Research Article

Factors Associated with Maternal-Fetal Morbidity in Prenatal Care

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Abstract

Background: The prenatal care is a set of actions that involves a series of visits of the pregnant woman to the health institution, with the objective of monitoring the evolution of pregnancy, detecting risks, preventing complications and preparing her for childbirth and maternity. The quality of prenatal care plays an important role in the outcome of pregnancy as well as maternal-fetal morbidity.

Aim: The purpose of this study is to determinate the factors associated with maternal-fetal morbidity in prenatal care.

Design and Setting: Comparative cross-sectional study.

Methods: In 66 patients in the Family Medicine Unit #46, Culiacan, Sinaloa, Mexico. The patients were divided into two groups, with maternal-fetal morbidity and without maternal-fetal morbidityto make an association in search of associated factors in prenatal care.In addition, a logical correlation was made between the variables studied; it was used 95% statistical power and 95% interval confidence; association was established by calculating odds ratios, chi-squared test and Spearman for statistical significance ($p < 0.05$).

Results: The association between maternal-fetal morbidity and associated factors reported the following results: age [OR = 1.7, p 0.30], body mass index [OR=3.7, p 0.01], scholarship [OR=1.1, p 0.82], occupation [OR=0.5, p 0.22], number of consultations [OR=0.9, p 0.90], obstetric risk [OR=0.8, p 0.69], quality of prenatal care [OR=1.1, p 0.77], way of birth [OR=1.2, p 0.69], comorbidities [OR=22.2, p 0.001], previous caesarean [OR=0.1, p 0.04]. The correlations found were mostly weak.

Conclusion: There are two variables that are important risk factors for developing maternal-fetal morbidity, obesity in pregnancy and the presence of comorbidities before pregnancy. Both variables are susceptible to modify, allowing the reduction of adverse maternal-fetal events.

Keywords: Prenatal care; Maternal-Fetal Morbidity; Pregnancy

Introduction

The risk approach is an instrument to identify the priority problems that contribute to perinatal morbidity and mortality in the different levels of attention. This strategy also works to distribute the resources required, proposing strategies that show benefits in the obstetric patient, as well as in the reduction of perinatal mortality (week 22 of pregnancy to the first seven days of life). Risk factors of the mother and child can be identified during prenatal care; many are preventable or modifiable by actions that will favor satisfactory results in maternal and child health [1]. The statistics of maternal and fetal morbidity and mortality in developing countries reflect the consequences of not providing good prenatal care. Traditionally, prenatal care programs (PNC) have been recommended in developing countries following the guidelines of programs used in developed countries, incorporating only minor adaptations according to local conditions [2].

Maternal and child health care is a priority for health services, its main objective is the prevention of maternal complications in pregnancy, timely diagnosis and adequate care. The main causes of maternal and perinatal mortality are preventable through early, systematic and high quality prenatal care, which allows identifying and controlling the main obstetric and perinatal risk factors [3]. WHO considers that only 63% of pregnant women in Africa, 65% in Asia and 73% in Latin America attend at least one prenatal care visit, among the factors associated with low adherence to prenatal care are: age, low socioeconomic level, multiparity, low educational level, lack of a stable partner, financial barriers, lack of health insurance and physical abuse [4].

The objectives of prenatalcare are: evaluate the health status of the mother and fetus, establish the gestational age, evaluate possible risks, plan prenatal care and indicate folic acid as soon as possible, for the prevention of neural tube defects. The recommended frequency for an uncomplicated pregnancy is every 4 weeks during the first 28 weeks, every 2-3 weeks between week 28 to week 36 and weekly after 36 weeks [5]. Despite the above the purpose of this study is to determinate the factors associated with maternal-fetal morbidity in prenatal care.

Table 1: Descriptive statistics of quantitative variables.

Variable	N	μ	SD	Minimum	Maximum
Age	66	27.6	±5.7	13	39
Number of consultations	66	7.2	±3.0	1	14

μ: Mean; SD: Standard Deviation; N: Frequency.

Table 2: Frequency of variables studied (Part 1).

