



ORIGINAL ARTICLE

Factors associated with physical aggression in pregnant women and adverse outcomes for the newborn[☆]

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Received 14 March 2012; accepted 29 August 2012

KEYWORDS

Violence against pregnant women;
Teenage pregnancy;
Infant mortality;
Prenatal care

Abstract

Objective: To assess the socioeconomic, demographic, and reproductive factors associated with physical aggression during pregnancy, and the negative outcomes for the newborn in two groups of women: adolescents and young adults.

Method: Cross-sectional study with a sample of 8,961 mothers who were admitted to hospitals of the city of Rio de Janeiro during delivery. To test the hypothesis of homogeneity of proportions, the chi-squared test was used. Odds ratio and confidence intervals were estimated using logistic regression.

Results: 5.0% of the adolescents and 2.5% of the young adult women suffered physical violence during pregnancy. In both groups, the variables associated with physical abuse were lower educational level, lower support from the child's father, and more attempts to interrupt the pregnancy. The increase in alcohol consumption was associated with physical abuse only in the group of adolescents; illicit drug use was only associated with physical abuse in young adults. The children of abused mothers had a two-fold increased chance of neonatal death, and a three-fold increased chance of post-neonatal death. Conversely, good quality prenatal care reduced the chance of physical aggression during pregnancy.

Conclusions: The results emphasize the increased chance of neonatal and post-neonatal mortality among children of victims of physical abuse during pregnancy, and indicate the importance of prenatal care to identify women at higher risk of suffering aggression, the appropriate time to provide measures of protection and care for mother and baby.

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[☆]Please, cite this article as: Viellas EF, Gama SG, Carvalho ML, Pinto LW. Factors associated with physical aggression in pregnant women and adverse outcomes for the newborn. J Pediatr (Rio J). 2013;89:83-90.

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PALAVRAS-CHAVE

Violência contra
mulher grávida;
Gravidez na
adolescência;
Mortalidade infantil;
Assistência pré-natal

Fatores associados à agressão física em gestantes e os desfechos negativos no recém-nascido**Resumo**

Objetivo: Verificar os fatores socioeconômicos, demográficos e reprodutivos associados à agressão física na gestação e os desfechos negativos para o recém-nascido em dois grupos de mulheres: adolescentes e adultas jovens.

Método: Estudo transversal com uma amostra de 8.961 puérperas que se hospitalizaram em maternidades do município do Rio de Janeiro por ocasião do parto. Para testar hipótese de homogeneidade de proporções foi utilizado o teste χ^2 . A razão de chances e os intervalos de confiança foram estimados através de regressão logística.

Resultados: Foi apontado que 5% das adolescentes e 2,5% das adultas jovens sofreram agressão física na gravidez. Em ambos os grupos, as variáveis associadas com o abuso físico foram: menor nível de escolaridade, menor apoio do pai da criança e maior tentativa de interrupção da gestação. O aumento no consumo de bebida alcoólica mostrou associação com o abuso físico apenas no grupo de adolescentes, e o uso de drogas ilícitas somente entre as adultas jovens. Os filhos das puérperas agredidas tiveram duas vezes mais chances de óbito neonatal, e três vezes mais de óbito pós-neonatal. Por outro lado, a assistência pré-natal de boa qualidade reduziu a chance de agressão física durante a gestação.

Conclusões: Os resultados alertam para o aumento da chance de óbito neonatal e pós-neonatal entre os filhos das vítimas de agressão física durante a gestação e apontam para a importância do pré-natal na identificação de mulheres sob maior risco de episódios violentos, momento oportuno para o desenvolvimento de ações de proteção e cuidado à mãe e ao bebê.

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Introduction

Violence is a major public health problem worldwide, and violence against women perpetrated by the intimate partner is of particular relevance, as it has been referred to as one of the main forms of violence among the population.^{1,2}

Violence against women does not cease, even during pregnancy. Indeed, the occurrence of abuse can often start or increase in frequency during pregnancy.³⁻⁵

Although they found conflicting results, studies that analyzed this subject have found prevalence rates of approximately 40%.^{4,6} To date, the studies conducted in Brazil have shown that the prevalence of violence against women perpetrated by the intimate partner during pregnancy varies between 7.0% and 34%.⁷⁻⁹ According to a study by Moraes and Reichenheim,⁷ conducted in 2000 in the city of Rio de Janeiro, approximately 16% of the women using public health services reported physical abuse during pregnancy.

