

# Clinical Profile of Migraine in a Rural Population Presenting to Tertiary Care Hospital in North India

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## Abstract

**Background and Objective:** Migraine is one of the most common types of headache leading to significant disability; still people do not seek early help in developing countries. Therefore, we planned to conduct a study to assess the clinical profile of migraine, its triggers, comorbidities, and related disability in rural India. **Design:** An observational study in which 1,245 men and women suffering from migraine were recruited at a tertiary care hospital and were asked to complete a questionnaire related to migraine, its triggers, comorbidities, and disability. **Results:** Out of 1245 patients, females constituted 75% (937) of the patient pool and rest 25% were males (308). Fatigability (52.7%), nausea/vomiting (42.7%), phonophobia (33.57%), numbness (28.2%), and vertiginous sensation (20.8%) were accompanying features. Stress was the most common trigger impacting 44.9% of the patient population, followed by noise in 44.3% of cases. Exertion and sleep disturbance acted as triggers in 36.1%, smells in 20.5%, hormonal factors in 11.5%, and visual stimuli in 5.1% of patients. Anxiety was identified as the most common comorbidity affecting 542 patients (43.5%), followed by depression in 25.7% of patients. Around 103 patients (8.2%) had other psychiatric illnesses such as panic disorder and bipolar mood disorder. **Conclusion:** The migraine-related disability is high; therefore we conducted a study to understand its triggers and clinical profile. This was the first observational study conducted in a tertiary care hospital on migraine in north India catering to a sizeable rural population however, larger population studies are required to understand migraine more exhaustively.

**Keywords:** Accompanying features, comorbidities, disability, migraine

## INTRODUCTION

Headache is one of the common neurological conditions that affect the emotional, social, economic, and physical well-being of individuals. Compared to other types of headaches, migraine is the most extensively studied headache disorder. Despite the absence of any biological marker confirming headache types, there is an upgradation of the already existing international headache society criteria (ICHD-3 beta), which divides headache into primary and secondary types.<sup>[1]</sup> Migraine ranks amongst the top four contributing neurological conditions and is the second-largest contributor to global neurological disability-adjusted life years (DALYs) responsible in 16.3% [11.7–20.8].<sup>[2]</sup> In India age-standardized DALY rates per 100,000,000 people were 4,029 (3,589 to 4,500) for migraine in 2016.<sup>[2]</sup>

In the United States, the female to male ratio for migraine is 3:1 and between 15% to 30% have an aura with some migraine attacks.<sup>[3]</sup> Similarly, various Asian studies show a higher prevalence of migraine in women (11.3% to 14.4%) as compared to men (3.6% to 6.7%).<sup>[4]</sup> There are various trigger factors for headache depending upon its type. A patient perceives a certain factor to be a trigger when there is a close temporal relationship between exposure time and the onset of the pain.<sup>[5,6]</sup> The most common triggers of migraine are stress, exertion, altered sleep cycle, noise, bright lights, hormonal factors, smells, weather, genetics, etc.<sup>[7]</sup> The triggers for Western and Indian populations

are nearly similar, though few differences are due to eating habits, cultural, and climate variations.<sup>[8]</sup>

## Comorbidities

In addition to depression,<sup>[9]</sup> migraine has been associated with other psychiatric comorbidities such as mood and anxiety disorders.<sup>[9,10]</sup> The lifetime prevalence of depression in migraine ranges from 17–42%.<sup>[11,12]</sup> It has also been reported that somatic amplification along with depression, anxiety, and stress may increase the burden of migraine and its disability. Depression is found to be as much as four times in patients with migraine vis-à-vis the general population.<sup>[13]</sup> Thus, psychiatric comorbidity seen with migraine should be recognized and treated appropriately for improving the patient's quality of life.

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In spite of being a common neurological disorder, there is poor knowledge and significant gap in awareness regarding disease, its clinical profile, triggers, and comorbidities in the majority of the people. Therefore, we planned to conduct a study in our population to assess the clinical profile of migraine and its related disability in rural India. The population size used to evaluate migraine along with its triggers and comorbidities adds to the uniqueness of this work. A study of this scale is a pioneering work in the field.

