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**Mapping of physical activity habits and kinesiophobia in a group of
people with migraine**

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Abstract

Background: Migraine is a common headache disorder often aggravated by physical activity. Due to the triggering feature of physical exercise, and it frequently leading to kinesiophobia, migraine patients are known to be less physically active. However, physical exercise may be used as a prophylactic migraine treatment option.

Aim: The aim of this study was to map out physical activity habits and kinesiophobia in relation to migraine in a group of people with migraine.

Methods: An electronic cross-sectional questionnaire was used as method. The questionnaire was based on specific questions on physical activity in relation to migraine, as well as on the indicator questions on physical activity from The Swedish National Board of Health and Welfare and The Swedish version of the Tampa Scale of Kinesiophobia (TSK-SV). A total of 205 people with migraine participated and were included in the study.

Results: The majority of participants had experienced physical activity to trigger a migraine attack. High intensity aerobic training was perceived as the most triggering type of physical exercise and low intensity aerobic training the least. The results also showed that the prevalence of kinesiophobia in the group was 62% and thus in agreement with previous studies on the subject.

Conclusions: The results from the current study sample were in agreement with previous studies regarding physical activity triggers and prevalence of kinesiophobia among people with migraine. The majority had experienced physical activity to trigger a migraine attack and especially high intensity aerobic training was perceived as triggering. Kinesiophobia was prevalent in over half of the study sample. Further studies are required in order to map out experiences of physical activity in people with migraine in general.

Key words: migraine, physical activity, migraine trigger, kinesiophobia

Sammanfattning

Bakgrund: Migrän är en vanlig huvudvärkssjukdom som ofta förvärras av fysisk aktivitet. På grund av den fysiska aktivitetens triggande egenskap, samt att det frekvent leder till kinesiofobi, är migränpatienter kända att vara mindre fysiskt aktiva. Däremot kan fysisk aktivitet användas som ett profylaktiskt behandlingsalternativ mot migrän.

Syfte: Studiens syfte var att kartlägga fysiska aktivitetsvanor och kinesiofobi i relation till migrän i en grupp personer med migrän.

Metod: En elektronisk tvärsnittlig enkät användes som metod. Enkäten baserades på specifika frågor om fysisk aktivitet i relation till migrän, så väl som på Socialstyrelsens indikatorfrågor om fysisk aktivitetsnivå och Tampaskalan för kinesiofobi – svensk version (TSK-SV). Totalt 205 personer med migrän deltog och var inkluderade i studien.

Resultat: Majoriteten av deltagarna hade upplevt att fysisk aktivitet triggat ett migränanfall. Högintensiv aerobisk träning uppfattades som den mest triggande typen av fysisk träning och lågintensiv aerobisk träning uppfattades som den minst triggande typen. Resultatet visade också att prevalensen av kinesiofobi i gruppen var 62% och således överensstämmande med tidigare studier i ämnet.

Slutsats: Resultaten från den aktuella studiepopulationen var överensstämmande med tidigare studier angående triggande fysisk aktivitet och prevalensen av kinesiofobi bland personer med migrän. Majoriteten hade upplevt att fysisk aktivitet triggat ett migränanfall och särskilt högintensiv aerobisk träning uppfattades som triggande. Kinesiofobi var prevalent hos mer än halva studiepopulationen. Fortsatta studier krävs för att kartlägga erfarenheter av fysisk aktivitet hos personer med migrän generellt.

Nyckelord: migrän, fysisk aktivitet, migräntrigger, kinesiofobi

Abbreviations

CGRP *Calcitonin gene-related peptide*

ICHD-3 *International Classification of Headache Disorders, 3rd edition*

NO *Nitric oxide*

NSAID *Nonsteroidal anti-inflammatory drug*

SD *Standard deviation*

SSRI *Selective serotonin reuptake inhibitor*

TSK-SV *Tampa Scale of Kinesiophobia - Swedish version*

Contents

1. Background	1
1.1 Migraine	1
1.1.1 Prevalence	1
1.1.2 Triggers and prodromal symptoms	1
1.1.3 Biopsychosocial impact	2
1.1.4 Treatment	3
1.2 Physical activity	5
1.2.1 Physical activity and migraine	5
1.2.2 Kinesiophobia in migraine patients	6
2. Purpose	6
2.1 Research questions	6
3. Methods	6
3.1 Design	6
3.2 Study sample	7
3.3 Procedure	7
3.3.1 Data collection	7
3.3.2 Measuring instrument	7
3.3.3 Analysis	8
3.4 Ethics	9
4. Results	9
4.1 Background variables	9
4.2 Physical activity level and triggers	11
4.3 Kinesiophobia	15
5. Discussion	15
5.1 Method and material discussion	15
5.1.1 Study sample	15
5.1.2 Procedure	16
5.2 Result discussion	17
6. Clinical relevance	20
7. Conclusion	20
8. References	21
9. Appendices	24
9.1 Appendix 1 - Questionnaire	24
9.2 Appendix 2 - Letter of information and consent	29

1. Background

1.1 Migraine

Migraine is a common headache disorder that appear with reoccurring headache attacks. Migraine is a neurovascular illness characterized by its unilateral location, pulsating quality, moderate to severe pain intensity and aggravation by physical activity. It is also often accompanied by symptoms such as nausea, with or without vomiting, and high sensitivity to light and sound. An untreated or unsuccessfully treated migraine attack typically lasts 4-72 hours. There are two major subtypes of migraine: migraine without aura and migraine with aura. For diagnosis, at least five headache attacks accompanied by the symptoms already mentioned above are required. Migraine with aura is in addition characterized by the temporary, often visual or sensory, phenomena happening before or during a migraine attack. Based on the number of days with headaches each month, migraine can be classified into episodic migraine or chronic migraine. For chronic migraine classification, 15 or more headache days have to occur each month, whereof eight headache days with the migraine features previously described, for at least 3 months (1).

1.1.1 Prevalence

A study in Europe showed that the mean prevalence of migraine among European adults is 14.7%. The prevalence is 8% in men and 17.6% in women, making migraine in women more common. However, the study also reports that if probable migraine – i.e. when all diagnostic criteria but one are met - was to be included, the prevalence would be nearly twice as high (2). The European prevalence of migraine correlates with the world prevalence which is also 14.7% (3). Another study showed that the prevalence of migraine in the Swedish adult population was $13.2 \pm 1.9\%$, whereof 9.5% among men and 16.7% among women. Yet, around 50% of individuals with migraine do not seek healthcare which may have an impact on and give a false impression of the prevalence (4).

1.1.2 Triggers and prodromal symptoms

Several studies have shown that there are a number of common trigger factors that may provoke migraine attacks in patients. Knowledge about these trigger factors is important to provide migraine management strategies and prevent future attacks. By avoiding or coping with individual trigger factors, people with migraine may decrease the number of headache

days and possibly improve their quality of life (5). Studies have shown that some common migraine triggers include, but are not limited to, emotional stress, sleep disturbance such as lack of sleep, changed sleep duration and oversleep, alcohol, hormones such as during the premenstrual period, dietary factors such as hunger, light, odors and smells such as strong perfume, weather changes and other environmental factors, physical activity and more (5, 6).

Prodromal symptoms are common in migraine patients and provide early signs that may predict potential migraine attacks. Patients have been able to accurately predict a future migraine attack 72% of the time based on prodromal symptoms. The symptoms include tiredness, difficulty concentrating, and having a stiff neck (7). Other common prodromal symptoms are general uneasiness, fatigue, mood changes, gastrointestinal problems and more (6). Migraine triggers and prodromal symptoms, i.e. symptoms at the onset of a migraine attack, are present in the majority of migraine sufferers. However, some common prodromal symptoms may be confused for triggers and individuals vary in their ability to correctly predict attacks based on prodromal symptoms and trigger factors (8).