Variable		N	%
Age	More than 30 years	26	39.4
	Less than 30 years	140	60.6
Body Mass Index	Obesity	24	36.3
	Overweight	25	37.9
	Normal weight	17	25.8
	Low weight	0	0.0
Schooling	Primary	6	9.1
	Secondary	13	19.7
	High school	17	25.8
	Bachelor's degree	27	40.9
	Technical career	3	4.5
Number of consultations	Less than 5	12	18.8
	More than 5	54	81.8
Occupation	Worker	41	62.1
	Housewife	25	37.9
Civil status	Single	11	16.7
	Married	35	53.0
	Free union	20	30.3
Adherence to CPG	80-100%	30	45.5
	0-79.9%	36	54.5

Table 2: Frequency of variables studied (Part 2).

Variable		N	%
Way of birth	Vaginal	38	57.6
	Cesarean	28	42.4
Perinatal morbidity	With perinatal morbidity	23	34.8
	Without perinatal morbidity	43	65.2
Perinatal morbidity	Prematurity	3	4.5
	Macrosomia	8	12.1
	respiratory distress syndrome	5	6.1
	transient tachypnea of the newborn	5	6.1
	Oligohydramnios	2	1.5
Maternal comorbidities	With maternal comorbidities	24	36.4
	Without maternal comorbidities	42	63.3
Previous cesarean	With previous cesarean	12	18.2
	Without Previous cesarean	54	81.8

Materials and Methods

A comparative cross-sectional study was carried out, in the Family Medicine Unit #46, of the Mexican Institute of Social Security (IMSS), located in Culiacan, Sinaloa, Mexico; in pregnant patients which were selected by a consecutive sampling techniques; that met the following inclusion criteria: any age, that accepted and signed the informed consent and with at least one medical consultation of prenatal care; were eliminated those who did not complete the survey or those with incomplete information. The following data were obtained directly from the patients or medical records: age, adherence to the clinical practice guide of prenatal care, comorbidities, nutritional status, schooling, number of consultations, obstetric risk, occupation, way of birth and previous cesarean. Patients were assigned to two groups based on maternal-fetal morbidity, which was considered as any adverse event occurred during pregnancy for the mother or fetus. The adherence to the clinical practice guide of prenatal care was measured with the unique prenatal care evaluation card developed by IMSS, this card divides the prenatal care into satisfactory prenatal care when the result is greater than 80 percent and unsatisfactory prenatal care when the result is less than 80 percent.

The data obtained was integrated into data collection sheets and analyzed using the SPSS program version 20 in Spanish, where we applied descriptive statistics; for qualitative variables frequencies and percentages were used and for quantitative variables mean and standard deviation were used. It was considered statistically significant a $p < 0.05$, with a 95% confidence interval, all variables were dichotomized to apply odds ratio and chi square. A logic correlation with Spearman was used between the variables studied; the Protocol was authorized by the Local Committee of Research and Ethics in Health Research from the Family Medicine Unit #46, where the study took place.

Results

A sample of 72 patients was analyzed, 6 of whom had incomplete information (9.0%), obtaining a total of 66 patients, the mean age of patients (Table 1) was 27.64 years (SD ±5.7), it was found that most of the participants were less than 30 years old (60.6%) compared to those older than 30 years (39.4%). When performing descriptive statistics of sociodemographic variables (Table 2) we found that most of the patients had a bachelor's degree (40.9%) compared to the other levels that included high school (25.8%), secondary (19.7%), primary (9.1%) and technical career (4.5%) in that order of frequency. In the occupation (Table 2) it was found that 62% are active workers and 38% are housewives. Regarding the marital status, most of the patients were married (53%) compared to the free union (30%) and unmarried (17%). When measuring the obstetric clinical variables (Table 2), in relation to the body mass index it was found that most of patients at the beginning of pregnancy were overweight (37.9%), followed by normal weight (25.8%), obesity grade 2 (18.2%), obesity grade 1 (13.6%) and obesity grade 3 (4.5%).

Most of patients did not have obesity (63.6%) but there were a significant number of patients with obesity (36.4%) which indicates that many of the pregnancies begin with a non-ideal weight that can have serious consequences in the morbidity and mortality. The obstetric risk (Table 2) of the patients was mostly high risk (57.6%) compared to low risk (42.4%), which makes us evidence the large number of patients with risk factors for an adverse outcome in pregnancy. Although, the majority of patients did not have comorbidities (63.6%), a considerable number did have (36.4%), the

Table 3: Association between factors associated and maternal-fetal morbidity.

