

## PUERPERAL INFECTION FROM THE PERSPECTIVE OF HUMANIZED DELIVERY CARE AT A PUBLIC MATERNITY HOSPITAL

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*This is an epidemiological, prospective and non-concurrent study of the cohort type about puerperal infection from the perspective of humanized delivery care, based on information from 5,178 records of patients who went through the experience of humanized delivery. The study aimed at describing the women who underwent humanized delivery, determining the incidence and time for manifestation of puerperal infections and investigating the association between the infection and the risk factors. An accumulated puerperal infection rate of 2.92% was found. The risk factors associated to puerperal infection in Cesarean delivery were the duration of labor and the number of digital examinations. No variable behaved as a risk factor for infection in normal delivery. Cesarean delivery was an important risk factor for puerperal infection. The results reinforce the need to develop alternative forms of delivery care that provides effective conditions for normal delivery, in order to reduce the number of Cesarean sections.*

**DESCRIPTORS:** puerperal infection; parturition; humanizing delivery

## INFECCIÓN PUERPERAL DEL PUNTO DE VISTA DE LA ATENCIÓN HUMANIZADA AL PARTO EN MATERNIDAD PÚBLICA

*Se trata de un estudio epidemiológico, tipo cohorte, prospectivo y no concurrente, sobre infección puerperal del punto de vista de la atención humanizada a los partos. En este estudio, se objetivó caracterizar las púerperas sometidas al parto humanizado; determinar la incidencia de las infecciones en el puerperio, así como el intervalo de manifestación, y también verificar la asociación entre la infección y los factores de riesgo. Los datos fueron obtenidos de 5178 prontuarios de púerperas que pasaron por la experiencia del parto humanizado. Fue verificada una tasa de incidencia de infección en el puerperio acumulada del 2,92%. Los factores de riesgo asociados a la infección en el puerperio en la modalidad del parto cesareano fueron la duración del trabajo de parto ( $p=0,002$ ) y el número de toques ( $p=0,011$ ). Ninguna variable se comportó como factor de riesgo para infección en el parto normal. Sin embargo, el parto cesarea se comportó como importante factor de riesgo para la infección puerperal ( $p=0,000$ ). Considerando que el modelo actual de atención humanizada al parto ha buscado cambio de paradigma en las prácticas asistenciales, siendo bastante favorable al parto normal, se cree que ese modelo puede estar contribuyendo directamente para la reducción en los índices de infección puerperal. Los resultados refuerzan la necesidad de estimular la realización de partos normales y la disminución de los partos cesáreos.*

**DESCRIPTORES:** infección puerperal; parto; parto humanizado

## INFEÇÃO PUERPERAL SOB A ÓTICA DA ASSISTÊNCIA HUMANIZADA AO PARTO EM MATERNIDADE PÚBLICA

*Trata-se de estudo epidemiológico, tipo coorte, prospectivo e não concorrente, sobre infecção puerperal sob a ótica da assistência humanizada ao parto. Objetivou-se caracterizar as púerperas submetidas ao parto humanizado; determinar a incidência das infecções puerperais, bem como o intervalo de manifestação, além de verificar a associação entre a infecção e os fatores de risco. Os dados foram obtidos de 5.178 prontuários de púerperas que passaram pela experiência do parto humanizado. Verificou-se taxa de incidência de infecção puerperal acumulada de 2,92%. Os fatores de risco associados à infecção puerperal na modalidade de parto cesáreo foram a duração do trabalho de parto ( $p = 0,002$ ) e o número de toques ( $p = 0,011$ ). Nenhuma variável se comportou como fator de risco para infecção na modalidade parto normal; porém, o parto cesariano comportou-se como importante fator de risco para a infecção puerperal ( $p = 0,000$ ). Considerando que o modelo atual de assistência humanizada ao parto tem buscado mudança de paradigma nas práticas assistenciais, sendo bastante favorável ao parto normal, acredita-se que esse modelo possa estar contribuindo diretamente para a redução nos índices de infecção puerperal. Reforça-se aqui a necessidade de estimular a realização de partos normais e a diminuição de cesarianas.*

**DESCRITORES:** infecção puerperal; parto; parto humanizado

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## INTRODUCTION

It is known that the delivery type, the insufficient notification of postpartum infection cases due to the lack of surveillance after discharge, the early discharge of puerperal women and the patient's return outside the institution where the delivery occurred, as well as environmental, individual and material factors have been related with the incidence of puerperal infections<sup>(1)</sup>. They are a source of concern to the extent that, as nurses, we are committed to the prevention and control of hospital infections.

