



Apgar Score related to Maternal/Obstetrical and Neonatal Factors

*Índice de Apgar relacionado a Fatores Maternos/Obstétricos e Neonatais**Índice de Apgar relacionado con Factores Maternos/Obstétricos y Neonatales*

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ABSTRACT

Objective: To analyze the influence of maternal/obstetric and neonatal factors on the results of the Apgar Index evaluation. **Method:** Documentary, retrospective study with Declarations of Live Births of a hospital and maternity hospital in Sobral/CE in 2015. The variables analyzed were: maternal age, number of prenatal consultations performed by the pregnant woman, type of delivery, gestational age and weight at born. **Result:** The best indices were related to the maternal age of 21 to 30 (38.42%) years. Cesarean delivery concentrated the highest percentages (46.43%) in the score of 8-10. Observing the prenatal consultations performed, the best index was represented by the pregnant women who performed 7 more consultations (58.03%). The gestations of 37 to 41 weeks' gestation were concentrated at the best indices (68.99%). Children weighing 2,500 g or more presented the best indices (8-10) with 69.8%. **Conclusion:** The maternal/obstetric factors analyzed are important for a good evaluation of the Apgar Index.

Keywords: Apgar score; Vital signs; Maternal Age; Gestational Age.

RESUMO

Objetivo: Analisar a influência dos fatores maternos/obstétricos e neonatais no resultado da avaliação do Índice de Apgar. **Método:** Estudo documental, retrospectivo com Declarações de Nascidos Vivos de um hospital e maternidade de Sobral/CE em 2015. As variáveis analisadas foram: idade materna, número de consultas pré-natais realizadas pela gestante, tipo de parto, idade gestacional e peso ao nascer. **Resultado:** Os melhores Índices foram relacionados à idade materna de 21 a 30 (38,42%) anos. O parto cesáreo concentrou os maiores percentuais (46,43%) no escore de 8-10. Observando as consultas pré-natais realizadas, o melhor Índice foi representado pelas gestantes que realizaram de 7 a mais consultas (58,03%). As gestações de 37 a 41 semanas de gestação estiveram concentrados os melhores Índices (68,99%). Crianças que tinham peso de 2.500g ou mais apresentaram os melhores Índices (8-10) com 69,8%. **Conclusão:** Os fatores maternos/obstétricos analisados são importantes para uma boa avaliação do Índice de Apgar.

Descritores: Índice de Apgar; Sinais Vitais; Idade Materna; Idade Gestacional.

RESUMÉN

Objetivo: Analizar la influencia de los factores maternos/obstétricos y neonatales en el resultado de la evaluación del Índice de Apgar. **Método:** estudio documental retrospectivo de certificados de nacimiento vivo de un hospital y maternidad Sobral/CE en 2015. Las variables analizadas fueron: edad materna, número de consultas prenatales por parte de mujeres embarazadas, tipo de parto, la edad gestacional y el peso al nacer. **Resultado:** Los mejores Índices fueron relacionados a la edad materna de 21 a 30 (38,42%) años. El parto cesáreo concentró los mayores porcentajes (46,43%) en la puntuación de 8-10. Observando las consultas prenatales realizadas, el mejor índice fue representado por las gestantes que realizaron de 7 a más consultas (58,03%). Las gestaciones de 37 a 41 semanas de gestación estuvieron concentrados en los mejores Índices (68,99%). Los niños que tenían un peso de 2.500 o más presentaron los mejores Índices (8-10) con el 69,8%. **Conclusión:** Los factores maternos/obstétricos analizados son importantes para una buena evaluación del Índice de Apgar.

Descritores: Índice de Apgar; Signos vitales; Edad materna; Edad Gestacional.

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INTRODUCTION

Death in the perinatal phase is an important indicator of maternal and child health (including fetal deaths and early neonatal deaths), reflecting both reproductive health conditions, which can be linked to socioeconomic factors, the quality of perinatal care, such as prenatal care, childbirth and neonatal care.¹

The Apgar Index was described in 1952 by the American anesthetist Virginia of Apgar. This Index takes useful proportions to guarantee the initial evaluation to the newborn, considering low values in the first and fifth minutes of evaluation as a risk of neonatal death.²

The Apgar scale is a test that consists of evaluating five vital signs: muscle tone, heart rate, reflex irritability, breathing, and color of the newborn's skin. The signs are evaluated in the first minute of life, which allows to determine the degree of tolerance of the child to the childbirth, fifth minute postpartum, that allows to evaluate the degree of adaptation of the baby to extra uterine life and also in the tenth minute. The sum of the scores on each of the five vital signs, ranging from 0 to 10, will result in the Apgar Index and the newborn (NB) will be classified as non-asphyxia (Apgar score 8 to 10) with mild asphyxia (Apgar score 5 to 7), moderate asphyxia (Apgar score 3 to 4), and severe asphyxia (Apgar score 0 to 2).³

The pathophysiological changes, which indicate a low Apgar score, are partially dependent on the maturity of the newborn.