1.1.3 Biopsychosocial impact

Migraine comes with a significant impact, both in terms of a socio-economic burden with extensive healthcare costs and in terms of loss in quality of life with increased numbers of migraine days (9). Not only does migraine disable during an attack, but also in between attacks. The worry and expectation of future migraine attacks is referred to as interictal burden. This, as well, may have a negative impact on for example productivity, social relationships and work capacity. It is reported that 48.2% of American people with migraine have some level of impairment and 22.1% are considered severely disabled. Fear of the next migraine attack is a major factor that reduces individuals' perception of quality of life and impact on routine daily activities. The stress and worry that the interictal burden causes may itself trigger migraine attacks, referred to as the "cycle of migraine" (10). The burden of migraine both during and in between attacks can have a significant impact on the individual's quality of life, family and social life (11). Furthermore, *cephalalgiphobia* is described as the fear or phobia of having a headache attack or of the pain worsening, particularly prevalent in some people with chronic migraine. This fear is linked to avoidance behavior such as overmedication (12). Although migraine patients typically are advised to avoid trigger factors, a study has shown that the preferred approach instead should be to develop coping strategies

for said factors. Avoidance of triggers may result in avoidance of other enjoyable activities (13).

Comorbidity is common in migraine patients. Migraine is comorbid with e.g. depression, anxiety disorders, vascular brain lesions, cardiovascular diseases and other chronic illnesses. Comorbidity require increased amount of medical care and implicate challenges and limitations to treatment (14). Studies show that headaches may progress from episodic into chronic migraines through certain risk factors. Some of these risk factors are modifiable and others are not. It has been reported that people with migraine have developed depressive symptoms as a result of recurring and disabling headaches. These depressive symptoms categorize as modifiable risk factors, meaning that the symptoms can be managed. However, since depressive symptoms may not always be apparent, it is suggested to include psychiatric screening and follow-up in the migraine treatment in order to confirm whether depression is present or not when other known risk factors are lacking (15, 16).

The tendency to seek medical consultation is, as previously presented, low among people with migraine (4). An American study on medical consultation for migraine found that there is a low rate of migraine diagnosis even among people that are suffering from migraine with severe pain intensity and disability. Men, young people, and people that are paying for their own health care are less likely to seek medical care which result in lack of consultation and diagnosis. More can be done to increase healthcare utilization in this group of people (17).

1.1.4 Treatment

There are several interventions for migraine treatment with strong evidence. Headaches, including migraines, are commonly treated with analgesics such as aspirin, other nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen. Because of their high accessibility and predominantly desired effect, NSAIDs remain the first choice when treating mild and moderate migraine attacks. When the desired effect is not achieved, triptans are the second choice (18). Studies have shown that triptans are more efficient than NSAIDs and other equivalent medicinal preparations when treating acute migraine attacks (19). Triptans may also be combined with NSAIDs in order to improve the desired outcome (18, 19).

Prophylactic migraine interventions play a major part in migraine treatment and should be considered when a patient's migraine attacks are too frequent, severely impairs the patient's

life, or when acute medication does not have the desired effect (20). For preventing migraine attacks, especially the episodic kind, there is significant evidence that for example beta-blockers and antiepileptic drugs are effective (21, 22). As second choice in prophylactic migraine treatment, tricyclic antidepressants are effective as migraine preventive drugs (23). Selective serotonin reuptake inhibitor (SSRIs) have been shown to be less efficient than tricyclic antidepressants and, according to studies with short-term trials, SSRIs have not been shown to have more effect on treating migraine than placebo (24, 25). Preventing migraines with botulinum toxins is another treatment option, especially for patients suffering from chronic migraine, as it has shown to reduce the number of monthly headache days by 2-3 days. However, the evidence is limited as to how effective the treatment is on patients with episodic migraine (26-28). A new prophylactic migraine treatment option on the market is the inhibition of calcitonin gene-related peptide (CGRP), a peptide that is involved in triggering migraine attacks. Erenumab, or Aimovig as it is also called, was the first of this kind on the market and has shown great effect in preventing migraine attacks and in reducing the number of monthly migraine days (29, 30).

Although acute pharmacological management is common, it is only one of many components in the broader migraine management (22). For migraine prevention, both pharmacological and non-pharmacological treatment may be equally helpful. However, the knowledge of how to use non-pharmacological interventions is not widespread among healthcare providers and further studies are needed in order to compare interventions and raise awareness of their efficacy (31). Lifestyle modification and avoidance of triggers are aspects for preventing migraine. Regularity in food intake, hydration and sleep, as well as management of stress levels, may reduce the risk of future attacks (32). Studies have suggested physical exercise to be a prophylactic treatment option for patients that do not want to take traditional medication or do not benefit from taking these (33). Implementing physical exercise as a lifestyle habit has several health benefits and may reduce the risk of common comorbidities (34). Acupuncture is an example of a non-pharmacological intervention utilized to prevent and reduce future attacks or to treat an ongoing one. Several studies have demonstrated its effectiveness (35). However, other studies conclude that the effect of acupuncture is limited or equivalent to placebo and remain skeptical to this treatment option (36).

1.2 Physical activity

Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (37, p.126). Physical activity can be related to e.g. sports, household work, occupation and more. Exercise is a subcategory of physical activity and imply that the movement is planned, structured and repetitive and has the purpose to improve or maintain physical fitness (37).

1.2.1 Physical activity and migraine

People with migraine are known to be less physically active than the average person without headache (38). Among many stimuli that may trigger migraine attacks, physical exercise is found to be one of them. A study on a group of diagnosed migraine patients from a headache clinic found that the lifetime prevalence of exercise-triggered migraine attacks was 38%. It was reported that exercise such as running and cardio-fitness, racket sports and boxing may contribute to trigger migraine attacks. In this particular study, patients often reported to quit high-intensity exercises or sports due to it triggering migraines, but some patients were capable of practicing low-energy exercises without experiencing migraines (39). Also, continuous pressure put to the head or forehead, from headwear such as swim goggles, helmets or hats used in sports, may lead to external compression headache and worsen migraines (40).

However, physical activity may not always trigger migraine. A study concluded that although patients report exercise to be a migraine trigger, maximal aerobic exercise may not always provoke an attack (41). Exercise may, in fact, be used as a non-pharmacological and prophylactic migraine treatment option. A study found physical exercise to be equally as effective as the pharmacological antiepileptic drug topiramate on the reduction of migraine frequency (33). A Swedish study had migraine patients join an aerobic exercise program which was based on indoor bicycling and included warm-up and cool-down. The exercise program was performed three times per week for 12 weeks and improved patients’ maximal oxygen uptake without worsening their migraines (42). Consistent physical exercise may alter the threshold of which a person’s migraine is triggered. The exact frequency and intensity of exercise is unknown and in need of future research (34).

1.2.2 Kinesiophobia in migraine patients

Kinesiophobia is the fear of pain induced by physical movement, defined as “an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability due to painful injury or reinjury” (43, p.847). Detection of kinesiophobia may be very important when managing chronic pain conditions such as migraine, as kinesiophobia is a fear behavior that often leads to reduced practice of physical activities and is related to a poorer prognosis. A recent study examined kinesiophobia in migraine patients and found that it was present in just over half (53%) of the 89 participating patients (44).

There is consequently support for physical activity to have positive effects on people, not least people suffering from migraine. Also, the high prevalence of kinesiophobia among people with migraine indicate fear of inducing migraine through physical activity, which may prevent people with migraine from being physically active. In summary, in order to provide migraine patients with safe and high-quality healthcare, further studies on physical activity in relation to migraine are required.

2. Purpose

The aim of this study was to map out physical activity habits and kinesiophobia in relation to migraine in a group of people with migraine.

