

EWA RUDNICKA-DROŻAK¹, BEATA RYBOJAD²

Przyczyny wcześniactwa noworodków hospitalizowanych w DSK w Lublinie

Causes of the premature birth of newborn babies hospitalized in Children's Clinical Hospital in Lublin

Streszczenie

Wprowadzenie. Okres życia wewnątrzmacicznego jest pierwszym etapem rozwoju osobniczego, decydującym o późniejszym rozwoju i stanie zdrowia człowieka. W tym okresie, który charakteryzuje się bardzo dynamicznymi przemianami i intensywnym rozwojem fizycznym, bardzo ważne jest ograniczenie oddziaływania czynników negatywnych na płód. Wzrastająca liczba noworodków przedwcześnie urodzonych z niską masą urodzeniową oraz wadami rozwojowymi stanowi wskazanie do podjęcia badań określających zależność pomiędzy przebiegiem ciąży a wpływem różnych czynników środowiskowych, jakie działają na płód w czasie ciąży.

Cel. Celem pracy była analiza przyczyn występowania wcześniactwa u noworodków.

Materiał i metody. Badaniami objęto 104 noworodki oraz ich matki, hospitalizowane w Oddziale Patologii Noworodków Dziecięcego Szpitala Klinicznego w Lublinie. Metodę badawczą stanowiła analiza dokumentacji medycznej oraz kwestionariusz ankiety. Dokonano oceny urodzeniowych parametrów antropometrycznych wcześniaków, ich wiek płodowy, kolejność ciąży, ilość punktów Apgar.

Wyniki. Większość noworodków bo aż 58,65% stanowiły noworodki matek zamieszkałych w rejonach wiejskich pochodzące z pierwszej ciąży i pierwszego porodu. Przyczyny wcześniejszego porodu wynikały w 85,58% ze strony matek, a wiek płodowy i ilość punktów w skali Apgar otrzymanych w pierwszej minucie po urodzeniu były ściśle związane z sobą, oraz z okresem, przez jaki dziecko przebywało w oddziale. Wykazano także wpływ czynników, takich jak: wiek matek, stan ich zdrowia, wykształcenie i sytuacja materialna, na stan zdrowia dziecka i związek z występowaniem porodów przedwczesnych.

Wnioski. Większość porodów przedwczesnych występowała u kobiet zamieszkałych w rejonach wiejskich. Stan zdrowia matki przed i w czasie ciąży oraz przyjmowane leki są przyczyną mniejszej masy urodzeniowej wcześniaków. Noworodki matek palących papierosy i narażone na wpływ dymu tytoniowego w bezpośrednim otoczeniu mają mniejszą masę urodzeniową. Przeprowadzone badania dowiodły, że konieczna jest edukacja dziewcząt i kobiet w okresie koncepcyjnym, oraz kobiet w ciąży w zakresie odpowiedniego stylu życia.

Słowa kluczowe: noworodek, wcześniactwo, płód.

Summary

Introduction. The period of intrauterine life is the first step in the individual growth, decisive for later development and health of human beings. During this period which is characterized by a very dynamic change, intense physical development is important to limit the impact of negative factors on the foetus. The increasing number of neonates born prematurely with low birth weight and developmental defects is the relevant issue to take tests to determine the relationship between the course of pregnancy and the influence of various environmental factors that influence the foetus during pregnancy.

Aim. The aim of this study was to analyze the reasons of prematurity.

Materials and methods. The survey included 104 mothers and their neonates hospitalized in The Department of Pathology of Neonates in Children's Clinical Hospital in Lublin. The method of research was the analysis of medical records and a questionnaire survey. We assessed anthropometric parameters of prematurely born, their foetal age, sequence of pregnancy and Apgar points.

Results. The majority of neonates (58.65%) were infants of mothers residing in rural areas from the first pregnancy and the first given birth. The reasons for early delivery in 85.58% were on mothers' side, foetal age and number of Apgar's scale points, obtained in first minute after birth, were closely related to each other and influenced the period for which the newborn was present in the ward. Our assessment proved that factors such as a maternal age, state of mothers' health, education and economic situation affected the health of the neonate and influenced the occurrence of premature births.

