Assessment of Migraine Management in Adolescents

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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

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Assessment of Migraine Management in Adolescents

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Abstract

Objective: The purpose of this study is to assess how providers are managing adolescent patients with migraines in Kentucky.

Methods: A cross-sectional descriptive study via a 28-item survey instrument, which is distributed electronically via member listserv to members of the Kentucky Coalition of Nurse Practitioners and Nurse Midwives (KCNPNM).

Results: Of the 35 survey respondents, there were 29 respondents who met criteria for participation in the survey. Respondents reported the most common presenting symptom for adolescent migraine was headache. Over half of the respondents (58.6%) initiated treatment with over-the-counter medications, with ibuprofen (65.5%) being the most commonly used. 62.1% of respondents felt that non-pharmacologic methods were effective in reducing migraine frequency. Results indicated a statistically significant relationship between age of provider and level of comfort in diagnosing, initiating treatment, and managing migraines in adolescent patients. 31% of providers felt there were significant obstacles in diagnosis, initiating treatment, and management of migraines in this population.

Conclusion: There is further research needed in this area in order to determine the most effective management techniques for migraines in adolescents. Also, further education for providers surrounding diagnosis, management, and treatment of migraines would be beneficial to increase level of comfort. Development of a guideline or algorithm to guide providers regarding migraine care would be beneficial as well.
Assessment of Migraine Management in Adolescents

Migraines are a serious disorder and are the most common cause of acute, recurrent headaches in the pediatric population (Behrman & Kliegman, 2002). Despite the prevalence, the etiology surrounding the disorder is not well studied in pediatrics. It is suspected that migraines originate from a neurovascular etiology and are associated with cranial vasodilation, although other components such as genetics, environmental factors, and stress can contribute to the presence of migraines (Edvinsson, Villalon, & MaassenVanDenBrink, 2012). There is a significant knowledge gap surrounding the presentation of migraines in pediatric patients, which can lead providers to be uncertain in managing this disorder (Harding & Clark, 2014). Due to the limited research surrounding migraines in adolescents, migraines are often difficult to diagnose, making effective management of migraines challenging.

Migraines are a common disorder in the pediatric population affecting up to 28% of adolescents between the ages of 15 and 19 years old, predominately females (Lewis, Yonker, Winner, & Sowell, 2005). The presenting symptoms in adolescents with migraines can vary and may include fatigue, irritability, nausea, vomiting, photophobia, phonophobia, abdominal pain, and sensitivity to smell (Fleener & Holloway, 2004). Like the variation in symptoms, the triggers for migraines can vary significantly and may involve diet, environmental factors, sleep patterns, and participation in certain activities. Due to the variation in presentation, this can contribute to difficulty in identifying migraines and initiating a treatment plan since diagnosis is based largely on history of symptoms and a thorough physical and neurological exam (Fleener & Holloway, 2004).
Migraine headaches in adolescents can have a significant impact on quality of life, school performance, and socialization. It was determined that children who suffer from migraines miss an average of 23.9 days of school, extracurricular activities, and household activities over a 3 month period (Ferracini, Dach, & Speciali, 2014). Adolescents who suffer from migraines were found to have lower grades and were less likely to graduate from high school and attend college when compared with adolescents without migraines (Rees & Sabia, 2011). Migraines not only impact a child in a social and physical way, but can also have significant psychological effects including depression and anxiety (Farmer, Dunn, & Scott, 2010). Due to the severity of this diagnosis, it is crucial that providers are effectively managing migraines through the use of pharmacologic and non-pharmacologic methods.

The methods used to prevent and manage migraines include pharmacologic methods through the use of both prescription and over-the-counter medications, as well as the use of non-pharmacologic methods, such as biofeedback and meditation therapy (Fantasia, 2014). The purpose of this study is to explore how providers are managing migraines in adolescents. It will also aim to identify barriers to diagnosing, treating, and managing migraines in this population.