## MATERIALS AND METHODS

This study was conducted in a tertiary care hospital in the city of Faridkot between August 2016 and January 2018. Faridkot is a small city holding a total area of 1469 km<sup>2</sup>, lying in the south-western corner of Punjab. Surrounded by rural areas, this hospital mainly caters to village residents. This was an observational, questionnaire-based prospective study. All the patients from the rural areas presenting to the neurology outpatient department, consecutively with complaints of headache were recruited for the study. Only consenting patients were enrolled in the study. Institutional ethical clearance was obtained for the same. A medical student was given training sessions by the neurologist regarding the method to deliver the questionnaire. Each patient was subjected to a simple questionnaire, which had four different sections. The first segment covered demographic factors including age, sex, marital status, education, and occupation. The second section dealt with if a patient had ever suffered a headache, who diagnosed them? Was it a general physician, a neurologist, other or they did not contact anyone? Questions regarding the severity of headache, location, and description of headache were also asked. The third segment enquired about the accompanying features like sound sensitivity, photophobia, nausea, vomiting, ringing sensation, numbness, dizziness, etc.,. In the fourth part questions regarding light sensitivity, triggers of migraine, and various comorbidities were asked. The aggravating and relieving factors for headache, drugs taken, and association with other neurological and systemic symptoms were also included in this section. MIDAS score was applied to all the patients to assess migraine-related disability. This is a 5 point score, assessing various problems faced by the patients during last 3 months, mainly - days missed at work or school, productivity reduction to half or more at work or school, skipped household work, reduced productivity in household work for more than half of the time, lastly, days missed for family or social functions due to a headache. Depending on the number of days in the above five points, MIDAS score was calculated as per grade I (0–5) little or no disability, grade II (6–10) mild disability, grade III (11–20 score) moderate disability, and grade IV (21+) severe disability. A necessary clinical examination was carried out on all the patients. The classification of headache was based on the criteria laid down by the International Classification of Headache Disorders, Third Edition (ICHD-III beta version), 2013.<sup>[1]</sup> Neuroimaging was performed in a few patients wherever indicated.

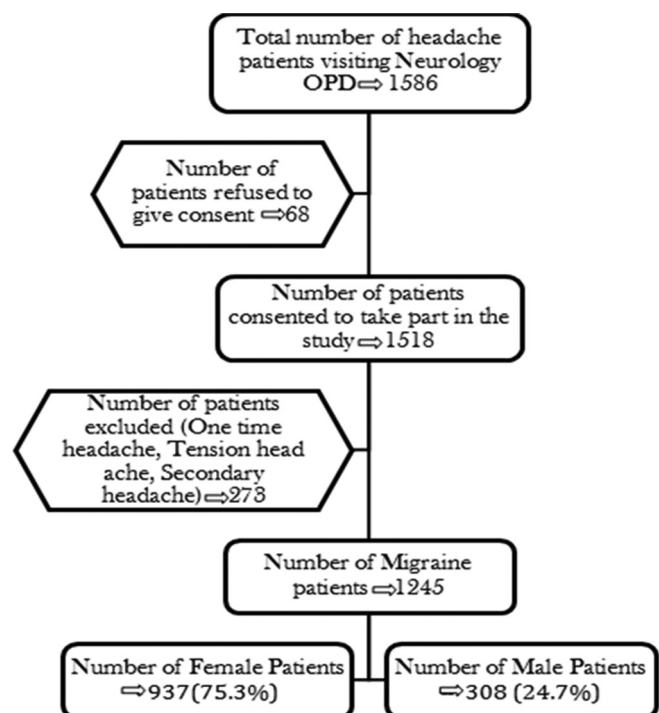
## Statistical analysis

SPSS Statistics v25, SAS Studio 3.7 and Excel (Office 365) were primarily used for analyzing data. Exploratory data analysis (EDA) was performed on explanatory variables (such as demographic variables). Distribution analysis was conducted on the independent variables using box-and-whisker plots to standardize the data and identify outliers. Once summary tables were generated using SPSS, the data was visualized using clustered bar charts and pie graphs. Furthermore, SAS studio was used for data exploration, running summary statistics, and performing distribution analysis.

