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THE ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF  
PEDIATRIC RESIDENT ON THE PRIMARY HEADACHE PRE AND POST  
EDUCATIONAL INTERVENTION, 2021

BY  
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RESEARCH THESIS:

THE ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE OF PEDIATRIC RESIDENT ON THE  
PRIMARY HEADACHE PRE AND POST EDUCATIONAL INTERVENTION, 2021

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## ABSTRACT

### BACKGROUND

Headache is a common complaint among children and adolescents and is the most common referral to neurology practices, with migraine being one of the top five neurological diseases of childhood. However, it is frequently ignored by parents, teachers, and primary care providers as a significant problem, resulting in suffering in children, lost school days and impaired social interactions. It is essential for clinicians to have a thorough and systematic approach to the evaluation and management of headaches in this population as the proper diagnosis and management can lead to improved outcomes and quality of life.

### OBJECTIVE

To assess pediatric residents' knowledge, attitude, and practice on the evaluation and management of pediatric patients with primary headache and assess changes acquired from educational intervention on the prevalence, evaluation, and management of primary headache..

### METHOD

We conducted a cross-sectional analysis of data collected from October 1, 2021, to November 31, 2021, from 122 residents working in the pediatrics residency program from Tikur Anbesa Specialized Hospital (TASH), St Paul Millineum Medical College (SPMMC), Arsi University College of Health Science(AUCHS), Yekatit 12 Hospital Medical College(Y12HMC). They were required to fill out a self-administered questionnaire in English via Google Form (an online survey administration software) designed to assess sociodemographic characteristics, attitude, knowledge and practice on diagnosis and management of primary headache. After completion of the questionnaire, they were shown a video of 1 hour and 10 minutes that was prepared by the investigator on primary headache prevalence, pathophysiology, clinical evaluation, and management. There were discussion, question and answer, vignettes in between the video presentation among the participants and the primary investigator (pediatrics neurology fellow) in person and via Google Meet (online video interactive platform). A summary of the presentation is shared via PDF document and allows the participant to go through the document for about 15 min. The overall duration was 2 hours. Then after participants were asked to do the same questioner again immediately after the session. Data were entered into the Statistical Package for social sciences version 26 for analysis. Categorical variables were summarized by frequency

and percentages. Continuous variables were summarized by mean  $\pm$  SD. Associations were done by one-way analysis of variance, paired-t-test and ANOVA.

#### RESULT

An assessment of the short-term impact of the educational intervention among attendees indicates that the percentage of correct answers increased from the pretest to the post-test on 9 questions; has decreased in one question. The mean pre-test score(SD) was  $5\pm 1.6$ ; The post educational intervention mean score was  $6.9 (\pm 1.7)$  with a p-value of 0.00 with paired t-test. Pre-educational intervention total result was statistically significant( $P<0.05$ ) lower in year 1 residents than year 3 residents using Post hoc test after ANOVA T-test; but has no statistically significant difference after taking the educational intervention. Those residents who had case discussions one to three hours prior to participating in the study had statistically significant ( $P<0.05$ ) superiority over those who had no case discussion in the post-EI result.

#### CONCLUSION

Primary headache is a common pediatrics neurological disorder in our country. The primary physician treating pediatrics patient in our country primarily includes pediatricians. This study has shown the poor knowledge on prevalence, pathophysiology, clinical evaluation and management of migraine patients which has improved after the educational intervention.

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## Abbreviation and Acronyms

Addis Ababa University	AAU
Cluster Headache	CH
Continuing Medical Education	CME
Educational Intervention	EI
Electroencephalography	EEG
Food and Drug Administration	FDA
General practitioners	GPs
International Headache Society	IHD-3b
Magnetic Resonance Imaging	MRI
Medication Overuse Headache	MOH
Non-Steroidal anti-inflammatory Drugs	NSAIDs
Pediatric Migraine Disability Assessment	PedMIDAS
Pediatrics Residents	PR
Primary Investigator	PI
Primary Care Providers	PCP
Tension-Type Headaches	TTH
Tikur Anbesa Specialized Hospital	TASH
Tricyclic Antidepressants	TCAs
Saint Paul Millennium Medical College	SPMMC

## INTRODUCTION

### BACKGROUND

Headache is defined as pain located above the orbitomeatal line. It is classified into primary headache disorders, secondary headache disorders and painful cranial neuropathies, and other facial pains. Various forms of headache, properly called headache disorders, are among the most common disorders of the nervous system. [2]

In 2021 school-based nationwide study done in Ethiopia showed, Gender- and age-adjusted 1-year prevalence of headache was 72.8% (migraine: 38.6%; tension-type headache: 19.9%; UdH: 12.3%; headache on  $\geq 15$  days/month: 1.2%; probable medication-overuse headache: 0.2%). Which is comparable with other developing country studies.[5]

When a child presents with a complaint of headache, the evaluation requires a complete general health and neurological assessment, in addition to a comprehensive headache history. A thorough evaluation is necessary to make the correct headache diagnosis based on criteria established by the International Classification of Headache Disorders, 3rd edition beta (ICHD-3b), which can help determine the appropriate treatment [6]

Treatment strategies for primary headaches vary according to the patient's age, family structure, culture and beliefs, headache diagnosis, and the disability, the headache imposes on the patient's daily life. A multidisciplinary treatment approach was found to be an effective strategy for children and adolescents, improving multiple outcome variants, including frequency and severity of headache, and school days missed because of headache [6]

Despite the evident burden of disease and increasing availability of effective treatment, the management of migraine remains less than satisfactory. Of all migraine sufferers who consult a doctor, about two-thirds consult their primary care providers (PCPs), i.e., general practitioners, pediatricians. [7]

### STATEMENT OF PROBLEM

Recurrent headache disorders impose a substantial burden on headache sufferers, families, and society. Resulting in lost school days and impaired social interactions. Despite the disease burden pediatric residents training in the referral centers do have lower exposure to children with primary headache. While these physicians are motivated to provide optimal headache management, they are limited by the short time available for consultation and the multiple other

medical conditions that compete for physician attention. In addition, they may not be fully current on research-based diagnostic criteria or recently developed guidelines and treatment.[7] Identifying knowledge gaps and deficiencies in the current practice is a critical step in improving the care of our patients.

Such studies are generally scarce globally, especially in developing countries. There has not been a proper, systematic assessment of the knowledge, attitude, and practice in Ethiopia, and this study will be an important first step in identifying deficiencies and assessing current processes, to develop constructive solutions and improve the health care service to our patients.

#### SIGNIFICANCE OF STUDY

Studying knowledge, attitude, and practice around evaluation, diagnosis, and management among residents working in TASH, SPMMC, Y12HMC, and AUCHS will identify knowledge gaps and deficiencies in our current practices, to treat and prevent the suffering and disability associated with recurrent headaches. We plan to disseminate the result to different stakeholders, including different university hospitals, the scientific community, and policymakers in Ethiopia. This study could serve as a model in other developing countries.

Based on our results, we plan to develop a teaching module to provide pediatrics residents with better knowledge, attitude on the evaluation and management of primary headache sufferers. Additionally, this will provide valuable input for the scientific community and highlight the need for further research based on the gaps that will be identified. Furthermore, this will be important for pediatrics residency programs across the country for planning training programs and guideline preparation to improve the quality of care addressing primary headaches.

