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ORIGINAL RESEARCH

Assessment of Pain Perception of Aesthetic Procedures During Menstrual Period in Comparison to Non- Menstrual Period days

Nouf F Bin Rubaian[1], Nada J AlGhamdi[1], Haya A AlHemli[2], Deemah S AlHuraish[2], Abrar E Bukhari[3], Baraa A Amir[2]

[1]Imam Abdulrahman Bin Faisal University, Department of Dermatology, King Fahad Hospital of the University, Al Khobar, Saudi Arabia; [2]College of Medicine, Imam Abdulrahman bin Faisal University, Dammam, Eastern Province, Saudi Arabia; [3]Department of Dermatology, College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia

Correspondence: Deemah S AlHuraish, Email Deemahalhuraish@gmail.com

Purpose: A global survey conducted by The International Society of Aesthetic Plastic Surgery (ISAPS) in 2022 reported 18.8 million non-surgical cosmetic procedures, with women representing 87%. Recent literature has shined a light on the possible implication of female sex hormones on the perception of pain, but the influence of these hormones on pain perception secondary to aesthetic procedures have scarcely been studied. Our study aimed to investigate the influence of the menstrual cycle on pain perception during non-surgical aesthetic procedures. The study explored the correlation between different phases of the menstrual cycle, the presence of premenstrual symptoms, and the severity of pain experienced by participants.

Patients and Methods: A questionnaire-based cross-sectional study was conducted at dermatology clinics in Saudi Arabia. 383 complete responses were collected from participants who provided data on demographic factors, aesthetic procedures, menstrual status, premenstrual symptoms, and pain severity.

Results: The 383 participants reported that the most frequent procedures were laser hair removal (82.5%) and injectables. Pain perception was highest for laser hair removal across all menstrual phases (4.5±2.66, 4.8±3.06 and 4.3±3.48), and lowest for Ultherapy (1.56±1.66, 1.40±1.36 and 1.37±1.37). Significant positive correlations were found between premenstrual symptom severity and pain perception in laser hair removal and injectables. Linear regression analysis revealed a significant negative association between age and pain perception in laser hair removal, while age had a positive association with other procedures.

Conclusion: In conclusion, pain perception during non-surgical aesthetic procedures varies across menstrual phases and is influenced by the type of procedure. The negative relationship between age and pain in laser hair removal requires further research. These findings can help practitioners better manage patient expectations and experiences during these cosmetic treatments.

Keywords: non-surgical aesthetic procedures, laser hair removal, injectables, menstruation

Introduction

With the growing pressure of beauty standards nowadays, the desire for cosmetic procedures has increased exponentially both nationally and internationally. According to the latest report released in 2022 by the International Society for Aesthetic Plastic Surgery (ISAPS), the percentage of non-surgical aesthetic procedures has increased by 57.8% in the last four years.[1] Furthermore, a local study in the Kingdom of Saudi Arabia (KSA) reported the prevalence of cosmetic procedures as 10%.[2]

Aesthetic procedures, by definition, comprise a range of non-invasive to minimally invasive techniques aimed at enhancing one's physical appearance and self-satisfaction. These procedures include laser hair removal, fractional laser treatments, ultherapy, injectables such as Botox and fillers, and microneedling radiofrequency techniques such as Scarlet and Morpheus.[3] Most of these aesthetic procedures are considered painful. However, the severity of pain and pain perception are influenced by multiple factors, including individual variation, the type of procedure conducted, age, and

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sex.[4] Another controversial factor associated with changes in pain perception is the variation between different phases of the menstrual cycle, which has been studied previously during several invasive procedures.[5–9]

Multiple studies have previously evaluated pain perception across different phases of the menstrual cycle during various invasive interventions, including propofol injection, venipuncture, gynecological laparoscopy, and laparoscopic cholecystectomy. However, the results of these studies varied. Hanci et al concluded that pain was higher in the luteal phase, while Piroli et al found lower pain levels in the follicular phase. Additionally, Sari et al reported no difference in acute pain; however, persistent postoperative pain was higher in the follicular phase compared to the luteal phase. A clinical review conducted by Wang et al in 2019 also examined variations in pain perception between different phases of the menstrual cycle, particularly in the context of aesthetic procedures.[5–9] Given these variations in pain perception, further research is essential to explore pain experiences in female patients undergoing aesthetic procedures during different phases of the menstrual cycle.

