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Retrospective analysis of parity and its impact on maternal and neonatal outcomes in term birth

Analiza retrospektywna liczby porodów i jej wpływu na wyniki położnicze u matek oraz wyniki noworodków w przypadku porodów o czasie

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STRESZCZENIE

ANALIZA RETROSPEKTYWNA LICZBY PORODÓW I JEJ WPŁYWU NA WYNIKI POŁOŻNICZE U MATEK ORAZ WYNIKI NOWORODKÓW W PRZYPADKU PORODÓW O CZASIE

Cel pracy. Tematyka związku pomiędzy rodnością a wynikami ciążowymi w dalszym ciągu pozostaje aktualna, ponieważ przeszłość porodowa kobiety przekłada się na ocenę ryzyka kolejnych ciąż oraz potencjalnych zagrożeń dla zdrowia i życia kobiety, jak i jej dziecka. Dlatego celem badań była analiza związku pomiędzy rodnością a wybranymi wynikami matczynymi i noworodkowymi związanymi z porodem w terminie.

Materiał i metody. To retrospektywne badanie przeprowadzono w okresie od stycznia 2017 do grudnia 2021 roku na podstawie dokumentacji medycznej ze Specjalistycznego Szpitala św. Zofii w Warszawie (Polska). Przeanalizowano 26 862 przypadków porodów o czasie.

Wyniki. U pierworódek rodzących o czasie zaobserwowano wyższy iloraz szans wystąpienia profilaktyki przeciwzakrzepowej (OR = 1,13), stanu przedrzucawkowego (OR = 3,12), nadciśnienia indukowanego ciążą (OR = 1,58), niedoczynności tarczycy (OR = 1,24), niedokrwistości (OR = 1,73) oraz wewnątrzmacicznego ograniczenia wzrastania płodu (OR = 1,93). Wieloródki istotnie częściej rodziły w domu narodzin, drogami natury, dochodziło u nich częściej do pęknięcia krocza ($p < 0,05$).

Wnioski. To badanie pokazało, że pierwiastki są szczególną grupą kobiet, które są narażone na więcej powikłań okołoporodowych i procedur podczas porodu w porównaniu do wieloródek. Należy objąć je szczególną opieką, ponieważ doświadczenia związane z pierwszym porodem mogą wpływać na dalsze decyzje prokreacyjne.

Słowa kluczowe: rodność, pierworódka, poród w terminie, wieloródka

ABSTRACT

RETROSPECTIVE ANALYSIS OF PARITY AND ITS IMPACT ON MATERNAL AND NEONATAL OUTCOMES IN TERM BIRTH

Aim. The relationship between parity and pregnancy outcomes remains a relevant subject, as a woman's obstetric history affects the assessment of risks associated with subsequent pregnancies and potential threats to the life and health of the mother and her child. The aim of the study was to analyse the relationships between parity and selected maternal and neonatal outcomes associated with term birth.

Material and methods. This retrospective study was conducted between January 2017 and December 2021 using medical records from St. Sophia's Specialist Hospital in Warsaw (Poland). We analysed 26862 cases of term births in the study period.

Results. A higher odds ratio of thromboprophylaxis (OR=1.13), pre-eclampsia (OR=3.12), gestational hypertension (OR=1.58), hypothyroidism (OR=1.24), anaemia (OR=1.73), and intrauterine growth restriction (OR=1.93) was observed in primiparas giving birth at term. Multiparas significantly more frequently gave birth in a birthing centre, via vaginal delivery, and experienced perineal tears ($p<0.05$).

Conclusions. In this study, primiparous women more frequently experienced selected periparturient complications and medical interventions during labour than multiparous women. Further studies, particularly those including adjusted analyses, are needed to better understand the observed differences and their clinical significance.

Key words: parity, primipara, term birth, multipara

INTRODUCTION

The term 'parity' is commonly used in everyday obstetric and gynaecological practice as well as in research. It pertains to the number of births given and should not be confused with the number of pregnancies, as there are pregnancies that do not end in childbirth (i.e. they end in miscarriage). The relationship between parity and pregnancy outcomes has been of great interest to researchers for decades, remaining a subject of ongoing discussion. Some studies have demonstrated that the likelihood of pregnancy complications is higher in primiparas [1,2], while others indicated that a higher number of births is a risk factor for adverse pregnancy outcomes [3,4]. Therefore, the relationship between parity and pregnancy outcomes remains a relevant subject, which requires further research. It is all the more important from the clinical standpoint, since a woman's obstetric history forms a major part of the risk assessment for the ongoing pregnancy and future threats to the health and life of the mother and her child [5,6].

A term birth refers to a delivery between 37 and 41 weeks of gestation and is characterised by a normal pregnancy course and a low risk of complications. However, it needs to be emphasised that this period of time has been defined somewhat arbitrarily, predominantly referring to the differences in the risk of pre-term birth and post-term pregnancy complications, which are commonly known. In contrast, little attention is paid to the differences in morbidity among full-term newborns understood in the broad sense.