## LITERATURE REVIEW

Headache is one among the most common medical complaints. Various forms of headache, properly called headache disorders, are among the most common disorders of the nervous system. They are pandemic and, in many cases, life-long conditions [9]. As many as 90% of all primary headaches including: migraine, tension type and cluster headache, fall under few categories. Recurrent headache disorders impose a substantial burden on headache sufferers, family and society. Headache disorders are in the top ten-and possibly the top five causes of disability worldwide.[2]

Population-based studies in the world have mostly focused on migraine which, although the most frequently studied, is not the most common headache disorder. Other types of headache, such as the more prevalent tension type headache and sub-types of the more disabling chronic daily headache, have received less attention [9, 10]. Globally, the prevalence of the adult population with active headache disorders are 46% for headache in general, 11% for migraine, 42% for tension-type headache and 3% for chronic daily headache. [11]

Few population-based studies exist for developing countries where limited funding and large and often rural populations, coupled with the low profile of headache disorders compared with other diseases, prevent the systematic collection of information There is a scanty data on the prevalence of primary headaches in sub-Saharan Africa in general and Ethiopia in particular.[2]

A study done by Mihila et.al on the prevalence of primary headache disorders in Ethiopia. It found that headache disorders were highly prevalent in this country,,: A 1-year prevalence of any headache was 44.9%; the 1-year prevalence of migraine was 17.7%, of TTH 20.6%, of all causes of headache on  $\geq 15$  days/month 3.2%, and of pMOH 0.7%. There was a very small proportion (1.6%) of unclassified headache[12]

When we come to pediatrics headache is a common complaint in children and adolescents. The most frequent type of recurrent headache in young children is migraine. While the frequency of tension type headache increases in the later years of childhood there has been limited population-based research on headache and migraine in children. Prevalence estimates for headache in pre pubertal children range from 2.4% to 17% for migraine and 4% to 5% for frequent or severe headache. For the post pubertal ages estimates are considerably higher, ranging from 5% to 18% for migraine and 9% to 29% for other frequent or severe headaches before puberty, rates of headache were comparable in boys and girls, but after the age of 12,

girls with headache outnumbered boys. The highest headache prevalence—27.4%—was observed in girls aged 16 to 18 years.[10, 13, 14]

Migraine in Nigerian Children - a Study of 51 Patients Eight hundred and ninety-seven new referrals were seen at the Child Neurology Clinic during the study period, of which only 51 (5.7%) were diagnosed as suffering from migraine. The age range of the patients was 5 to 19 years. There were 23 males and 28 females with a male to female ratio of 1:1.2.[15]

A recent study done by Zewde et al. on The prevalence of headache disorders in children and adolescents in Ethiopia: a schools-based study 2344 completed the questionnaire (1011 children (43.1%) 1333 adolescents (56.9%); 1157 males (49.4%), 1187 females (50.6%)), a participation proportion of 99.8%. Gender- and age-adjusted 1-year prevalence of headache was 72.8% (migraine: 38.6%; tension-type headache: 19.9%; UdH: 12.3%; all headache on  $\geq 15$  days/month: 1.2%; probable medication-overuse headache: 0.2%). Headache was more prevalent in females (76.2%) than males (71.0%), a finding reflected only in migraine among the headache types. Headache was more prevalent among adolescents (77.6%) than children (68.4%), reflected in all types except migraine, although prevalence of UdH fell sharply after age 14 years to 3.9%.[5]

When a child presents with a complaint of headache, the evaluation requires a complete general health and neurological assessment, in addition to a comprehensive headache history. A thorough evaluation is necessary to make the correct headache diagnosis based on criteria established by the International Classification of Headache Disorders, 3rd edition beta (ICHD-3b), which can help determine the appropriate treatment.[16] The diagnosis of migraine in children and adolescents can be established through a headache history in the vast majority of patients.[17] This history needs to be directed not only to the parent, but also towards the child, as the parent often bases their answers on their own observations and experiences. Younger patients may need to have questions phrased at a more developmentally appropriate level.[4, 17] The initial approach to the patient with headache begins with a focused set of headache-based questions (Table 1). (2) The answers to these questions allow the provider to begin to distinguish between features characteristic of a primary headache disorder and those suggestive of a secondary headache disorder and to determine whether neurodiagnostic testing is indicated.[18]

The clinician should obtain a detailed description of the headache, including location of the pain, quality of the pain, severity, and any associated symptoms. Focal pain may be consistent with migraine, whereas a more diffuse description of pain may be consistent with tension-type headaches (TTHs). Quality of pain may be difficult to describe, especially for the younger patient.

This may also be true when describing the severity of the pain. A variety of tools are available to assess severity and the most appropriate scale should be used based on the patient's developmental stage. Some may be able to describe the pain as mild, moderate, or severe, or use a numerical scale of 0 to 10.[4]

Younger patients may find using the faces scale more effective when describing their pain. When asking about associated symptoms, the clinician should not just focus upon the classic symptoms of migraine including nausea, vomiting, and light and sound sensitivities, as symptoms of other headache disorders or secondary headaches may be missed.[4, 17]

Autonomic symptoms may indicate the presence of a trigeminal autonomic cephalalgia Focal neurological symptoms such as focal weakness or sensory or visual disturbance may indicate a mass lesion.[4, 17]

Frequency and duration of the headaches are important as these responses may alter treatment choices. For example, a child may describe few headaches, but these headaches may last several days at a time, which would prompt the clinician to focus on the appropriate use of abortive therapies.[4, 17, 19]

The evaluation of a child with headaches should incorporate headache disability and quality-of-life assessments. The Pediatric Migraine Disability Assessment (PedMIDAS) Table 2 table 3 has been tested and validated for ages 4–18 years, and it parallels the use of the adult MIDAS that developed for adults aged 20–50.[20] These questions aim to determine how the headaches have impacted the child's performance in both the school and home settings and during social functions. It provides a developmentally sensitive, reliable, and valid assessment of disability related to childhood headaches. It may also act as a tool to monitor response to treatment [20, 21]

#### Acute management in the outpatient setting

The goal of acute treatment of headache should be a consistent response with minimum side effects and a rapid return to normal function. They should be properly dosed, used as quickly as possible, while minimizing the potential for medication overuse. Acute treatment should be incorporated into the child's life with the ability to receive these treatments at school or in the home, without missing school or social activities.[7]

To avoid the development of medication overuse headache (MOH), abortive medications should be used no more than 3 days/ week. Migraine-specific drugs, particularly the triptans, should be

used fewer than nine times per month. The most rigorously studied agents include ibuprofen, acetaminophen, the nasal spray forms of sumatriptan and zolmitriptan, and almotriptan and rizatriptan (both approved for use in the pediatric population), all of which have shown both safety and efficacy in controlled trials. The patient should be instructed to treat the headache as quickly as possible, or at the onset of the aura, if present. Children should be educated on the importance of treating early, even while in school, and ways to avoid the potential for medication overuse.[7]

Acute management in the emergency department

Primary headaches presenting to the emergency department include: migraine with or without aura 15.6–58.0%; TTH 4.5–29.0%, and nonspecific headache 14–41%.[22] Children presenting with an acute intractable headache should receive intravenous hydration in addition to migraine-specific therapy to abort the headache

Inpatient management of status migrainosus

A child should be admitted to the hospital for a primary headache when he/she is in status migrainous ( is an attack of severe migraine lasting more than 72 hours

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Inpatient management of status migrainosus

A child should be admitted to the hospital for a primary headache when he/she is in status migrainous ( is an attack of severe migraine lasting more than 72 hours accompanied by debilitating symptoms and is not attributable to another disorder)or has a severe exacerbation of a chronic headache. Approximately 6–7% of patients fail acute treatment in the emergency department.[23] The goal of inpatient treatment is to control a headache that is disabling to the child and has been unresponsive to outpatient abortive therapy. It is important to note that treatments available for use for acute migraine headache in children are off label.[4] Their use is widespread, but double-blind placebo-controlled studies continue to be unavailable in this age group.[4]