Conclusions. Most premature births occurred among women living in rural areas. Health state of mothers before and during pregnancy and taking medications are some of the causes of lower weight of premature babies. Newborn babies of mothers smoking cigarettes and exposed to the tobacco smoke in their surroundings have smaller birth body weight. Performed studies showed that it is necessary to instruct the girls and women within the conceptual period and pregnant women about the healthy lifestyle.

Key words: neonate, prematurity, foetus.

¹ Independent Laboratory of Medicine of Disasters, Medical University of Lublin

² Children's University Hospital, Lublin

INTRODUCTION

The period of intrauterine life is the first step in the individual growing. It influences subsequent development and health of human beings. During this period which is characterized by a very dynamic change, intense physical development is important to limit the impact of negative factors on the foetus [1]. The development of the foetus is influenced by interaction among the maternal, placental and numerous external factors [2, 3]. Anthropometric features, such as birth body weight, are indicators of proper development in the foetal period which determine the degree of maturity of all organs and systems and adjustment of child to the extrauterine life. In case of not-supporting conditions in intrauterine life, a baby is born with the immaturity and the physical development fundamentally different from adopted norms – of what a low birth weight is a biological exponent (Low birth weight, LBW). In particular in neonates, born with the body weight below 2500 g [4], the symptoms of the retardation of intrauterine development can be observed. Stopping of the development of the foetus and eventually low birth body weight are connected with factors limiting the supply of oxygen and nutritional substrates for the growing foetus. Changes associated with disorders of the blood flow and function of placenta and with its malformation can be caused by disadvantageous effects of motherly, foetal and environmental factors during pregnancy [5]. Adaptation to conditions of the intrauterine undernourishment influences and modulates changes in foetus' physiological processes and its metabolism, which results in developmental inhibition of the foetus [6]. The low birth weight as well as undernourishment during the foetal life increase the risk of such diseases as: coronary heart disease, obesity, diabetes (of the II type), arterial hypertension and of other diseases associated with the progress of civilization. Long-term examinations conducted amongst middle-aged adults born with the low body weight prove the mentioned above results. At present, metabolic diseases associated with the progress of civilization constitute the greatest threat of the public health in developed countries [7].

During last few years the increase in the number of allergic diseases can be observed, which may suggest (apart from the genetic predisposition) a large impact of environmental factors which influence the foetus in its intrauterine life. It was also confirmed that components of mothers' diet, exposure to food and inhalational allergens and tobacco smoking during pregnancy can increase the risk of asthma among children.

Rising number of premature babies with low birth weight and congenital defects become the right topic for undertaking examinations determining the relationship between the course of the pregnancy with the influence of various factors which have an effect in this period on the expectant mother but appearing of premature deliveries. Many authors notice the need of paying attention to such important aspect as living a healthy lifestyle in case of the planning and of course of pregnancy. Proper conduct of pregnant women, early education, proper medical care in this period, as well as protection against the influence of undesirable factors will let be pleased with a birth of the newborn healthy baby.

The aim of this study was to analyze the reasons of prematurity. However, the main research problem was an

attempt to answer the question concerning the factors influencing the premature birth.

MATERIAL AND METHODS

The author's survey was a research tool constituting the base for the data acquisition, applied at this study.

The data received from the survey covered an obstetric interview (foetal age, course of pregnancy and the childbirth and its kind- caesarean section or physiological childbirth). There was made an evaluation of the newborn babies based on the data and on the analysis of medical documentation: foetal age, birth weight, number of points in the Apgar Scale (received in the first minute after birth). All this information let us describe the reasons for the premature childbirth. The survey was also a source of information about diagnosing diseases of the examined premature babies and the time of their hospitalization in the ward. On the basis of survey data concerning mothers of the examined premature babies, the age was assessed, social conditions and details about diseases affecting the pregnancy, also substances and taken medicines were acquired both before and during pregnancy.

The obtained findings were subjected to a statistical analysis. The values of analysed parameters were characterised by means of the cardinality and percentage or the average value, of standard deviation. For comparing two independent groups, the t-Student test was applied, and there was used a variance analysis to compare many groups. There was used the Chi-square test of independence for unrelated quality features for detecting the relation between tested guildhalls.

The survey included 104 neonates hospitalized in The Department of Pathology of Neonates in Children's Clinical Hospital in Lublin between June 2007 and June 2008 after obtaining written consent of hospital authorities for performed studies.

