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Review article

Review of migraine incidence and management in obstetrics and gynaecology

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ABSTRACT

Purpose: Migraines are the third most prevalent disorder, and seventh-highest specific cause of disability worldwide. Migraines have a multitude of underlying aetiologies; the pathology may come as a result of hormonal treatment or as a sole symptom during menstrual cycle or pregnancy, with variable intensity and duration. In addition, clinicians should be fully aware of the potential complications and well-versed in management options.

Methods: A systematic review of the incidence, symptoms, treatment options and complications among women suffering from migraines in gynaecology, as well as obstetrical cases has been performed. The significance of migraines as a marker in antenatal care and contraception treatment has also been investigated.

Results: The incidence of migraines in gynaecological and obstetrical cases, and contraceptive users were 11.7–12.5 %, 9–38.5 %, and 16.7–54.7% respectively. There is an average six-fold increase in the risk of stroke in women who take combined hormonal contraception and suffer from migraines. Four papers with 1565 patients proposed the combination of triptans along with the progesterone only pill. Desogestrel 75mcg/day was found to reduce the intensity of migraines compared to the combined hormonal contraceptives. The risk of gestational hypertension, pre-eclampsia, low birth weight, and preterm birth was found to be increased in pregnant women suffering from migraines.

Conclusion: Migraines have a high incidence in gynaecology and obstetrics. Health care providers must include screening questions when history taking to identify women with migraines and effectively manage them. Proper follow-up and treatment is required for all women with migraines in order to minimize the risk of cerebrovascular events, and negative pregnancy outcomes. Women with migraines are advised to avoid combined hormonal contraception and use progesterone only pills.

Contents

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Introduction

Headache disorders have gathered more interest and investigation in the scientific community during the last several years. Migraines are the most common type of headache. They are characterized by recurrent attacks that vary in intensity but are often debilitating and interfere with daily life. Migraines are usually unilateral, throbbing headaches that are sometimes accompanied with nausea and vomiting. Some patients experience these headaches with mood, motor, and sensory disturbances such as photophobia, sonophobia, and paraesthesia. Aura can be experienced up to one hour preceding the migraine attack, they present in different forms with the most commonly reported being scintillations [1].

Migraines are the third most prevalent disorder, and seventh-highest specific cause of disability worldwide [2,3]. Women are more commonly affected and are especially susceptible during their reproductive years. The rates increase 4% to 25% from onset of menarche and decline post-menopause [4].

Due to the high global incidence of migraines, it is no longer a disorder treated exclusively by neurologists and headache specialists. It is of utmost importance to general practitioners, obstetricians and gynecologists alike to be aware of the epidemiology, as well as diagnosis and treatment options available for migraine disorders. The symptoms of headache and/or migraine do not present a priority for doctors in a routine anamnesis interview during a patient's first visit. When patients are asked specifically whether they suffer from headaches and/or migraines, an incidence of 40–60 %, is reported [5].

Migraines have a multitude of underlying aetiologies; the pathology may come as a result of hormonal treatment or as a sole symptom during menstrual cycle or pregnancy, with variable intensity and duration. In addition, clinicians should be fully aware of the potential complications and fluent in management options. Specific cases within migraine disorders which should be actively managed include: (a) menstrual migraines, (b) safe administration and monitoring of oral contraceptives for migraineurs, (c) cardiovascular risks and complications for migraineurs and their foetus during pregnancy.

The term "catamenial migraine" refers to a headache disorder related to the oestrogen level fluctuation during the menstrual cycle. Therefore, attacks occur regularly for at least 2 of 3 consecutive menstrual cycles, between 2 days prior and 3 days after initiation of menses. Two subtypes of catamenial migraine exist, in the first, migraineurs suffer around the menstruation period but also have attacks outside that time. The alternative subtype consists of pure menstrual migraine attacks, that occur exclusively within the range of 5 days [6].