## Preventive therapies

Management of pediatric migraine requires a tailored regimen of pharmacological and behavioral measures that consider the child's headache burden and their level of disability. Prevention should be limited to those patients whose headaches occur with sufficient frequency or severity to warrant daily medication. The goal of therapy should include reducing the frequency of headaches, reducing the progression to chronic daily headache, and decreasing associated pain and disability. [24] Daily medication may be warranted if a child experiences 1 headache/week or 3–4 headaches/month. It should also be considered if acute treatments are deemed ineffective, poorly tolerated, contraindicated, or overused. Children who report intensive and prolonged headaches should also be considered candidates for prevention.[25] Currently, no standardized guidelines for choosing a preventive for pediatric patients exist. Only one, topiramate, has gained recent approval from the FDA for use in childhood migraine. It is essential to discuss the long-term treatment plan at the initial visit so that families understand that the effort is often a long-term one and response is not rapid.[26] Goal of three or fewer headaches is often recommended for a sustained period of 4–6 months. Regardless of preventive choice, doses should be titrated slowly to minimize adverse effects. When an effective dose is reached, relief must be sustained for 2–3 months before considering alternative medication. It is essential to discuss the time it will take, often several weeks, for the preventive to become effective.[27]. Treatment should not be abandoned until it has been given an adequate trial of at least 6–8 weeks unless the child experiences intolerable side effects.[4]

## Behavioral measures

Lifestyle modifications are often discussed with patients, including maintenance of good sleep hygiene, a well-balanced diet, sufficient hydration, and regular exercise. The American Headache Society only recommends limiting caffeine intake and does not restrict any type of food unless a very specific food trigger is identified. Balanced diet, nonetheless, appears to be important and skipping meals is often identified as a trigger. Dehydration is also commonly identified as a headache trigger. In addition to 1–2 L fluid intake, a slight increase in dietary sodium, are often recommended [28]

## The role of physician in primary headache management

There are few researches looking at the interaction of primary care physicians with national and international guidelines. A study done in Switzerland in 2001 on physicians' caseload of

headache patients; their behavior in dealing with such patients with respect to treatment, referrals to specialists, and direct ordering of magnetic resonance imaging (MRI); and furthermore their interest in pursuing continuing medical education about headache, both in general and, specifically, from the Swiss Headache Society (SHS).[29] A qualitative study and the questionnaire were designed by a group of SHS members (the SHS Study Group). Structured telephone interviews involving a computer-assisted interview program and a standardized script were conducted. Each interview took approximately 5 minutes. A total of 1000 interviews with PCP have been conducted, in 350 cases directly with the physician. The rest with the physician assistant. Out of the one thousand interviewed clinics 357 were run by internists and 643 by general practitioners (GPs).[29] Among the 350 physicians, 92% reported that they saw at least one headache patient (i.e., a patient whose main symptom is headache) at least once per week. 23% (25% of GPs and 10% of internists) reported seeing such patients every day, 45% (47% and 40%) at least twice a week, and 24% once a week. Two-thirds of the physicians reported asking their patients actively about headache. Of all the 1000 PCP surveyed, 86% reported treating patients with primary headaches (no reply to this question, 4%); the corresponding figure among the 350 physicians was 91% (no reply, 1%). Only a very small percentage of the directly interviewed physicians (3%) said that they would refer any patient presenting to them with headache to a specialist. On the other hand, 31% of them said they would rarely or never refer a headache patient to a specialist, even in case of treatment failure (the corresponding figure for all practices surveyed was 26%). Many physicians said they ordered MRI scans for their headache patients themselves (84% of both internists and GPs; percentage of all 1000 practices, 80%). A total of 255 physicians (73%) expressed an interest in further education about headache, preferring the following topics: "headache refresher" (88%), "practice-oriented workshops and case reports" (85%), "treatment of rare headaches" (76%), and "discussion of own cases with experts" (48%).[29] The authors concluded that the survey yielded information on primary care physicians' awareness of headache. They were surprised by the high percentages of PCPs who ordered MRIs directly and who did not refer their headache patients to specialists.[29]

Another study done on Primary headache care delivery by nonspecialists in Brazil by Twenty-one members of the Brazilian Headache Society from 16 cities in different regions of the country, all fully qualified doctors with special interests and skills in headache, interviewed 414 patients. Only patients examined by the participating researcher for the first time were included.[30] The main diagnosis had to be a primary headache classified in groups 1,2, or 3 according to the

international headache society (HIS) .The presence of more than one headache was accepted[30].The accuracy of the previous diagnoses, treatments, and supplementary examinations was checked. The majority of the subjects (316, 76.7%) had seen on average 2.9 health providers each before coming to a headache specialist (range 0 to 32). The headache started 10.8 +/-10.4 between the headache onset and the first examination was 4.6 to 7.7 years. The correct diagnosis was only made by the nonheadache specialists in 44.9%, 6.7%, and 26.7% of the migraine, TTH, and cluster headache (CH) patients, respectively. A substantial number of patients received "headache" as a diagnosis, were informed that no disease was present, or had the diagnosis of various emotional disorders. Concerning the 136 migraine patients who had had a correct diagnosis, 50.7% visited a GP, 49.3% visited a neurologist, 30.9% an ophthalmologist, 11% a neurosurgeon, and 11% an otorhinolaryngologist. Migraineurs visited 3.3 +/- 3.6 health providers before the diagnosis was made. Out of the 7 TTH patients with a previous correct diagnosis, 6 had visited a GP, 4 had seen a neurologist and 1 had been examined by a neurosurgeon. These TTH patients had seen 1.5 + 0.5 health providers before. Four out of 15 CH patients had had a correct diagnosis before visiting the headache specialist. This group had consulted 5.7 + 1.5 health providers previously; all had seen a neurologist, 3 visited a GP, and 2 an otorhinolaryngologist.[30]Patients underwent 501 investigative procedures motivated by the headache, averaging 1.21 examinations per patient. EEG, the most frequent supplementary investigation, was performed by half of the migraine and TTH patients, and by almost all CH patients.[30]As far as treatment is concerned, patients were recommended 0.6 +/- 1.2 types of prophylactic treatment each (range 0 - 11). Each individual had 1.6 +/- 1.6 different acute treatments before coming to the specialized headache service. The researchers concluded that curricular amendments and continuing medical education activities are needed to further emphasize that the headache diagnosis is based on adequate history and examination, except in relatively rare occasions when a secondary headache must be ruled out.[30]

A study done Headache in Medical Education, Medical Schools, Neurology and Family Practice Residencies. 51 out of the 141 medical schools (36%), 80 out of the 200 family medicine residency programs (40%), and 44 of the 126 neurology programs (35%) responded. Medical school lecture hours in headaches varied from 0 hours (4%) to >5 hours (24%).Forty-five schools (88%) indicated that undergraduate curricular headache exposure was adequate, and 92% had no plans to increase headache hours. In comparison, 43% of the medical schools offered 5 to 8 hours of diabetes undergraduate exposure and 47% offered greater than 9 hours. Neurology

residency program lecture hours varied from 1 to 3 hours (11%) to >5 hours (64%). The number of case presentations ranged from 1–5 (23%) to >10 (57%), Forty-two (95%) of program directors believed that their headache education was adequate. Interestingly, 20% of neurology programs indicated plans to increase training in headache management. Although headache is a major pain complaint seen by generalist physicians and neurologists, formal headache education during medical school and residency varies greatly. It is generally accepted that physicians who are knowledgeable in the diagnosis and treatment of headache are more likely to recognize and help headache sufferers.[31]

Another similar study on Migraine Management Training Program for Primary Care Providers done in New York University Langone Medical Center. patients frequently first present with migraine symptoms to a primary care physician (PCP) and most remain in primary care – only a minority of migraine sufferers are treated at headache centers.[32] However, the care the patients receive in the primary care setting is often suboptimal, with studies showing inaccurate diagnoses, inadequate acute treatment, for example, NSAIDs for severe attacks, and an average of four years between migraine diagnosis and initiation of preventive medications. The American Migraine Prevalence and Prevention (AMPP) study showed that 38% of migraine sufferers meet criteria for preventive treatment but only 11% get it. PCPs hesitate to prescribe migraine preventive medications because of a lack of understanding about efficacy and side effects. [27] Though headache accounts for 10% of PCP visits, and migraine accounts for at least 75% of the headache diagnoses at these visits, few studies have endeavored to improve migraine treatment in the primary care setting.