Nowadays, the humanization of delivery and its influence on puerperal infections has been valued. However, various obstetric institutions have not worked with this philosophy, systematically ignoring the routines and conducts the Ministry of Health recommends for humanization. At these units, the delivery occurs in a totally strange and enigmatic environment, in which the parturient woman is isolated from her family and care during the act involves a large number of interventions, which can influence the increase in infections.

Humanization does not simply aim to decrease the number of Cesarean births, but to deliver humanized care to delivery and birth and to recover women's central position in the birth process, respecting her dignity and autonomy, besides breaking with the unnecessary interventionism with respect to deliveries. In recent years, with a view to changing the delivery care model at a moment that is considered interventionist, the Ministry of Health has implemented measures and recommendations based on care humanization<sup>(2)</sup>.

Care humanization acknowledges the fundamental rights of mothers and babies. This includes the right to choose the place of delivery, the people and professionals involved, the forms of care during the delivery, respect for delivery as a highly personal, sexual and family experience, besides the minimal realization of interventions in the natural delivery process<sup>(3)</sup>.

The hospital, in turn, is the place where we find the most sophisticated technological devices that have been considered necessary to accomplish a delivery. In this context, the woman is the object of the process, as she has to submit herself to the procedures defined by the care team. In the hospital environment, delivery has been characterized as a

surgical event. Almost always, instead of being private, intimate and female, it is experienced publicly, with the presence of other social actors<sup>(2)</sup>.

In turn, professionals and health system users have acknowledged hospital infection control as an essential parameter of care quality. Quality needs to be aimed for in hospital care, offering a service of less risk and greater efficacy to the population<sup>(4)</sup>.

Hospital infection is considered as the infection acquired after the patient's admission, which manifests itself during the hospitalization or after discharge and can be related with the hospitalization or hospital procedures<sup>(5)</sup>.

The landmark in knowledge about hospital infections is due to Semmelweis, a gynecologist-obstetrician who suspected that puerperal infections could be transferred to the women through the hands of physicians and students<sup>(6)</sup>.

Nowadays, despite scientific and technological advances in different knowledge areas, puerperal infection remains a big problem, due to its prevalence, morbidity and even lethality.

Internationally, puerperal infection ranges between 3% and 20%, with a mean rate of 9%. In Brazil, these rates vary between approximately 1% and 7.2%<sup>(7)</sup>. However, it should be highlighted that these infection rates may be underestimated, considering the high number of Cesarean deliveries, which is an important risk factor, failures in the surveillance system, as well as the inexpressive awareness and involvement of people for a better presentation of reality.

The *Centers for Disease Control* (CDC) defines puerperal infection as any isolation of a microorganism in the endometrium, temperature increase to 38°C in the period after a recent delivery, presence of consistent and sudden tachycardia, purulent uterine discharge and abdominal pain accompanied by uterine tenderness.

Nowadays, in Brazil, delivery interventions mainly occur in hospital units, with less choice of normal delivery and abusive use of the Cesarean delivery procedure. Brazil is considered one of the countries in the world with the highest Cesarean delivery rate, which has contributed to the increased risk of maternal mortality, especially due to infection<sup>(2)</sup>.

Hospital delivery care should be safe, guaranteeing, besides the benefits of technological and scientific advances, every woman's autonomy

during the delivery, permitting her to be the subject of the process and to define what she believes is best for her and her son.

Nowadays, deliveries have been accomplished in hospital environments with all technological and scientific resources and, despite all infection prevention and control measures, postpartum infections seem to persist in the scenario of these institutions. The concern caused by this problem gave rise to the interest in studying puerperal infections from the perspective of humanized delivery care, with a view to characterizing puerperal women submitted to humanized delivery, determining the incidence and interval in which the puerperal infections are manifested, besides verifying the association between infections and risk factors.