Thus, gestational age should be treated as a biological continuum. Furthermore, the labour at term will not always be physiologic, as it might be complicated by haemorrhage, perineal tears, placental retention, adaptation and health problems of the newborn and poor general condition of the mother [7].

Having children is an important factor affecting the way people function in various areas of life. It allows for maintaining the replacement fertility rate, affects global markets, and contributes to the development of numerous fields of science. Therefore, it is of key importance to continuously study the factors that influence women's procreative decisions. Multiple studies have shown that the decision to have children is determined by such factors as sociodemographic status, obstetric and gynaecological history, chronic and pregnancy-associated diseases, the course of pregnancy and the management of labour [8-10]. Taking into account the need to continuously improve the quality of perinatal care, the small number of current studies on the proposed topic, and the fact that a positive first birth experience can influence women's subsequent procreative decisions, the authors undertook a study to analyse the relationship between the parity and selected maternal and neonatal outcomes associated with term delivery.

MATERIALS AND METHODS

Data collection and variables

This retrospective study was conducted between 1 January 2017 and 31 December 2021 using electronic medical records from St. Sophia's Specialist Hospital in Warsaw (Poland), which is a tertiary referral hospital.

The analysed variables were identified based on routinely recorded clinical diagnoses and procedures documented in the electronic medical records. Due to the retrospective nature of the study, detailed standardised diagnostic criteria for all variables were not available.

The study included all women who gave birth to full-term infants, i.e. between 37+0 and 41+6 weeks of gestation, with a division into groups by parity: primiparous women and multiparous women (2, 3, 4 and subsequent childbirths). The exclusion criteria were as follows: gaps in medical records pertaining to the variables included in the final analysis, delivery before 37+0 or at/after 42+0 weeks of gestation, multiple pregnancy, stillbirth, newborns with severe congenital defects or abnormal karyotype. We analysed medical records covering 28,128 births in the study period. Of these, based on the eligibility criteria, 26,862 cases of full-term births were included in the final analysis, including 12,303 primiparous and 14,559 multiparous women (Figure 1).

The anonymised electronic database provided the following information: women's sociodemographic data, obstetric history, course of pregnancy and delivery, and birth data of the infants.

Statistical Analysis

The data obtained were analysed using IBM SPSS Statistics 25.0 for Windows (Armonk, NY: IBM Corp.). Categorical variables were reported as numbers (n) and percentages (%), whereas continuous variables were reported

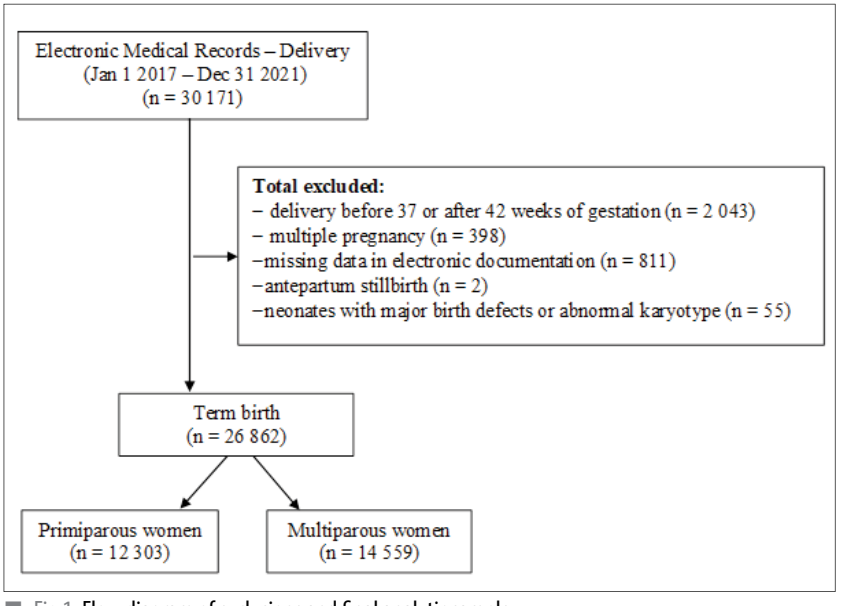

Fig 1. Flow diagram of exclusions and final analytic sample

as medians (Me) and interquartile ranges (IQR). The Kolmogorov–Smirnov test and the Lilliefors test were used to verify the normality of distribution of the continuous variables. To compare the baseline data, a chi-square test was used for categorical variables and the Mann–Whitney U test was used for continuous variables. The odds of a given outcome occurring in the group of primiparous women versus the group of multiparous women were calculated as the odds ratio (OR) with a 95% confidence interval (95% CI). An OR > 1 indicates a higher odds of the outcome in primiparous women. A p<0.05 was considered statistically significant.

