

Headache diagnosis, management and morbidity in the Singapore primary care setting: findings from a general practice survey

Khu J V, Siow H C, Ho K H

ABSTRACT

Introduction: We sought to determine the epidemiological features and the headache burden of headache patients in the Singapore primary care setting. Particular attention was given to the adequacy of migraine diagnosis and management as well as the utilisation of prophylactic medication by primary care doctors.

Methods: Consenting patients who consulted participating general practice clinics with the chief complaint of headache, were administered a questionnaire incorporating demographical data, headache characteristics and burden as well as treatment patterns. For each patient, the attending doctor independently completed a second questionnaire covering diagnosis and treatment of the patient.

Results: A disproportionate number of non-Chinese and females presented for headache management in the primary care setting as compared to the Singapore population at large. Migraineurs had more headache-related disability (67.3 percent) than non-migraineurs (45.7 percent). In our study setting, the IHS diagnostic criteria (38.2 percent of respondents), ID migraine (61.1 percent) and physician's diagnosis (62.0 percent) correlated poorly with each other when employed for case definition of migraine. In the study population, 22.6 percent used acute pain medication excessively (more than four days a week), 39.3 percent were dissatisfied with their current treatment and 58.3 percent had frequent headaches (more than four attacks a month). Only a minority of those in whom prophylaxis was indicated were treated appropriately.

Conclusion: Diagnosis of migraine is inconsistent in the primary care setting despite the condition being responsible for considerable disability. Prophylactic treatment is underutilised as a management strategy, and the risk of medication-

overuse headaches is underestimated. Our results emphasise the continuing need for education of primary care physicians and the public about strategies for effective headache diagnosis and treatment.

Keywords: headache, headache-related disability, migraine, migraine prophylaxis, primary healthcare

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INTRODUCTION

The World Health Organisation (WHO) has ranked migraine as one of the 20 most disabling medical illnesses in the world.^(1,2) Yet migraine is often under-diagnosed, under-recognised and under-treated, despite being a common disorder that is frequently encountered by primary care and specialist physicians.⁽³⁻⁷⁾ This may be due to the fact that physicians may not see patients during an acute migraine attack and must rely on patients' retrospective descriptions of their prior symptoms.⁽³⁾ Two epidemiological headache studies^(8,9) have been done in the local undergraduate population and the community at large in Singapore. These have shown an overall headache lifetime prevalence of 82.7%, as well as a prevalence rate of 9.3% for migrainous headaches.⁽⁹⁾ No local study has yet been done on the primary care treatment of headache patients. In this study, we sought to determine the epidemiological features and headache burden of headache patients in the Singapore primary care setting, to ascertain the accuracy of migraine diagnosis by general practitioners as compared to the International Headache Society (IHS) diagnostic criteria⁽¹⁰⁾ (Appendix 1) and the Migraine⁽¹¹⁾ score, and to look at headache management patterns. The utilisation of prophylactic treatment and recognition of medication-overuse headaches were given special attention.

METHODS

The Singapore Headache Patient Survey was a questionnaire-based study designed and directed by the

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Table I. Age, race and gender of study population.

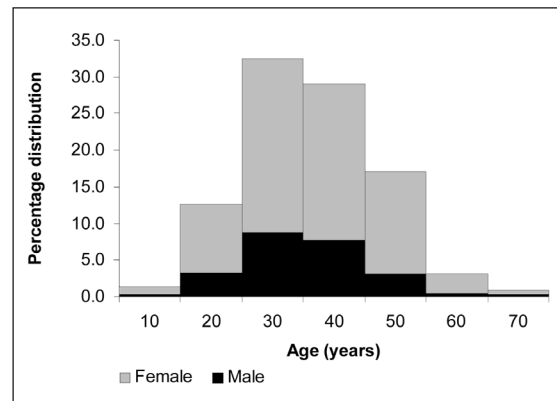
| | Male (%) | Female (%) | Total (%) |
|--------------------------|-------------|-------------|------------|
| Age group (years) | | | |
| < 20 | 20.7 | 79.3 | 5.0 |
| 21–50 | 26.2 | 73.8 | 81.5 |
| > 50 | 16.7 | 83.3 | 11.3 |
| Unknown | 23.1 | 76.9 | 2.2 |
| Race | | | |
| Chinese | 23.7 | 76.3 | 67.3 |
| Malay | 22.0 | 78.0 | 15.9 |
| Indian | 31.1 | 68.9 | 7.9 |
| Others | 19.0 | 81.0 | 3.6 |
| Unknown | 41.4 | 58.6 | 5.3 |
| Total gender | 24.5 | 74.5 | 100 |