## METHODOLOGY

This is an epidemiological, prospective and non-concurrent cohort study, also called historical cohort<sup>(8)</sup>, which was carried out at a public maternity hospital of the Municipal Health Secretary in Goiânia (GO), Brazil. This institution aims to deliver care to women and adolescents during the prenatal, delivery and puerperal phase, in which care humanization is being implanted as a work philosophy.

For the study, we selected puerperal women submitted to humanized delivery who attended to the criteria of having been through the humanized delivery experience at the MNC (*Nascer Cidadão* Maternity Hospital) in the period from December 2000 to July 2003, which fitted into the criteria established to call NNIS (National Nosocomial Infections Surveillance System) patients, proposed by the CDC<sup>(9)</sup>. Records of postpartum infection were verified in their patient files upon admission and until the first thirty days after giving birth.

The study population consisted of the patient files of all puerperal women who went through the humanized delivery experience at the MNC. From the expected study population (5,203), twenty-five puerperal women were excluded as their deliveries had occurred at home and they were sent to the maternity hospital after the delivery. Thus, the study sample included the information contained in 5,178 files.

We analyzed puerperal infection in humanized deliveries and their possible risk factors. The

categorization of puerperal infection was based on the absence (no) or presence (yes) of the infection, which could be characterized as endometritis, surgical site infection and episiotomy infection.

The following independent variables were considered: *delivery mode* (normal and Cesarean delivery); *rupture of ovular membranes* (intact or broken); *time of membrane rupture* (period in minutes from the rupture of the membranes until delivery). An expected membrane rupture time of up to six hours was considered); *amniotic fluid characteristic* (discolored, meconial and purulent); *duration of labor* (period in hours and minutes from the parturient woman's admission in the labor phase until the end of this phase. An expected labor duration of up to 12 hours is considered); *digital examinations* (up to 6, between 7 and 13 and more than 13 examinations); *duration of delivery* (period in minutes). For normal delivery, the period from the start of the expulsion of the fetus until the expulsion of the placenta was considered and, for Cesarean delivery, from the start of anesthesia until the complete closure of the surgical incision. The maximum time expected to perform the procedure is one hour); *type of anesthesia* (general, spinal, epidural and local); *use of antimicrobial agent; age and weight gain*.

For the ordinal variables, interval codes were established to designate the groupings to be processed by statistical analysis. An instrument was elaborated, based on the classification and diagnosis criteria of puerperal infections<sup>(7)</sup>, so as to cover the specific variables of the humanized delivery and birth care mode and the inclusion of data about infections, required to fill out the protocol established by the NNIS System<sup>(9)</sup>.

Information was collected from the patient files of the users submitted to humanized delivery care at the MNC, after the approval of the research project (Protocol No 090/03) by the Institutional Review Board at Minas Gerais Federal University (UFMG/COEP), in compliance with Resolution No 196/96 on research involving human beings.

EPI-INFO software, version 2002, was used for data entry and treatment. A specific database was created, in which data were statistically treated. Simple frequency distribution and central tendency measures like mean, median and standard deviation were used for the descriptive analysis of numerical variables.

To assess the association between the independent and dependent variables, non parametrical significance tests were used, such as Chi-square, Fisher's Exact test, as well as statistical significance measures like Relative Risk (RR), with a 95.0% confidence interval, which assesses the association between infection and suspected risk factor.

## RESULTS AND DISCUSSION

The 5,178 puerperal women submitted to humanized delivery at the MNC were mostly (59%) women over 20 (mean and median of 22 years). A large number of primiparous adolescent deliveries was identified. The adolescents (between 10 and 20 years old) corresponded to 41% of the population. Motherhood during adolescence can be considered a public health issue, in view of psychosocial problems it may result in<sup>(10)</sup>.

As to the association between the parturient women's age range and the puerperal infection, the data did not reveal a statistically significant difference for puerperal infection in parturient women up to the age of 20 or older than 20.