Tab. 1. Analysis of the relationship between the parity of women giving birth at term and selected demographic variables

Variables	Total	Primiparous women	Multiparous women			p	OR (95% CI) Primiparous vs. Multiparous women
			2 births	3 births	≥4 births		
Age– Me (IQR)	32 (29-35)	30 (28-33)	33 (31-36)	35 (32-38)	37 (34-40)	<0.001	-
Place of residence - n (%)							
Village	3723 (13.86)	1440 (11.70)	1487 (14.09)	588 (19.69)	208 (20.35)	<0.001	1 (ref.)
City/town	23139 (86.14)	10863 (88.30)	9064 (85.91)	2398 (80.31)	814 (79.65)		1.40*** (1.31-1.51)
Education – n (%)							
Primary	496 (1.85)	195 (1.58)	168 (1.59)	74 (2.48)	59 (5.77)	<0.001	1 (ref.)
Secondary	3152 (11.73)	1537 (12.49)	1100 (10.43)	369 (12.36)	146 (14.29)		1.29** (1.08-1.55)
Higher	23214 (86.42)	10571 (85.92)	9283 (87.98)	2543 (85.16)	817 (79.94)		0.88*** (0.82-0.95)
Marital status – n (%)							
Single	5237 (19.50)	3202 (26.03)	1635 (15.50)	317 (10.62)	83 (8.12)	<0.001	1 (ref.)
In a relationship	21625 (80.50)	9101 (73.97)	8916 (84.50)	2669 (89.38)	939 (91.88)		0.46*** (0.43-0.49)

* p<0.05, ** p<0.01; *** p<0.001

Tab. 2. Analysis of the relationship between the parity of women giving birth at term and selected health variables

Variables	Total	Primiparous women	Multiparous women			p	OR (95% CI) Primiparous vs. Multiparous women
			2 births	3 births	≥4 births		
Cholestasis of pregnancy – n (%)	279 (1.04)	127 (1.03)	110 (1.04)	34 (1.14)	8 (0.78)	0.810	0.99 (0.78-1.25)
Thromboprophylaxis – n (%)	6485 (24.14)	3123 (25.38)	2319 (21.98)	771 (25.82)	272 (26.61)	<0.001	1.13*** (1.07-1.20)
Pre-eclampsia – n (%)	145 (0.54)	105 (0.85)	31 (0.29)	8 (0.27)	1 (0.10)	<0.001	3.12*** (2.17-4.50)
Gestational hypertension – n (%)	828 (3.08)	470 (3.82)	257 (2.44)	73 (2.44)	28 (2.74)	<0.001	1.58*** (1.37-1.81)
Hypertension – n (%)	306 (1.14)	146 (1.19)	105 (1.00)	35 (1.17)	20 (1.96)	0.040	1.08 (0.86-1.35)
Thrombocytopenia – n (%)	2976 (11.08)	1413 (11.49)	1165 (11.04)	317 (10.62)	81 (7.93)	0.005	1.08 (1.00-1.16)
Hashimoto's – n (%)	2319 (8.63)	985 (8.01)	944 (8.95)	312 (10.45)	78 (7.63)	<0.001	0.86** (0.79-0.94)
Hypothyroidism – n (%)	6919 (25.76)	3445 (28.00)	2578 (24.43)	692 (23.17)	204 (19.96)	<0.001	1.24*** (1.18-1.31)
Hyperthyroidism – n (%)	90 (0.34)	31 (0.25)	41 (0.39)	14 (0.47)	4 (0.39)	0.160	0.61* (0.40-0.96)
Gestational diabetes – n (%)	3288 (12.24)	1368 (11.12)	1349 (12.79)	419 (14.03)	152 (14.87)	<0.001	0.82*** (0.77-0.89)
Anaemia – n (%)	7873 (29.31)	4363 (35.46)	2548 (24.15)	705 (23.61)	257 (25.15)	<0.001	1.73*** (1.64-1.82)
Serological conflict – n (%)	1611 (6.00)	699 (5.68)	655 (6.21)	194 (6.50)	63 (6.16)	0.220	0.90* (0.81-0.99)
Intrauterine growth restriction – n (%)	907 (3.38)	558 (4.54)	267 (2.53)	58 (1.94)	24 (2.35)	<0.001	1.93*** (1.69-2.22)
Pessary – n (%)	410 (1.53)	186 (1.51)	171 (1.62)	48 (1.61)	5 (0.49)	0.044	0.98 (0.81-1.20)
History of miscarriage – n (%)	5747 (21.39)	1889 (15.35)	2521 (23.89)	899 (30.11)	438 (42.86)	<0.001	0.50*** (0.47-0.54)
GBS – n (%)							
Negative	15402 (57.34)	6995 (56.86)	6144 (58.23)	1707 (57.17)	556 (54.40)	<0.001	1 (ref.)
Positive	6469 (24.08)	2868 (23.31)	2549 (24.16)	767 (25.69)	285 (27.89)		0.87*** (0.82-0.93)
No swab	4991 (18.58)	2440 (19.83)	1858 (17.61)	512 (17.15)	181 (17.71)		1.04 (0.98-1.11)

