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Early hospital discharge and early puerperal complications

Dolores Ramírez-Villalobos, MSc,⁽¹⁾ Adolfo Hernández-Garduño, DSc,⁽²⁾ Aarón Salinas, MSc,⁽³⁾
Dolores González, MSc,⁽¹⁾ Dilys Walker, MD,⁽¹⁾ Guadalupe Rojo-Herrera, MD,⁽²⁾ Bernardo Hernández-Prado, DSc.⁽¹⁾

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Abstract

Objective. To evaluate the association between time of postpartum discharge and symptoms indicative of complications during the first postpartum week. **Materials and Methods.** Women with vaginal delivery at a Mexico City public hospital, without complications before the hospital discharge, were interviewed seven days after delivery. Time of postpartum discharge was classified as early (≤ 24 hours) or late (> 25 hours). The dependent variable was defined as the occurrence and severity of puerperal complication symptoms. **Results.** Out of 303 women, 208 (68%) were discharged early. However, women with early discharge and satisfactory prenatal care had lower odds of presenting symptoms in early puerperium than women without early discharge and inadequate prenatal care (OR 0.36; 95% confidence intervals = 0.17-0.76). **Conclusions.** There was no association between early discharge and symptoms of complications during the first postpartum week; the odds of complications were lower for mothers with early discharge and satisfactory prenatal care.

Key words: patient discharge; postpartum period; postnatal care; Mexico

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Resumen

Objetivo. Evaluar la asociación entre el tiempo de egreso posparto y las posibles complicaciones en el puerperio mediato. **Material y métodos.** Mujeres con parto vaginal atendidas en un hospital público de la Ciudad de México, sin complicaciones antes del egreso hospitalario, fueron entrevistadas a los siete días de egreso. La variable dependiente fue la ocurrencia y severidad de complicaciones. Se calcularon media y desviación estándar para las variables continuas, y proporciones para las categóricas. Las variables relacionadas con egreso temprano en el análisis bivariado (con $p < 0.15$) fueron incluidas en un modelo de regresión logística. **Resultados.** Se analizó información de 303 partos, de los cuales 208 (68%) tuvieron egreso temprano posparto. Las mujeres que fueron egresadas en forma temprana con un control prenatal adecuado reportaron menos síntomas de complicaciones en el puerperio mediato (RM = 0.36; IC 95% = 0.17-0.76). **Conclusiones.** Aunque no se encontró asociación entre el egreso temprano y los síntomas de complicaciones durante la primera semana del posparto, el riesgo de complicaciones fue menor en mujeres con egreso temprano y con cuidado prenatal adecuado, comparadas con las mujeres que presentaron egreso tardío sin control prenatal.

Palabras clave: alta del paciente; periodo de posparto; atención posnatal; México

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- (1) Centro de Investigación en Salud Poblacional. Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.
- (2) Hospital General de México, Secretaría de Salud, México, DF.
- (3) Centro de Investigación en Evaluación y Encuestas. Instituto Nacional de Salud Pública. Cuernavaca, Morelos, México.

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Address reprint requests to: Dolores Ramírez Villalobos. Instituto Nacional de Salud Pública-México (INSP).
Av. Universidad 655, 3er piso, Col Sta. Ma. Ahuacatlán. 62508 Cuernavaca, Morelos, México.
E-mail: mdolores@correo.insp.mx; mdoloresram@hotmail.com

In recent years, there has been growing interest to determine the ideal time for postpartum discharge for optimal maternal and child outcomes.¹⁻⁹ Hospital length of stay after childbirth has decreased progressively during the past 60 years.¹⁰⁻¹⁵ In the early 1980s in Mexico, the Mexican Social Security Institute (Instituto Mexicano del Seguro Social – IMSS) developed the program *Atención de Parto de Bajo Riesgo* (Care for Low-Risk Delivery),^{16, 17} which resulted in a six-hour reduction in postpartum hospital stays.