Oestrogen-withdrawal migraine is specifically encountered in women who take oestrogen-based contraceptives, for at least 3 weeks and experience migraine attacks within 5 days of ceasing administration [7]. Prevention of catamenial migraine attacks has been attempted by prescribing oral contraceptive pills, however the possible increase of cerebrovascular thrombosis has been of great concern [8,9]. The combined contraceptive pill is contraindicated in women with migraines [10] and furthermore, exogenous oestrogens increase the hypercoagulability state and vascular contractility predisposing the patient to a higher risk of developing thromboembolic events [11].

For patients suffering from migraines and diagnosed with systemic lupus erythematosus, hypertension, history of cerebrovascular accident and smoking, the administration of combined hormonal contraceptives is an absolute contraindication [11].

Observational studies with a limited number of patients reported that pregnant women with migraines have a higher risk of adverse obstetric outcome such as placental abruption, preterm

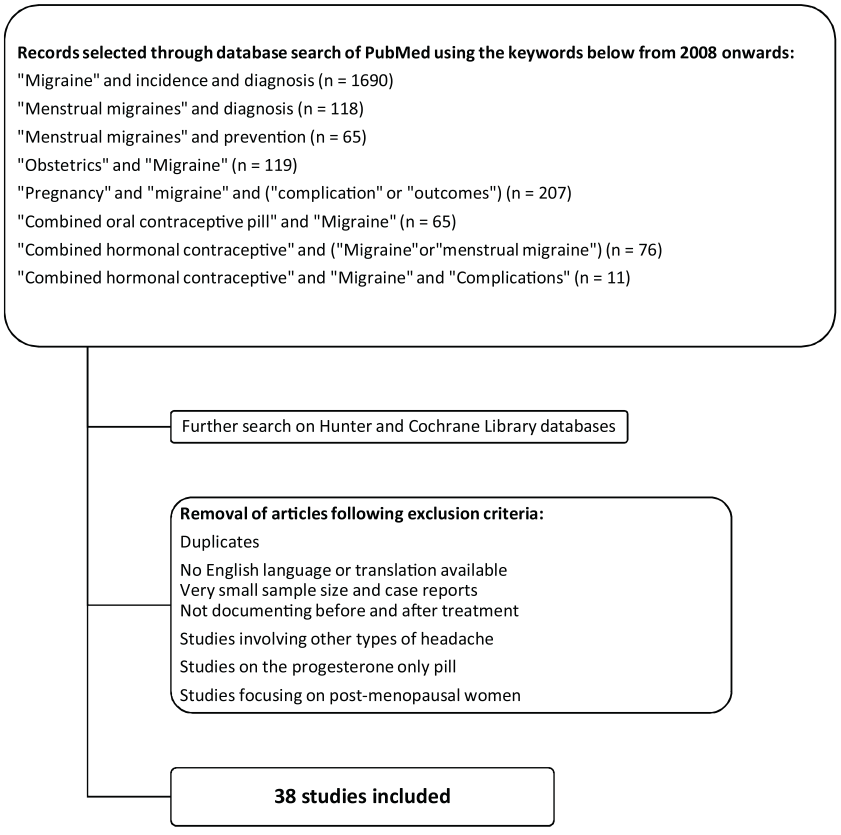

Fig. 1. Diagram of the methodology followed for screening and identification of literature related to migraine articles.

birth, gestational hypertension, preeclampsia, small for gestational age foetuses, and increase rate of caesarean section [12]. The mechanisms leading to these pathologies are not fully understood, however obstetricians should monitor pregnant migraine patients closely.

In several countries, gynaecologists are the first line healthcare providers for disease prevention, screening of the high-risk patients, early diagnosis and management. Within this context, a review of the incidence, symptoms, treatment options and complications among women suffering from migraines in gynaecology, as well as obstetrical cases has been performed. The significance of migraines as a marker in antenatal care and contraception treatment has also been investigated.