## OBSERVATIONS AND RESULTS

### Sociodemographic features

Around 1,586 patients visited the neurology OPD with complaints of a headache. Out of which 68 patients refused to take part in the study, citing personal reasons. The remaining 1,518 patients gave consent to take part in the study. The classification of headache was applied to 1,518 patients [Flow Chart 1]. Patients with tension headaches, one-time-only headaches, and secondary headaches were excluded from the study. Out of these 1,245 patients were found to have a migraine. Amongst these, 937 (75.3%) were females and 308 (24.7%) were males. Table 1 shows the age and sex distribution of patients. Demographic profile of patients is given in [Table 2], which gives a detailed overview of patients married status, education status, and occupation. The unspecified group covered those patients whose answers were ambiguous about their educational status. Besides being housewives, farmers, students; 258 (20.7%) had various other



Flow Chart 1: Migraine patient account flow chart

**Table 1: Age and sex distribution of patients**

Age and Sex Distribution		
Age	Female Freq.	Male Freq.
<b>Mean age- 36.8 years</b>		
Up to 14 Years	9	22
15-24 Years	121	62
25-34 Years	263	83
35-44 Years	254	52
45-54 Years	177	38
55-64 Years	84	28
65-74 Years	10	11
>= 75 Years	6	5
Unspecified	13	7
Gender	Freq.	Percentage
Female	937	75.26%
Male	308	24.74%

professions such as teaching, army, laborers, businessmen, shopkeepers, tailors, clerks, retired people, etc., Questions regarding whom they contacted first for their headaches were asked to all the patients. To our surprise, only 25.5% consulted a neurologist, 19.6% visited a general physician whereas 18.1% were seeking advice from homoeopathic or ayurvedic doctors [Table 2]. Most of the patients were not taking any regular prophylaxis treatment. Though in our study, we did not look specifically at this aspect; however, a substantial number of patients i.e. 36.8% were not seeking consultation from any doctor and were taking over the counter painkillers to relieve their headaches. This was their first visit to the hospital for treating their headache.

### Clinical characteristics

Detailed history regarding symptoms preceding and associated with headache was noted. All the participants were classified into migraine with and without aura. Out of 1,245 patients, 180 (14.46%) admitted to having an aura.

Nearly 165 patients accounting for visual aura (91.66%) outnumbered rest of the aura types including slurring of the speech seen in 37 (20.5%). Though 120 patients complained of slurring of speech, which was seen preceding the attack in few, it was during the attack and following the attack in others. About 99 patients initially complained about of numbness though as aura preceding the migraine was seen in 12 (6.7%). Total 79 patients (30.5%) complained of a feeling weakness on one side of the body, although actually visible weakness (hemiplegia) was seen in 2 patients (1.1%) preceding the migraine attack. Many patients had more than one type of aura and few had more than two. Almost half of the population (636, 51.08%) suffered a headache for nearly the entire day (24 h). This number was comparable in both the genders. The duration was calculated on the basis of the most common attacks patients had. In 363 (29.2%) patient's headache lasted up to 4 h, whereas for 109 (8.6%) pain duration was only a few minutes in a few attacks. Only 52 (4.2%)

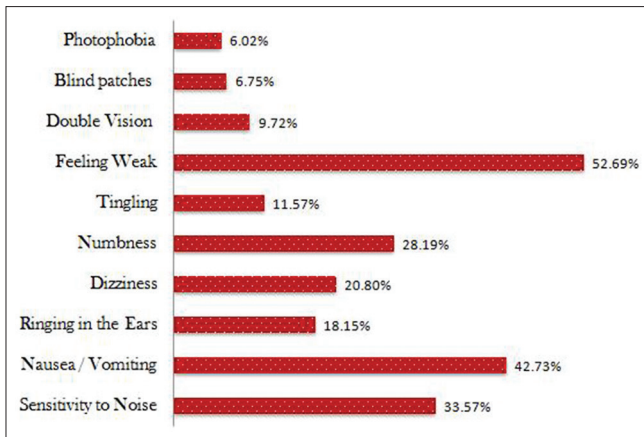
**Table 2: Demographic and clinical profile of patients with migraine**