Among the factors associated with physical violence between intimate partners during pregnancy, in addition to localized bruises, it has been observed that women usually initiate prenatal care at a later period, have lower self-esteem, lower educational levels, and show greater use of alcohol and other drugs, leading to a possible increase in maternal and fetal complications. Permanent stress, disappointment with the partner, and lack of hope

of changing the situation of violence are believed to be the main precursors of the acquisition or intensification of these habits.⁸⁻¹¹

Although there is evidence that violence between intimate partners during pregnancy is a universal phenomenon that affects all social groups, violence during this period of life affects mainly young women and teenagers. It is postulated that these groups are more often victimized than older women as, in addition to the fact of being women, they are young, which represents a vulnerability factor in coping with the situation to which they are subjected.^{4,7,12,13}

Moreover, violence during pregnancy can lead to a major conflict situation for the whole family, with possible repercussions on child development. Ferreira,¹⁴ in his review study, emphasizes that physical abuse is closely related to the bond between parents and children and to cultural issues of childhood education. It also emphasizes the importance of pediatricians in the identification of families at risk, through actions to prevent negative outcomes for the newborn.

Studies indicate a failure in preventing aggression against these babies, whose consequences can be prematurity, low birth weight, restricted intrauterine growth, and even perinatal and neonatal death.^{5,8,9,15,16}

Thus, this study aimed to identify factors associated with physical aggression in two groups of pregnant women - adolescents and young adults - and the main negative outcomes for the baby, in the city of Rio de Janeiro.

Methods

The present study is part of the “Study of morbimortality and neonatal and perinatal care in the city of Rio de Janeiro”, developed with a sample of mothers who were admitted in the city hospitals during delivery, between 2000 and 2001.

A proportional stratified sample was obtained, in which health facilities were grouped according to the proportion of low birth weight in three strata: 1 - municipal and federal institutions; 2 - state, military, philanthropic, and private institutions that work with the Brazilian Unified Health System (Sistema Único de Saúde - SUS); 3 - private institutions.

In each stratum, a sample of approximately 10% of mothers was selected from the expected number of births in all hospitals. For logistical reasons, facilities with fewer than 200 births per year were excluded, corresponding to only 3.7% of total births.

The sample size in each stratum was established with the objective of comparing proportions in similar samples at a significance level of 5%, in order to detect differences of at least 3% with a power of test of 90%, based on the proportion of low birth weight.

Data were collected from the mothers' and newborns' medical records, as well as from structured interviews with mothers in the immediate postpartum period. Further details on the methodology of the project can be found in the study of perinatal morbimortality published by Leal et al.¹⁷

For the present article, mothers aged 10 to 34 years were selected, who had answered the following question of the questionnaire “have you ever been physically abused during this pregnancy?”, and whose perpetrator was the father of the current baby. All those who were abused by another perpetrator or who had not answered the question were excluded from the sample. Women aged > 35 years were also excluded.

Thus, the sample comprised 8,961 mothers, divided into two distinct groups - ages 10 to 19 years (adolescents), ages 20 to 34 years (young adults). The categorization into these age groups was due to the fact that the incidence of violence between intimate partners during pregnancy is higher among adolescents and young adults.^{4,7,12,13}

Physical aggression was defined as intentional use of physical force with the potential for causing death, disability, injury, or harm, which includes, but is not limited to: scratches, slaps, pushes, perforations, kicking, bruises, burns, bone fractures, beating, head injuries, internal injuries, permanent injuries, and use of a weapon (gun, knife, or other object).¹⁸

For the analysis, the answer variable was categorized into two distinct levels - suffered or did not suffer physical abuse during pregnancy perpetrated by the baby's father. To determine the association between physical aggression and possible associated factors, the following variables were selected: ethnicity (white and Asian; black and mixed-race); educational level (as years of study, in binary form: \leq fourth grade of elementary school or $>$ fourth grade of elementary school); remunerated work (yes or no); history of smoking (smoked or not during pregnancy); alcohol consumption (consumed or not during pregnancy);

and illicit drug use (used or not during pregnancy). The psychosocial characteristics such as the baby's father's support in relation to the current pregnancy, living with the baby's father, and attempted interruption of pregnancy by the current mother were also collected and classified as yes or no.