2.1 Research questions

- What is the physical activity level in a group of people with migraine?
- To what extent is physical activity perceived to trigger migraine in this group of people?
- To what extent are different types of physical activity perceived to trigger migraine in this group of people?
- What is the prevalence of kinesiophobia in this group of people?

3. Methods

3.1 Design

Quantitative cross-sectional questionnaire study.

3.2 Study sample

The participants in this study were people who identify themselves as people with migraine, with or without a medical diagnosis, all of which were members of two specific headache related Facebook groups. The groups had approximately 6300 and 2800 members each. A total of 205 people responded to the survey.

Inclusion criteria:

- Medical migraine diagnosis (ICHD-3) or self-diagnosed migraine
- Over 18 years of age
- Ability to understand the Swedish language

Exclusion criteria:

- Pertinent comorbidity (i.e. occurrence of other severe chronic diseases/disorders/disabilities that impair or limit physical activity)

3.3 Procedure

3.3.1 Data collection

An electronic questionnaire was published in two specific headache related Facebook groups. Participants were asked to answer truthfully and to have their own experiences in mind when responding to the survey questions. The collection of data proceeded for just over two weeks. A reminder was published in the same Facebook groups when about half of the data collection time had passed.

3.3.2 Measuring instrument

An electronic questionnaire was designed in the survey tool SUNET Survey and used as method for collection of data (Appendix 1). The questionnaire took about 10 minutes to complete. It included specific questions that enabled responses to the research questions. Almost all questions were closed-ended which allowed participants to choose the options that best correlated with their experiences. The questionnaire also included indicator questions on physical activity from The Swedish National Board of Health and Welfare and The Swedish

version of the Tampa Scale of Kinesiophobia (TSK-SV). The indicator questions on physical activity from The National Board of Health and Welfare consist of three questions that aim to establish a person's level of physical activity. The questions are based on the recommendations on physical activity from the same government agency (45, 46). Through the questions, participants report how much time they spend on physical exercise each week, how much time they spend on daily non-exercise physical activity each week, and how much time they spend sitting each week. The response alternatives are a range of number of minutes/hours. The participant chooses the response alternative that best correlates with his or her own experience. A study executed by The National Board of Health and Welfare showed that closed-ended questions in the indicator questionnaire gave the most valid responses (45). The purpose of including the indicator questions in the survey was to measure the level of physical activity in the study sample. The TSK-SV was included in the questionnaire to examine to what extent participants rank fear of physical movement. The TSK-SV is a measuring instrument consisting of 17 statements and has the participant ranking these statements in a 4-point scale from "strongly disagree" to "strongly agree". The lowest possible score is 17 and the highest possible score, suggesting severe kinesiophobia, is 68. TSK-SV was established as a reliable and validated measuring instrument when tested on a sample with low back pain and is suggested to be valid also on other populations (47). Some of the TSK-SV questions were slightly modified to suit the purpose of this study. The 1st, 9th, and 15th TSK-SV questions were modified by replacing "injure myself"/"get injured" with "trigger migraine". The 6th question was modified by replacing "injury" with "migraine".

The questionnaire was formatted in a way that required responses to all the survey questions. Skipping questions was not allowed. In some cases, the "other" or "do not know" alternative was enabled. The questionnaire was pretested by having 2 people with migraine outside of the project complete the survey. The measuring instrument, namely the complete questionnaire, was not tested for reliability and validity.

3.3.3 Analysis

Variables and the collected data were transferred into Microsoft Excel program for Mac. Participants' responses to the indicator questions on physical activity from The National Board of Health were analyzed to determine the distribution of physical activity level among people in the group. Responses to the TSK-SV questions were calculated at individual level to obtain individual scores of kinesiophobia. Rankings of the TSK-SV questions 4, 8, 12 and 16

were inverted in accordance with the formation of the questionnaire (48). A cut-off score of 37 was used to establish the prevalence of kinesiophobia at individual level. Then, the share of participants with a total score of 37 or higher were calculated into a sum score to determine the prevalence of kinesiophobia in the group (49). Data was compiled and presented with descriptive statistics, mainly in the form of numbers and percentages. Mean value and standard deviation (SD) were used for background variables and TSK-SV scores. The results were presented in text format and with tables and figures created in the Microsoft Excel and Microsoft Word programs.

3.4 Ethics

Participation in the study was voluntary and participants were free to refuse participation or choose to discontinue at any time. To participate, participants had to read through and agree to conditions and thus give their written informed consent before responding to the questionnaire (Appendix 2). Anonymity was guaranteed in order to enable honest and trustworthy responses. The responses could not be connected to any single individual. Data was handled confidentially. Data was initially saved and stored in the SUNET Survey online survey tool before it was transferred to the researching student's password protected computer. Only the researching student had access to the collected data and the data was used only for research purposes. Data was not analyzed until the data collection time had concluded and the online survey was closed. To ensure confidentiality further, data was presented at group level in a way that could not expose a single individual's responses.

4. Results

4.1 Background variables

This study included 205 participants of which 96% (n=196) were women and 4% (n=9) were men. The mean age was 42 (SD \pm 9.91) years and ranged between a minimum of 18 years and a maximum of 72 years. Ninety-one percent (n=186) of the participants had been diagnosed with migraine by a physician and 9% (n=19) had not. Reported diagnoses included migraine, chronic migraine, migraine with aura, migraine without aura and hormonal migraine. Out of the 186 participants who reported to have been diagnosed by a physician, 18 participants failed to respond accurately or did not know the diagnosis. Migraine with aura was reported

by 53% (n=109) whereas 45% (n=92) reported migraine without aura in the group. The most frequently reported number of headache days within the group was 5-9 days of headache (29.8%/n=61), immediately followed by 15 or more days of headache (28.8%/n=59) each month (Figure 1).

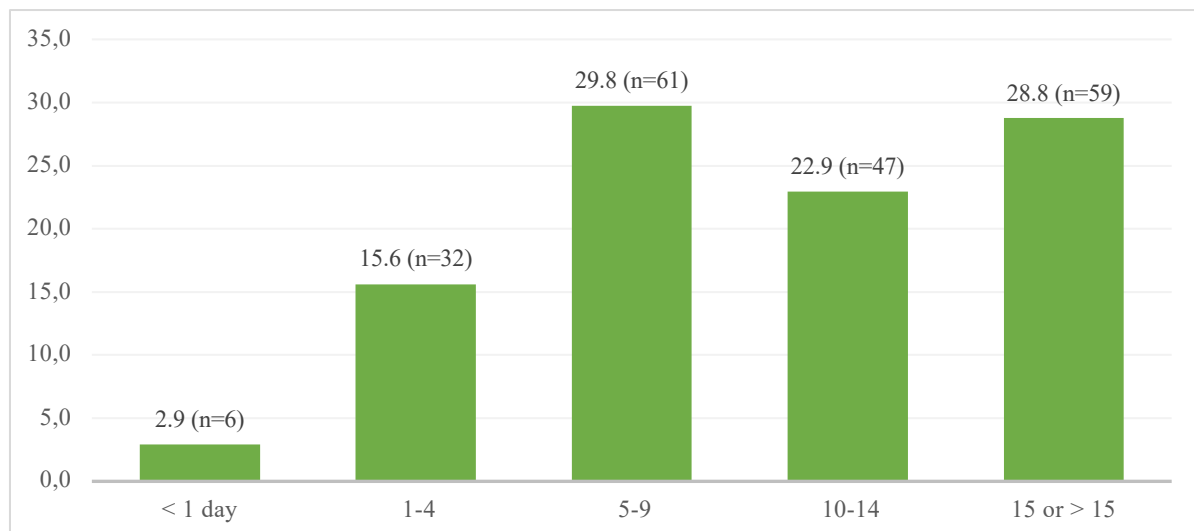


Figure 1. Approximate number of headache days a month per person in percentage (n=205).