Abbreviation: GBS – group B streptococci
* p<0.05, ** p<0.01; *** p<0.001

Tab. 3. Analysis of the relationship between the parity of women giving birth at term and selected labor variables

Variables	Total	Primiparous women	Multiparous women			p	OR (95% CI) Primiparous vs. Multiparous women
			2 births	3 births	≥4 births		
Place of birth – n (%)							
Hospital	24266 (90.34)	11765 (95.63)	9229 (87.47)	2475 (82.89)	797 (77.98)	<0.001	1 (ref.)
Community birth	2596 (9.66)	538 (4.37)	1322 (15.53)	511 (17.11)	225 (22.02)		0.28*** (0.25-0.31)
Mode of birth – n (%)							
Physiologic	18494 (68.85)	7981 (64.87)	7451 (70.62)	2223 (74.45)	839 (82.09)	<0.001	1 (ref.)
Cesarean birth	7759 (28.88)	3811 (30.98)	3018 (28.60)	750 (25.12)	180 (17.61)		5.40*** (4.33-6.74)
Instrumental	609 (2.27)	511 (4.15)	82 (0.78)	13 (0.44)	3 (0.29)		6.87*** (5.52-8.54)
Pre–induction – n (%)	1235 (4.60)	875 (7.11)	297 (2.81)	47 (1.57)	16 (1.57)	<0.001	3.02*** (2.67-3.42)
Induction of labor – n (%)	5692 (21.19)	3317 (26.96)	1729 (16.39)	467 (15.64)	179 (17.51)	<0.001	1.89*** (1.79-2.01)
Stimulation – n (%)	3970 (14.78)	2994 (24.34)	735 (6.97)	180 (6.03)	61 (5.97)	<0.001	4.48*** (4.15-4.83)
Oxytocin – n (%)							
First stage of labor	5230 (19.47)	3288 (26.73)	1425 (13.51)	387 (12.96)	130 (12.72)	<0.001	2.37*** (2.23-2.52)
Second stage of labor	5854 (21.79)	3740 (30.40)	1564 (14.82)	418 (14.00)	132 (12.92)	<0.001	2.57*** (2.42-2.73)
Third stage of labor	14163 (52.73)	6637 (53.95)	5666 (53.70)	1518 (50.84)	342 (33.46)	0.220	1.10*** (1.04-1.15)
Spinal anaesthesia – n (%)	7691 (28.63)	3786 (30.77)	2984 (28.28)	744 (24.92)	177 (17.32)	<0.001	1.21*** (1.15-1.28)
Epidural anaesthesia – n (%)	8378 (31.19)	5579 (45.35)	2270 (21.51)	413 (13.83)	116 (11.35)	<0.001	3.49*** (3.30-3.68)
Antibiotic prophylaxis – n (%)	15165 (65.46)	7513 (61.07)	5595 (53.03)	1538 (51.51)	519 (50.78)	<0.001	1.42*** (1.35-1.49)
Amniotomy – n (%)	1612 (6.00)	830 (6.75)	563 (5.34)	154 (5.16)	65 (6.36)	<0.001	1.28*** (1.15-1.41)
Episiotomy – n (%)	5654 (21.05)	4114 (33.44)	1306 (12.38)	188 (6.30)	46 (4.50)	<0.001	4.25*** (3.98-4.53)
Perineal laceration – n (%)	6518 (24.26)	2230 (18.13)	3174 (30.08)	832 (27.86)	282 (27.59)	<0.001	0.53*** (0.50-0.56)
Perineal laceration degree – n (%)							
1	6116 (93.83)	1990 (89.24)	3039 (95.75)	810 (97.36)	277 (98.23)	<0.001	1 (ref.)
2	336 (5.15)	213 (9.55)	106 (3.34)	16 (1.92)	1 (0.35)		1.44 (0.88-2.35)
3 and 4	66 (1.02)	27 (1.21)	29 (0.91)	6 (0.72)	4 (1.42)		0.40*** (0.23-0.69)
Labial laceration – n (%)	1256 (4.68)	868 (7.06)	329 (3.12)	47 (1.57)	12 (1.17)	<0.001	2.77*** (2.45-3.13)
Vaginal mucosa laceration – n (%)	2785 (10.37)	1715 (13.94)	877 (8.31)	153 (5.12)	40 (3.91)	<0.001	2.04*** (1.88-2.21)
Vaginal wall laceration – n (%)	106 (0.39)	78 (0.63)	20 (0.19)	5 (0.17)	3 (0.29)	<0.001	3.31*** (2.15-5.10)
Cervix laceration – n (%)	629 (2.34)	445 (3.62)	158 (1.50)	21 (0.70)	5 (0.49)	<0.001	2.93*** (2.47-3.49)
Uterine curettage – n (%)	1423 (5.30)	775 (6.30)	482 (4.57)	117 (3.92)	49 (4.79)	<0.001	1.44*** (1.30-1.61)
First stage of labor – duration (min) – Me (IQR)	270 (180-375)	345 (255-460)	219 (155-295)	200 (145-270)	190 (130-265)	<0.001	-
Second stage of labor – duration (min) – Me (IQR)	20 (10-35)	35 (25-50)	15 (10-23)	10 (10-16)	10 (5-15)	<0.001	-
Third stage of labor – duration (min) – Me (IQR)	10 (10-10)	10 (10-10)	10 (10-10)	10 (10-10)	10 (10-10)	0.080	-
Labor – duration (min) – Me (IQR)	300 (210-420)	397 (305-520)	245 (180-326)	225 (165-300)	210 (150-285)	<0.001	-
Blood loss (ml) – Me (IQR)	350 (350-500)	400 (350-500)	350 (350-500)	350 (350-500)	350 (350-400)	<0.001	-

