Original Article

Effectiveness of flower essences in labor and birth: evaluation of obstetric and neuroendocrine parameters

Efetividade das essências florais no trabalho de parto e nascimento: avaliação dos parâmetros obstétricos e neuroendócrinos

Efectividad de las esencias florales en el trabajo de parto y nacimiento: evaluación de los parámetros obstétricos y neuroendócrinos

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Abstract

Objective: To evaluate the effectiveness of floral therapy associated with factors that strengthen pain and stress in the labor process through obstetric and neuroendocrine parameters.

Methods: Randomized, triple-blind, placebo-controlled clinical trial performed with 164 parturients at usual obstetric risk subdivided into two groups to which Five Flower floral essence and placebo were administered. Obstetric and neuroendocrine aspects were evaluated through biochemical analysis of the beta-endorphin and cortisol hormones through salivary samples before and after the intervention.

Results: The flower essence modulated the factors that strengthen pain in labor, that is, rupture of amniotic membranes, active phase and induction of labor. There was an increase in beta-endorphin levels along with one less contraction in women with ruptured ovular membranes and labor induction. Regarding stress, cortisol values were constant for the Experimental group, and did not change in the active phase, rupture of the ovular membranes or induction. The Five Flower essence proved to be effective in reducing labor time by 1 hour 25 minutes in the Experimental group.

Conclusion: The floral therapy used proved to be effective in controlling pain and stress during labor, and reflected positively on its agility and qualified its outcome.

Resumo

Objetivo: Avaliar a efetividade da terapia floral associados aos fatores que potencializam a dor e o estresse no processo de parturição por meio de parâmetros obstétricos e neuroendócrinos.

Métodos: Ensaio clínico randomizado, triplo cego, placebo controlado, realizado com 164 parturientes de risco obstétrico habitual, subdivididas entre dois grupos para as quais foram ministradas essência floral F*ive Flower* e placebo, respectivamente. Avaliou-se aspectos obstétricos e neuroendócrinos por meio da análise bioquímica dos hormônios Beta-endorfina e Cortisol salivar antes e ao término da intervenção.

Resultados: A essência floral modulou os fatores que potencializam a dor no trabalho de parto, isto é, rotura das membranas amnióticas, fase ativa e indução do parto. Houve aumento dos níveis de Beta-endorfina juntamente com a diminuição de uma contração em mulheres com rotura das membranas ovulares e com indução. Em relação ao estresse, houve constância dos valores do Cortisol para o Grupo Experimental, não alterando seu valor na fase ativa, rotura das membranas ovulares ou indução. A Essência *Five Flower* mostrou-se eficaz na redução de uma hora e vinte e cinco minutos do tempo do trabalho de parto no Grupo Experimental.

Conclusão: A terapia floral realizada, mostrou-se eficaz no controle da dor e estresse durante o trabalho de parto, refletindo positivamente na sua brevidade e qualificando seu desfecho.

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Conflicts to interest: extracted from the thesis "Flower Essences: Effects on the pain relief, anxiety, clinical and neuroendocrine parameters of stress during labor" presented to the Nursing Postgraduate Program, Universidade Federal de São Paulo, 2020. Although Barbieri M is Scientific Editor of Acta Paulista de Enfermagem, she did not participate in the peer review process that resulted in her article being approved.

Resumen

Objetivo: Evaluar la efectividad de la terapia floral asociada a los factores que potencializan el dolor y el estrés en el proceso de parto por medio de parámetros obstétricos y neuroendócrinos.

Métodos: Ensayo clínico aleatorizado, triple ciego, placebo controlado, realizado con 164 parturientas de riesgo obstétrico normal, subdivididas en dos grupos en que se les administró esencia floral *Five Flower* y placebo. Se evaluaron aspectos obstétricos y neuroendócrinos por medio del análisis bioquímico de las hormonas betaendorfina y cortisol salival antes y al final de la intervención.

Resultados: La esencia floral reguló los factores que potencializan el dolor en el trabajo de parto, es decir, ruptura de las membranas amnióticas, fase activa e inducción del parto. Hubo aumento de los niveles de betaendorfina junto con la reducción de una contracción en mujeres con ruptura de las membranas ovulares y con inducción. Con relación al estrés, hubo constancia de los valores de cortisol en el grupo experimental, sin aumento de su valor en la fase activa, ruptura de las membranas ovulares o inducción. La esencia *Five Flower* demostró ser eficaz para la reducción de una hora y veinticinco minutos de tiempo de trabajo de parto en el grupo experimental.

