U.PORTO

FACULDADE DE MEDICINA
UNIVERSIDADE DO PORTO

MESTRADO INTEGRADO EM MEDICINA

2023/2024

Matilde Meireles Bertão

Female Sexual Dysfunction and Distress in Migraine: Results from a Tertiary Referral Hospital

Março, 2024

Matilde Meireles Bertão

Female Sexual Dysfunction and Distress in Migraine: Results from a Tertiary Referral Hospital

Mestrado Integrado em Medicina

Área: Medicina Clínica

Tipologia: Artigo de investigação

Trabalho efetuado sob a Orientação de:

Doutora Andreia Filipa Gomes Costa

E sob a Coorientação de:

Professor Doutor Pedro Miguel Paredes Abreu

Doutora Bárbara Pinto Martins

Trabalho organizado de acordo com as normas da revista:

Journal of Neurology

Março, 2024

Eu, Matilde Meireles Bertão, abaixo assinado, nº mecanográfico 201807441, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro ter actuado com absoluta integridade na elaboração do meu trabalho de Dissertação ou Monografia.

Neste sentido, confirmo que **NÃO** incorri em plágio (acto pelo qual um indivíduo, mesmo por omissão, assume a autoria de um determinado trabalho intelectual, ou partes dele). Mais declaro que todas as frases que retirei de trabalhos anteriores pertencentes a outros autores, foram referenciadas, ou redigidas com novas palavras, tendo colocado, neste caso, a citação da fonte bibliográfica.

Faculdade de Medicina da Universidade do Porto, 19/03/2024

Assinatura conforme cartão de identificação:

Matilde Meireles Bertão

UC Dissertação – DECLARAÇÃO DE REPRODUÇÃO

NOME

Matilde Meireles Bertão

NÚMERO DE ESTUDANTE	E-MAIL
201807441	up201807441@up.pt

DESIGNAÇÃO DA ÁREA DO PROJECTO

Medicina Clínica

TÍTULO DISSERTAÇÃO/~~MONOGRAFIA~~ (riscar o que não interessa)

Female Sexual Dysfunction and Distress in Migraine: Results from a Tertiary Referral Hospital

ORIENTADOR

Andreia Filipa Gomes da Costa

COORIENTADOR (se aplicável)

Pedro Miguel Paredes Abreu Bárbara Pinto Martins

ASSINALE APENAS UMA DAS OPÇÕES:

É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTE TRABALHO APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	☐
É AUTORIZADA A REPRODUÇÃO PARCIAL DESTE TRABALHO (INDICAR, CASO TAL SEJA NECESSÁRIO, Nº MÁXIMO DE PÁGINAS, ILUSTRAÇÕES, GRÁFICOS, ETC.) APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	☐
DE ACORDO COM A LEGISLAÇÃO EM VIGOR, (INDICAR, CASO TAL SEJA NECESSÁRIO, Nº MÁXIMO DE PÁGINAS, ILUSTRAÇÕES, GRÁFICOS, ETC.) NÃO É PERMITIDA A REPRODUÇÃO DE QUALQUER PARTE DESTE TRABALHO.	☒

Faculdade de Medicina da Universidade do Porto, 19/03/2024

Assinatura conforme cartão de identificação: Matilde Meireles Bertão

UC Dissertação - DECLARAÇÃO DE TRANSPARÊNCIA

RELATIVAMENTE À UTILIZAÇÃO DE FERRAMENTAS DE CHATBOT

GENERATIVO BASEADAS EM LARGE LANGUAGE MODELS

Eu, Matilde Meireles Bertão, abaixo assinado, nº mecanográfico 201807441, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro que:

☒ Não procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* para nenhuma das tarefas no contexto do meu trabalho de Dissertação ou Monografia

☐ Procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia, encontrando-se todas as interacções (*prompts* e respostas) transcritas em anexo bem como a indicação das aplicações utilizadas.

Neste sentido, confirmo que a eventual utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia foi exclusivamente descrita na sequência de *prompts* e respostas transcritos em anexo e nas aplicações indicadas.

Faculdade de Medicina da Universidade do Porto, 19/03/2024

Assinatura conforme cartão de identificação:

Matilde Meireles Bertão

Dedicatória

Peço ao tempo, que corra devagar

Um lugar a que possa voltar.

Clã 38 – Agrupamento 572 Mindelo

Em primeiro lugar, gostaria de agradecer à Dra. Andreia por ter aceitado o convite para orientar esta dissertação. Desde o 4º ano de faculdade, enquanto aluna, encontrei na Dra. Andreia a competência e dedicação para com a profissão e o ensino que tornaram esta escolha clara. Quero ainda agradecer à Dra. Bárbara por se ter juntado a este projeto e ajudado a cada passo do caminho. A ambas, um grande agradecimento por todo o apoio e compreensão na elaboração desta tese.

Aos meus Pais, por sempre terem acreditado em mim. Por todas as boleias, marmitas, caminhadas até à praia para espairecer, pelos "vai descansar" e pelos "eu posso-te ir buscar à faculdade". Por me incentivarem sempre a ser a minha melhor versão, com trabalho e esforço, mas também com muito amor. Sei que tenho muita sorte por ter crescido convosco. Ao meu Irmão, o maior exemplo de disciplina e dedicação que conheço. À Avó Dina, a minha primeira doente, que sempre teve muito orgulho na sua senhora doutora, antes mesmo de o ser. À Avó Adelaide, por todo o carinho e preocupação que sempre teve comigo, por vezes longe, mas sempre perto.

Ao João, por ser o meu porto de abrigo em todas as horas, a calma no meio do nervosismo, a motivação na insegurança, o colo no desmoronar e o abraço nos momentos certos. A vida é mais feliz contigo.

À Ana, à Bia, à Cássia, à Xica, à Raquel e à Vi por começarem esta aventura de Medicina comigo. À Mariana, à Marta e à Bea que se juntaram a meio. Esta faculdade nunca mais será só uma faculdade, e estas paredes contarão para sempre a nossa história. Pelo imenso *stress*, é certo, mas também pelas teóricas a dormir, pelos cafés no salão, pelos épicos Baconais e MedRads e pelas ressacas advindas, pelas épocas de exame a rir de nervoso e a chorar de não aguentar. Conseguimos, meninas. Pelas buscas na Queima de caloira, pela última Queima que se avizinha. Pelas memórias que vou levar comigo destes 6 anos. Obrigada por tudo.

Ao meu Clube de Debate, à Mariana, à Matilde, à Rita, à Sofia, ao Renato, ao Juncal e ao Zé, por, no meio dos vossos Erasmus, congressos na Austrália, voos do Algarve para o mundo, vida de trabalhadores e novas casas, terem sempre tempo para uma francesinha no Ritz ou no Sailorman.

Às minhas M&Ms, Mafalda e Guida, pelos abraços, pelos sorrisos, pelas aventuras de Mindelo até Kandersteg, por um Cenáculo *un poco loco* que me fez entender que a minha essência passa por amizades como a vossa.

Ao Escutismo, ao qual nunca vou conseguir encontrar palavras para agradecer. Tudo o que sou não o seria, pelo menos na mesma medida, sem o meu desenvolvimento enquanto escuteira. Ao meu Agrupamento, a cada um que encontra uma segunda casa entre as quatro paredes da sede, quero agradecer pelo lugar especial que ocupa na minha vida. Já diziam uns (sábios) exploradores: “Sozinhos vamos mais rápido, mas juntos vamos mais longe!”

A todos os que fizeram e fazem parte do crescimento desta menina mulher, que *é quase doutora*, o meu mais sincero e comovido: Obrigada!

Female Sexual Dysfunction and Distress in Migraine: Results from a Tertiary Referral Hospital

Matilde Bertão[1*], Bárbara Martins[2,3], Andreia Costa[2,3]

[1]Faculty of Medicine, University of Porto, Porto, Portugal

[2]Clinical Neuroscience and Mental Health Department, Faculty of Medicine, University of Porto, Porto, Portugal

[3]Neurology Department, Unidade Local de Saúde de São João, E.P.E., Porto, Portugal

*Corresponding author: Matilde Bertão, Faculty of Medicine, University of Porto. Alameda Prof. Hernâni Monteiro, 4200–319 Porto, Portugal. Email: up201807441@up.pt

ORCIDs:

Bárbara Martins: 0000-0003-3026-3453

Andreia Costa: 0000-0002-5331-9934

Abstract

Background: Female sexual dysfunction (FSD) is an underdiagnosed and undertreated problem. Few studies have addressed sexual distress in migraine. We aim to determine if there is an association between migraine and sexual dysfunction/distress and to identify their respective risk factors.

Methods: Retrospective, cross-sectional study, including 71 premenopausal female patients with migraine, followed in a tertiary hospital, and 34 age-matched-controls. Female Sexual Function Index-6 (FSFI-6), Female Sexual Distress Scale-Revised (FSDS-R), Migraine Disability Assessment (MIDAS) Scale, Brief Pain Inventory (BPI), Hospital Anxiety and Depression Scale (HADS) and Sleep Health Scale (RU-SATED) were applied.

Results: Of the 71 patients [40.0 (IQR=11.00) years], only 12.7% (n=9) were not under migraine prophylactic treatment; 62.3% (n=33) reported severe disability (MIDAS-IV). FSD and sexual distress were present in 50.7% (36) patients with migraine [vs 20.6% (7) controls]. Migraine patients showed lower FSFI-6 scores [19.0 (9.0) vs 24.0 (6.0), p=0.005], with significantly lower levels of desire (p=0.011), lubrication (p=0.002), and satisfaction (p=0.013), higher sexual distress [11.2 (25.6) vs 3.2 (9.6), p=0.001], anxiety (p<0.001), and depression (p<0.001) levels, and lower sleep health scores (p=0.005). Old age of onset, being under preventive medication, anxiety/depression, and dysfunctional sleep, were significantly associated to sexual distress. Certain domains of sexual function were associated with sociodemographic and migraine characteristics, anxiety, depression, and sleep health.

Conclusions: This study highlights the association between migraine and elevated sexual dysfunction/distress levels among premenopausal women. It underscores the importance of sexual health assessments in these individuals, mainly the ones with higher levels of anxiety, depression, or experiencing poor sleep quality.

Keywords: Female Sexual Dysfunction; Sexual Distress; Migraine; Anxiety; Depression; Sleep Health

Background

Sexual health is regarded by the World Health Organization (WHO) as “a state of physical, emotional, mental, and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity” [1]. This major dimension of global health is linked to various aspects of general well-being, such as the physical and psychological health of individuals, sociodemographic characteristics, cultural beliefs, and the quality and stability of interpersonal relationships [2].

Sexual dysfunction is characterized by persistent or recurrent difficulties during the sexual response cycle that prevent individuals from experiencing satisfaction with sexual activity, associated with psychological suffering and negative impact on interpersonal relationships [3, 4]. This is an underdiagnosed and undertreated but very common problem [3, 4]. Although there is limited literature on its incidence, particularly in women, a global prevalence of 40-50% of sexual dysfunction in females is estimated, regardless of age [5]. Female sexual dysfunction (FSD) can be divided into sexual desire/interest, arousal, orgasm, and pain disorders [6, 7]. The presence of sexual distress, which includes experiencing negative emotional responses such as frustration, worry, guilt, anxiety, or discomfort regarding own sexual life, is a necessary condition for the diagnosis of FSD [3, 4]. The assessment of this construct has been increasingly recognized by clinicians, as it is a central but separate component of sexual dysfunction and a determinant of individuals' sexual health.

Chronic neurological diseases [8, 9] and pain-associated syndromes [10-12] can affect sexual and social functions. Migraine is the second most frequent cause of seeking medical attention for a headache, after tension-type headache, but the first when the headache promotes a recurrence to the emergency department [13]. Its global prevalence is 14-15%, being three times more common in women [13]. With a significant peak burden at 35-39 years old, it constitutes the leading cause of disability worldwide in females under 50 years [14]. However, studies showed contradictory results regarding the impact of headache characteristics on sexual function in women with migraine; some found a significant relationship between migraine and FSD [15-17], while others reported no relationship between the two conditions [18-21]. Additionally, only two studies have addressed the presence of sexual distress in women with migraine, an issue that requires further investigation [16, 20]. Thus, this work aimed to evaluate if migraine is associated with higher levels of FSD and sexual distress in premenopausal women, compared to a female sample without migraine. Secondarily, it was intended to uncover which domains of sexual health are more affected

in migraineurs, and what are the possible clinical factors associated with sexual dysfunction/distress in migraine patients.

Methods

Study Design, Population and Data Collection

We performed a single-centre, retrospective cross-sectional study, at a tertiary hospital in the north of Portugal. The study protocol was approved by the Ethics Committee and the Administration Board of Unidade Local de Saúde São João - Centro Hospitalar Universitário de São João.

The participants were adult premenopausal female patients, with a diagnosis of episodic or chronic migraine performed by a neurologist, according to the 3rd edition of the International Classification of Headache Disorders [22], followed at the Neurology outpatient clinic, between June and December 2023. The control group was constituted of healthy premenopausal women, without migraine, obtained through a community sample, paired by age. Patients and controls who could not read or collaborate, and those who refused to participate in the study, were excluded. Patients with another type of headache that is not migraine (excluding migraine accompanied by medication overuse headache), with chronic disorders which may affect sexual function (diabetes mellitus, uncontrolled thyroid dysfunction or any other endocrinological abnormalities, rheumatic, systemic inflammatory or neoplastic diseases, and severe psychiatric disorders [23]), with substance use disorders and/or chronic alcoholism, and women that were pregnant, breastfeeding, in the puerperium, undergoing fertility treatments or not sexually active, were also excluded.

Participants who meet the inclusion and exclusion criteria and gave informed consent filled out a form composed of sociodemographic data (age, education level, employment status, marital status, and number of children), baseline health status (cardiovascular risk factors, psychiatric/sleep disorders, and contraceptive methods) and migraine-related data (first onset, frequency, presence of aura, and current medication).

Questionnaires

Standardized self-administered questionnaires were answered by both groups at a single time point, through an online form sent by text message. The first two questionnaires, regarding migraine characteristics, including disability assessment and pain, were only applied to patients with migraine, while FSD, female sexual distress, anxiety, depression, and sleep health scales were applied to all the participants. All the questionnaires are validated for the Portuguese population.

Migraine Disability Assessment (MIDAS) Scale is a reliable tool used for evaluating migraine-related disability. It includes five questions investigating the impact of migraine on everyday activities in the past three months, resulting in minimal (0-5), mild (6-10), moderate (11-20), or severe (>20) disability [24]. A complementary measure is the Brief Pain Inventory (BPI), which we use in its pain intensity section, where the patient is asked to score from 0 to 10 their worst, least, average, and current pain intensity [25].

Female Sexual Function Index (FSFI) is a 19-item questionnaire investigating the domains of sexual desire, arousal, lubrication, orgasm, satisfaction, and pain, during the last four weeks. We used its short version, which is a selection of 6 items from the total scale (FSFI-6), one for each domain, ranging from 0 or 1 to 5 points, considering ≤19 as a FSD [26]. To evaluate the sexual activity-related personal distress in women over the last four weeks, we used the Female Sexual Distress Scale-Revised (FSDS-R), a 13-item outcome measure. Items are scored from 0 to 4 (never, rarely, occasionally, frequently, or always, respectively), considering a cut-off score of ≥11 a good indicator of sexual distress [27].

Hospital Anxiety and Depression Scale (HADS) comprises 14 items, scored from 0 to 3, including subscales for anxiety (HADS-A) and depression (HADS-D), in the past week. A score of ≤7 means there is no sign of anxiety or depression; 8–10 indicates mild or borderline cases; ≥11 indicates anxiety or depression [28].

To evaluate sleep health we used the Regularity, Satisfaction, Alertness, Timing, Efficiency, and Duration Sleep Health Scale (RU-SATED). The items of this scale can be summed up to have a single score ranging from 0 (poor sleep health) to 30 (good sleep health) [29].

Statistical Analysis

Statistical analysis was performed using the IBM® Statistical Package for the Social Sciences (SPSS®) software, version 26. For the descriptive analysis, we determined the frequency and percentage of categorical variables. Quantitative variables were presented as mean ± standard deviation (SD) if normally distributed, or median and interquartile range (IQR) if otherwise. We used the Kolmogorov-Smirnov Test to assess the normality of distribution. For inferential analysis, we used the Chi-square test for categorical variables, except in the case of having an expected count less than 5 in more than 20% of cells in the contingency table, where Fisher's exact test was used, and Independent Samples T-test (parametric test) or Mann-Whitney U test (non-parametric test) for quantitative variables. Spearman's correlation test was used for correlation analysis between continuous variables. The *p* values presented are for a two-tailed test and a *p* value of ≤ 0.05 was defined as statistically significant.

Results

Patient and control recruitment and selection processes are represented in Fig. 1. We identified 189 potentially eligible patients through hospital electronic records; 106 (response rate of 56.1%) agreed to participate in the study. Of these 106 patients, 71 (67.0%) met the inclusion criteria, 17 (16.0%) were excluded because of their comorbidities, 1 (0.9%) was pregnant/breastfeeding, 6 (5.7%) were postmenopausal women, and 11 (10.4%) were not sexually active. From the community sample that completed the form, 34 age-matched controls were included. The study gathered a total of 105 participants.

Sociodemographic and clinical characteristics

The sociodemographic and clinical characteristics of the sample are presented in Table 1. Migraine patients' ages ranged from 21 to 53 years old, with a median age of 40.0 years (IQR=11.0). This group less frequently had a higher education level compared to controls [41 (57.7%) vs 28 (82.4%), p=0.045], with no other significant difference regarding sociodemographic data. In both groups, most were married or were in a stable relationship [56 (78.9%) vs 26 (76.5%), p=0.763], and had at least one child [44 (62.0%) vs. 18 (52.9%), p=0.205].

Regarding clinical features, patients with migraine had higher levels of insomnia [25 (35.2%) vs 4 (11.8%), p=0.012], with no statistically significant differences for cardiovascular risk factors, anxiety,

depression, and other sleep disorders. Combined oral contraceptive pill [used in 17 (23.9%) migraineurs vs 16 (47.1%) controls], copper intrauterine device [10 (14.1%) vs 4 (11.8%)], and male condom [8 (11.3%) vs 8 (23.5%)] were the most used contraceptive methods, with only statistically significant differences between groups found for the use of the oral contraceptive pill (p=0.017).