Prenatal care was analyzed with a score of adequacy of prenatal care use - the Kotelchuck index, adapted by Leal et al.¹⁹ It assesses the number of prenatal consultations based on the initial month of prenatal care, and on the proportion of consultations observed over the expected number of consultations, according to gestational age at birth. In the modified Kotelchuck index, women that did not have prenatal care are identified as group 1; in group 2, prenatal care is classified as inappropriate; in group 3, as intermediary; in group 4, as appropriate; and, in group 5, more than appropriate. At a later stage of the analysis, the score of adequacy was categorized in binary form, combining groups 1 and 2, and groups 3, 4, and 5.

Regarding the newborns, the outcomes of interest were represented by low birth weight (birth weight < 2,500 g), preterm birth (birth < 37 weeks gestation), fetal death (death from the 22nd full week of gestation and/or fetal weight \geq 500 g), neonatal death (death of newborn up to 28 days), and post-neonatal mortality (death occurring in children older than 28 days and younger than 1 year old).

Gestational age was determined according to the information provided by the ultrasound or date of last menstrual period. In the absence of both, information provided by the mother was used. Data on mortality were obtained from the Brazilian Mortality Information System, through a conjoined information process between the database of live births in this sample and infant deaths that occurred in the city of Rio de Janeiro. The probabilistic record linkage method was used, whose full description is given by Pereira et al.²⁰ The definitions for death were described in the International Statistical Classification of Diseases and Related Health Problems (ICD-10).²¹

In the second stage, statistical procedures were used to search for explanations between the differences in the proportions of the answer variable and the independent variables. Initially, the homogeneity of proportions was tested through the chi-squared test, and those variables with p-value less than 0.20 were included in multivariate analysis. Crude and adjusted odds ratio (OR) and respective 95% confidence intervals were estimated for the variables that remained in the model. At this stage, p-values < 0.05 were considered statistically significant. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 17.0.

The study was approved by the Research Ethics Committee of the Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz (CAAE 0240.0.031.000-9). Data collection was conducted after the informed consent was signed by the mother or her guardian, when necessary.

Results

Of the 8,961 mothers, 22% were younger than 19 years. Approximately 5.0% of adolescents and 2.5% of young

adults reported being victims of at least one act of physical aggression perpetrated by the father of the baby during pregnancy.

A higher consumption of alcohol, and use of cigarettes and other drugs during pregnancy were associated with aggression, both for the adolescents and young adults. The lack of support perceived by the mother during pregnancy, as well as the desire to interrupt the pregnancy, were also factors associated with physical abuse (Table 1).

Regarding the educational level, most of the women who suffered physical abuse during pregnancy had less than eight years of schooling. Regarding prenatal care, pregnant women who were victims of physical abuse during pregnancy had less adequate care. As shown in Table 1, a total of 11.5% of the adolescents and 5.3% of the young adults received no prenatal care.

In the group of young adult mothers, low birth weight, neonatal deaths, and post-neonatal deaths were associated with physical aggression during pregnancy. Conversely, among adolescents, only the variable neonatal death was selected to compose the multivariate analysis of the variables related to health status of the newborns (Table 2).

The multivariate analysis (Table 3) showed that among pregnant adolescents, having a lower academic performance, consuming more alcohol during pregnancy, more frequently attempting to interrupt the pregnancy, and feeling less supported by the baby's father were all associated with physical aggression during pregnancy.

For the young adult pregnant women, the associations were similar. However, consumption of alcohol lost some of its statistical significance when adjusting for other

Table 1 Characteristics of adolescent and young adult mothers attended to at hospitals in the city of Rio de Janeiro, Brazil, and the association with physical aggression during pregnancy.