Methods

Searches were conducted using Hunter, PubMed and Cochrane databases. Scientific journals were accessed and reviewed for articles matching migraines in gynaecology and obstetrics (Fig. 1) according to the International Headache Society criteria for migraines [7]. The main journals included were: The Headache Journal, Cephalgia: International journal of Headache, The Journal of Headache and Pain, Neurological Sciences Journal, Journal of Contraception, and major journals in Obstetrics and Gynaecology worldwide.

Papers were excluded after reviewing the abstracts and found to be unsuitable based on the inclusion criteria, as shown in Fig. 1. Articles that were not in English or without a reliable translation and studies with small sample size, poor design and methodology, focusing on menopausal women were excluded. Studies mentioning other types of headaches besides migraines such as tension or cluster headaches were also excluded from our search. In total, 30 articles were included in our systematic review (Fig. 2)

Five papers reported the incidence of migraines in obstetrics, with three case control studies [12,14,15], one prospective [33], and one retrospective [5]. The incidence in gynaecology was reported in two papers, studying women from adolescent through their reproductive years. Two questionnaire-based studies were included [4,34]. Finally, migraine incidence in women using the combined contraceptive pill were reported in three studies. One retrospective study [19], one systematic review [29], and in one cross sectional study [20].

Pregnancy complications in women who suffer from migraines were reported in six studies that matched the inclusion criteria. The papers compared pregnancy complications in healthy women versus women who suffer from migraines - three case-control

