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Temporal evolution of prenatal care in Pernambuco in the years 1997, 2006 and 2016

Evolução temporal do pré-natal em Pernambuco nos anos 1997, 2006 e 2016

Evolución temporal de la atención prenatal en Pernambuco en los años 1997, 2006 y 2016

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ABSTRACT

Objective: to describe the temporal evolution of prenatal care in terms of the month when prenatal care began, vaccination and guidelines on breastfeeding in 1997, 2006 and 2016**. Method**: cross-sectional study operationalized in databases of the II, III and IV State Health and Nutrition Survey. The variables were described: month when prenatal care began, doses of tetanus vaccine and guidance on breastfeeding received during prenatal care. Research protocol approved by the Research Ethics Committee. **Results**: in 2016 there was a significant increase in early prenatal care when compared to 1997 and 2006 (p<0.001). Tetanus vaccination during pregnancy showed a significant increase in 2006 and 2016 compared to 1997, as did the proportion of pregnant women who received guidance on breastfeeding during prenatal care (p<0.001). **Conclusions**: there was an improvement in prenatal care regarding early initiation, tetanus vaccination and guidelines on breastfeeding.
Descriptors: Women's Health; Maternal and Child Health; Prenatal care; Health Surveys.

RESUMO

Objetivo: descrever a evolução temporal do pré-natal quanto o mês do início do pré-natal, vacinação e orientações sobre aleitamento materno nos anos de 1997, 2006 e 2016. **Método:** estudo transversal operacionalizado em bancos de dados da II, III e IV Pesquisa Estadual de Saúde e Nutrição. Foram descritas as variáveis: mês de início do pré-natal, doses da vacina antitetânica e orientação sobre o aleitamento materno recebidas no pré-natal. Protocolo de pesquisa aprovado pelo comitê de ética em pesquisa da instituição. **Resultados:** em 2016 observou-se aumento significativo do início precoce do pré-natal quando comparado a 1997 e 2006 (p<0,001). A vacinação antitetânica durante a gravidez apresentou um aumento significativo em 2006 e 2016 comparado a 1997, assim como a proporção de gestantes que receberam orientações sobre aleitamento materno durante o pré-natal (p<0,001). **Conclusões:** houve melhoria da assistência pré-natal quanto ao início precoce, vacinação antitetânica e orientações sobre aleitamento materno.
Descritores: Saúde da Mulher; Saúde Materno-Infantil; Cuidado pré-natal; Inquéritos Epidemiológicos.

RESUMEN

Objetivo: describir la evolución temporal de la atención prenatal en función del mes de inicio de la atención prenatal, vacunación y guías de lactancia materna en 1997, 2006 y 2016. **Método**: estudio transversal operacionalizado en bases de datos de la II, III y IV Encuesta Estatal de Salud y Nutrición. Las variables fueron descritas: mes de inicio de la atención prenatal, dosis de vacuna antitetánica y orientación sobre lactancia materna recibida durante la atención prenatal. Protocolo de pesquisa aprobado por el Comité de Ética en Investigación de la instituición. **Resultados**: en 2016 hubo un aumento significativo en la atención prenatal temprana en comparación con 1997 y 2006 (p <0,001). La vacunación contra el tétanos durante el embarazo mostró un aumento significativo en 2006 y 2016 en comparación con 1997, al igual que la proporción de mujeres embarazadas que recibieron orientación sobre la lactancia materna durante la atención prenatal (p <0,001). **Conclusiones**: hubo una mejora en la atención prenatal en cuanto a inicio temprano, vacunación antitetánica y guías de lactancia materna.
Descriptores: Salud de la Mujer; Atención prenatal; Salud Materno-Infantil; Encuestas Epidemiológicas.

INTRODUCTION

Pregnancy is an event in which there is a series of physiological, emotional and behavioral changes that involve and go beyond the organic systems and demand adequate care for the mother-fetus binomial[1]. Defined as a set of actions that are simultaneously preventive, health-promoting, diagnostic and curative, prenatal care is intended to provide this assistance, aiming at a good pregnancy outcome[2].

