Monte,² Luigi Mazzone,¹ Massimiliano Valeriani²⁻⁴

¹Child Neurology and Psychiatry Unit, Department of Wellbeing of Mental and Neurological, Dental and Sensory Organ Health, Tor Vergata Foundation Hospital, Rome, Italy; ²Developmental Neurology, IRCCS Bambino Gesù Children Hospital, Rome, Italy; ³System Medicine Department, Tor Vergata University of Rome, Italy; ⁴Center for Sensory-Motor Interaction, Aalborg University, Denmark

ABSTRACT

Background: Migraine is a frequent neurological condition with a high impact on quality life. The diagnosis is clinical in accordance with the International Classification of Headache Disorders version 3 criteria. Early diagnosis is important to initiate timely treatment. A screening tool for adulthood is already available (ID-Migraine), while there is currently no questionnaire that allows for diagnosis in children and adolescents. The aim of the present study is to demonstrate the validity of ID-Migraine to diagnose migraine in pediatric population.

Methods: A total of 94 pediatric patients were enrolled and administered ID-Migraine. The mean age was 11.6 years. The study group included patients with a diagnosis of migraine (63%) and primary stabbing headache (37%).

Results and conclusions: Specificity and positive predictive values were >80% (92% and 93% respectively); sensitivity and negative predictive values tended towards reliability (71% and 66% respectively), making the ID-Migraine a reliable tool in diagnosing migraine in the pediatric population.

Key words: migraine, pediatric, Italian validation, ID-Migraine.

Introduction

Migraine is the neurological condition with the highest prevalence in both pediatric and adult age (1,2). The diagnosis is clinical and based on International Classification of Headache Disorders version 3 (ICHD3) criteria (3). However, for the pediatric age, the application of the ICHD3 criteria, valid for adulthood, is debated due to the shorter duration of the attacks, often less than 30 minutes (4), and the quality pain, which is rarely throbbing (5). ID-Migraine is a screening tool consisting of 3 questions that can be administered between the ages of 18 and 65 (6); it is validated also in Italian for adulthood (7). For the pediatric age, to date, there are no validated tools that allow the diagnosis of migraine. Two previous studies tried to demonstrate ID-Migraine validity in children and adolescents with discordant results (8, 9).

The aim of this study was to demonstrate that the ID-Migraine can be used also in children and adolescents for diagnosing migraine.

Results

A total of 94 patients (58 girls, 36 boys), who gave consent to the questionnaire administration were included. The mean (and median) age was 11.6 years (11.3±03.1 SD, range 6-17 years). The ICHD3 criteria were used to diagnose migraine in 59 (63%) patients (36 girls, 23 boys), with a mean age of 12.1 years (11.8±3.3 SD, range 6-17 years), and primary stabbing headache in 35 (37%) patients (22 girls, 13 boys), with a mean age of 10.6 years (10.1±3.4 SD, range 6-17 years). Thirty percent (n=18) of migraine and 63% (n=22) of primary stabbing headache patients were under the age of 11.

Considering the single investigated areas, nausea/vomiting was reported in 25/59 patients with migraine (42%) versus 5/35 patients with primary stabbing headache (14%), photophobia in 37/59 migraineurs (63%) versus 6/35 patients with primary stab-

bing headache (17%), and disability was reported by 53/59 migraine patients (90%) versus 9/35 primary stabbing headache patients (26%).

Two positive item was reported in 42/59 (71%) migraineurs versus 3/35 (8.6%) patients with primary stabbing headache.

Specificity, sensitivity, and negative (NPV) and positive (PPV) predictive values of positive responses to the ID items for the diagnosis of migraine are reported in **Table 1**.

Considering the positive response to the ID-Migraine, *i.e.* the presence of 2 positive responses, the sensitivity was 0.71 (71%), the specificity 0.92 (92%), the PPV 0.93 (93%) and NPV 0.66 (66%).

All valid scores were also obtained for the disability item (sensitivity 0.89, 89%; specificity 0.75, 75%; PPV 0.85, 85%; NPV 0.82, 82%).

Values above 80% were obtained in all PPV and specificity items, except for disability value which tend towards to reliability, while the NPV was >80% only considering the disability variable of the questionnaire.

Discussion

The purpose of ID-Migraine is to identify the presence of the main characteristics associated with the attack, such as nausea/vomiting, photophobia, and disability. Previously, two studies tried to demonstrate the validity of ID-Migraine in childhood. Zarifoglu and Taskapilioglu showed a sensitivity of 62.1% and a specificity of 71.1% (8), while Jin *et al.* (9) obtained a sensitivity of 39.71% and a specificity of 46.63%. The disagreeing results could be attributed to the different methods. Particularly, while Zarifoglu and Taskapilioglu used face-to-face interviews, Jin *et al.* selected a group, which was asked to answer to ID-Migraine, by a multi-step questionnaire.

From a methodological point of view, we decided to use patients with primary stabbing headache as *controls*, since the

clinical features of primary stabbing headache can be easily distinguished from those of migraine. We considered the possibility to compare patients with migraine to those with tension-type headache. However, this did not seem a good option to us, since clinical characteristic of migraine and tension-type headache can often co-exist in the same children and adolescents.