For women who have uncomplicated vaginal deliveries, the American College of Obstetrics and Gynecology (ACOG) defines early discharge (ED) as a hospital stay lasting 48 hours or less, and considers a stay of 24 hours or less very early discharge (VED).¹⁸⁻²¹ The hypothesis of this study is that shorter postpartum stays are associated with poor health outcomes because of the decreased probability of detecting postpartum complications, as has been found in studies with other populations.²²

Little information is available in Mexico to assess the potentially negative effects of early hospital discharge on maternal health during early puerperium, defined as the period between 24 hours to 7 days postpartum.²³ It is important to assess whether mothers who are discharged early after vaginal delivery are at risk to develop complications, as well as what type of complications may occur. The aim of this study was to evaluate the association between time of postpartum discharge and reported symptoms indicative of complications during early puerperium.

Material and Methods

The study population consisted of women who received obstetric care after normal vaginal delivery at the Gynecology and Obstetrics Department of the General Hospital of Mexico (HGM), Mexico City, Ministry of Health (Secretaría de Salud, SSA) between April and December 2003.

The inclusion criteria for the study were: a) vaginal delivery of a live singleton term infant (gestational age 37 to 41 weeks); b) uncomplicated pregnancy without concomitant diseases such as diabetes, hypertension, preeclampsia, cardiopathy, epilepsy, or evident infections; c) routine postpartum care, and d) residence in Mexico City. The exclusion criteria were refusal to participate, checking out of the hospital separately from the child and residing outside the city. The withdrawal criteria were refusal to continue participating and failure to locate the patient after three attempts.

Six trained interviewers evaluated medical records to select subjects who fulfilled the inclusion criteria and then invited eligible mothers to participate in the

study. After signed informed consent, selected mothers participated in a face-to-face interview prior to leaving the hospital to collect the following baseline data: a) sociodemographic characteristics; b) gynecologic and obstetric history; c) prenatal care assessed according to the Official Mexican Norm (NOM-007-SSA2-1993);²⁴ d) delivery events, including vaginal lacerations; e) clinical characteristics of the immediate puerperium, (considered as the 24-hour period following delivery);²⁴ and f) physician's discharge orders. A chart review was performed for all cases to corroborate questionnaire data and obtain clinical information. Upon discharge, mother-child pairs were invited for a medical visit seven days after delivery to assess newborn health status. At this visit, mothers underwent another face-to-face interview to obtain information related to maternal and infant postpartum health.

Women reporting serious complication symptoms were referred to the hospital's Gynecology and Obstetrics Service for clinical evaluation. In the event that the mother failed to attend the 7-day follow-up appointment, a trained interviewer visited her at home to complete the interview. The study was approved by the Ethics, Biosafety, and Research Committees of the Mexican National Institute of Public Health and of the General Hospital of Mexico.

The study outcome variable was the presence of self-reported symptoms in early puerperium. This variable was measured using symptoms reported by the mother during an interview conducted seven days after hospital discharge. Symptoms were categorized as suggestive of: a) urinary tract infection (dysuria, frequent urination, bladder tenesmus); b) episiotomy complications (local pain or discomfort, bleeding, separation of sutures, c) episiotomy infection (purulent discharge, pain, warmth and redness in the area); d) endometritis: (uterine pain, foul smelling lochia, and fever or shivering); f) mastitis and/or mammary abscess (pain, heat, and redness or cracking of nipples); and g) other reported symptoms or hospital readmission. Subjects were assigned one of two categories: a) absence of symptoms or b) presence of any symptom.

The exposure variable was the time of postpartum hospital discharge, measured as the time elapsed from delivery to hospital discharge (according to hospital records). For this study, early postpartum discharge (ED) was defined as 24 hours or less, whereas late discharge (LD) was defined as later than 25 hours. Potential confounders included sociodemographic or obstetric variables, perinatal and delivery events, and early postpartum complications.

It is important to clarify that in the facility where the study was conducted, physicians' discharge orders

are given by the responsible obstetrician during clinical rounds that occur each day in the morning and afternoon. Depending on the clinical status of the patient the rounding physician will give the discharge order. These orders depend on non-clinical (bill must be paid prior to discharge and dedicated blood donation is sometimes required) as well as clinical (no apparent complication) indications for discharge. In some cases of non-clinical discharge, some women in the late discharge group were actually candidates for early discharge but were kept for non-clinical reasons.