Table II. Headache profile of study population.

| Characteristics | Percentage |
|--------------------------------|------------|
| Pulsatile | 52.6 |
| Unilateral | 49.3 |
| Nausea | 52.9 |
| Vomiting | 22.6 |
| Moderate to severe headache | 54.8 |
| Physical activity exacerbation | 22.6 |
| Photophobia | 32.9 |
| Phonophobia | 11.0 |
| Aura | 14.2 |

Headache Society (Singapore). The questionnaire was developed with consultation with neurologists with a specialty interest in headaches. It comprised two sections: a self-assessed patient's questionnaire and a physician's questionnaire, to be respectively completed by the patient and his/her physician (Appendix 2). The questionnaires were collected separately, so as to reflect independent perspectives of the patient and the attending physician in each case presenting to medical attention. Patients who consulted participating general practice (GP) clinics from November 2006 to February 2007 with the chief complaint of headache, were included in the study after their consent was obtained. Personalised instruction and clarification on the questionnaire were given to the physician and clinic assistants by a single study coordinator. The latter were instructed on how to assist patients in completing their questionnaires. 57 clinics participated in the study. A total of 584 completed pairs of questionnaires were received. Data was entered into and analysed with a database programme (Excel 2000; Microsoft). Where applicable, Fisher's χ^2 tests were performed to determine the significance of differences in proportions and κ values were used to determine the extent of agreement. A p-value ≤ 0.05 was regarded as statistically significant.

The questions in the patient's questionnaire were designed to obtain information on patient demographics, headache duration, headache frequency, ID Migraine score,⁽¹¹⁾ migraine disability assessment score (MIDAS),⁽¹²⁾

**Fig. 1** Bar chart shows age and gender distribution of the study population.

doctor-hopping behaviour, headache treatment and social burden of headaches. ID Migraine is a validated three-item self-assessed screener in which the presence of two of three features (disabling headache, photophobia and vomiting) diagnoses migraine with a positive predictive value of 93%.⁽¹¹⁾ The MIDAS instrument is a validated five-item questionnaire used to quantify headache-related disability.^(12,13) MIDAS measures disability by counting the number of days of lost and limited activity in work, school and social activities in the preceding three months. A score of 0–5 days is defined as minimal disability, 6–10 days as mild disability, 11–20 days as moderate disability, and ≥ 20 days as severe disability. The physician recorded headache features, clinical diagnosis for the case, and management details in the physician's questionnaire. Particular attention was paid to the overusage of acute pain medication and perceived need for prophylactic treatment.

RESULTS

The mean age of the study population was 37 ± 11 years, with the age of respondents ranging from 8 to 74 years, and a peak in age at presentation between 25 and 45 years (Table I and Fig. 1). There was no significant difference between the racial distribution in the study population and that of a general survey of GP clinic patients in Singapore ($\chi^2 = 4.69$, $p = 0.20$).⁽¹⁴⁾ However, the racial distribution in the study population differed significantly ($\chi^2 = 10.41$, $p = 0.015$) from that of the Singapore population at large (75.2% Chinese, 13.6% Malay, 8.8% Indian and 2.4% other races) as found in the 2006 National Census. This difference was due to a proportionately greater number of non-Chinese headache outpatients as compared to Chinese ($\chi^2 = 5.04$, $p = 0.025$). A significantly greater number of females presented with headaches in the primary care setting as compared with the Singapore population at

Table III. Reasons for dissatisfaction with current treatment for headache among dissatisfied patients.

| Reasons | Percentage |
|---|------------|
| Insufficient pain relief | 35.7 |
| Failure to reduce number of headache attacks by at least half | 20.9 |
| Side-effects | 10.9 |
| High cost of treatment | 7.8 |
| Others | 13.5 |