What the women's weight is concerned, we found that 2,121 (41%) gained up to 10kg during their pregnancy; 2,712 (52%) between 11 and 20kg and 345 (7%) more than 21kg. The mean weight gain was 12.2kg. Although literature indicates an increase in the incidence of infection in patients with problematic clinical conditions and obese patients, in this study, we found no statistically significant difference between the weight gain variable and the puerperal infection<sup>(6)</sup>. This can be justified by the good clinical conditions a woman giving birth normally presents.

As to the rupture of the membranes, we found no statistically significant association between the two treatment modes, normal and Cesarean, and the puerperal infection. Although some studies on endometritis in vaginal births have demonstrated that the combination between the rupture of the membranes and a long labor constitutes an important risk factor for the frequency and severity of infections<sup>(11)</sup>.

No statistically significant association was found between membrane rupture time and puerperal infection, neither for normal nor for Cesarean deliveries. However, different authors have examined

this association and have found quite controversial results<sup>(12)</sup>. In a study about infection in parturient women submitted to Cesarean deliveries, the above mentioned authors evidenced that these women presented colonization of the amniotic fluid six hours after the rupture of the membranes and also identified a 27% prevalence of positive amniotic fluid cultures in patients with ruptured membranes.

As to the characteristics of the amniotic fluid, no statistically significant difference was observed between this variable and the presence of puerperal infection in normal and Cesarean deliveries. Studies accomplished to correlate the presence of meconium in the amniotic fluid and increased maternal infection rates identified that meconium raises the phosphate level, inactivating the zinc-protein complex, which favors the parturient woman's increased susceptibility to puerperal infection<sup>(13)</sup>.

In this study, we found that the duration of labor and Cesarean delivery are risk factors for the development of puerperal infection, with a relative risk of 2.16 - [1.36-3.44]. However, when the labor duration variable is associated with normal delivery, it did not appear as a risk factor for puerperal infection.

The number of digital examinations during normal deliveries did not constitute a risk factor for puerperal infection. However, a significant association was observed between the number of examinations and infection in case of Cesarean delivery, which can also be related with the duration of labor. Subsequent statistical analyses are needed to prove this association. A p-value = 0.011 was found, showing that infection risk tends to increase with the number of digital examinations.

A Cesarean delivery rate of 23% was identified, which is still high in view of the characteristics of the maternity hospital under study and the rate recommended by the WHO, i.e. between 10 and 15%<sup>(14)</sup>. This fact can be justified by the short term (three years) the hospital has been functioning and by the professionals' adaptation process to the procedures, standards and established routines.

An association was found of the risk factor type ( $p = 0.000$  and Relative Risk of 4.40-[3.19-6.06]), resulting in a statistically significant association between the delivery mode variable and puerperal infection. Hence, the parturient women submitted to Cesarean delivery presented a 4.4 times higher risk of catching an infection than women submitted to

normal delivery. This fact has been proved by some authors who, in analyzing the delivery type and puerperal infection, found that rising incidence levels of Cesarean deliveries have contributed to the increase in puerperal infection rates. Cesarean delivery is related with a higher incidence of post-operative infectious morbidity in comparison with normal delivery<sup>(15)</sup> (Table 1).

Table 1 - Distribution of puerperal infection cases according to delivery mode. Goiânia - Dec. 2000- Jul. 2003

Delivery mode	Puerperal infection		Total	R.R	95% C.I.
	Yes	No			
Normal	63 (42.8%)	3,911 (75.8%)	3,974	1.00	-
Cesarean	84 (57.2%)	1,120 (22.3%)	1,204	4.40	[3.19-6.06]
<b>Total</b>	<b>147 (100%)</b>	<b>5,031 (100%)</b>	<b>5,178</b>		

Observation: p = 0.000

Figures between parentheses refer to percentages related to the total of the column

RR. = Relative Risk. 95% C.I. = 95% confidence interval

What delivery duration is concerned, no statistically significant association was found with puerperal infection. A cut-off point of one hour was used for the duration of the delivery, and no association was evidenced between a procedure duration of more than one hour and the occurrence of puerperal infection in women submitted to normal and Cesarean deliveries.