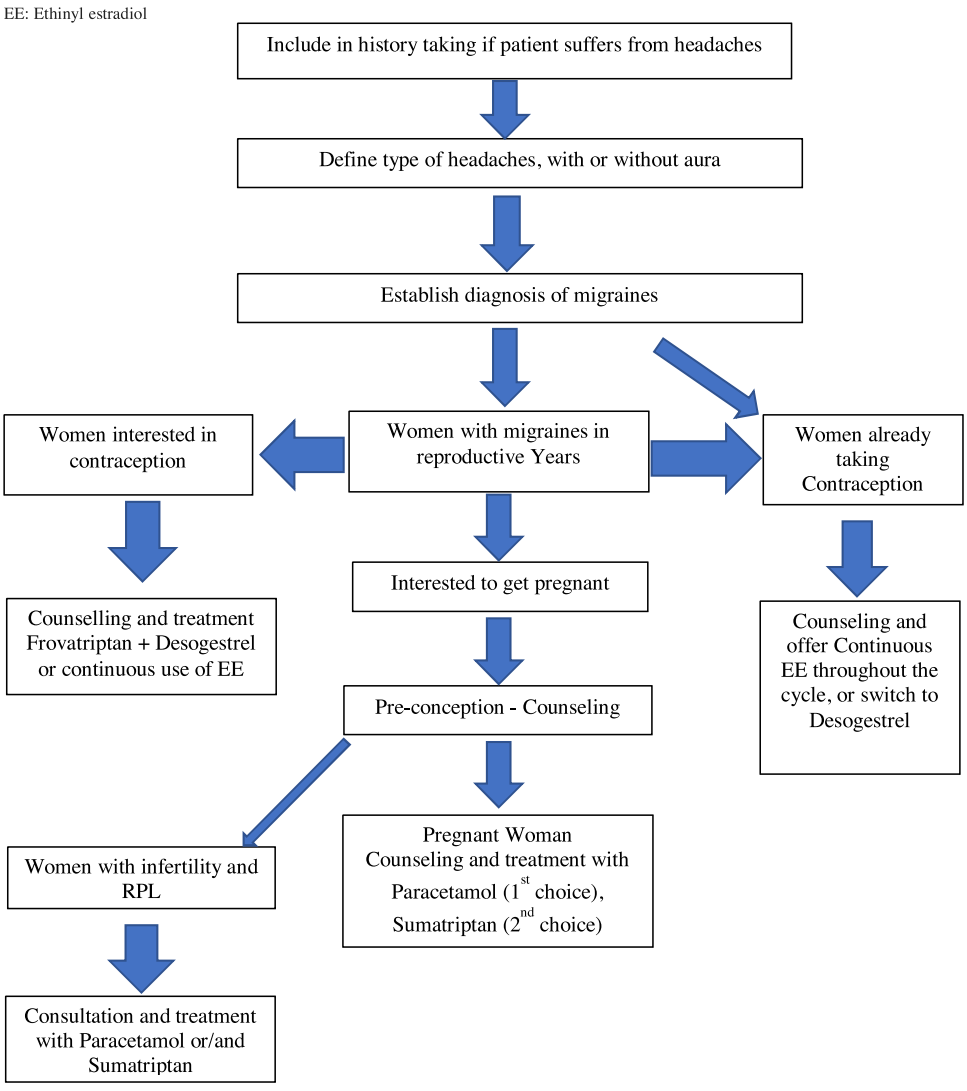

Fig. 2. Diagram of the Management options for migraines in women that present to Obstetricians & Gynaecologists.

studies [12,14,15], two prospective studies [33,35], and one retrospective study [5]

Different management options for menstrual migraines were also explored. Four studies satisfied our criteria and these were one systematic review [6], two meta-analyses [9,17] and one retrospective study [16].

Nine studies focused on the complications faced by women who have migraines and use the combined contraceptive pill. These papers consisted of one case control study [26], two systematic reviews [7,25] one meta-analysis ([27]), two review articles [13,18], one society statement [28], and two cross sectional studies [20,24],). All these research papers confirmed the increased risk of vascular events in these women.

Five studies including two systematic reviews [7,13], one retrospective [19], one review article [18], and one cross sectional study [20] explored the different management options relating to headaches in women taking the combined contraceptive pills.

Results

Incidence

The incidence of migraines in gynaecological, obstetric and contraceptive users were 11.7–12.5 %, 9–38.5 %, and 16.7–54.7% respectively (Table 1).

The composite prevalence of migraines in the general female population is around 12.15% according to two questionnaire-based studies with a total of 164,519 patients.

In the field of obstetrics, migraines seem to be more prominent in the first trimester and decline in severity and incidence during the third trimester [5]. The cumulative average prevalence of migraines during pregnancy is estimated to be 20.04% based on four papers with a total of 34,351 patients.

Different papers compared different parameters related to pregnancy and migraines. Grossman et al. [5], found the prevalence of migraine with aura in pregnant women to be 40.7% of all migraines experienced in this group, 12.8% had chronic migraines and 31.4% had status migrainosus. Sanchez et al. [12] reported that 40% of pregnant women who suffered placental abruption reported a previous or current history of migraines as opposed to 29.6% in the control group. Mathew et al. [6] compared the change in migraines along the pregnancy and found that 25% of women had no change, 80% had not reported migraines in the third trimester and less than 3% experienced de novo migraines and these were present in the first trimester. It was also reported that breastfeeding delayed the onset of migraines in the postpartum period.

The incidence of migraine in contraceptive use has been reported in a wide variety of parameters. Faubion et al. [13] assert if a woman experienced a migraine in the first CHC cycle, she has a 1 in 3 chances of experiencing a migraine attack in the second cycle and 1 in 10 chance in the third cycle. Therefore, with prolonged CHC use migraine prevalence drops. The average prevalence of migraines in CHC users is estimated to be 35.7% based on two papers with a total number of 557 patients.

Complications

The different complications related to migraines in pregnancy are demonstrated in Table 2. It includes six papers with a total patient population of 286,304. Regarding low birth weight, there is a 1.8-fold increase risk in migraineurs versus non-migraineurs. The preterm birth rate was found to also be higher in females with migraines in four papers out of five. Cripe et al. [14] were the only group to contradict the other four with a pre-term birth rate of 8% healthy women vs. 7.1% in migraineurs. On average, pregnant women with migraines have a 1.72-fold increase in incidence of preterm births.

