A nursing intervention – relaxation, and its effects on the immune system of postpartum women*

A intervenção de enfermagem – relaxamento e seus efeitos no sistema imunológico de puérperas

La intervención de enfermería – relajación y sus efectos en el sistema inmunológico de puérperas

Cândida Caniçali Primo[1], Maria Helena Costa Amorim[2], Franciele Marabotti Costa Leite[3]

ABSTRACT

Objectives: To evaluate the effects of relaxation techniques in the levels of immunoglobulin A (IgA) in saliva of postpartum women, in relationship to the variables: age, education level, marital status, type of delivery and parity. **Methods:** This experimental, randomized trial was conducted in a maternity ward of Espirito Santo (Brazil). The sample consisted of 60 postpartum women. The experimental group consisted of 30 postpartum women who received the relaxation technique proposed by Benson. The levels were collected using a specific form and level of salivary IgA by immunoturbidimetry in two stages: up to 24 hours postpartum, and 7 days later. **Results:** We observed a significant increase of IgA levels in the experimental group ($p = 0.01$) after the practice of relaxation, and a lack of relationship between the control variables and IgA. **Conclusion:** Relaxation can help increase immunological resistance in postpartum women.
keywords: Relaxation therapy, Immunoglobulin A, secretory; Psychoneuroimmunology; Postpartum period; Puerperal disorders

RESUMO

Objetivos: Avaliar os efeitos da técnica de relaxamento nos níveis de Imunoglobulina A (IgA) salivar em puérperas e a relação com as variáveis: idade, grau de instrução, estado civil, tipo de parto e paridade. **Métodos:** Estudo experimental randomizado realizado em uma maternidade do Espírito Santo (Brasil). A amostra constituiu-se de 60 puérperas. O grupo experimental composto por 30 puérpuras seguiu a técnica de relaxamento proposta por Benson. As variáveis foram coletadas por meio de formulário específico e o nível de IgA salivar por imunoturbidimetria em dois momentos: até 24 horas pós-parto e 7 dias depois. **Resultados:** Verificou-se aumento significativo dos níveis de IgA no grupo experimental ($p= 0,01$) após a prática do relaxamento e ausência de relação entre as variáveis de controle e a IgA. **Conclusão:** O relaxamento pode ajudar a aumentar a resistência imunológica de puérperas.
Descritores: Terapia de relaxamento; Imunoglobulina A secretora; Psiconeuroimunologia; Período pós-parto; Transtornos puerperais

RESUMEN

Objetivos: Evaluar los efectos de la técnica de relajación en los niveles de Inmunoglobulina A (IgA) salival en puérperas y la relación con las variables: edad, grado de instrucción, estado civil, tipo de parto y paridad. **Métodos:** Estudio experimental randomizado realizado en una maternidad de Espírito Santo (Brasil).La muestra se constituyó de 60 puérperas. El grupo experimental compuesto por 30 puérperas siguió la técnica de relajación propuesta por Benson. Las variables fueron recolectadas por medio de un formulario específico y el nivel de IgA salival por imunoturbidimetria en dos momentos: hasta 24 horas post-parto y 7 días después. **Resultados:** Se verificó aumento significativo de los niveles de IgA en el grupo experimental ($p= 0,01$) después de la práctica de relajación y ausencia de relación entre las variables de control y la IgA. **Conclusión:** La relajación puede ayudar a aumentar la resistencia inmunológica de puérperas.
Descriptores: Técnicas de relajación; Inmunoglobulina A secretora; Psichoneuroinmunología; Periodo de posparto; Transtornos puerperales

Corresponding Author: **Cândida Caniçali Primo**
R. João de Oliveira Soares, 241/701 - Jardim Camburi - Vitória - ES - Brazil
CEP. 29090-390 E-mail: candidaprimo@gmail.com

INTRODUCTION

Pregnancy is definitely a process that leads to extraordinary changes in the hormones and immune system of women.

