

The impact of antenatal classes on the newborn state

Wpływ zajęć w szkole rodzenia na stan urodzeniowy noworodków

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Abstract

Background. The leading goal for antenatal classes is to prepare future parents to find their way in new roles. It is also the transfer of the current, competent and useful knowledge that will help them properly prepare for childbirth and infant care.

Objectives. Analysis of the birth status of newborns delivered by women participating in antenatal classes compared to non-participating ones.

Material and methods. The study involved 100 newborns born via vaginal canal. The analysis covered the medical documentation, especially taking into account the delivery data and the birth status of children. The birth status of newborns was assessed using: Apgar scale score 1 min, 5 min and 10 min after birth; fetal umbilical cord blood gasometry; birth weight; and body length. The analysis took into account also the labor duration and sex of the newborns.

Results. The average birth weight of newborns born from the population of mothers attending the antenatal classes was $3,243.0 \pm 436.10$ g, while newborns of women who did not participate in these classes weighed $3,407.80 \pm 467.57$ g. The average Apgar assessment of the newborn according to the Apgar scale 1 min after birth in women participating in classes was 9.14 ± 1.07 points, and in non-participating 9.14 ± 1.29 . In the 5th minute, the Apgar ratings were as follows: 9.42 ± 0.78 and 9.48 ± 0.95 , respectively. The average assessment of the newborns 10 min after birth was 9.64 ± 0.56 in the participants and 9.68 ± 0.62 in the non-participants. The average pH value of the fetal umbilical cord blood gasometry in the 1st group was 7.26 ± 0.09 , while in the 2nd the pH was 7.30 ± 0.10 ($p = 0.038$). Differences in pCO₂, pO₂ and BE results were not statistically significant.

Conclusions. Participation in the antenatal classes does not have a significant impact on the birth state determined with parameters tested. However, the potential relationship of parity and participation in antenatal classes with the duration of delivery seems to be interesting. This will require further research.

Key words: education, antenatal classes, childbirth, newborn

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Streszczenie

Wprowadzenie. Celem szkół rodzenia jest ułatwienie przyszłym rodzicom odnalezienia się w nowych rolach oraz przekazanie najnowszej, niezbędnej i przydatnej wiedzy, która pomoże im w należyty sposób przygotować się do porodu i opieki nad noworodkiem.

Cel pracy. Analiza stanu urodzeniowego noworodków kobiet uczestniczących w zajęciach szkoły rodzenia w porównaniu z noworodkami matek nieuczyszczających do takich szkół.

Materiał i metody. Badaniami objęto 100 noworodków urodzonych drogami natury. Analizie poddano dokumentację medyczną, uwzględniając dane porodowe oraz stan urodzeniowy. Stan urodzeniowy noworodków określono na podstawie: punktacji w skali Apgar wyznaczanej w 1., 5. i 10. min, parametrów gazometrii krwi pępowinowej płodu, masy urodzeniowej i długości. W analizie uwzględniono ponadto czas trwania porodu oraz płeć noworodków.

Wyniki. Średnia masa ciała noworodków urodzonych przez kobiety uczęszczające do szkoły rodzenia wyniosła 3243,0 g $\pm$ 436,10 g, a noworodków pacjentek nieuczyszczających do takich szkół – 3407,80 g $\pm$ 467,57 g. Średnia ocena wg skali Apgar w 1. min życia noworodków matek biorących udział w zajęciach wyniosła 9,14 $\pm$ 1,07, a u niebiorących w nich udziału – 9,14 $\pm$ 1,29. W 5. min życia noworodków oceny były następujące: odpowiednio 9,42 $\pm$ 0,78 oraz 9,48 $\pm$ 0,95. Średnia ocena w 10. min życia wyniosła 9,64 $\pm$ 0,56 w przypadku noworodków uczestniczek szkoły rodzenia oraz 9,68 $\pm$ 0,62 w przypadku noworodków matek nieuczyszczających do takich szkół. Średnie pH w badaniu gazometrycznym noworodków pacjentek biorących udział w zajęciach szkoły rodzenia wyniosło 7,26 $\pm$ 0,09, a niebiorących w nich udziału – 7,30 $\pm$ 0,10 ($p = 0,038$). Różnice w wynikach pCO_2 , pO_2 oraz BE nie były istotne statystycznie.