With regard, to babies born small for gestational age (SGA), the studies reviewed had conflicting results. Three papers investigated the possible relationship between migraines in pregnancy and SGA babies. On average, women with migraines do not have a higher incidence of SGA babies compared to women without migraines. Results are varied regarding the likelihood of women with migraines necessitating a caesarean section. Two studies [14,15] indicate that women with migraines have a higher risk of needing a caesarean section. These two papers have a combined study population of 32,898 patients, as opposed to one opposed study [5] with 86 patients that indicates that pregnant migraineurs have a lower chance of needing a caesarean section.

Women with migraines have been shown to have a 1.04-fold increased risk of requiring a caesarean section.

The pre-eclampsia risk in women with migraines was consistently shown in four papers to be higher. Migraineurs have a 3.3-fold average increased risk of having preeclampsia. The relationship between gestational hypertension and pregnant migraineurs was explored in three papers and it depicted how migraines increase the risk of having gestational hypertension by 2.05-fold. Sanchez et al. [12] explored the correlation between migraines and placental abruption and found a 2.14-fold increase of placental abruption in women with migraines compared to non-migraineurs, as well as a 2.85-fold increased risk of developing hypertensive disorders during pregnancy.

Skajaa et al. [38] was the only paper that discussed the increased risk of miscarriage in women with migraines as opposed to the control with a 1.1-fold increase of this risk.

Management

The management of menstrual migraines (Table 3) comprises of acute management and/or hormonal management. Key statements were made by four papers with 1565 patients discussing various

Table 1
Incidence of migraines as reported by the largest studies.

Author (s)	Type of study	Patients Control	migraine patients	Incidence of migraine (%)
Migraines in pregnancy				
Facchinetti et al. 2008 [33]	Prospective	702	270	38.50
Cripe et al. 2011 [14]	Case-control	3,432	550	16.1[a]
Chen et al. 2010 [15]	Case control	29,466	4,911	16.67
Sanchez et al. 2010 [12]	Case-control	751	67	8.92
Migraines in general population				
Lipton et al. 2007 [4]	Questionnaire	162,576	18,968	11.7
Dzoljic et al. 2002 [34]	Questionnaire	1943	245	12.6
Migraines in CHC users				
Merki-Feld et al. (2017) [19]	Retrospective	64	64	54.7
Machado et al. 2010 [20]	Cross sectional study	493	80	16.7

[a](including co-morbid patients with mood disorder).

Table 2
Complications of pregnancy in women with migraine.

	Patients	Placental abruption		Gestational hypertension		Pre-eclampsia		Small for Gestat. age		Cesarean section		Preterm birth		Low birth weight		Miscarriage	
		C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M
Facchinetti et al. 2008 [a] [33] *Prospective study*	702			3.09	9.09			4.28	3.41			4.51	7.2	3.56	6.82		
Marozio et al. 2012 [a] [35] *Prospective study*	702							3.8	3.8			2.8	7.6				
Chen et al. 2010 [15] *Case-control study*	29,466					1.1	1.4	16.8	17.7	36	39.5	7.7	9.4	6.6	7.5		
Sanchez et al. 2010 [12] *Case-control study*	751	6.3	11.7														
Cripe et al. 2011 [14] *Case-control study*	3,432			5.3	8.1	1.8	1.9			28.1	30.2	8	7.1				
Grossman et al. 2017 [5] *Retrospective study*	86					4	19.5			32.7	30.6	11.4	28	8	18.7		
Skajaa et al. 2019 [38] *Retrospective study*	251,165	0.5	0.5	5	7.9	2.9	4.3									10.3	11.3

(C: Control group, M: Migraine group. All values are in %).
[a]Part of the same research group.

Table 3
Management of menstrual migraines, migraines related to the use of CHC and in pregnancy.