Maternal conditions may also influence this score, such as medications, and also the NB's own conditions influence assessment such as neuro-motor or brain malformations and

Factors related with Apgar score

respiratory conditions. Apgar scores, neonatal weight and gestational age (GA) are highly associated with survival and, together, are a measure of NB well-being, size, maturity and resuscitation success.⁴

This method was developed for assistance in obstetric and pediatric practice. However, it has been determined over time as a practice to identify neonatal asphyxia. And more recent became a method of response after maneuvers in the NB. This method is closely linked to the analysis of mortality in the first 28 days of life.⁵

The objective of this study was to analyze the influence of maternal/obstetrical and neonatal factors on the outcome of the Apgar Index in a newborn from a city in the interior of Ceará.

METHODS

The present study is documentary, retrospective and used as a source of data were the Declarations of Live Births in a hospital and maternity hospital in the city of Sobral/CE using data from the year 2015.

The hospital, a place of study, is a reference in the North region and state, attending cases of high complexity, having completed more than 90 years of activity. Approximately 40,000 patients are housed monthly in their hospital units and contribute to the training of academics in several areas, thus becoming a teaching hospital. In its routine, the hospital aims to promote care, research, teaching and extension, attending health services looking after the quality, through a humanized service and the training of

professionals from diverse areas, aiming at the contentment of its employees and users.⁶

The documents were filed at the Medical and Statistical Archive Service of the referred hospital. Participants in the study were parturients and their newborns (n=1,232) attended in the referred hospital, who had the medical records dated to the year 2015. The records and/or medical charts of different years were excluded.

The variables that correlate the Apgar Index with maternal/obstetrical and neonatal factors were analyzed: maternal age, number of prenatal consultations, type of delivery, gestational age and birth weight.

The data were analyzed in Microsoft Excell and tables were made containing absolute and relative frequencies.

The present study was approved by the Ethics Committee of the State University of Vale do Acaraú with approval opinion number 1,402,425, maintaining anonymity and following the recommendations of the Ordinance of the National Health Council, Resolution number 466/12.

RESULTS

The research was based on the analysis of 1,232 medical records. In these, it was possible to more concretely have the associated relation through the Apgar Index with maternal/obstetric and neonatal variables.

Table 01 deals with the Apgar index relation with the total number found of its respective index value.

Table 01: Apgar index of live newborns at Hospital Santa Casa de Misericórdia in the city of Sobral/CE in the first five minutes.

Apgar Index at 5 minutes	n	%
0-3	72	5.84
4-7	162	13.14
8-10	998	81.01

In table 02 one can deepen the perception between the close relation of the maternal age with its respective values found in

the Apgar Index. It is observed that the age group of 21 to 30 years presented better Apgar Index.

Table 02: Distribution of the age group of parturients attended at Santa Casa de Misericórdia Hospital in the city of Sobral/CE according to Apgar index in the first five minutes.

Maternal Age (Years)	Apgar Index					
	0-3		4-7		8-10	
	n	%	N	%	n	%

12 to 20	08	0.74	35	3.24	309	28.6
21 to 30	09	0.83	27	2.5	415	38.42
31 to 40	04	0.37	34	3.14	201	18.6
41 to 50	00	00	07	0.64	27	2.5
51 to 54	00	00	01	0.09	03	0.27

Table 03 shows the relationship of the type of delivery, cesarean or vaginal with the values found in the Apgar Index. It can be seen

that the Apgar Index in the range of 08 to 10 was higher in cesarean delivery.

Table 03: Type of birth in parturients attended at the Hospital Santa Casa de Misericórdia in the city of Sobral/CE compared to the Apgar Indexes in the first five minutes.

Type of delivery	Apgar Index					
	0-3		4-7		8-10	
	n	%	N	%	n	%
Cesarean	18	1.46	66	5.35	572	46.43
Vaginal	10	0.81	57	4.62	509	41.31

Table 04 shows the relation between the number of prenatal consultations performed during and the respective Apgar Index. It was found that the higher the number of prenatal

consultations performed by pregnant women, the higher were the classification scores for the Apgar Index.

