ORIGINAL ARTICLE

Validation of The 3-Question Headache Screen in The Diagnosis of Migraine in Nigeria

KolawoleWahab[1], AsuwemheUgheoke[2], Peter Okokhere[2], Titus Ibekwe[3]

ABSTRACT

BACKGROUND: Migraine is a chronic episodic disorder that is still under-diagnosed and undertreated. A rapid diagnostic method is desirable so that treatment can be initiated early. We compared the 3-question headache screen with the International Headache Society (IHS) criteria in the diagnosis of migraine among Nigerians.
METHODS: Using a multi-stage sampling technique, 1513 respondents were screened for migraine using both the IHS criteria and the 3-question headache screen. A statistical comparison of the two diagnostic methods was then done by determination of kappa coefficient, sensitivity and specificity.
RESULTS: The prevalence of migraine obtained using the IHS criteria was 9.6% (95% CI, 8.1%-11.1%) while it was 8.3% (95% CI, 8.1%-8.5%)with the use of the 3-question headache screen. There was a good agreement between the IHS criteria and the 3-question headache screen (k=0.68, p<0.001). The 3-question headache screen had a sensitivity of 66.2% (95% CI, 58.5%-73.9%), specificity of 97.8% (95% CI, 97.0%-98.6%), positive predictive value of 76.2% (95% CI, 68.8%-83.6%) and a negative predictive value of 96.5% (95% CI, 95.5%-97.5%).
CONCLUSION: The 3-question headache screen is sensitive and specific in making a rapid diagnosis of migraine among Nigerians. Its use is thus encouraged so that appropriate management of the condition can be initiated early in order to reduce associated disability.
KEYWORDS: 3-question headache screen, Validation, Diagnosis, Migraine, Nigeria

INTRODUCTION
Although it is rated alongside dementia, psychosis and quadriplegia as one of the most disabling disorders by the World Health Organization (1), migraine is still largely under-diagnosed and undertreated (2). This may be particularly worse in developing countries where doctor to patient ratio is low. In Nigeria, the crude prevalence of migraine is 5.3% (3), and we recently reported an overall migraine prevalence of 9.6% among undergraduates of a Nigerian university (4), but this prevalence may just represent the tip of the iceberg.
A simple screening tool will result in a rapid recognition of migraine so that appropriate management can be commenced without delay. It is in recognition of the foregoing that various rapid screening methods have been developed for the condition (5-7). Cady et al (5) proposed a 3-question headache screening tool for rapid diagnosis of migraine in 2003 and found a good correlation between this tool and the International Headache Society (IHS) criteria. Similarly, the Brief Headache Screen used by Maizels and Burchette was found to have a good correlation with the diagnoses of headache specialists (8). We are not aware of any study that has explored the recognition of migraine in Nigeria using any of the validated rapid assessment methods. The objective of this study was therefore to compare the International Headache Society (IHS) criteria with the3-question headache screen in thediagnosisof migraine in Nigerians.

[1]Division of Neurology, Department of Medicine, University of Ilorin Teaching Hospital, Ilorin, Nigeria
[2]Department of Medicine, Irrua Specialist Teaching Hospital, Irrua, Nigeria
[3]Department of Otorhinolaryngology, University of Abuja, Abuja, Nigeria
Corresponding Author: KW Wahab, Email: kwwahab@yahoo.com

METHODS

Using a cross-sectional multi-stage sampling technique, students of Ambrose Alli University in Southern Nigeria were screened for migraine using the International Headache Society (IHS) criteria for migraine without aura (9). The study protocol was approved by the Ethics Committee of Irrua Specialist Teaching Hospital. Data acquisition was done by the researchers and trained research assistants who were Year 4 medical students of Ambrose Alli University, Ekpoma, Nigeria. The only eligibility criterion for inclusion in the study was being a student of Ambrose Alli University irrespective of academic level. As reported in an earlier publication (4), in order to obtain a 95% confidence interval of ±5% around an estimated prevalence of migraine of 16% (10), the calculated minimum sample size was 200. The primary sampling unit was however increased to 2000 from a sampling frame of 6000 undergraduate students in order to reduce the possibility of type 2 error. Cluster sampling technique was used in the selection of respondents; each of the 9 Faculties and one College of Medicine in the University at the time of the study (January, 2007) was taken as a cluster. Each of the clusters had 200 questionnaires administered on consenting eligible respondents based on availability in the lecture rooms or hostels on the days of data collection. The semi-structured questionnaire used for data acquisition was designed to simultaneously obtain responses to the International Headache Society (IHS) criteria and the 3-questions headache screen. The IHS criteria (9) included:

A. At least 5 attacks fulfilling criteria B–D
B. Headache attacks lasting 4–72 hours (untreated or unsuccessfully treated)
C. Headache has at least two of the following characteristics:
1. Unilateral location
2. Pulsating quality
3. Moderate or severe pain intensity
4. Aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs)

D. During headache at least one of the following:
  i.   Nausea and/or vomiting
  ii.   Photophobia and phonophobia
E. Not attributed to another disorder

On the other hand, the three-question headache screen consisted of: 1. *Do you have recurrent headaches that interfere with work, family, or social function?* 2. *Do your headaches last at least 4 hours?* 3. *Have you had new or different headaches in the past 6 months?* Diagnosis of migraine was made if the responses to the first 2 questions were *yes* and the response to the last one was *no (5)*.

A statistical comparison of the two methods of diagnosis was then made with the Statistical Package for the Social Sciences version 17 (SPSS® Inc, Chicago, IL). In order to ascertain the measures of agreement between the 3-question headache screen and the IHS criteria, kappa coefficient was determined. Sensitivity, specificity, positive and negative predictive values with the appropriate 95% confidence intervals were determined as the instrument's measures of validity. A p value <0.05 was taken as a measure of statistical significance.

RESULTS

There were 1513 respondents (males, n= 755) with a mean age of 23.3±2.5 years. Using the IHS criteria, 145(9.6%; 95% CI, 8.1%-11.1%) of the 1513 respondents satisfied the criteria for the diagnosis of migraine whereas with the use of the 3-question headache screen, 126(8.3%; 95% CI, 8.1%-8.5%) were diagnosed. Of the 126 diagnosed to have migraine based on the 3-question headache screen, 96 were found to satisfy the IHS criteria thus giving a sensitivity of 66.2%(95% CI, 58.5%-73.9%). There was a good agreement between the 3-question headache screen and the IHS criteria (k =0.68, p<0.001). The specificity was 97.8%(95% CI, 97.0%-98.6%), positive predictive value was 76.2%(95% CI, 68.8%-83.6%) while the negative predictive value was 96.5%(95% CI, 95.5%-97.5%). These are presented in Table 1 below.

Table 1: Comparison of the 3-question headache screen with the International Headache Society criteria in the diagnosis of migraine.

Migraine based on 3-question headache screen	Migraine based on IHS criteria		Total
	Present	Absent	
Present	96 (a)	30 (b)	126
Absent	49 (c)	1338 (d)	1387
Total	145	1368	1513

Sensitivity = a/a+c = 96/145 = 66.2% (95% CI=58.5%-73.9%)
Specificity= d/b+d = 1338/1368 = 97.8% (95% CI= 97.0%-98.6%)
Positive predictive value = a/a+b = 96/126 = 76.2% (95% CI= 68.8%-83.6%)
Negative predictive value = d/c+d = 1338/1387 = 96.5% (95% CI= 95.5%-97.5%)

DISCUSSION

In view of the significant disability associated with migraine, its early diagnosis and initiation of treatment is imperative. The well-recognized diagnostic method for the condition isthe use of the International Headache Society criteria (9) which can be time-consuming. In addition, except for specialists in tertiary hospitals in Nigeria, many healthcare practitioners at primary or even secondary care levels may not be conversant with the diagnostic criteria and this may increase the possibility of misdiagnosis of the condition. This study has demonstrated a good agreement between the International Headache Society criteria and the 3-question headache screen. The screening tool was also found to have a good sensitivity and an excellent specificity.