Wnioski. Uczestnictwo w zajęciach szkoły rodzenia nie wpływa w istotny sposób na stan urodzeniowy noworodków określony poprzez badane przez autorów tej pracy parametry. Interesujący wydaje się potencjalny związek rodności i uczestnictwa w zajęciach szkoły rodzenia z czasem trwania porodu, ale wymaga to dalszych badań.

Słowa kluczowe: edukacja, szkoła rodzenia, poród, noworodek

Background

Antenatal classes are among the possibilities for future parents to learn the physiology of pregnancy, the changes that take place during this period in the female body and the mechanisms accompanying the birth. The involvement of both parents creates an unbreakable bond between them, which in most cases pays off with cooperation and partnership during the first moments of their child's life. Parents' great awareness is also reflected in a better understanding of the birth period and communication with the medical staff. After all, the birth of a healthy newborn baby is a priority for all those present at birth.^{1–3}

The aim of this study was to analyze the birth status of newborn babies of mothers participating in antenatal classes as compared to those of mothers not participating in such classes.

Material and methods

The research involved 100 newborns – 50 babies born from women participating in antenatal classes and 50 babies born from women not participating in such classes. All cases studied were natural childbirths, full-term, at the Department of Obstetrics and Gynaecology of the Independent Public Clinical Hospital No. 2 of the Pomeranian Medical University in Szczecin, Poland. The study was conducted in the period from December 2017 to March 2018. The participants to antenatal classes were mostly primigravidae (76%), while among those who did

not attend such classes, multigravidae prevailed (72%). Forty percent of the respondents had higher or secondary education. Most of the respondents came from cities (70%). The methodology of the study assumed the analysis of medical records. The birth status of newborn babies was determined based on: the Apgar score determined 1 min, 5 min and 10 min after birth, fetal cord arterial blood gas test parameters, and birth weight and length. The analysis also considered the duration of childbirth and the sex of newborns.

The STATISTICA, v. 10.0 software (StatSoft Polska, Cracow, Poland) was used for statistical analysis of the data. The measured parameters are presented with arithmetic averages, standard deviations (SDs) for continuous variables, while for discrete variables – number of cases and percentage value. Arithmetical mean differences were analyzed using Student's *t* test for 2 groups compared and Mann–Whitney *U* test. The statistical significance for all comparisons was set at $p < 0.05$.

Results

The average duration of the 1st stage of childbirth in the participants to antenatal classes was 342.3 $\pm$ 174.2 min ($Me = 290$ min), and 274.4 $\pm$ 185.5 min ($Me = 240$ min) in women not attending such classes. The differences were statistically significant ($p = 0.018$). The average duration of the 2nd stage of childbirth was accordingly: 29.0 $\pm$ 21.5 min and 21.1 $\pm$ 24.5 min. The differences were statistically significant ($p = 0.0012$). Detailed results are presented in Table 1.

The average body weight of newborn babies born by mothers participating in antenatal classes was $3,243.0 \pm 436.10$ g, and of newborn babies of women not participating in such classes $3,407.80 \pm 467.57$ g. The average length of newborns was 53.50 ± 2.32 cm and 54.54 ± 3.33 cm, respectively. The differences were not statistically significant (Table 2).

Average Apgar score at 1 min of life of newborn whose mothers participated in antenatal classes was 9.14 ± 1.07 points, and that of newborns of women not participating in classes 9.14 ± 1.29 points. At the 5th minute of life, the respective results were as follows: 9.42 ± 0.78 points and 9.48 ± 0.95 points, and in the 10th minute of life 9.64 ± 0.56 points and 9.68 ± 0.62 points. The differences were not statistically significant (Table 3).