Table 04: Number of prenatal visits performed in parturients attended at Santa Casa de Misericórdia Hospital in the city of Sobral/CE compared to the Apgar Indexes in the first five minutes.

Number of prenatal consultations	Apgar Index					
	0-3		4-7		8-10	
	n	%	N	%	n	%
1 to 3	15	1.21	20	1.62	53	4.30
4 to 6	08	0.65	42	3.40	321	26.05

>7	03	0.24	55	4.46	715	58.03
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Table 05 shows the relationship between gestational age and the respective Apgar Index. It is observed that the majority of the deliveries, 850, corresponding to 68.99% of the total

deliveries, occurred from the 37th week of gestation with the Apgar Indexes between 8 and 10.

Table 05: Gestational age (length of gestation in weeks) in parturients attended at Santa Casa de Misericórdia Hospital in the city of Sobral/CE according to Apgar indices in the first five minutes.

Gestational Age (weeks)	Apgar Index					
	0-3		4-7		8-10	
	n	%	n	%	n	%
22 to 27	14	1.13	04	0.33	03	0.25
28 to 36	10	0.81	70	5.69	229	18.58
37 to 41	04	0.33	46	3.73	850	68.99
>42	00	00	00	00	02	0.16

In this table 06 the Apgar Index with the birth weight is related. It is observed that birth weight greater than or equal to 2,500 grams

obtained an expressive Apgar high between 8 and 10.

Table 06: Weight of the newborns in the Santa Casa de Misericórdia Hospital of the city of Sobral/CE compared to the Apgar Indexes in the first five minutes.

Birth Weight	Apgar Index Five minutes					
	0-3		4-7		8-10	
	n	%	n	%	n	%
<2500g	21	1.70	73	5.92	221	17.93
≥2500g	08	0.64	49	3.97	860	69.8

DISCUSSION

The highest percentage of medical records collected, approximately 81.01%, obtained an

excellent Apgar Index in the classification range between 8 and 10 in the first 5 minutes of life.

Thus, 948 newborns of the total were classified as without asphyxia, which does not represent risk to the newborns. That is, it indicates, that the risk of complication is low and denote a healthy child.⁷ For the range 4-6, wake up call for special attention, was not observed any newborn.⁸

Newborns with low Apgar score have a classification of severe asphyxia, and from this it is necessary to prepare and care carefully in order to favor the exit of the newborn from this classification.⁴

The age group of 21 to 30 years presented a better Apgar score, approximately 38.42%, thus, it represented the age group in which the low probability of the newborn is classified with some risk of asphyxia.

In fact, in relation to maternal age over 40 years, a decline was observed in this range of the Apgar Index between 08 and 10. Pregnancy after 34 years of age is called late pregnancy and is considered a risk factor for morbidity-maternal and fetal mortality,⁹ thus representing an age group at risk for the newborn.

Regarding this perinatal condition (age range), there was a frequency of about 02 times higher neonatal death and 4 times higher rate of late fetal death among pregnant women aged 40 years or older.¹⁰

For elective caesarean deliveries, emergency cesarean deliveries and natural births, it is concluded that the risk of respiratory tract problems is lower for live newborns of natural birth.¹¹

Although the Apgar Index in the range of 8 to 10 is higher in cesarean section, approximately 46.43%, the difference is minimal

compared to vaginal delivery, which corresponds to 41.31% of the data collected.

Thus, in the worst range, from 0 to 3, cesarean delivery, obtained almost double the number of newborns with the worst classification score for Apgar compared to vaginal delivery. This represents a risk of asphyxia to the newborn and a more cautious follow-up should be given to cesarean deliveries, in order to avoid future complications with the newborn.¹¹

Despite advances in techniques in surgical practices, maternal morbidity and mortality continue to be correlated with cesarean delivery; the cesarian births should only be used when strictly indicated. However, in the process of medicalization during pregnancy, cesareans are indicated in Brazil as a convenient form of delivery. Obstetricians have chosen cesarean deliveries because they are faster than the delayed natural births (vaginal) and use the reasons stated by a small portion of parturients that demand cesarean deliveries to spread the supposed option of the parturients by the cesarean delivery.¹²