* p<0.05, ** p<0.01; *** p<0.001

Ethics

The study design was submitted to and approved by the Bioethical Committee at the Medical University of Warsaw (AKBE/112/2022). The study was conducted in line with the principles set out in the Declaration of Helsinki (1964) as amended. Database reports were anonymised and did not allow for patient identification at any stage of the study.

RESULTS

Relationship between the parity and selected demographic variables

Multiparas who gave birth at term were older, significantly more likely to live in rural areas, more often having a primary education, being in a relationship than primiparas (p<0.05). Detailed data are presented in Table 1.

Relationship between the parity and selected health variables

Table 2 presents an analysis of the relationship between the parity of women giving birth at term and selected health variables. The analysis demonstrated a statistically significant relationship between parity and the incidence of thromboprophylaxis, pre-eclampsia, gestational hypertension, hypertension, thrombocytopenia, Hashimoto's, hypothyroidism, gestational diabetes, anaemia, intrauterine growth restriction, pessary, history of miscarriage, and GBS ($p< 0.05$). A higher odds ratio of thromboprophylaxis (OR=1.13; 95% CI=1.07-1.20), pre-eclampsia (OR=3.12; 95% CI=2.17-4.50), gestational hypertension (OR=1.58; 95% CI=1.37-1.81), hypothyroidism (OR=1.24; 95% CI=1.18-1.31), anaemia (OR=1.73; 95% CI=1.64-1.82), and intrauterine growth restriction (OR=1.93; 95% CI=1.69-2.22) was observed in primiparas giving birth at term. In turn, these women were found to have a lower odds ratio of Hashimoto's (OR=0.86; 95% CI=0.79-0.94), gestational diabetes (OR=0.82; 95% CI=0.77-0.89), miscarriage (OR=0.50; 95% CI=0.47-0.54), and positive GBS (OR=0.87; 95% CI=0.82-0.93).

Relationship between the parity and selected labor variables

Multiparas significantly more frequently gave birth in a birthing centre, via vaginal delivery, and experienced perineal tears, usually of the first degree ($p<0.05$).

Tab. 4. Analysis of the relationship between the parity of women giving birth at term and selected labor pain relief methods

Variables	Total	Primiparous women	Multiparous women			p	OR (95% CI) Primiparous vs. Multiparous women
			2 births	3 births	≥4 births		
Aromatherapy – n (%)	313 (1.17)	167 (1.36)	103 (0.98)	31 (1.04)	12 (1.17)	0.054	1.36** (1.09-1.70)
Music therapy – n (%)	3692 (13.74)	1947 (15.83)	1286 (12.19)	361 (10.09)	98 (9.59)	<0.001	1.38*** (1.29-1.48)
Water immersion – n (%)	5881 (21.89)	3018 (24.53)	2030 (19.24)	628 (21.03)	205 (20.06)	<0.001	1.33*** (1.25-1.41)
TENS – n (%)	678 (2.52)	331 (2.69)	254 (2.41)	68 (2.28)	25 (2.45)	0.440	1.13 (0.97-1.32)
Compresses – n (%)	6522 (24.28)	3612 (29.36)	2138 (20.26)	574 (19.22)	198 (19.37)	<0.001	1.66*** (1.57-1.76)
Relaxation massage – n (%)	4327 (16.11)	2371 (19.27)	1412 (13.38)	394 (13.19)	150 (14.68)	<0.001	1.54*** (1.44-1.64)
Labor positions – n (%)							
Lithotomy	10421 (54.55)	5733 (67.5)	3497 (46.42)	891 (39.85)	300 (35.63)	<0.001	1 (ref.)
Side-lying	4850 (25.39)	1822 (21.46)	2168 (28.78)	630 (28.18)	230 (27.32)		0.19*** (0.16-0.22)
Squatting	875 (4.58)	378 (4.45)	350 (4.65)	101 (4.52)	46 (5.46)		0.98 (0.79-1.23)
On all fours	915 (4.79)	172 (2.03)	487 (6.46)	183 (8.18)	73(8.67)		0.49*** (0.34-0.71)
Kneeling	722 (3.78)	135 (1.59)	356 (4.73)	154 (6.89)	77 (9.14)		0.30*** (0.25-0.37)
In water	1149 (6.01)	213 (2.51)	604 (8.02)	239 (10.69)	93 (11.05)		0.24*** (0.20-0.28)
Upright	171 (0.90)	39 (0.46)	71 (0.94)	38 (1.70)	23 (2.73)		039*** (0.27-0.57)