Variable	Subtype	With maternal-fetal morbidity	With maternal-fetal morbidity	OR	p
		N	N		
Age	More than 30 years	11	15	1.7	0.30
	Less than 30 years	12	28		
Nutritional status (Obesity)	With Obesity	13	11	3.2	0.01
	Without Obesity	10	32		
Schooling	Basic level	7	12	1.1	0.82
	More than basic level	16	31		
Number of consultations	Less than 5 consultations	4	8	0.9	0.90
	More than 5 consultations	19	35		
Obstetric risk	Low risk	9	19	0.81	0.69
	High risk	14	24		
Occupation	Worker	12	29	0.52	0.22
	Housewife	11	14		
Adherence to CPG	80-100 %	11	29	1.1	0.77
	Less than 80%	12	14		
Way of birth	Cesarean	14	24	1.2	0.69
	Vaginal birth	9	19		
Comorbidities	With comorbidities	18	6	22.2	0.001
	Without comorbidities	5	37		
Cesarean previous	With cesarean previous	1	11	0.13	0.03
	Without cesarean previous	22	32		

N: Frequency; OR: Odds Ratio; p: Chi Square; CPG: Clinical Practice Guide.

comorbidities most frequently found were obesity (36%), previous abdominal surgery (20%), metabolic diseases (4.5%) and respiratory diseases (2%). The antecedent of caesarean (Table 2) was found in 18.2% compared to those patients without previous cesarean (81.8%).

At the time of analyzing the prenatal care (Table 2) we found that most of the patients had five or more consultations (81.8%) and 18.2% of the participants had less than five consultations in all their prenatal care. The good adherence to the guide of clinical practice (CPG) of prenatal care was defined with a minimum of 80% of qualification made through the prenatal care evaluation card, it was found that most of the prenatal care notes evaluated did not comply with the minimum qualification (good adherence 45% versus bad adherence 55%). When examining the way of birth (Table 2) we found that most of the patients had vaginal way (58%) compared with those who required cesarean (42%). There was perinatal morbidity in 35% of pregnancies and although most of patients did not have perinatal morbidity (65%). The main causes of morbidity were macrosomia (12%), transient tachypnea of the newborn (6%), respiratory distress syndrome (6%) and premature (5%). No perinatal mortality was found among the patients in our sample.

When associating the variables studied with perinatal morbidity (Table 3), the following results were obtained: age (equal to or greater than 30 years) [RM=1.7, 95% CI (0.6-4.7), p 0.30], body mass index (with obesity) [RM=3.7, IC 95% (1.2-11.0) p 0.01], education (basic education) [RM=1.1, IC 95% (0.3-3.4), p 0.82], occupation (active worker) [RM=0.5, 95% CI (0.18-1.4), p 0.22], number of consultations [RM=0.9, IC 95% (0.24-3.4), p 0.90], obstetric risk (low risk) [RM=0.8, 95% CI (0.29) -2.2), p 0.69], adherence to the clinical practice guide of prenatal care (good attachment) [RM=1.1, IC 95% (0.41-3.1), p 0.77], way of birth (vaginal way) [RM=1.2, 95% CI (0.43-3.4), p 0.69], comorbidities (with comorbidities) [RM=22.2, IC95% (5.9-82.5), p 0.001], previous caesarean (with previous caesarean) [RM=0.1, IC95 % (0.01-1.1), p 0.04].

Finally we made a logical correlation (Table 4) between the different variables we studied, the following results were statistically significant: age-obstetric risk correlation [Rho= -0.3, IC 95%, p 0.01], age-adherence to the CPG [Rho= -0.3, IC 95%, p 0.01], age-way of birth [Rho= -0.43, IC 95%, p 0.001], obesity-way of birth [Rho= -0.2, IC 95%, p<0.05], perinatal obesity-morbidity [Rho=0.3, 95% CI, 0.01], obesity-comorbidities [Rho= 0.3, IC 95%, p 0.005], number of consultations-adherence to the CPG [Rho= -0.35, IC 95% p 0.004], risk obstetric-way of birth [Rho= 0.55, 95% CI, p 0.001], obstetric risk-previous caesarean [Rho= -0.40, IC 95%, p 0.001], way of birth-previous cesarean [Rho= -0.39, IC 95%, p 0.001], perinatal morbidity-comorbidities [Rho= 0.63, 95% CI, p 0.001], perinatal morbidity-previous caesarean [Rho= -0.26, 95% CI, 0.03], comorbidities-previous caesarean [Rho= -0.35, IC 95%, p 0.003].