Migraine characteristics are displayed in Table 2. Most migraine patients (44, 62.0%) had their headache onset in adulthood. The majority (47, 66.2%) suffered from headache 4 to 15 days per month, and 10 (14.1%) had headache more than half of the month. Only 9 (12.7%) were not receiving migraine preventive treatment. Among those under treatment, the largest group belongs to those under anti-Calcitonin Gene-Related Peptide (CGRP) receptor/ligand monoclonal antibodies (28, 39.4%), followed by oral preventive medication (25, 35.2%), botulinum toxin A injections (20, 28.2%) and occipital nerve blocks (6, 8.5%). Most patients (35, 49.3%) needed rescue medication 4 to 9 days per month; 5 (7.0%) needed it more than 15 days per month. The median score of the MIDAS Scale was 28.0 (IQR=41.0), with 33 (62.3%) patients reporting severe disability of headache (MIDAS-IV). Regarding the intensity of pain, according to the BPI, the median worst pain was 7.0 (IQR=2.0) and the median average pain was 5.0 (IQR=3.0), respectively (Table 2).

Female sexual dysfunction and distress, anxiety, depression, and health sleep

Of the 71 patients with migraine, 36 (50.7%) reported having sexual dysfunction, measured by an FSFI-6 score of 19 or lower, compared to 7 controls (20.6%). In addition to lower total FSFI-6 scores [19.0 (IQR=9.0) vs 24.0 (IQR=6.0), p=0.005], these patients showed significantly lower desire [3.0 (IQR=2.0) vs 3.5 (IQR=1.0), p=0.011], lubrication [4.0 (IQR=2.0) vs 4.0 (IQR=1.0), p=0.002], and satisfaction levels [3.0 (IQR=2.0) vs 4.0 (IQR=2.0), p=0.013], with no statistically significant differences between groups concerning arousal (p=0.218), orgasm (p=0.098), and pain (p=0.166) domains. Migraine patients also had more frequent sexual distress, with 36 (50.7%) of them showing scores of 11 or higher on the FSDS-R scale compared to 7 (20.6%) in the control group [total score of 11.2 (IQR=25.6) vs 3.2 (IQR=9.6), p=0.001].

Anxiety and depression levels were significantly higher in migraineurs [10.0 (IQR=6.0) vs 5.0 (IQR=6.0), p<0.001, for anxiety, and 7.0 (IQR=7.0) vs 2.0 (IQR=3.0), p<0.001, for depression], with lower sleep health scores in this group [18.0 (IQR=12.0) vs 23.5 (IQR=9.0), p=0.005]. The previous results are all explored in Table 3.

Patients with migraine were then categorized according to the presence of FSD (FSFI-6≤19) and sexual distress (FSDS-R≥11) (Table 4). Comparing migraineurs with and without sexual distress, the first ones more frequently had headache onset in adulthood [19 (52.8%) vs 8 (22.9%), respectively, *p*=0.014], and were more often under oral preventive medication [18 (50.0%) vs 7 (20.0%), respectively, *p*=0,008]. Migraineurs reporting FSD were also more often under oral preventive medication than the ones with no FSD [18 (50.0%) vs 7 (20.0%), *p*=0,008]. Despite that, no significant differences between having or no FSD/sexual distress were found regarding other migraine characteristics, including migraine-related disability, frequency, and intensity of pain (except for current pain, see Table 4). On the other hand, patients with FSD/sexual distress had higher anxiety [FSD+: 12.0 (IQR=6.0) vs FSD-: 9.0 (IQR=5.0), *p*=0.023; Distress+: 12.0 (IQR=5.0) vs Distress-: 8.0 (IQR=5.0), *p*=0.002] and depression [FSD+: 8.56 (SD=4.48) vs FSD-: 4.86 (SD=3.40), *p*<0.001; Distress+: 10.0 (IQR=5.0) vs Distress-: 4.0 (IQR=6.0), *p*<0.001] levels. Lower levels of sleep health were portrayed by patients with sexual distress [Distress+: 15.47 (SD=7.09) vs Distress-: 20.46 (SD=5.64), *p*=0.002], which also showed statistically significant differences concerning the presence of insomnia, compared to patients without sexual distress [18 (50.0%) vs 7 (20.0%), *p*=0,008].

Female Sexual Dysfunction per domain

Finally, migraine patients were compared according to individual sexual domains.

Having higher education level was significantly associated with higher levels of desire [3.0 (IQR=2.0) vs 2.0 (IQR=2.0), *p*=0.013] and arousal [4.0 (IQR=1.0) vs 3.0 (IQR=2.0), *p*=0.003], and to be employed with lower levels of sexual pain [0.5 (IQR=3.0) vs 3.0 (IQR=4.0), *p*=0.044]. Suffering from insomnia was significantly associated with lower levels of arousal [3.0 (IQR=3.0) vs 4.0 (IQR=1.0), *p*=0.013] and lubrication [3.0 (IQR=3.0) vs 4.0 (IQR=2.0), *p*=0.034].

Concerning migraine characteristics, having headache more than 15 days/month was associated with lower levels of arousal [2.0 (IQR=3.0) vs 3.0 (IQR=2.0), *p*=0.050], and severe disability (MIDAS-IV) with higher levels of sexual pain [2.0 (IQR=4.0) vs 0.0 (IQR=3.0), *p*=0.030]. Patients under migraine oral preventive medication showed significantly lower levels of desire [2.0 (IQR=2.0) vs 3.0 (IQR=2.0), *p*=0.002], arousal [3.0 (IQR=3.0) vs 3.5 (IQR=1.0), p=0.020], lubrication [3.0 (IQR=3.0) vs 4.0 (IQR=2.0), *p*=0.002] and satisfaction [3.0 (IQR=3.0) vs 4.0 (IQR=1.0), *p*=0.007] comparing with those with other or no treatment.

Table 5 shows the correlation results between sexual function domains and responses to questionnaires. Patient age was not correlated to any domain of FSD. Sexual distress scores were strongly correlated to all domains of sexual function ($p<0.001$), with a negative correlation to desire ($\rho=-0.429$), arousal ($\rho=-0.457$), lubrication ($\rho=-0.399$), orgasm ($\rho=-0.418$) and satisfaction ($\rho=-0.481$), and a positive correlation to sexual pain ($\rho=0.435$). Migraine disability, accessed by MIDAS Score, was positively correlated to sexual pain ($\rho=-0.312$, $p=0.023$), and current pain scores were negatively correlated to desire ($\rho=-0.240$, $p=0.043$); other pain scores had no statistically significant correlation to any sexual domain. Anxiety was negatively correlated to desire ($\rho=-0.322$, $p=0.006$), arousal ($\rho=-0.350$, $p=0.003$) and satisfaction ($\rho=-0.290$, $p=0.014$). Depression was negatively correlated to desire ($\rho=-0.509$, $p<0.001$), arousal ($\rho=-0.512$, $p<0.001$), lubrication ($\rho=-0.321$, $p=0.006$), orgasm ($\rho=-0.382$, $p=0.001$) and satisfaction ($\rho=-0.455$, $p<0.001$). Good sleep health was negatively correlated to pain ($\rho=-0.259$, $p=0.029$).

Discussion

Migraine patients display higher levels of sexual dysfunction; it is particularly true in three domains of sexual function - desire, lubrication, and satisfaction –, and sexual distress. At baseline, these patients had lower education levels, a higher prevalence of insomnia, and less use of combined oral contraceptive pills compared to age-matched controls. Within the migraine group, patients with sexual dysfunction were those who presented greater anxiety and depression (with a negative correlation of anxiety and depression with the sexual domains of sexual desire, arousal, and satisfaction, and depression with lubrication and orgasm), with no differences for other potential risk factors. Additionally, regarding sexual distress, patients more frequently presented migraine onset symptoms in adulthood (vs onset in childhood/adolescence), and had higher levels of sleep dysfunction, namely insomnia. Regarding sexual domains, having insomnia was associated with lower levels of arousal and lubrication, having a headache frequency of more than 15 days/month with lower levels of arousal, having a severe headache with higher levels of sexual pain. Being on preventive migraine medication was associated with both sexual dysfunction and distress, affecting desire, arousal, lubrication, and satisfaction levels. Good sleep health had been positively correlated to total FSFI-6 scores.

Sexual dysfunction and migraine are both prevalent disorders, which separately represent a serious burden on patients' lives, with a significant impact on their quality of life. The migraine-sexual dysfunction

binomial is not a recent concept, as can be discerned from the vast literature that attempts to interpret the aetiology of FSD and the factors that modulate it. However, this study aimed to standardize the information known, with the presence of a control group and a validated instrument, the FSFI, as previous studies only had one of these components [15, 16, 18-21]; furthermore, we focused on understanding sexual distress, addressed in only two studies [16, 20], as a central concept, since it is essential for the understanding of female sexuality as a whole, including the suffering arising from sexual problems. We also considered the addition of sleep health in this equation, a parameter that has only been investigated once [30]. Finally, we also aim to compare migraine characteristics with the different domains of FSD, as the most recent literature focuses on the absence of association of these risk factors with the overall scores of FSFI and FSDS-R; a deeper investigation of this relationship is necessary.

The prevalence of sexual dysfunction was more than twice as high as that found in the control group (50.7% vs 20.6%). This frequency aligns with previous studies, that rated FSD among female migraine patients between 41.8-90% [16, 21]; the varying prevalence rates may be related to different definitions of sexual dysfunction, a wide variety of measurement tools used, cultural and environmental factors, and the inclusion of postmenopausal patients in former studies (which likely includes other confounders that affect this measure). According to epidemiologic research, the worldwide prevalence of FSD in premenopausal women is estimated to be 40.9% [31]; the lower percentage obtained in our control group might be due to social and demographic factors. The distress percentage was also 50.7%, in line with the range seen in other studies in migraine patients 29-67.2% [16, 20] and in young women [32]; this value seems reliable due to an openness and interest on the part of the participants in addressing the issues in their sexual lives and, more broadly, the limitations they feel due to migraine.

Menopause is the most studied condition in the context of FSD from an organic standpoint as it is an explicit state of hormonal deprivation [33]. Conditions associated with hormonal changes at menopause, such as vulvovaginal atrophy and hypoactive sexual desire disorder, have a significant impact on sexual function and quality of life [33]. Since menopause is a well-known risk factor for FSD and migraine peaks in women of reproductive ages, this study was only performed in premenopausal patients.

Sexual satisfaction is influenced not only by individual and relational factors but also by individuals' social and cultural environment. This constitutes an adaptation from the ecological theory (Bronfenbrenner, 1994) [34], organized into four interrelated levels: the microsystem (gender, age, self-

esteem, depression, child sexual abuse, internalized homophobia), the mesosystem (relationship satisfaction, communication, sexual functioning), the exosystem (parenthood, social support, socioeconomic status), and the macrosystem (political ideology, religious beliefs) [2]. We found an association between higher education and higher levels of desire and arousal; we also detected that employment was associated with lower levels of sexual pain. Higher education constitutes a protective factor for arousal disorder in gender-equal regimes; in this study, particularly, it constitutes a protective factor for all domains and global FSD [35]. Employment has an unclear effect on FSD, with mixed results in previous studies [35]. We did not find a relation between age, marital status, and number/presence of children. Approaching other variables from the ecological theory in patients with migraine could be interesting research for the future.

Although the limited data provided by our sample regarding cardiovascular risk factors and contraceptive methods, some remarks can be made. The only obese participant in our study had migraine, FSD, and distress, with low scores in every sexual domain. Of the overweight patients with migraine, four (57.1%) had FSD, and five (71.4%) experienced sexual distress. Obesity and overweight are important risk factors for FSD [36], however, rates of FSD do not differ in obese women with and without migraine [37]. There is a statistical difference regarding the choice of contraception between migraine patients and controls, with the latter having a higher frequency of use of the combined oral contraceptive pill. Exogenous hormones may change the course of migraine by inducing new migraine, new aura, and worsening previous migraine, but also improving migraine, particularly those attacks related to menstruation [38]; worsening of migraine symptoms may be the reason for patients to avoid this method. Nonetheless, migraine patients who use the combined oral pill did not experience significant differences in terms of headache frequency, presence of aura, severity, pain, prophylactic treatment, or necessity of rescue medication. Within the migraine sample, we did not obtain a significant association between the use of the oral combined pill, the presence of sexual dysfunction/distress, and FSFI-6 domain scores.

Anxiety and depression are prevalent among migraine patients. Adults with migraine are two to four times more likely to experience depression and anxiety compared to the general population [39]. Patients and controls reported, at baseline, a prevalence of anxiety and depression of 22.5% and 23.9% (migraine), respectively, and 20.6% and 8.8% (controls). Completing the HADS Scale, these percentages rose to 71.8%, 42.3%, 26.5%, and 11.8%, respectively, with the migraine sample having a 2.7 higher presence of anxiety and a 3.6 higher presence of depression than controls. Anxiety and depression scores

were statistically higher in the migraine group compared to controls and statistically associated with the presence of FSD and distress within the migraine group. They were also correlated to FSD domains: desire, arousal, and satisfaction (both), and lubrication and orgasm (depression). Our findings were supported by previous studies that detected an association between at least one of these comorbidities and total FSD and/or domains [19, 21, 30, 37], and contradict the ones that did not find a relation [16, 20], all regarding migraine patients. According to Nappi et. al [16], sexual distress was neither associated with anxiety nor depression; indeed, Kucukdurmaz et al. [20] found a significant association between distress and depression, but not anxiety. Thus, we defend that both comorbidities constitute important risk factors in FSD and its domains, as well as sexual distress.

Ghajarzadeh et. al [30] conducted the only study to combine the variables of FSD, depression, and sleep health in patients with migraine; however, a lengthier instrument for sleep health evaluation was used, and the variables of sexual distress and anxiety were not addressed, as well as the presence of sleep disorders, such as insomnia. Available literature suggests a bidirectional relationship between migraine and insomnia, independent of anxiety and depression. Insomnia is a risk factor for migraine onset and increased migraine impact, pain intensity, and frequency; moreover, migraineurs are at increased risk of developing insomnia [40]. In compliance with our results, it is imperative to highlight the relation between sleep dysfunction and feelings of sexual distress since patients with sexual distress had a significantly higher presence of insomnia and lower levels of sleep health scores. The same did not occur when we compared patients with and without FSD. Nonetheless, patients suffering from insomnia had significantly lower levels of arousal and lubrication, and in a complementary way higher sleep health scores were correlated to lower levels of sexual distress and sexual pain. Routine assessment of insomnia complaints in patients with migraine and implementation of customized pharmacological and non-pharmacological insomnia treatments would be beneficial in reducing migraine burden and sexual suffering.

Lastly, we will center our attention on discussing one of the main aims of this study: to evaluate if the presence of sexual dysfunction/distress in migraine patients is associated with migraine characteristics and treatment. All previous studies with a control sample [15, 17-19] also verified statistically significant higher levels of FSD in patients with migraine. Regarding specific domains, and using different validated tools, Ifergane et. al [15] found lower levels of satisfaction and higher levels of sexual pain in patients with migraine, Bestepe et. al [18] showed lower sex drive, arousal, vaginal lubrication, ability to reach orgasm and orgasmic satisfaction in this population, and Solmaz et. al [17] and Dogan et. al [19] utilized the FSFI

and obtained significantly lower levels of every domain in patients with migraine. Current evidence regarding a direct influence of migraine characteristics in FSD is controversial: while a few former studies have shown a relationship [15-17], others report no association between the two conditions [18-21, 30, 37]. According to Ifergane et. al [15], migraine-related severity was found to be significantly correlated to higher scores of health influence on sexual life. Indeed, Solmaz et. al [17] found that a percentage increase in FSD was observed as the frequency of headache attacks and the number of painful years increased, however, this consideration was not statistically significant. In our study, we found a statistically significant relation between migraine first onset and sexual distress, with first occurrence in adulthood being associated with a higher presence of sexual distress. We also discovered that the presence of FSD was associated with higher levels of current migraine pain. Other migraine characteristics were not a direct risk factor for either the presence of FSD or distress. Despite this fact, significant associations were discovered when comparing domains: a headache frequency of more than 15 days/month demonstrated an association with lower levels of sexual arousal, and migraine-related severe disability (MIDAS-IV) showed a relation with higher levels of sexual pain. Regarding domain correlations, migraine-related disability, assessed by MIDAS Score, was positively correlated to sexual pain; BPI's current pain scores were negatively correlated to desire. Investigating the impact of prophylactic treatments poses a challenge, as they may be related to FSD [23] and are being excluded from some studies on account of possible interference [17, 19]. In this study, the use of oral preventive medication showed an association with the presence of FSD and sexual distress, besides correlating to lower levels of desire, arousal, lubrication, and satisfaction. Through our research, we were unable to find solid, exhaustive, comprehensive data assessing the relationship between FSD and migraine characteristics, as well as adverse effects of migraine preventive medication in women's sexual health, outside of observational cross-sectional studies. Further research is necessary to better characterize the relation between migraine features and treatment with FSD, sexual domains, and sexual distress, in premenopausal, perimenopausal, and postmenopausal patients.

This study had also some limitations that may impact the generalizability of these results, including a sample from a single tertiary hospital. The control group had a reduced number of participants, due to age-matching, and had higher levels of education. Thus, it is important to expand it to a more diverse control group, specifically in terms of age and educational status, and consider more variables from the ecological theory of sexual satisfaction [2]. Retrospective data was collected through self-administered questionnaires, which may lead to recall bias. The inability to assess patients' partners in terms of their

sexual function, emotions, and comorbidities also constitutes an obstacle. Further, this study only focused on sexual dysfunction and distress of sexually active individuals, however, sexuality is influenced not only by interpersonal relationships but also by one's sexual self-concept. Lastly, this was a cross-sectional study, which limits the conclusions that can be made. Longitudinal studies are needed to further assess the long-term relationships among migraine characteristics and treatment, sexual dysfunction and distress, anxiety, depression, and sleep health over time.

Conclusions

This study highlights the association between migraine and high levels of sexual dysfunction and distress among premenopausal women, as well as high rates of depression, anxiety, and sleep dysfunction. In migraine patients, the presence of insomnia, late age of symptoms onset, and use of preventive medication were significantly related to sexual distress. Education, employment, migraine frequency, current pain, and related pain disability, preventive medication, anxiety, depression, and sleep health were associated with one or more sexual domains of FSD.

With this investigation's results, we advocate that both sexual dysfunction and distress should be addressed and screened upon the diagnosis of migraine. Such evaluations can facilitate tailored interventions to improve both migraine management and overall well-being.