Advances in care quality and greater access to actions and services aimed at maternal and child health, combined with improved socioeconomic conditions of the population, especially in the case of women of reproductive age, have contributed to the decline in infant mortality worldwide.[3] However, there is still a significant number of stillbirths and maternal deaths due to preventable causes, especially in low- and middle-income countries and regions[3,4].

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The World Health Organization (WHO) estimated that 295,000 women died due to pregnancy-related causes in 2017, with 94% of these deaths occurring in places with few resources, and most of them being preventable[5]. In addition to that, according to the United Nations Children's Fund (UNICEF), in 2019, 2.4 million children died in the first month of life, and approximately three quarters of those deaths occurred in the first week of life[6].

In this context, the WHO issued a set of recommendations in 2016, which included increasing to eight the minimum number of prenatal consultations. With the new minimum number of consultations, the indicators pointed to a reduction in perinatal deaths of up to eight for every 1,000 live births[7]. In addition, the evidence indicates that the number of stillbirths could be reduced by one third and maternal mortality by 50% effective care is implemented during the antenatal period and at the time of delivery[4].

In Brazil, the Ministry of Health recommends that prenatal care be initiated preferably up to the 12th gestational week, as well as that it guarantees the provision of at least six prenatal consultations, offers anti-tetanus and hepatitis B immunization, and promotes the pregnant woman's connection to the delivery locus as well as awareness raising about breastfeeding[8].

When specifically dealing with the anti-tetanus vaccine, the Pan-American Health Organization (PAHO) declared Maternal Neonatal Tetanus (MNT) eradication in the American continent. In Brazil, tetanus was eradicated in 2003. The Ministry of Health recommends the following to maintain MNT eradication: guaranteeing and maintaining a minimum tetanus vaccination coverage of 80%, carrying out prenatal care, adopting the necessary care measures in the postpartum period, and taking due care of the umbilical cord[9].

However, it is noted that the National Immunization Program faces challenges regarding vaccination coverage due to the so-called vaccine hesitancy, which is not new in European and North American countries and has been studied in Brazil. Vaccine hesitation has been studied in Brazil. It is defined as the delay in accepting or refusing the recommended vaccines when they are available in the health services[10].

In Pernambuco, in addition to joining the national programs, *Mãe Coruja Pernambucana* was launched in 2007, which proposes reducing infant and maternal mortality in the most vulnerable regions of the state, by means of intersectoral and health actions aimed both at the pregnant women during prenatal care, delivery and postpartum and at the children, up to the age of five years old[11]. In 2011, the state also adhered to *Rede Cegonha*, implemented by the Ministry of Health, which aims at ensuring access, welcoming and resoluteness in Health Care for women and children with a focus on delivery, birth, growth and development of children from zero to 2 years old[12].

Thus, the importance of portraying the characteristics of prenatal care regarding the number of consultations, vaccination and guidance on breastfeeding over the years is emphasized, for the planning of interventions that promote a qualitative improvement in prenatal care with a consequent reduction in maternal and infant morbidity and mortality.

Considering the relevance of prenatal care for maternal and child health and the perspective of transitions in the time scenario of this assistance, this research aims at describing the time evolution of prenatal care as to the month when prenatal care is initiated, vaccination and guidelines on breastfeeding in 1997, 2006, and 2016.

LITERATURE REVIEW

The Ministry of Health recommends that prenatal care makes it possible to carry out rapid tests and routine exams, as well as it should offer the medications and supplements necessary for the treatments and that all procedures are recorded in the Pregnant Woman's Handbook[8,13].

In 2012, the Maternal Mortality Ratio (MMR) in Brazil was 65 deaths per 100,000 live births, within the aspirations set forth by United Nations Sustainable Development Goals, which aim, by 2030, at reducing the global maternal mortality rate to less than 70 for every 100,000 live births[14,15]. However the MMR varies according to the region of the country. The Northeast and Midwest regions, for example, stood out for presenting rates above the acceptable limits defined by the UN, highlighting the regional inequalities existing in Brazil[14].