The presence or absence of premenstrual syndrome (PMS) is another important factor influencing pain perception. This was studied by Arab et al in a study involving 140 women undergoing elective surgery. They found that patients with PMS exhibited higher pain sensitivity, while those in the luteal phase experienced less pain and required fewer analgesics.[10]

Despite existing literature describing the differences in pain perception during various phases of the menstrual cycle in relation to multiple invasive procedures, none have focused on non-surgical aesthetic procedures. Therefore, this study aims to assess pain perception during non-surgical aesthetic procedures before, during, and after the menstrual cycle, as well as to investigate the correlation between the presence of premenstrual symptoms and the severity of pain experienced during each procedure.[11]

Materials and Methods

Study Design Participants

This questionnaire-based cross-sectional study was conducted at the dermatology clinics of both King Fahad Hospital of the University (KFHU) in Al Khobar, Eastern Province, and Imam Mohammed Ibn Saud Islamic University (IMSIU) Medical Complex in Riyadh, Saudi Arabia. The study spanned from February to March 2024 and was conducted in accordance with the Declaration of Helsinki. Approval from the Institutional Review Board was obtained from both institutions, with the respective numbers: IRB-2024-01-178 from Imam Abdulrahman Bin Faisal University (IAU) and 551/223 from Imam Mohammed Ibn Saud Islamic University (IMSIU). Informed consent was obtained from all participants before they filled out the questionnaire.

The sample size was calculated using an online sample size calculator (Epi Info v5.5.10), assuming a 95% confidence interval, a 50% expected frequency, and a precision level of 5%. The minimum required sample size was determined to be 370 patients. The sampling technique used in this study was convenience sampling, where every female patient attending the clinic during the specified study period who met the inclusion criteria completed the online questionnaire. The inclusion criteria comprised females aged 14 years and older who visited the clinic to undergo any of the following cosmetic procedures: fractional laser, laser hair removal, injectables, microneedling radiofrequency, and ultherapy. Patients visiting the dermatology clinic for other purposes were excluded from the study.

Questionnaire Development and Data Collection

The questionnaire comprised four main parts. The first part inquired about the patients' demographics, including continuous variables such as age, weight, and height, as well as categorical variables like marital status (married, single, others).

The second part included a question about the type of aesthetic procedure the patient underwent, allowing participants to choose from five options: fractional laser, laser hair removal, injectables (Botox, fillers, mesotherapy, and platelet-rich plasma), microneedling radiofrequency (Scarlet, Morpheus, Infini, and Secret), and ultherapy.

The third part addressed menstrual period status and premenstrual symptoms. It contained two questions regarding menstrual status: the first asked about menstrual regularity (regular, irregular, or I do not know), while the second

estimated the severity of menstrual pain by asking whether the patient needed to use oral analgesics during their menstrual period (yes/no). Premenstrual symptoms were measured on a scale from 0 to 10, where 0 indicated the absence of symptoms, 1 represented mild symptoms, and 10 signified the most severe symptoms. The severity of individual premenstrual symptoms was summed and averaged to calculate the "mean premenstrual symptom severity". Five premenstrual symptoms were included: abdominal cramps, breast tenderness, backache, headache, and irritability.

The final part of the questionnaire assessed pain perception for each aesthetic procedure during different phases of the menstrual cycle. This section included a scale from 0 to 10, where 0 indicated no pain at all, 1 represented the least severe pain, and 10 indicated the most severe pain. Pain severity was measured for each aesthetic procedure during three phases: before the menstrual period, around the menstrual period (1–3 days prior), and during the menstrual period.