**Methods**

This study took place in the state of Kentucky. The university’s Institutional Review Board (IRB) approved this study. Study participants were recruited through the listserve of the Kentucky Coalition of Nurse Practitioners & Nurse Midwives. This organization is composed of over 2,000 advanced practice nurses who strive to provide quality, accessible, and compassionate healthcare throughout the state of Kentucky (kcnpm.org).
Each member of the organization who subscribes to the listserve received an email requesting participation in the survey. The survey inclusion criteria included all pediatric nurse practitioners and family nurse practitioners who see pediatric patients and have been in practice for at least 1 year. The survey exclusion criteria includes nurse practitioners who are in administrative or teaching roles and do not actively provide patient care. The survey was created through the use of REDcap, a secure website through the University of Kentucky Office of Research Integrity. REDcap is utilized for electronic research and is a secure application used to capture data. The survey was distributed through the administrator at the Kentucky Coalition of Nurse Practitioners & Nurse Midwives. The survey was available for a total of three weeks. All data collected from the survey was deidentified.

Recruitment

Each member of the Kentucky Coalition of Nurse Practitioners & Nurse Midwives received an email via the listserve with the survey link, requesting participation in the study. A cover letter was also included that discussed the purpose of the survey, inclusion criteria, exclusion criteria, risks, and benefits. Each study participant was able to give informed consent through clicking the survey link and choosing to participate in the study. All participants were able to quit the survey at any time. Study reminders along with the survey link were sent out weekly for 3 weeks. All study participants required internet access and a computer to participate in the study.

Design

This study utilized a descriptive, cross-sectional study design (Appendix A) distributed via listserve to members of the Kentucky Coalition of Nurse Practitioners & Nurse Midwives.
The survey consisted of a 28-item survey focusing on the assessment of pharmacologic and non-pharmacologic treatments that providers are using to manage migraines in adolescents. Each study participant was able to provide consent by clicking the survey link and participating in the survey. Each participant was able to skip questions or stop the survey at any time. The secure website, REDcap, was utilized in designing the survey and capturing data, and Statistical Package for Social Sciences (SPSS) was utilized for data analysis.

Data Analysis

There were a total of 35 (n=35) listserve members who responded to the survey. Of the 35 respondents, 29 (n=29) respondents met criteria for data analysis. These study participants included both pediatric nurse practitioners and family nurse practitioners. Data was analyzed using the SPSS data analysis application. Descriptive statistics including frequency distribution were utilized, as well as nonparametric testing, including chi-square analysis. Chi-square analysis was not able to be performed to evaluate the relationship between years of practice and effectiveness of pharmacologic versus non-pharmacologic management methods due to the small sample size.

Results

Of the 29 respondents who met criteria for the study, the majority were female (89.7%). The age of the study respondents was variable with 1 respondent 25-30 years old (3.4%), 4 respondents between 31-40 years old (13.8%), 10 respondents between 41-50 years old (34.5%), 10 respondents between 51-60 years old (34.5%), and 4 respondents greater than 60 years old (13.8%). The ethnicity of the study respondents was predominately Caucasian (89.7%). Most respondents were family nurse practitioners (86.2%) as opposed to pediatric nurse practitioners.
The years of experience was varied and included 10 respondents with 1-5 years practicing (34.5%), 8 respondents with 6-10 years practicing (27.6%), 7 respondents with 11-20 years practicing (24.1%), 2 respondents with 21-30 years practicing (6.9%), and 2 respondents with greater than 30 years practicing (6.9%). Most of the study respondents stated that they typically seen 5-15% adolescent patients in their practice (46.2%).

The age group that presented most frequently with migraines was between the ages of 17 and 18 (58.6%). The majority of providers (93.1%) reported that a headache was the most common presenting symptom [Table 1]. The most commonly seen triggers for migraines was stress (79.3%), followed by sleep disturbances (41.4%), school/social factors (31.0%), environmental factors (27.6%), senses (13.8%), and food/drink (3.4%). A significant number of respondents (75.9%) reported that migraines have a significant impact on the life of the adolescent, leading to an increased number of school absences.

