Diversifying the Knowledge Base: The Strive for the Inconceivable True Objectivity

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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I. Introduction

There has been a push in recent years to better encapsulate the woman's experience by describing the effects that sex and social differences have in various diseases and disorders. The sex differences described are biological differences, mainly hormonal changes, whereas the social differences range from social class and workplace environment to gender presentation and relationships. Despite this push, there still is lacking clinical evidence of improvement in treatment, diagnosis rates, nor quality of life improvement for women. A simple internet search of 'How do I get my doctor to care about my symptoms?' will result in hundreds of articles stating to bring a man to their appointment to verify their symptoms. Those who are heavier or have a high BMI typically get told to simply lose weight rather than have their symptoms appropriately assessed. The emphasis on the 'right weight' is so prevalent in the healthcare system that severe issues get tossed aside (*Overcome Weight Bias at the Doctor's | Right as Rain*, 2022; Phelan et al., 2015). Furthermore, social class and mental illnesses also allow for discrimination by primary care providers (PCPs). Those who are seen as anxious are not taken seriously and those who are poor don't have access to proper care due to commuting difficulties, lack of insurance, and the extensive wait times that take away from work hours and income.

On their own, these barriers to proper healthcare seem unrelated or uncommon. After all, why would issues like these still exist if they were highly prevalent? One way to contextualize these issues is by investigating a disease or disorder that disproportionately affects women. Migraines – despite most calling these headaches – are disabling neurological conditions that are characterized by attacks that last between 4 to 72 hours followed by a period of remission. Since migraines are complex, chronic, and less tangential in nature, they allow us to ask whether or not American society cares to notice issues that don't loudly express themselves. Despite how disabling migraines tend to be, those who experience them typically are not given any sympathy nor treatment. This lack of sympathy and the lack in knowledge of effective migraine treatments are heavily exacerbated by the fact that migraines are seen as a ‘women’s disease’ and that we typically use male models in research. It is known that migraines are more prevalent in women (20.7% globally versus 9.7% in men) and women typically have shorter remission times whilst also scoring higher on the Migraine Disability Assessment Questionnaire (MIDAS) (Rossi et al., 2022). The worse severity of migraines that women experience may be due to estrogen well as stress, anxiety, and sleep issues (Al-Hassany et al., 2020). Even with the knowledge that women experience migraines at a much higher disabling degree than men, women are typically prescribed triptans, a non-preventative treatment that treat acute or rapid onset migraines, whereas men typically get opioids (Lipton et al., 2018). Despite the existence of rigid diagnostic criteria, PCPs tend to ask the wrong questions or patients don’t give satisfactory medical histories, interfering with proper diagnosis. These rigid diagnostic criteria also do not fully encapsulate everyone’s experience and allow for some to slip through the cracks as they don’t check every box (Gupta & Gaurkar, 2022). Those who are lucky enough to see a neurologist have better chances of getting diagnosed correctly instead of seeing a PCP, with there being a 4.2% misdiagnosis rate from neurologists versus 44.0% from PCPs (Kim et al., 2024).

To overcome these barriers, research must focus on the drowned out voices. Much of the struggle of research is determining when to be objective. Currently in cases like migraine diagnosis and treatment, using ‘objective’ protocols completely ignores the barriers and injustice that women face at the doctor’s office as these ‘objective’ protocols are made by men for men. The increased effort to focus on women’s health is important but greatly lacks discussion on why it is important to focus on women’s health. Without this discussion, many are led to believe that the exclusion of men is an injustice rather than compensative. Much of the existing data is from men or male animal models since there is less hormonal flux that can interfere with findings. However, women live with these hormonal fluxes and ignoring this for the sake of simplicity invalidates the accuracy of results and conclusions we make. We must even the playing field by getting data from women or female animal models. Only then can we start employing truly objective protocols in our research. With this in mind, does current research adequately address and work on diversifying the study pool for migraine?

II. Background and Significance

Presentation of Migraines

Migraines can present in multiple forms: aura, without aura, chronic, episodic, and menstrual. Migraines that meet all but one required feature on the diagnostic criteria have a level of uncertainty that makes them possibly a migraine, or more formally known as probable migraine. Aura migraines consist of some form of disturbance in the person's visual field, speech, senses, or motor function that is followed by headache. Those without aura typically experience photo- or phonophobia (light or sound sensitivity, respectively). These two types of migraines can reoccur periodically. If they reoccur for 15 or more days per month for at least 3 months, then the migraine is considered chronic (Pescador Ruschel & De Jesus, 2025). If the migraines reoccur in conjunction with or closely preceding menstruation, then it is considered a pure menstrual migraine. If the migraine reoccurs during the menstrual cycle but is not specific to the menstrual cycle, then it is considered a menstrually-related migraine (Gibb, 2025).