People in the group treated their migraine in different ways (Figure 2). The majority treated their migraines with analgesics and/or migraine specific medication. Only one person reported to not treat their migraine at all. Participants that reported to treat their migraines in other ways were asked how. Other ways of treating migraines included massage, chiropractic and/or physiotherapy, exercise such as medical and regular yoga, low intensity aerobic exercise, strength training, walks, caffeine or coffee, daith piercing, acupressure mat, special diet such as gluten free or LCHF, dietary supplements of magnesium or vitamin B12, opioid-based analgesics, blood pressure medication, occipital nerve block, medical oxygen, and more (Figure 2).

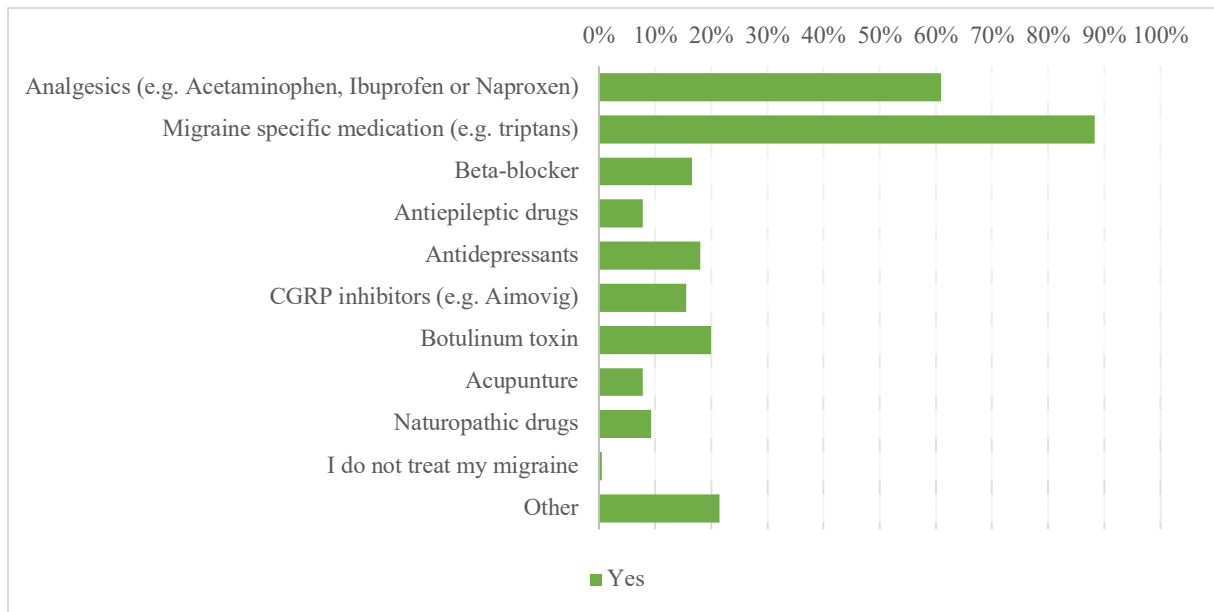


Figure 2. Migraine treatment options* (n=205).

*Participants were able to choose all options that applied.

4.2 Physical activity level and triggers

The physical activity level in the group was mapped out through the indicator questions on physical activity from The Swedish National Board of Health and Welfare (Figure 3a-c). As presented in figure 3a, 23.4% (n=48) did not engage in any physical exercise at all each week, whereas 20% (n=41) engaged in more than 2 hours of physical exercise each week (Figure 3a). Most participants engaged in daily non-exercise physical activity each week (Figure 3b). Also, most participants sat down for several hours each day (Figure 3c).

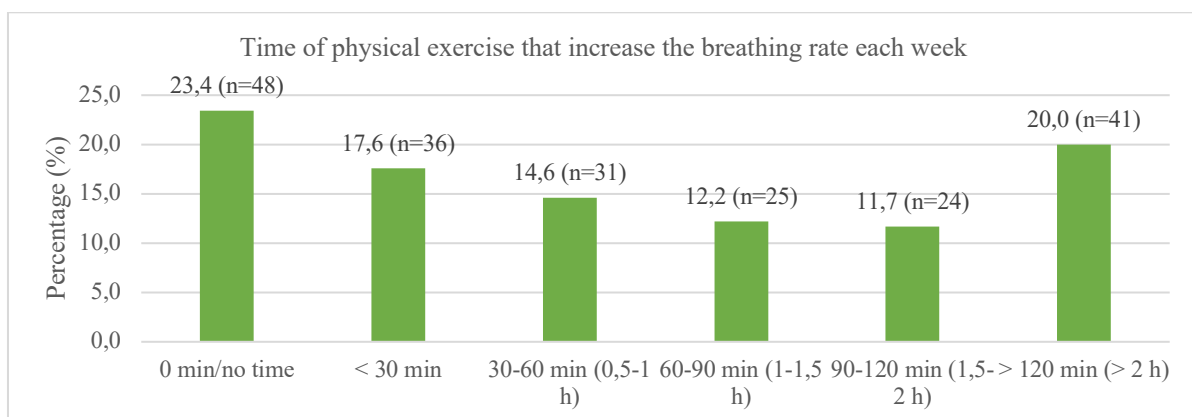


Figure 3a.

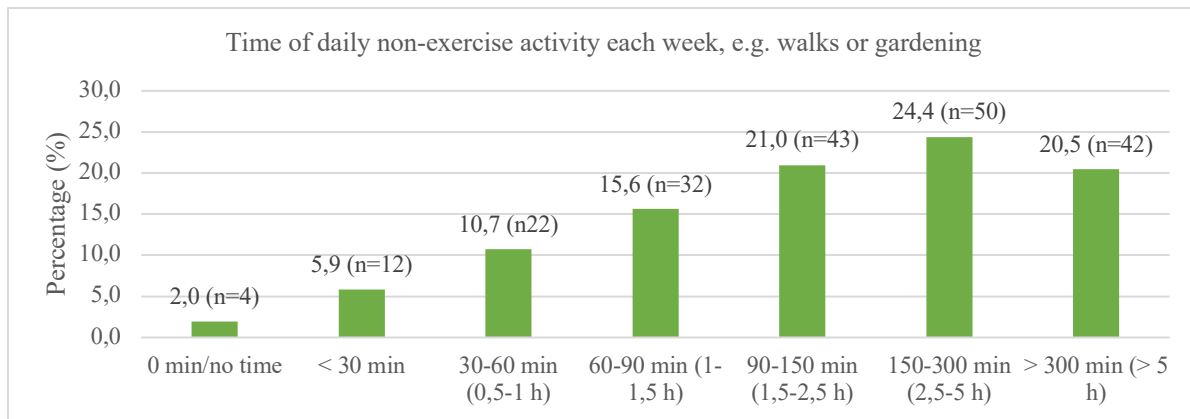


Figure 3b.