The majority of providers (93.1%) reported the use of over-the-counter medications, most often in the initiation of migraine management. The most commonly used medication was Ibuprofen (65.5%). When it comes to the use of prescription drug classes utilized for migraine management, the most commonly used class was antidepressants (34.5%) [Figure 1]. Several respondents (13.8%) also reported the use of triptans in migraine management, which was reported under the ‘other’ category. Many different non-pharmacologic measures were also utilized, with the most common being sleep modification (86.2%) [Figure 2]. Although sleep modification was the most commonly initiated non-pharmacologic treatment, most providers (69%) felt that stress management was the most effective. The majority of providers (62.1%) felt that non-pharmacologic treatment methods were effective in reducing migraine frequency.
A significant focus of the study was to determine if providers felt that pharmacologic or non-pharmacologic management methods were more effective in adolescent patients with migraines. The results indicated that the majority of providers (55.2%) felt that pharmacologic measures were more effective than non-pharmacologic measures (31.0%). 13.8% of providers felt that there was no difference in effectiveness between pharmacologic and non-pharmacologic measures [Table 2]. The majority of providers (65.5%) re-evaluate patients monthly after treatment has been initiated. When discussing when to refer patients to a specialist, 62.1% of respondents reported that they refer once their initiated management technique is no longer effective. Other reasons for referral included persistence of symptoms (20.7%), along with uncertainty about the diagnosis of migraines (17.2%).

A chi-square test was performed to determine if there was a significant relationship between age (those 25-40 years old versus those 41 years old and above) and level of comfort in diagnosing, managing, and treating migraines in adolescents. When evaluating age and the level of comfort in diagnosing, the chi-square value was 8.31 with a significance level of $p=0.004$. Evaluating age and the level of comfort in initiating treatment showed similar results with a chi-square value of 8.309 with a significance level of $p=0.004$. Similarly, the evaluation of age and level of comfort with migraine management resulted in a chi-square value of 6.768 with a significance level of $p=0.009$. This result indicates that there is a significant relationship between the age of the provider and their level of comfort in diagnosing, initiating treatment, and managing migraines. Most providers (69%) did not identify any obstacles in diagnosing, initiating treatment, or managing adolescents with migraines, although it is important to address the other 31% to improve patient care and clinical outcomes.
Limitations

There are several limitations that are present in this study. First, the small sample size did not allow for generalizability of study findings. It also limited the amount of analysis that could be performed to evaluate relationships between variables. The small sample size also indicated a small percentage of providers who saw pediatric patients, with only 3.4% of respondents being a pediatric nurse practitioner. This could have impacted results. Since migraines are poorly understood in pediatric patients, providers also may not have felt comfortable with responding to the survey.

Since this study was distributed only to the KCNPNM listserv, this presents another limitation of the study. This listserv requires membership to the organization, which may indicate that the listserv is not representative of all advanced practice nurses. The survey was distributed only to advanced practice nurses in Kentucky, indicating that results may vary if the study was conducted in another state or nationwide. Since the survey was administered only to advanced practice nurses, there is no ability to assess how physicians manage migraines in adolescents.

The timing of the study (October-November) could present another confounding factor. This time of year is particularly busy with flu season and school physicals. Providers may not have had an adequate amount of time to complete the study due to high patient volume. Survey fatigue could also be a factor since other graduate students were also distributing surveys to members of the KCNPNM listserv at this time.
Discussion

Although there were several limitations associated with this study, the findings were helpful and identify areas of focus for further research. Children with migraines reported a similar quality of life and pattern of disability as children who suffer from rheumatoid arthritis or cancer (Ferracini, Dach, & Speciali, 2014). Based on our study findings, we can conclude that study respondents also agreed that migraines play a significant role in adolescent quality of life, affecting school, socialization, and participation in extra-curricular activities. Despite the responses indicating that providers recognize the prevalence and severity of migraines, the level of comfort in diagnosing, initiating management, and treating migraines must be addressed.

The statistically significant findings associated with age of the provider and level of comfort in diagnosing, initiating treatment, and managing adolescents with migraines must be noted. This positive relationship between age and level of comfort indicates that as the provider’s age increases, their level of comfort also increases. This could benefit from further research to identify ways to improve comfort level at younger age, whether this be through initiation of specific migraine guidelines or continuing education related specifically to migraines. It would also be advantageous to compare level of comfort between family nurse practitioners, pediatric nurse practitioners, and physicians in a future research study.

Results of this survey indicated that initiation of migraine intervention is variable between non-pharmacologic measures (24.1%), over-the-counter medications (58.6%), and prescription medications (17.2%). All providers who responded to the survey indicated that they initiated some form of migraine treatment, although only 20.7% of providers reported that they were very comfortable with initiating treatment. This could be related to lack of clear guidelines
surrounding adolescent migraine management. It also could be due to lack of knowledge surrounding prescription medications, since until 2014 there were no prescription medications approved by the U.S. Food and Drug Administration (FDA) for migraines in adolescents (Fantasia, 2014). This is an area that should be addressed in further studies in order to ensure migraine patients are receiving the most effective and safe management possible.