Conclusión: La terapia floral realizada demostró ser eficaz en el control del dolor y del estrés durante el trabajo de parto, con un impacto positivo en su brevedad y en la cualificación de su desenlace.

Introduction

Pain in childbirth is unique and involves physiological, psychological and sociocultural aspects. It is defined as an acute, transient, complex, subjective and multidimensional pain inherent to the labor process, resulting from sensory stimuli generated mainly by uterine contraction.[1]

The active phase of labor, from 5 cm of cervical dilation, induction and rupture of the ovular membranes are factors that strengthen pain during labor. The intensity of the pain felt can change in the same woman, given the possibility of her secreting endogenous analgesic substances, that is, the plasma concentration of beta-endorphin may be significantly higher in a woman in labor compared to a non-pregnant woman.[2]

The endocrine system usually interacts with the nervous system; together they act in the coordination and regulation of body functions, and interconnected they constitute the neuroendocrine system. The endocrine system communicates with the body through hormones and is conducted through the blood directly to target organs and cells. Hormones are physiological regulators; they accelerate or decrease the speed of reactions and biological functions taking place in the body.[3]

Beta-endorphin is a hormone released by the anterior pituitary. It is an endogenous neurotransmitter found in both central and peripheral nervous system neurons, secreted when the body needs something that can fight some discomfort, reversing the situation. It is released in response to any kind of physical or emotional stress and commonly relieves pain and anxiety.[3]

In a study on pain during labor using beta-endorphin and cortisol as markers, the hot aspersion bath and perineal exercises combined provided relaxation and consequently, reduced stress, leading to the decrease and control of pain, which may be considered an adjuvant therapy for parturients experiencing pain and stress during labor.[4]

Stress is an adaptive and defense biological mechanism characterized by the immediate activation of the sympathetic nervous system mediated by higher adrenaline secretion, followed by activation of the hypothalamic-pituitary-adrenal axis and consequent increase in plasma levels of corticotropin-releasing hormone (CRH), adrenocorticotropic hormone (ACTH) and cortisol.[5]

The ACTH stimulates the adrenal cortex to release cortisol which, after exerting a modulating and adaptive action on the body to the stressor agent, inhibits the secretion of ACTH by the pituitary gland or CRH by the hypothalamus through a negative feedback regulatory mechanism. Cortisol measures the progression or suspension of the stress response.[5]

Baseline ACTH levels allow an effective response to stress. There is an association between beta-endorphin and cortisol levels during labor. The levels of these hormones are higher in maternal plasma and closely interrelated during labor and up to 24 hours after delivery.[5]

Given the above, actions that reduce stress during labor evidently can contribute to minimize pain.[6]

In this sense, it is up to the obstetrician nurse and other professionals assisting in childbirth to

promote care to reduce the stress factors and possible unpreparedness faced by women using strategies that bring their comfort in this period.[7-9]

In this context, floral therapy can be used as a nonpharmacological method for the relief of anxiety and pain during labor. This is a Complementary Integrative Practice in Health (CIP) characterized by acting in the fields of disease prevention and health promotion, maintenance and recovery based on a humanized care model, centered on the integrality of the individual, comprehensive vision of health and non-invasive methods.[10]

Floral therapy is based on a concept where the Cartesian divide between body and mind is overcome by an integrative perspective of these elements in a dimension where the mind assumes essential importance. Emotions change the physical state through the action of the central nervous system, endocrine and immune systems. The positive emotion establishes health, while the negative state encourages disease. Thus, it is necessary to value the symptoms that are not only physical in order to solve problems not merely rooted in the biological field.[11,12]

Thinking about anxiety and the fear-tension-pain triad that guides labor, the Five Flower floral essence, Bach's emergency compound, is considered a combination of "emotional balance rescue" for its remarkable ability to deal with emergency situations of crisis and stress, a situation experienced by the parturient during the active phase of labor.[13]

The objective of the study was to evaluate the effectiveness of floral therapy associated with factors that strengthen pain and stress in the parturition process through obstetric and neuroendocrine parameters.