Table IV. Comparison of different diagnostic methods for migraine.

| | IHS (%) | | ID Migraine (%) | |
|---------------------|---------|------|-----------------|------|
| | Yes | No | Yes | No |
| ID Migraine | | | | |
| Yes | 32.4 | 5.8 | | |
| No | 29.6 | 32.2 | | |
| κ | 0.329 | | | |
| Physician diagnosis | | | | |
| Yes | 33.1 | 28.8 | 46.8 | 15.1 |
| No | 5.2 | 32.9 | 15.1 | 23.1 |
| κ | 0.356 | | 0.361 | |

large (49.5% male and 50.5% female; $\chi^2 = 147.52$, $p < 0.0001$), as well as when compared with all GP clinic patients (46.6% male and 53.4% female; $\chi^2 = 110.11$, $p < 0.0001$).⁽¹⁴⁾ The clinical characteristics of headaches in the study population are summarised in Table II.

Almost half (48.8%) of subjects had frequent headaches, defined as four or more headache attacks per month. Females were more likely to get frequent headaches than males ($\chi^2 = 4.34$, $p = 0.037$). A non-significant trend towards the non-Chinese having frequent headaches compared to the Chinese was present. ($\chi^2 = 7.5$, $p = 0.057$). In the study population, 20.7% had suffered from headaches for less than a year; 28.6% for 1–5 years, and 49.1% for more than five years. Approximately half (51.4%) of the respondents had consulted only one physician for their headaches; 30.0% had consulted two physicians; 8.7% had consulted three physicians; and 5.5% had consulted four or more physicians for their headaches. Dissatisfaction with their current treatment was felt by 39.3% of respondents for various reasons (Table III). Further analysis showed that 58.3% of the dissatisfied subjects had frequent headaches and 27.8% of the dissatisfied subjects were taking acute pain medication more than four times per week.

The MIDAS showed that 53.9% of the respondents had greater than minimal headache-related disability, with 22.6% having mild disability, 19.7% having moderate disability and 11.6% having severe disability. Migraineurs had relatively greater disability than non-migraineurs: when the IHS criteria were used for case definition, 67.3% of migraineurs suffered some level of

Table V. Indications for and corresponding usage of prophylactic treatment by population subgroup.

| Category | Identified as needing prophylaxis by attending doctor (%) | Already on or newly given prophylaxis (%) |
|--|---|---|
| Patient with ≥ 4 headaches per month | 36.1 | 16.3 |
| Moderate to severe disability based on MIDAS | 42.1 | 12.4 |
| Anxious about the next headache | 37.0 | 20.9 |
| Severe pain (7–10) | 45.5 | 13.0 |
| Overuse of acute pain medication* | 80.0 | 36.7 |
| Total study population | 22.4 | 13.0 |

* indicated by physician

disability, whereas disability was only present in 45.7% of the non-migraineurs ($\chi^2 = 28.23$, $p < 0.001$). Anxiety regarding the possibility of a subsequent headache attack was present in 57.4% of the study population. More than a quarter (26.7%) felt that headaches were not accepted as a reason for medical leave by their employer or teacher. The migraine prevalence was 38.2% according to the IHS diagnostic criteria, whereas ID Migraine scores and the physician's clinical diagnosis showed higher prevalences of 61.1% and 62.0%, respectively. The prevalence of migraine by the IHS criteria was 26.6% in male and 41.6% in female respondents, a statistically significant gender difference ($\chi^2 = 8.37$, $p = 0.004$). There was a significant racial difference in migraine prevalence ($\chi^2 = 9.92$, $p = 0.027$), and the Chinese were significantly less likely to have migraines than the non-Chinese ($\chi^2 = 8.10$, $p = 0.004$). A comparison of different migraine case definitions (by physician diagnosis, ID Migraine score and IHS criteria) showed a considerable lack of correlation between the three diagnostic classifications (Table IV), with κ values of 0.33–0.36.