Abbreviation: TENS – transcutaneous electrical nerve stimulation
* p<0.05, ** p<0.01; *** p<0.001

Tab. 5. Analysis of the relationship between the parity of women giving birth at term and selected neonatal variables

Variables	Total	Primiparous women	Multiparous women			p	OR (95% CI) Primiparous vs. Multiparous women
			2 births	3 births	≥4 births		
Birth weight – Me (IQR)	3460 (3180-3750)	3400 (3130-3700)	3500 (3220-3800)	3530 (3250-3800)	3580 (3300-3890)	<0.001	-
Birth length – Me (IQR)	55 (53-56)	54 (53-56)	55 (53-56)	55 (53-56)	55 (53-57)	<0.001	-
1-min Apgar score – n (%)							
≤7	530 (1.97)	333 (2.71)	140 (1.33)	39 (1.31)	18 (1.76)	<0.001	2.03*** (1.70-2.42)
>7	26332 (98.03)	11970 (97.29)	10411 (98.67)	2947 (98.69)	1004 (98.24)		1 (ref.)
3-min Apgar score – n (%)							
≤7	215 (0.80)	132 (1.07)	61 (0.58)	16 (0.54)	6 (0.59)	<0.001	1.89*** (1.44-2.49)
>7	26647 (99.20)	12171 (98.93)	10490 (99.42)	2970 (99.46)	1016 (99.41)		1 (ref.)
5-min Apgar score – n (%)							
≤7	84 (0.31)	52 (0.42)	22 (0.21)	7 (0.23)	3 (0.29)	0.029	1.93*** (1.24-3.00)
>7	26778 (99.69)	12251 (99.58)	10529 (99.79)	2979 (99.77)	1019 (99.71)		1 (ref.)
NICU transfer – n (%)	2630 (9.79)	1371 (11.14)	924 (8.76)	246 (8.24)	89 (8.71)	<0.001	1.33*** (1.22-1.44)

Abbreviation: NICU – Neonatal Intensive Care Unit
* p<0.05, ** p<0.01; *** p<0.001

In turn, primiparas were significantly more likely to give birth via caesarean section (OR=5.40; 95% CI=4.33-6.74) and instrumental delivery (OR=6.87; 95% CI=5.52-8.54). Pre-induction (OR=3.02; 95% CI=2.67-3.42), induction (OR=1.89; 95% CI=1.79-2.01), labour stimulation (OR=4.48; 95% CI=4.15-4.83) and oxytocin administration in the 1st (OR=2.37; 95% CI=2.23-2.52), 2nd (OR=2.57; 95% CI=2.42-2.73) and 3rd (OR=1.10; 95% CI=1.04-1.15) stages of labour were more often performed in primiparas. Furthermore, primiparas were more likely to receive spinal anaesthesia (OR=1.21; 95% CI=1.15-1.28), epidural anaesthesia (OR=3.49; 95% CI=3.30-3.68), antibiotic prophylaxis (OR=1.42; 95% CI=1.35-1.49), and amniotomy (OR=1.28; 95% CI=1.15-1.41) ($p<0.05$). Moreover, primiparas were significantly more likely to experience tears of the labia (OR=2.77; 95% CI=2.45-3.13), vaginal mucosa (OR=2.04; 95% CI=1.88-2.21), vaginal wall (OR=3.31; 95% CI=2.15-5.10) and cervix (OR=2.93; 95% CI=2.47-3.49), and undergo episiotomy (OR=4.25; 95% CI=3.98-4.53) and uterine curettage (OR=1.44; 95% CI=1.30-1.61) ($p<0.05$). On the other hand, the duration of the entire labour and its 1st and 2nd stages was shorter and blood loss smaller in multiparas than in primiparas ($p<0.05$). Table 3 presents an analysis of the relationship between the parity of women giving birth at term and selected labour variables.

Relationship between the parity and selected labor pain relief methods

As for labour pain relief methods, primiparas selected music therapy (OR=1.38; 95% CI=1.29-1.48), water immersion (OR=1.33; 95% CI=1.25-1.41), compresses (OR=1.66; 95% CI=1.57-1.76), and relaxation massage (OR=1.54; 95% CI=1.44-1.64) more frequently than multiparas. Furthermore, primiparas were more likely to choose the lithotomy position (67.5%) compared to multiparas. The relationships were statistically significant ($p<0.05$). Detailed results are presented in Table 4.

Relationship between the parity and selected neonatal variables

As compared to primiparas, multiparas were more likely to give birth to infants with a higher birth weight and a higher birth length. The infants of primiparas were more likely to receive an Apgar score of ≤7 both at 1 (OR=2.03; 95% CI=1.70-2.42), 3 (OR=1.89; 95% CI=1.44-2.49) and 5 minutes (OR=1.93; 95% CI=1.24-3.00) after birth. Furthermore, infants of primiparas had to be transferred to an NICU more often than those born to multiparas (OR=1.33; 95% CI=1.22-1.44). The relationships were statistically significant ($p < 0.05$). Detailed results are presented in Table 5.