Methods

Randomized, triple-blind, placebo-controlled clinical trial guided by the CONSORT 2017 tool, for non-pharmacological clinical studies.[14] A pre- and post-intervention design with repeated measures between two groups was used. The allocation rate was 1:1 and data masking between participants, researchers and the statistical team responsible for data analysis was used.

It was performed at the in-hospital birth center for labor and delivery care in a hospital linked to the National Health Service (Brazilian SUS) in the city of São Paulo, Brazil.

The study population consisted of parturients at usual obstetric risk in pregnancies that progressed without complications, admitted to the in-hospital birth center. Inclusion criteria comprised parturients aged at least 18 years, term pregnancy between 37 weeks and 42 completed weeks, with a single fetus alive in flexed cephalic presentation; free from any clinical and/or obstetric pathology; in established labor, that is, two uterine contractions in ten minutes, minimum cervical dilatation of 4 cm and maximum of 8 cm recorded on a partograph. Exclusion criteria were parturients with indication for cesarean delivery at the time of admission; smokers; women with mental disorders; women who reported having ingested caffeine in the last 10 hours and users of any psychoactive drug.

The sample size was calculated from a pilot study with 30 parturients. Maternal heart rate was used as a sizing variable. The necessary sample calculated was 74 parturients per group, totaling 148 women. The sample size calculation was increased by 10% given the probable losses, totaling 164 parturients subdivided into two groups of 82 each, called even and odd, and later revealed as control and experimental, respectively.

Data collection was performed between May and October 2018, from Monday to Sunday, for about ten hours a day by two obstetric nurses specially trained for this purpose, through interviews with parturients, using data from the obstetric records and digital pregnancy records by accessing the *Cadastro* application for collection adapted in Visual Basic Applications.

The data collection instrument was specially prepared for the study, containing data on the sociodemographic characterization of participants, including the control variables: age, color, education, marital status and family income. Dependent variables, obstetric parameters: gestational age, number of pregnancies, abortions and parities, cervical dilatation, frequency and intensity of uterine contractions, condition of the ovular membranes (intact or

ruptured), induction of labor, time elapsed from the birth intervention and type of delivery. The dependent variables related to neuroendocrine parameters comprised the concentration of beta-endorphin and cortisol hormones through salivary samples. The independent variable was represented by flower essence for the experimental group and placebo for the control group.

Parturients were contacted in the pre-delivery room and assessed for obstetric risk and eligibility criteria through interviews, analysis of obstetric records and electronic pregnancy records. Those who met all inclusion criteria were invited to participate in the study, and after acceptance, they were asked to sign the Informed Consent form.

Simple randomization was used, where a participant has an equal chance of being allocated to the intervention group or control group. Interventions were identified on cards numbered 1 to 164 placed in an envelope. For allocation into one of the groups, even or odd, each parturient picked a card from the envelope; each card had a number corresponding to the therapy received. Even numbers indicated the therapy of 4 drops of solution diluted in 20 ml of water every 15 minutes, for one hour, in a vial previously handled, registered and identified by the importer as even. Odd numbers indicated the therapy of 4 drops of solution diluted in 20 ml of water every 15 minutes, for one hour, in the vial previously handled, registered and identified by the importer as odd. Each number drawn was taken from the total until the formation of each study group was finished, equivalent to two intervention groups. Note that the vials containing the solutions were identical; what differentiated them were the labels "Even", "Odd". It was not possible to recognize which was a floral or a placebo. Only the manufacturer was aware of the contents and identification of the vials of both formulas. The entire process of preparing the formulas was photographed and revealed only after performing statistical analysis of data.

The parturient was evaluated before and 30 minutes after the last dose of drops intended for randomization. At these times, 1.5 to 2.0 ml of saliva were collected through a tube Salivette® for the measurement of beta-endorphin and cortisol hormones.

Data collected in a digital spreadsheet were automatically integrated into an Excel® version 2016 database. In the analysis, the mean values between the two groups were compared using the Student's t test for independent samples. To analyze the behavior of neuroendocrine stress characteristics, Generalized Estimating Equations (GEE) models were used. Additionally, multivariate analysis was used through the decision/classification tree using the CHAID (Chi Square Interaction Detector) algorithm.

For the time from the intervention to the moment of delivery, the linear regression model was adjusted, which has the normality of data distribution as one of the assumptions, verified using the Kolmogorov-Smirnov test.