Variable	Maternal age								
	≤ 19 years				20-34 years				
	Physical aggression during pregnancy				Physical aggression during pregnancy				
	n	No %	Yes %	p-value	n	No %	Yes %	p-value	
<i>Ethnicity</i>									
White	822	42.5	32.2		3,611	52.4	35.6		
Black	448	22.5	30.0		1,241	17.5	33.3		
Asian	51	2.6	3.3		154	2.2	2.3		
Mixed-race	636	32.4	34.4	0.21	1,942	27.9	28.7	< 0.01	
<i>Years of schooling</i>									
0-3 years	181	8.9	16.7		598	8.3	19.0		
4-7 years	960	48.4	60.0		1,988	28.2	40.8		
8-10 years	664	34.4	21.1		1,478	21.1	25.3		
≥ 11 years	158	8.3	2.2	< 0.01	2,909	42.4	14.9	< 0.01	
<i>Remunerated work</i>									
Yes	223	11.4	9.9	0.66	3,015	43.3	35.4	0.04	
<i>Lives with baby's father</i>									
Yes	1,304	67.3	46.2	< 0.01	6,097	87.6	74.3	< 0.01	
<i>Support from baby's father</i>									
Yes	1,670	86.3	57.3	< 0.01	6,333	91.4	65.1	< 0.01	
<i>Tried to interrupt the pregnancy</i>									
Yes	174	8.2	23.1	< 0.01	309	4.2	14.3	< 0.01	
<i>Smoked during pregnancy</i>									
Yes	214	10.6	17.6	0.04	882	12.5	19.0	0.01	
<i>Drank alcohol during pregnancy</i>									
Yes	329	15.8	35.2	< 0.01	1,327	18.7	29.9	< 0.01	
<i>Used illicit drugs during pregnancy</i>									
Yes	16	0.7	2.2	0.13	27	0.3	4.0	< 0.01	
<i>Modified Kotelchuck index</i>									
Did not undergo	93	4.8	11.5		243	3.6	5.3		
Inadequate	724	39.6	37.9		1,556	23.0	42.8		
Intermediate	657	35.8	36.8		2,072	31.2	30.3		
Adequate	295	16.3	11.5		2,173	33.0	17.8		
More than adequate	65	3.6	2.3	0.06	604	9.2	3.9	< 0.01	

Table 2 Health profile of the newborns according to episode of physical abuse during pregnancy in adolescent and young adult mothers attended to at hospitals in the city of Rio de Janeiro, Brazil.

Variable	Maternal age							
	≤ 19 years				20 - 34 years			
	Physical aggression during pregnancy				Physical aggression during pregnancy			
	n	No %	Yes %	p-value	n	No %	Yes %	p-value
<i>Gestational age < 37 weeks</i>								
Yes	302	16.2	19.0	0.49	825	12.2	15.3	0.25
<i>Birth weight < 2,500 g</i>								
Yes	214	11.4	7.9	0.30	632	9.1	16.6	< 0.01
<i>Fetal death</i>								
Yes	23	1.2	0.0	0.29	67	1.0	0.6	0.60
<i>Neonatal death</i>								
Yes	28	1.3	3.3	0.12	60	0.8	2.9	< 0.01
<i>Post-neonatal death</i>								
Yes	13	0.6	1.1	0.60	33	0.4	1.7	0.02

Table 3 Crude and adjusted analysis between characteristics of adolescent and young adult mothers and occurrence of physical aggression during pregnancy, in the city of Rio de Janeiro, Brazil.

Variable	Crude OR	95% CI	Adjusted OR	95% CI
<i>Adolescent mother</i>				
Schooling > fourth grade of elementary school	0.52	0.33-0.83	0.56	0.34-0.91
Lives with the baby's father	0.42	0.27-0.64	0.63	0.39-1.04
Had support from the baby's father	0.21	0.14-0.33	0.32	0.19-0.53
Pregnancy interrupted	3.37	2.01-5.64	2.03	1.16-3.55
Smoked during pregnancy	1.81	1.03-3.16	1.08	0.59-2.00
Drank alcohol during pregnancy	2.88	1.84-4.51	2.41	1.48-3.93
<i>Young adult mother</i>				
Black or mixed-race ethnicity	1.97	1.44-2.68	1.40	0.99-1.99
Schooling > fourth grade of elementary school	0.39	0.28-0.54	0.64	0.43-0.95
Remunerated work	0.72	0.53-0.98	0.88	0.62-1.25
Lives with the baby's father	0.41	0.29-0.58	1.04	0.65-1.67
Had support from the baby's father	0.17	0.13-0.25	0.28	0.18-0.45
Pregnancy interrupted	3.83	2.47-5.94	1.85	1.08-3.15
Smoked during pregnancy	1.64	1.12-2.42	0.71	0.42-1.18
Drank alcohol during pregnancy	1.85	1.33-2.58	1.33	0.90-1.98
Used illicit drugs during pregnancy	14.22	5.93-34.08	8.06	2.70-24.04
Adequate prenatal care	0.39	0.28-0.54	0.67	0.46-0.97