The selection of the participants was random, and the questionnaire form filled in on the basis of data from medical record and health certificates of the child as well as the information obtained from the mother of the child.

RESULTS

Analysed documentation concerned 104 neonates born in 2007 – 41.35% (n=43) and in 2008 – 58.65% (n=61). There were equally 50% the male sex and the female ones. Newborn babies came from country areas in 58.65% (n=61) and in 41.35% from municipal ones.

The average weight of examined newborn babies was 1795.45 ± 803.13 g (650 g – 4240 g). The weight of the male sex gained 1940 ± 896.45 , whereas of female $1656, 37 \pm 682.19$.

As a result of performed studies we stated that the average weight of the newborn baby had been significantly higher after 29 weeks of the foetal age compared to foetal age 24 – 28 (977.93 g), ($p < 0.01$), (table 1)

Newborn babies most often came from first pregnancy (n=44; 42.31%) and second (n=34; 32.69%), from third – they constituted 9.62% (n=10) and from the following one 15.38% (n=16).

The analysed documents confirm that 48.08% (n=50) of newborn babies came from the first childbirth, 36.54%

TABLE 1. Average weight of a newborn baby considering the foetal age.

Foetal age	Average	Standard deviation
24–28 weeks	977.93	172.43
29–32 weeks	1587.41	471.72
33 weeks and up	2503.57	606.79
F=91.26; p=0.01*		

(n=38) from second, 3.85% (n=4) from third and 11.54% (n=12) from following. 16) 15.38% (n=16).

The documents prove that 31.73% (n=33) newborn babies were born through the physiological childbirth, whereas 68.27% (n=71) through the Caesarean section.

Examinations showed that in the first minute after birth only 15.38% (n=16) newborn babies received from 10 to 8 points in the Apgar scale, however 42.31% (n=44) received between 8 and 6 points and the same percentage of newborn babies received fewer than 6 points (42.31%).

As a result of the conducted statistical analysis, highly important differences were stated in the weight of the newborn babies among groups receiving points t in the Apgar scale (p=0.000003). Newborn babies which received the highest score had the greatest body birth weight (Table 2).

TABLE 2. Average birth weight of a newborn baby considering the Apgar scale.

Agar scale	Average	Standard deviation
10–8 points	2 425.00	678.28
8–6 points	1 975.49	758.94
Less than 6 points	1 389.54	675.42
F=14.57; p=0.000003*		

The cause of the earlier childbirth has most often resulted in disorders of the mother (n=89; 85.58%), in 8.65% (n=9) of the child and in 5.77% (n=6) of both: the mother and the child.

The analysis of medical documentation confirmed that newborn babies had most often stayed in the ward from 7 up to 30 days (n=84; 80.77%), however 14.42% (n=15) stayed above 30 days and only 4.81% up to 7 days.

Statistical analyses demonstrated the essential relationship between the time of the hospitalization in the ward and with Apgar scale (p=0.005).

We stated, that newborn babies who received from 10 to 8 points mostly stayed in the ward from 7 up to 30 days (75.00%), 18.75% stayed up to 7 days and only 6.25% above 30 days, similarly newborn babies who received in 1 minute from 8 to 6 points – in 88.64% stayed up to 30 days in the ward, but newborn babies who received fewer than 6 points stayed up to 30 days in the ward in 75.00% whereas 25.00% above 30 days (Table 3).

It appears from analysed documentation that newborn babies have most often suffered from pneumonia (68.27%) and sepsis (51.92%), however congenital defects constituted 39.42% and other illnesses 16.35%. Heart defects were stated in 26.92% and nervous system defects – in 14.42% amongst all congenital defects. At two newborn babies simultaneously heart defects and of the nervous system appeared.

TABLE 3. Duration of the stay of an infant at the ward considering the Apgar scale.

Agar scale	Up to 7 days		7-30 days		over 30 days		All	
	n	%	n	%	n	%	n	%
10-8 points	3	18.75	12	75.00	1	6.25	16	100.00
8-6 points	2	4.55	39	88.64	3	6.82	44	100.00
Less than 6 points	0	0.00	33	75.00	11	25.00	44	100.00
Chi ² =15.09; p=0.005*								

The average age of mothers of examined newborn babies was 28.89±6.64 (17 – of 43 years); 64.31% (n=64) of mothers were up to 30 years, whereas above – 38.46% (n=40). Mothers mostly had the secondary education (46.15%) and basic professional (41.35%) however only 6.73% had the primary education (pupils) and 5.77% – higher education.