According to a study that observed the evolution of the Neonatal Mortality Coefficients (NMCs) in Pernambuco between 2007 and 2016, the implementation of the *Mãe Coruja Pernambucana* and *Rede Cegonha* programs did not accentuate the downward trend of the preventable NMCs in Health Regions located in the inland of the state, despite the expansion of prenatal coverage noticed in these regions[16]. In 2014, of the 10,446 preventable infant and neonatal deaths in Brazil, nearly 40% were related to inadequate care provided during pregnancy[17].

Therefore, the development of studies in the area of prenatal care emerges as a subsidy for the increase in the number of health actions, in addition to providing transformational elements in the assistance practice.

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METHOD

A cross-sectional and population-based study, developed from access to secondary data extracted from the databases of the II, III and IV State Health and Nutrition Surveys (*Pesquisas Estaduais de Saúde e Nutrição*, PESNs), conducted in the state of Pernambuco. The research was elaborated according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline.

Collection of the original studies took place in 1997, 2006 and 2016, on occasion of the II, III and IV PESNs, respectively. The universe of mothers of children under five years old living in the state of Pernambuco in 1997, 2006 and 2016 was included in the population. For the current study, in the case of the mothers with more than one child under five years of age, the prenatal care referring to the last pregnancy was considered.

Adoptive mothers were excluded, understood as those who did not give birth but assumed the maternal role of raising these children. Incomplete data in the forms were discarded, in order for them not to exert any influence on the internal validity of the study. For analysis purposes, the forms considered incomplete were those in which at least 5% of the data of interest were lost. Consequently, the samples of mothers obtained in 1997, 2006 and 2016 for this study consisted of 2,081, 1,650 and 880 individuals, respectively.

The data were collected during interviews with the mothers at their homes or in the Basic Health Units, as scheduled. For data collection in the original surveys, household identification forms were used; as well as registration of family members; registration and description of the household and socioeconomic aspects; registration of the child, adolescent and woman of reproductive age; registration of the child's morbidity; registration of the family and children's food consumption; anthropometric registration; and registration of biochemical data.

The variables used in the study were the following: month when prenatal care was initiated; doses of the anti-tetanus vaccine received in the prenatal period, and guidance on breastfeeding. The gestational month for initiation of prenatal care was assessed according to information on the prenatal card, and was categorized as follows: up to the fourth month (up to the 16th gestational week), from the fifth to the seventh month (from the 16th gestational week and 1 day to the 28th gestational week), and after the seventh month (from the 28th gestational week and 1 day of gestation). The criterion used to define 16 gestational weeks was based on the Ministry of Health's manual[18] and on the diverse information available in the State Health and Nutrition Surveys in force at the time of data collection.

The “doses of anti-tetanus vaccine received during prenatal care” variable was defined as the completion of adult-type double vaccination (dT) during pregnancy, according to the diverse information on the prenatal card. This was categorized as follows: previously immunized (women who were vaccinated before pregnancy), vaccinated (women who were vaccinated with the booster, one, two or three doses during pregnancy), and has not received/has never been vaccinated (women who were not vaccinated at any time in their lives).

The data regarding receiving professional guidance on breastfeeding were obtained from the diverse information in the interviews with the pregnant women.

Data analysis was performed with the aid of the Stata 12.1 software. The categorical variables are presented in absolute and relative frequency distribution tables and the continuous variables, by means of central tendency and dispersion measures. The comparison of the categorical characteristics across the years was performed based on the chi-square association test or on Fisher's exact test, when pertinent.

This study is linked to an umbrella project entitled “Time trends and factors associated with adequate Prenatal Care in Pernambuco”, which covers the objectives of the current research not incorporated in the primary studies. The research protocol was approved by the Committee of Ethics in Research with Human Beings of the institution involved.

RESULTS

When describing the time evolution referring to the month of prenatal care initiation in 1997, 2006 and 2016, it was possible to observe that, in 2016, the proportion of pregnant women who started attending consultations up the fourth month was 91.7%, which represented statistical significance when compared to 1997 and 2006 ($p<0.001$). In turn, from the fifth to the seventh month, 1997 stood out with 14.8% ($p<0.001$). When compared to each other, the other years did not present a significant difference. In relation to the pregnant women who initiated prenatal care after the seventh month, an increase in the relative value was observed between 1997 and 2006 ($p<0.001$) followed by a reduction in this value between 2006 and 2016 ($p<0.001$) (Table 1).