Theories explain the reduction of cell-mediated immunity during pregnancy; however, there are diverging opinions regarding changes in the number, distribution, and reactivity of T lymphocytes[1]. Immunity by B cells is maintained in normal levels during pregnancy and there is no change in the serum levels of Immunoglobulins (Igs)[2]. Researchers[3] studying the concentration of Ig in the blood of the umbilical cord and the maternal blood at the time of delivery, found that the fetus IgG increased proportionally to the maternal gestational age and decreased at a greater time of membrane rupture. It has also been observed that maternal concentration of IgM and IgA increase significantly when compared to the IgG of the umbilical cord.

Cells of the immune system are in a complex network influenced by the nervous and the endocrine system. Their mediators (neurotransmitters and different hormones) act synergistically with other lymphocyte and macrophage products, regulating their actions [4].

Considering the integrating capacity of the central nervous system in a variety of biological processes, studying the role of the nervous system in relation to the immune function in a variety of biological processes was encouraged. Psychoneuroimmunology studies the bidirectional influence of the psychological state in the immune function which is contrasted by the nervous and endocrine systems[4].

Retrospective studies in human beings suggest that chronic maternal stress during pregnancy is associated with increased levels of corticotrophin releasing hormone, the adrenocorticotropic hormone, and cortisol[5]. These hormones can increase the likelihood for premature birth; can lead to delays in infants' development and behavioral disorders in children[6]. The abnormalities in the development and behavior of children can be due to their brain sensibility to these maternal hormones increased by stress, as well as to the damaging action of glucocorticoids and neurotransmitters affected by the emotional tensions of mothers in the brain of fetuses [7].

We increasingly recognize that the immune dependence of neonates to the maternal body, in the same manner of the affective and nutritional dependence, does not cease at the time of delivery. After birth, mothers continue to pass anti-infectious defense factors to their children by breastfeeding[8]. IgA is considered as the main defense factor of the human milk and immunoglobulin is present in this secretion, with about 90% of the total content of antibodies. IgA plays an important protective role especially on the mucous to prevent the penetration of microbial and viral agents and other types of substances such as allergens[9].

Psychoneuroimmunology is a broad area for the work of nursing, since an individualized and human practice can be provided, with a holistic view of patients, working in the physical and psychological aspects. Behavioral interventions, such as relaxation, are simple and effective techniques that can be used by nurses and that are useful in the treatment and control of stress and anxiety[10].

Relaxation therapies using images in video, music and positive statements can reduce the activation of the central nervous system. Studies showed that individuals, after watching humorous videos presented an increase in the levels of salivary IgA; the same thing did not occur after watching instructional videos[11].

Music has been used for relaxation in several areas[12-14]. Using this resource, the author of the present study[15] observed the decrease in anxiety and pain during labor. Studies with different therapies such as massage, Reiki, muscle relaxation and meditation showed an increase in the secretion of salivary IgA[16-21].

The studies that have already been developed in the field of psychoneuroimmunology and its application in care for patients, and the professional experience with women during pregnancy and childbirth led to the following questions which encouraged us to carry out the present study: Can the use of the relaxation technique during the nursing intervention modulate the activity of salivary IgA in women who have recently given birth? Do variables such as: age, level of instruction, marital status, type of delivery and parity influence the activity of salivary IgA?

METHODS

Experimental, randomized study carried out in a municipal maternity in the State of Espírito Santo, (Brazil).

Women who had recently given birth were randomly selected both for the control and for the experimental group. The size of the sample was calculated for both groups, considering a 5% significance level, and an 80% power analysis, the minimum difference that we wanted to detect is 4mg/dl, and the standard deviation is 5.5. Thus, the size obtained was 30 individuals in each group.

The inclusion criteria for the sample were: women who had recently given birth in that institution, with gestational age over 37 weeks, that were in the bedroom together with newborns and who have given their written consent, after being explained about the study. We have excluded women who presented infectious diseases during pregnancy and the study period, with a personal or family history of a psychiatric disorder and those that used illegal drugs.