Generally, there are 4 phases of migraines: prodrome, aura, headache, and postdrome. Prodrome, or hypothalamic activation (increase in dopamine and lead to irresponsible decision making) occurs in roughly 77% of patients before the headache onset and is more common in women than men (81% vs 64%). Prodrome presents as mood changes, drowsiness or lethargy, photo- or phonophobia, cravings, increased energy, difficulty focusing vision, and other sensory issues. Aura occurs in roughly 25% of patients, and it gradually occurs and persists over the course of 60 minutes. It presents mainly as visual disturbances and must be fully reversible to be considered a true aura. The headaches that migraine sufferers typically endure last on the order of hours to days. These present with symptoms such as nausea, vomiting, photo- or phonophobia, increased sensitivity to smells (osmophobia), increased sensitivity to touch (allodynia), and uncontrolled crying (lachrymation) with uncontrolled runny nose (rhinorrhea). At the end of migraine, postdrome occurs after relief of headache which typically consists of exhaustion, tenderness at the site of headache, dizziness, difficulty concentrating, and euphoria (Pescador Ruschel & De Jesus, 2025).

Difficulty arises when attempting to find a generalizable baseline for diagnosis. The Internation Classification of Headache Disorders (ICHD) has gone through several iterations in an attempt to accurately describe and diagnose migraines. ICHD-3 uses separate criteria for the different presentations of migraines. However, in these criteria there isn’t much consideration for the differences between women and men migraine presentation nor separate criteria for pure menstrual migraines (Pescador Ruschel & De Jesus, 2025).

Sex and Social Differences

Interestingly enough, boys typically have earlier onset of migraine before puberty. However, after puberty, the prevalence of migraine spikes in girls – nearly 3 to 4 times the frequency of those in boys after puberty. Menstruation has a big effect on the way migraines present themselves as well. Menstrual migraine diagnosis is much harder to diagnose as there needs to be consistent descriptive detailing of the migraine attacks. With these descriptions, a short-term preventative plan can be made – but only for those with regular cycles (Pavlović, 2018). Moreover, menstrual migraines have been shown to be more impairing and longer in duration. Those with menstrually-related migraines, or migraines that are due to estrogen withdrawal or hormonal imbalances, suffer the highest burden (Pavlović et al., 2015). As women transition into menopause, migraines worsen due to the comorbidity perimenopause has with anxiety, depression, and sleep issues.

In terms of career, men worry more about how their migraines affect their jobs – whereas migraines negatively affect women's careers more than men's. As migraines are seen as a highly feminine disorder, men often delay care due to risk of being feminized. This stigma likely stems from the fact that healthcare workers see higher rates of migraine attacks than the general population, with most of these attacks in nurses, a highly feminine field. It is also interesting to note that evening workers see a higher rate of migraines than day shift workers (Al-Hassany et al., 2020). Women report nearly 3 times the prevalence of migraines in self-reported high stress environments, and more so during night shifts than men do (Slatculescu & Chen, 2018). Overall, the more psychologically demanding the job is, the worse the migraines tend to be. The higher stress as well as the general lack of support and awareness of the actual nature of migraines all contribute to the worsening of migraines.

III. Methodology

A review of scientific literature that contain either social- and/or sex aspects of migraines in adults was done. The Medline (Ovid), PubMed, and Web of Science databases were used to conjure up relevant research from 1950 until March 1st, 2025. In an attempt to fully encapsulate diagnostic and treatment inconsistencies over the years, specifically between men and women, this overarching scope was necessary. Any research pertaining to social- and/or sex aspects of migraines will be considered and scrutinized. However, research focusing solely on social settings such as class or location were excluded even if there was minor mention of sex or gender differences. Any research focusing solely on hormonal changes in women and their effects on migraines were carefully sifted through to ensure relevancy to the purpose of this review. Any literature reviews, commentaries, book reviews, and case studies were excluded as well as any studies with a study size less than one or if the study size was not mentioned. Only fully-accessible research papers – papers without a paywall or subscription – that were in English or translated to English were used.

The search strings used in the databases are shown in Table 1 and the literature review was conducted on March 15th, 2025. Moreover, there was an effort to include transgender research into this topic. The stressors that transgender people face in the workplace, school, home, and general society as well as the hormone therapies they may be undergoing will provide insight on the differences in migraine presentation.