Statements and Declarations

Authors contributions

MB, BM, and AC conceptualized and designed the study. MB was responsible for data search and analysis. MB wrote the original draft of the manuscript. Important data analysis suggestions were made by BM and AC. Manuscript revisions and editing were made by BM and AC. All authors contributed significantly to the creation of this manuscript.

Ethics approval and Informed consent

This study was performed following the principles of the 1964 Declaration of Helsinki and its later amendments. Approval was granted by the Ethics Committee of *Unidade Local de Saúde de São João* (02/11/2023; nº 263/2023) and by the Data Protection Officer. Informed consent was obtained from all individual participants included in the study.

Data availability

All data generated or analysed during the study are included in this article.

Competing interests

The authors declare that they have no conflict of interest. The authors have no relevant financial or non-financial interests to disclose.

Funding

The authors did not receive support from any organisation for the submitted work.

References

1. World Health Organization (2015) Sexual health, human rights and the law. Geneva.
2. Sánchez-Fuentes M del, Santos-Iglesias P, Sierra JC (2014) A systematic review of sexual satisfaction. International Journal of Clinical and Health Psychology. 14:67–75. https://doi.org/10.1016/S1697-2600(14)70038-9
3. American Psychiatric Association (2013) Diagnostic and Statistical Manual of Mental Disorders (DSM-5). 5th ed.
4. World Health Organization (2022) International Classification of Diseases, Eleventh Revision (ICD-11). License: CC BY-ND 3.0 IGO. Available at: https://icd.who.int/browse11. Accessed June 4, 2023
5. McCabe MP, Sharlip ID, Lewis R, et al (2016) Incidence and prevalence of sexual dysfunction in women and men: A consensus statement from the Fourth International Consultation on Sexual Medicine 2015. The Journal of Sexual Medicine. 13:144–152. https://doi.org/10.1016/j.jsxm.2015.12.034
6. McCabe MP, Sharlip ID, Atalla E, et al (2016) Definitions of sexual dysfunctions in women and men: A consensus statement from the Fourth International Consultation on Sexual Medicine 2015. The Journal of Sexual Medicine. 13:135–143. https://doi.org/10.1016/j.jsxm.2015.12.019
7. Clayton AH, Valladares Juarez EM (2017) Female sexual dysfunction. Psychiatric Clinics of North America. 40:267–284. https://doi.org/10.1016/j.psc.2017.01.004
8. Buhmann C, Dogac S, Vettorazzi E, et al (2016) The impact of Parkinson disease on patients' sexuality and relationship. Journal of Neural Transmission. 124:983–996. https://doi.org/10.1007/s00702-016-1649-8
9. Rathore C, Henning OJ, Luef G, Radhakrishnan K (2019) Sexual dysfunction in people with epilepsy. Epilepsy & Behavior. 100:490-495. https://doi.org/10.1016/j.yebeh.2019.106495
10. Kwan KSH, Roberts LJ, Swalm DM (2005) Sexual dysfunction and chronic pain: The role of psychological variables and impact on quality of life. European Journal of Pain. 9:643–652. https://doi.org/10.1016/j.ejpain.2004.12.008
11. Zhao S, Li E, Wang J, et al (2018) Rheumatoid arthritis and risk of sexual dysfunction: A systematic review and metaanalysis. The Journal of Rheumatology. 45:1375–1382. https://doi.org/10.3899/jrheum.170956

12. Besiroglu MD, Dursun MD (2018) The association between fibromyalgia and female sexual dysfunction: A systematic review and meta-analysis of observational studies. International Journal of Impotence Research. 31:288–297. https://doi.org/10.1038/s41443-018-0098-3
13. Ashina M (2020) Migraine. New England Journal of Medicine. 383:1866–1876. https://doi.org/10.1056/NEJMra1915327
14. Ashina M, Katsarava Z, Do TP, et al (2021) Migraine: Epidemiology and systems of care. The Lancet. 397:1485–1495. https://doi.org/10.1016/S0140-6736(20)32160-7
15. Ifergane G, Ben-Zion IZ, Plakht Y, et al (2008) Not only headache: Higher degree of sexual pain symptoms among migraine sufferers. The Journal of Headache and Pain. 9:113–117. https://doi.org/10.1007/s10194-008-0028-8
16. Nappi RE, Terreno E, Tassorelli C, et al (2012) Sexual function and distress in women treated for primary headaches in a Tertiary University Center. The Journal of Sexual Medicine. 9:761–769. https://doi.org/10.1111/j.1743-6109.2011.02601.x
17. Solmaz V, Ceviz A, Aksoy D, et al (2016) Sexual dysfunction in women with migraine and tension-type headaches. International Journal of Impotence Research. 28:201–204. https://doi.org/10.1038/ijir.2016.22
18. Bestepe E, Cabalar M, Kucukgoncu S, et al (2011) Sexual dysfunction in women with migraine versus tension-type headaches: a comparative study. International Journal of Impotence Research. 23:122–127. https://doi.org/10.1038/ijir.2011.16
19. Dogan VB, Dagdeviren H, Dirican A, et al (2017) Hormonal effect on the relationship between migraine and female sexual dysfunction. Neurological Sciences. 38:1651–1655. https://doi.org/10.1007/s10072-017-3023-5
20. Kucukdurmaz F, Inanc Y, Inanc Y, Resim S (2018) Sexual dysfunction and distress in premenopausal women with Migraine: Association with depression, anxiety and migraine-related disability. International Journal of Impotence Research. 30:265–271. https://doi.org/10.1038/s41443-018-0049-z
21. Torres-Ferrus M, López-Veloso AC, Gonzalez-Quintanilla V, et al (2021) The MIGREX study: Prevalence and risk factors of sexual dysfunction among migraine patients. Neurología. https://doi.org/10.1016/j.nrl.2021.02.006

22. Headache Classification Committee of the International Headache Society (2018) The International Classification of Headache Disorders, 3rd edition. Cephalalgia. 38:1—211. https://doi.org/10.1177/0333102417738202
23. McCabe MP, Sharlip ID, Lewis R, et al (2016) Risk factors for sexual dysfunction among women and men: A consensus statement from the Fourth International Consultation on Sexual Medicine 2015. The Journal of Sexual Medicine. 13:153–167. https://doi.org/10.1016/j.jsxm.2015.12.015
24. Ferreira PL, Luzeiro I, Lopes M, et al (2021) Validity and reliability of the Portuguese version of the modified Migraine Disability Assessment. BMC Neurology. 21:58. https://doi.org/10.1186/s12883-021-02085-z
25. Ferreira-Valente MA, Pais-Ribeiro JL, Jensen MP. (2012) Further Validation of a Portuguese Version of the Brief Pain Inventory Interference Scale. Clínica y Salud. 23:89–96. https://doi.org/10.5093/cl2012a6
26. Santos Pechorro P, Pascoal PM, Monteiro Pereira N, et al (2016) Validação da Versão Portuguesa do Índice de Funcionamento Sexual Feminino – 6. Revista Internacional de Andrología. 15:8–14. http://dx.doi.org/10.1016/j.androl.2016.06.001
27. Tavares IM, Santos-Iglesias P, Nobre PJ (2022) Psychometric validation of the sexual distress scale in male and female Portuguese samples. The Journal of Sexual Medicine. 19:834–845. https://doi.org/10.1016/j.jsxm.2022.02.026
28. Pais-Ribeiro J, Silva I, Ferreira T, et al (2007) Validation study of a Portuguese version of the hospital anxiety and depression scale. Psychology, Health & Medicine. 12:225–237. https://doi.org/10.1080/13548500500524088
29. Brandolim Becker N, Martins RI, Jesus S de, et al (2018) Sleep health assessment: A scale validation. Psychiatry Research. 259:51–55. https://doi.org/10.1016/j.psychres.2017.10.014
30. Ghajarzadeh M, Jalilian R, Togha M, et al (2014) Depression, poor sleep, and sexual dysfunction in migraineurs women. International Journal of Preventive Medicine. 5:1113–1118.
31. McCool ME, Zuelke A, Theurich MA, et al (2016) Prevalence of Female Sexual Dysfunction Among Premenopausal Women: A Systematic Review and Meta-Analysis of Observational Studies. Sexual Medicine Reviews. 4:197–212. https://doi.org/10.1016/j.sxmr.2016.03.002

32. Zheng J, Skiba MA, Bell RJ, et al (2020) The prevalence of sexual dysfunctions and sexually related distress in young women: a cross-sectional survey. Fertility and Sterility. 113:426–434. https://doi.org/10.1016/j.fertnstert.2019.09.027

33. Nappi RE, Cucinella L, Martella S, et al (2016) Female sexual dysfunction (FSD): Prevalence and impact on quality of life (QoL). Maturitas. 94:87–91. https://doi.org/10.1016/j.maturitas.2016.09.013

34. Bronfenbrenner, U. (1994). Ecological models of human development. In The International Encyclopedia of Education (2nd ed., Vol.3, 1643-1647). Oxford: Elsevier.

35. McCool-Myers M, Theurich M, Zuelke A et al (2018) Predictors of female sexual dysfunction: a systematic review and qualitative analysis through gender inequality paradigms. BMC Women's Health. 18:108. https://doi.org/10.1186/s12905-018-0602-4

36. Salari N, Razie Hasheminezhad, Tabassom Sedighi, et al (2023) The global prevalence of sexual dysfunction in obese and overweight women: a systematic review and meta-analysis. BMC Women's Health. 23:375. https://doi.org/10.1186/s12905-023-02544-4

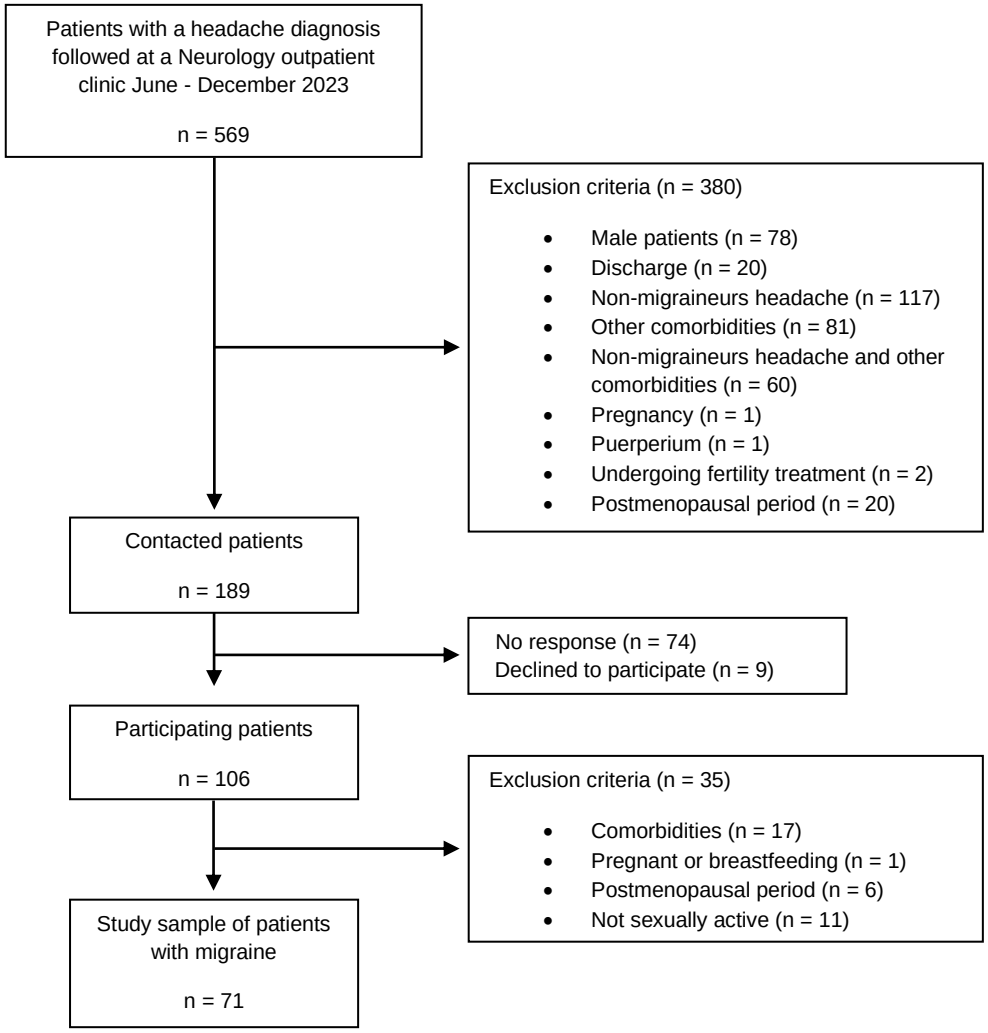
37. Bond DS, Pavlović JM, Lipton RB, et al (2017) Sexual dysfunction in women with migraine and overweight/obesity: relative frequency and association with migraine severity. Headache. 57:417–427. https://doi.org/10.1111/head.13019

38. Sacco S, Merki-Feld GS, Ægidius KL, et al (2018) Effect of exogenous estrogens and progestogens on the course of migraine during reproductive age: a consensus statement by the European Headache Federation (EHF) and the European Society of Contraception and Reproductive Health (ESCRH). The Journal of Headache and Pain. 19:76. https://doi.org/10.1186/s10194-018-0896-5

39. Hamelsky SW, Lipton RB (2006) Psychiatric Comorbidity of Migraine. Headache: The Journal of Head and Face Pain. 46:1327–1333. https://doi.org/10.1111/j.1526-4610.2006.00576.x

40. Tiseo C, Vacca A, Felbush A, et al (2020) Migraine and sleep disorders: a systematic review. The Journal of Headache and Pain. 21:126. https://doi.org/doi: 10.1186/s10194-020-01192-5

a) Patient sample selection



b) Control sample selection

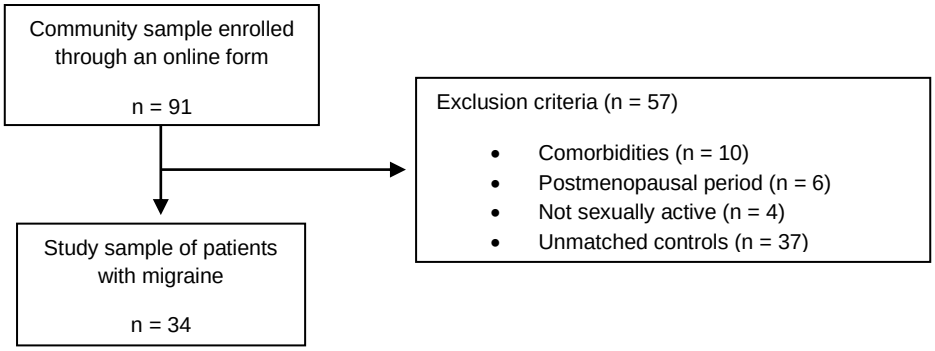


Fig. 1 Flow diagram of study recruitment, participation, and exclusion criteria of **(a)** patients with migraine and **(b)** controls.

Table 1 Sociodemographic and clinical characteristics of the participants.

	Migraine sample (n = 71)	Control sample (n = 34)	*p* value
Age, in years, median (IQR)	40.0 (11.0)	41.0 (13.0)	0.358*
Education, n (%)			**0.045****
Basic Education	11 (15.5)	2 (5.9)	
Secundary Education	19 (26.8)	4 (11.8)	
Higher Education	41 (57.7)	28 (82.4)	
Employment Status, n (%)			1.000***
Employee	60 (84.5)	30 (88.2)	
Self-employed	4 (5.6)	1 (2.9)	
Unemployed	4 (5.6)	1 (2.9)	
Student	3 (4.2)	2 (5.9)	
Marital Status, n (%)			0.763***
Married or in a stable relantionship	56 (78.9)	26 (76.5)	
Divorced	2 (2.8)	2 (5.9)	
Single	13 (18.3)	6 (17.6)	
Number of children, n (%)			0.205***
None	27 (38.0)	16 (47.1)	
One	14 (19.7)	4 (11.8)	
Two	28 (39.4)	10 (29.4)	
Three	2 (2.8)	3 (8.8)	
Four or more	0 (0.0)	1 (2.9)	
Cardiovascular risk factors, n (%)			
Pre-obesity	7 (9.9)	8 (23.5)	0.135***
Obesity	1 (1.4)	0 (0.0)	1.000***
Arterial hypertension	4 (5.6)	0 (0.0)	0.213***
Smoking	8 (11.3)	4 (11.8)	1.000***
Dyslipidemia	6 (8.5)	2 (5.9)	0.721***
Sedentarism	6 (8.5)	5 (14.7)	0.497***
Psychiatric symptoms, n (%)			
Anxiety	16 (22.5)	7 (20.6)	0.821**
Depression	17 (23.9)	3 (8.8)	0.065**
Sleep disturbances, n (%)			
Insomnia	25 (35.2)	4 (11.8)	**0.012****
Sleepwalking	2 (2.8)	1 (2.9)	1.000***
Restless Legs Syndrome	3 (4.2)	0 (0.0)	0.549***
Sleep Bruxism	1 (1.4)	0 (0.0)	1.000***
Sleep Apnoea	1 (1.4)	0 (0.0)	1.000***
Hypersomnia	1 (1.4)	0 (0.0)	1.000***
Contraceptive methods, n (%)			
Combined oral contraceptive pill	17 (23.9)	16 (47.1)	**0.017****
Progestogen-only pill	5 (7.0)	0 (0.0)	0.172***
Copper Intrauterine Device	10 (14.1)	4 (11.8)	1.000***
Male condoms	8 (11.3)	8 (23.5)	0.102**
Tubal ligation	7 (9.9)	2 (5.9)	0.715***
Absence of contraceptive methods	11 (15.5)	2 (5.9)	0.215***

Bold for statistically significant results.

IQR – Interquartile range; * Mann-Whitney U test; ** Chi-squared test; *** Fisher's exact test

Table 2 Clinical characterization of migraine.