Regarding the assistance characteristics, the amount of prenatal consultation performed and Apgar in the 1st and 5th minutes as risk factors are therefore decisive for the mortality of the newborn, guaranteed to the pregnant woman a prenatal follow-up with excellence, with an adequate amount of prenatal consultations, adequate care during delivery, the newborn and the mother could have a decrease in neonatal mortality.¹³

According to the analysis, it was found that the higher the number of prenatal

consultations performed by the larger pregnant women were the classification notes for the Apgar Index. In the case, between one and three appointments, the Apgar Index between 08 and 10 represented, approximately 4.3% of the data collected. Between four and six prenatal visits, the percentage for this same Apgar score rose to 26.05%, an increase of approximately 84.7% over the frequency of one to three visits. The same was observed for the increase in prenatal consultations to greater or equal to seven, which obtained an increase of approximately 58.03% compared to the frequency of four to six prenatal consultations.

The amount of prenatal consultations is inversely associated with the prevalence of below-normal weight and/or prematurity of the newborn. With the increase from zero to three visits to seven or more prenatal consultations, the difference in prevalence of underweight and/or prematurity from 14.1% to 4.1% is reduced.¹⁴

The minimum amount recommended by the Ministry of Health (Brazil) for all pregnant women is 6 consultations, starting as soon as possible, thus distributed: a consultation in the first trimester (up to the 12th week); two consultations in the second quarter and three consultations in the third quarter; considering the perinatal risk and clinical-obstetric complications, which are more common in the third trimester, it is essential that consultations are performed up to the 40th gestational week.¹⁵

Still on perinatal data, Table 05 analyzes the GA and the Apgar Index. It is observed that the majority of deliveries, 850, corresponding to 68.99% of total deliveries, occurred from the

37th week of gestation with the Apgar Indexes between 8 and 10. Findings show a worldwide trend towards decline of GA rates of 40 weeks or more and an increase in GA rates from 37 to 39 weeks.¹⁶

Perinatal morbidity and mortality have always been correlated with preterm delivery, post-term delivery, and intrauterine growth restriction. The accuracy of knowledge of GI and the probable date of delivery is essential in Perinatal Medicine for correct obstetric orientation and definition of care measures.¹⁷

Better understanding of GA has beneficial and well-documented effects on the population by allowing intrauterine growth restriction screening and avoidance of pseudo-post-maturity, thus reducing the amount of unnecessary interference and guiding more appropriate medical decisions.¹⁷

Premature infants are children weighing less than 2,500 grams, born before the 37th week of gestation. Prematurity is a matter of concern for the associated mortality indices.¹⁸

Birth weight greater than or equal to 2,500 grams obtained an expressive Apgar high between 8 and 10, corresponding to about 69.8%. While the birth weight below this value represented approximately 17.93% of the data collected for the same range of the Apgar Index.

It is defined by the World Health Organization as Low Birth Weight, the birth of infants weighing less than 2.5 kg. This is a condition where the main factors are intrauterine growth restriction and the short gestational period, that is, prematurity.¹⁹

Birth weight is considered a good indicator of current health quality. However,

low birth weight is currently considered a management problem in the health area, since it predicts the health risks of the neonate in the short term, such as the one with the highest morbidity and mortality, in the first year of life, being affected by malnutrition, discomfort respiratory infections, susceptibility to infections and traumas during childbirth.²⁰

In spite of a higher number of deaths in premature infants, there is no statistically significant association between GA and Apgar level^{21,22}. The 13.5% of preterm infants born between 28 and 36 weeks presented Apgar levels between 4 and 7, demonstrating a tendency to drop Apgar in preterm infants.

The results of this study should take into account the limitation of the secondary data source. With regard to the contributions to public health, we show confirmatory and relevant results as the importance of prenatal care is fundamental for the health of the neonate, so public policies directed to the mother-child binomial are of utmost relevance.

CONCLUSION

It is concluded that the Apgar Index is still a widely used tool to evaluate newborns in general. Considering the data collected and analyzed, this study showed us that: maternal age, number of prenatal consultations, type of delivery, the age of the pregnant woman and the birth weight are important data for a good evaluation of the Apgar.

Pregnant women aged 21 to 30 years had the best indices. In addition, those who had a regular follow-up in the gestation with more than 7 appointments during the prenatal period and had a total number of gestational weeks between 37 and 41 also obtained high scores in the Apgar Index. This leads to the conclusion that, these maternal/obstetric factors have a positive influence on the Apgar score. Therefore, this reinforces the importance of medical follow-up during pregnancy, especially in pregnant women of more advanced age.

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The authors declare that no have conflicts of interest.

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