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TABLE 1: Time evolution of the month when prenatal care was initiated in 1997, 2006 and 2016. Recife, PE, Brazil.

Month when prenatal care was initiated	Year			Comparisons (p-value)		
	1997 (n = 1,606)	2006 (n = 1,626)	2016 (n = 817)	1997 *versus* 2006	1997 *versus* 2016	2006 *versus* 2016
Up to the 4th month	1,354 (84.3)	1,354 (83.3)	749 (91.7)	0.424	<0.001	<0.001
From the 5th to the 7 th month	238 (14.8)	144 (8.9)	65 (8.0)	<0.001	<0.001	0.453
After the 7th month	14 (0.9)	128 (7.9)	3 (0.4)	<0.001	0.0	<0.001

Pearson's chi-square test

Table 2 presents the vaccination status regarding tetanus, in the period under study.

TABLE 2: Time evolution of the anti-tetanus vaccine in 1997, 2006 and 2016. Recife, PE, Brazil.

Anti-tetanus vaccine	Year			Comparisons (p-value)		
	1997 (n = 2,036)	2006 (n = 1,632)	2016 (n = 846)	1997 *versus* 2006	1997 *versus* 2016	2006 *versus* 2016
Previously immunized	1,039 (51.0)	271 (16.6)	161 (19.0)	<0.001	<0.001	0.131
Vaccinated	569 (27.9)	1,102 (67.5)	585 (69.1)	<0.001	<0.001	0.411
Never vaccinated	428 (21.0)	259 (15.9)	100 (11.8)	<0.001	<0.001	0.007

Pearson's chi-square test

In 1997 there was 51% of previously vaccinated pregnant women, which represented the highest proportion when compared to the other years (p<0.001). The opposite was observed in the "vaccinated" variable, in which 1997 presented a lower value (27.9%) when compared to 2006 and 2016. The "never vaccinated" variable presented a decreasing relationship across the years described.

According to Table 3, regarding guidance on breastfeeding, the proportion of pregnant women who received individual instruction and verbal guidelines was significantly higher in 2006 and 2016 when compared to 1997 (p<0.001).

TABLE 3: Time evolution of the guidance on breastfeeding in 1997, 2006 and 2016. Recife, PE, Brazil.

Guidance on breastfeeding	Year			Comparisons (p-value)		
	1997 (n = 2,036)	2006 (n = 1,632)	2016 (n = 843)	1997 *versus* 2006	1997 *versus* 2016	2006 *versus* 2016
Yes	1,320 (64.8)	1,305 (80.0)	665 (78.9)	<0.001	<0.001	0.528
No	716 (35.2)	327 (20.0)	178 (21.1)			

Pearson's chi-square test

When describing years 2006 and 2016, it is noted that the proportions did not present a significant difference (p=0.528).

DISCUSSION

This study presents results that contribute to knowledge advancement in the area of women's health, as it provides diverse evidence of the time analysis of priority characteristics in prenatal care.

It was observed that most of the pregnant women initiated prenatal care by the fourth gestational month in all the years evaluated, evidencing a significant increase in 2016 when compared to 1997 and 2006. In relation to the vaccination status, a progressive increase in the prevalence of pregnant women immunized with the anti-tetanus vaccine was found, as well as a relevant decrease both in the group of those previously immunized and in those who had never been vaccinated. Regarding the pregnant women who received guidance on breastfeeding, a significant increase was observed in 2006 and 2016, when compared to 1997.

The significant increase noticed in relation to early initiation of prenatal care in 2016 can be related to the implementation of programs and policies carried out in the country, such as *Rede Cegonha*, implemented in 2011, and the *Mãe Coruja Pernambucana* program, deployed in 2007[16]. A study that evaluated the impact of these programs reveals a significant reduction in avoidable neonatal mortality in Recife 2 years after the implementation of *Rede Cegonha*, especially associated with the strengthening of the high-complexity network[16].

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Socioeconomic factors arising from the epidemiological transition evidenced in recent years, such as increased family incomes, declining birth rates and expansion of and access to the health network, among other conditioning elements, can also be associated with the results obtained in the current study[19].