	Migraine sample (n = 71)
Symptom onset time, n (%)	
Since childhood	13 (18.3)
Since adolescence	31 (43.7)
Since adulthood, < 45 years old	27 (38.0)
Since adulthood, ≥ 45 years old	0 (0.0)
Headache frequency/month, n (%)	
< 4 days	14 (19.7)
4 to 9 days	27 (38.0)
10 to 15 days	20 (28.2)
> 15 days	10 (14.1)
Presence of migraine aura, n (%)	
Present	46 (73.0)
Absent	17 (27.0)
Unknow	8
Prophylactic Treatment, n (%)	
CGRP monoclonal antibodies	28 (39.4)
Oral preventive medication	25 (35.2)
Botulinum toxin	20 (28.2)
Occipital nerve block	6 (8.5)
None	9 (12.7)
Frequency of rescue medication/month, n (%)	
< 4 days	22 (31.0)
4 to 9 days	35 (49.3)
10 to 15 days	9 (12.7)
> 15 days	5 (7.0)
MIDAS, median (IQR)	28.0 (41.0)
MIDAS I (0–5) (minimal disability)	6 (11.3)
MIDAS II (6–10) (mild disability)	5 (9.4)
MIDAS III (11–20) (moderate disability)	9 (17.0)
MIDAS IV (>20) (severe disability)	33 (62.3)
Not applicable	18
Brief Pain Inventory, median (IQR)	
Worst pain	7.0 (2.0)
Least pain	3.0 (3.0)
Pain on average	5.0 (3.0)
Current pain	2.0 (5.0)

CRGP – Calcitonin gene-related peptide; MIDAS – Migraine Disability Assessment Score; IQR – Interquartile range

.

Table 3 Comparison of migraneous and non-migraneous women's responses to the questionnaires: FSFI-6, FSDS-R, HADS and RU-SATED.

	Migraine sample (n = 71)	Control sample (n = 34)	*p* value
FSFI-6, median (IQR)	19.0 (9.0)	24.0 (6.0)	**0.005***
Desire, median (IQR)	3.0 (2.0)	3.5 (1.0)	**0.011***
1 n (%)	14 (19.7)	1 (2.9)	
2 n (%)	14 (19.7)	5 (14.7)	
3 n (%)	22 (1.0)	11 (32.4)	
4 n (%)	18 (25.4)	15 (44.1)	
5 n (%)	3 (4.2)	2 (5.9)	
Arousal, median (IQR)	3.0 (2.0)	3.5 (1.0)	0.218*
0 n (%)	5 (7.0)	0 (0.0)	
1 n (%)	7 (9.9)	0 (0.0)	
2 n (%)	10 (14.1)	4 (11.8)	
3 n (%)	19 (26.8)	13 (38.2)	
4 n (%)	19 (26.8)	14 (41.2)	
5 n (%)	11 (15.5)	3 (8.8)	
Lubrication, median (IQR)	4.0 (2.0)	4.0 (1.0)	**0.002***
0 n (%)	6 (8.5)	0 (0.0)	
1 n (%)	6 (8.5)	0 (0.0)	
2 n (%)	6 (8.5)	0 (0.0)	
3 n (%)	13 (18.3)	6 (17.6)	
4 n (%)	24 (33.8)	13 (38.2)	
5 n (%)	16 (22.5)	15 (44.1)	
Orgasm, median (IQR)	4.0 (3.0)	4.0 (2.0)	0.098*
0 n (%)	9 (12.7)	1 (2.9)	
1 n (%)	9 (12.7)	0 (0.0)	
2 n (%)	4 (5.6)	2 (5.9)	
3 n (%)	11 (15.5)	10 (29.4)	
4 n (%)	21 (29.6)	10 (29.4)	
5 n (%)	17 (23.9)	11 (32.4)	
Satisfaction, median (IQR)	3.0 (2.0)	4.0 (2.0)	**0.013***
1 n (%)	15 (21.1)	0 (0.0)	
2 n (%)	5 (7.0)	4 (11.8)	
3 n (%)	17 (23.9)	6 (17.6)	
4 n (%)	23 (32.4)	15 (44.1)	
5 n (%)	11 (15.5)	9 (26.5)	
Pain, median (IQR)	1.0 (3.0)	0.0 (2.0)	0.166*
0 n (%)	33 (46.5)	20 (58.8)	
1 n (%)	12 (16.9)	5 (14.7)	
2 n (%)	4 (5.6)	2 (5.9)	
3 n (%)	9 (12.7)	4 (11.8)	
4 n (%)	8 (11.3)	3 (8.8)	
5 n (%)	5 (7.0)	0 (0.0)	
FSDS-R, median (IQR)	11.2 (25.6)	3.2 (9.6)	**0.001***
HADS			
HADS-Anxiety, median (IQR)	10.0 (6.0)	5.0 (6.0)	**<0.001***
HADS-Depression, median (IQR)	7.0 (7.0)	2.0 (3.0)	**<0.001***
RU-SATED, median (IQR)	18.0 (12.0)	23.5 (9.0)	**0.005***

Bold for statistically significant results.

FSFI-6 – Female Sexual Function Index-6; FSDS-R – Female Sexual Distress Scale-Revised; HADS – Hospital Anxiety and Depression Scale; RU-SATED – Regularity, Satisfation, Alerttness, Timing, Efficiency and Duration Sleep Health Scale; IQR – Interquartile range; * Mann-Whitney U test

Table 4 Comparison of migraine patients according to the presence of Female Sexual Dysfunction and Sexual Distress.

	FSD+ (n = 36)	FSD- (n = 35)	*p* value	Distress + (n = 36)	Distress - (n = 35)	*p* value
Age, in years, median (IQR) | mean (SD)	40.5 (11.0)	40.0 (12.0)	0.778*	39.58 (7.64)	38.34 (6.88)	0.475****
Education, n (%) (Basic/Secondary/Higher)	6 (16.7) 11 (30.6) 19 (52.8)	5 (14.3) 8 (22.9) 22 (62.9)	0.680**	8 (22.2) 12 (33.3) 16 (44.4)	3 (8.6) 7 (20.0) 25 (71.4)	0.062**
Employment Status, n (%) (Employee/Self-employed/Unemployed/Student)	30 (83.3) 3 (8.3) 1 (2.8) 2 (5.6)	30 (85.7) 1 (2.9) 3 (8.6) 1 (2.9)	0.593***	30 (83.3) 1 (2.8) 3 (8.3) 2 (5.6)	30 (85.7) 3 (8.6) 1 (2.9) 1 (2.9)	0.593***
Marital Satus, n (%) Married or stable/Divorced/Single	27 (75.0) 0 (0.0) 9 (25.0)	29 (82.9) 2 (5.7) 4 (11.4)	0.141***	29 (80.6) 1 (2.8) 6 (16.7)	27 (77.1) 1 (2.9) 7 (20.0)	0.881***
Number of children, n (%) (Zero/One/Two/Three children)	15 (41.7) 6 (16.7) 14 (38.9) 1 (2.8)	12 (34.3) 8 (22.9) 14 (40.0) 1 (2.9)	0.869***	11 (30.6) 10 (27.8) 15 (41.7) 0 (0.0)	16 (45.7) 4 (11.4) 13 (37.1) 2 (5.7)	0.127***
Pre-obesity, n (%)	4 (11.1)	3 (8.6)	1.000***	5 (13.9)	2 (5.7)	0.429***
Obesity, n (%)	1 (2.8)	0 (0.0)	1.000***	1 (2.8)	0 (0.0)	1.000***
Arterial hypertension, n (%)	1 (2.8)	3 (8.6)	0.357***	2 (5.6)	2 (5.7)	1.000***
Tabagism, n (%)	4 (11.1)	4 (11.4)	1.000***	5 (13.9)	3 (8.6)	0.710***
Dyslipidemia, n (%)	4 (11.1)	2 (5.7)	0.674***	2 (5.6)	4 (11.4)	0.429***
Sedentarism, n (%)	2 (5.6)	4 (11.4)	0.429***	2 (5.6)	4 (11.4)	0.429***
Insomnia n (%)	14 (38.9)	11 (31.4)	0.511**	18 (50.0)	7 (20.0)	**0.008****
Sleepwalking, n (%)	2 (5.6)	0 (0.0)	0.493***	2 (5.6)	0 (0.0)	0.493***
Restless Legs Syndrome, n (%)	1 (2.8)	2 (5.7)	0.614***	2 (5.6)	1 (2.9)	1.000***
Sleep Bruxism, n (%)	1 (2.8)	0 (0.0)	1.000***	1 (2.8)	0 (0.0)	1.000***
Sleep Apnoea, n (%)	1 (2.8)	0 (0.0)	1.000***	1 (2.8)	0 (0.0)	1.000***
Hypersomnia, n (%)	1 (2.8)	0 (0.0)	1.000***	1 (2.8)	0 (0.0)	1.000***
Combined oral contraceptive pill, n (%)	8 (22.2)	9 (25.7)	0.730**	8 (22.2)	9 (25.7)	0.730**
No contraceptive methods, n (%)	4 (11.1)	7 (20.0)	0.301**	5 (13.9)	6 (17.1)	0.705**
Migraine onset, n (%) (childhood/adolescence/adulthood)	6 (16.7) 15 (41.7) 15 (41.7)	7 (20.0) 16 (45.7) 12 (34.3)	0.807**	3 (8.3) 14 (38.9) 19 (52.8)	10 (28.6) 17 (48.6) 8 (22.9)	**0.014****
Frequency/month, n (%) (< 4/ 4-9/ 10-15/ > 15days)	6 (16.7) 12 (33.3) 10 (27.8) 8 (22.2)	8 (22.9) 15 (42.9) 10 (28.6) 2 (5.7)	0.240**	8 (22.2) 13 (36.1) 9 (25.0) 6 (16.7)	6 (17.1) 14 (40.4) 11 (31.4) 4 (11.4)	0.823**
Aura (present/absent), n (%)	23 (74.2) 8 (25.8)	23 (71.9) 9 (28.1)	0.836**	22 (68.8) 10 (31.3)	24 (77.4) 7 (22.6)	0.438**
CGRP monoclonal antibodies, n (%)	15 (41.7)	13 (37.1)	0.697**	13 (36.1)	15 (42.9)	0.561**
Oral preventive medication, n (%)	18 (50.0)	7 (20.0)	**0.008****	18 (50.0)	7 (20.0)	**0.008****
Botulinum toxin, n (%)	7 (19.4)	13 (37.1)	0.097**	8 (22.2)	12 (34.3)	0.259**
Occipital nerve block, n (%)	2 (5.6)	4 (11.4)	0.429***	2 (5.6)	4 (11.4)	0.429***
No chronic treatment, n (%)	5 (13.9)	4 (11.4)	1.000***	5 (13.9)	4 (11.4)	1.000***
SOS medication, n (%) (< 4/ 4-9/ 10-15/ > 15days)	10 (27.8) 19 (52.8) 4 (11.1) 3 (8.3)	12 (34.3) 16 (45.7) 5 (14.3) 2 (5.7)	0.862***	12 (33.3) 17 (47.2) 5 (13.9) 2 (5.6)	10 (28.6) 18 (51.4) 4 (11.4) 3 (8.6)	0.945***
MIDAS, median (IQR)	30.5 (34.3)	21.0 (41.0)	0.381*	26.0 (40.0)	31.0 (42.5)	0.830*
BPI: Worst pain, median (IQR)	8.0 (3.0)	7.0 (2.0)	0.245*	7.5 (2.0)	7.0 (3.0)	0.726*
BPI: Least pain, median (IQR)	4.0 (4.0)	3.0 (3.0)	0.630*	3.5 (3.0)	3.0 (4.0)	0.732*
BPI: Pain on average, median (IQR)	6.0 (3.0)	5.0 (3.0)	0.944*	5.0 (3.0)	6.0 (4.0)	0.111*
BPI: Current pain, median (IQR)	2.5 (5.0)	0.0 (3.0)	**0.046***	2.0 (5.0)	2.0 (5.0)	0.562*
HADS-Anxiety, median (IQR)	12.0 (6.0)	9.0 (5.0)	**0.023***	12.0 (5.0)	8.0 (5.0)	**0.002***
HADS-Depression, mean (SD) | median (IQR)	8.56 (4.48)	4.86 (3.40)	**<0.001****	10.0 (5.0)	4.0 (6.0)	**<0.001***
RU-SATED, median (IQR) | mean (SD)	16.0 (13.0)	20.0 (8.0)	0.271*	15.47 (7.09)	20.46 (5.64)	**0.002****

Bold for statistically significant results.

FSD – Female Sexual Dysfunction; MIDAS – Migraine Disability Assessment Score; BPI – Brief Pain Inventory; HADS – Hospital Anxiety and Depression Scale; RU-SATED – Regularity, Satisfation, Alerttness, Timing, Efficiency and Duration Sleep Health Scale; IQR – Interquartile range; SD – Standard deviation; * Mann-Whitney U test; ** Chi-squared test; *** Fisher's exact test; **** Independent Samples T-test

Table 5 Correlation between FSFI-6 domain scores and age, FSDS-R, MIDAS, BPI, HADS-A, HADS-D and RU-SATED scores in patients with migraine.

	Desire ρ, *p*	Arousal ρ, *p*	Lubrication ρ, *p*	Orgasm ρ, *p*	Satisfaction ρ, *p*	Pain ρ, *p*
Age	-0.101, 0.402	-0.120, 0.320	-0.070, 0.560	0.193, 0.107	-0.141, 0.241	-0.153, 0.204
FSDS-R	**-0.429, <0.001**	**-0.457, <0.001**	**-0.399, <0.001**	**-0.418, <0.001**	**-0.481, <0.001**	**0.435, <0.001**
MIDAS Score	-0.037, 0.790	0.049, 0.727	-0.021, 0.879	0.027, 0.849	-0.040, 0.775	**0.312, 0.023**
BPI: Worst pain	-0.040, 0.742	0.022, 0.854	-0.094, 0.433	0.044, 0.714	0.077, 0.525	0.121, 0.314
BPI: Least pain	-0.176, 0.143	-0.086, 0.478	-0.197, 0.099	0.031, 0.797	0.040, 0.743	0.054, 0.653
BPI: Average pain	-0.018, 0.883	0.090, 0.453	0.063, 0.603	0.118, 0.326	0.179, 0.136	-0.054, 0.655
BPI: Current pain	**-0.240, 0.043**	-0.150, 0.213	-0.138, 0.252	-0.079, 0.513	-0.185, 0.122	0.076, 0.528
HADS-Anxiety	**-0.322, 0.006**	**-0.350, 0.003**	-0.220, 0.066	-0.233, 0.051	**-0.290, 0.014**	0.220, 0.066
HADS-Depression	**-0.509, <0.001**	**-0.512, <0.001**	**-0.321, 0.006**	**-0.382, 0.001**	**-0.455, <0.001**	0.228, 0.056
RU-SATED	0.154, 0.200	0.193, 0.108	0.127, 0.293	0.208, 0.081	0.179, 0.136	**-0.259, 0.029**

Bold for statistically significant results.

FSFI-6 – Female Sexual Function Index-6; FSDS-R – Female Sexual Distress Scale-Revised; HADS – Hospital Anxiety and Depression Scale; RU-SATED – Regularity, Satisfation, Alerttness, Timing, Efficiency and Duration Sleep Health Scale

Apêndices

A. Reporting guidelines (STROBE) para estudos observacionais transversais

B. Normas de formatação da revista: *Journal of Neurology*

C. Parecer da Comissão de Ética e do Encarregado da Proteção de Dados do Centro Hospitalar Universitário de São João

Apêndice A

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 9: "Retrospective, cross-sectional study"
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 9: "Female sexual dysfunction (FSD) (…) poor sleep quality."
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 10: "Sexual health is (…) requires further investigation."
Objectives	3	State specific objectives, including any prespecified hypotheses	Pages 10-11: "Thus, this work aimed (…) in migraine patients."
Methods			
Study design	4	Present key elements of study design early in the paper	Page 11: "We performed a single-centre, retrospective cross-sectional study"
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Pages 11-12: "We performed a single-centre (…) sent by text message."
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Page 11: "The participants were (…) were also excluded."
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Pages 11-12: "The participants were (…) 30 (good sleep health)."
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Pages 11-12: "Participants who meet (…) 30 (good sleep health)."
Bias	9	Describe any efforts to address potential sources of bias	Page 11: "with a diagnosis of (…) International Classification of Headache Disorders"
Study size	10	Explain how the study size was arrived at	Page 13: "The study gathered a total of 105 participants."
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 13: "Quantitative variables were (…) if otherwise."
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Page 13: "Statistical analysis was performed (…) was defined as statistically significant."
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	

		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Not applicable.
		(*e*) Describe any sensitivity analyses	We did not perform any sensitivity analyses.
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 13: "Patient and control recruitment (…) total of 105 participants."
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Page 27: Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Pages 13-14: "The sociodemographic characteristics (…) 15 days per month." Page 28: Table 1 Page 29: Table 2
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	Pages 14-16: "The median score of the MIDAS Scale (…) correlated to pain ($\rho=-0.259$, $p=0.029$)." Page 30: Table 3 Page 31: Table 4 Page 32: Table 5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Pages 14-16: "Migraine characteristics are displayed (…) correlated to pain ($\rho=-0.259$, $p=0.029$)."
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Page 28: Table 1 Subanalysis of the sociodemographic and clinical characteristics
Discussion			
Key results	18	Summarise key results with reference to study objectives	Pages 16-17: "Migraine patients display (…) of this relationship is necessary. Page 21: "This study highlights (…) sexual domains of FSD."

Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Pages 20-21: “This study had also some limitations (…) and sleep health over time.”
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Pages 17-20: “The prevalence of sexual dysfunction (…) premenopausal, perimenopausal and postmenopausal patients.”
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 20: “including a sample from a single tertiary hospital (…) variables from the ecological theory of sexual satisfaction.”
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 22: “The authors did not receive support from any organisation for the submitted work.”

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Journal of Neurology
Publishing model: Hybrid

Back to Overview

Submission guidelines

Contents

Instructions for Authors

Types of manuscripts and formal requirements

All articles must be written in English.

The following article will be considered for publication and can be submitted via Editorial Manager: Original Communication, Reviews, Short Commentary, Letters to the Editors and Pioneers in Neurology.

Original Communication must not exceed 9,000 words (excluding abstract and keywords, figures, tables, captions and references). Exceptions can be made only with the agreement of the responsible Chief Editor.

Review Articles must not exceed 12,000 words (excluding abstract and keywords, figures, tables, captions and references). Exceptions can be made only with the agreement of the responsible Editor.

Short Commentaries highlight new developments in clinical neuroscience and should not contain more than 6,000 words. Preliminary results of highly innovative studies may be submitted as Short Commentaries.

Letters to the Editors will be considered describing small studies or case reports of special significance and should not contain more than 2,500 words and 15 references. Abstract and key words are not required.