The continuing medical education (CME) literature shows that: (1) Multiple teaching strategies are effective; (2) Live media is more effective than print; (3) Multimedia is more effective than single media interventions; (4) Multiple exposures are more effective than single exposure; (5) Interactive techniques are more effective than didactic ones. Participants were informed about the study through an online departmental newsletter. All PCPs at Bellevue Hospital Center were invited to attend the migraine educational series and they received CME credit for participation. The survey asked PCPs about their knowledge, comfort, and practice patterns regarding migraine management, including questions about abortive and preventive treatments for migraine, including pharmacologic and behavioral treatment, indications for imaging, and concern for medication overuse headache (MOH). The educational intervention offered a combination of live media, multimedia, multiple exposures, and interactive techniques. The live sessions had a

combination of PowerPoint slides with traditional lecture, case based learning, and opportunities for questions. The initial study design included a pre-test and a post-test to assess the efficacy of the migraine education program. Out of 39 attending physicians, 22 attended the first session (56%). Of these, 21 eligible attending physicians completed the survey for a response rate of 95%.[33] Several themes emerged from this study: (1) PCPs have difficulty translating knowledge about treatment into clinical practice. (2) About one fifth made minimal or no use of migraine preventive medications. (3) PCP attendance at a multi-day live program was poor.[33]

Traditionally, the vehicle for improving physician knowledge and skills has been Continuing Medical Education (CME). “Optimal CME is highly self-directed, with content, learning methods, and learning resources selected specifically for the purpose of improving the knowledge, skills, and attitudes that physicians require in their daily professional lives and that lead to improved patient outcomes.”[34]

The CME may also provide the best route through which to reach the physician. Whether or not CMEs are effective, physicians continue to attend them for a variety of reasons. A recent survey showed that 81% of responding physicians claimed they participated in a CME to meet state-based licensure requirements. Forty-two percent believed that the most important reason they participated was to learn and keep up-to date with medical developments.[35] In addition, CMEs provide “verification” value—physicians want to ascertain that nothing has changed so significantly that they need to change their practice. The American Headache Society (AHS) developed a CME program called BRAINSTORM. The developers of the program recognized the limitations of the predominantly lecture presentation (“didactic CME”) and designed BRAINSTORM to be in part “interactive,” i.e., to include techniques such as discussions and role-play that encourage attendee participation. Some studies and systematic reviews have concluded that use of interactive techniques and addition of enabling material (e.g., patient education material) have generally made CME programs more successful.[36] These features are considered to have a greater impact on physician knowledge, skills, and, more importantly, on physician performance. [36]The BRAINSTORM program was systematically developed in 5 steps: First, a series of surveys were conducted to assess ongoing PCP attitudes and beliefs about headache. Second, key messages were extracted from the guidelines. Third, a committee of experts worked with an editorial consultant to develop strategies and core materials for an interactive educational program. Fourth, PCPs were interviewed in order to obtain feedback on messages, strategies employed, and overall educational communication. Finally, the program was revised, produced,

and distributed. Four distinct modules, each 20 minutes in length, convey specific educational messages on (1) understanding the prevalence and impact of migraine, (2) understanding migraine mechanisms, (3) history taking/ physical examination and diagnosis of migraine, and (4) migraine management.[35]Physician experts act as facilitators for the program. To ensure that a consistent message is conveyed in every presentation, facilitators are trained by AHS and provided with a guidebook and a CD-ROM. They guide participant discussion of the materials presented and ensure time for questions and answers. All participants are provided with a workbook, a program material, and directions to other educational resources for physicians and patient.[35]Of 20 questions: 5 questions testing knowledge, 5 questions testing beliefs, and 10 questions based on a vignette describing the history and laboratory results of a typical migraine patient. Intervention Group. The questionnaire was administered before and after the BRAINSTORM presentation to 254 consenting primary care clinicians attending a medical meeting at 1 of the 6 sites: The same questionnaire was sent by e-mail, mail, or fax to 643 clinicians who did not attend a BRAINSTORM presentation.[35]Of the 254 primary care clinicians who attended the BRAINSTORM CME, 237 returned completed surveys (93% response rate).We discarded all incomplete surveys. An assessment of the short-term impact of the CME among attendees indicates that the percentage of correct answers increased from the pretest to the posttest for all 20 questions.[35]

In another study done on primary care physician about 70 physicians chose spontaneously our course, 52 PCPs returned completed questionnaires (74% response rate). All incomplete tests were discarded. The four lectures took 3.5 hours followed by group discussions and finally by supervised clinical practice in three other dates. All physicians were provided with a guidebook. The lectures were given by neurologists with expertise in headache from the Universidade Federal do Paraná, Brazil. The questionnaire consisted of 20 questions, with three initial questions on the prevalence of headache, a fourth question on migraine impact, and the remaining 16 questions were based on clinical vignettes and surveyed diagnosis, history taking, physical examination and management. The time needed for completion was 10 to 15 minutes for each clinical vignette. Scores lower than 60% on seven key questions, were arbitrarily defined as indicative of poor baseline knowledge. Three questions that were less than 60% on the pre-CME scores improved to higher than 60% in the post-CME scores. Scores on some questions showed little or no impact of the CME, and 4 questions showed worse scores in post-CME tests, but those were not statistically significant. In this study we compared pre-CME and post-CME results of a

group of 52 physicians who attended the headache training program. The pretest scores gave us a clear sign about the participant baseline knowledge of headache, indicating a poor awareness about the epidemiology and pathophysiology of the commonest headaches. Improvement in post-CME scores confirms that the program has a significant immediate impact on the PCPs knowledge, what probably affected positively the quality of patient care .[37]

Though headache accounts for 10% of PCP visits, and migraine accounts for at least 75% of the headache diagnoses at these visits, few studies have endeavored to improve migraine treatment in the primary care setting. Formal headache education during medical school and residency varies greatly. It is generally accepted that physicians who are knowledgeable in the diagnosis and treatment of headache are more likely to recognize and help headache sufferers. Curricular amendments and continuing medical education activities are needed to further emphasize that the headache diagnosis is based on adequate history and examination, except in relatively rare occasions when a secondary headache must be ruled out. An assessment of the short-term impact of the CME among attendees indicates that the percentage of correct answers increased from the pretest to the posttest. Improvement in post-CME scores confirms that the program has a significant immediate impact on the PCPs knowledge, what probably affected positively the quality of patient care

## OBJECTIVES

### GENERAL OBJECTIVES

To assess knowledge, attitude and the clinical practice of pediatrics residents on the evaluation and management of primary headache in children and adolescents and to evaluate knowledge change acquired from the educational intervention

### SPECIFIC OBJECTIVES

To evaluate the knowledge of the pediatric residents on the epidemiology of primary headache in children and adolescents.