For all statistical tests, a significance level of 5% was adopted. For the other analyses, the Statistical Package for the Social Sciences (SPSS) 20.0 was used.

Hormonal assessment was performed using the ELISA method, adopting the quantitative assessment of cortisol and beta-endorphin in salivary samples, and range of the curve below:

- beta-endorfin= 12.35 to 1,000 pg/mL. Sensitivity = 4.84 pg/mL
- cortisol = 0.1 to 30 ng/mL- Sensitivity = 0.09 ng/mL

The study complied with the ethical requirements required by CNS Resolution 466/12, was submitted and approved by the Research Ethics Committee under opinion number 1.325.908 and CAAE: 50134315.2.0000.5505. It is published in the Brazilian Registry of Clinical Trials under the number RBR-5tt55v.

Results

In recruitment and allocation, six out of the 170 eligible parturients were excluded before randomization due to refusal. Thus, 164 parturients were randomized and randomly allocated into two intervention groups preliminarily divided into Even

control group (n=82) and Odd experimental group (n=82). In the follow-up after randomization, there were eight losses, of which five in the Control group (one due to insufficient amount of biological material-saliva, and four births before the end of intervention) and three in the Experimental group (one due to insufficient amount of biological material and two births before the end of intervention). In the analysis, 156 out of the total of 164 parturients who started the research protocol completed all the steps until the analysis phase (Control group = 77, Experimental group = 79). Figure 1 shows the flow diagram of the study participants, as recommended by the CONSORT Statement, 2017[14].

The homogeneity of sociodemographic and obstetric characteristics of parturients by intervention group was obtained. The average age of women participating in both groups was 25 years old. In relation to color, mixed race predominated between the two groups (92/156: 50 parturients in the Experimental group and 42 in the Control group). When assessing education, most participants had eight to 11 years of study (119/156: 60 in the Experimental group and 59 in the Control group). Regarding marital status, common-law marriage predominated in both groups (63/156: 37 in the Experimental group and 26 in the Control group). Regarding family income, one minimum wage predominated in both groups (50/113: 25 in the Experimental group and 25 in the Control group). When evaluating the average obstetric characteristics among participants, we observed the gestational age of 39.3 weeks for the two groups, two pregnancies, and ten antenatal consultations. Regarding measurements of neuroendocrine characteristics by intervention group according to the moment of evaluation, the following results were obtained in relation to cortisol: before intervention, the Experimental group had 16,075.6 ± 10,908.5 ng/ml and after intervention 18,243.8 ± 11,673.5 ng/ml; before intervention, the Control group had 15,288.5 ± 10,764.3 ng/ml and after intervention 16,429.6 ± 11,438.1 ng/ml. Regarding beta-endorphin, before the intervention, the Experimental group had 32,434.2 ± 21,823.5 pg/ml and after intervention 28,405.9 ± 17,457.9 pg/ml; and before