Pioneers in Neurology articles have a limit of 1,000 words, 10 references, and 1 portrait figure. These articles are not obituaries; rather, they focus on the scientific contributions of past pioneers to the neurological sciences, comprising key biographical information, but foremost, offering originality and a fresh perspective. Please consult previous issues for sample papers.

Neurological Update papers are invited reviews by experts that provide an update in their field of expertise. *Journal of Neurology* does not consider unsolicited submissions of Neurological Update papers.

Journal Club papers are invited to discuss relevant publications in the field of clinical neurology. *Journal of Neurology* does not consider unsolicited submissions of Journal Club papers.

Back to top

Editorial procedure

Single-blind peer review

This journal follows a single-blind reviewing procedure.

Back to top

Manuscript Submission

Manuscript Submission

Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

Permissions

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) for both the print and online format and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors.

Online Submission

Please follow the hyperlink "Submit manuscript" and upload all of your manuscript files following the instructions given on the screen.

Source Files

Please ensure you provide all relevant editable source files at every submission and revision. Failing to submit a complete set of editable source files will result in your article not being considered for review. For your manuscript text please always submit in common word processing formats such as .docx or LaTeX.

Back to top

Title Page

Please make sure your title page contains the following information.

Title

The title should be concise and informative.

Author information

The name(s) of the author(s)

The affiliation(s) of the author(s), i.e. institution, (department), city, (state), country

A clear indication and an active e-mail address of the corresponding author

If available, the 16-digit ORCID of the author(s)

If address information is provided with the affiliation(s) it will also be published.

For authors that are (temporarily) unaffiliated we will only capture their city and country of residence, not their e-mail address unless specifically requested.

Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript.

Abstract

Please provide an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

For life science journals only (when applicable)

Trial registration number and date of registration for prospectively registered trials

Trial registration number and date of registration, followed by "retrospectively registered", for retrospectively registered trials

Keywords

Please provide 4 to 6 keywords which can be used for indexing purposes.

Statements and Declarations

The following statements should be included under the heading "Statements and Declarations" for inclusion in the published paper. Please note that submissions that do not include relevant declarations will be returned as incomplete.

Competing Interests: Authors are required to disclose financial or non-financial interests that are directly or indirectly related to the work submitted for publication. Please refer to "Competing Interests and Funding" below for more information on how to complete this section.

Please see the relevant sections in the submission guidelines for further information as well as various examples of wording. Please revise/customize the sample statements according to your own needs.

Back to top ↑

Text

Text Formatting

Manuscripts should be submitted in Word.

Use a normal, plain font (e.g., 10-point Times Roman) for text.

Use italics for emphasis.

Use the automatic page numbering function to number the pages.

Do not use field functions.

Use tab stops or other commands for indents, not the space bar.

Use the table function, not spreadsheets, to make tables.

Use the equation editor or MathType for equations.

Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Manuscripts with mathematical content can also be submitted in LaTeX. We recommend using Springer Nature's LaTeX template.

Headings

Please use no more than three levels of displayed headings.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

Acknowledgments

Acknowledgments of people, grants, funds, etc. should be placed in a separate section on the title page. The names of funding organizations should be written in full.

Back to top ↑

Scientific style

Generic names of drugs and pesticides are preferred; if trade names are used, the generic name should be given at first mention.

Back to top ↑

References

Citation

Reference citations in the text should be identified by numbers in square brackets. Some examples:

1. Negotiation research spans many disciplines [3].

2. This result was later contradicted by Becker and Seligman [5].

3. This effect has been widely studied [1-3, 7].

Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text.

The entries in the list should be numbered consecutively.

If available, please always include DOIs as full DOI links in your reference list (e.g. “https://doi.org/abc”).

Journal article

Gamelin FX, Baquet G, Berthoin S, Thevenet D, Nourry C, Nottin S, Bosquet L (2009) Effect of high intensity intermittent training on heart rate variability in prepubescent children. Eur J Appl Physiol 105:731-738. https://doi.org/10.1007/s00421-008-0955-8

Ideally, the names of all authors should be provided, but the usage of “et al” in long author lists will also be accepted:

Smith J, Jones M Jr, Houghton L et al (1999) Future of health insurance. N Engl J Med 965:325–329

Article by DOI

Slifka MK, Whitton JL (2000) Clinical implications of dysregulated cytokine production. J Mol Med. https://doi.org/10.1007/s001090000086

Book

South J, Blass B (2001) The future of modern genomics. Blackwell, London

Book chapter

Brown B, Aaron M (2001) The politics of nature. In: Smith J (ed) The rise of modern genomics, 3rd edn. Wiley, New York, pp 230-257

Online document

Cartwright J (2007) Big stars have weather too. IOP Publishing PhysicsWeb. http://physicsweb.org/articles/news/11/6/16/1. Accessed 26 June 2007

Dissertation

Trent JW (1975) Experimental acute renal failure. Dissertation, University of California

Always use the standard abbreviation of a journal’s name according to the ISSN List of Title Word Abbreviations, see

ISSN.org LTWA

If you are unsure, please use the full journal title.

Authors preparing their manuscript in LaTeX can use the bibliography style file sn-basic.bst which is included in the Springer Nature Article Template.

Back to top ↑

Tables

All tables are to be numbered using Arabic numerals.

Tables should always be cited in text in consecutive numerical order.

For each table, please supply a table caption (title) explaining the components of the table.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

Back to top ↑

Artwork and Illustrations Guidelines

Electronic Figure Submission

Supply all figures electronically.

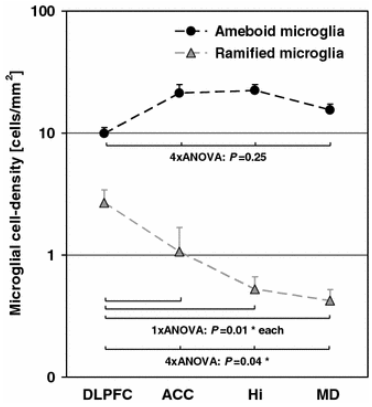
Indicate what graphics program was used to create the artwork.

For vector graphics, the preferred format is EPS; for halftones, please use TIFF format. MSOffice files are also acceptable.

Vector graphics containing fonts must have the fonts embedded in the files.

Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

Line Art



Definition: Black and white graphic with no shading.

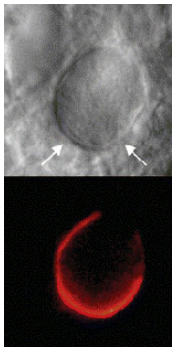
Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.

All lines should be at least 0.1 mm (0.3 pt) wide.

Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.

Vector graphics containing fonts must have the fonts embedded in the files.

Halftone Art

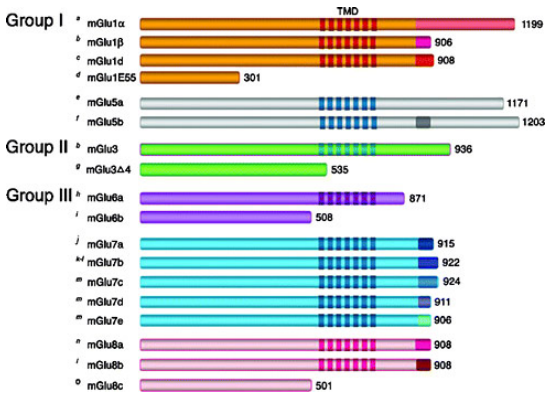


Definition: Photographs, drawings, or paintings with fine shading, etc.

If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.

Halftones should have a minimum resolution of 300 dpi.

Combination Art



Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.

Combination artwork should have a minimum resolution of 600 dpi.

Color Art

Color art is free of charge for online publication.

If black and white will be shown in the print version, make sure that the main information will still be visible. Many colors are not distinguishable from one another when converted to black and white. A simple way to check this is to make a xerographic copy to see if the necessary distinctions between the different colors are still apparent.

If the figures will be printed in black and white, do not refer to color in the captions.

Color illustrations should be submitted as RGB (8 bits per channel).

Figure Lettering

To add lettering, it is best to use Helvetica or Arial (sans serif fonts).

Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).

Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.

Avoid effects such as shading, outline letters, etc.

Do not include titles or captions within your illustrations.

Figure Numbering

All figures are to be numbered using Arabic numerals.

Figures should always be cited in text in consecutive numerical order.

Figure parts should be denoted by lowercase letters (a, b, c, etc.).

If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures,"A1, A2, A3, etc." Figures in online appendices [Supplementary Information (SI)] should, however, be numbered separately.

Figure Captions

Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.

Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.

No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.

Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.

Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

Figure Placement and Size

Figures should be submitted within the body of the text. Only if the file size of the manuscript causes problems in uploading it, the large figures should be submitted separately from the text.

When preparing your figures, size figures to fit in the column width.

For large-sized journals the figures should be 84 mm (for double-column text areas), or 174 mm (for single-column text areas) wide and not higher than 234 mm.

For small-sized journals, the figures should be 119 mm wide and not higher than 195 mm.

Permissions

If you include figures that have already been published elsewhere, you must obtain permission from the copyright owner(s) for both the print and online format. Please be aware that some publishers do not grant electronic rights for free and that Springer will not be able to refund any costs that may have occurred to receive these permissions. In such cases, material from other sources should be used.

Accessibility

In order to give people of all abilities and disabilities access to the content of your figures, please make sure that

All figures have descriptive captions (blind users could then use a text-to-speech software or a text-to-Braille hardware)

Patterns are used instead of or in addition to colors for conveying information (colorblind users would then be able to distinguish the visual elements)

Any figure lettering has a contrast ratio of at least 4.5:1

Generative AI Images

Please check Springer's policy on generative AI images and make sure your work adheres to the principles described therein.

Back to top

Supplementary Information (SI)

Springer accepts electronic multimedia files (animations, movies, audio, etc.) and other supplementary files to be published online along with an article or a book chapter. This feature can add dimension to the author's article, as certain information cannot be printed or is more convenient in electronic form.

Before submitting research datasets as Supplementary Information, authors should read the journal's Research data policy. We encourage research data to be archived in data repositories wherever possible.

Submission

Supply all supplementary material in standard file formats.

Please include in each file the following information: article title, journal name, author names; affiliation and e-mail address of the corresponding author.

To accommodate user downloads, please keep in mind that larger-sized files may require very long download times and that some users may experience other problems during downloading.

High resolution (streamable quality) videos can be submitted up to a maximum of 25GB; low resolution videos should not be larger than 5GB.

Audio, Video, and Animations

Aspect ratio: 16:9 or 4:3

Maximum file size: 25 GB for high resolution files; 5 GB for low resolution files

Minimum video duration: 1 sec

Supported file formats: avi, wmv, mp4, mov, m2p, mp2, mpg, mpeg, flv, mxf, mts, m4v, 3gp

Text and Presentations

Submit your material in PDF format; .doc or .ppt files are not suitable for long-term viability.

A collection of figures may also be combined in a PDF file.

Spreadsheets

Spreadsheets should be submitted as .csv or .xlsx files (MS Excel).

Specialized Formats

Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

Collecting Multiple Files

It is possible to collect multiple files in a .zip or .gz file.

Numbering

If supplying any supplementary material, the text must make specific mention of the material as a citation, similar to that of figures and tables.

Refer to the supplementary files as “Online Resource”, e.g., "... as shown in the animation (Online Resource 3)", “... additional data are given in Online Resource 4”.

Name the files consecutively, e.g. “ESM_3.mpg”, “ESM_4.pdf”.

Captions

For each supplementary material, please supply a concise caption describing the content of the file.

Processing of supplementary files

Supplementary Information (SI) will be published as received from the author without any conversion, editing, or reformatting.

Accessibility

In order to give people of all abilities and disabilities access to the content of your supplementary files, please make sure that

The manuscript contains a descriptive caption for each supplementary material

Video files do not contain anything that flashes more than three times per second (so that users prone to seizures caused by such effects are not put at risk)

Generative AI Images

Please check Springer’s policy on generative AI images and make sure your work adheres to the principles described therein.

Back to top ↑

Integrity of research and reporting

Ethical standards

Manuscripts submitted for publication must contain a statement to the effect that all human and animal studies have been approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

It should also be stated clearly in the text that all persons gave their informed consent prior to their inclusion in the study. Details that might disclose the identity of the subjects under study should be omitted.

These statements should be added in a separate section before the reference list. If these statements are not applicable, authors should state: The manuscript does not contain clinical studies or patient data.

The editors reserve the right to reject manuscripts that do not comply with the above-mentioned requirements. The author will be held responsible for false statements or failure to fulfill the above-mentioned requirements

Conflict of interest

Authors must indicate whether or not they have a financial relationship with the organization that sponsored the research. This note should be added in a separate section before the reference list.

If no conflict exists, authors should state: The authors declare that they have no conflict of interest.

Back to top ↑

Editing Services

English

How can you help improve your manuscript for publication?

Presenting your work in a well-structured manuscript and in well-written English gives it its best chance for editors and reviewers to understand it and evaluate it fairly. Many researchers find that getting some independent support helps them present their results in the best possible light. The experts at Springer Nature Author Services can help you with manuscript preparation—including **English language editing, developmental comments, manuscript formatting, figure preparation, translation**, and more.

Get started and save 15%

You can also use our free Grammar Check tool for an evaluation of your work.

Please note that using these tools, or any other service, is not a requirement for publication, nor does it imply or guarantee that editors will accept the article, or even select it for peer review.

Chinese (中文)

您怎么做才有助于改进您的稿件以便顺利发表?

如果在结构精巧的稿件中用精心组织的英语展示您的作品，就能最大限度地让编辑和审稿人理解并公正评估您的作品。许多研究人员发现，获得一些独立支持有助于他们以尽可能美好的方式展示他们的成果。Springer Nature Author Services 的专家可帮助您准备稿件，具体包括**润色英语表述、添加有见地的注释、为稿件排版、设计图表、翻译**等。

开始使用即可节省 15% 的费用

您还可以使用我们的免费语法检查工具来评估您的作品。

请注意，使用这些工具或任何其他服务不是发表前必须满足的要求，也不暗示或保证相关文章定会被编辑接受（甚至未必会被选送同行评审）。

Japanese (日本語)

発表に備えて、論文を改善するにはどうすればよいでしょうか？

内容が適切に組み立てられ、質の高い英語で書かれた論文を投稿すれば、編集者や査読者が論文を理解し、公正に評価するための最善の機会となります。多くの研究者は、個別のサポートを受けることで、研究結果を可能な限り最高の形で発表できると思っています。Springer Nature Author Servicesのエキスパートが、**英文の編集、建設的な提言、論文の書式、図の調整、翻訳**など、論文の作成をサポートいたします。

今なら15%割引でご利用いただけます

原稿の評価に、無料の文法チェックツールもご利用いただけます。

これらのツールや他のサービスをご利用いただくことは、論文を掲載するための要件ではありません。また、編集者が論文を受理したり、査読に選定したりすることを示唆または保証するものではないことにご注意ください。

Korean (한국어)

게재를 위해 원고를 개선하려면 어떻게 해야 할까요?

여러분의 작품을 체계적인 원고로 발표하는 것은 편집자와 심사자가 여러분의 연구를 이해하고 공정하게 평가할 수 있는 최선의 기회를 제공합니다. 많은 연구자들은 어느 정도 독립적인 지원을 받는 것이 가능한 한 최선의 방법으로 자신의 결과를 발표하는 데 도움이 된다고 합니다. Springer Nature Author Services 전문가들은 **영어 편집, 발전적인 논평, 원고 서식 지정, 그림 준비, 번역** 등과 같은 원고 준비를 도와드릴 수 있습니다.

지금 시작하면 15% 할인됩니다.

또한 당사의 무료 문법 검사도구를 사용하여 여러분의 연구를 평가할 수 있습니다.

이러한 도구 또는 기타 서비스를 사용하는 것은 게재를 위한 필수 요구사항이 아니며, 편집자가 해당 논문을 수락하거나 피어 리뷰에 해당 논문을 선택한다는 것을 암시하거나 보장하지는 않습니다.

Back to top ↑

Ethical Responsibilities of Authors

This journal is committed to upholding the integrity of the scientific record. As a member of the Committee on Publication Ethics (COPE) the journal will follow the COPE guidelines on how to deal with potential acts of misconduct.

Authors should refrain from misrepresenting research results which could damage the trust in the journal, the professionalism of scientific authorship, and ultimately the entire scientific endeavour. Maintaining integrity of the research and its presentation is helped by following the rules of good scientific practice, which include*:

The manuscript should not be submitted to more than one journal for simultaneous consideration.

The submitted work should be original and should not have been published elsewhere in any form or language (partially or in full), unless the new work concerns an expansion of previous work. (Please provide transparency on the re-use of material to avoid the concerns about text-recycling ('self-plagiarism').

A single study should not be split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time (i.e. 'salami-slicing/publishing').

Concurrent or secondary publication is sometimes justifiable, provided certain conditions are met. Examples include: translations or a manuscript that is intended for a different group of readers.

Results should be presented clearly, honestly, and without fabrication, falsification or inappropriate data manipulation (including image based manipulation). Authors should adhere to discipline-specific rules for acquiring, selecting and processing data.

No data, text, or theories by others are presented as if they were the author's own ('plagiarism'). Proper acknowledgements to other works must be given (this includes material that is closely copied (near verbatim), summarized and/or paraphrased), quotation marks (to indicate words taken from another source) are used for verbatim copying of material, and permissions secured for material that is copyrighted.

Important note: the journal may use software to screen for plagiarism.

Authors should make sure they have permissions for the use of software, questionnaires/(web) surveys and scales in their studies (if appropriate).

Research articles and non-research articles (e.g. Opinion, Review, and Commentary articles) must cite appropriate and relevant literature in support of the claims made. Excessive and inappropriate self-citation or coordinated efforts among several authors to collectively self-

cite is strongly discouraged.

Authors should avoid untrue statements about an entity (who can be an individual person or a company) or descriptions of their behavior or actions that could potentially be seen as personal attacks or allegations about that person.

Research that may be misapplied to pose a threat to public health or national security should be clearly identified in the manuscript (e.g. dual use of research). Examples include creation of harmful consequences of biological agents or toxins, disruption of immunity of vaccines, unusual hazards in the use of chemicals, weaponization of research/technology (amongst others).

Authors are strongly advised to ensure the author group, the Corresponding Author, and the order of authors are all correct at submission. Adding and/or deleting authors during the revision stages is generally not permitted, but in some cases may be warranted. Reasons for changes in authorship should be explained in detail. Please note that changes to authorship cannot be made after acceptance of a manuscript.