The conducted statistical analysis didn't confirm important differences in the weight of the infants between women at the age up to 30 years and above (p=0.62). However they confirmed that the weight of the infants had been a little bit lower amongst women above 30 years (1746.71 g).

The presence of other illnesses also didn't have essential statistically significant influence on weight of a new born baby (p=0.61) as well as taking medicines (p=0.50), however babies of mothers who were taking medicines during pregnancy had lower weight (1755.00 g) in comparison to mothers who didn't take any (1870.57 g). The presence of illnesses didn't have a statistically significant influence on the weight of an infant (p=0.61) as well as taking medicines (p=0.50) but children whose mothers were taking medicines during pregnancy had lower body birth weight (1755.00 g) in comparison to mothers who didn't take medicines (1870.57 g). It was stated that newborn babies whose mothers didn't smoke during pregnancy, had the higher body weight (1849.83 g) in comparison to newborn babies whose mothers smoked cigarettes (1659.50 g) as well as the ones whose mothers smoked before pregnancy (1735.81 g). However the stated differences weren't statistically significant (p=0.67) (Table 4).

TABLE 4. Influence of smoking, taking medicines, the age and illnesses of the mother on the body birth weight.

Categories	Average	Standard deviation	Statistic analysis
Age			
Up to 30 years	1829.32	776.47	t=0.50;
Over 30 years	1746.71	847.39	p=0.62
Mother's illness			
Yes	1823.75	824.97	t=0.51;
No	1735.31	763.85	p=0.61
Taking medicines			
Yes	1755.00	789.02	t=-0.68;
No	1870.57	835.06	p=0.50
Smoking			
Before pregnancy	1735.81	773.81	F=0.36;
Before and during pregnancy	1659.50	667.06	
No smoking	1849.83	845.05	
p=0.67			

DISCUSSION

For the growing human being a correct physical development is a measure of the health condition. A birth weight is one of the factors of an appropriate intrauterine development determining the degree of the biological maturity of the newborn baby.

The birth weight depends on many factors such as: the age and the health condition of the mother, her diet, social and economic situation and addictions during pregnancy [8, 9].

Performed studies showed that both a very young age of the mother as well as the age above 30 have an impact on development of pregnancy and appearing of premature deliveries (age of the mother up to 30 equals a higher foetal age, a higher birth weight and a better general condition of an infant's health).

The analysis of the data gained on the basis of filled in surveys concerning relations between the Apgar scale achieved after the birth and the foetal age, the weight of the newborn baby and the time of its stay in the ward, showed a close relationship between the duration of pregnancy and the Apgar scale, birth weight and the time the child stays in the ward. The higher birth weight is, the higher Apgar score and the shorter time of hospitalization in the ward but also better state of health of the newborn baby and rarer appearing of such illnesses as pneumonia – 68.27% or sepsis – 51.92% and congenital defects (hearts – 26.92%, of nervous system 14.42%).

Smoking cigarettes by an expectant mother and its harmful influence on the development of the foetus was and still is an object of many studies and publications [10, 11]. In the examined group it was also stated that newborn babies whose mothers didn't smoke had had the higher birth weight 1849.83 g from newborn babies of smoking mothers (1659.50 g). One should suppose the passive smoking also has an impact on the general condition of the baby, and this is showed in the survey after interviews with mothers. Considering illnesses of the mothers and taken medicines we notice that average birth weight of their newborn babies was 1755.00 g and the weight of newborn babies of healthy and not taking medicines ones was 1870.57 g on average.

Our performed examinations analysing the reasons of the premature delivery resulted in that more often it occurred because of the disorders on the part of the mother 85.58% however only 8.65% because of the child defect.

A majority of questioned mothers are residents of villages 58.65% whereas 41.35% of urban areas, and this shows the availability and the level of the provided medical care during entire pregnancy. And in our opinion it also affects the greater awareness of existing threats before and during pregnancy amongst women living in cities where possibilities of using specialist's advice and the help in case of the existing threat are faster [12].