Discussion

In the research study it was found that on average the degree of adherence to the prenatal care CPG was 45%, this is similar to Escobar-Carmona (2012) where it was determined that there was low adherence to CPG of prenatal care with 60.75%. There are no

Table 4: Correlations of studied variables.

Correlation	Rho value	p	Meaning
Perinatal morbidity and comorbidities	0.63	0.01	Good correlation
Obstetric risk and way of birth	0.55	0.01	Moderate correlation
Age and way of birth	-0.43	0.01	Moderate correlation
Age and obstetric risk	-0.31	0.01	Weak correlation
Age and adherence to CPG	-0.30	0.01	Weak correlation
Obesity and way of birth	-0.24	0.04	Weak correlation
Obesity and perinatal morbidity	0.30	0.01	Weak correlation
Obesity and comorbidities	0.34	0.01	Weak correlation
Number of consultations and adherence to CPG	-0.35	0.01	Weak correlation
Obstetric risk and previous cesarean	0.40	0.01	Weak correlation
Way of birthand previous cesarean	-0.39	0.01	Weak correlation
Perinatal morbidity and previous caesarean	-0.26	0.01	Weak correlation
Comorbidities and previous caesarean	-0.35	0.01	Weak correlation

CPG: Clinical Practice Guide; p: Rho Spearman.

published data on the relationship between the adherence to the CPG of prenatal care and maternal-fetal morbidity [6]. The main causes of perinatal morbidity found during the investigation were fetal macrosomia with 12%, transient tachypnea of the newborn/respiratory distress syndrome with 6% and prematurity 5%; this coincides with Cáceres-Manrique, where it is mentioned that the perinatal morbidity includes neonatal conditions such as prematurity, asphyxia, congenital malformations, low birth weight and respiratory distress syndrome [4]. There was maternal-fetal morbidity in 35% of pregnancies and although most of patients did not have perinatal morbidity (65%), the cases that were found are considerable.We found that most of patients had five or more consultations (81.8%) and 18.2% of participants had less than five consultations in all their prenatal care, which makes us think that although the majority of patients complied with what is established in the official Mexican norm and clinical practice guidelines, a considerable percentage (18.2%) did not adequately comply with the minimum consultations suggested. We found that most of the patients had vaginal way (58%) compared with those who required cesarean (42%), despite the above, the number of cesareans represents a very high percentage according to WHO recommendations [7].

Conclusion

Based on the previous results, it is possible to highlight the presence of two variables with statistically significant association with perinatal morbidity, the first is the presence of obesity [RM=3.7, 95% CI (1.2-11.0), p 0.01]. Having obesity at the beginning of pregnancy predisposes patients to be 3.7 times more likely to have maternal-fetal morbidity compared to those who are overweight or normal weight at the beginning of pregnancy, which determines obesity as a risk factor to develop maternal-fetal morbidity. The second variable is the presence of comorbidities during pregnancy [RM=22.2, 95% CI (5.9-82.5), p 0.001]. According to our results, having some comorbidityat the start or in the course of pregnancy predisposes patients to be 22.2 times more likely to present maternal-fetal morbidity or a perinatal adverse event in comparison with those that do not have any comorbidity, which determines the presence of comorbidities as a risk factor to develop maternal-fetal morbidity or perinatal adverse event.

We found a weak correlation in most of the variables; therefore, its correlation force is not adequate to establish a cause-effect in dependence of the variables. The only ones that can be established as adequate are the moderate correlations (age-way of birth and obstetric risk-way of birth) and correlation between maternal-fetal morbidity and comorbidities that were good. Despite the above, none of our variables had a very good correlation, so it is difficult to establish dependence between the variables.

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