The study was carried out from April 2004 to March 2005, and was started after being approved by the Research Ethics Committee from the Center for Health Science at Universidade Federal do Espírito Santo.

Levels of salivary IgA were defined as a dependent variable. The researcher collected two samples of saliva from each mother of the experimental and of the control group, one up to 24 hours after birth, and another 7 days later. Saliva samples were collected from 3 to 5 PM, always before dinner and before a relaxation was carried out with the experimental group during hospital stay, and at patients' homes. The level of total IgA was

determined by the immunoturbidimetric method, carried out in the Immunology Laboratory at the University Hospital.

The relaxation technique was defined as an independent variable. The experimental group was guided in the relaxation technique proposed by Benson[22] that uses four essential elements: a quiet environment, a mental device, a passive attitude and a comfortable position. It can be described in seven steps: Step 1: a patient chooses a word or a small sentence that is important to her, as a reference point, based on her belief. Step 2: silently, she seats down comfortably. Step 3: she closes her eyes. Step 4: she relaxes her muscles. Step 5: she breaths slowly and, naturally, and continues to repeat the word or sentence mentally while breathing out. Step 6: from the beginning to the end, she takes a passive attitude, not concerned about how she is doing. When other thoughts come to mind, she just says to herself "Oh, ok!", and comes back to the previous thought. Step 7: she continues this way for 20 minutes. An alarm should not be used. When she is done, she should continue with her eyes closed and then she should open her eyes.

The researcher explained the relaxation technique to each women who gave birth individually during hospitalization for two days in a row, so that they could learn it and do it twice a day, the first time when they woke up, and the second before going to bed.

According to the routine of the Ministry of Health, the women who give birth and are clinically well can be discharged 48 hours after normal delivery and 72 hours after a C-section[23]. Thus, we decided to teach patients for two days in a row because of their short stay in the maternity and the difficulty to go back to the institution during the postpartum period because of the need to take care of the newborn and their recovery.

The control variables used were: age, level of education, marital status, type of delivery, and parity. To raise these data, an interview was carried out in the first 24 hours after delivery and registered on a form.

To avoid the Hawthorne effect, that is, so that there was no contamination between individuals from the control group and those from the experimental group, some actions were taken, such as including a new individual in the study only after the previous women had been discharged.
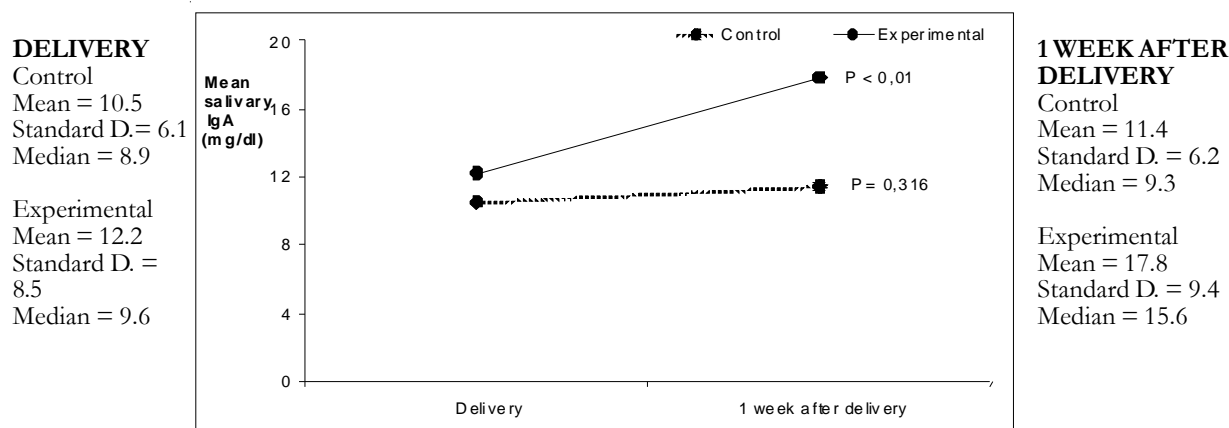
Data analysis was carried out using the statistical package Social Package Statistical Science Version 11 (2002) and a 5% significance level was fixed, corresponding to a= 0.05 (95% confidence limit). After the normality test was carried out (Kolmogorov-Smirnov) it was seen that the dependent variable salivary IgA did not meet the criteria and was considered a non-parametric variable, because of that, we have used the non-parametric tests Wilcoxon, Kruskal-Wallis and Mann-Whitney to analyze the variables.