Marital Status	Female Freq.	Male Freq.	Total %
Married	828	212	83.53%
Unmarried	107	92	15.98%
Unspecified (undisclosed)	2	4	0.48%
Education	Female Freq.	Male Freq.	Total %
Primary	137	45	14.62%
Middle	120	49	13.57%
Secondary	288	131	33.65%
Diploma and Graduation	98	35	10.68%
Post graduation	50	7	4.58%
Illiterate	191	31	17.83%
Unspecified (not sure)	53	10	5.06%
Occupation	Female Freq.	Male Freq.	Total %
Housewife	740	0	59.44%
Farmer	1	127	10.28%
Student	73	46	9.56%
Others	123	135	20.72%
Shown first for headache	Female Freq.	Male Freq.	Total %
GP	182	62	19.60%
Neurologist	233	85	25.54%
Others (Homeopathic doctors, Ayurveda)	165	60	18.07%
No One	357	101	36.79%
Pain Duration	Female Freq.	Male Freq.	Total %
≤24 h	831	275	88.83%
>24 h	42	10	4.17%
Not Specified	64	23	6.98%
Pain Intensity in Last 12 months	Female Patients	Male Patients	Total %
Mild	82	51	10.68%
Moderate	265	113	30.36%
Severe	563	141	56.55%
Not Sure	27	3	2.40%
Pain Type	Female Count	Male Count	Total %
Aching	233	90	21.21%
Throbbing/Pulsating	251	69	21.01%
Sharp/Lancing	393	120	33.68%
Pressure/Squeeze	274	93	24.10%

patients complained of a headache for more than 24 h. Another pain severity and types of pain are discussed in Table 2.

### Accompanying features of headache

Fatigability was the most common accompanying feature accounting for 52.7% of cases, followed by nausea/vomiting (42.7%) and phonophobia (33.6%). Around 28.2% patients complained of numbness during headache, 20.8% felt



**Figure 1:** The various accompanying features of migraine besides headache

a vertiginous sensation, 18.2% people complained of a feeling of ringing in the ears, and 11.6% complained of tingling [Figure 1]. Few patients complained of visual symptoms in the form of double vision (9.7%), blind patch in one eye (6.8%) and photophobia affected only 6.0% of patients in our study population, which is in contrast to many studies published earlier that had shown a high percentage of people complaining of photophobia. Fundus examination was done in all the patients who complained of ringing in the ears, double patch and blind patch to rule out papilledema. Wherever indicated, neuroimaging was planned in patients to look for secondary headaches.

**Trigger factors**

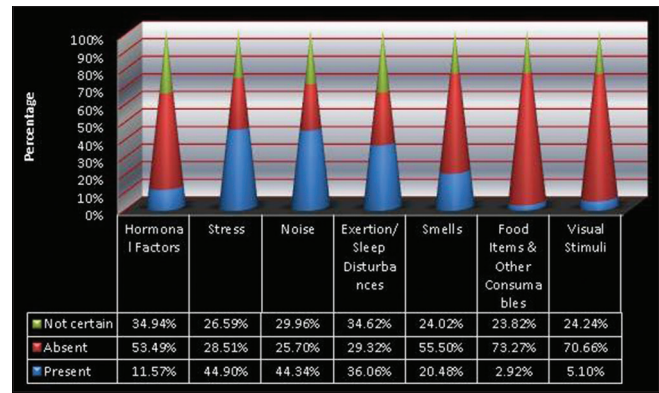
Stress (44.9%), noise (44.3%), exertion, and sleep disturbances (36.1%) were identified as the top three triggers for migraine. Furthermore, smell (20.5%) and hormonal factors (11.6%) also emerged as significant migraine triggers. Moreover, visual stimuli, flickering lights, alternate light, and shade and other patterns were considerably weaker triggers (5.1%). Lastly, consumables and eatables had the least impact (2.9%) [Figure 2].

**Comorbidities**

The common comorbid conditions associated with migraine are depression, anxiety, syncope, panic disorder, epilepsy, stroke, and sometimes cardiovascular diseases and gastrointestinal disorders. Anxiety was identified as the most common comorbidity, prevalent in 542 patients (43.5%) followed by depression (320, 25.7%). About 78 patients (6.3%) suffered from episodes of syncope once or twice in their lifetime which was also seen in a younger population. Panic and bipolar mood disorders were present in 103 (8.3%) patients.