The questionnaire was designed and validated by two board-certified dermatologists in both Arabic and English. QuestionPro software was used to prepare the questionnaire. To assess clarity, a pilot study was conducted with 20 patients before administering the questionnaire, and modifications were made based on the feedback received. Additionally, the pilot study was used to estimate the average time required to complete the questionnaire, which was approximately 4 minutes.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 27, IBM Corporation, Armonk, NY, USA). Frequencies and distributions were analyzed using descriptive statistics. Pain perception across various phases of the menstrual cycle was compared using a one-way repeated measures ANOVA, followed by Bonferroni post-hoc analysis to identify which specific phases differed significantly from one another.

To assess the relationship between the severity of mean premenstrual symptoms and pain sensitivity across menstrual cycle phases, Pearson correlation was employed. Additionally, linear regression univariate analysis was conducted to evaluate age, BMI, and premenopausal pain symptom severity as risk factors affecting pain perception and sensitivity. In this analysis, pain perception was treated as the dependent variable, while age, BMI, and premenopausal pain symptoms served as independent variables. A significance level of $p < 0.05$ was considered statistically significant for all tests.

Results

A total of 619 responses were received. Responses that were incomplete or submitted by participants who had not undergone any of the aesthetic procedures of interest (ie, laser hair removal, fractional laser, injectables, microneedling, or ultherapy) were excluded, resulting in 383 complete responses. The demographic characteristics of the participants are shown in Table 1. The mean age and BMI of the participants were 30.83 ± 10.07 years and 24.23 ± 4.54 kg/m², respectively. The majority of participants were Saudi nationals (98.4%). The most frequently performed aesthetic procedures were laser hair removal (82.5%), followed by injectables (Botox, fillers, mesotherapy, and PRP) (60.6%).

Pain perception during laser hair removal across various phases of the menstrual cycle was highest before the menstrual period (4.5 ± 2.66), followed by around the period (1–3 days before the menstrual period) (4.8 ± 3.06), and lowest during the first three days of the menstrual period (4.3 ± 3.48). In contrast, pain perception during ultherapy was lowest across all phases, with values of 1.56 ± 1.66 before the menstrual period, 1.40 ± 1.36 around the period, and 1.37 ± 1.37 during the first three days of the menstrual period (Table 2).

In the laser hair removal procedure, pain perception was significantly higher during the "around-period" phase compared to the "first three days of menstruation" (4.80 ± 3.06 vs 4.33 ± 3.48; $p = 0.017$). In fractional laser procedures, pain perception during the first three days of menstruation was significantly lower than pain experienced before or around the period ($p = 0.019$ and $p = 0.049$, respectively). For ultherapy, pain experienced before menstruation was significantly higher than pain reported during the "around menstruation" phase or in the first three days of menstruation ($p = 0.011$ and $p = 0.005$, respectively) (Table 3).

Table 4 shows significant positive correlations between the severity of premenstrual symptoms and pain perception during all three menstrual phases for laser hair removal, with Pearson correlation coefficients of $r = 0.102$ ($p = 0.045$), $r = 0.169$ ($p = 0.001$), and $r = 0.182$ ($p = 0.000$), respectively. For injectables, the correlations were $r = 0.137$ ($p = 0.008$), $r =$

Table 1 Demographic Characteristics of Study Participants (N=383)