RESULTS

When we assessed the levels of salivary IgA in women who had just given birth, we saw that in the first time of the dosage, up to 24 hours after delivery, the median of the level of salivary IgA of the control group was 8.9 mg/dl and that of the experimental group was 9.6 mg/dl, with no significant differences between them ($p>0.05$), which demonstrates homogeneity among the groups.

However, at the second time, one week after birth, the median of the level of salivary IgA in the control group was 9.3 mg/dl and that of the experimental group was 15.6 mg/dl. We saw a significant increase ($p= 0.009$) in the levels of salivary IgA of women who had just given birth in the experimental group from the first to the second time of collection; thus, through the analysis of Picture 1, we can state that the nursing intervention using the relaxation technique changes the levels of salivary IgA.

Data from Table 1 show the relationship between levels of salivary IgA and some variables at the first time of collection. There was no significant difference between the control and the experimental groups ($p>0.05$) for all variables tested, demonstrating the homogeneity between the groups.

DELIVERY
Control
Mean = 10.5
Standard D.= 6.1
Median = 8.9

Experimental
Mean = 12.2
Standard D. = 8.5
Median = 9.6

1 WEEK AFTER DELIVERY
Control
Mean = 11.4
Standard D. = 6.2
Median = 9.3

Experimental
Mean = 17.8
Standard D. = 9.4
Median = 15.6

Picture 1 – Mean of the level of salivary IgA in the 1st and 2nd times saliva were collected in the control and experimental groups. Serra/ES, April/2004 – March/2005.

Table 1 – Mean level of salivary IgA, according to the group of puerperal women. Serra/ES, April/2004 – March/2005.

Variable	Mean level of salivary IgA		
	Control	Experimenta	P value
Type of delivery			
Normal	10.4	12.5	0.304
C-section	11.2	8.3	0.177
Time after birth			
Up to 10 horas	10.9	11.1	0.933
11 and more hours	10.1	13.1	0.308
Age group			
Until 18 years	10.8	14.5	0.391
19 to 25 years	10.6	9.6	0.605
26 to 25 years old	9.8	16.7	0.244

In the control and experimental group, the predominant age group was from 19 to 25 years old (60% and 56.7%, respectively). A correlation between age and levels of salivary IgA was not observed in the present study ($r = -0.02$ and $p = 0.988$).

As for the level of education, 63.3% of the experimental group and 36.6% of the control group had not finished Elementary School; 30% of the women had complete Elementary school or had incomplete High School. This predominance of women with Elementary school may be because it is a public hospital that sees people with a low income who have low level of schooling.

As for the marital status, most women in the two groups lived with their partners in a common-law marriage (73.3% in the control group and 66.7% in the experimental one).

Also, it was observed that the variables: age, level of schooling and marital status did not present significant difference ($p > 0.05$) between postpartum women in the control and experimental groups.

There was greater incidence of normal delivery among women, over 90% in the two groups, probably because it is a maternity that sees low risk cases. As for parity, there was no significant difference among the groups. However, there was predominance of multiparous women (66.7% in the control group and 70% in the experimental group) with two children or over.

Still according to the data related to the type of delivery, to parity, and to the number of hours after birth, we saw that these variables did not present significant differences between the control and experimental groups ($p > 0.05$), which proves the homogeneity of the groups.

DISCUSSION

In the present study, the practice of relaxation was effective, with a significant increase in the levels of salivary IgA of the experimental group ($p < 0.05$) after learning and practicing the technique which could be observed by comparing the same patients before and after the intervention (1st and 2nd dosages of salivary IgA), or the control group with the experimental group tested at the same time (2nd dosage).