Management of Menstrual Migraines				
Reference	Study Type	Patients	Medication	Conclusive remarks
Warhurst et al. (2017) [9]	Meta-analysis	165	Desogestrel (75mcg/day)	↑ frequency and severity of MRM and PMM. Less intense when compared to CHC.
Witteveen, et al. (2017) [16]	Retrospective	90	Triptans + POP	Best treatment for MRM and PMM, ↑ migraine severity and days
Allais et al. (2012) [17]	Meta-analysis	346	Frovatriptan	↓ efficacy in acutely treating MRM and PMM than other triptans since it has a ↑ recurrence rate.
Mathew et al. (2013) [6]	Systematic review	964	Combination therapy	EE (20 mg/day) CD1-21 followed by conjugated estrogens on CD22-28 showed a ↑ in migraines. Triptans provide relief in only 20-30% of patients. Frovatriptan used prophylactically bd during the time of menses improved MRM and PMM
Management of Migraines Related to the use of CHC				
Sacco et al. 2018 [7]	Systematic review	972	Desogestrel-only pill 75 μg/day	Best treatment for migraine with and without aura
Faubion et al. 2012 [13]	Systematic review	59 papers[a]	Combination therapy	Extend cycle - CHCs +10 μg EE during the placebo week as management of estrogen withdrawal migraines
Nappi et al. 2013 [18]	Review	14,044	POP	No increased risk for vascular events as compared with non-users
Machado et al. 2010 [20]	Cross-sectional	493	EE + drospirenone combination	Most migraine episodes occur during the pill free interval in CHC. Improvement of symptoms with combination therapy
Merki-Feld et al. 2017 [19]	Retrospective	64	Desogestrel 75 μg/d and/or POP	Switch from CHC to POP reduces frequency and intensity of migraines
Management of Migraines in Pregnancy				
Amundsen et al. 2019 [21]	Cross-sectional	401	Paracetamol and Sumatriptan	Paracetamol is the safest medication to use, followed by Sumatriptan.
Nezvalová-Henriksen et al. 2010 [22]	Systematic Review	69,929	Triptan	Triptan therapy during pregnancy is not associated with an increased risk of congenital malformations. A slight increase in the risk of atonic uterus (5.5 vs 5.4%) and hemorrhage was associated with triptan use during the second and/or third trimesters
Brandlistuen et al. 2013 [23]	Prospective study	48,631	Paracetamol	Long-term Paracetamol use (more than 28 days) during pregnancy is associated with gross motor disfunction in chidren post-nataly at 3 years old.

[a] Number of patients not detailed.
Patients = Number of patients involved in the study.
EE = Ethinyl estradiol.
POP = Progesterone Only Pill.
PMM = Pure Menstrual migraine.
CHC = Combined hormone contraception.
MRM = Menstrually related migraines EE = Ethinyl estradiol.
Bd = bi-daily.
POP = progesterone only pill.
↓ = increased.
↑ = reduced.

management options such as using the combination of triptans along with the progesterone only pill, which gives better results than using each separately [16]. Desogestrel 75mcg/day reduces the intensity of migraines compared to the combined hormonal contraceptives [9].

As acute management, drovatriptan had a higher efficacy in treating menstrual migraines as opposed to other triptans [17]. Prophylactic use of fovatriptan is effective when combined with 20 mg daily of ethinyl oestradiol for 21 days followed by conjugated oestrogen supplementation on day 22–28 [6].

Low dose combined hormonal contraceptives (CHC) followed by supplemental oestrogens has also been reported to prevent menstrual migraines in a statistically significant proportion of women [13].

CHCs have a range of complications documented in seven papers with 1,129,715 patients (Table 4). The European Headache

Table 4
Reported complications of combined hormonal contraction CHC use in women with migraines.

Reference	Study type	Patients	Conclusive remarks
Gillum et al. 2000 [27]	Meta-analysis	1,079,750	2 -3 x risk of ischemic stroke
Sacco et al. 2018 [7]	Systematic review	972	increased risk of ischemic stroke European Headache Federation: CHC is contraindicated in all women with migraines, POP a safer
Tepper et al. 2016 [25]	Systematic review	8134	2-4x increased risk of stroke as opposed to non-users of CHC
Nappi et al. 2013 [18]	Review	14,044	>35y old is a category 4 in WHO MEC risk of vascular events for all types of migraine <35y old, migraine with aura is a category 4 for CHC users
Kruit et al. 2004 [24]	Cross sectional	435	Increased risk of subclinical brain infarcts and white matter lesions
Machado et al. 2010 [20]	Cross sectional	493	associated with a greater risk of vascular accidents especially with the presence of auras
Champaloux et al. 2017 [26]	Case-control	25,887	CHC + migraine history: 6 x increase in risk of ischemic stroke
Faubion et al. 2012 [13]	Review	59 papers*	x 2-3 risk of stroke in migraine without aura 6-8 x risk of stroke in migraine with aura
Bousser et al. 2000 [28]	Society statement	*	Increased risk of ischaemic stroke especially in migraine with aura.