The mean pH in the arterial blood gas test of the newborns of the patients participating in the antenatal classes

was 7.26 ± 0.09 , and of those whose mothers did not participate in it 7.30 ± 0.10 . Statistically significant differences were found ($p = 0.038$). The average $p\text{CO}_2$ (partial pressure of carbon dioxide) was, respectively, 47.64 ± 11.67 mm Hg and 47.30 ± 11.75 mm Hg. The respective results of mean $p\text{O}_2$ (partial oxygen pressure) were as follows: 20.14 ± 9.97 mm Hg and 23.88 ± 9.71 mm Hg. In turn, BE (excess of base in blood) in the newborns of women attending antenatal classes was 4.25 ± 3.34 mmol/L and 3.09 ± 3.02 mmol/L in the newborns of women not attending such classes. The differences were not statistically significant. The results are shown in Table 4.

Among the population of women attending antenatal classes, 52% of newborns were female and 48% were male. In the group of women who did not participate in antenatal classes, 64% of newborns were male and 36% were female. The differences were not statistically significant (Table 5).

Table 1. Duration of the 1st and 2nd period of delivery depending on the participation in the antenatal classes

Tabela 1. Czas trwania I i II okresu porodu w zależności od uczęszczania do szkoły rodzenia

Duration of childbirth	Total			Participation in antenatal classes						<i>p</i> -value ^a
				yes			no			
	<i>M</i>	<i>SD</i>	<i>Me</i>	<i>M</i>	<i>SD</i>	<i>Me</i>	<i>M</i>	<i>SD</i>	<i>Me</i>	
First stage of childbirth [min]	308.30	182.20	256.00	342.30	174.20	292.00	274.40	185.50	240.00	0.0180
Second stage of childbirth [min]	25.00	23.30	15.00	29.00	21.50	19.00	21.10	24.50	11.00	0.0012

^a Mann–Whitney *U* test.

M – mean; *SD* – standard deviation; *Me* – median.

Table 2. Anthropometric data of the newborn depending on the participation in the antenatal classes

Tabela 2. Dane antropometryczne noworodka w zależności od uczestnictwa w szkole rodzenia

Anthropometric data	Total		Participation in antenatal classes				<i>p</i> -value ^a
			yes		no		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Birth weight [g]	3,325.40	457.38	3,243.00	436.10	3,407.80	467.57	NS
Length [cm]	54.02	2.91	53.50	2.32	54.54	3.33	

^a Student's *t* test.

NS – statistically insignificant result.

Table 3. Birth state of the newborn according to the Apgar score in the 1 min, 5 min and 10 min after birth, depending on the participation in antenatal classes

Tabela 3. Stan urodzeniowy noworodka wg punktacji w skali Apgar w 1., 5. i 10. min w zależności od uczęszczania do szkoły rodzenia

Birth condition based on the Apgar score	Total		Participation in antenatal classes				<i>p</i> -value ^a
			yes		no		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
At 1 min	9.14	1.18	9.14	1.07	9.14	1.29	NS
At 5 min	9.45	0.87	9.42	0.78	9.48	0.95	
At 10 min	9.66	0.59	9.64	0.56	9.68	0.62	

^a Student's *t* test.

Table 4. Results of fetal umbilical cord blood gasometry depending on participation in antenatal classes**Tabela 4.** Wyniki gazometrii krwi pępowinowej płodu w zależności od uczestnictwa w zajęciach szkoły rodzenia

Fetal cord arterial blood gas test	Total		Participation in antenatal classes				<i>p</i> -value ^a
			yes		no		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
pH	7.28	0.1	7.26	0.09	7.30	0.10	0.038
pCO ₂ [mm Hg]	47.47	11.65	47.64	11.67	47.30	11.75	NS
pO ₂ [mm Hg]	22.01	9.97	20.14	9.97	23.88	9.71	
BE [mmol/L]	−3.67	3.22	−4.25	3.34	−3.09	3.02	

^a Student's *t* test.**Table 5.** Results of fetal umbilical cord blood gasometry depending on participation in antenatal classes**Tabela 5.** Płeć noworodków w zależności od uczestnictwa w szkole rodzenia

Sex of the newborn	Total		Participation in antenatal classes				<i>p</i> -value ^a
			yes		no		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Male	56	56	24	48	32	64	NS
Female	44	44	26	52	18	36	
Total	100	100	50	100	50	100	

^a χ^2 test.*n* – number of the analysed characteristic in the sample.