To evaluate the practice of pediatric resident in clinical evaluation and management of children and adolescents presented with primary headache.

To evaluate short term changes acquired from educational intervention and there attitude on their previous educational exposure.

## METHODS AND MATERIALS

### STUDY AREA

The study will be conducted in Addis Ababa, Ethiopia at TASH and SPMMC, Yekatit 12 Hospital, Arsi Universtiy Hosital. This are four universtiy hospital in the country among twelve universty hospitals. Currently there are 209 pediatrics residents in the department of pediatrics and child health of TASH, SPMMC, AUH, Y12H. The The pediatrics residency lasts for three years classified as year one, year two, and year three residency each lasts for one year. In respective years they have a month or two months of attachment at neurology clinic.

There are different ways of teaching methodologies including lecture, teaching and business round, morning case discussion, demonstration, grand round, seminar on selected topics, and journal club

### STUDY PERIOD

The study was conducted from September 1, 2021, to October 31, 2021

### STUDY DESIGN

It is a cross-sectional pre and post interventional study;

About the Questioner Development; The Initially, the primary investigator prepare a 24-questions test based on instruments used by meenal et.al. [35] Resident's background question developed by principal investigator and approved by pediatrics and adult neurologist in TASH neurology department and pilot test implemented on pediatrics residents outside the study group i.e. pediatric residents from other universities whom do have attachment at pediatrics neurology clinic of TASH. The final version of the questioner administered to the study grou.

The questioner consist of 5 questions assess the back ground 4 questions on attitude , 5 questions assess practice, and 10 questions assess knowledge on clinical evaluation and management.

Structurally, the test consist of 24 multiple-choice questions in which the participant will be given 2 to 5 possible answers and asked to choose the right answer.

## Description of Educational Intervention Program,

After completion of the questionnaire, they were shown a video of 1 hour and 10 minute that was prepared by the primary investigator and educationalist from department of pediatrics; on primary headache prevalence, pathophysiology, clinical evaluation and management. There were discussion, question and answer, vignettes in between the video presentation among the participants and the primary investigator (pediatrics neurology fellow) in person and via Google Meet (online video interactive platform). A summary of the presentation shared via PDF document and allows to go through the document for about 15 min. The overall duration was 2 hours. A training physician act as facilitators for the program to ensure that a consistent message is conveyed in every presentation.

## Measuring Outcomes

We will maintain the anonymity of the respondents, pre- and posttest results will not be paired for individual physicians. Instead, we will analyze the data by comparing the pre-educational intervention scores for attendees with post-educational intervention scores for attendees Scores of <60% on 10 key questions defined as indicative of poor baseline knowledge and above this will be consider as good knowledge ( taken from previous study).

## SOURCE POPULATION

All residents training in the department of pediatrics and child health at TASH, SPMMC, Y12HMC, AUCHS during the study period.

## STUDY POPULATION

Sampled residents training in the department of pediatrics and child health at TASH, SPMMC, Y12HMC, AUCHS during the study period.

## INCLUSION CRITERIA

Consented pediatric residents training in the department of pediatrics and child health at TASH, SPMMC, Y12HMC, AUCHS during the study period from october 10, 2021, to November 15,2021.

## EXCLUSION CRITERIA

All pediatric residents training in the department of pediatrics and child health at TASH, SPMMC, Y12HMC, AUCHS in the study periods who are month off, on their detachment, not willing to participate.

### SAMPLE SIZE AND SAMPLE TECHNIQUES

The assumptions used to calculate the actual sample size are 95% level of confidence with 0.05  $\alpha$  value (which yields  $Z_{\alpha/2} = 1.96$  on the standard normal distribution curve), 5% margin of error.

With these assumptions using a single population proportion formula:

$$n = \frac{\left( Z \frac{\alpha}{2} \right)^2 p(1-p)}{d^2}$$

Where, n = is sample size

z = the value of the standard normal curve score corresponding to the given

Confidence interval = 1.96

p = estimated prevalence when prevalence of knowledge and practice of management of increased ICP among residents and nurses is unknown = 0.5

d = the permissible margin of error (the required precision) = 5%

$$n = \frac{(1.96^2)(0.50(1-0.50))}{0.05^2} = 384$$

Since the population is less than 10,000 a correction formula will be used. Therefore, using the correction formula:

$n = \frac{n_0}{1 + \frac{n_0}{N}}$  Where  $n_0$  is the initial sample size and N is the total population

$$n = \frac{384}{1 + \frac{384}{\text{residents in TASH, SPMMC, Y12HMC, AUCHS}(209)}}$$

N= 384

n = 135

The sample size will be 135 pediatric residents from TASH, SPMMC, Y12HMC, AUCHS

Stratified sampling formula =

Size of the entire sample x layer size (number of people in the strata)

Population size

*Table 1- sample size stratification based on year of residency*

Number	Group	Total number of pediatrics resident from TASH, SPMMC, Y12HMC, AUCHS	Sample size
1	R1	99	63
2	R2	71	45
3	R3	49	31

## STUDY VARIABLES

### INDEPENDENT VARIABLES

Year of residency, attachment at neurology clinic, exposure to patient with acute and chronic migraine headache, previous exposure to headache training.

### DEPENDENT VARIABLES

The knowledge, attitude and practice of the Residents on clinical evaluation and management of patient with acute and chronic primary headache.

## OPERATIONAL DEFINITION

**Educational intervention:** The process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. Educational methods is through web based teaching platform power point presentation, video animation, clinical vignette and question and answer method.[35]

**Primary headache:** A primary headache is caused by over activity of or problems with pain-sensitive structures in your head. A primary headache isn't a symptom of an underlying disease

**Grade assessment:** Scores of <60% on 10 key questions will be arbitrarily defined as indicative of poor baseline knowledge and above this will be consider as good knowledge. The pre and post educational intervention score will be compared for a given question as overall group result than individual participant

## DATA COLLECTION

Pediatrics residents were randomly selected with a lottery method from each year of residency according to the stratified sample size.

After informed consent, the participants were given a google form link (an online survey administration software) in English that was developed after a rigorous literature review and consultation and discussion with pediatrics and adult neurologist .It was designed to assess sociodemographics, knowledge, attitude and practice on primary headache among pediatrics residents working in TASH, SPMMC, Y12HMC, AUCHS.

A pilot study was done on 10 participants (5% of sample size). Following this, questions that were not answered by most participants were reformed, redundant questions were dropped. Those who participated in the pilot study were not included in the main study.

The questioner consist of 5 questions assess the back ground 4 questions on attitude , 5 questions assess practice, and 10 questions assess knowledge on clinical evaluation and management. Structurally, the test consist of 24 multiple-choice questions in which the participant will be given 2 to 5 possible answers and asked to choose the right answer.

The same questioner was administered pre and post educational intervention, and allowed to complete the form with in 20 minute before the educational video then they will fill the post assessment after the educational intervention with in 15 minutes. The primary investigator follows the completeness of there response via the online software.

## DATA ANALYSIS

The data were checked manually and cleaned for completeness. It was entered manually into SPSS version 26. Continuous variables were summarized by mean SD. Categorical variables were summarized by frequency and percentages. Associations were done by paired t-test and one-way ANOVA. Associations were considered significant when P- value is < 0.05 at 95% confidence interval and power of 80%

## ETHICAL ISSUES

Protocol approval was obtained before the beginning of data collection from the department research and publication committee, DRPC. Personal identifier information (PII), were not included in the questionnaire. The information in the questionnaire was used solely for the intended purpose and the primary investigator put the google form and the SPSS data in a safe password-locked computer.