Physicians identified 5.3% of the population as taking acute pain medication for their headaches at least four days a week. However, 22.6% of the studied population reported doing so, implying that physicians missed recognition of potential medication overuse in up to 79.9% of cases. Among patients indicated for prophylactic treatment by the physician, only 58% was eventually treated with such because of various reasons (Table V). Only 16.3% of respondents having four or more headaches per month and 12.4% of those having moderate to severe disability were on preventive medication, although 36.1% and 42.1%, respectively, were identified as needing prophylaxis.

DISCUSSION

The Singapore Headache Outpatient Survey is the first study of Singapore headache patients in a primary care setting. The finding of a non-Chinese, female preponderance in headache patients is consistent with earlier studies in the local community.⁽¹⁵⁾ The peak age of presentation to medical attention as found in this study also corresponds well with local age-specific headache prevalence figures.⁽⁹⁾ The prevalence of migraine in the primary care setting in other studies ranged from 14%⁽¹⁶⁾ to 84%.⁽¹⁷⁾ The great differences in migraine case definition using different methods of diagnosis is of interest. It would appear that local primary care physicians do not use either the standardised and widely-accepted IHS diagnostic criteria or the well-validated ID Migraine screener to diagnose migraines. The IHS criteria are more complex to administer and may be unfamiliar to general practitioners. Local data has suggested that the IHS criteria may under-diagnose migraine in an Asian population.⁽⁹⁾ Failure to meet the criteria with respect to number of previous similar headache episodes and/or duration of headache episodes is common, and these criteria have been omitted from consideration in our study. Despite the resulting reduced diagnostic specificity, the prevalence of migraine according to the IHS criteria is only two-thirds of that diagnosed by doctors as well as the ID Migraine score. On the other hand, the ID Migraine test is easily completed and is probably less liable to recall error. We therefore recommend that primary care physicians who do not use the IHS criteria for diagnosis familiarise themselves with the ID Migraine criteria.

Half of the headache population at large, and 70% of migraineurs, suffer from some degree of disability from their headaches. This finding is comparable with American (76%) and British (71%) data.⁽¹³⁾ Given that about 27% of the local population above the age of 12 years present to medical attention for their headaches,⁽¹⁸⁾ it would appear that approximately one in 6–7 Singapore residents experience some degree of disability from headaches. It is known that 50% of migraineurs are disabled^(4,19) and 75% have reduced ability to function^(20,22) during an attack. Migraineurs also fear loss of their jobs because they take too much sick leave, and feel that they miss promotion opportunities.⁽²³⁾ Many aspects of a migraine sufferer's life may be compromised, including education, employment, personal relationships, family life and social activities.⁽²⁾ This is often translated to tangible economic costs because of missed work, missed school hours, impaired work performance and healthcare use.^(4,22,24–26) Extrapolation of the resultant annual economic impact in Britain,⁽²⁷⁾ which has a similar GDP per capita (US\$ 31,800) to that in Singapore (US\$

31,400), finds an indirect cost of migraine in Singapore of approximately US\$ 100 million per year. Up to a quarter of the study population may be using analgesic medications at least four days a week. This would place them at risk of medication-overuse headaches. The latter respond poorly to both acute and prophylactic treatments and may be the reason why patients feel dissatisfied with their current treatment. Overuse of analgesic medications also may lead to doctor-hopping in the hope of finding a cure for their headache. It is noteworthy that only a quarter of patients at risk of medication overuse were recognised by the attending physicians.

The American Academy of Neurology (AAN) headache guidelines for clinicians suggest that patients having more than two headaches per month should be considered suitable for prophylactic treatment.⁽²⁸⁾ Patients defined as having moderate to severe disability by MIDAS are also candidates for prophylactic medication.⁽²⁹⁾ Assessments of severity and disability in headache patients identify at-risk populations in which prophylactic medication^(30–32) should be used. Our results therefore suggest that prophylaxis is underutilised as a headache management strategy. It assumes even greater importance in view of the high prevalence of potential medication overuse in the study population. It may be helpful to have a headache educational programme for the public to highlight the indications for, and availability of, prophylactic treatment. This study has the advantage of a large sample size. It should, however, be noted that self-assessed questionnaires are subject to bias because interpretation of questions may differ from respondent to respondent, even though an effort has been made to explain to participating doctors and clinic assistants on how the questionnaire should be administered.