*All of the above are guidelines and authors need to make sure to respect third parties rights such as copyright and/or moral rights.

Upon request authors should be prepared to send relevant documentation or data in order to verify the validity of the results presented. This could be in the form of raw data, samples, records, etc. Sensitive information in the form of confidential or proprietary data is excluded.

If there is suspicion of misbehavior or alleged fraud the Journal and/or Publisher will carry out an investigation following COPE guidelines. If, after investigation, there are valid concerns, the author(s) concerned will be contacted under their given e-mail address and given an opportunity to address the issue. Depending on the situation, this may result in the Journal's and/or Publisher's implementation of the following measures, including, but not limited to:

If the manuscript is still under consideration, it may be rejected and returned to the author.

If the article has already been published online, depending on the nature and severity of the infraction:

- an erratum/correction may be placed with the article

- an expression of concern may be placed with the article

- or in severe cases retraction of the article may occur.

The reason will be given in the published erratum/correction, expression of concern or retraction note. Please note that retraction means that the article is **maintained on the platform**, watermarked "retracted" and the explanation for the retraction is provided in a note linked to the watermarked article.

The author's institution may be informed

A notice of suspected transgression of ethical standards in the peer review system may be included as part of the author's and article's bibliographic record.

Fundamental errors

Authors have an obligation to correct mistakes once they discover a significant error or inaccuracy in their published article. The author(s) is/are requested to contact the journal and explain in what sense the error is impacting the article. A decision on how to correct the literature will depend on the nature of the error. This may be a correction or retraction. The retraction note should provide transparency which parts of the article are impacted by the error.

Suggesting / excluding reviewers

Authors are welcome to suggest suitable reviewers and/or request the exclusion of certain individuals when they submit their manuscripts. When suggesting reviewers, authors should make sure they are totally independent and not connected to the work in any way. It is strongly recommended to suggest a mix of reviewers from different countries and different institutions. When suggesting reviewers, the

Corresponding Author must provide an institutional email address for each suggested reviewer, or, if this is not possible to include other means of verifying the identity such as a link to a personal homepage, a link to the publication record or a researcher or author ID in the submission letter. Please note that the Journal may not use the suggestions, but suggestions are appreciated and may help facilitate the peer review process.

Back to top ↑

Competing Interests

Authors are requested to disclose interests that are directly or indirectly related to the work submitted for publication. Interests within the last 3 years of beginning the work (conducting the research and preparing the work for submission) should be reported. Interests outside the 3-year time frame must be disclosed if they could reasonably be perceived as influencing the submitted work. Disclosure of interests provides a complete and transparent process and helps readers form their own judgments of potential bias. This is not meant to imply that a financial relationship with an organization that sponsored the research or compensation received for consultancy work is inappropriate.

Editorial Board Members and Editors are required to declare any competing interests and may be excluded from the peer review process if a competing interest exists. In addition, they should exclude themselves from handling manuscripts in cases where there is a competing interest. This may include – but is not limited to – having previously published with one or more of the authors, and sharing the same institution as one or more of the authors. Where an Editor or Editorial Board Member is on the author list they must declare this in the competing interests section on the submitted manuscript. If they are an author or have any other competing interest regarding a specific manuscript, another Editor or member of the Editorial Board will be assigned to assume responsibility for overseeing peer review. These submissions are subject to the exact same review process as any other manuscript. Editorial Board Members are welcome to submit papers to the journal. These submissions are not given any priority over other manuscripts, and Editorial Board Member status has no bearing on editorial consideration.

Interests that should be considered and disclosed but are not limited to the following:

Funding: Research grants from funding agencies (please give the research funder and the grant number) and/or research support (including salaries, equipment, supplies, reimbursement for attending symposia, and other expenses) by organizations that may gain or lose financially through publication of this manuscript.

Employment: Recent (while engaged in the research project), present or anticipated employment by any organization that may gain or lose financially through publication of this manuscript. This includes multiple affiliations (if applicable).

Financial interests: Stocks or shares in companies (including holdings of spouse and/or children) that may gain or lose financially through publication of this manuscript; consultation fees or other forms of remuneration from organizations that may gain or lose financially; patents or patent applications whose value may be affected by publication of this manuscript.

It is difficult to specify a threshold at which a financial interest becomes significant, any such figure is necessarily arbitrary, so one possible practical guideline is the following: "Any undeclared financial interest that could embarrass the author were it to become publicly known after the work was published."

Non-financial interests: In addition, authors are requested to disclose interests that go beyond financial interests that could impart bias on the work submitted for publication such as professional interests, personal relationships or personal beliefs (amongst others). Examples include, but are not limited to: position on editorial board, advisory board or board of directors or other type of management relationships; writing and/or consulting for educational purposes; expert witness; mentoring relations; and so forth.

Primary research articles require a disclosure statement. Review articles present an expert synthesis of evidence and may be treated as an authoritative work on a subject. Review articles therefore require a disclosure statement.Other article types such as editorials, book reviews, comments (amongst others) may, dependent on their content, require a disclosure statement. If you are unclear whether your article type requires a disclosure statement, please contact the Editor-in-Chief.

Please note that, in addition to the above requirements, funding information (given that funding is a potential competing interest (as mentioned above)) needs to be disclosed upon submission of the manuscript in the peer review system. This information will automatically

be added to the Record of CrossMark, however it is **not added** to the manuscript itself. Under 'summary of requirements' (see below) funding information should be included in the '**Declarations**' section.

Summary of requirements

The above should be summarized in a statement and placed in a 'Declarations' section before the reference list under a heading of 'Funding' and/or 'Competing interests'. Other declarations include Ethics approval, Consent, Data, Material and/or Code availability and Authors' contribution statements.

Please see the various examples of wording below and revise/customize the sample statements according to your own needs.

When all authors have the same (or no) conflicts and/or funding it is sufficient to use one blanket statement.

Examples of statements to be used when funding has been received:

Partial financial support was received from [...]

The research leading to these results received funding from [...] under Grant Agreement No[...].

This study was funded by [...]

This work was supported by [...] (Grant numbers [...] and [...]

Examples of statements to be used when there is no funding:

The authors did not receive support from any organization for the submitted work.

No funding was received to assist with the preparation of this manuscript.

No funding was received for conducting this study.

No funds, grants, or other support was received.

Examples of statements to be used when there are interests to declare:

Financial interests: Author A has received research support from Company A. Author B has received a speaker honorarium from Company Wand owns stock in Company X. Author C is consultant to company Y.

Non-financial interests: Author C is an unpaid member of committee Z.

Financial interests: The authors declare they have no financial interests.

Non-financial interests: Author A is on the board of directors of Y and receives no compensation as member of the board of directors.

Financial interests: Author A received a speaking fee from Y for Z. Author B receives a salary from association X. X where s/he is the Executive Director.

Non-financial interests: none.

Financial interests: Author A and B declare they have no financial interests. Author C has received speaker and consultant honoraria from Company M and Company N. Dr. C has received speaker honorarium and research funding from Company M and Company O. Author D has received travel support from Company O.

Non-financial interests: Author D has served on advisory boards for Company M, Company N and Company O.

Examples of statements to be used when authors have nothing to declare:

The authors have no relevant financial or non-financial interests to disclose.

The authors have no competing interests to declare that are relevant to the content of this article.

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

The authors have no financial or proprietary interests in any material discussed in this article.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Back to top ↑

Research involving human participants, their data or biological material

Ethics approval

When reporting a study that involved human participants, their data or biological material, authors should include a statement that confirms that the study was approved (or granted exemption) by the appropriate institutional and/or national research ethics committee (including the name of the ethics committee) and certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. If doubt exists whether the research was conducted in accordance with the 1964 Helsinki Declaration or comparable standards, the authors must explain the reasons for their approach, and demonstrate that an independent ethics committee or institutional review board explicitly approved the doubtful aspects of the study. If a study was granted exemption from requiring ethics approval, this should also be detailed in the manuscript (including the reasons for the exemption).

Retrospective ethics approval

If a study has not been granted ethics committee approval prior to commencing, retrospective ethics approval usually cannot be obtained and it may not be possible to consider the manuscript for peer review. The decision on whether to proceed to peer review in such cases is at the Editor's discretion.

Ethics approval for retrospective studies

Although retrospective studies are conducted on already available data or biological material (for which formal consent may not be needed or is difficult to obtain) ethics approval may be required dependent on the law and the national ethical guidelines of a country. Authors should check with their institution to make sure they are complying with the specific requirements of their country.

Ethics approval for case studies

Case reports require ethics approval. Most institutions will have specific policies on this subject. Authors should check with their institution to make sure they are complying with the specific requirements of their institution and seek ethics approval where needed. Authors should be aware to secure informed consent from the individual (or parent or guardian if the participant is a minor or incapable) See also section on **Informed Consent**.

Cell lines

If human cells are used, authors must declare in the manuscript: what cell lines were used by describing the source of the cell line, including when and from where it was obtained, whether the cell line has recently been authenticated and by what method. If cells were bought from a life science company the following need to be given in the manuscript: name of company (that provided the cells), cell type, number of cell line, and batch of cells.

It is recommended that authors check the NCBI database for misidentification and contamination of human cell lines. This step will alert authors to possible problems with the cell line and may save considerable time and effort.

Further information is available from the International Cell Line Authentication Committee (ICLAC).

Authors should include a statement that confirms that an institutional or independent ethics committee (including the name of the ethics committee) approved the study and that informed consent was obtained from the donor or next of kin.

Research Resource Identifiers (RRID)

Research Resource Identifiers (RRID) are persistent unique identifiers (effectively similar to a DOI) for research resources. This journal encourages authors to adopt RRIDs when reporting key biological resources (antibodies, cell lines, model organisms and tools) in their manuscripts.

Examples:

Organism: *Filip1*$^{tm1a(KOMP)Wtsi}$ **RRID:MMRRC_055641-UCD**

Cell Line: RST307 cell line **RRID:CVCL_C321**

Antibody: Luciferase antibody DSHB Cat# LUC-3, **RRID:AB_2722109**

Plasmid: mRuby3 plasmid **RRID:Addgene_104005**

Software: ImageJ Version 1.2.4 **RRID:SCR_003070**

RRIDs are provided by the Resource Identification Portal. Many commonly used research resources already have designated RRIDs. The portal also provides authors links so that they can quickly register a new resource and obtain an RRID.

Clinical Trial Registration

The World Health Organization (WHO) definition of a clinical trial is "any research study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes". The WHO defines health interventions as “A health intervention is an act performed for, with or on behalf of a person or population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions” and a health-related outcome is generally defined as a change in the health of a person or population as a result of an intervention.

To ensure the integrity of the reporting of patient-centered trials, authors must register prospective clinical trials (phase II to IV trials) in suitable publicly available repositories. For example www.clinicaltrials.gov or any of the primary registries that participate in the WHO International Clinical Trials Registry Platform.

The trial registration number (TRN) and date of registration should be included as the last line of the manuscript abstract.

For clinical trials that have not been registered prospectively, authors are encouraged to register retrospectively to ensure the complete publication of all results. The trial registration number (TRN), date of registration and the words 'retrospectively registered’ should be included as the last line of the manuscript abstract.

Standards of reporting

Springer Nature advocates complete and transparent reporting of biomedical and biological research and research with biological applications. Authors are recommended to adhere to the minimum reporting guidelines hosted by the EQUATOR Network when preparing their manuscript.

Exact requirements may vary depending on the journal; please refer to the journal’s Instructions for Authors.

Checklists are available for a number of study designs, including:

Randomised trials (CONSORT) and Study protocols (SPIRIT)

Observational studies (STROBE)

Systematic reviews and meta-analyses (PRISMA) and protocols (Prisma-P)

Diagnostic/prognostic studies (STARD) and (TRIPOD)

Case reports (CARE)

Clinical practice guidelines (AGREE) and (RIGHT)

Qualitative research (SRQR) and (COREQ)

Animal pre-clinical studies (ARRIVE)

Quality improvement studies (SQUIRE)

Economic evaluations (CHEERS)

Summary of requirements

The above should be summarized in a statement and placed in a 'Declarations' section before the reference list under a heading of 'Ethics approval'.

Examples of statements to be used when ethics approval has been obtained:

• All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of the Medical University of A (No. ...).

• This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University B (Date.../No. ...).

• Approval was obtained from the ethics committee of University C. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

• The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the University of D (Ethics approval number: ...).

Examples of statements to be used for a retrospective study:

• Ethical approval was waived by the local Ethics Committee of University A in view of the retrospective nature of the study and all the procedures being performed were part of the routine care.

• This research study was conducted retrospectively from data obtained for clinical purposes. We consulted extensively with the IRB of XYZ who determined that our study did not need ethical approval. An IRB official waiver of ethical approval was granted from the IRB of XYZ.

• This retrospective chart review study involving human participants was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Human Investigation Committee (IRB) of University B approved this study.

Examples of statements to be used when no ethical approval is required/exemption granted:

• This is an observational study. The XYZ Research Ethics Committee has confirmed that no ethical approval is required.

• The data reproduced from Article X utilized human tissue that was procured via our Biobank AB, which provides de-identified samples. This study was reviewed and deemed exempt by our XYZ Institutional Review Board. The BioBank protocols are in accordance with the ethical standards of our institution and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Back to top ↑

Informed consent

All individuals have individual rights that are not to be infringed. Individual participants in studies have, for example, the right to decide what happens to the (identifiable) personal data gathered, to what they have said during a study or an interview, as well as to any photograph that was taken. This is especially true concerning images of vulnerable people (e.g. minors, patients, refugees, etc) or the use of images in sensitive contexts. In many instances authors will need to secure written consent before including images.

Identifying details (names, dates of birth, identity numbers, biometrical characteristics (such as facial features, fingerprint, writing style, voice pattern, DNA or other distinguishing characteristic) and other information) of the participants that were studied should not be published in written descriptions, photographs, and genetic profiles unless the information is essential for scholarly purposes and the participant (or parent/guardian if the participant is a minor or incapable or legal representative) gave written informed consent for publication. Complete anonymity is difficult to achieve in some cases. Detailed descriptions of individual participants, whether of their whole bodies or of body sections, may lead to disclosure of their identity. Under certain circumstances consent is not required as long as information is anonymized and the submission does not include images that may identify the person.

Informed consent for publication should be obtained if there is any doubt. For example, masking the eye region in photographs of participants is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic profiles, authors should provide assurance that alterations do not distort meaning.

Exceptions where it is not necessary to obtain consent:

• Images such as x rays, laparoscopic images, ultrasound images, brain scans, pathology slides unless there is a concern about identifying information in which case, authors should ensure that consent is obtained.

• Reuse of images: If images are being reused from prior publications, the Publisher will assume that the prior publication obtained the relevant information regarding consent. Authors should provide the appropriate attribution for republished images.

Consent and already available data and/or biologic material

Regardless of whether material is collected from living or dead patients, they (family or guardian if the deceased has not made a pre-mortem decision) must have given prior written consent. The aspect of confidentiality as well as any wishes from the deceased should be respected.

Data protection, confidentiality and privacy

When biological material is donated for or data is generated as part of a research project authors should ensure, as part of the informed consent procedure, that the participants are made aware what kind of (personal) data will be processed, how it will be used and for what purpose. In case of data acquired via a biobank/biorepository, it is possible they apply a broad consent which allows research participants to consent to a broad range of uses of their data and samples which is regarded by research ethics committees as specific enough to be considered "informed". However, authors should always check the specific biobank/biorepository policies or any other type of data provider policies (in case of non-bio research) to be sure that this is the case.

Consent to Participate

For all research involving human subjects, freely-given, informed consent to participate in the study must be obtained from participants (or their parent or legal guardian in the case of children under 16) and a statement to this effect should appear in the manuscript. In the case of articles describing human transplantation studies, authors must include a statement declaring that no organs/tissues were obtained from prisoners and must also name the institution(s)/clinic(s)/department(s) via which organs/tissues were obtained. For manuscripts reporting studies involving vulnerable groups where there is the potential for coercion or where consent may not have been fully informed, extra care will be taken by the editor and may be referred to the Springer Nature Research Integrity Group.

Consent to Publish

Individuals may consent to participate in a study, but object to having their data published in a journal article. Authors should make sure to also seek consent from individuals to publish their data prior to submitting their paper to a journal. This is in particular applicable to case studies. A consent to publish form can be found

here. (Download docx, 36 kB)

Summary of requirements

The above should be summarized in a statement and placed in a 'Declarations' section before the reference list under a heading of 'Consent to participate' and/or 'Consent to publish'. Other declarations include Funding, Competing interests, Ethics approval, Consent, Data and/or Code availability and Authors' contribution statements.

Please see the various examples of wording below and revise/customize the sample statements according to your own needs.

Sample statements for **"Consent to participate"**:

Informed consent was obtained from all individual participants included in the study.

Informed consent was obtained from legal guardians.

Written informed consent was obtained from the parents.

Verbal informed consent was obtained prior to the interview.

Sample statements for **"Consent to publish"**:

The authors affirm that human research participants provided informed consent for publication of the images in Figure(s) 1a, 1b and 1c.

The participant has consented to the submission of the case report to the journal.

Patients signed informed consent regarding publishing their data and photographs.

Sample statements if identifying information about participants is available in the article:

Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

Authors are responsible for correctness of the statements provided in the manuscript. See also Authorship Principles. The Editor-in-Chief reserves the right to reject submissions that do not meet the guidelines described in this section.

Images will be removed from publication if authors have not obtained informed consent or the paper may be removed and replaced with a notice explaining the reason for removal.

Back to top ↑

Authorship principles

These guidelines describe authorship principles and good authorship practices to which prospective authors should adhere to.

Authorship clarified

The Journal and Publisher assume all authors agreed with the content and that all gave explicit consent to submit and that they obtained consent from the responsible authorities at the institute/organization where the work has been carried out, **before** the work is submitted.

The Publisher does not prescribe the kinds of contributions that warrant authorship. It is recommended that authors adhere to the guidelines for authorship that are applicable in their specific research field. In absence of specific guidelines it is recommended to adhere to the following guidelines*:

All authors whose names appear on the submission

1) made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work;

2) drafted the work or revised it critically for important intellectual content;

3) approved the version to be published; and

4) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

* Based on/adapted from:

ICMJE, Defining the Role of Authors and Contributors,

Transparency in authors' contributions and responsibilities to promote integrity in scientific publication, McNutt at all, PNAS February 27, 2018

Disclosures and declarations

All authors are requested to include information regarding sources of funding, financial or non-financial interests, study-specific approval by the appropriate ethics committee for research involving humans and/or animals, informed consent if the research involved human participants, and a statement on welfare of animals if the research involved animals (as appropriate).