95% CI, 95% confidence interval; OR, odds ratio.

variables in the model, and drug use emerged as a factor associated with cases of physical abuse during pregnancy.

According to the outcomes for the newborn, after multivariate analysis, physical aggression between intimate partners during pregnancy increased by two-fold the risk of neonatal death, and by three-fold the risk for post-neonatal death, compared with children of mothers who were not victims of aggression by the baby's father. Adequate prenatal care decreased the chance of low birth weight, as well as protected against neonatal and post-neonatal mortality (Table 4).

Discussion

The results of the present study are in agreement with other studies investigating physical aggression between intimate partners during pregnancy in adolescents.^{8,22} A recent study conducted in Rio de Janeiro found a prevalence of approximately 7%.²²

The findings also match the current conceptual theoretical model regarding the relations involved in physical aggression between intimate partners during pregnancy and women's profile, considering important

Table 4 Multivariate analysis to evaluate the role of physical aggression by intimate partner during pregnancy as a factor associated with the occurrence of adverse pregnancy outcomes in the city of Rio de Janeiro, Brazil.

Variable	OR	95% CI
<i>Low birth weight</i>		
Physical aggression during pregnancy	1.35	0.90-2.01
Adolescent mother	0.94	0.79-1.12
Schooling > fourth grade of elementary school	1.10	0.90-1.35
Had support from baby's father	1.16	0.90-1.49
Pregnancy interrupted	0.97	0.71-1.34
Drank alcohol during pregnancy	1.03	0.85-1.24
Used illicit drugs during pregnancy	1.86	0.79-4.36
Adequate prenatal care	0.44	0.38-0.51
<i>Neonatal death</i>		
Physical aggression during pregnancy	2.43	1.02-5.80
Adolescent mother	0.72	0.45-1.15
Schooling > fourth grade of elementary school	1.43	0.77-2.63
Had support from baby's father	1.37	0.66-2.83
Pregnancy interrupted	0.73	0.28-1.86
Drank alcohol during pregnancy	1.10	0.64-1.89
Used illicit drugs during pregnancy	1.76	0.23-13.6
Adequate prenatal care	0.25	0.16-0.40
<i>Post-neonatal death</i>		
Physical aggression during pregnancy	3.01	1.02-8.84
Adolescent mother	0.75	0.38-1.47
Schooling > fourth grade of elementary school	0.90	0.42-1.93
Had support from baby's father	0.64	0.28-1.45
Pregnancy interrupted	0.49	0.11-2.11
Drank alcohol during pregnancy	1.07	0.50-2.26
Used illicit drugs during pregnancy	0.00	.
Adequate prenatal care	0.40	0.21-0.77

95% CI, confidence interval; OR, odds ratio.

factors described in the literature, such as low level of education, unstable marital status, factors that reflect the pregnant woman's lifestyle (smoking, alcohol and drugs consumption), and those related to their reproductive health (prenatal care and childbirth).⁸⁻¹¹

Among these, the role of education must be highlighted. The main explanations for the association between physical aggression and the mother's educational level highlight that a lower educational level can determine difficulties in interpersonal relationships between men and women, by interfering with the way individuals can solve everyday problems, generating violent episodes with aggression.^{1,7,8}

In the present study, it was observed that mothers who experienced physical abuse during pregnancy were those who were more dissatisfied, as they felt less supported by the baby's father and tried to interrupt the pregnancy

approximately twice as often as the women who did not suffer such aggression.

Moreover, the lack of support to the women when they need the most care appears to be related to the tendency of women to establish risk behaviors. According to some authors,^{8,23,24} such habits accentuate the imbalance of power and control exercised by the partner, increasing the loss of self-esteem in the postpartum period, leading to progressive disinterest in their own and their children's well being.