In summary, this large outpatient-based survey shows that headaches are a major problem presenting to primary care physicians in Singapore. Migraine diagnosis remains difficult and inconsistent. Physicians need to pay special attention to the headache frequency and burden in their patients in order to identify and manage medication-overuse headaches. Prophylactic treatment is likely to be underutilised. Our results highlight the under-recognised economic burden of headaches in Singapore and reflect the continuing need for education of primary care physicians and the public about strategies for effective headache diagnosis and treatment.

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Appendix I

IHS diagnostic criteria for migraine.⁽¹⁰⁾

- 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 (eg, walking or climbing stairs)
- During the headache, at least one of the following is encountered:
 - (1) Nausea and/or vomiting
 - (2) Photophobia and phonophobia
- Not attributed to another disorder.

Appendix 2**Part I: Patient's characteristics questionnaire.**

1. Year of birth _____
2. Gender Male Female
3. Race Chinese Malay Indian Others
4. How long has it been since you started having headaches? < 1 year 1–5 years > 5 years
5. On average, do you have ≥ 4 days headaches a month?
(If a headache lasted for > 1 day, count each day) Yes No
6. When you have a headache, have your activities been limited for 1 day over the past 3 months? Yes No
7. When you have a headache, were you nauseated or sick to your stomach? Yes No
8. When you have a headache, does light bother you? Yes No
9. On how many days in the last 3 months did you miss work/school because of your headaches? _____ days
10. On how many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches?
(Do not include days you counted in Question 9 where you missed work or school) _____ days
11. On how many days in the last 3 months did you not do household work because of your headaches? _____ days
12. How many days in the last 3 months was your productivity in household work reduced by half or more because of your headaches?
(Do not include days you counted in Question 11 where you did not do household work) _____ days
13. On how many days in the last 3 months did you miss family, social or leisure activities? _____ days
14. How many doctors have you seen for your headaches including this doctor? _____
15. Do you take medication for at least 4 days a week? Yes No Not applicable
16. Do you worry about having the next headache attack? Yes No Not applicable
17. Do you feel that your employer/teacher accepts headaches as a valid reason for MC? Yes No Not applicable
18. Are you satisfied with your current headache treatment?
 Very unsatisfied Quite unsatisfied Unsatisfied Quite satisfied Very satisfied
19. If you are not satisfied with your current headache treatment, why?
 Medication does not reduce pain enough
 Medication does not decrease my headache days by $\geq 50\%$
 Medication has side effects
 Cost is high
 Others _____

Part II: Physician's core screening questions.

1. Headache profile (check all that apply)
 Pulsatile Unilateral Photophobia Nausea Vomiting Aura
 Moderate or severe headache Physical activity exacerbation Phonophobia
2. Is your patient diagnosed as having migraine? Yes No
3. Is your patient taking medication for headache? Yes No

| | | |
|--|---------------------------------------|--|
| Mild headaches | Moderate headaches | Severe headaches |
| <input type="checkbox"/> Acetaminophen | <input type="checkbox"/> Ultracet | <input type="checkbox"/> Topamax |
| <input type="checkbox"/> NSAIDs | <input type="checkbox"/> Ergotamines | <input type="checkbox"/> Beta-blockers |
| <input type="checkbox"/> Others _____ | <input type="checkbox"/> Weak Opioids | <input type="checkbox"/> Ca ²⁺ channel blockers |
| | <input type="checkbox"/> Others _____ | <input type="checkbox"/> Triptans |
| | | <input type="checkbox"/> Others _____ |
4. Is your patient overusing acute pain medication?
(≥ 15 days per month for simple analgesics or ≥ 10 days for ergotamines, triptans, opioids or combination medication) Yes No
5. How painful was the most painful headache your patient had in the past year?
On the scale 0 to 10 (with 0 being no pain and 10 being the worst pain imaginable), circle the appropriate number below
1 2 3 4 5 6 7 8 9 10
6. Is your patient taking medication to prevent headaches? Yes No
7. If not, do you think your patient needs prophylaxis for headaches? Yes No