Statistics

Data are presented as mean and standard deviation for continuous variables and proportions for categorical variables. Bivariate associations between the outcome variable and each of the covariates were assessed to obtain odds ratios and 95% confidence intervals. The variables related to early discharge in the bivariate analysis at $p < 0.15$ were included in a logistic regression model.

An interaction term was added to assess the potential modifying effect of ED with satisfactory prenatal care on the presence of complications in early puerperium. All women with any complication identified during the hospital stay were excluded from the analysis. There were four women whose hospital stays were longer than 72 hours (77, 79, 87 and 99 hours). The analysis was conducted both including and excluding those observations, and no differences were found. The results that we present in this paper include these four women.

Finally, regression diagnostics were obtained for the logistic model.²⁵ The statistical analysis was performed using Stata Version 9.0.*

Results

Of the 5 326 women who delivered at the HGM between April 11 and December 15, 2003, a total of 2 710 (50.8%) had normal vaginal deliveries; 829 of those were eliminated due to premature birth, low birth weight ($\leq 2 600$ g or ≤ 36 weeks gestational age), stillbirths, or twins. Of the remaining 1 881 vaginal deliveries, 1 216 (64.6%) fulfilled all inclusion criteria. Of these women, 323 (26.6%) did not participate because they resided outside the metropolitan area or simply because they

did not wish to participate in the study. No differences were found between women who agreed to participate and those who did not with respect to number of live born children, newborn weight, maternal age or time of discharge. From the 893 remaining women, 497 were excluded from the analysis because they had complications before the hospital discharge. Out of the 396 women without complications prior to hospital discharge, only 303 were included in the analysis because 93 did not have complete information on the variables under study (Figure 1). We did not find significant differences between women with complete and incomplete information regarding their age, length of hospital stay and number of live-born children.

During follow-up, 63 women (15.9%) were lost due to change of residence, failure to locate the place of residence after three attempts, or incorrect address. No significant differences were found between women who completed the study and those who were lost to follow-up, regarding the length of hospital stay, age, and number of live-born children.

A total of 303 mothers were included in the analysis. Almost two thirds (67.2%) were interviewed at the hospital appointment while 32.8% were interviewed at home. Among these women, 208 (68.6%) had early postpartum discharge and 62 (15.6%) had their discharge delayed for administrative reasons; of these, 14 (6.7%) were in the late discharge group. There were no differences found in age or length of hospital stay between women with delayed discharge due to administrative reasons and those without this delay.

Table I shows sociodemographic and delivery characteristics of participating women, by time of discharge. The mean hospital stay (HS) was 21.5 ± 8.5 hours.

Table II presents symptoms reported up to the seventh day postpartum, analyzed from the time of discharge. From the 303 women included in the analysis, 65% (215) reported at least one symptom after hospital discharge. The most frequent symptom was genital discomfort, which was reported by 26.9% of the women, followed by symptoms suggesting urinary tract infection (23.1%) and symptoms suggesting endometritis (3.4%). We found no significant differences in the occurrence of each of the signs and symptoms by time of discharge (Table II). One woman was hospitalized on the fifth day after delivery with fever.

We fit a multivariate logistic regression model with the dependent variable being the presence of symptoms and the covariates being age of the mother in years, number of live-born children, admission in the second stage of labor, satisfactory prenatal care, application of enema prior to the delivery and having received instructions to have a medical check-up seven days after

* StataCorp LP. Stata Statistical Software STATA/SE for Windows; Release 9.0, Special Edition. College Station (TX, USA): Stata Corporation, 2002.