Moraes et al.,¹¹ in their study on family violence and poor quality of prenatal care in Rio de Janeiro, demonstrated that the high prevalence of violence during pregnancy and the range of associated factors indicate the importance of the incorporation of this topic into routine feminine health care services. Primary care has a privileged role in confronting the aggression between intimate partners, as the pregnant women who have difficulty to attend prenatal consultations are the most affected by their aggressors' threats. The authors identified that having been the victim of at least one act of physical violence perpetrated by an intimate partner during pregnancy nearly triples the chance of having had inadequate prenatal care.

In the initial exploratory analysis, the categories of the modified Kotelchuck index were evaluated separately; it was observed that the better the index classification, the lower the frequency of physical abuse during pregnancy. The multivariate analysis (Table 3) showed that the occurrence of physical abuse during pregnancy was a significant factor associated with poorer quality prenatal care, as the young adults who had a more adequate assistance showed a 33% lower chance of suffering this form of violence than the other group.

These findings lead to reflection on the role of the health care service in the identification of this excluded group. Certainly, prenatal care would have had a key effect on the self-esteem of the pregnant woman and on the pregnancy outcome.

In the present study, important consequences for the fetus were observed, especially the frequency of neonatal and post-neonatal deaths, which were significantly higher among pregnant women who were victims of physical aggression. The results are consistent with those of other studies, in which the deaths also were associated with physical aggression during pregnancy. It is postulated that the violent episodes between intimate partners may be part of a complex interaction of factors that can contribute, among other things, to increased infant mortality.^{8,13,25}

In addition to the aggression, the association found between neonatal and post-neonatal mortality, as well as low birth weight and prenatal care, even after adjusting for a significant set of variables, reinforces the need for improvement in the care of pregnant women and newborns in more vulnerable situations.²⁶

The results found by Gamma et al.,²⁷ using data from this same study on perinatal morbidity and mortality, but investigating the experience of adolescent pregnancy with 3 groups of pregnant women, showed no statistical difference between the negative outcomes and maternal groups when the pregnant mother attended four or more prenatal care consultations.

Conversely, for those who had insufficient or no prenatal care (zero to three consultations), the risk of premature birth and low birth weight was significantly higher in the group of adolescent mothers.

According to Lansky et al.,²⁸ the measures to improve the situation should have decreasing the avoidable deaths as their main objective, since it is possible to identify risk situations at an early stage and take appropriate actions through close monitoring.

Costa et al.,²⁹ studying perinatal mortality and the preventability of deaths in hospitals in the city of Rio de Janeiro, observed that adverse perinatal outcomes are associated with a lack of health care received by the mother during the prenatal period, caused by difficulty of access to health care services. Considering the possibilities of prenatal care, it is critical that pregnant women have access to it.

Despite the limitations inherent to all cross-sectional studies, such as the possible reverse causality of the role of physical abuse during pregnancy in relation to other variables, and even though this study was not designed with the purpose of accurately investigating physical violence between intimate partners, this research is justified considering the importance of the subject. The results can be analyzed considering its strengths.

Initially, the use of the questionnaire in the immediate postpartum period must be emphasized, as it appears to facilitate detection of cases of aggression, as demonstrated in the studies by Moraes et al.¹¹ and by de Menezes et al.⁸ The authors comment that the postpartum period has been identified as appropriate for investigation of the complaint, since it represents, for many women, a unique opportunity to contact the healthcare service, with the advantage of allowing the identification of cases of aggression in the beginning of the pregnancy up to the child's birth.

The robust findings of this study can also be considered a positive point, as the multivariate approach was used in the data analysis and assessment of possible factors associated with aggression and important outcomes for the birth.

Despite the limitations and the time interval between collection and analysis of data, the study is still relevant for providing data that are representative of the city, analyzing both public and private institutions.

The present findings can be used to educate both prenatal health professionals and pediatricians in relation to the problem, as they can be used to identify possible factors associated with physical violence between partners and unfavorable outcomes throughout the first year of the child's life.

Conflicts of interest

The authors have no conflicts of interest to declare.

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