[a] Number of patients not detailed, recommendations from a professional body WHO MEC = World Health Organization Medical Eligibility Criteria CHC = combined hormonal contraction.

Federation states that CHC use is contraindicated in all women with migraines due to their association with an increased risk of stroke [7,12]. There is an average six-fold increase in the risk of stroke in women who take CHC and suffer from migraines. This risk is higher for women who have migraine with aura. CHC use in women with migraine is a category 4 contraindication in the World Health Organization Medical Eligibility Criteria [18].

The literature available surrounding the subject of management of headaches related to CHC use provides two options represented in five papers (Table 3) [7,13,18–20]. Switching from the CHC to the progestogen only pill (Desogestrel 75 μg/day) [7,18,19] or extending the cycle with supplementary oestrogens during the days of menses [13,20]. These papers studied a total of 15,573 patients across three systematic reviews, one retrospective and one cross-sectional study.

Based on the Median Teratogenic Risk Scores, it was shown that paracetamol is the safest drug to use for treatment of migraines in pregnant and breastfeeding women as it carries the lowest risk score (0–2) for the foetus [21]. Triptan therapy, notably sumatriptan, was not associated with an overall increased risk of negative outcomes on the foetus such as congenital malformations in pregnant women with migraines. The risk was 3% in pregnant women who took triptans as opposed to 2.9% in the control [22].

Pre-natal paracetamol use for more than 28 days has been linked to poorer gross motor development (b 0.24, 95% confidence interval (CI) 0.12–0.51) in children aged around 3 years. These effects were significantly smaller (b 0.10, 95% CI 0.02–0.19) with short term use of paracetamol (1–27 days) [23].

Discussion

Our systematic review revealed that modern scientific literature provides evidence regarding the complications of pregnancy due to migraines, as well as the effects of CHC use on the migraines and their complications. However, there is a lack of prospective randomized control trials and well-designed studies, most likely due to ethical difficulties in randomizing patients. There is also limited information surrounding menstrual migraines and their treatment. Small patient populations and the loss of multiple participants due to miscarriage or decision to abort, may also be factors which have affected the data available on pregnancy and migraines.

In migraineurs using CHC, 18–50% reported worsening migraines with the pill, as opposed to 3–35% who found an improvement in their migraines by the sixth cycle. 39–65% reported no change in their migraines. Therefore, prolonged use of CHC is linked with a reduction of migraine intensity and short exposure is linked with migraine exacerbations. [29]

Table 2 explored the complications of pregnancy. Throughout this data set, one study is of great significance due to a large disparity in morbidity risk between the control and the migraine group. Grossman et al [5] a retrospective study based on 86 patients found a 4% and 19.5% (control and migraine groups respectively) risk of having pre-eclampsia during pregnancy, as opposed to other papers that had much closer results between the two groups [14,15]. This study also showed a large difference in preterm births and low birthweight with 11.4% versus 28% and 8% versus 18.7% respectively. It was also noted that Marozio et al recorded a significant difference in preterm birth with 2.8% and 7.6% for controls and migraineurs respectively [35]. Both these studies [5,35] have a small sample size, which could have affected the results mentioned.