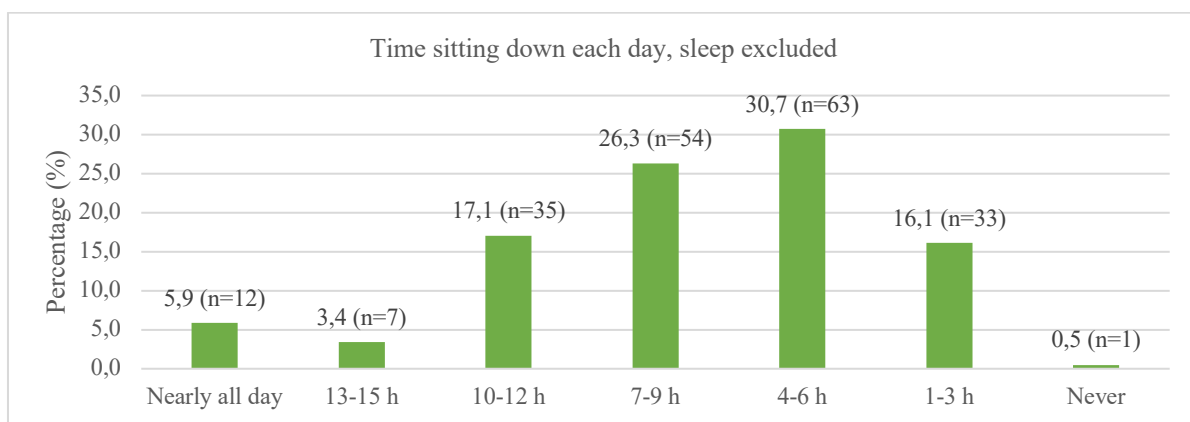


Figure 3c. Figure 3a-c depict the distribution of physical activity level in the group according to the indicator questions on physical activity from The Swedish National Board of Health and Welfare (n=205).

When asked if they had ever experienced physical activity to trigger a migraine attack, 81% (n=167) said yes, 14% (n=28) said no, and 5% (n=10) did not know. Most participants experienced that they sometimes had migraines triggered by physical exercise. Also, more or less the same number of participants experienced that they always (n=23) or never (n=22) had migraines triggered by physical exercise (Figure 4). High intensity aerobic training, running and moderate intensity aerobic training were the top three most commonly chosen physical activity alternatives that participants had experienced to always trigger migraine attacks. Household work, low intensity aerobic training and gardening were the top three physical activities experienced to never trigger migraine attacks (Figure 5). When specifying the “other” option, swimming, crossfit, dancing and horseback riding were given as examples of frequently triggering forms of exercises. Some participants reported physical activity that included neck flexion or strains on the neck, or physical activity in combination with other trigger factors – such as stress, poor sleep or food – to be specifically triggering. Physical exercise in combination with menstruation was also mentioned as a factor. A common

opinion was that all types of heart rate increasing activities could potentially lead to migraines, and that ongoing headaches and migraines are always aggravated by physical activity. However, other participants stated that migraines may not always be triggered by physical exercise and that sometimes it is hard to tell whether a migraine attack would occur regardless. High intensity aerobic training was perceived to trigger migraine the most and low intensity aerobic training was perceived to trigger migraine the least (Figure 6). Seventy-six percent (n=155) claimed to have refrained from engaging in a physical activity due to avoid it triggering a migraine attack. Twenty-four percent (n=50) had not refrained from a physical activity for the same reason.

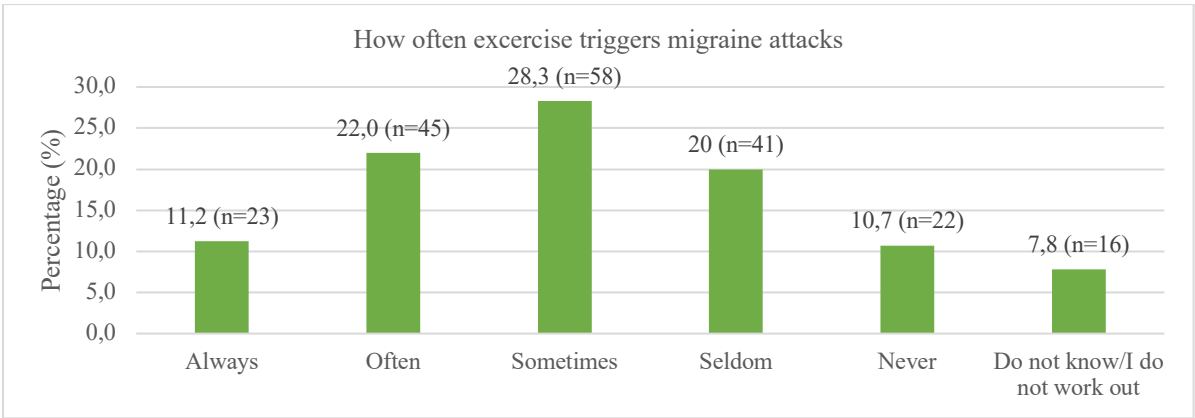


Figure 4. How often physical exercise is perceived to trigger migraine attacks (n=205).

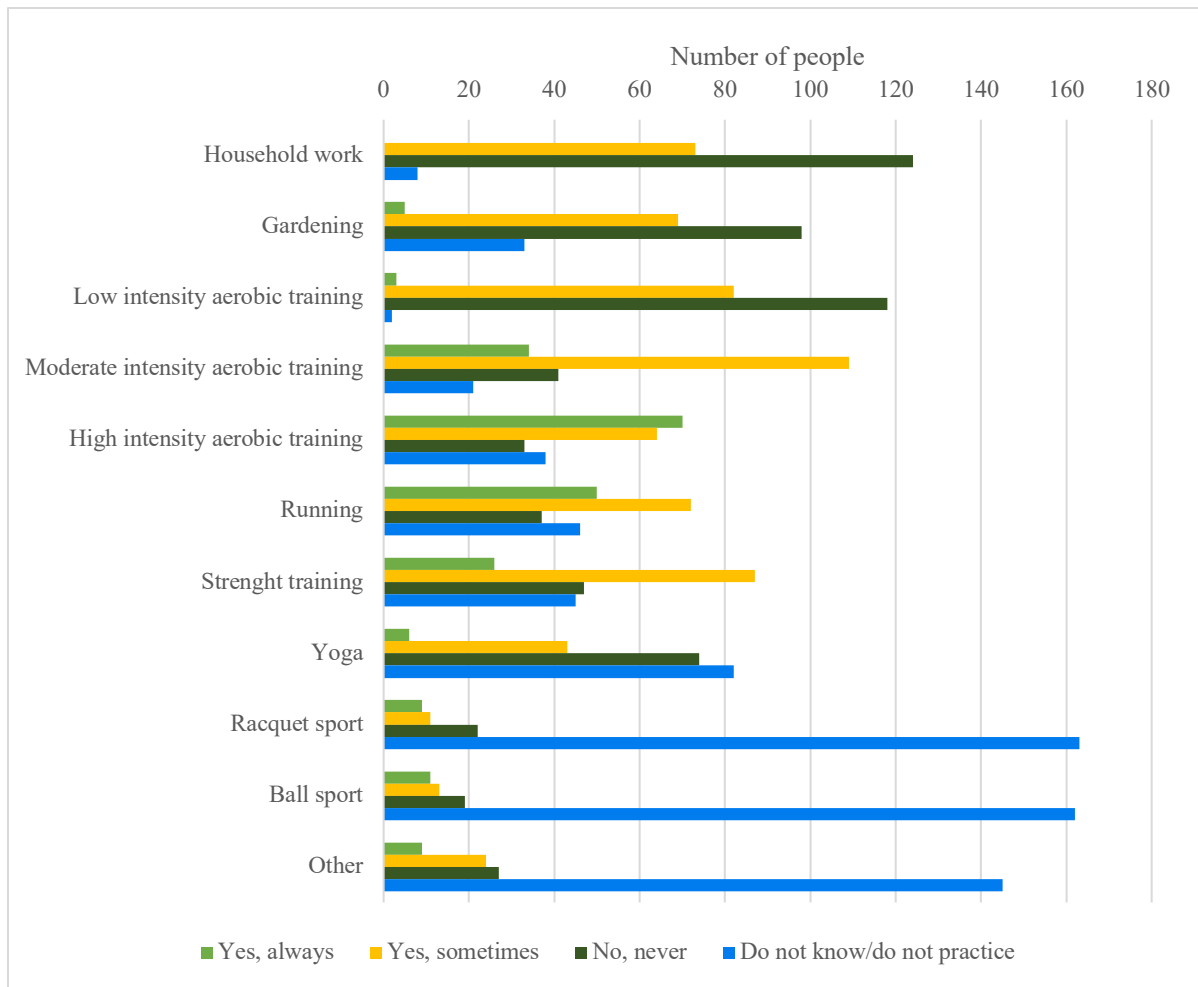


Figure 5. Types of physical activities that have triggered migraines (n=205).