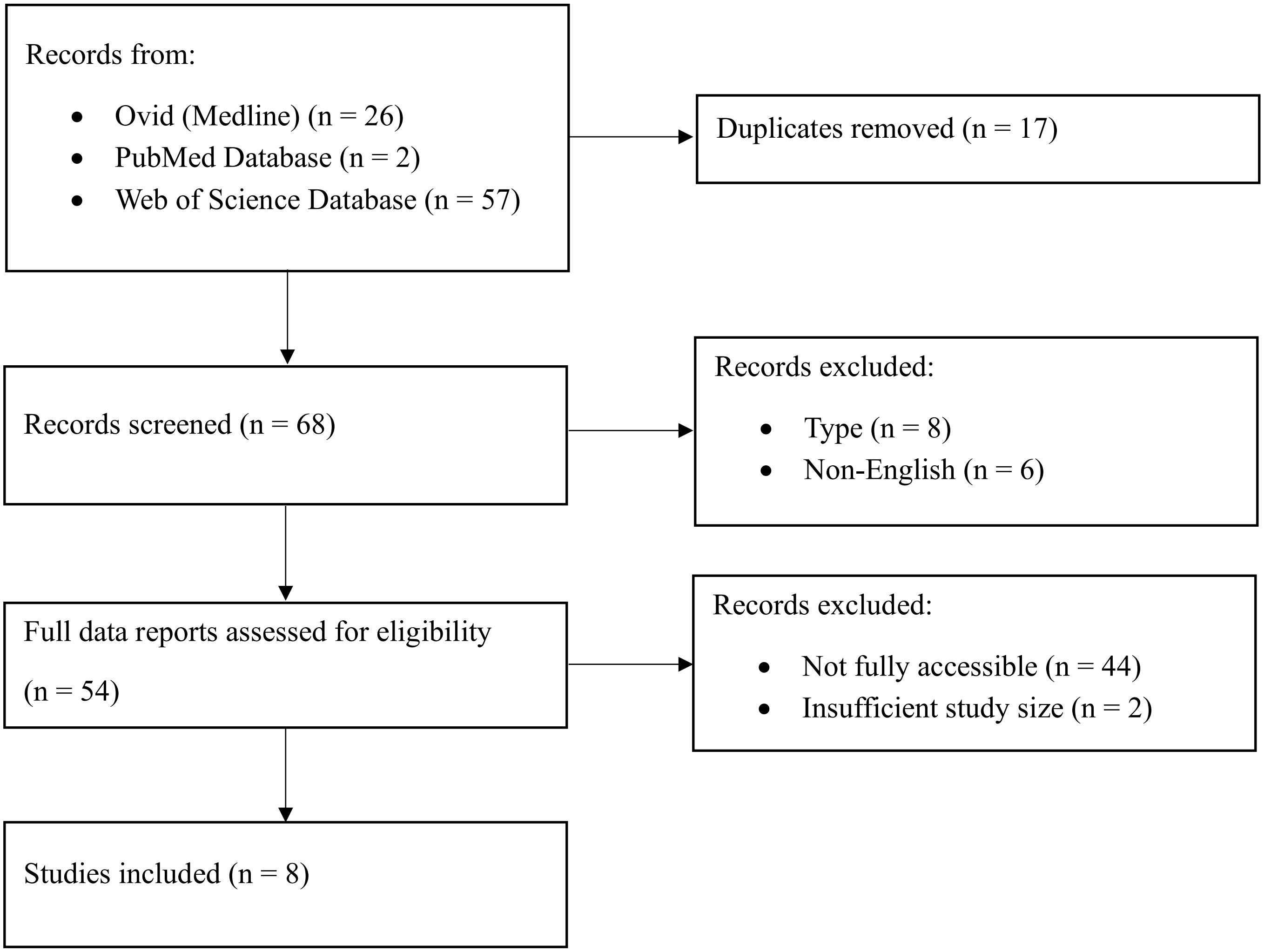
Table 1

Search Strings

Database	Search String
Medline (Ovid)	(migraine and (hormones or women or transgender or gender or sex) and (treatment or diagnosis or misdiagnosis)).m_titl.
PubMed Database	(Migraine[Title]) AND (women[Title] OR hormones[Title] OR gender[Title] OR transgender[Title] OR sex[Title]) AND (treatment[Title] OR diagnosis[Title] OR misdiagnosis[Title])
Web of Science Database	(TI=(Migraine) AND TI=(hormones OR gender OR sex OR transgender OR women) AND TI=(treatment OR diagnosis OR misdiagnosis))

Figure 1

Literature Screening Diagram



With these papers, each was scrutinized to determine areas of bias and systemic issues (such as migraine stigma) within their methodologies. Eighty-five studies were found and screened according to the criteria described previously (Figure 1). Taking from Donna Haraway's thesis on *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective* (Haraway, 1988), the eight resulting studies will serve to demonstrate the inherent bias against education of migraines.