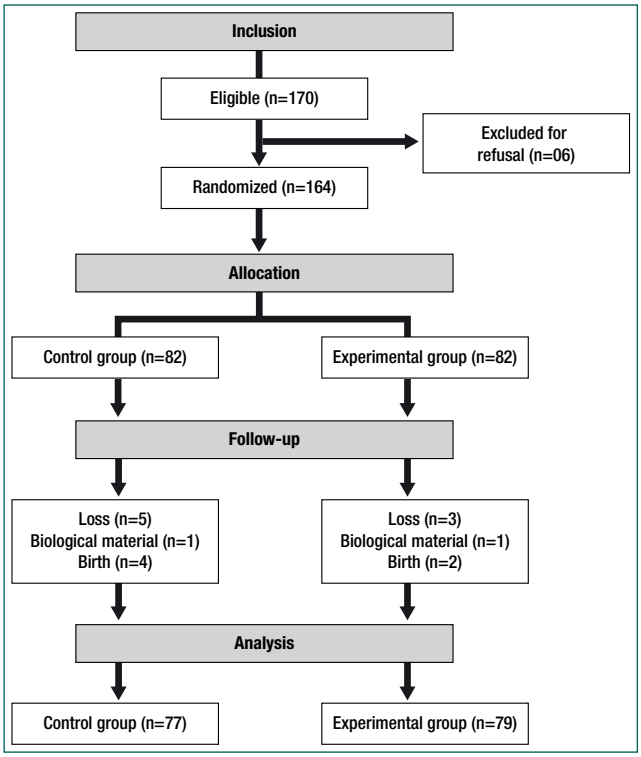

Figure 1. Flow diagram of the study design and participant allocation

intervention, the Control group had 28,668.7 ± 22,357.1 pg/ml and after intervention, 24,508.4 ± 13,092.9 pg/ml. These results demonstrate homogeneity in the mean values of these characteristics. For a better understanding of the role of beta-endorphin and cortisol in both groups, the decision tree was used to explore the behavior of hormonal variation by conditions that strengthen labor (amniotic membrane status, labor induction and cervical dilatation pre-intervention). The results found in the decision tree were presented in the form of a table for better visualization and understanding (Table 1).

Beta-endorphin variation

When taking into account the decision tree, with the beta-endorphin variation as a dependent variable, and the initial cervical dilatation equal to or greater than 5 cm (active phase), labor induction, state of the ovular membranes and contractions (frequency and duration) initial, final and variation as predicting variables, in addition to intervention (mandatory), three groups were formed, as presented in table 1.

Table1. Summary measures of beta-endorphin variation by intervention group

Group	Mean	Median	Standard deviation	Minimum	Maximum	n	p-value
							0.018
Control group	-4,160.3[B]	-2,714.0	21,382.5	-145,524.0	22,536.0	77	
Experimental group with variation in contraction frequency > -1	-6,974.6[B]	-4,686.0	16,089.2	-83,841.0	12,949.0	60	
Experimental group with variation in contraction frequency ≤ -1	5,276.0[A]	6,185.0	15,991.9	-24,092.0	58,265.0	19	

p - descriptive level of the Kruskal Wallis test.
(A) and (B) show different means according to Dunn Bonferroni's multiple comparisons

Table 2. Summary measures of cortisol variation by group

Group	Mean	Median	Standard deviation	Minimum	Maximum	n	p-value
							0.023
Experimental group	1,401.1[A]	1,298.0	5,831.2	-19,106.0	25,957.0	79	
Control group and dilatation ≥ 5 cm	1,976.7[A]	1,483.0	4,793.3	-12,155.0	12,184.0	53	
Control group, 4 cm dilatation and no labor induction	-2,364.4[B]	-2,344.0	4,746.1	-14,211.0	6,938.0	17	
Control group, 4 cm dilatation and labor induction	3,328.0[A]	2,589.0	5,400.4	-2.,08.0	12,637.0	7	

p - ANOVA descriptive level;
(A) and (B) show different means according to Duncan's multiple comparisons

The Control group did not present differentiation by any of the characteristics, that is, initial dilatation ≥ 5, labor induction, state of the ovular membranes and initial contractions.

In the Experimental group, distinct groups of average variation of beta-endorphin were formed by the condition of variation in the frequency of contractions - those that had variation in the frequency of contractions greater than one (1) contraction, presented, on average, beta-endorphin reductions similar to those of the Control Group. On the other hand, parturients who had a reduction in frequency of contractions greater than one (1) showed an increase in beta-endorphin. A more detailed assessment showed that unlike the other groups (p=0.010), this group was made up mostly (78.9%) of parturients undergoing labor induction with ruptured amniotic membrane. Thus, the Experimental group showed an improvement in the sense of wellbeing measured by beta-endorphin, associated with factors that strengthen labor such as induction and broken water, unlike the Control group.

Cortisol variation

The decision tree, having cortisol variation as the dependent variable, and the initial dilatation equal to or greater than 5 cm (active phase), labor induction, state of ovular membranes and contractions (frequency and duration) initial, final and variation as predicting variables, in addition to intervention (mandatory), pointed to the formation of four groups, as shown in table 2.

The Experimental group did not present differentiation by any of the characteristics (initial dilatation equal to or greater than 5, labor induction, state of ovular membranes and initial, final and variation of contractions). On the other hand, in the Control group, distinct groups of average cortisol variation by dilatation and labor induction were formed. In relation to type of delivery after the intervention, there were 31 cesarean sections; 12 in the Experimental group and 19 in the Control group. There were 125 vaginal deliveries; 67 in the Experimental group and 58 in the Control group. As parturients underwent interventions at different moments of labor, the time to birth was compared by type of intervention, adjusted for cervical dilatation, contractions - frequency - and initial pain, using a linear regression model. This analysis is presented in table 3.