The decision whether such information should be included is not only dependent on the scope of the journal, but also the scope of the article. Work submitted for publication may have implications for public health or general welfare and in those cases it is the responsibility of all authors to include the appropriate disclosures and declarations.

Data transparency

All authors are requested to make sure that all data and materials as well as software application or custom code support their published claims and comply with field standards. Please note that journals may have individual policies on (sharing) research data in concordance with disciplinary norms and expectations.

Role of the Corresponding Author

One author is assigned as Corresponding Author and acts on behalf of all co-authors and ensures that questions related to the accuracy or integrity of any part of the work are appropriately addressed.

The Corresponding Author is responsible for the following requirements:

ensuring that all listed authors have approved the manuscript before submission, including the names and order of authors;

managing all communication between the Journal and all co-authors, before and after publication;*

providing transparency on re-use of material and mention any unpublished material (for example manuscripts in press) included in the manuscript in a cover letter to the Editor;

making sure disclosures, declarations and transparency on data statements from all authors are included in the manuscript as appropriate (see above).

* The requirement of managing all communication between the journal and all co-authors during submission and proofing may be delegated to a Contact or Submitting Author. In this case please make sure the Corresponding Author is clearly indicated in the manuscript.

Author contributions

In absence of specific instructions and in research fields where it is possible to describe discrete efforts, the Publisher recommends authors to include contribution statements in the work that specifies the contribution of every author in order to promote transparency. These contributions should be listed at the separate title page.

Examples of such statement(s) are shown below:

• Free text:

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by [full name], [full name] and [full name]. The first draft of the manuscript was written by [full name] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Example: CRediT taxonomy:

• Conceptualization: [full name], ...; Methodology: [full name], ...; Formal analysis and investigation: [full name], ...; Writing - original draft preparation: [full name, ...]; Writing - review and editing: [full name], ...; Funding acquisition: [full name], ...; Resources: [full name], ...; Supervision: [full name],....

For **review articles** where discrete statements are less applicable a statement should be included who had the idea for the article, who performed the literature search and data analysis, and who drafted and/or critically revised the work.

For articles that are based primarily on the **student's dissertation or thesis**, it is recommended that the student is usually listed as principal author:

A Graduate Student's Guide to Determining Authorship Credit and Authorship Order, APA Science Student Council 2006

Affiliation

The primary affiliation for each author should be the institution where the majority of their work was done. If an author has subsequently moved, the current address may additionally be stated. Addresses will not be updated or changed after publication of the article.

Changes to authorship

Authors are strongly advised to ensure the correct author group, the Corresponding Author, and the order of authors at submission. Changes of authorship by adding or deleting authors, and/or changes in Corresponding Author, and/or changes in the sequence of authors are **not** accepted **after acceptance** of a manuscript.

Please note that author names will be published exactly as they appear on the accepted submission!

Please make sure that the names of all authors are present and correctly spelled, and that addresses and affiliations are current.

Adding and/or deleting authors at revision stage are generally not permitted, but in some cases it may be warranted. Reasons for these changes in authorship should be explained. Approval of the change during revision is at the discretion of the Editor-in-Chief. Please note that journals may have individual policies on adding and/or deleting authors during revision stage.

Author identification

Authors are recommended to use their ORCID ID when submitting an article for consideration or acquire an ORCID ID via the submission process.

Deceased or incapacitated authors

For cases in which a co-author dies or is incapacitated during the writing, submission, or peer-review process, and the co-authors feel it is appropriate to include the author, co-authors should obtain approval from a (legal) representative which could be a direct relative.

Authorship issues or disputes

In the case of an authorship dispute during peer review or after acceptance and publication, the Journal will not be in a position to investigate or adjudicate. Authors will be asked to resolve the dispute themselves. If they are unable the Journal reserves the right to

withdraw a manuscript from the editorial process or in case of a published paper raise the issue with the authors' institution(s) and abide by its guidelines.

Confidentiality

Authors should treat all communication with the Journal as confidential which includes correspondence with direct representatives from the Journal such as Editors-in-Chief and/or Handling Editors and reviewers' reports unless explicit consent has been received to share information.

Back to top

Research Data Policy

This journal operates a type 1 research data policy. The journal encourages authors, where possible and applicable, to deposit data that support the findings of their research in a public repository. Authors and editors who do not have a preferred repository should consult Springer Nature's list of repositories and research data policy.

List of Repositories

Research Data Policy

General repositories - for all types of research data - such as figshare and Dryad may also be used.

Datasets that are assigned digital object identifiers (DOIs) by a data repository may be cited in the reference list. Data citations should include the minimum information recommended by DataCite: authors, title, publisher (repository name), identifier.

DataCite

If the journal that you're submitting to uses double-blind peer review and you are providing reviewers with access to your data (for example via a repository link, supplementary information or data on request), it is strongly suggested that the authorship in the data is also blinded. There are data repositories that can assist with this and/or will create a link to mask the authorship of your data.

Authors who need help understanding our data sharing policies, help finding a suitable data repository, or help organising and sharing research data can access our Author Support portal for additional guidance.

Back to top

After Acceptance

Upon acceptance, your article will be exported to Production to undergo typesetting. Shortly after this you will receive two e-mails. One contains a request to confirm your affiliation, choose the publishing model for your article, as well as to arrange rights and payment of any associated publication cost. A second e-mail containing a link to your article's proofs will be sent once typesetting is completed.

Article publishing agreement

Depending on the ownership of the journal and its policies, you will either grant the Publisher an exclusive licence to publish the article or will be asked to transfer copyright of the article to the Publisher.

Offprints

Offprints can be ordered by the corresponding author.

Color illustrations

Publication of color illustrations is free of charge.

Proof reading

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

Online First

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After release of the printed version, the paper can also be cited by issue and page numbers.

Back to top

Open Choice

Open Choice allows you to publish open access in more than 1850 Springer Nature journals, making your research more visible and accessible immediately on publication.

Article processing charges (APCs) vary by journal – view the full list

Benefits:

Increased researcher engagement: Open Choice enables access by anyone with an internet connection, immediately on publication.

Higher visibility and impact: In Springer hybrid journals, OA articles are accessed 4 times more often on average, and cited 1.7 more times on average*.

Easy compliance with funder and institutional mandates: Many funders require open access publishing, and some take compliance into account when assessing future grant applications.

It is easy to find funding to support open access – please see our funding and support pages for more information.

*) Within the first three years of publication. Springer Nature hybrid journal OA impact analysis, 2018.

Open Choice

Funding and Support pages

Copyright and license term – CC BY

Open Choice articles do not require transfer of copyright as the copyright remains with the author. In opting for open access, the author(s) agree to publish the article under the Creative Commons Attribution License.

Find more about the license agreement

Back to top

Open access publishing

To find out more about publishing your work Open Access in *Journal of Neurology*, including information on fees, funding and licenses, visit our Open access publishing page.

Back to top

SÃO JOÃO

Apêndice C

DELIBERAÇÃO DO CONSELHO DE ADMINISTRAÇÃO

Após apreciação e pareceres favoráveis da Comissão de Ética e do Centro de Epidemiologia Hospitalar, considerando que se encontram reunidos os requisitos e demais trâmites previstos no circuito para submissão de projetos de investigação no Centro Hospitalar Universitário de S. João e em conformidade com as disposições legais em vigor, o Conselho de Administração – ao abrigo das competências previstas no Artigo 71.º dos Estatutos dos hospitais, centros hospitalares, institutos portugueses de oncologia e unidades locais de saúde, aprovados pelo Decreto-Lei n.º 52/2022, de 4 de agosto – delibera:

1. Aprovar a realização do projeto de investigação:
   - "Prevalência e Fatores Preditivos de Disfunção Sexual Feminina e de Distress Sexual em Mulheres com Enxaqueca".
   - Serviço(s) onde decorrerá o projeto de investigação: Neurologia.
   - Investigador(a) principal: Andreia Gomes da Costa
2. Remeta-se à Comissão de Ética para os procedimentos adequados e demais trâmites convenientes.

CONSELHO DE ADMINISTRAÇÃO DO CENTRO HOSPITALAR UNIVERSITÁRIO DE S. JOÃO, EPE • REUNIÃO DE 2 DE NOVEMBRO DE 2023

Presidente do Conselho de Administração			
Prof.ª Doutora Maria João Baptista			
Diretor Clínico	Enfermeiro Diretor	Vogal Executiva	Vogal Executiva
--- AUSENTE ---			
Prof.º Doutor Roberto Roncon	Enfermeiro Paulo Emílio Mota	Dra. Sofia Leal	Dra. Fernanda Oliveira

› Comissão de Ética
› Centro de Epidemiologia Hospitalar
› Direção Clínica

CE 262/2023

Centro de Epidemiologia Hospitalar

Tomei conhecimento. Nada a opor. À DC.

30 de Outubro de 2023

A Diretora do Centro de Epidemiologia Hospitalar

(Prof.ª Doutora Ana Azevedo)

n.º 262 / 2023

SÃO JOÃO

DIRECÇÃO CLÍNICA
31 OUT 2023

PEDIDO DE AUTORIZAÇÃO

Realização de Investigação

Exmo. Senhor Presidente do Conselho de Administração
do Centro Hospitalar Universitário de São João

Nome do Investigador Principal:
Andreia Gomes da Costa

Título da Investigação:
Prevalência e Fatores Preditivos de Disfunção Sexual Feminina e de Distress Sexual em Mulheres com Enxaqueca

Pretendendo realizar no(s) Serviço(s) de:
Neurologia

a investigação em epígrafe, solicito a V. Exa., na qualidade de Investigador/Promotor, autorização para a sua efetivação.

Para o efeito, anexo toda a documentação referida no dossier da Comissão de Ética do Centro Hospitalar Universitário de São João/ Faculdade de Medicina da Universidade do Porto respeitante à investigação, à qual enderecei pedido de apreciação e parecer.

Com os melhores cumprimentos.

O Investigador/ Promotor

Andreia Filipe Gomes da Costa

assinatura

Porto, 10 *de* Julho *de* 2023 .

SÃO JOÃO | Encarregado de Proteção de Dados
Data Protection Officer

Entrada 17/09/2023

Centro Hospitalar São João
Centro de Epidemiologia Hospitalar
23/10/2023

CES-IM005-1

Parecer da Comissão de Ética do

Centro Hospitalar Universitário de São João / Faculdade de Medicina da Universidade do Porto

Título do Projeto: Prevalência e Fatores Preditivos de Disfunção Sexual Feminina e Distress Sexual em mulheres com Enxaqueca

Nome da Investigadora Principal: Dra. Andreia Gomes da Costa. Serão co-investigadoras a Matilde Meireles Bertão e a Dra. Bárbara Martins.

Onde decorre o Estudo: No Serviço de Neurologia do CHUSJ. Apresentou declaração da Prof.ª Doutora Elsa Azevedo.

Objetivos do Estudo:

Avaliar se a enxaqueca se associa a pior saúde sexual (disfunção sexual e/ou distress sexual) em mulheres portuguesas pré-menopáusicas em comparação com um grupo de mulheres sem esta patologia; Comparar a frequência de disfunção sexual e distress sexual em mulheres com enxaqueca episódica e enxaqueca crónica; Determinar em que domínio de saúde sexual é que a enxaqueca tem maior impacto; Avaliar se doentes com enxaqueca mais incapacitante são os que apresentam mais disfunção sexual e/ou distress sexual; Identificar possíveis preditores de risco de disfunção sexual e distress sexual em mulheres pré-menopáusicas: características e incapacidade associada à cefaleia, número de analgésicos agudos e de fármacos preventivos, presença de comorbilidade psiquiátrica, como ansiedade/depressão, e alterações do sono.

Estudo realizado no âmbito do Mestrado Integrado em Medicina da FMUP de Matilde Meireles Bertão, sob orientação da Dra. Andreia Gomes da Costa e co-orientação da Dra. Bárbara Martins.

Conceção e Pertinência do estudo:

Trata-se de um estudo observacional e transversal, mas com intervenção já que é dependente da aplicação de vários questionários.

O objetivo principal é avaliar se a enxaqueca se associa a pior saúde sexual (disfunção sexual e/ou distress sexual) em mulheres portuguesas pré-menopáusicas em comparação com um grupo de mulheres pré-menopáusicas sem esta patologia.

Maior compreensão relativamente à relação entre a enxaqueca e a saúde sexual da mulher, sobretudo o sentimento de distress associado à mesma, parâmetro negligenciado nos estudos realizados até à data, focados principalmente na função orgânica e desvalorizando a experiência emocional e subjetiva da vida sexual feminina. É fundamental que os clínicos disponham de ferramentas validadas e estandardizadas, que providenciem informação na área da medicina sexual e reprodutiva, para uma abordagem integrativa e multidisciplinar que envolva os vários domínios de saúde necessários ao bem-estar da população.

Serão recolhidos os seguintes dados: Idade, grau de escolaridade, situação profissional, estado civil, peso, altura, índice de massa corporal, número de filhos. Enxaqueca - data de início da doença e diagnóstico, frequência mensal, presença de aura, medicação sintomática e preventiva, intensidade, incapacidade associada, número de dias por mês com necessidade de medicação de resgate e número de fármacos preventivos atuais e prévios. Fatores de risco cardiovasculares, diagnóstico de patologia depressiva e/ou ansiosa e perturbações do sono. Método contracetivo.

Serão recrutadas 100 participantes entre os 18 e 55 anos e sexualmente activas (50 com diagnóstico de enxaqueca, 50 sem enxaqueca), da Consulta de Neurologia-Cefaleias, Neurologia-Intervenção e Neurologia-Geral do CHUSJ. Estão definidos critérios de exclusão.

Serão aplicados 6 questionários autoadministrados. Todas as escalas possuem uma versão validada para a população portuguesa (Escala de Avaliação de Incapacidade da Enxaqueca - MIDAS – Migraine Disability Assessment Scale; Escala Visual Analógica - VAS – Visual Analogue Scale; Índice de Funcionamento Sexual Feminino – 6 FSFI-6 – Female Sexual Function Index; Escala de Distress Sexual Feminino - FSDS-R – Female Sexual Distress Scale-Revised; Escala de Ansiedade e Depressão Hospitalar - HADS – Hospital Depression and Anxiety Scale; Escala de Saúde do

Sono - SHS – Sleep Health Scale [adaptada e traduzida com base no questionário RU-SATED – Regularity, Satisfation, Alerttness, Timing, Efficiency and Duration Questionnaire for Sleep Health Measurement]).
As doentes com enxaqueca irão realizar os questionários MIDAS, VAS, FSFI-6, FSDS-R, HADS e SHS enquanto os controlos farão o preenchimento dos questionários FSFI-6, FSDS-R, HADS e SHS. Os questionários serão fornecidos por meio de um formulário online, enviado para as participantes do estudo através de uma mensagem para o telemóvel ou via correio eletrónico. Será também necessário acesso aos registos clínicos eletrónicos das doentes para complemento da informação clínica relevante relativa ao diagnóstico.

Benefício/risco: Sem riscos previstos.

Confidencialidade dos dados:
As doentes receberão um número exclusivo de identificação do estudo. Os dados serão extraídos eletronicamente para um banco de dados. Apenas os membros da equipa do estudo terão acesso aos dados. Os dados serão mantidos em anonimato e não serão utilizados para outro fim que não o do presente estudo.
Apresentou um pedido de reutilização de registos clínicos para Investigação e Desenvolvimento ao RAI, e uma 'avaliação sobre o impacto da proteção de dados' para o EPD. Sugere-se a substituição da data de nascimento por apenas ano de nascimento ou idade de forma a não fragilizar o processo de anonimização.

Respeito pela liberdade e autonomia do sujeito de ensaio:
Será fornecida informação às participantes e recolhido consentimento informado, através de um formulário online previamente ao início do questionário. Questiona-se esta metodologia para obtenção de consentimento informado, sugerindo-se que a obtenção seja feita previamente ao preenchimento do questionário, que pode ser online, mas num segundo momento. Questiona-se, ainda, a afirmação que diz: 'Ao assinalar que aceita participar neste estudo, autoriza o acesso à informação obtida neste estudo ou em futuras investigações'. Adicionalmente, o documento de informação ao participante deve explicitar que poderão existir questões de natureza sensível. O recrutamento não pode ser feito pela estudante do MIMED.

***Curriculum* da investigadora**: Adequado à investigação.

Data previsível da conclusão do estudo: maio de 2024

Conclusão: Proponho um parecer favorável à realização do estudo após esclarecimento das questões em sublinhado.

Porto, 21 de julho de 2023

O Relator da CE, Prof. Doutor Paulo Chaves

07/09/2023
Todas as questões foram esclarecidas
Pedro Brito

Questionário eletrónico

n.º 262 / 2023

SUBMISSÃO DE PROJETO DE INVESTIGAÇÃO PARA PARECER E AUTORIZAÇÃO

SÃO JOÃO

Preenchimento em formato digital obrigatório

Caro/a Investigador/a

Este questionário vai ser objeto de apreciação pela Comissão de Ética (CE), que emitirá o competente parecer; pelo Responsável de Acesso à Informação (RAI), que emitirá um despacho de autorização ou indeferimento, relativamente à reutilização da informação a que pretende ter acesso; pelo Encarregado de Proteção de Dados (EPD), que emitirá um parecer, mediante a 'avaliação do impacto sobre a proteção de dados' (que deve anexar a este pedido); pelo Centro de Epidemiologia Hospitalar; sendo enviado, num último momento, para decisão institucional do Conselho de Administração do CHUSJ. Os respetivos despachos de parecer e autorização serão exarados no final deste documento, e enviados posteriormente, de modo a poder iniciar, nesse momento, a investigação a que se propõe.