Compared to the study of Cady et al (5) which demonstrated that the 3-question headache screen was able to diagnose migraine in 78% of the patients enrolled based on the International Headache Society criteria, we found that the sensitivity of the tool in our respondents was 66.2%. According to Landis and Koch (11), these two values fall within the range of substantial concordance in the measurement of observer agreement for categorical data. The sensitivity is also similar to the high correlation between the Brief Headache Screen and headache specialists' diagnoses as reported by Maizels and Burchette (6). The ability to screen for those who do not have the disease is very good (97.8%) which implies that if 100 people are screened using this rapid screening method, only 2 are likely to be misdiagnosed. The recorded high measures of agreement with the International Headache Society criteria are also quite comparable to the findings of Lainez et al (12) in a validation study of Migraine Screen Questionnaire (MS-Q) in primary care setting in Spain. A further pointer to the good sensitivity of the 3-question headache screen in our respondents is the fact that the prevalence rate of 8.3% obtained using this method falls within the 95% confidence interval (8.1%-11.1%) of the prevalence obtained using the IHS criteria. This implies that the two values are comparable.

The sensitivity and specificity of the 3-question Headache Screen in our subjects means that it can be used in rapid screening for migraine. This is especially important in busy outpatient clinics in primary and secondary care hospitals where doctor to patient ratio is very low. However, in spite of its high specificity and negative predictive value, we suggest that this instrument should only be used for initial assessment in any patient with recurrent headaches. Those who have a positive screening could then be appropriately referred for further evaluation by neurologists or physicians who can then apply the IHS criteria to establish the diagnosis.

The main strength of this study is the fact that it is the first to validate a rapid assessment method for migraine among Nigerians in spite of the potentially huge burden of the disease given the country's population. We however appreciate that a generalization of the results would be difficult because of the small number of migraineurs studied which could have increased the possibility of type 2 error. However, in a country where there have been very few studies on migraine, we believe that our findings could serve as a template for further studies on this subject. A validation

study of the screening tool in Nigeria's major indigenous languages will also be necessary since a high percentage of the population is illiterate.

In view of its good agreement with the IHS criteria, good sensitivity and specificity, the 3-question headache screen is a useful tool in the rapid recognition of migraine in Nigerians; hence, its use should be popularized. Further studies using the same tool validated in major Nigerian languages are however desirable so that migraine can be detected early and use of effective preventive and abortive therapies can be commenced in order to reduce the burden of the disease and its associated disability.

REFERENCES

1. Menken M, Munsat TL, Toole JF. The global burden of disease study implications for neurology. *Arch Neurol,* 2000; 57: 418-20.
2. Lipton RB, Silberstein SD. The role of headache-related disability in migraine management: implications for headache treatment guidelines. *Neurology,* 2001; 56: 35-42.
3. Osuntokun BO, Adeuja AO, Nottidge VA,*et al*. Prevalence of headache and migrainous headache among Nigerian Africans: a community-based study. *East Afr Med J*, 1992; 69(4): 196-9.
4. Wahab KW, Ugheoke AJ. Migraine: prevalence and associated disability among Nigerian undergraduates. *Can J NeurolSci,* 2009; 36: 216-221.
5. Cady RK, Borchert LD, Spalding W, *et al.* Simple and efficient recognition of migraine with 3-question headache screen. *Headache,* 2004;44(4):323-7.
6. Lipton RB, Dodick D, Sadovsky R, *et al*, for ID Migraine validation study. A self-administered screener for migraine in primary care: The ID migraine validation study. *Neurology,* 2003; 61(3): 375-382.
7. Gervil M, Ulrich V, Olesen J, Russell MB. Screening for migraine in the general population: Validation of a simple questionnaire. *Cephalalgia,* 1998; 18: 342-348.
8. Maizels M, Burchette R. Rapid and sensitive paradigm for screening patients with headache in primary care settings.*Headache,*2003; 43(5): 441-50.
9. The International Classification of Headache Disorders: 2nd Edition. Headache Classification Subcommittee of the International Headache Society**.** *Cephalalgia*, 2004; 24Suppl 1:9-160.
10. Ogunyemi AO. Prevalence of headache among Nigerian university students. *Headache,* 1984; 24: 127-130.
11. Landis JR, Koch GC. The measurement of observer agreement for categorical data. *Biometrics,*1977; 33: 159-174.
12. Lainez MJ, Castillo J, Dominguez M, *et al.* New uses of the Migraine Screen Questionnaire (MS-Q): validation in the primary care setting and ability to detect hidden migraine. MS-Q primary care. *BMC Neurology,* 2010; 10: 39.