According to our results, the ID-Migraine questionnaire appears to have an excellent profile in terms of specificity and PPV in all the investigated features.

Photophobia is a necessary criterion for migraine diagnosis in adulthood but unfrequently reported in pediatric age. Nevertheless, it is possible to notice its presence observing the child's behavior (4). Although photophobia is rarely reported by the child during the visit, in our sample we obtained specificity and PPV values >80%.

Young patients suffering from headache usually are referred to a Headache Center after having been evaluated by their own GP and undergone several instrumental evaluations. Most of these procedures are useless for the diagnosis of migraine which is rarely provided by the GP. This tortuous path often delays the diagnosis with the risk, at least in some patients, to transform episodic into chronic migraine and even to favor the appearance of medication overuse headache. Seen from this light, having a screening tool, quick to be administered, could represent a great advantage for the GP who could provide a correct diagnosis of migraine and start a correct treatment also without using the ICHD criteria, which can be of more difficult use. Mostly, it could help children and adolescents with headache, who could receive an early diagnosis and considerably reduce their sufferance and the risk to develop resistant or refractory migraine.

Considering 2 out of 3 positive responses, the test can be considered reliable, with specificity and PPV >80% (92% and 93% respectively), and sensitivity and NPV tending towards reliability (71% and 66% respectively).

Primary stabbing headache is characterized by localized and transient single or in series stabs of pain lasting few seconds, recurring from one to many per day (3). In pediatric age, there are some reports of duration up to 15 minutes (5,10). Given to the duration, no disability would be expected. In our sample, however, disability was reported by 26% of patients with primary stabbing headache, probably linked to the preoccupation of children and their families about the possible serious etiology of a stabbing pain involving the head.

Limitations of the study. The main limitation of the present study is represented by a discrepancy between the number of migraineurs and non-migraineurs, which results in an underestimation of the NPV in all items, as well as the sensitivity in identifying nausea and photophobia. Moreover, given the small sample size, it was not possible to generalize the results by stratifying the sample by age. A multicenter study will hopefully be able to include a larger sample of patients, making the current results more generalizable.

Conclusions

ID-Migraine can be considered as a migraine screening tool with a good reliability profile in pediatric age, starting from 6 years of age. The positivity of the test, based on 2 out of 3 positive responses, requires confirmation by using the ICHD criteria (3).

Materials and Methods

All under 18 patients suffering from migraine with or without aura, who consecutively had the first visit at the Headache Center of the Bambino Gesù Children's Hospital in Rome (Italy) in the period January-March 2022, were included in the study. Also, all patients with primary stabbing headache referred to our Headache Center from January 2022 to July 2023 were enrolled. The study was approved by the Ethical Committee of Bambino Gesù Children's Hospital. All patients enrolled and their parents provided consent for the publication of the results.

The original ID-Migraine validated by Lipton *et al.* consists of 3 items; the answers to which are coded as "no", meaning "never", or "rarely" and "yes" for "less than half the time" or "half the time or more." The questionnaire is suggestive of a diagnosis of migraine if 2 out of 3 answers are positive.

The administered questionnaire was that validated in Italian by Brighina *et al.* (Figure 1), who gave consent to its use (7).

After ID-Migraine administration, patients underwent clinical and neurological evaluation, included fundus oculi examination.

The diagnosis according with the ICHD3 criteria, formulated at the end of visit, was matched with the answers provided to the ID-Migraine.

Inclusion criteria were: i) age between 6 and 17 years, ii) diagnosis of migraine with or without aura or primary stabbing headache according to ICHD3 criteria, and iii) consent provided by parents to answer the questionnaire. The exclusion criteria were: i) age less than 6 years and over 17 years, ii) other primary and secondary headaches, and iii) intellectual disability.

Questionario ID-Migraine		
1. Ha avuto la nausea o conati di vomito?	Si	No
2. Le ha dato fastidio la luce (molto di più di quando non ha mal di testa)?	Si	No
3. Il mal di testa ha limitato, per almeno un giorno, la sua capacità di lavorare, studiare o fare quello che deve?	Si	No

During the last 3 months, did you have the following disturbances with your headaches?

1. Did you have nausea or retching? Yes / No
2. Did light bother you (more than when you did not have headache)? Yes / No
3. Did your headache limit your ability to work, study, or do what you needed to do? Yes / No

Figure 1. Italian version of ID-Migraine translated from the original version (6).

Table 1. Sensitivity, specificity, positive and negative predictive values.

	Sensitivity, %	Specificity, %	PPV, %	NPV, %
Nausea/vomiting	42	86	83	48
Photofobia	62	84	86	58
Disability	89	75	85	82
Two positive items	71	92	93	66

PPV positive predictive values; NPV negative predictive values.

Sensitivity, specificity, positive and negative predictive factor were statistically evaluated. They were considered reliable for values >80%.

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Correspondence: Ilaria Frattale, Child Neurology and Psychiatry Unit, Department of Wellbeing of Mental and Neurological, Dental and Sensory Organ Health, Policlinico Tor Vergata Foundation Hospital, Viale Oxford 31, 00133, Rome, Italy.
Tel.: +393334060768. E-mail: ilariafrattale@libero.it

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