IDENTIFICAÇÃO DO ESTUDO

Título do projeto:

Prevalência e Fatores Preditivos de Disfunção Sexual Feminina e de Distress Sexual em Mulheres com Enxaqueca

Data prevista para início: 01 /08 /2023 Data prevista para o término: 31 /05 /2024

EQUIPA DE INVESTIGAÇÃO

1. Investigador principal

Nome: Andreia Gomes da Costa

Afiliação institucional: ☒ CHUSJ ☒ FMUP Outro:

Serviço/ Departamento: Serviço de Neurologia, CHUSJ | D. Neurociências Clínicas e Saúde Mental, FMUP

Grupo profissional: Cédula Profissional n.º: 52914

Contacto telefónico: 917 935 410 Endereço eletrónico institucional: andreiafgcosta@gmail.com

Formação em Boas Práticas Clínicas (GCP): ☐ Não ☒ Sim

2. Co-investigadores

Nome: Matilde Meireles Bertão

Afiliação institucional: Departamento de Neurociências Clínicas e Saúde Mental, FMUP

Grupo profissional: Cédula Profissional n.º:

Contacto telefónico: 934 268 855 Endereço eletrónico institucional: up201807441@g.uporto.pt

Nome: Bárbara Martins

Afiliação institucional: Serviço de Neurologia, CHUSJ | D. Neurociências Clínicas e Saúde Mental, FMUP

Grupo profissional: Cédula Profissional n.º:

Contacto telefónico: 917 729 901 Endereço eletrónico institucional: barbarapmartins6@gmail.com

(acrescentar nº de investigadores, se apropriado ao projeto de investigação)

3. Promotor *(se aplicável)*: Não aplicável.

CARACTERIZAÇÃO DA INVESTIGAÇÃO

1. Metodologia da investigação

☐ Qualitativa ☒ Mista (qualitativa+quantitativa) ☐ Outra. Qual? _____

Se quantitativa:

☐ Experimental ☒ Observacional ☒ Sem intervenção ☐ Com intervenção

Se experimental ou observacional com intervenção, qual o tipo de intervenção?

☐ Algoritmo de decisão diagnóstica/terapêutica ☐ Comunicação

☐ Outra. Qual? _____

2. Aleatorização dos braços de intervenção: ☒ Não ☐ Sim

3. Se observacional, qual o desenho?

☐ Coorte prospetivo ☐ Coorte retrospetivo ☐ Caso-controlo

☒ Transversal ☐ Ecológico ☐ Outro. Qual? _____

REALIZAÇÃO DA INVESTIGAÇÃO

Local onde se realiza a investigação: ☒ CHUSJ ☐ FMUP ☐ Outro

Serviço/ Departamento: Serviço de Neurologia

Existem outros Centros onde se realizará a investigação? ☒ Não ☐ Sim. Quais? _____

ENTIDADE(S) QUE TUTELA(M) A INVESTIGAÇÃO

1. CHUSJ – Serviço: Neurologia

2. FMUP – Departamento: Departamento de Neurociências Clínicas e Saúde Mental

3. Outra instituição. Qual? _____

ORIENTADOR *(se aplicável)*

Nome: Andreia Costa

Afiliação: CHUSJ | FMUP Endereço eletrónico institucional: andreiafgcosta@gmail.com

PROFISSIONAL DE LIGAÇÃO *(se aplicável - ver anexo)*

Nome: _____ Serviço: _____

ENQUADRAMENTO DA INVESTIGAÇÃO

Em trabalho académico? ☐ Não ☒ Sim Conferidor de grau? ☐ Não ☒ Sim

Síntese dos objetivos:

Avaliar se a enxaqueca se associa a pior saúde sexual (disfunção sexual e/ou distress sexual) em mulheres portuguesas pré-menopáusicas em comparação com um grupo de mulheres sem esta patologia;
Comparar a frequência de disfunção sexual e distress sexual em mulheres com enxaqueca episódica e enxaqueca crónica;
Determinar em que domínio de saúde sexual é que a enxaqueca tem maior impacto;
Avaliar se doentes com enxaqueca mais incapacitante são os que apresentam mais disfunção sexual e/ou distress sexual;
Identificar possíveis preditores de risco de disfunção sexual e distress sexual em mulheres pré-menopáusicas: características e incapacidade associada à cefaleia, número de analgésicos agudos e de fármacos preventivos, presença de comorbilidade psiquiátrica, como ansiedade/depressão, e alterações do sono.

Fundamentação ética *(incluir informação sumária sobre o estado da arte, ganhos em conhecimento/inovação, ponderação geral sobre benefícios/risco)*:

Maior compreensão relativamente à relação entre a enxaqueca e a saúde sexual da mulher, sobretudo o sentimento de distress associado à mesma, parâmetro negligenciado nos estudos realizados até à data, focados principalmente na função orgânica e desvalorizando a experiência emocional e subjetiva da vida sexual feminina. É fundamental que os clínicos disponham de ferramentas validadas e estandardizadas, que providenciem informação na área da medicina sexual e reprodutiva, para uma abordagem integrativa e multidisciplinar que envolva os vários domínios de saúde necessários ao bem-estar da população.

PARTICIPANTES PREVISTOS PARA A INVESTIGAÇÃO

Estão definidos critérios de inclusão / de exclusão de doentes? ☐ Não ☒ Sim

Onde e como serão recrutados os participantes no estudo?

Consulta de Neurologia-Cefaleias, Neurologia-Intervenção e Neurologia-Geral do CHUSJ, via e-mail e/ou telefone.

Qual é o tamanho amostral? 100 participantes (50 com diagnóstico de enxaqueca, 50 sem enxaqueca)

Está prevista a recolha de material biológico específico para a investigação?

☒ Não ☐ Sim. Identifique e justifique:

BENEFÍCIO/RISCO DECORRENTE DA PARTICIPAÇÃO

Descreva os benefícios previsíveis:

Maior conhecimento da relação entre a enxaqueca e a saúde sexual feminina, tanto para clínicos como doentes.

Descreva os riscos/incómodos previsíveis:

Não são previsíveis riscos decorrentes deste trabalho.

CONSENTIMENTO INFORMADO, ESCLARECIDO E LIVRE

Prevê a obtenção de consentimento informado? ☒ Sim ☐ Não

Se não, justifique: _____

Prevê informação escrita para os participantes? ☒ Sim. **Enviar modelo preenchido.**

☐ Não. Justifique: _____

O modelo para obtenção de consentimento é o modelo institucional do CHUSJ? ☒ Sim ☐ Não

PROTEÇÃO DE DADOS PESSOAIS

Necessita consultar registos clínicos? ☐ Não ☒ Sim

Está previsto o tratamento de dados pessoais? ☐ Não ☒ Sim

Se sim, de que forma é garantida a pseudonimização dos dados recolhidos? *(codificação, uso de filtros, siglas...)*

As doentes receberão um número exclusivo de identificação do estudo. Os dados serão extraídos eletronicamente para um banco de dados. Apenas os membros da equipa do estudo terão acesso aos dados. Os dados serão mantidos em anonimato e não serão utilizados para outro fim que não o do presente estudo.

Descreva o património informacional a que pretende ter acesso *(v.g.: nome, idade, data nascimento, idade, morada, diagnóstico, história clínica, tratamento...)*:

Idade, grau de escolaridade, situação profissional, estado civil, peso, altura, índice de massa corporal, número de filhos. Enxaqueca - data de início da doença e diagnóstico, frequência mensal, presença de aura, medicação sintomática e preventiva, intensidade, incapacidade associada, número de dias por mês com necessidade de medicação de resgate e número de fármacos preventivos atuais e prévios. Fatores de risco cardiovasculares, diagnóstico de patologia depressiva e/ou ansiosa e perturbações do sono. Método contracetivo.

Está prevista a criação de um Banco de Dados? ☐ Não ☒ Sim

Está previsto o registo de som ou de imagem dos participantes? ☒ Não ☐ Sim

O estudo envolve investigação genética? ☒ Não ☐ Sim

PROPRIEDADE INTELECTUAL

De quem será a propriedade intelectual da investigação e seus resultados?

☒ Investigador ☐ Promotor ☒ Serviço/CHUSJ ☐ Todos

DIVULGAÇÃO DOS RESULTADOS

Está prevista a divulgação dos resultados da investigação? ☐ Não ☒ Sim

Se sim, estão definidos critérios de publicação? ☒ Não ☐ Sim. Quais? _____

CONTRAPARTIDAS PARA OS PARTICIPANTES

Estão previstas contrapartidas para os participantes? ☒ Não ☐ Sim

Pela participação? ☒ Não ☐ Sim

Pelas deslocações? ☒ Não ☐ Sim

Pelas perdas salariais? ☒ Não ☐ Sim

Por outras perdas e/ou danos? ☒ Não ☐ Sim

EXAMES COMPLEMENTARES DE DIAGNÓSTICO

Estão previstos exames complementares de diagnóstico, para além dos inerentes à rotina assistencial?

☒ Não ☐ Sim. Quais? _____

Por quem serão suportados estes custos?

PROTOCOLO FINANCEIRO

Existe protocolo financeiro com o CHUSJ? ☒ Não ☐ Sim

SEGURO

Este estudo prevê intervenção clínica que implique a existência de um seguro para os participantes?

☒ Não ☐ Sim *(se sim, junte cópia da respetiva Apólice)*

Data previsível para fim das credenciais de acesso: ____/____/____

DOCUMENTOS ANEXOS *(em suporte digital)*

- [x] Pedido de autorização ao Presidente do Conselho de Administração do CHUSJ
- [x] Protocolo do estudo
- [ ] Caderno de recolha de dados (CRF)
- [x] Declaração Diretor(es) Serviço(s)
- [ ] Informação Orientador
- [ ] Profissional de ligação
- [ ] Informação aos participantes
- [ ] Modelo de consentimento a utilizar
- [x] Instrumentos de avaliação *(escalas, inquéritos)* _____
- [x] Curriculum/a vitae *(investigador/es)*
- [ ] Questionário para Encarregado de Proteção de Dados (EPD)
- [ ] Termo de Responsabilidade do Centro Académico Clínico *(para investigadores da FMUP que não pertençam ao CHUSJ)*
- [ ] Protocolo financeiro
- [ ] Outros: _____

TERMO DE RESPONSABILIDADE

Aceitação dos termos e condições de reutilização

Cumulativamente com as obrigações decorrentes da *Lei n.º 26/2016, de 22 de agosto*, maxime dos *n.º 2 e 3 do artigo 21 e o n.º 1 e 2 do artigo 12*, ao submeter o presente pedido, concordo e fico ainda juridicamente vinculado aos seguintes termos e condições:

- Comprometo-me a manter confidencial toda a informação à qual vou ter acesso;
- Após explicação do RAI do CHUSJ, embora a Lei 26/2016, de 22 de agosto, imponha como requisito a anonimização sem possibilidades de reversão, tal desiderato, é não só uma impossibilidade matemática já comprovada, como ainda resulta num prejuízo para a investigação, face à quantidade e à qualidade da informação a retirar à fonte, razão pela qual, concordando com o RAI, assumimos como compromisso a pseudonimização, o que impõe uma avaliação e gestão do risco, num quadro ético-jurídico que aceitamos e nos comprometemos a colaborar e respeitar;
- Não vou elaborar registos, suscetíveis de identificar ou tornar identificável a identidade das pessoas a quem os mesmos dizem respeito;
- Comprometo-me a consultar os processos clínicos nos termos e locais que me forem indicados para o efeito;
- Tomei conhecimento, que a violação de qualquer dos compromissos aqui assumidos, poderá resultar no apuramento de responsabilidades disciplinares, civis e penais, e ainda, à impossibilidade futura de aceder a informação de saúde para fins de investigação.
- Independentemente de requerer a Certidão de Reutilização, DAta REuse Certificate for Research (DARE), comprometo-me a citar as fontes, sempre que publicitar, no todo ou em parte, resultados da presente investigação.

COMPROMISSO DE HONRA E DECLARAÇÃO DE INTERESSES

Eu, Andreia Gomes da Costa ,

abaixo assinado, na qualidade de Investigador Principal, declaro por minha honra que as informações prestadas neste questionário são verdadeiras. Mais declaro que, durante o estudo, serão respeitadas as recomendações constantes na Declaração de Helsínquia (1960, e sucessivas emendas), da Organização Mundial de Saúde, da Convenção de Oviedo e das 'Boas Práticas Clínicas' (GCP/ICH) no que se refere à experimentação que envolve seres humanos. Aceito, também, a recomendação da CE de que o recrutamento para este estudo se fará junto de doentes que não tenham participado em outro estudo, nos últimos três meses. Comprometo-me a entregar à CE o relatório final da investigação, assim que concluído.

Data: 10 /07 /2023

Andreia Filipe Gomes da Costa

assinatura

COMISSÃO DE ÉTICA CHUSJ/FMUP

.Centro Hospitalar **São João**.

Parecer da CE, emitido na reunião plenária de 21 / 07 / 2023

Aguarda esclarecimentos

CONSIDERADOS QUE FORAM COMO SATISFATÓRIOS OS ESCLARECIMENTOS PRESTADOS PELO(A) INVESTIGADOR(A), A CES APROVA POR UNANIMIDADE O PARECER DO RELATOR, PELO QUE NADA TEM A OPOR À REALIZAÇÃO DESTE PROJETO DE INVESTIGAÇÃO.

07/09/2023

RAI 23012980

RAI - Responsável pelo Acesso à Informação no Centro Hospitalar Universitário de São João (Art. 9º, Lei 26/2016 de 22 de Agosto)

SÃO JOÃO HOSPITAL
Gabinete de Apoio ao RAI
Recebido em 08/09/2023
A funcionária

SÃO JOÃO
AUTORIZADO
O Responsável pelo Acesso à Informação do Centro Hospitalar de São João (Art. 9º, Lei 26/2016, de 22/8)
14/09/2023

CENTRO DE EPIDEMIOLOGIA HOSPITALAR

ENCARREGADO DE PROTEÇÃO DE DADOS (EPD)
CENTRO HOSPITALAR UNIVERSITÁRIO DE S. JOÃO, EPE
Paulo Alexandre Mota da Silva
Encarregado de Proteção de Dados do CHUSJ
epd@chsj.min-saude.pt

Ref.ª CES CHUSJ: **262 / 2023**

Título do Projeto	Prevalência e Fatores Preditivos de Disfunção Sexual Feminina e de Distress Sexual em Mulheres com Enxaqueca
Responsável pelo tratamento	Andreia Filipa Gomes da Costa
Instituição	Centro Hospitalar Universitário São João (CHUSJ)
	Faculdade de Medicina da Universidade do Porto (FMUP)
Investigador	**Interno** Externo
Contacto telefónico	917935410 **Endereço Electrónico** u011357@chsj.min-saude.pt
Profissional de Ligação	Não aplicável
Amostra	100 participantes (50 com diagnóstico de enxaqueca, 50 sem enxaqueca)
Análise de Risco	Tolerável **Baixo** Elevado Muito Elevado

Parecer do EPD: **Data:** 19/10/2023

Finalidade: avaliar se a enxaqueca se associa a pior saúde sexual (disfunção sexual e/ou distress sexual) em mulheres portuguesas pré-menopáusicas em comparação com um grupo de mulheres pré-menopáusicas sem esta patologia; Comparar a frequência de disfunção sexual e distress sexual em mulheres com enxaqueca episódica e enxaqueca crónica; Determinar em que domínio de saúde sexual é que a enxaqueca tem maior impacto; Avaliar se doentes com enxaqueca mais incapacitante são os que apresentam mais disfunção sexual e/ou distress sexual; Identificar possíveis preditores de risco de disfunção sexual e distress sexual em mulheres pré-menopáusicas: características e incapacidade associada à cefaleia, número de analgésicos agudos e de fármacos preventivos, presença de comorbilidade psiquiátrica, como ansiedade/depressão, e alterações do sono.

Licitude: fundamento previsto no artigo **6(1)**(a) e **9(2)(a)** do **RGPD**

Categorias de dados pessoais: variáveis identificadas com detalhe na AIPD, datada de 18/09/2023, **ponto 13 e protocolo de investigação**, tendo presente o **princípio da minimização dos dados.**

Conservação: os dados serão alvo de **pseudonimização**, armazenados **em local seguro**, em área restrita com acesso limitado ao Investigador Principal, com acesso a ficheiros **protegido por palavra-passe**, efetuando-se a conservação até a conclusão da investigação, que se estima ser até **30 de junho de 2024**. Os dados recolhidos **serão destruídos** após a finalização do estudo.

Comunicação de Dados: **não há partilha** de dados pessoais.

Face ao exposto, e observadas as recomendações, entende-se que a presente AIPD apresenta os elementos necessários para assegurar que o **tratamento é realizado em conformidade com o RGPD.**

Recomendações:

1. Sempre que o consentimento do titular for o fundamento de legitimidade adequado para o tratamento de dados, dever-se-á assegurar que o mesmo é válido nas condições legalmente exigíveis: ***uma manifestação de vontade livre, específica, informada e inequívoca***.
2. No sentido de assegurar o correto recrutamento para o presente estudo o Investigador Principal CHUSJ deve articular diretamente com os eventuais participantes (utentes CHUSJ) e solicitar previamente o seu consentimento para espoletar o envio / divulgação do link do questionário, bem como deve garantir as medidas técnicas e organizativas adequadas para a respetiva divulgação através dos meios / ferramentas CHUSJ disponíveis para esse efeito;
3. Garantir medidas de segurança adicionais (ex. transformar os dados com recursos a técnicas de generalização, perturbação e/ou como último recurso, a supressão de dados) para os dados que, ainda que pseudonimizados, contém elementos informativos que no seu conjunto possibilitam a re-identificação dos participantes, tendo presente a amostra em estudo (utentes CHUSJ), em particular na fase de disseminação ou publicação dos resultados (incluindo repositórios científicos).

4. Garantir medidas de segurança adicionais para o envio da informação por correio eletrónico, nomeadamente através de medidas de encriptação / codificação dos dados a tratar;
5. Garantir medidas de segurança adicionais no transporte dos dados com recurso a dispositivos electrónicos de armazenamento (Laptop), nomeadamente através de medidas de cifragem e autenticação;
6. Em caso de necessidade de extensão de prazo e/ou de qualquer alteração dos pressupostos atinentes ao presente parecer o Investigador Principal deverá solicitar a reapreciação do projeto de investigação junto do EPD.

Revisão AIPD:

☐ Data da próxima revisão: ___/___/_____ ☒ Não carece de revisão.

Anexos:

1. Processo CES n.º 262/2023
2. Parecer CES (07/09/2023)
3. AIPD (18/09/2023)
4. Consentimento Informado e Informação ao Participante
5. Protocolo de Investigação

Encarregado de Proteção de Dados
Assinado por: **PAULO ALEXANDRE MOTA DA SILVA**
Data: 2023.10.19 12:18:03+01'00'
Localização: CHUSJ

CARTÃO DE CIDADÃO