Variables	Mean±SD or N (%)
Age (years)	30.83±10.07
Marital status	
Single	203 (53%)
Married	171 (44.6%)
Others	9 (2.3%)
Weight (kg)	62.79±12.88
Height (cm)	160.83±5.68
Body Mass Index (kg/m^2)	24.23±4.54
Premenstrual symptoms severity on a VAS of 0–10 where 10 is highest and 0 is lowest pain	
Abdominal cramps	6.08±2.48
Breast tenderness	4.46±2.622
Backache	5.71±2.88
Headache	4.33±2.86
Irritability	6.59±2.97
Mean Premenstrual symptom severity[a]	5.43±1.94
Need of using oral analgesics for Premenstrual symptoms	
Yes	238 (62.1%)
No	145 (37.9%)
Aesthetics Procedures done previously	
Laser Hair Removal	316 (82.5%)
Fractional Laser	82 (21.4%)
Injectables (botox, filler, mesotherapy & PRP)	232 (60.6%)
Microneedling (scarlet, Morpheus, infini & secret)	96 (25.1%)
Ultherapy (Ulthera)	19 (5%)

Note: [a]The severity of individual premenstrual symptoms was summed up and averaged to get "Mean premenstrual symptom severity".
Abbreviation: VAS, Visual analog scale.

Table 2 Comparison of Pain Severity Across Menstrual Cycle Phases in Various Aesthetic Procedures (N=383)

	Severity of Pain			P-value (Repeated Measure ANOVA)
	Before Menstrual Period	Around Period (1–3 days Before Menstrual Period)	First Three Days of Period	
Laser Hair Removal	4.50±2.66	4.80±3.06	4.33±3.48	0.017
Fractional Laser	2.27±2.36	2.17±2.32	2.01±2.26	0.009
Injectables (botox, filler, mesotherapy & PRP)	3.24±2.59	3.14±2.77	3.11±2.92	0.466
Microneedling (scarlet, Morpheus, infini & secret)	2.31±2.42	2.28±2.57	2.20±2.53	0.410
Ultherapy (Ulthera)	1.56±1.66	1.40±1.36	1.37±1.37	0.002

0.147 (p = 0.004), and r = 0.146 (p = 0.005) across the same phases. In fractional laser procedures, the severity of premenstrual symptoms also correlated significantly and positively with pain perceived during the first three days of menstruation (r = 0.107, p = 0.037).

Table 3 Pairwise Comparison Results From Bonferroni Post-Hoc Test

	P-values		
	Before Menstrual Period vs Around Period (1 vs 2)	**Before Menstrual Period vs First Three Days of Period (1 vs 3)**	**Around Period vs First Three Days of Period (2 vs 3)**
Laser Hair Removal	0.141	1.000	0.004
Fractional Laser	0.725	0.019	0.049
Ultherapy (Ulthera)	0.011	0.005	0.877

Table 4 Pearson Correlation Between Mean Premenstrual Symptom Severity and Pain Severity Felt During Individual Aesthetic Procedures (at Three Time Periods Each) Three Separate Tables of Before, Around and During Periods

Aesthetic Procedures	**Pain Perception**	**Pearson Correlation**	
		r	**p-value**
Laser Hair Removal	Before Menstrual Period	0.102	0.045
	Around Period (1–3 days before Menstrual Period)	0.169	0.001
	During first three days of period	0.182	0.000
Fractional Laser	Before Menstrual Period	0.047	0.359
	Around Period (1–3 days before Menstrual Period)	0.070	0.178
	During first three days of period	0.107	0.037
Injectables (botox, filler, mesotherapy & PRP)	Before Menstrual Period	0.137	0.008
	Around Period (1–3 days before Menstrual Period)	0.147	0.004
	During first three days of period	0.146	0.005
Microneedling (scarlet, Morpheus, infini & secret)	Before Menstrual Period	0.19	0.705
	Around Period (1–3 days before Menstrual Period)	0.044	0.387
	During first three days of period	0.038	0.456
Ultherapy (Ulthera)	Before Menstrual Period	−0.044	0.394
	Around Period (1–3 days before Menstrual Period)	−0.035	0.497
	During first three days of period	0.010	0.845

In the univariate linear regression analysis shown in Table 5, age had a significant negative association with pain perception in laser hair removal ($p = 0.036$ and $p = 0.005$), indicating that pain perception is inversely related to age—higher in younger age groups and lower in older age groups. Conversely, age had a significant positive association with pain perception in the remaining aesthetic procedures (ie, fractional laser, injectables, microneedling, and ultherapy) ($p < 0.05$ across all menstrual cycle phases), suggesting that pain perception increases with age. The severity of premenstrual symptoms was also significantly and positively associated with pain perception in laser hair removal (all three menstrual phases; $p = 0.045$, $p = 0.001$, $p = 0.000$) and in fractional laser procedures (pain during the first three days of menstruation only; $p = 0.037$). BMI had a significant positive association with pain perception during injectable procedures performed before the menstrual cycle ($p = 0.033$).