For menstrual migraine management, three options have been proposed. The use of CHCs followed by supplemental oestrogens [6,13], fovatriptan [17], and progestogen only pill [9,16] all showed a reduction in migraine severity and days lasting. The pathophysiology behind migraines is poorly defined, studies have shown that the disorder could be a result of both vasodilation and vasoconstriction with treatments such as ergotamine and oestrogen being of benefit, respectively [30,31]. More studies with a bigger sample size and comparison between these methods is needed to come to a conclusion on the best management of menstrual migraines that provides relief as well as minimizing side effects.

On CHC use in women with migraines, few papers explored the risk of CHC use in migraines with aura as opposed to without aura, and if it truly intensifies the risk. The evidence was overall weak, and very few studies were done taking into account both risk factors (CHC use and migraines) and if they have an additive effect when it comes to risk increase for stroke events.

Pregnancy complications associated with migraine sufferers have been explored in this paper. Pregnant migraineurs have an increased risk of preterm birth, caesarean section, pre-eclampsia, gestational hypertension, low birth weight, placental abruption and having a foetus that is small for gestational age. Much

contention surrounds the notion that hypertension causes headaches; therefore, the question as to whether gestational hypertension and pre-eclampsia in fact cause migraines and headaches themselves in these patients has been posed [32]. On the other hand, some literature supports the premise that migraine sufferers have a higher risk of developing hypertension. It should also be noted that the vast difference shown between healthy women and migraineurs in the study by Grossman et al. [5] (4% vs. 19.5% respectively) is most likely due to the patients involved in this study being obese, therefore carrying a higher risk for preeclampsia already.

With regards to the management of headaches due to CHC use, the literature agrees on two methods, continued CHC regime and switching to POP. Larger studies are needed to be able to confidently compare which of these options is better for the patient in terms of efficacy and lesser side effects.

Based on the evidence shown, migraines have a high incidence in gynaecology and obstetrics. Health care providers must include screening questions in the history to identify women with migraines and effectively manage them.

The guidelines for treatment of migraine in pregnant women is not clear, as research shows conflicting results. Generally, paracetamol use is safe on the short-term, but shows adverse effects with long-term exposure. Sumatriptan is safe to use in pregnancy with very mild adverse effects. More research needs to be done to understand the risks of exposure on the foetus and mother to common medications used to treat migraines. As discussed previously, women with migraines have a 1.1-fold increased risk of miscarriage as compared to pregnant women without migraines. This raised an issue of potential overlap between isolated migraines and antiphospholipid syndrome [38].

Antiphospholipid syndrome APS is linked with recurrent miscarriages, but the commonest symptom is migraine, which manifests in more than 20% of patients with APS. Interestingly, by treating APS with low molecular weight heparin or warfarin, users reported the complete disappearance of migraines [36,37].

Recurrent miscarriage is defined as 3 or more miscarriages per patient before 20 weeks gestation. It happens in 1% of the general female population. 10–15% of these women get diagnosed with antiphospholipid syndrome. It is a common feature of APS since more than 20% of patients diagnosed with APS had/have recurrent miscarriages [37]. Based on these numbers, obstetricians and gynaecologists should be on high alert to patients having a history of migraines along with a miscarriage or more as these patients could have antiphospholipid syndrome and require a different treatment plan that not only targets the migraine, but also the increased risk of thrombosis and risk of having further miscarriages. Proper follow-up and treatment is required for all women with migraines in order to minimize the risk of cerebrovascular events, and negative pregnancy outcomes. In addition, patients who are taking CHC and have migraines should be put on one of the treatment plans mentioned in order to avoid unwanted complications.

Conclusion

In conclusion, there was great paucity in calibre of data pertaining to the concerns we set out to address; furthermore, the studies found were of moderate adequacy. Future studies assessing a wide selection of migraine treatments for CHC users and those with menstrual migraines are needed, as well as their side effects.

With regard to pregnancy, doctors should remember that women with migraines have a higher rate of complications. Although evidence is limited, women with migraines should be monitored closely.

CRediT authorship contribution statement

Vasilios Tanos: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing. **Elissa Abi Raad:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Kelsey Elizabeth Berry:** Conceptualization. **Zara Abigail Toney:** Writing - original draft, Writing - review & editing.

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