Several authors[12-14,16-21] demonstrated that nursing interventions such as relaxation change the levels of salivary IgA, however, these types of studies with postpartum women have not been found.

In the study with pregnant women[21] it was seen that relaxation increases the levels of salivary IgA. A study with elderly people on the effect of back massage showed a significant increase in salivary IgA[12].

According to another study[13], it was seen that the practice of musical activities increased the secretion of salivary IgA in students. A study on meditation with the use of music showed an increase in salivary IgA secretion and decrease in the saliva flow after patients meditated for 30 minutes14).

Using the same relaxation technique of the present study[22], the researcher obtained positive results as a response to relaxation regarding the decrease in patients' stress and recorded a reduction in anxiety and hostility, blood pressure, pain, nervousness and depression.

After the use of Reiki[16], there was an increase in the signs of relaxation, and improvement in the immunologic function with increase in the levels of IgA. Another study using a touch technique saw an increase in secretory IgA concentrations and decrease in the perceptions of stress and pain relief[17].

A study found out that students, after performing relaxation exercises presented lower levels of salivary cortisol and a significant increase in the concentrations and secretion of salivary IgA[18]. In a study on patients with persistent facial pain, that used the progressive muscle relaxation technique, there was an increase in the secretion rate of salivary IgA[19]. Another study which also used the progressive muscle relaxation technique demonstrated a significant increase in salivary IgA in students[20].

Although we have not found studies in the literature that directly correlated the levels of salivary IgA of mothers with the concentrations present at the colostrum, is it possible that a higher concentration of IgA in the saliva of women who had just given birth and used relaxation could lead to an increase in the IgA concentration in maternal colostrum in this group? Could the newborns from these women be receiving a higher concentration of IgA through breastfeeding?

Breastfeeding is important in the transitory protection of newborns – infants, because the transference of IgA from mothers to babies through the breast milk is numerically important since IgA does not cross the placenta and is present in small amounts in the blood of normal newborns[9].

Studies demonstrate that children who are breastfed have lower risk for allergies, gastrointestinal, urinary and respiratory infections, including meningitis, pneumonias and bacteremias, otitis and lower frequency of some chronic diseases[8-9].

Additionally, the saliva of newborns presents little

IgA and the concentration of this immunoglobulin increases significantly in the first weeks of life, especially when they receive breast milk. Breastfeeding is an important factor in the development of the immune system of newborns[24].

In the present study, the median of the level of salivary IgA in the control group was 8.9 mg/dl and that of the experimental group was 9.6 mg/dl, similar values of salivary IgA have been found on a study with a group of 109 women in the first days after labor[25].

The outcomes found for the variables: age, marital status, level of education and type of labor were similar to the study that describes the epidemiological profile of 1,335 puerperal women seen in the same maternity from January to December 2002[26]. However, in the present study no correlation between age and the concentration of salivary IgA has been observed as described in a population survey carried out in Scotland with 1,971 participants[27].

Despite the impossibility of guiding the relaxation technique for more than two days because of the time they stayed in the maternity, it did not interfere in the outcomes of the present study.

CONCLUSION

The results obtained were extremely significant, confirming that nursing intervention - relaxation modulates the activity of salivary IgA in women who have just given birth. There was no relationship between control variables, age, parity, type of delivery and level of salivary IgA of these women; there was no significant difference between the control and the experimental group with ($p > 0.05$) for the control variables tested.

Postpartum is a period of physical and emotional changes experienced differently among women. Nurses should dedicate themselves to listen to the demands of these women, providing them the necessary support and confidence, so that women get stronger and can carry out their lives with more autonomy.

Thus, we see that nursing interventions, such as relaxation, should be included in the routine of nursing care to get customers close to the centers, to improve the quality of nursing care, and to foster the recognition of the profession. Further studies should be carried out to assess the effects of relaxation in the immune system of mothers and newborns in the long term, checking the levels of salivary IgA more often.

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