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Table 5 Univariate Linear Regression for Pain Perception in Various Aesthetic Procedures Across Menstrual Cycle Phases

Variables	Before Menstrual cycle			Around Period (1–3 days before Menstrual Period)			During First Three Days of Period		
	R2	Beta (95% CI)	P-value	R2	Beta (95% CI)	P-value	R2	Beta (95% CI)	P-value
Laser Hair Removal Pain Perception Risk Factors									
Age	0.012	−0.107 (−0.055 to −0.002)	0.036	0.021	−0.145 (–0.074 to −0.014)	0.005	0.004	−0.058 to 0.012	0.193
BMI	0.003	−0.056 (−0.092 to 0.026)	0.276	0.002	−0.039 (−0.094 to 0.042)	0.447	0.002	−0.044 (−0.111 to 0.044)	0.396
Pre-menstrual symptoms severity	0.010	0.102 (0.003 to 0.279)	0.045	0.029	0.169 (0.110 to 0.426)	0.001	0.033	0.182 (0.150 to 0.508)	0.000
Fractional Laser Pain Perception Risk Factors									
Age	0.013	0.112 (0.003 to 0.050)	0.029	0.011	0.103 (0.001 to 0.047)	0.045	0.014	0.116 (0.004 to 0.049)	0.024
BMI	0.003	0.054 (−0.025 to 0.080)	0.297	0.000	0.017 (−0.043 to 0.060)	0.739	0.000	−0.020 (−0.060 to 0.041)	0.701
Pre-menstrual symptoms severity	0.002	0.047 (−0.066 to 0.183)	0.359	0.005	0.070 (−0.038 to 0.206)	0.178	0.012	0.107 (0.008 to 0.245)	0.037
Injectables (botox, filler, mesotherapy and PRP)									
Age	0.040	0.200 (0.026 to 0.077)	0.000	0.039	0.197 (0.027 to 0.082)	0.000	0.025	0.157 (0.016 to 0075)	0.002
BMI	0.012	0.110 (0.005 to 0.120)	0.033	0.004	0.064 (−0.23 to 0.100)	0.215	0.000	0.01 (−0.059 to 0.071)	0.847
Pre-menstrual symptoms severity	0.002	0.047 (−0.066 to 0.183)	0.359	0.005	0.070 (−0.038 to 0.206)	0.178	0.012	0.107 (0.008 to 0.245)	0.037
Microneedling RF (scarlet, Morpheus, infini and secret)									
Age	0.103	0.322 (0.054 to 0.101)	0.000	0.085	0.291 (0.050 to 0.099)	0.000	0.100	0.316 (0.056 to 0.104)	0.000
BMI	0.002	0.040 (−0.032 to 0.0750	0.432	0.005	0.074 (−0.015 to 0.099)	0.149	0.006	0.077 (−0.013 to 0.099)	0.134
Pre-menstrual symptoms severity	0.000	0.019 (−0.102 to 0.151)	0.705	0.002	0.044 (−0.075 to 0.193)	0.387	0.001	0.038 (−0.082 to 0.182)	0.456
Ultherapy									
Age	0.088	0.296 (0.033 to 0.065)	0.000	0.096	0.309 (0.029 to 0.055)	0.000	0.078	0.279 (0.025 to 0.051)	0.000
BMI	0.006	0.079 (−0.008 to 0.066)	0.125	0.001	0.030 (−0.021 to 0.039)	0.564	0.001	0.038 (−0.019 to 0.042)	0.458
Pre-menstrual symptoms severity	0.002	−0.44 (−0.124 to 0.049)	0.394	0.001	−0.035 (−0.095 to 0.497)	0.497	0.000	0.010 (−0.064 to 0.079)	0.845