Initiation of prenatal care stands out as an important factor for assessing its adequacy. The *Nascer no Brasil* (Being Born in Brazil) study conducted between 2011 and 2012 highlights important regional variations in prenatal care, despite its high coverage. When considering early initiation (up to 12 weeks) and the adequate number of consultations (six), the North (48.7%) and Northeast (54.7%) regions presented the worst results in relation to adequacy of prenatal care. Furthermore, it is noted that prenatal care inadequacy was significantly associated with spontaneous prematurity[2], which may emphasize the importance of adequate prenatal assistance for the prevention of adverse neonatal outcomes.

A cross-sectional study, linked to the research study entitled *Nascer em Sergipe* (Being Born in Sergipe) and conducted with 768 puerperal women between 2015 and 2016, reveals that 57% of the women who underwent prenatal care initiated follow-up before the 16th gestational week, with those who had higher schooling levels, presence of a partner and a desire to become pregnant significantly standing out[20]. Another survey observed that conduction of six or more consultations was higher among white-skinned, older and high-income pregnant women, while worse prenatal care was provided to younger women and to those with lower incomes[17]. These findings suggest a direct relationship between prenatal care and socioeconomic factors. The importance of continuous monitoring of the time evolution is noted, from the conduction of new studies.

Regarding vaccination status, an increasing trend of anti-tetanus vaccination during pregnancy was noticed in this study, as well as a reduction in the prevalence of previously vaccinated women and in those who had never been vaccinated. This result reinforces the importance of vaccination being present in the gateway to the Health Care Network.

A national study that evaluated the quality indicators of prenatal care in Brazil observed that, when necessary, 97% of the women had the anti-tetanus vaccine update during pregnancy; the percentage being significantly higher among those who were older, non-white-skinned and residents of medium-sized municipalities with lower Human Development Indices (HDIs)[17].

In a research study conducted with women in their last trimester of pregnancy in Pakistan, it was noticed that periodic prenatal care improved vaccination coverage, which can be the key to achieving the goal of MNT eradication in the country[21]. The factors associated with vaccine implementation primarily affect low-income countries; therefore, it is necessary to develop studies that identify and understand the challenges in the provision of maternal and neonatal vaccination services.

As for receiving guidelines on breastfeeding during prenatal care, there was a significant increase in 2006 and 2016, when compared to 1997. This finding corroborates a national study that found a 91% prevalence of women being counseled on the importance of exclusive breastfeeding, this being the most common guidance offered during prenatal care[17].

In this context, the influence of prenatal care adequacy in the breastfeeding practice stands out, already evidenced in the literature. A study reveals greater adherence and duration of exclusive breastfeeding in women who attended at least six prenatal consultations and received guidelines on the importance of breastfeeding up to the age of 2 years old[22]. The need for the adoption of new strategies, more effective education in health, and incorporation of new technologies in order to increase these orientations is emphasized. New studies may come to clarify which is the main method used by the professionals to offer guidance to the women in the prenatal period.

Study Limitations

The following are highlighted as limitations: the ample time interval between the collection years and the irregular time lapse in the three comparisons: 1997, 2006 and 2016.

In addition to that, the study only used three variables, which hindered a broader assessment about prenatal care adequacy. Prenatal care was only described in the state of Pernambuco, which may not correspond to the reality of other Brazilian states.

CONCLUSION

Between 1997, 2006 and 2016 there was a significant increase in the prevalence of pregnant women who initiated prenatal care early in time, who were immunized with the anti-tetanus vaccine during pregnancy, and who received guidelines referring to breastfeeding during prenatal care. A reduction was also noticed in the women who initiated prenatal care after the seventh month and in those that had never been vaccinated. The data found present potential transferability to contexts similar to the reality under study.

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The study emphasizes the importance of public health policies and programs aimed at improving prenatal care in the country, not only looking at epidemiological data, but especially targeting the pregnant women's individual needs and factors associated with inefficient prenatal care.

Finally, the importance of providing quality care in order to promote comprehensive health was demonstrated, especially for women at risk of vulnerability. All of this information may contribute to improving prenatal care, in order to reduce the maternal mortality rates that are still a reality in the state of Pernambuco and in the country.

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