**Participants were asked to choose the option that applied for each activity.*

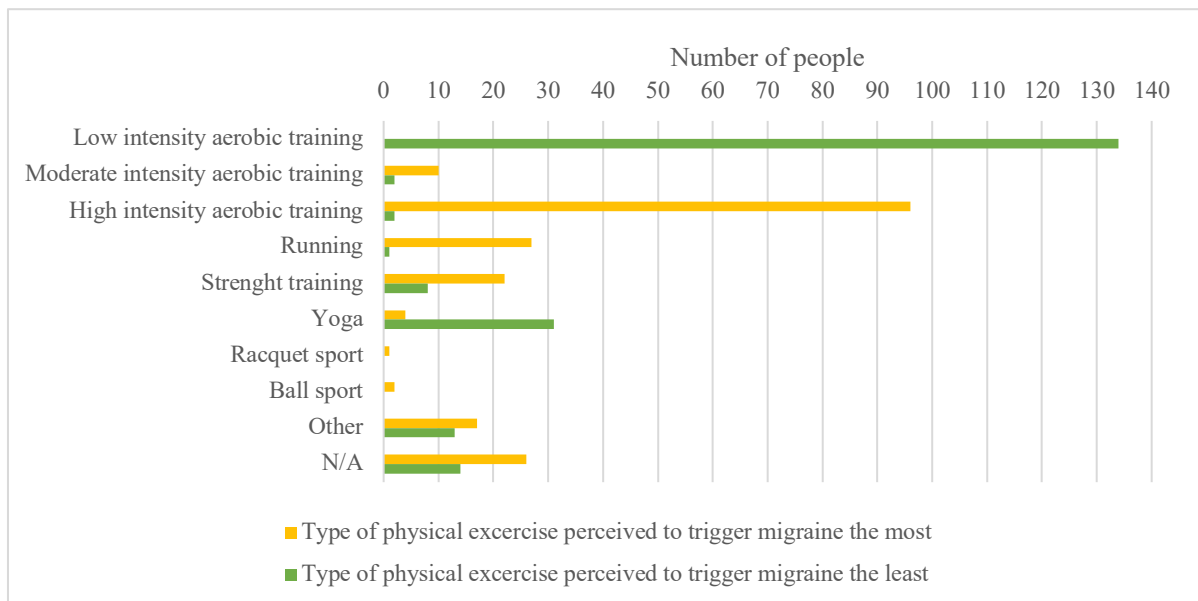


Figure 6. Physical exercises that trigger migraine the most/the least (n=205).

4.3 Kinesiophobia

The mean TSK-SV score in the group was 39.4 (SD \pm 8.73). The minimum score was 20 and the maximum score was 63. The results show that 62% (n=128) of the participants scored 37 or higher on the TSK-SV questionnaire.

5. Discussion

5.1 Method and material discussion

5.1.1 Study sample

It is important to emphasize that the results of this study apply only to this specific study sample. Participants in this study were people with migraine, where the majority had a medical migraine diagnosis. Despite defining migraine as a disease in the questionnaire's introductory information, it is possible that some participants may not actually suffer from migraine or may instead suffer from diseases other than migraine which are not strived after in this particular study. Participants were predominantly women which correlates with previous research on migraine prevalence (2). However, the prevalence ratio of migraine for men and women in the current study does not entirely match the prevalence ratio in the general population. The study sample was collected from two specific migraine and headache related Facebook groups, which consequently included only a small portion of people with migraine in Sweden. The sex ratios in these Facebook groups were unknown but the high number of female participants may indicate a high number of female Facebook group members. If that is the case, the hormonal aspect also has to be taken into consideration when interpreting the results, as menstrually related migraine is a form of migraine diagnosis (1). Some participants in the current study reported to have menstrually related migraines which thus may affect the results. Furthermore, since the questionnaire title was formulated as "physical activity and migraine", and participants were provided with information regarding the purpose of the study, the study may have attracted some people and repelled others. Since the aim of the study was known, there is a chance that the questionnaire may have attracted people who are physically active people more than people who are not. On the other hand, the questionnaire may also have attracted less physically active people who might consider lack of physical activity to be an issue in their lives. This may suggest that the results of physical activity levels may be either overestimated or underestimated and may not be representative

of people with migraine in general. Extensive demographic data of the study sample was limited, although further background variable mapping may be irrelevant.

Pertinent comorbidity was specified as the only exclusion criterion in this study. It was defined as an occurrence of other severe chronic diseases/disorders/disabilities that impair or limit physical activity. However, it was not further specified how this exclusion was defined and applied. This is one of the greater limitations of this study, as people decided to participate despite having diseases/disorders/disabilities that may possibly have an impact on their physical activity. Some of the reported comorbidities that participants stated impair on their physical activity ability include, but are not limited to, depression, anxiety, fatigue syndrome, spinal disc herniation, spinal stenosis, hyperthyroidism, cancer, arthritis, diabetes, obesity, asthma and other injuries or dysfunctions. The extent of the impact these comorbidities have on people's physical activity cannot be determined from this survey.

5.1.2 Procedure

The survey was tested only on two people with migraine, not involved in the project, before the final version of the survey was published. This enabled feedback on for example perplexing questions and enabled the possibility to correct any uncertainties. The collection of data was accomplished completely digitally through the participants' own computers or other digital devices. The environment in which participants took part of the study is thus unknown, as well as its potential impact on responses. Participants were encouraged to email the researching student with questions regarding the survey. Yet, no questions were emailed. Instead, the comment section by the end of the questionnaire was frequently used to leave feedback and comments. Therefore, the researching student did not have the opportunity to provide assistance while participants were filling out the questionnaire. By responding to participants questions during the data collection, some sources of error may had been avoided and made the results more credible.

The questionnaire included the standardized indicator questions on physical activity from The Swedish National Board of Health and Welfare to evaluate the level of physical activity in the group with valid and reliable measures. The questionnaire also included the measuring instrument TSK-SV which previously has been concluded as a reliable questionnaire on patients with chronic low back pain (47). It is, however, not studied whether it is appropriate to apply the measuring instrument on migraine patients. The TSK-SV was slightly modified

to suit the purpose of this study. One can debate whether the choice to include and modify the TSK-SV is reasonable. By reading the questions, one may be confused whether the questions are referring to an ongoing migraine attack or not, or a mix of both, and participants may have drawn their own conclusions in this matter. Take for example the statement “My pain would probably be relieved if I were to exercise”. This is an example of a statement which contradicts one of the most fundamental characteristics of a migraine headache, as physical activity is well known to aggravate an ongoing migraine (1). The modification of the TSK-SV statements were for the most part to alter the phrasing “injury“ to “migraine”. The statements phrasing “pain”, on the other hand, were left unchanged. This resulted in comments from participants regarding there being more to migraine than pain. In addition to the measuring instruments, the questionnaire included questions created by the researcher. These questions were not validity and reliability tested.

All collected survey data was utilized in this study. Thus, data from individuals with reported comorbidity that still chose to participate in the study, even though comorbidity is an exclusion, was included in the study. The dropout rate was not measured in this study. As all survey questions were compulsory and required responses, the participants dropping out of the study were thus the participants that did not complete the full questionnaire. An advantage with compulsory survey questions is that participants do not miss questions by mistake, that they are forced to choose the best corresponding option and that it results in a sufficient amount of data. However, a consequence of requiring participants to respond to every single survey question is that they may not always agree with any alternative and may therefore randomly pick one. They may also decide not to complete the questionnaire, which would be the unknown dropout rate in the current study.