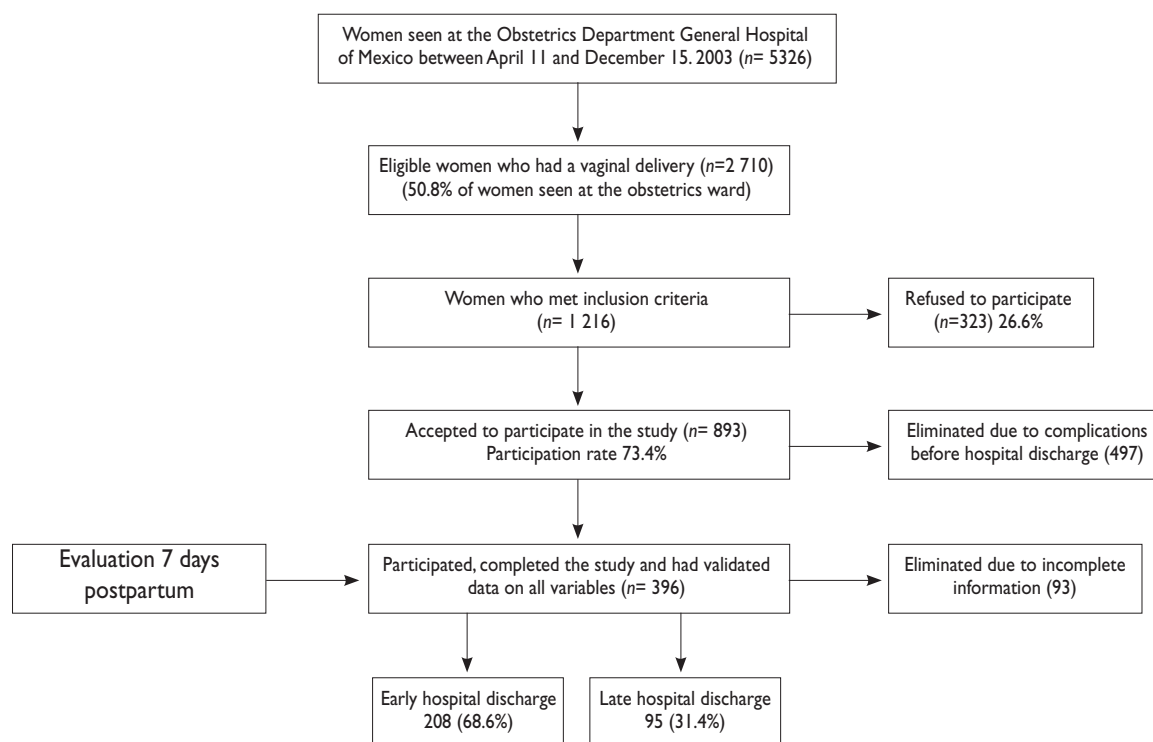


FIGURE 1. FLOWCHART FOR RECRUITMENT AND FOLLOW-UP AFTER VAGINAL DELIVERY. GENERAL HOSPITAL OF MEXICO, MEXICO CITY, MEXICO, 2003

delivery. The analysis also included the time between maternal discharge from the hospital and the day on which the interview was conducted. The results are shown in Table III.

The raw analysis did not find any variable associated with the presence of early puerperium complications. The analysis adjusted for confounding variables found that women who received no instructions to have a medical check-up seven days after delivery had a higher odds ratio of reporting symptoms of complications than women who received follow-up instructions (OR 1.73; 95% CI 1.01, 2.97). Early discharge was not associated with the presence of symptoms during early puerperium. Nevertheless, in the adjusted models with interaction terms between early discharge and satisfactory prenatal care, we found that women with early discharge and satisfactory prenatal care had a 63% lower odds of presenting symptoms compared with women with late discharge and whose prenatal control was unsatisfactory.

Discussion

This study found no significant association between early discharge and maternal symptoms of complications during the early puerperium. This result is consistent with other investigators such as Brown *et al.*¹² We found that women who had satisfactory prenatal care and early discharge had lower odds ratio of presenting symptoms of complications than mothers who had early discharge but whose prenatal care was not satisfactory. This study also found that women who received no instructions to get a medical check-up after discharge had a higher risk of presenting complications, what may be an indicator of a positive effect of counseling during the hospital stay.