Abbreviations: ISAPS, International Society for Aesthetic Plastic Surgery; KSA, Kingdom Of Saudi Arabia; KFHU, King Fahad Hospital of The University; IMSIU, Imam Mohammed Ibn Saud Islamic University; IAU, Imam Abdulrahman Bin Faisal University; BMI, Body Mass Index; ANOVA, Analysis of Variance; SPSS, Statistical Package for the Social Sciences; CI, Confidence Interval; PRP, Platelet-rich plasma; fMRI, functional Magnetic Resonance Imaging; GABA, Gamma-Aminobutyric Acid.

Discussion

Aesthetic procedures have gained significant popularity in recent years. According to a global survey conducted by ISAPS in 2022, there were 18.8 million non-surgical and 14.9 million surgical cosmetic procedures performed, reflecting an overall increase of approximately 11% from the previous year, with women representing a substantial 87% of these procedures.[1] This rising trend underscores the need to understand the factors influencing patient experiences, particularly pain perception during these procedures.

Hormonal Influence on Pain Perception

Recent studies have highlighted the potential impact of female sex hormones on pain perception. Both estrogen and progesterone exhibit anti-nociceptive and nociceptive properties, yet their specific effects on pain perception during aesthetic procedures remain underexplored.[10]

Fluctuations in hormone levels during the menstrual cycle can significantly affect pain perception. In the luteal phase, elevated estrogen and progesterone levels may increase sensitivity to pain by altering pain pathways in the nervous system. Additionally, premenstrual symptoms can further exacerbate pain perception, indicating that carefully timing aesthetic procedures in relation to the menstrual cycle could enhance patient comfort and pain management.[10,11]

Recent findings have further elucidated the role of cortisol in pain perception during the menstrual cycle. A study demonstrated that estradiol levels were significantly elevated during the midcycle and early luteal phases, while progesterone increased during the luteal phase. Notably, post-awakening cortisol values rose during the midcycle, luteal phase, and premenstrual phase, but exhibited a blunted response during menstruation. Positive correlations were observed between cortisol and both estradiol and progesterone, suggesting an interplay between these hormones.

Importantly, that research indicated that premenstrual symptoms, including pain perception, were more pronounced during the menses and premenstrual phases, corresponding with lower ovarian steroid levels. This suggests that cortisol may play a phase-specific role in the regulation of pain, further complicating the hormonal landscape influencing pain during aesthetic procedures. Understanding these relationships can enhance strategies for managing pain in women undergoing procedures during different menstrual cycle phases.[12]

In light of this context, our study aimed to investigate the influence of the menstrual cycle on pain perception during non-surgical aesthetic procedures. We explored the correlation between different phases of the menstrual cycle, the presence of premenstrual symptoms, and the severity of pain experienced by participants. By examining these factors, the study seeks to provide valuable insights into pain management strategies and enhance patient comfort during aesthetic procedures. Our findings contribute to the existing literature on pain perception during different menstrual cycle phases, specifically in the context of non-surgical aesthetic procedures, filling a gap left by previous studies that primarily focused on invasive procedures.[5–9]

Timing and Pain Perception

In our study, pain perception was found to be highest around the time of menstruation and was least prominent during the first 3 days of the cycle; this finding resembles that of Volkan et al, whose study recorded pain scores during follicular and luteal phases regarding perception of propofol injections. This questionnaire based research found a pain score of 1.81 ± 2.30 in the follicular phase group compared to a significantly higher score of 4.83 ± 3.09 in the luteal group.[5] In 2018, Piroli et al studied the Influence of the menstrual cycle phases on pain perception and analgesic requirements in young females undergoing gynecological laparoscopy; the results of the study demonstrated a significant increase in pain perception during the luteal phase, and therefore recommended women to undergo elective surgeries preferably during the follicular phase in order to reduce post-operative pain.[7] The aforementioned findings indicate that pain perception is most heightened during luteal phases not only secondary to cosmetic procedures, but also similarly due to invasive laparoscopic surgeries. These findings collectively suggest that the timing of gynecological surgeries in relation to the menstrual cycle may have implications for pain management and analgesic requirements.