Table 3. Result of the linear regression model for time from the intervention to birth

Characteristics	Coefficient	95%CI	p-value
Experimental group (ref.=Control group)	-85.51	-180.05 to 9.04	0.076
Cervical dilatation before (cm)	-94.27	-142.04 to -46.5	0.000
Frequency of contractions – before	10.46	-38.44 to 59.36	0.673
Pain score – before	-5.30	-26.19 to 15.58	0.617
Constant	947.40	662.97 to 1.231.83	<0.001

Kolmogorov-Smirnov test for normality in the distribution (p=0.076)

Table 3 reveals that the Experimental group showed a reduction in time from the intervention to delivery by 1hour 25 minutes, adjusted for cervical dilatation and frequency of contractions.

Discussion

In view of the results presented, the study shows homogeneous sociodemographic and obstetric characteristics of the parturients participating in the study.

When analyzing the neuroendocrine behavior, similar average characteristics were observed between the two evaluation moments. However, the decision tree reveals the action of beta-endorphin directly on the frequency of contractions; in the Experimental group there was an increase in its level and a reduction in the frequency of contractions greater than one (1.0) contraction in parturients with ruptured ovular membranes and induction of labor. However, there was a decrease in beta-endorphin and an increase greater than one (1.0) contraction in women with intact ovular membranes, without labor induction and cervical dilatation of less than 5 cm, i.e., at the beginning of labor (Table 1).

Although the scientific literature describes that experiences after artificial rupture of the ovular membranes are limited, research reveals reports of women experiencing more intense pain after this intervention. This increase in the nociceptive signal can be the result of the absence of amniotic fluid, which acts as a buffer between the fetus and the maternal pelvis.[15]

A review study of endogenous oxytocin points to investigations where, in women undergoing labor induced by synthetic oxytocin, beta-endorphin levels remained constant or lower. The increase in pain sensation that occurs with induction is not only a result of myometric ischemia, but may also be due to inhibitory effects caused by induction on the release of endorphins in the brain. This study also highlights that labor induction can result in tocophobia, anxiety and fear of childbirth, which may be associated with lower levels of beta-endorphin.[16]

The results presented here contrast with the findings of that study, since in the Experimental group, the Five Flower floral essence acted positively on tocophobia, as an increase in beta-endorphin was observed in parturients undergoing labor induction, with ruptured ovular membranes and one (1.0) less contraction, revealing the beneficial action of the floral on negative emotions of fear and anxiety that could inhibit the action of this hormone.

The findings of the Experimental group corroborate a clinical study that aimed to evaluate the effects of floral therapy against the factors that strengthen pain in the parturition process and concluded that the Five Flower floral essence proved to be effective in the face of these factors in labor.[17]

For scholars, the Five Flower formula immediately reintegrates the psychoenergetic system, and is useful to reestablish emotional balance and provide a sense of wellbeing.[18]

A qualitative study with the objective of describing the experience of women using flower essences as a nonpharmacological therapy for the relief of pain and anxiety during labor was conducted in a Natural Birth Center. According to reports of nurses who provided care, the use of flower essence provided calm, relaxation, concentration and courage to women, and facilitated the birth process.[19]

The behavior of cortisol variation in relation to factors that strengthen labor showed that in the Experimental group there was no differentiation by any of the characteristics, that is, there was a small increase (1,401.1) for the entire group. However, in the Control group, the formation of distinct groups of average variation of this hormone by cervical dilatation and labor induction was observed (3,328), and this group had a three times greater increase in cortisol compared to the Experimental group (Table 2).

A prospective study with repetitive measures of 186 parturients conducted in Taiwan at a University-affiliated Birthing Center, shows the association between pain, anxiety and stress. In the absence of factors that strengthened labor, with a low level of pain, parturients responded with less anxiety and stress. On the other hand, when these factors were present, pain, anxiety and stress increased exponentially.[20]

However, the results of the present research contradict the findings of that study, since the Five Flower floral essence maintained a moderate cortisol average for the entire Experimental group,

regardless of factors that strengthen pain in labor, showing that the progression of labor did not interfere with the increase in cortisol levels.