5.2 Result discussion

The results show that physical activity levels in the group are varying. A total of 23,4% reported to not engage in any physical exercise at all each week. This was the most frequently chosen alternative and may indicate that some participants in this group are inactive. Previous research has shown that migraine patients are less active than the general population (38). However, the distribution of physical activity levels reported depict that the remaining participants engaged in some physical exercise each week and that the second most frequently chosen alternative was to engage in physical exercise for 2 hours or more each week. Also,

most participants engaged in some sort of daily non-exercise physical activities. The results from the three indicator questions have not been compiled and calculated. Furthermore, researchers use different approaches when establishing physical activity levels in a study sample. The measured levels of physical activity among participants in the current study may therefore not be evaluated or compared to the general population.

Participants had to a great extent experienced physical activity to trigger a migraine attack. Approximately 4 out of 5 participants reported to have had a migraine triggered by physical activity at least once, whereas 14% had never had that experience. When asked if they experienced physical exercise to trigger migraine, the majority revealed that it sometimes did. However, around 11% reported physical activity to never trigger migraine, which is a lower number than 14% and indicates inconsistency. The inconsistency may depend on the increasing number of participants that reported “do not know/I do not work out” when asked how often they perceive physical exercise to trigger migraine attacks. The answers varied between physical exercise to always, often, sometimes and never trigger migraine which indicates that this is an experience which varies between individuals. Some individuals may be more or less prone to trigger an attack through physical exercise. Exercise may trigger an attack, as previously discussed by Varkey et al., but even high intensity aerobic training may not always cause such consequences (41). Rather, what is experienced as migraine triggering is individual, and people have individual migraine thresholds which can be altered by consistent physical exercise (5, 34). The tendency to trigger an attack through physical exercise may also depend on the type of exercise performed.

High intensity aerobic training, running and moderate intensity aerobic training were the three most frequently chosen physical activity alternatives experienced to trigger migraine attacks in this group of people. In this study, high intensity aerobic training was reported as the type of physical exercise to trigger migraine the most. Previous studies have established high intensity exercises to be especially migraine triggering, which supports the results of the current study (39). Participants reported examples of forms of physical exercises that trigger migraine, for example swimming and horseback riding. These types of exercises may both be performed at different intensity levels. The types of exercises also correlates with a study on headaches due to external compression, where pressure put on head and forehead was concluded to cause headaches or trigger migraine attacks (40). Just as in the examples given by participants in the current study, the pressure from swim goggles worn when swimming or

helmets worn in sports such as horseback riding could potentially be a factor which contributes to people experiencing these types of physical exercises as migraine triggering. The fact that ongoing migraines are typically aggravated by physical movement is important to take into consideration. The survey question simply asked if the participant had ever experienced a physical activity to trigger a migraine attack. It could, however, easily be mistaken for the experience of worsening an already ongoing migraine. The least triggering physical activities reported by participants were household work, low intensity aerobic training and gardening. This, too, correlates with previous research on people with migraine being able to perform low intensity exercises without triggering an attack (39).

The mean TSK-SV score was 39.4 and thus over the cut-off score of 37. A total of 62% of the participants attained a TSK-SV score of 37 or higher, indicating a high prevalence of kinesiophobia in the group. It is a number that is in agreement with the prevalence of 53% among migraine suffering participants in a recent study by Benatto et al. (44). Fear of pain induced by physical activity is, interestingly enough, preventing people with migraine from a potentially prophylactic migraine treatment option (33). Consequently, due to the high prevalence of kinesiophobia and the apparent benefits of physical activity, it would be beneficial to include discussions about fears and information about the importance of physical activity as an essential part of migraine treatment.

The current study will hopefully inspire to future studies with a similar aim to investigate physical activity habits and experiences among people suffering from migraines. It would also be interesting to investigate whether said group of people consider themselves pleased with their level of physical activity or if they aspire to be able to exercise more. Furthermore, future studies may investigate approaches and attitudes towards physical activity, or more specifically physical exercise, in a group of people with migraine. From the results of the current study, it would also be interesting to investigate whether there is a correlation between low levels of physical activity and a high prevalence of kinesiophobia. There is a lack of studies and evidence on physical exercise in combination with migraine. Future studies should aim to investigate specific physical exercise for migraine patients, for example regarding type of exercise, dosage and individualization. Such studies are needed in order to develop specific physical activity recommendations and guidelines for people suffering from migraine.

6. Clinical relevance

Migraine is a common disease in the world and practicing healthcare professionals are very likely to encounter patients suffering from migraine. It is a disease which can have a tremendous impact on people's lives and severely impair on daily activities, such as physical activity. It is well established that physical activity is part of the foundations for a healthy lifestyle. To this day, there is a limited amount of studies on physical activity in relation to migraine. There are currently no recommendations or guidelines on physical activity for people with migraine. For physiotherapists, it is important to have knowledge about migraine and to individualize and modify treatment. Due to its potentially triggering effect, physiotherapists should take this into consideration and adjust physical exercise to meet patients' needs. It is also important to have the prevalence of kinesiophobia in mind and take into consideration how that may affect a patient's motivation to participate in physiotherapy. The physiotherapist plays an important part in educating its patients and informing about the positive effects of physical activity. A physiotherapist should also collaborate with other healthcare professionals in order to provide patients with adequate treatment options.

In this study, a group of people with migraine have shared their experiences of physical activity in relation to migraine. This study has hopefully shed light on some of the difficulties and challenges patients with migraine may face as well as the opportunities they have.

7. Conclusion

The aim of the study was to map out physical activity habits and kinesiophobia in relation to migraine in a group of people with migraine. The results depict a varying physical activity level in the group. Most participants engaged in some physical exercise each week and also in daily non-exercise physical activities. The majority of participants had experienced physical activity to trigger a migraine attack. High intensity aerobic training was perceived as the most triggering type of physical exercise and low intensity aerobic training as the least. The results also showed that the prevalence of kinesiophobia in the group was in agreement with previous studies on the subject. The results only apply to the study sample and may not be generalized to people with migraine. Due to the rather small size of the study, future more comprehensive studies are required in order to establish experiences of physical activity in people with migraine in general, specifically in terms of physical activity level, migraine triggers, and kinesiophobia.

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9. Appendices

9.1 Appendix 1 - Questionnaire

Tack för att du deltar i denna enkätstudie! Enkäten innehåller frågor om migrän och fysisk aktivitet. Med *migrän* menas återkommande huvudvärksattacker med pulserande, ofta ensidig karaktär och med symptom som illamående och ljus- och ljudkänslighet. Med *fysisk aktivitet* menas alla typer av kroppsrörelse, t.ex. hushållsarbete, sport och träning.

Bakgrund

Följande frågor ämnar att ge en bakgrundsbild av studiens deltagare.

1. Kön/Könsidentitet

- Man
- Kvinna
- Annat alternativ

2. Ange din ålder (år)

Om migrän

Följande frågor handlar om din migränsjukdom. Kryssa i det alternativ som passar bäst in på din situation.