The association between prenatal care and reported symptoms can be interpreted in the following manner: satisfactory prenatal care serves as an important venue for educating women about postnatal care and their own health;²⁴⁻²⁶ prenatal visits can help resolve mothers'

Table I
CHARACTERISTICS DESCRIBING MOTHERS STUDIED
ACCORDING TO TIME OF POSTPARTUM HOSPITAL DISCHARGE.
GENERAL HOSPITAL OF MEXICO, MEXICO, 2003

Variable	Early discharge (≤ 24 hrs) n (%) 208 (68.6)	Late discharge (≥ 25 hrs) n (%) 95 (32.4)
Duration of hospital stay	17.2	32.4
Maternal age (years)	22.8*	23.2
14-19	70 (33.6)	27 (28.4)
20-34	134 (64.4)	62 (65.3)
≥ 35	4 (1.9)	6 (6.3)
Marital status		
Single [‡]	170 (81.7)	79 (83.2)
Having a partner	38 (18.2)	16 (16.8)
Education level		
None	0	1 (1.1)
Elementary school completed	46 (22.2)	33 (34.7)
Middle school completed	113 (54.3)	45 (47.4)
High school or more	49 (23.5)	16 (16.8)
Obstetric history		
Prenatal care		
Satisfactory [#]	70 (33.6)	367 (37.9)
Unsatisfactory	138 (66.4)	59 (56.1)
Number of live-born children		
Primigravida	10 (4.8)	9 (9.5)
2-3	99 (47.6)	49 (51.6)
4 or more	99 (47.6)	37 (38.9)
Status of the patient at the time of admission		
Second stage	20 (9.6)	11 (11.6)
Ruptured membranes	26 (12.8)	15 (16.3)
Active labor	162 (94.2)	80 (97.6)
Procedures		
Labor induction	11 (5.4) [§]	13 (14.3) [§]
Application of enema	43 (20.7)	19 (20.0)
Episiotomy	164 (79.6)	63 (67.9)
Revision of uterine cavity after delivery	207 (99.5)	93 (98.9)
Bladder catheter at the time of delivery	117 (62.2)	46 (53.5)
Type of anesthesia		
None or local	115 (55.3)	44 (46.7)
Epidural	93 (44.7)	51 (53.6)
Receiving instructions to attend a check-up seven days after delivery	52 (60.5)	34 (39.5)

* Mean (SD)

[‡] Single, separated, divorced or widowed women

[§] Observations made with missing data

[#] Satisfactory prenatal care according to the Mexican Official Norm NOM-007-SSA2-1993

doubts about events during puerperium as well as provide instructions for when to seek medical care;^{27,28} early postpartum discharge (EPD) can reduce the window of opportunity for detecting potential complications and for counseling the mother on puerperal care, especially if she did not receive satisfactory prenatal care. It is important to note that even with early discharge, women with satisfactory prenatal care had lower odds of complications than women without early discharge and unsatisfactory prenatal care. This finding indicates that prenatal care plays an important role not only in the prevention of prenatal and delivery complications, but also serves to educate the mother as to early postpartum care.

There are a number of limitations of this study that deserve mentioning. The data on the presence and severity of symptoms of complications during early puerperium were obtained by interviewing the mothers and not by clinical exam or evaluation, which may lead to errors in classification. Also, we did not determine the reasons why mothers did not seek medical attention despite complaining of certain symptoms. However, we presume that the problems in detection and identification of these symptoms, as well as the reasons for not seeking medical care despite the presence of symptoms, are not related to the time of postpartum discharge. This would likely result in a non-differential error in measurement and would only attenuate the associations found between time of postpartum discharge and the occurrence of complications.

Recall bias may be another limitation of this study, as mothers simply tried to remember symptoms when the survey was administered. However, the authors contend that if such bias were present it also would be non-differential, given that mothers were all asked in the same manner (regardless of early or late discharge). Another limitation of the study is the short follow up period of only seven days. Although the majority of the symptoms identified here occur preferentially during the first week postpartum, it is possible that other symptoms or complications appeared after those seven days and were not identified or analyzed, but this issue is part of a future complementary analysis.

In the present study, early discharge was decided by the responsible physician. Women in the early discharge group were all clinically stable. However, for administrative reasons, some women who would have been candidates for early discharge were kept in the hospital. Although it is impossible to control for this effect, we included this "late discharge for administrative reasons" variable in the model and found no significant attributable effect.