IV. Results

There exists lacking research in transgender people and the issues they encounter whilst on hormone therapies. Even through broadening the scope to any hormonal changes or therapies, there were no freely accessible studies that discussed this topic. Additionally, of the 85 studies that were found, none of them specifically looked at transgender people.

For the eight studies that passed the given criteria, the main author for six of them was a woman, one was a man (Ornello et al., 2024), and one was unable to be confirmed (Qiu et al., 2013). Additionally, only one of these studies focused on diagnosis alone (Qiu et al., 2013) and only two studies looked at demographic information such as income, race, and marital status (Farris et al., 2020; Qiu et al., 2013). However, there were no clear efforts to find links between these factors and migraines. An overview of the studies included is shown below in Table 2.

Table 2

Summary of Characteristics of Studies Included

Study	Design	Focus	Study Size	Study F:M	Migraine Type	Outcomes based on gender?
(Varnado et al., 2025), United States	Retrospective cohort	Treatment using galcanezumab (GMB)	2304	2015:292	Chronic, Episodic	Yes
(Farris et al., 2020), United States	Cohort	Treatment using behavioral weight loss (BWL) or migraine education (ME)	110	110:0	Not Specified	Women-only study
(Cooke & Becker, 2010), Canada	Survey	Medication usage rates	1210	1210:0	Not Specified	Women-only study
(Verhaak et al., 2021), United States	Survey	Healthcare providers awareness of proper diagnosis criteria and migraine treatment	115	92:23	Not Specified	No
(Ornello et al., 2024), Italy	Interventional, non-randomized	Migraine treatment with erenumab may reveal novel migraine pathogenesis or biomarker of treatment response	36	36:0	Chronic, Episodic	Women-only study
(Chalmer & Lonberg, 2023), Denmark	Survey distributed on social media	Diagnosis and treatment of menstrual migraines	2956	2956:0	Menstrual	Women-only study
(Murray & Muse, 1997), United States	Nonrandomized, prospective	Treatment of migraines by estrogen-progestin “add-back” therapy effect on pain	5	5:0	Not Specified	Women-only study
(Qiu et al., 2013), United States	Cross-sectional	Self-reported migraine accuracy using ICHD-II diagnostic criteria	500	500:0	Not Specified	Women-only study

V. Discussion

Donna Haraway argues that the knowledge in the world is a result of the social environment from the time when that knowledge was founded. Only those who had enough money and status were able to contribute to the knowledge pool that we have today (Haraway, 1988). This patterns continues on to this day. Only the voices of those who have the proper status and money are heard which pushes the bias towards one perspective, typically the rich white male perspective. In order to progress as a society, there needs to be movement towards the diversification of our knowledge base to include more perspectives in order to highlight issues in our logic and actions.

This idea of diversifying our knowledge base extends much farther than those in charge of researching. The data that exists is only of those who have the means to report it. Those of the working class don’t always have the time to care about a chronic health condition. Financial, emotional, and temporal shortcomings hugely influence a person’s decision on going to the hospital or participating in a study. From this, we filter out whose data we care about without even realizing it.

Despite nearly a hundred articles discussing gender or hormonal differences in the treatment or diagnosis of migraines, only eight of these were freely available for the public (Table 2). The lack of accessibility limits the ability to better understand these differences in the presentation and treatment of migraines for the common person. Only those with the opportunities to attend universities or those in communities with enough resources to subscribe to various scientific journals will be able to get a more holistic view of migraines.

Moreover, in the study conducted by Veerhaak et al. in 2021, they found that most healthcare providers were not aware of the standardized preventative treatment guidelines from the American Academy of Neurology or the Choosing Wisely Campaign recommendations. These guidelines were made to both inform and standardize treatment of migraine. Nearly none of the providers placed referrals for non-pharmacological treatments and only a handful knew of their existence. Instead, many prescribed treatments known to be overused and that contribute to even worse headaches. Even for those in the active medical field, they did not have sufficient knowledge to properly treat migraines.