However, there appears to be variation in consistency between pain perception during follicular and luteal phases in the current available literature. Previous studies have primarily focused on invasive procedures and not on non-invasive

aesthetic procedures, such as laser hair removal. However, in the context of gynecological surgeries, several studies have examined the impact of the menstrual cycle on pain perception and analgesic needs. Arab et al conducted a study with 140 patients and found that individuals in the follicular phase, as opposed to the luteal phase, regardless of their premenstrual syndrome history, experienced heightened postoperative pain and required increased analgesic medication.[9] Similarly, Moradhakhani et al reported a higher occurrence of postdural puncture headache in patients undergoing spinal anesthesia during the follicular phase.[13] These studies contradict the findings of the aforementioned articles, and the results of our study; therefore further research is required to investigate this difference.

Mechanisms of Pain Perception

Despite variations in pain perception between menstrual phases, heightened pain perception during the menstrual cycle is a consistent phenomenon in the literature. This may be attributed to the mechanism of action of sex hormones, primarily estradiol and progesterone. The prominent role of progesterone in modulating the neurotransmitter GABA, possibly contributes to its antinociceptive properties during menstruation.[14]

Additionally, a study conducted utilizing fMRI and a noxious thermal stimulus to explore the relationship between sex steroid hormones and pain perception revealed a notable reduction in pain when exposed to physiologically high progesterone levels demonstrating a clear dissociation between the intensity of pain and the sensation of unpleasantness. Prominently, the researchers observed a decrease in functional connectivity between the inferior frontal gyrus and amygdala which they attributed to the elevated levels of circulating female sex hormones.[15]

Limitations and Future Research

It is important to consider the limitations of this study. The relatively constricted sample size of 383 may affect the generalizability of the results. Additionally, the study utilized a convenience sampling technique, which introduces a potential bias in participant selection. The use of self-reported measures, such as the questionnaire, may also be subject to recall bias.

Despite these limitations, the findings of this study suggest that pain perception during non-surgical aesthetic procedures may vary across different phases of the menstrual cycle and may be influenced by the specific type of procedure. The negative association between age and pain perception was only observed in laser hair removal, indicating a need for further research to understand this phenomenon. The presence of premenstrual symptoms, such as irritability, may influence the severity of pain experienced by individuals undergoing non-surgical aesthetic procedures.

These findings have implications for healthcare providers and patients, highlighting the need to consider the menstrual cycle phase and premenstrual symptoms when managing pain associated with aesthetic procedures.

Further research with larger sample sizes and more diverse populations is needed to validate and expand upon these findings. Longitudinal studies tracking pain perception across multiple menstrual cycles can provide comprehensive insights into the relationship between pain and the menstrual cycle in the context of aesthetic procedures.

Conclusion

In conclusion, this study sheds light on the pain perception of non-surgical aesthetic procedures during different phases of the menstrual cycle. The findings suggest that menstrual cycle phases and premenstrual symptoms may influence pain severity. Importantly, understanding how PMS affects daily life practices can provide valuable insights into the timing of aesthetic interventions and their impact on patient comfort. Healthcare providers should consider these factors when managing pain in patients undergoing non-surgical aesthetic procedures. Future research should further explore the correlations between PMS, pain experiences, and daily activities to enhance pain management strategies.

Disclosure

All authors declare that they have no conflict of interest. All authors have declared that they have no financial relationships at the present or within the previous three years with any organizations that might have an interest in the submitted work.

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