The type of anesthesia used during the deliveries, in turn, showed no association with the presence of puerperal infection.

An accumulated incidence level of puerperal infection was found within the previewed limits (2.92%), in comparison with normally described rates (Figure 1), which range from 1% to 7.2% in Brazil<sup>(7)</sup>.

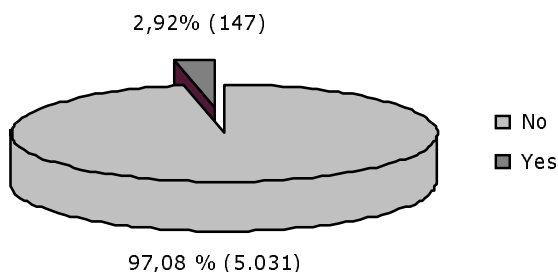


Figure 1 - Puerperal infection in humanized delivery care. Goiânia - dec. 2000 - jul. 2003

We calculated the monthly incidence levels of puerperal infection in the parturient women submitted to humanized delivery during the study

period, with the highest peak in infection incidence levels in January 2001, with 1.4%. This higher incidence level could be explained by the adaptation process to the standards, routines and procedures the maternity hospital was going through during that period, coinciding with the year of inauguration.

In the group of 147 puerperal infection cases that were analyzed, 74 (50.3%) occurred in Cesarean deliveries and were considered as surgical site infection, with an incidence level of 1.47%; 57 (77%) were considered superficial; 14 (19%) deep and 3 (4%) organ/space infections. The infections categorized as endometritis corresponded to 31.3% (46 cases), with an incidence level of 0.91%, while episiotomy infections (27 cases) corresponded to 18.4%, with an incidence level of 0.54%. Twenty-five of these (93%) were considered superficial and 2 (7%) as deep.

It is remarkable that most infections in this study were surgical site infections (SSI), which may be related to the surgical incisions involved in Cesarean deliveries.

In only one case of deep SSI, a culture of the wound secretion was performed, revealing the presence of *Staphylococcus epidermidis*. This may indicate contamination caused by contact, through the parturient women's skin, as a consequence of precarious washing and asepsis of the skin. No culture results were found in 146 files, in which the institution did not perform the tests due to the lack of material resources for this end.

This study proved expectations to the extent that the use of antibiotic prophylaxis in the period before the delivery did not show an association with the occurrence of puerperal infection in any of the delivery modes. However, the postpartum use of antibiotics therapy in women submitted to Cesarean and normal delivery showed a statistically significant association, with p = 0.000. These results imply that the use of antibiotics in the postpartum period is associated with the presence of puerperal infection or that patients needing antibiotics therapy present greater predisposition to puerperal infection. The scheme and indications for prophylaxis must be determined after a detailed assessment.

The interval in which the puerperal infection manifested itself in humanized care to normal and Cesarean deliveries in all 147 infection cases was within 30 days after the discharge, more specifically between the fifth and twenty-sixth day after hospital

discharge (100%). The puerperal women's early discharge impedes a diagnosis while still at the maternity hospital. Thus, post-discharge surveillance is considered very important. Especially in procedures with a short post-operative hospitalization period, the presence of an appropriate surveillance system becomes increasingly important<sup>(7)</sup>.

## CONCLUSIONS

This study allows us to conclude that:

- The incidence level of puerperal infection was 2.92% (147/5031). This rate is considered low, in view of levels normally accepted by the Atlanta CDC and those described in Brazilian literature (between 1% and 7.2%), which does not discard suspicions of insufficient notification of puerperal infection rates, as literature data indicate these can also be underestimated.
- All infections found were diagnosed and notified in the period after hospital discharge and categorized as endometritis, surgical site infection and episiotomy infection. The puerperal infections appeared within thirty days after the delivery.
- The variables of age, weight, membrane rupture, time of membrane rupture, amniotic fluid characteristic, anesthesia type and use of prophylactic antimicrobial agent did not behave as risk factors for puerperal infection.

- The variables that behaved as risk factors for puerperal infection in case of Cesarean delivery were labor duration and number of digital examinations. None of the variables behaved as a risk factor for infection the normal delivery mode.