The findings of the Experimental group corroborate a study which reveals that healthy physiological levels of stress (eustress) and stress hormones during labor, including cortisol, may be important to promote contractions and progression of labor.[21]

Cortisol levels increase, on average, ten times during labor compared to baseline, and higher levels are related to greater self-reported pain sensation.[21]

In this context, as a result of the incorporation of specific energy patterns of flowers, flower essences act through the various energy fields, which influence mental, emotional and physical wellbeing. Each flower essence encourages a virtue or positive quality inherent in our souls. Flower essences do not do the inner work for the individual, they catalyze one's consciousness and capacity for self-reflection, providing physical and emotional balance.[22]

Stress, anxiety, or situations in which a woman does not feel deprived and secure can cause elevations of epinephrine and noradrenaline, which can delay or stop labor and reduce uterine and fetal blood supply. Therefore, nonpharmacological methods that reduce anxiety and stress during this period can shorten the time of labor and improve the newborn's life.[23]

In this sense, this phenomenon was observed in parturients of the Control group, as well as the occurrence of 19 (24.7%) cesarean sections and among indications, five (26.4%) were due to functional dystocia, an indication that was not observed in the Experimental group, revealing, once again, the presence and effect of anxiety in the Control group.

Flower essences bring body, mental and spiritual awareness to the individual, make the person aware of the moment experienced, creating mechanisms to face such a situation, and promote balance that leads individuals to their healing.[22,23]

This balance was observed in parturients of the Experimental group, who showed greater awareness of their real situation, in this case, anxiety. It can be said that when coming into contact with this feeling, parturients created mechanisms to minimize it, reflecting an increase in beta-endorphin in those with the presence of factors that strengthened labor (Table 1) and constant cortisol values in view of the progression of labor (Table 2).

Regarding the time of intervention at birth adjusted for cervical dilatation and frequency of contractions, the Experimental group had a reduction of about 1 hour and 30 minutes from the beginning of the intervention to birth compared to the Control group (Table 3).

Suffering, unlike pain, occurs when a woman is unable to activate her own coping mechanisms related to pain or when her own mechanisms are insufficient to deal with the situation, and this suffering can generate great stress. A study reveals that parturients who experience stress, anxiety and fear may experience an increase in adrenaline and noradrenaline as a result of this negative state, leading to a decrease in the progression of labor.[21,24]

There is a known association between births and high levels of cortisol in the umbilical cord blood of newborns. Growing evidence shows that stress experienced by the fetus or newborn can have long-term effects on the hypothalamic-pituitary-adrenal axis function in adulthood, and cord blood cortisol and prolactin levels positively correlate with duration of delivery, that is, the longer the duration of labor, the higher the level of cortisol in the newborn's umbilical cord blood.[25]

Given the above, shortening the time of labor brings beneficial advantages for the binomial. Our results show that the Five Flower floral essence brought parturients of the Experimental group a level of consciousness that facilitated the physiological process of childbirth, activating their mechanisms of coping in relation to pain, resulting in emotional balance and shortening the time of labor.

As limitations of the study, the reduced number of clinical studies with the use of flower essences focused on the obstetric area is highlighted, which restricts the analysis, comparison and interpretation of results. Only the cortisol dosage was used for the assessment of stress. In future clinical trials, we suggest the use of one more marker with appropriate scales for this purpose. Although limitations are recognized, the present clinical trial improves the knowledge on the use of an effective integrative

practice in the parturition process, as it presents important results for the minimization of stress and pain in labor and delivery, in view of its strengtheners, corroborating new research in this field. The development of new studies is suggested, in order to motivate the definition and provide its dissemination, in addition to expand the implementation of its propositions in obstetric care practice.

Conclusion

The analysis of results showed the positive action of the Five Flower floral essence in the face of factors that strengthen pain in labor. When evaluating neuroendocrine aspects, the Five Flower floral essence provided feelings of wellbeing and less pain, represented by the increase in beta-endorphin and decrease in the frequency of contractions in a group where most parturients had factors that strengthened labor. Cortisol, in turn, maintained constant mean serum levels as it increased for the entire group, regardless of such strengthening factors. In conclusion, the Five Flower floral essence, which has the main function to rescue physical and emotional balance, was effective in reducing anxiety and stress and in pain control, and can be used as a nonpharmacological method during labor.

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Collaborations

Lara SRG, Gabrielloni MC, Cesar MBN and Barbieri M declare that they contributed to the study design, analysis and interpretation of data, article writing, relevant intellectual content and approval of the final version to be published.

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