DISCUSSION

The differences between primiparas and multiparas offer some insight into the situation of these women, including their health status, which is relevant for the pregnancy care they receive [11,12]. Therefore, the aim of this study was to analyse the relationships between parity and selected maternal and neonatal outcomes associated with term birth. We presented some of the differences between primiparas and multiparas when describing their sociodemographic characteristics. Our study showed that multiparas were older, more likely to be in a relationship, live in rural areas and have primary education than primiparas. Our findings are in line with those reported by other authors [13,14].

There is a discrepancy in the subject literature pertaining to the risk of complications of pregnancy depending on parity. A study by Maed et al. showed that the risk of pre-eclampsia is lower in multiparas than in primiparas, which was corroborated in our study [15]. This can result from the fact that, among other things, a first pregnancy and an interval of more than 10 years since the last pregnancy are risk factors for pre-eclampsia [16]. Furthermore, our study demonstrated a higher odds ratio of gestational hypertension in primiparas. These findings may suggest the need for further investigation of factors associated with pre-eclampsia and gestational hypertension in primiparous women. In terms of hypothyroidism, understood as a state of reduced production of thyroid hormones (most often diagnosed on the basis of increased TSH and/or reduced FT4 levels), Knøsgaard et al. reported that this condition is more frequent in multiparas [17]. This finding contrasts with our results, in which primiparity was associated with a higher prevalence of hypothyroidism. Our findings indicate that anaemia during pregnancy was more frequently observed in primiparous than in multiparous women (most often defined as a decrease in hemoglobin concentration below the reference values for pregnant women <11 g/dl). The Expert Panel of the Polish Gynecological Society in 2014 included this fact in the prevention of iron deficiency in women. Giving birth to two or three children increases the risk of iron deficiency anemia by three times, and more births by up to four times. Despite the passing of time, this group of women is still at risk for anemia [18]. This discrepancy may reflect differences in study populations, definitions of anaemia, or other uncontrolled factors. In our study, we showed that primiparas have a lower odds ratio of developing Hashimoto's during pregnancy and gestational diabetes. This is linked to physiological mechanisms including impaired insulin action and beta cell function [19]. Furthermore, our study demonstrated that primiparas were less likely to have a history of miscarriage and colonisation of the genital tract by GBS bacteria compared to multiparas, which is in line with the findings by Gopal et al. [20]. Our results and those obtained by other authors emphasise the complexity and multidimensionality of the subject of health complications associated with the parity of pregnant women. This points to the need for further research to understand these issues, which may be crucial in making decisions about monitoring and treating patients during pregnancy. The lack of clear criteria for identifying these variables and uncertainty regarding their consistent coding throughout the analyzed period constitute a significant limitation and may impact the interpretation of the obtained results.

A birthing centre is a place where women can have a natural, non-medicalised birth in an intimate, home-like

setting [21]. Our study showed that multiparas more frequently selected a birthing centre as a place to give birth and, importantly, the frequency of such a choice increased with every subsequent birth. The reason why primiparas are less interested in giving birth in birthing centres may be the fear of labour pain, which they had not experienced before, and no access to epidural anaesthesia. We observed that multiparas are more likely to give birth vaginally, which is consistent with the findings of Jardine et al., who reported that the risk of instrumental delivery is significantly higher in low-risk pregnant women who are giving birth for the first time than in multiparas [10]. Parity and mode of delivery may be associated with maternal health outcomes. Davis et al. observed that women who have only one child are characterised by poorer mental and physical health than those who have two children [22].

Our study showed that pre-induction, induction and stimulation were more often used in primiparas, which corroborates the findings by Gu et al. and Litorp et al. [23,24]. Hidalgo-Lopezosa et al. found that stimulation with oxytocin was associated with a shorter first stage of labour in primiparas, with no differences found in multiparas [25]. Amniotomy is an intentional puncturing of the amniotic sac during labour [26]. Our study showed that this procedure was more often performed in primiparas than in multiparas. The same results were obtained by Gu et al [23].

Epidural anaesthesia is an effective method of relieving pain during labour. However, it may be associated with complications such as prolonged delivery, drowsiness, hypotension, and fever [23]. We observed that this pain relief method was significantly more frequently used by primiparas, which corroborated the results obtained by Gu et al. To make childbirth a positive experience, women should have the possibility of making decisions about pain relief [23].

Furthermore, our study showed that antibiotic therapy was administered more often in primiparas than multiparas. This may stem from the greater number of medical procedures and complications occurring in the course of labour in women giving birth for the first time, as reported by Damkier et al. [27]. These findings may highlight the importance of a more holistic approach to childbirth management in primiparous women; however, further studies are needed to determine whether such approaches may influence the level of medicalisation in this group.