- Cesarean delivery also behaved as a risk factor for puerperal infection. Hence, the parturient women submitted to Cesarean delivery displayed a higher risk of infection in comparison with women submitted to normal delivery.

As the current humanized delivery care model has attempted to change the paradigm of care practices, is very much in favor of normal delivery and aims to decrease Cesarean delivery rates, it is believed that this model may be contributing directly to the decrease in puerperal infection rates. We recommend that, based on the puerperal infection results identified in this study, educational mechanisms be created to raise the medical team's awareness, so as to break with the paradigm of medicalization and intervention in deliveries, and investments be made in the training process of obstetric nurses.

We reinforce the need to implant an effective hospital infection control service, through a prospective surveillance method, as early as upon admission, including post-discharge follow-up. This can allow for the implementation of systemized actions directed at this population, as well as to establish infection prevention and control measures, besides getting to know the microbiological profile of the detected infections.

## REFERENCES

1. Starling CEF, Couto BR, Pinheiro SMC. Vigilância epidemiológica das infecções hospitalares na prática diária: ensaios. Belo Horizonte (MG): Cuatiara; 1993.
2. Ministério da Saúde (BR). Parto, aborto e puerpério: assistência humanizada a mulher. Brasília (DF): Ministério da Saúde; 2001.
3. Dossiê Humanização do Parto. Rede Nacional Feminista de Saúde Direitos Sexuais e Direitos Reprodutivos. São Paulo (SP); 2002.
4. Richtmann R. Ginecologia e Obstetrícia. In: Rodrigues EAC, Mendonça JS, Amarante MB, Filho MBA, Grinbaum RS, Richtmann R. Infecções Hospitalares Prevenção e Controle. São Paulo (SP): Sarvier; 1997. p. 269-73.
5. Ministério da Saúde (BR). Portaria 2.616. Normas para a prevenção e controle das infecções hospitalares. Brasília (DF): Ministério da Saúde; 1998.
6. Silveira JCB. Uso profilático de antimicrobianos. In: Martins MA, coordenador. Manual de Infecção Hospitalar: epidemiologia, prevenção e controle. Rio de Janeiro (RJ): Medsi; 2001. p.1000-6.
7. Gabriellone MC, Barbieri M. Infecção em obstetrícia. In: Fernandes AT. Infecção hospitalar e suas interfaces na área saúde. São Paulo (SP): Atheneu; 2000. p. 91-128.
8. Szkló M; Nieto FJ. Epidemiology: beyond the basics. Aspen: Gaithersburg 2000.
9. Ministério da Saúde (BR). NNIS. Vigilância epidemiológica por componentes. Brasília (DF): Coordenação de Controle de Infecção Hospitalar; 1994.
10. Oliveira ZMLP. Vivenciando o parto humanizado: um estudo compreensivo fenomenológico sob a ótica de adolescentes. [Dissertação]. Belo Horizonte (MG): Escola de Enfermagem/UFMG; 2001.
11. Gibbs RS, Rodgers PJ, Castaneda YS. Endometritis following vaginal delivery. *Obstet Gynecol* 1990; 56(pt 1): 555-9.
12. Romero R, Ghidini A, Mazor M, Behnke E. Microbial invasion of the amniotic cavity in premature rupture of membranes. *Clin Obstet Gynecol* 1991; 34(4):769-78.
13. Ledger W J. Puerperal endometritis. In: Bennett JV, Brashmsn PS. Hospital infection. 3ª ed. Boston: Little Brown; 1992. p. 659-71.
14. Ministério da Saúde (BR). Tecnologia Apropriada para o parto. Brasília (DF): Ministério da Saúde; 1985.

15. Spiandorello WP, Madi JM, Spiandorello FSA, Tregansin M. Antibioticoprofilaxia pela cefazolina e cefalotina para partos cesáreos eletivos e de baixo risco para desenvolvimento de infecção pós-operatória: Antibiotic propylaxis for cefazolin and cefalotin in elective risk to infection cesarean section. Rev Ci Amecs 2000 January; 9(1):12-6.