Three of these studies specified the type of migraine they were investigating as well as the criteria used to diagnose the migraines. The five other studies made no mention nor discernment between the different types of migraines. Since each type of migraine has its own presentation, it is difficult to discern if these results are generalizable to all types of migraine or if these results only exist in the study pool. The manifestations of pain, encumberment, and overall symptoms are different across all types of migraines. In the same vein, medications can not be generally prescribed the same way for each type of migraine.

Beyond the disregard for consideration of migraine presentation, many of these freely accessible studies utilize survey data which introduces survey bias, where only those who choose to respond will have their data recorded. The opinions of those who do not respond to the surveys may well be the majority but there can be no conclusion since there is no data. Response bias, a specific type of survey bias, is created through the questions that the interviewers ask. If the questions evoke a strong emotional response or is too ambiguous, the interviewee may choose an extreme or give an unsatisfactory answer due to the misleading question. In Chalmer and Lonberg’s case, response bias was formulated by the avenue that the surveys were given. In this study, they pushed surveys on social media. This method presents many issues as the algorithms on each social media is unique. Generally, there is a higher chance that those who already believe they have migraine and want validation will interact with more migraine related posts and will be shown the study due to these algorithms. Thus, there is likely a large population excluded from the study. Another survey-based study was performed by Cooke & Becker where they surveyed women to gain a better understanding of frequency of appointments with any healthcare provider, appointments with specialists, and the frequency at which different medications were taken to treat migraine. All of this data was done through phone interviews with trained interviewers rather than clinicians. This alone presents a vastly different environment than women typically find themselves in at the doctor's office. Here, they do not have a history with the interviewer and the interviewers are seeking women with migraines, diagnosed formally or not. The women interviewed were much more likely to be taken seriously in the interview than in the doctor's office and were much more likely to be diagnosed in the study than they are at the doctor's office. Even so, the sample size was not large and may present a skewed view of reality. Veerhaak et al. face similar issues as they surveyed healthcare providers. There is a high likelihood of misrepresentation of reality as these providers are heavily biased for themselves. There is no gold standard of comparison for providers to compare themselves when diagnosing migraine.

Across all of these studies comes the issue of who is conducting the study and why. We push the voices that we agree with naturally and have an inherent bias against those who go against what we believe. Those who have the funds and the time to conduct these studies are the very same who choose what results we see. Those who have access to the internet or phones and with enough means to care about a randomized survey will respond. Those who are more worried about financial and job stability are less likely to agree to be surveyed. There is common sentiment among the working class that the hospital is only meant for near-death issues, whereas those of higher class can spare the money for the trip to the hospital for a simple issue. In the end, the upper class ultimately decide whose data gets recorded.

Even though these eight studies were fully accessible does not mean that the common person will understand the verbiage used. Scientific writing is different and often more technical than writing found in books. These articles are also not geared towards the common person attempting to understand migraines. Many people rely on websites like WebMD or Mayo Clinic to summarize these findings. However, these sites do not pledge to bridge gaps in medical understanding and often have been discounted by doctors. Furthermore, there are many biases that exist within these studies that require an understanding of how these biases come to be and how these biases alter conclusions. All of which the common person may not think nor know to consider.

Diversification of our knowledge base starts by amplifying the unheard voices. None of these studies focused specifically on the minorities – and hardly any of them made any mention of race or social class. It is important to focus on women’s health, however, if the focus is only of white women’s health, then we are simply evolving the problem into a racial and sex based issue. Considerations for all unheard and drowned out voices must be taken in order for research to contribute to a better society.

VI. Conclusion

Reiterating Haraway’s main point: we can not be objective in our research since we have inherent bias towards those better off. Despite many of the main authors of these studies being women, they are building off of existing research that originated from a man's point of view. Worse still, the information gleaned from these studies may not be relevant due to the survey bias within them. The knowledge about science and disorders that we teach the public originates from these research studies. If the studies are unreliable or are biased towards the majority, then progress can not be made. Even with the bias present in the study by Veerhaak et al., it was still shown that many healthcare providers do not fully understand the presentation nor the treatment of migraines. This lack of education in differences in disorder presentation is nothing new. It stems from the beginnings of healthcare, where much emphasis was put on what inconvenienced the man and his offspring, not the woman. Migraines will continue to not be taken seriously until we turn the tides of society and make people care about them.

In this day and age where money is the main motivator for progress, we can not let the communities who seem less profitable to fall by the wayside. These unheard voices do not deserve to suffer in silence simply because they are the minority and do not affect the general population. Manifestations of diseases and disorders can vary across race, sex, and social class due to different cultures, stressors, and genetic dispositions. We must strive for true objectivity in our research by intentionally including and discussing minorities and the barriers they face.

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