**Migraine disability assessment test**

MIDAS questionnaire was applied to all the patients to evaluate the disease-related disability and its impact on their quality of lives in the previous 3 months. About 41.9% of patients scored more than 20 points and had a severe disability with migraine,



**Figure 2:** Various trigger factors precipitating migraine

**Table 3: MIDAS- disability scale**

MIDAS Grade	Types of grades	Number of Patients	Percentages	Score
I	Little or No Disability	376	30.2%	<5
II	Mild Disability	119	9.56%	6-10
III	Moderate Disability	240	19.28%	11-20
IV	Severe Disability	510	41.9%	> 20

19.3% had moderate disability, 9.6% had a mild disability, and 30.2% had no disability [Table 3]. Since the population was predominantly comprised of females, especially housewives, the reduced and missed days of household work scored higher than missed or reduced activity in school or job.

**DISCUSSION**

Migraine, a chronic disabling disease is one of the leading neurological disorders for seeking medical care. Migraine significantly impacts the quality of life of sufferers compared to that of non-migraineurs.<sup>[14]</sup> Earlier studies have reported 1.6 times the frequency of migraines in female students (62%) compared to that of male counterparts (38%).<sup>[15,16]</sup>

Whereas the current study suggests thrice the frequency of migraine in females (75.3%) compared to males (24.7%). Most of the participants were in the 12–54 year age group and were seeking medical attention for migraine for the first time. Around 59.4% of the patients were housewives.

Our social fabric usually puts the needs of males ahead of females. Based on this observation, we can presume that a similar trend is observed in migraine treatment for females.

Though migraine has a major impact on health and the healthcare system, as per a study done on medical students, only a fourth of them approached health services for treatment.<sup>[15]</sup> A previous study demonstrated that only 4.6% sought medical assistance with a substantial number (68.2%) taking simple analgesics for pain relief.<sup>[16]</sup> In the current study, only 25.5% of patients visited a neurologist and a significant number (36.8%) did not go to any doctor and were taking over

the counter pain killers to relieve their headaches. Moreover, it was their first visit to the hospital for a headache. One possible explanation could be that the study population mainly belongs to rural areas and the people were unaware of the specialist help available to cure this disease. None of the patients was on migraine-specific treatment or its prophylaxis. Whether these people had analgesic abuse or not, could not be ascertained from the questionnaire, though about one-third of them were consuming over the counter medications.

### Accompanying features

Besides frequency and severity, the impact of migraine on a person can be assessed by accompanying factors such as headache which usually does not happen in isolation. Nausea/vomiting, photophobia, phonophobia, insomnia, etc., could be the possible accompanying features though their association with headache is quite a variable as per the literature. The most common accompanying feature exhibited by the study group was a feeling of weakness (52.7%), followed by nausea/vomiting (42.7%) and phonophobia (33.6%). Around 28.2% of patients reported numbness during a headache, 20.8% felt a vertiginous sensation, 18.2% of the people experienced a ringing in the ears, and 11.6% felt a tingling. Photophobia was present in 6.0% of patients.

Some patients had one associated feature and very few had multiple associated features simultaneously. These symptoms were in comparison to an Australian study where nausea was present in 46.6%, vomiting in 10%, and photophobia in 10% patients of a headache though this study was conducted mainly in cervicogenic headache.<sup>[17]</sup> In previous studies, associated features were exhibited in variable proportions. This was in contrast with a Turkish study that mentioned photophobia in 82%, nausea in 64%, vomiting in 24%, strong odors in 35%, and lacrimation in 34% of patients as associated features.<sup>[18]</sup> In another study from an Indian tertiary care center, the associated features with migraine were also displayed in varied frequency, photophobia in 84%, nausea in 72%, and vomiting was observed in 50% of patients.<sup>[19]</sup> Hence these figures indicate a great variability in the proportion of abovementioned associated features with a headache.