## DISSEMINATION OF RESULTS

The result of this study will be submitted to the AAU, SPMMC, Y12HMC, AUCHS department of neurology and pediatrics and child health department, which will be presented in professional conferences and will be published in local and international journals.

## RESULTS

Of the 138 pediatrics resident who were selected to participate in the study 122 has responded complete surveys (85% response rate). The pediatric resident performance was not assessed based on the site of the study i.e., TASH, SPMMC, Y12HMC, AUCHS because there is a difference in the sample size and also the absence of year three residency at Y12HMC. The highest non respondent was from the online study because they couldn't follow the educational intervention and couldn't fill the post educational assessment; this typically occur in Haromaya University pediatric residents. We discarded all incomplete surveys.

### Pediatrics residents background

A total of 122 pediatrics residents were participated from TASH, SPMMC, Y12HMC and AUCHS were participated in the study. Of the 122 pediatrics residents 65(53%) were year one residents, 35(28%) were year two residents and 22(18%) were year three residents. Of the 122 residents 82(67.2%) of them has one to two months of neurology clinic attachment; 98(80%) residents

claims the do not attend any lecture on primary headache, 93(76%) of the residents with no case discussion on primary headache.

*Table 2; Base line characteristics of participating pediatrics residents Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, October 15- November 15, 2021*

Variables	n (%)
Year of residency	
R1	65 (53.3)
R2	35 (28.7)
R3	22 (18.0)
Number of attachments in neurology clinic	
0	35 (28.7)
1-2	82 (67.2)
3-4	5 (4.1)
Number of lecture hours on primary headache	
0	98 (80.3)
1-2	16 (13.1)
≥3	8 (6.6)
Number of case discussion hours on primary headache	
0	93 (76.2)
1-3	27 (22.1)
≥4	2 (1.6)

#### Assessment questions

Score of <60% (based on three previous similar studies) on 10 key questions marked as indicative of poor knowledge. Three of these questions related to prevalence, impact and pathophysiology; three pertaining to clinical evaluation; and four questions were on management of primary headache questions. Posttest results on the questions related to prevalence and pathophysiology showed improvement over pretest, 3 of the pre EI questions were < 60% in the pretest and in the post test all the results were improved but only 2 of the result scored > 60%. Pretest scores that were <60% on clinical evaluation questions related to primary headaches improved >60% in the posttest. But one question has dropped in the post test(42.6%) from the pre-test(49%). Four management questions that scored <60% pre-EI improved post EI and 3 of the result, scored >60%; but one of the management result was <60% in the post test.

*Table 3 Factors associated with pre and post educational intervention Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, and October 1- November 30, 2021*

Variables	Total pre-test mean score	p-value	Total post-test mean score	p-value
<b>Year of residency</b>				
R1	4.66 (±1.43)	0.03	7.1(±1.7)	0.43
R2	5.1 (±1.34)		6.7(±1.5)	
R3	5.5 (±2.2)		6.7(±1.7)	
<b>Number of attachments in neurology clinic</b>				
0	4.6(±1.4)	0.072	7.4(±1.5)	0.124
1-2	5.1(±1.6)		6.8(±1.7)	
3-4	4.0(±1.5)		6.0(±2.3)	
<b>Number of lecture hours on primary headache</b>				
0	4.9(±1.5)	.104	7.1(±1.6)	0.204
1-2	5.5(±2.0)		6.3(±1.1)	
≥3	4.6(±1.1)		8(±1.1)	
<b>Number of case discussion hours on primary headache</b>				
0	4.8(±1.4)	0.226	7.1(±1.6)	0.048
1-3	5.3(±2.0)		6.2(±2.0)	
≥4	4(±1.6)		6.5(±1.6)	

The baseline scores for individual physicians were quite heterogeneous, with the number of correct answer ranging from 2 to 9 (data not shown). Conspicuous differences were observed across questions.

An assessment of short-term impact of the educational intervention among attendees indicate that the percentage of correct answers increased from the pretest to the post test on 9 questions; has decreased in one question. The mean pre-test score(SD)5±1.6 The post educational intervention mean score 6.9 (±1.7) with p-value of 0.00 with paired t-test. pre-educational intervention total result was statistically significant(P<0.05) lower in year 1 residents than year 3 residents using Post hoc test after ANOVA T-test but has no statistically significant difference after taking the educational intervention. Those residents who had case discussion of one to three hours prior to participating in the study had statistically significant (P<0.05) superiority over those who had no case discussion.

*Table 4; comparison between pre and post intervention Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, October 1- November 30, 2021*

Variables	Pre-test		P-value	Post-test		P-value
	Correct n (%)	Incorrect n (%)		Correct n (%)	Incorrect n (%)	
Prevalence of primary headache	36 (29.5)	86 (70.5)	0.000	65 (53.3)	57 (46.7)	0.000
There Prevalence/Pathophysiology of primary headache	74 (60.7)	48 (39.3)	0.000	77 (63.1)	45 (36.9)	0.202
Prevalence/pathophysiology	67(54.9)	55(45.1)	0.000	87(71.3)	35(28.7)	
Clinical evaluation	60(49.2)	62(50.2)	0.000	94(77.0)	28(23.0)	0.000
Clinical evaluation	60(49.2)	62(50.8)	0.010	52(42.6)	70(57.4)	0.000
Clinical evaluation	88(72.1)	34(27.9)	0.000	111(91.0)	11(9.0)	0.000
Management	63(51.6)	59(48.4)	0.000	108(88.5)	14(1.5)	0.000
Management	109(89.3)	13(10.7)	0.022	106(86.9)	16(13.1)	0.000
Management	50(41.0)	72(59.0)	0.000	65(53.3)	57(46.7)	0.024
Management	79(64.8)	42(34.4)	0.002	87(71.3)	35(28.7)	0.000

*Table 5; Total score comparison pre and post educational intervention using paired t-test. Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, October 1- November 30, 2021*

Pre-test Mean score(SD)	Post-test Mean score(SD)	P-value
5 (±1.6)	6.9 (±1.7)	0.000

Other variables i.e., lecture hours, number of months in neurology clinic, patient referral to MRI, number of patients seen per week doesn't have statistical significant ( $p < 0.05$ ) impact on the total pre or post educational intervention result based on ANOVA T-test.

#### Practice

Among the 122 pediatrics residents 48(39%) reported that they saw at least one headache patient per week. About 20(16%) report seeing patient every day, 31(25%) at least once in a

month. Three-fourth of the pediatrics residents reported asking their patients actively about headache; comparable number of residents reported they treated patient with primary headache.

In cases of patients who do not respond to treatment; 68(55.7%) of residents refer to specialist. On the other hand, 46(37.7%) of pediatrics residents rarely refer headache patient to a specialist. Only few pediatrics residents said they order MRI scans for their headache patients themselves 8(6.6%), on the other hand 111(91%) said they do not directly refer patient for MRI

*Table 6 – practice Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, October 15- November 15, 2021*

Variables	n (%)
<b>Actively ask about headache</b>	
Always	13 (10.7)
Usually	76 (62.3)
Rarely	33 (27.0)
<b>Do you treat patients with primary headache</b>	
Yes	87 (71.3)
No	27 (22.1)
Don't know	8 (6.6)
<b>How often do you see patient with headache</b>	
Once in a day	20(16%)
Once in a week	48(39%)
Once in a month	31(25%)
Once in three month	22(18%)
<b>Headache patient referral to specialist</b>	
Yes (If not responding)	68 (55.7)
Rarely	46 (37.7)
Don't know	8 (6.6)
<b>Directly referral to MRI</b>	
Yes	8 (6.6)
No	111 (91.0)
Don't know	3 (2.5)

## Attitude

The result indicated 96(78%) of pediatric residents believed their previous exposure before entering residency was inadequate; most participants 99(81%) think their exposure to headache patient is inadequate. Ninety( 76%) of participant are moderately comfortable in diagnosing

migrain headahe and 25(20%) of the paticipants are not comfortable in diagnosing migraine. 97(79.5%) particibant belives the lecture hour should increase.