The ideal design for evaluating the association between the time of discharge postpartum and the pres-

Table II
SYMPTOMS REPORTED BY MOTHERS DURING EARLY PUERPERIUM, BY TIME OF HOSPITAL DISCHARGE.
GENERAL HOSPITAL OF MEXICO. MEXICO, 2003

Symptoms reported at seven days postpartum	Early discharge group n = 208 (%)	Late discharge group n = 95 (%)	Crude OR*	95% CI
Symptoms of urinary tract infection ^{‡,§}	48 (23.1)	21 (22.1)	1.05	0.59, 1.89
Genital discomfort (pain and edema of labia) [§]	56 (26.9)	18 (18.9)	1.57	0.86, 2.86
Breast conditions (abscess, mastitis)	2 (0.96)	0	-	-
Symptoms infection at the site of episiotomy [#]	24 (11.5)	9 (9.5)	1.24	0.55, 2.79
Symptoms of endometritis ^{§,¶}	7 (3.4)	1 (1.05)	3.37	0.39, 26.98
Hospital readmission	1 (0.48)	0	-	-

* Binary logistic regression

[‡] Dysuria, frequent urination and vesical tenesmus

[§] Missing data in one observation

[#] Pus or dehiscence, episiotomy or cellulitis in episiotomy site

[¶] Uterine pain along with fever or shivering

Table III
LOGISTIC REGRESSION MODEL. FACTORS ASSOCIATED WITH COMPLAINTS OF COMPLICATIONS DURING EARLY PUERPERIUM
AND THE DIFFERENTIAL EFFECT OF EARLY DISCHARGE. GENERAL HOSPITAL OF MEXICO. MEXICO, 2003

Variables	OR Crude analysis		OR Adjusted analysis*		OR Adjusted with Interaction*	
	OR	95% CI	OR	95% CI	OR	95% CI
Early discharge	0.62	0.37, 1.02	0.54	0.31, 0.94	0.95	0.41, 2.20
Age (years)	1.00	0.96, 1.04	0.99	0.94, 1.05	0.99	0.94, 1.04
Two or more children	1.22	0.56, 2.68	1.13	0.45, 2.81	1.13	0.45, 2.84
Admission in the second stage of labor	1.56	0.67, 3.63	1.46	0.61, 3.47	1.42	0.59, 3.38
Application of enema	0.78	0.44, 1.40	0.78	0.43, 1.42	0.80	0.44, 1.46
Not receiving instructions to attend medical check-up seven days after delivery	1.57	0.94, 2.64	1.69	0.99, 2.8	1.73	1.01, 2.97
Satisfactory prenatal care	0.84	0.51, 1.38	0.82	0.49, 1.35	0.41	0.16, 1.05
Interaction between early discharge with satisfactory prenatal care					0.36	0.17, 0.76

* Adjusted for the variables in the table, the time elapsed since discharge and interview data

ence of complications would be a randomized clinical trial instead of the cohort observational design used in our study. Such a design would randomize women to early or late discharge groups, and clinical assessment and follow-up would yield more accurate data on puerperal complications. Due to ethical and logistic reasons, it was not possible to use such design in this report.

There may be a residual effect of complications in the immediate postpartum period, which may increase

the time to discharge as well as increase the probability of complications appearing during early puerperium. Thus, the results of this study may overestimate the association between early postpartum discharge and the presence and severity of puerperal complications. To decrease the possible bias, we opted for the restriction of the study sample to only those women with no complications at the time of discharge and those with puerperal complications after delivery and before

hospital discharge, which could considerably affect the time of postpartum discharge and the probability of later complications.

The results of this study show that although there was no association between early discharge and the severity of complications during early puerperium for all mothers, the presence of symptoms decreased among women who received indications to have a medical check up one week later, and among women with early discharge and satisfactory prenatal care, compared with those with early discharge and unsatisfactory prenatal care, suggesting a positive effect of satisfactory prenatal care even with an early discharge. This correlation deserves further study in order to better understand its importance.

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