### Trigger factors

Trigger factors are quite common in migraine patients and stress, reduced sleep, noise, bright light, exertion, tiredness, and various foods were identified as common triggers in the present study. By impacting 44.9% of patient population stress emerged as the most common trigger in the study. The noise was ranked second (44.3%) and the third was exertion and sleep disturbances, seen in 36.1% of people, and the results were comparable to previously conducted studies. This is in comparison with the research conducted on medical students which indicated poor sleep hygiene and emotional stress as triggers.<sup>[20]</sup> Around 68% of the medical students felt relieved of their headaches after a good sleep. Weather changes and head movement identified as migraine triggers by that piece of work are beyond the purview of the current study.<sup>[21,22]</sup>

Smells triggered migraine in 20.5% of cases. This finding is also supported by the literature review.<sup>[15,23-25]</sup> Hormonal factors acted as a trigger in 11.6% of patients.<sup>[15]</sup> Another study also found fatigue, bright light, noise, nervous strain, fasting or missing a meal, menstruation etc., as causal factors for migraine.<sup>[24]</sup> In that study, about 55% of the patients had one or more provoking factors. In our study, visual stimuli, flickering lights, alternate light and shade, and other patterns were found in very low frequency (5.1%) as contributory factors for the onset of a migraine. Food items such as cheese, chocolates, and consumables like caffeine (tea, coffee etc.), red wine and alcohol triggered migraine in only 2.9% of patients. These differences could correlate to varied dietary habits based upon geographic boundaries. Moreover, previous studies of migraine in India have also established that dietary factors have not been a significant trigger in our country.<sup>[25]</sup> Trigger factors vary with the type of population under study and the geographical area hence, one needs to be aware of them for effective counseling of migraine patients. Emotional stress, noise, exertion and sleep disturbances, visual stimuli (bright lights, alternating patterns), smells, and some foodstuffs were identified as modifiable triggers in the current study. Unmodifiable triggers were mainly hormonal changes and menstrual cycles. Therefore, lifestyle modification, adequate sleep, avoiding stress and overexertion, some foods, and smells may help in relieving symptoms to some extent. However, one can also prevent it by taking prophylactic medications. In certain cases multiple triggers were also evident. Therefore, each trigger needs to be addressed separately to reduce the frequency of attacks.

### Comorbidities

Various published studies have manifested the association of depression and anxiety disorders in adults with migraine.<sup>[13]</sup> In the current study, 38.2% of the migraineurs suffered from depressive symptoms. Previously published research study has highlighted the incidence of depressive symptoms in 17–42% of migraine patients.<sup>[11,12]</sup> Around 62% of the patients with migraine in our study were suffering from anxiety symptoms.<sup>[26]</sup> Though this observation rate was found to be higher than as reported in studies from Italy (38.1%), China (38.1%), and the USA (51%).<sup>[27-29]</sup> In the current study, anxiety was found to be the most common comorbidity in 542 patients (43.53%) and depression in 320 (25.7%). About 78 patients (6.27%) suffered from the episodes of syncope once or twice in a lifetime that was also seen in a younger population. Other psychiatric illnesses such as panic disorder and manic-depressive illness were found in 103 patients (8.3%). This reporting of the comparatively low rate of comorbid conditions in the present study could be accounted to its rural background where such symptoms might not be given due significance. It has been indicated that comorbid conditions like depression or anxiety in conjunction with migraine, may result in higher medical costs compared to migraine alone hence, these factors need to be studied very carefully and thoroughly.

Migraine-related disability was found to be high in the younger and middle-aged population, especially in housewives. Studies

have confirmed the burden of migraine on the affected person, his/her family and work productivity.<sup>[30]</sup>

The analgesic overuse headache was out of the purview of this study and could be contemplated as its limitation. However, this shortcoming could not defeat the main purpose of the entire exercise. A sizably large population; investigating previously ignored demography (rural) to evaluate migraine along with its triggers and comorbidities adds to the strength of this work. This maiden effort made to access the neurological health of rural India can have a far-reaching impact on the millions plagued by this condition.

## CONCLUSION

The current findings suggest a high prevalence of headache and migraine amongst the female population. Despite having a significant amount of disability associated with the disease; its triggers and treatment options were marginally studied among this rural population. Furthermore, taking over the counter painkillers to suppress triggers was prominently evident. This being a public health issue; besides raising disease awareness, enhanced community participation can be instrumental in ensuring better diagnosis and effective treatment regimen. Nonetheless, larger population-based studies can accomplish more pronounced benefits.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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