3. Har du fått en migrändiagnos av läkare?

- Ja
- Nej

4. Om ja, vilken?

5. Upplever du någon gång en så kallad aura (t.ex. synfenomen) i samband med migränanfall?

- Ja
- Nej
- Vet ej

6. Ungefär hur många dagar i månaden har du *huvudvärk*?

- <1 dag
- 1-4 dagar
- 5-9 dagar
- 10-14 dagar
- 15 eller >15 dagar

7. Hur behandlar du din migrän? Du kan välja flera alternativ.

- Smärtstillande läkemedel (t.ex. Paracetamol, Ibuprofen eller Naproxen)
- Migränspecifika anfallskuperande läkemedel (som t.ex. innehåller triptaner)
- Betablockerare
- Epilepsiläkemedel
- Antidepressiva läkemedel
- Aimovig/Ajovy (CGRP-hämmande)
- Botox
- Akupunktur
- Naturläkemedel
- Jag behandlar inte min migrän
- Annat, nämligen

Om fysisk aktivitet

Frågor om din fysiska aktivitetsnivå. Följande frågor handlar om hur fysiskt aktiv du är. Kryssa i eller svara på det alternativ som passar bäst in på din situation.

8. Hur mycket tid ägnar du en vanlig vecka åt fysisk träning som får dig att bli andfådd, till exempel löpning, motionsgymnastik eller bollsport?

- 0 minuter/Ingen tid
- Mindre än 30 minuter
- 30-60 minuter (0,5-1 timmar)
- 60-90 minuter (1-1,5 timmar)
- 90-120 minuter (1,5-2 timmar)
- Mer än 120 minuter (2 timmar)

9. Hur mycket tid ägnar du en vanlig vecka åt vardagsmotion, till exempel promenader, cykling eller trädgårdsarbete? Räkna samman all tid (minst 10 min åt gången).

- 0 minuter/Ingen tid
- Mindre än 30 minuter
- 30-60 minuter (0,5-1 timmar)
- 60-90 minuter (1-1,5 timmar)
- 90-150 minuter (1,5-2,5 timmar)
- 150-300 minuter (2,5-5 timmar)
- Mer än 300 minuter (5 timmar)

10. Hur mycket sitter du under ett normalt dygn om man räknar bort sömn?

- Så gott som hela dagen
- 13-15 timmar
- 10-12 timmar
- 7-9 timmar
- 4-6 timmar
- 1-3 timmar
- Aldrig

11. Har du någon gång upplevt att fysisk aktivitet kan trigga ett migränanfall?

- Ja
 Nej
 Vet ej

12. När du tränar, hur ofta triggas ett migränanfall?

- Alltid
 Ofta
 Ibland
 Sällan
 Aldrig
 Vet ej/jag tränar inte

13. Vilken typ av fysisk aktivitet har triggat ett migränanfall? Sätt ett kryss vid lämpligt alternativ för varje påstående.

	Ja, alltid	Ja, ibland	Nej, aldrig	Vet ej/utövar inte
Hushållsarbete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trädgårdsarbete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lågintensiv konditionsträning (t.ex. promenader)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medelintensiv konditionsträning (t.ex. gympapass eller uthållighetsträning)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Högintensiv konditionsträning (t.ex. intervallträning eller spinning)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Löpning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Styrketräning (t.ex. med kroppstyngd eller vikter/skivstång)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yoga	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Racketsport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bollsport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Annat (vänligen specificera i kommentarsfältet)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kommentar

14. Vilken typ av träning upplever du har *minst* risk att trigga ett migränanfall?

- Lågintensiv konditionsträning (t.ex. promenader)
- Medelintensiv konditionsträning (t.ex. gympapass eller uthållighetsträning)
- Högintensiv konditionsträning (t.ex. intervallträning eller spinning)
- Löpning
- Styrketräning (t.ex. med kroppstyngd eller vikter/skivstång)
- Yoga
- Racketsport
- Bollsport
- Inte tillämpligt/Jag tränar inte
- Annat, nämligen

15. Vilken typ av träning upplever du har *störst* risk att trigga ett migränanfall?

- Lågintensiv konditionsträning (t.ex. promenader)
- Medelintensiv konditionsträning (t.ex. gympapass eller uthållighetsträning)
- Högintensiv konditionsträning (t.ex. intervallträning eller spinning)
- Löpning
- Styrketräning (t.ex. med kroppstyngd eller vikter/skivstång)
- Yoga
- Racketsport
- Bollsport
- Inte tillämpligt/Jag tränar inte
- Annat, nämligen

16. Har du någon gång avstått från en fysisk aktivitet för att undvika att trigga ett migränanfall?

- Ja
- Nej

Kinesiofobi

Följande frågor är modifierade frågor av den svenska versionen av Tampa Scale of Kinesiophobia (TSK-SV).

17. Nedan följer olika erfarenheter som andra delgivit oss. Var vänlig och ringa in lämplig siffra från 1-4 för varje påstående. Läs varje påstående och besvara varje påstående så gott du kan, utifrån din egen migränsjukdom.

	1: Håller inte alls med	2	3	4: Håller med
Jag är rädd för att jag kan utlösa migrän om jag tränar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Om jag försökte träna så skulle min smärta öka	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Min kropp säger mig att jag har någon allvarlig åkomma	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Min smärta skulle troligen lindras om jag motionerade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Människor tar inte mitt medicinska tillstånd tillräckligt allvarligt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Min migrän har försvagat mig kroppsligen för resten av mitt liv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smärta beror alltid på kroppslig skada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bara för att någonting förvärrar min smärta behöver det inte betyda att det är farligt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jag är rädd för att jag skulle kunna utlösa migrän oavsiktligt om jag tränar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Att vara försiktig med onödiga rörelser är det bästa jag kan göra för att förhindra att smärtan förvärras	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jag skulle inte ha så här ont om det inte var något farligt på gång i min kropp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Även om det gör ont klarar jag mig bättre om jag är fysiskt aktiv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smärtan säger mig när jag skall sluta träna, så att jag inte skadar mig själv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det är verkligen inte ofarligt för en person i mitt tillstånd att vara fysiskt aktiv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jag kan inte göra samma saker som andra eftersom det är för stor risk att utlösa migrän	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Även om någonting orsakar mig mycket smärta så tror jag faktiskt inte att det är farligt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ingen ska behöva träna när hon eller han har ont	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Avslutande frågor

18. Har du andra allvarliga sjukdomar som påverkar eller leder till nedsatt fysisk aktivitet?

Nej

Ja, nämligen

19. Avslutningsvis, har du några övriga kommentarer? Här kan du till exempel ange om någonting varit oklart eller om du anser att något saknas i enkäten.

9.2 Appendix 2 - Letter of information and consent



LUNDS
UNIVERSITET

Deltagarinformation

Hej!

Jag är en fysioterapeutstudent vid Lunds Universitet som i samband med examensarbete valt att göra en enkätstudie med fokus på fysisk aktivitet och migrän. Genom att svara på enkäten deltar du i studien med syftet att undersöka attityder till och erfarenheter av fysisk aktivitet bland personer med migrän. Ditt deltagande kan bidra till ökad förståelse för aktivitets- och träningsvanor bland personer med migrän. Enkäten riktar sig till dig som är över 18 år gammal, som har någon form av migrän, med eller utan diagnos, och som inte har någon annan allvarlig sjukdom eller funktionsnedsättning som du tror påverkar din fysiska aktivitetsförmåga. Med migrän menas i stora drag återkommande huvudvärksattacker med pulserande, ofta ensidig karaktär och med symptom som illamående och ljus- och ljudkänslighet.

Enkäten tar ca 10 minuter att fylla i och består av 5 delar. Deltagande i studien är frivilligt. Du är fri att avbryta ditt deltagande när du vill utan att uppge anledning. Du behöver inte heller svara på alla frågor och behöver inte motivera varför. I övrigt är det bra om du svarar så ärligt som möjligt på frågorna. Utgå alltid ifrån dina egna erfarenheter när du svarar. Ditt svar är anonymt och kommer inte att kunna kopplas till dig. Resultat kommer att redovisas på gruppnivå och insamlad data kommer att hanteras och förvaras skyddad mot obehörig åtkomst.

Tack för ditt deltagande!

För frågor, mer information eller för att ta del av den färdiga uppsatsen, vänligen kontakta:

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Handledare

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