Discussion

Over the years, there has been a constant development of conscious parenthood, which is related to the modern family model. Women attach great importance to family planning and proper preparation for the role of the mother. The attitude of modern men to parenthood has also changed. Future fathers show commitment from an early stage of pregnancy and try to prepare for their new role as best they can.

According to Consonni et al., newborns of mothers after antenatal classes are born in a much better condition, which is reflected in the Apgar score.⁴ Similar results were obtained by Kozłowska et al., showing the relationship between earlier preparation for delivery during antenatal classes and the Apgar score.⁵ Equally interesting observations were described by Kolanko, who states that newborns of mothers after the prenatal course not only receive higher scores according to the abovementioned scale, but additionally, in arterial blood gas test, they are more likely to have pH values within the norm.⁶ Cendrowski et al. found that the newborns of antenatal classes graduates had a higher Apgar score than the newborns of mothers from the control group.⁷ According to the results of the study by Kolomyjec et al., participation in antenatal classes does not have a significant impact on the Apgar score.⁸ The same conclusions were reached by Bödecs et al., describing the lack of greater relationships between prenatal education and the birth state of the newborn baby as reflected by the Apgar score.⁹ Berg-

ström et al. examined 1,100 nulliparae in the 3rd trimester of pregnancy who participated in 2 types of prenatal education: psychoprophylactic and non-prophylactic. There were no differences in the incidence of epidural analgesia, planned and emergency cesarean sections, and in the level of stress accompanying labor. The conclusions of Bergström et al. indicate that theoretical preparation or focusing on labor or parental problems has no effect on the objective or subjective outcome of pregnancy.¹⁰ In our study, we have made similar observations for the Apgar score 5 min and 10 min after birth, while after 1 min the results were the same for both groups.

Kolanko describes the differences between the results of arterial blood gas tests of newborns of mothers after the prenatal course and of those not attending such courses. According to his research, newborns of women from the first group had a higher pH than those of the control group, while the arterial blood gas tests of newborns did not show statistically significant differences between mothers' newborns from both groups.⁶ However, his own research does not confirm this theory, as no statistically significant differences were observed when comparing the arterial blood gas test of mothers' newborns from the 2 groups.

The results of research by Kwiatek et al. show that there are no statistically significant differences between the birth weight of newborns of antenatal classes graduates and the birth weight of newborns of women who did not have a preparation course for childbirth.¹¹ Own studies also yielded similar results. However, Bödecs et al. pre-

sented a certain correlation between the participation of women in antenatal classes and the use of the acquired knowledge, and the weight and length of the newborn baby after birth.⁹

The impact of the duration of the birth on the newborns' condition remains an interesting issue. Yohai et al. found that the total duration of childbirth was significantly shorter in women who preferred prenatal education, but comparing various stages of childbirth, it was shown that statistically significant differences only applied to the 1st stage of childbirth.¹² Adams et al. conducted a survey among 2,200 women who gave birth spontaneously and found that in women who were afraid of giving birth, the labor duration was 1 h 32 min longer than in those who did not report fear. However, although the knowledge gained at the antenatal classes made childbirth time shorter, it was still significantly longer than in the control group.¹³ In our study, we observed a significantly shorter duration of childbirth in women not participating in antenatal classes, which may have been due to the fact that there were more multigravidae in this group.

To sum up, women participating in antenatal classes are more aware of their bodies and have more knowledge about the course of pregnancy, childbirth, puerperium, and neonatal care. The knowledge gained at antenatal classes is not indifferent to certain aspects and procedures of childbirth. There is an increased awareness of healthy lifestyle during pregnancy and methods of relieving labor pain, hence the expectation that the birth condition of newborn babies may depend on the mother's earlier preparation for delivery.¹⁴ Modern obstetrics and constantly evolving perinatal care make it possible for women to broaden their knowledge of changes in their bodies throughout their lives, not just at birth. Notwithstanding some differences in results, researchers agree that prenatal education is needed and has many benefits for parents.^{15–17}

Conclusions

Participation in antenatal classes does not significantly affect the birth condition of newborn babies as determined by the parameters examined by the authors of this paper. The potential relationship between fertility and participation in antenatal classes and the duration of childbirth seems interesting, but this requires further research.

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