A practice parameter published by the American Academy of Neurology discusses the pharmacologic treatment of migraines in pediatric patients. It was determined that both ibuprofen and acetaminophen were effective in reducing pain associated with migraines (Lewis et al., 2004). This is consistent with the findings of this study, which showed that 93.1% of providers utilized over-the-counter medications frequently in managing migraine patients. Other medications discussed in the practice parameter included cyproheptadine, amitryptyline, divalproex, topiramate, pizotifen, nimodipine, and levetiracetam, and it was determined that the evidence for use in pediatric patients is conflicting (Lewis et al., 2004). Lewis et al. (2004), also discussed the need for standardized criteria for diagnosis and treatment in order to improve outcomes in adolescents with migraines. This identifies a significant area of focus for future research regarding migraines in adolescents.

It is also significant that 31% of respondents reported significant obstacles in diagnosing, initiating treatment, and managing migraines. Respondents reported that insurance, access to care, patient compliance, and length of appointment time were all factors that hindered care for adolescents with migraines. It is important to address these barriers and work towards finding solutions to make improvements in these areas. Addressing these obstacles can potentially lead to significant improvement in care and better outcomes for these patients.
It is evident that there is more research that needs to be conducted in order to further assess migraine management in adolescent patients. Due to lack of comfort in diagnosis, initiation of treatment, and management of migraines in adolescents, the development and initiation of a clinical guideline or algorithm related to adolescent migraines would be beneficial. This guideline could also provide specific timelines and criteria that would warrant a referral to a neurologist. Further education surrounding migraines would also be influential in improving knowledge surrounding the condition and could help improve confidence and understanding when caring for adolescents with migraines. In order to further improve generalizability of results and transitioning study findings into practice, a larger sample size and improved study design with increased reliability would also be beneficial. Due to lack of knowledge surrounding migraines in this population, an increased awareness and more education throughout healthcare systems would help to improve diagnosis, treatment initiation, management, and therefore, overall patient outcomes of adolescents with migraines.
Table 1: Frequencies of the most common presenting symptoms in adolescents with migraines

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>27(93.1%)</td>
</tr>
<tr>
<td>Photophobia</td>
<td>14(48.3%)</td>
</tr>
<tr>
<td>Phonophobia</td>
<td>5(17.2%)</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>17(58.6%)</td>
</tr>
</tbody>
</table>
Figure 1: Pharmacologic methods utilized for migraine management in adolescents
Figure 2: Non-pharmacologic methods utilized to manage migraines in adolescents
Table 2: Comparison of years of experience as an advanced practice provider and views on effectiveness of pharmacologic versus non-pharmacologic management methods

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Pharmacologic</th>
<th>Non-Pharmacologic</th>
<th>No Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10 years</td>
<td>8(44.4%)</td>
<td>8(44.4%)</td>
<td>2(11.1%)</td>
</tr>
<tr>
<td>11-20 years</td>
<td>5(71.4%)</td>
<td>1(14.3%)</td>
<td>1(14.3%)</td>
</tr>
<tr>
<td>21 years and above</td>
<td>3(75%)</td>
<td>0(0%)</td>
<td>1(25.0%)</td>
</tr>
</tbody>
</table>
1. What is your gender?
   a. Male
   b. Female
2. What is your age?
   a. <25 years old
   b. 25-30 years old
   c. 31-40 years old
   d. 41-50 years old
   e. 51-60 years old
   f. Greater than 60 years old
   g. Refuse/Prefer not to answer
3. What is your ethnicity?
   a. American Indian/Alaskan Native
   b. Asian
   c. Black/African American
   d. Hispanic/Latino
   e. Native Hawaiian/Pacific Islander
   f. White/Caucasian
   g. Other
   h. Refuse/Prefer not to answer
4. What is your profession?
   a. Pediatric Nurse Practitioner-Primary Care
   b. Pediatric Nurse Practitioner-Acute Care
   c. Family Nurse Practitioner
   d. Other
5. What is your current role?
   a. Teaching
   b. Administration
   c. Actively practicing
   d. Retired/inactive practice
6. How long have you been practicing as an advanced practice provider?
   a. Less than 1 year
   b. 1-5 years
   c. 6-10 years
   d. 11-20 years
   e. 21-30 years
f. Greater than 30 years