To sum up analysis of performed own examinations which describe the reason for premature birth. We state there is a relationship between the premature birth and the health condition of the mother, her age as well as an appropriate life-style both before pregnancy and during pregnancy (including smoking cigarettes and using other harmful substances), with environmental conditions and the influence of surroundings and this decides about the occurrence of the premature delivery and about an appropriate development of the child.

CONCLUSIONS

1. On the basis of performed studies we are able to say what factors affect the prevalence of the premature birth among newborn babies.
2. Research analysis showed that health condition of the woman before and during pregnancy and taken medicines are the reasons of smaller body birth weight of premature babies.
3. We confirmed that bad influence of harmful environmental conditions caused the wrong course of pregnancy and development of the foetus.
4. Examinations showed that newborn babies of mothers smoking cigarettes and exposed to the influence of tobacco smoke have lower body birth weight than infants of mothers both actively and passively smoking.
5. Newborn babies, who had longer intrauterine life, received higher scoring in the Apgar scale and their birth weight was also higher.
6. Analysing a place of residence we proved that the majority of premature deliveries occurred more often in women living in the country than in the city. One should suppose it correlates with better social and economic conditions as well as with better medical care both preconceptive as well as during pregnancy of women living in a town.

REFERENCES

1. Chazan B. Położnictwo w praktyce lekarza rodzinnego. Warszawa: PZWL; 1997.
2. Bożkowska K, Sito A. Opieka zdrowotna nad rodziną. Warszawa: PZWL; 2003.
3. Chrząstek-Szpruch H. Wymiary, kształt ciała i proporcje między składnikami ciała jako mierniki rozwoju. In: Ocena rozwoju dziecka w zdrowiu i chorobie. Ossolineum; 1987.
4. Connor PD, Streissguth AP. Występujące na przestrzeni całego życia skutki narażenia na działanie alkoholu w okresie płodowym. In: Picie alkoholu w różnych okresach życia. Raport, 25. Warszawa: PARPA; 2000.
5. Eriksson J, Forsen T, Tuomilehto J, Osmond C, Barker D. Early growth, adult income and risk of stroke. Stroke; 2000.
6. Furmaga-Jabłońska W. Wpływ hormonów na rozwój płodu. In: Długofalowa analiza rozwoju fizycznego dzieci urodzonych z małą masą ciała z uwzględnieniem wieku płodowego i chronologicznego. Lublin: Akademia Medyczna w Lublinie, Wydział Lekarski (Folium); 1999.
7. Gajewska, Fuchs B, Paluszyńska D, Świdarska B. Noworodek o małej masie ciała – problem nadal aktualny. Materiały Seminarium: Żywność kobiet w ciąży a wczesniactwo i porody noworodków z małą masą ciała. Warszawa: Wydawnictwo CZD; 1995.
8. Klimek R, editor. Położnictwo. Warszawa: PZWL; 1988.
9. Oleszczuk J, Leszczyńska-Gorzela B, Poniedziałek-Czajkowska E. Rekomendacje postępowania w najczęstszych powikłaniach ciąży i porodu. Wydawnictwo Bifolium; 2002.
10. Pac-Kożuchowska E. The influence of the nutritional status of the mothers before pregnancy upon the anthropometric measures of their newborns. Pol J Environ Stud. 2004;13(Suppl 2, Pt 2):S377-80.
11. Polańska K, Hanke W. Palenie papierosów przez kobiety ciężarne a przebieg i wynik ciąży – przegląd badań epidemiologicznych. Prz Epid. 2004;58:4-10.
12. Wilczyński J, Pawłowicz P. Choroby współistniejące z ciążą. In: Chazan B, editor. Położnictwo w praktyce lekarza rodzinnego. Wydawnictwo Lekarskie PZWL; 1997.

Informacje o Autorach

Dr hab. n. med. EWA RUDNICKA-DROŻAK – adiunkt, Samodzielna Pracownia Medycyny Katastrof, Uniwersytet Medyczny w Lublinie; lek. med. BEATA RYBOJAD – starszy asystent, Kliniczny Oddział Anestezjologii i Intensywnej Terapii Dziecięcego Szpitala Klinicznego w Lublinie.

Adres do korespondencji

Dr hab. n. med. Ewa Rudnicka-Drożak
Samodzielna Pracownia Medycyny Katastrof UM w Lublinie
Lublin, ul. Chodźki 1