*Table 7; Attitude Resident education level, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, October 1- November 30, 2021*

Variables	
<b>What do you think about exposure to headache patient</b>	
Adequate	10 (8.2)
Inadequate	99 (81.1)
Don't know	13 (10.7)
<b>Do you think the number of hours devoted to headache lecture should be increased</b>	
Yes	24 (19.7)
No	97 (79.5)
<b>How comfortable in the diagnosis of migraine headache</b>	
Not comfortable	25 (20.5)
Moderately comfortable	93 (76.1)
Extremely comfortable	4 (3.4)
<b>How familiar residents are before entering residency program on primary headache</b>	
Well informed	5 (4.1)
Adequate	12 (9.8)
Not sufficient	96 (78.7)
Don't know	9 (7.4)

## DISCUSSION

### KNOWLEDGE

To the best of the investigator's knowledge, this is the first study targeting knowledge, attitude and practice on primary headache in africa.

We utilized a multiple choise questionnaire and a clinical vignette in order to understand current level of knowledge and there post-EI change.

The pre-EI knowledge on the question assesng the prevalence, pathophysiology of headache answered by mean percent score of 47%, wich has improved to 62% percent. The pre-EI scores indicated that pediatrics residents need to acquire a greater understanding about the epidemiology primary headaches. (For example, many participants apparently failed to realize

that the most prevalent headache being tension headache.) despite the result in our study, our participants showed a relatively greater knowledge on the prevalence and pathophysiology than participants in another older study. This might be due to the non convenience sample. Understanding the prevalence of primary headache is essential to give a due emphasis for this common disabling disease. Understanding the pathophysiology of migraine can improve diagnostic acumen of physicians and their ability to devise treatment plans.

Three clinical vignette assess the clinical evaluation knowledge of the participants on the primary headache. In two questions percent of the participants respond the right answer in the pre test mean total score of 57%; following the educational intervention the score raised to mean total score 88 percent. In an other previous similar study the pre and post educational intervention clinical knowledge is comparable to our study.(31) But in one of our clinical vignette question the score has dropped from 49 percent to 42 percent. The drop in the score of the participant might explained by immediate exposure to primary headache discussion. Since the EI primarily about the primary headache the participants biased when the clinical vignette asked about secondary headache.

Knowledge about clinical evaluation is very important in reaching a diagnosis, identifying the triggering factors and setting management strategies. The educational intervention should give emphasis on symptoms and sign to identify secondary headache also.

Regarding the management of primary headache the participant mean percentage score has improved from 61.5 percent to 74.5 percent following the educational intervention. In an other older study done by AHA on primary physician the results were comparable with our participants in their mean percentage score of the management part.(37)

Having good clinical knowledge about abortive, preventive treatment along with life style modification is crucial in alleviating the suffering of pediatric headache patients with acute and chronic presentation.

## PRACTICE

46(37.7%) of pediatric residents rarely refer headache patient to a specialist. Most patients with PH can receive adequate treatment in primary care if they are not too severely affected and if good clinical guidelines are available. Nonetheless, in a study conducted in the United Kingdom, reported that 70% of patients presenting to GPs with new-onset primary headaches did not

receive a diagnosis. An earlier study in a Swiss tertiary care centre revealed a similarly high number of incorrect or unspecified diagnoses.<sup>(29)</sup> Only few pediatric residents said they order MRI scans for their headache patients themselves (6.6%). This result is unlike other similar study in Switzerland where a large percentage of primary care physicians who said they themselves ordered MRI scans for their headache patients (over 80%) with potential implications for health-care costs.<sup>(29)</sup>

Other variables i.e., lecture hours, number of months in neurology clinic, patient referral to MRI, number of patients seen per week doesn't have a statistically significant ( $p < 0.05$ ) impact on the total pre or post educational intervention result based on ANOVA T-test. Data analysis in this study, seeing more patients is not an indicator of having better sort of knowledge about headache disorders. This emphasizes the need for well structured educational programs to be widely applied. A study reported by Kowacs et al. stated that such educational program can highly improve primary healthcare physicians' knowledge and quality of patient care. (35,29)

#### Attitude

Seventy eight percent of the participants believe that their clinical, lecture and patient exposure to headache is inadequate. One similar study described the status of headache education in medical schools and academic departments of neurology and found that, essentially, all respondents believe that migraine is a valid neurological disorder and an important subject to teach in medical school.)

#### Conclusion

Primary headache is a common pediatric neurological disorder in our country. The primary physician treating pediatric patient in our country primarily includes pediatricians. This study has shown the poor knowledge on prevalence, pathophysiology, clinical evaluation and management of migraine patients which has improved after the educational intervention.

#### Recommendation

Education of physicians play an important role in improving headache care, education helps to overcome barriers to headache care and improve headache management.

#### Limitation

The limitations seen in this study were due to the current pandemic; COVID 19, we prepared the session in a video format which might decrease the interactivity of the session. Other methods of teaching like patient model, demonstration were not used during the study. This impact

attributed to short duration of time allocated in relative to this large topic. The discussion presented by only the PI which might create a bias. Follow-up assessment; at 3 and 6 months post-intervention, would have been a better opportunity to draw a conclusion about the long-term and sustainable impact of the training.

## ANNEX 1

### WORK PLAN

*Table 8: Activities and timeline for the study on the assessment of knowledge, attitude and practice of pediatric residents on primary headache pre and post educational intervention Addis Ababa Ethiopia, 2021*

No	Description	Responsible	July 2020	Aug-Sept 2020	Oct 2020	Jan – Aug 2021	Oct-Nov 2021	Dec 2021
1	Prepare proposal and submit to advisors	PI						
2	Proposal submission for defense	PI						
3	Proposal defense	PI						
4	Final submission	PI						
5	Data collection	PI						
6	Data analysis	PI						
7	Submission to advisors	PI						
8	Feedback from advisors	Advisors						
9	Defense	PI						

## BUDGET

*Table 9: Budget breakdown for the study the assessment of knowledge, attitude and practice of pediatric residents on primary headache pre and post educational intervention Addis Ababa Ethiopia, 2021*

Title	Personnel	Individual Cost	Total Cost
Data Collection	PI via Google Form	0 birr	0 birr
Coordinator	2 pediatrician / pediatric fellow	5,000 birr	10,000 birr
Data Analyzer	1	5000 birr	5,000 Birr
Total cost		15,000 Birr	15,000 Birr

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## Questioner

Assessment of knowledge and practice of pediatric residents in the evaluation and management of primary headache.

This is a cross sectional study to assess knowledge and practice of pediatric resident in the evaluation and management of primary headache. The Aim of the study is to help residents to improve their knowledge on pediatrics primary headache patients' clinical evaluation and management

Your name will not be written anywhere in the form and all the information you give us will never be disclosed for a third parity. I also would like to inform you that you have the right to withdraw from the study or to skip any question that you do not want to answer. Thank You ( Behaylu Yibe, Pediatrics Neurology Fellow)

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\* Required

## Questioner

1. Code ( please write a certain code number that you do not forget) \*

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2. 1. Year of residency \*

*Mark only one oval.*

A. Year 1

B. Year 2

C. Year 3

D. other

3. 2. Number of months in neurology clinic attachment

*Mark only one oval.*

- 0
- 1-2
- 3-4
- >4
- Other: \_\_\_\_\_

4. 3. Approximately how many hours of formal pediatric lectures do you receive on primary headaches in the first year of residency?