7. In your practice setting, approximately what percentage of patients you see are adolescent patients (ages 13-18)?
   a. 0-5%
   b. 5-15%
   c. 15-50%
   d. Greater than 50%

8. What is the most common age group of patients presenting with migraines in your practice?
   a. 5-10 years old
   b. 11-13 years old
   c. 14-16 years old
   d. 17-18 years old

9. In your practice, what are the most common presenting symptoms you find? (select all that apply)
   a. Headache
   b. Photophobia
   c. Phonophobia
   d. Nausea/Vomiting
   e. Other (Text box)
   f. None of the above

10. In your practice, what triggers are most commonly reported by your patients? (select all that apply)
    a. Environmental
    b. Senses (smells and sounds)
    c. Food/Drink
    d. Sleep disturbances
    e. Stress
    f. School/social factors

11. In your practice, how are their migraines impacting the child’s life? (Select all that apply)
    a. School absences
    b. Decreased socialization
    c. Limited participation in extracurricular activities
    d. Reduced performance in school
    e. Other (text box)
    f. None of the above

12. What is the typical duration of symptoms reported by parents and/or adolescent before seeking treatment?
    a. Less than 1 month
    b. 1 month
    c. 2-6 months
    d. 7-12 months
    e. Greater than 1 year

13. How comfortable do you feel with diagnosing migraine in adolescent patients?
    a. Very comfortable
    b. Somewhat comfortable
c. Not very comfortable
d. Not at all comfortable

14. How comfortable do you feel with initiating treatment for adolescents with migraines?
   a. Very comfortable
   b. Somewhat comfortable
   c. Not very comfortable
   d. Not at all comfortable

15. In your experience, what treatment method(s) is typically initiated first by the parent and/or adolescent?
   a. Non-pharmacologic measures (text box)
   b. Over-the-counter medications (text box)
   c. Prescription medication
   d. None

16. If previous measures were not implemented by the parent and/or adolescent, what treatment method do you start with?
   a. Non-pharmacologic measures (text box)
   b. Over-the-counter medications (text box)
   c. Prescription medication (text box)
   d. Other (text box)

17. In your practice, are over-the-counter medications utilized frequently for migraine patients?
   a. Yes
   b. No

18. If so, what medication is used most often?
   a. Ibuprofen
   b. Tylenol
   c. Other
   d. Not applicable

19. In your practice what prescription drug classes are typically used for migraine treatment? (select all that apply)
   a. Antiepileptics
   b. Antihypertensives
   c. Antidepressants
   d. Antihistamines
   e. Other (text box)

20. What non-pharmacologic treatment methods do you recommend? (Select all that apply)
   a. Biofeedback
   b. Music therapy
   c. Stress management
   d. Diet modification
   e. Sleep modification
   f. Exercise
   g. Other (text box)
   h. None of the above

21. If non-pharmacologic treatments are recommended, who teaches these methods?
   a. Advanced Practice Provider
b. Registered Nurse

c. Patient is referred to another provider
d. None of the above

22. Do you find that non-pharmacologic treatment methods are effective in reducing migraine frequency?
   a. Yes
   b. No

23. In your opinion, which have been the most effective non-pharmacologic management techniques? (select all that apply)
   a. Biofeedback
   b. Music therapy
   c. Stress management
   d. Diet modification
   e. Sleep modification
   f. Exercise
   g. Other (text box)

24. Do you feel that pharmacologic or non-pharmacologic treatment methods are more effective in managing migraines?
   a. Pharmacologic
   b. Non-pharmacologic
   c. No difference

25. How comfortable do you feel with the management of adolescents with migraines?
   a. Very comfortable
   b. Somewhat comfortable
   c. Not very comfortable
   d. Not at all comfortable

26. How often are patients re-evaluated after treatment initiation?
   a. Monthly
   b. Bimonthly
   c. Every 6 months
   d. Yearly
   e. Other (text box)

27. At what point do you refer adolescents with migraines?
   a. When management techniques have not been effective
   b. When symptoms persist after a certain length of time
   c. When diagnosis is uncertain
   d. Other (text box)

28. Do you find any obstacles preventing you from diagnosing, treating, or managing migraines in adolescent patients? If yes, please describe.
   a. Yes (Text box)
   b. No
References