*Mark only one oval.*

- A. 0-hr
- B. 1-3 hrs
- C. 3-5 hrs
- D. >5 hrs

5. 4. In approximately how many case presentations on primary headache per year are you involved?

*Mark only one oval.*

- A. 0
- B. 1-3
- C. 3-5
- D. >5

6. 5. In your experience, what percent of visits to neurology clinic are dedicated to the primary headache complaint?

*Mark only one oval.*

- A. <5%
- B. 5–15%
- C. 15–25%
- D. >25
- I do not know

7. 6. In your opinion, upon entering residency program how familiar are residents with the diagnosis and treatment of primary headache disorders such as migraine?

*Mark only one oval.*

- A. well-informed
- B. adequate
- C. not sufficient
- D. Don't know

8. 7. In your opinion, the exposure that residents receive during training on headache diagnosis and treatment is:

*Mark only one oval.*

- A. adequate
- B. inadequate
- C. Don't Know

9. 8. Do you agree on the number of hours devoted to headache diagnosis and treatment in your residency program should be increased?

*Mark only one oval.*

- A. No
- B. Yes

10. 9. How often do you see patients presenting with (any type of) headache as the main symptom?

*Mark only one oval.*

- A. Once a day
- B. once a week
- C. once a month
- D. once in three months
- E. never

11. 10. Do you actively ask about headache?

*Mark only one oval.*

- A. Always
- B. Usually
- C. Rarely
- D. Never

12. 11. Do you treat patients with primary headache disorders?

*Mark only one oval.*

- A. Yes
- B. No
- C. Don't know

13. 12. Do you refer headache patients to a specialist?

*Mark only one oval.*

- A. Always
- B. yes, if treatment is not effective
- C. Rarely
- D. don't know

14. 13. Do you refer patients directly for MRI?

*Mark only one oval.*

- A. Yes
- B. No
- C. Don't know

15. 14. How comfortable are you in diagnosing migraine?

*Mark only one oval.*

- A. Not at all comfortable
- C. Somewhat comfortable
- D. Moderately comfortable
- E. Extremely comfortable

Knowledge, evaluation and management

16. 15. What is the common primary headache in children

*Mark only one oval.*

- A. Migraine without aura
- B. Tension type headache
- E. Medication overuse headache
- D. Cluster headache

17. 16. Which of the following statements about migraine is true?

*Mark only one oval.*

- A. Is only a disorder of cranial blood vessels.
- B. More than half of patients with migraine do have a family history.
- C. The over all prevalence of migraine is higher than tension type of headache.
- D. Migraine occurs most commonly under five years of age.

18. 17. Which of the following statements about migraine triggers is false?

*Mark only one oval.*

- A. Diaries are a useful way to identify triggers.
- B. Migraine patients should be put on a rotation diet to identify food triggers.
- C. Irregular sleep is an important trigger of migraine.
- D. Irregular diet could be a triggers for migraine

19. 18. Which of the following statements about migraine headaches is false?

*Mark only one oval.*

- A. Most migraine patients have aura.
- B. All migraine headaches are unilateral.
- C. People with migraine do not get tension-type headaches.
- D. All of the above

20. 19. 13-year-old boy presents to the clinic with a 2-month history of headaches. The headaches are right-sided and pulsating. There is associated nausea, phonophobia and photophobia, and dizziness. There is no vomiting. At onset, the headaches occurred once every few days but now he always has a headache with increased in severity . He is taking ibuprofen every other day but it is not helping. His only other medication is isotretinoin for acne. He is otherwise healthy. On neurologic examination has decreased visual acuity. Which of the following is the most appropriate next step in management?

*Mark only one oval.*

- A. Increase ibuprofen dose and frequency.
- B. Refer to ophthalmology to evaluate for optic nerve edema.
- C. Refer to otolaryngology to evaluate for vestibulitis.
- D. Start him on migraine prophylaxis for migraine headaches.

21. 20. A 10-year-old girl presents to the emergency department with headaches and vomiting for the past several hours. The headache is frontal and “like a heartbeat.” She has to have the lights out and no noise in the room to feel some relief. She has had headaches like this every few months for the past 3 years. This headache was different in that it started with numbness and tingling that spread up her right arm, and then she had garbled speech and confusion. Her vision was normal. These symptoms resolved after 45 minutes, but the headache continued. Her blood pressure is normal, and her general physical and neurologic examination including funduscopic findings are normal, . Which of the following is the most likely diagnosis in this patient?

*Mark only one oval.*

- A. Intracranial hemorrhage.
- B. Migraine with aura.
- C. Pseudo tumor cerebri.
- D. Tension headache.

22. 21. A 9-year-old girl presents to the clinic with a 1-year-history of headaches. The headaches are frontal and associated with photophobia, phonophobia, nausea, and vomiting. She denies double vision, vision loss, numbness and tingling, or weakness. These headaches occur 1 to 2 times a month, usually after school. In between headaches she is normal. She continues to do well in school. Her physical and neurologic examination findings are normal. Which of the following diagnostic tests is the most appropriate to obtain for further evaluation of this patient?

*Mark only one oval.*

- A. Complete blood cell count and serum electrolytes.
- B. Lumbar puncture
- C. Magnetic resonance imaging of the brain.
- D. No further evaluation is needed

23. 22. A 14-year-old boy presents to the clinic with 2 to 3 episodes of migraine headache per month. He reports that he plays sports and does his homework after school, and often cannot go to bed until 11 pm. He watches videos on his phone and sometimes does not fall asleep until 1 am. He has to wake up at 6 am for school. He denies anxiety or depression. He takes ibuprofen about once a week for the most severe migraines, but ibuprofen does not usually relieve the headache. He drinks a lot of water and sports drinks, and he denies drinking any caffeinated beverages. Which of the following is the most appropriate next step in the management of this patient?

*Mark only one oval.*

- A. Decrease his use of ibuprofen.
- B. Improve sleep hygiene.
- C. Increase hydration.
- D. Start a daily medication for preventive therapy.

24. 23. A 11-year-old girl with migraines presents to the clinic reporting that her abortive medications do not help. She gets migraine with aura 2 times a month. The aura is a "hole in my vision" that gets progressively bigger, then she gets numbness and tingling in one arm. This lasts approximately 20 minutes and then she gets a severe right-sided headache with nausea, vomiting, phonophobia, and photophobia. There is no hemiparesis. As soon as the headache starts, she takes ibuprofen with a caffeinated soda. She reports that the headache improves a little but she still cannot function and has to go to sleep. Which of the following is the most appropriate advice to give her in aborting her headache episodes?

*Mark only one oval.*

- A. Decrease her use of abortive medications to avoid medication overuse headache.
- B. Go to an emergency department for a Ergotamine
- C. Start a combination medication with triptan.
- D. Start a daily medication for preventive therapy.

25. 24. A 13 years old female has had headaches for the past three years: were mild types occurring in the afternoon, having a band-like tightening over the head with neck pain. She usually takes ibuprofen to get relief. In the past six months, she has been having a frequent episode of headaches occurring twenty days of a month with similar location and quality but not relieved with ibuprofen. She has normal physical and neurological findings with normal MRI findings from the referral. what is your next step of management ?

*Mark only one oval.*

- A. Start prophylaxis's treatment
- B. Repeat brain MRI
- C. Increase the dose of ibuprofen
- D. Admit her and for inpatient dihydroergotamine treatment

26. Please add any other comments you have about primary headache diagnosis and treatment in the primary care setting:

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Do not wanted to participate in this study

27. Thank you for you time

*Mark only one oval.*

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