Although for nearly 30 years now the World Health Organization has recommended an episiotomy rate of fewer than 15% of births [28], there is an alarmingly high rate of this intervention in Poland, which was confirmed by our findings and those of Bączek et al. [29]. Our study showed that primiparas were significantly more likely to have episiotomy compared to multiparas. This association was also reported by Beyene et al. [30]. Furthermore, we observed that multiparas more frequently experienced perineal tears, usually of the first degree. In turn, primiparas more often experienced perineal tears of the second degree, and tears of the labia, vaginal mucosa, vaginal wall, and cervix. Urasaki et al. demonstrated that perineal tears of the first degree occurred in over 25% of nulliparas and over 50% of multiparas [31]. Dendini et al. reported that the rate of second-degree perineal tears ranged from 35.1% to 78.3% in nulliparas and from 34.8% to 39.6% in multiparas [32]. Thus, it is important to prevent perineal injuries and their consequences (perineal pain, dyspareunia, pelvic organ prolapse and urinary incontinence). In the third trimester, it is viable to introduce perineal massage to make the tissue more flexible and allow it to stretch during labour. This will reduce the risk of perineal tears and the need for episiotomy [33].

The duration of labour is shorter in multiparas than in primiparas [34]. Our study supports this thesis. Our detailed analysis of labour duration revealed that both the first and second stages of labour were shorter in multiparas, which is consistent with studies by Ashwal et al. [35]. Gu et al. also reached similar conclusions, demonstrating that parity was an independent variable associated with the duration of labour [23]. Possible explanations for these differences have been suggested in the literature, including physiological factors such as differences in cervical tissue and the birth canal; however, these mechanisms were not directly analysed in the present study.

Eto et al. reported that postpartum blood loss was significantly higher in primiparas than in multiparas [36], which is consistent with our findings. Similarly, Bestman et al. observed a lower incidence of postpartum haemorrhage in multiparas compared to nulliparas [37]. This could be due to the use in multiparous women of prophylaxis in the third period of labor aimed at reducing postpartum bleeding. Consideration of maternal factors such as age ≥ 35 years, BMI > 30, and type 2 diabetes in perinatal care may be associated with a reduced risk of postpartum haemorrhage in primiparous women [38]. Although the observed differences reached statistical significance, their clinical relevance should be interpreted with caution. The associations identified in this study may be influenced by potential confounding factors and should not be interpreted as indicating causal relationships. Further studies using adjusted analyses are needed to better assess the clinical significance of these findings.

Women who give birth for the first time are more scared of childbirth, more sensitive to labour pains and more likely to ask for pain relief than multiparas [13,39]. In our study, primiparas were more likely to use such pain relief methods as music therapy, water immersion, compresses, and relaxation massage compared to multiparas. At the same time, it needs to be emphasised that alternative pain relief methods are beneficial in terms of reducing pain and the duration of labour, which is reflected in the subject literature [40,41]. In their study, Goswami et al. also found that heat therapy effectively reduced the intensity of labour pain and shortened the first stage of labour [44]. Ulubasoglu et al. reported that relaxation massage reduces the duration of labour and the intensity of labour pain [41]. A metaanalysis by Ergin et al. confirmed that hydrotherapy reduced the perception of pain, increased the rate of vaginal births and improved comfort. Furthermore, it did not have a negative effect on the mother's and infant's health during labour [42]. Thus, women should be offered non-pharmacological methods for pain relief,

so that they can feel a greater sense of control and satisfaction with the childbirth process [23].

The next stage of our study involved analysing the relationship between parity and the labour positions selected by the women studied. During the process of childbirth, women can assume any position, such as kneeling, squatting, sitting, back-lying or side-lying. Different birthing positions have a different effect on the position of the pelvis, which may result in a more favourable course of labour in some positions than in others [43]. Our study showed that multiparas were more likely to choose vertical positions, while primiparas selected the lithotomy position. Fu et al. reported that a sitting position in the second stage of labour among primiparas shortened the duration of this stage, reduced the episiotomy rate and increased the vaginal birth rate. Moreover, it provided a better childbirth experience compared to the lithotomy position [44]. Therefore, vertical positions should be offered to patients to enhance a positive birth experience.

According to a study by Lin et al., multiparity is associated with a reduced risk of low birth weight in newborns and preterm birth [6]. In our study, multiparas were more likely to give birth to infants with a higher birth weight and higher birth length compared to infants born to primiparas. Dai et al. reported that infants born to nulliparas were more likely to receive an Apgar score of <7 compared to infants born to multiparas, which is consistent with our study. Furthermore, Haidari et al. demonstrated that infants born to primiparas were significantly more often admitted to an NICU, which we corroborated in our study [45,46]. The observed differences may reflect variations in maternal characteristics between the groups. It is possible that factors such as the presence of comorbidities during pregnancy or differences in obstetric history may contribute to the patterns observed; however, these aspects were not directly analysed in this study and therefore require cautious interpretation. Although these findings reached statistical significance, their clinical relevance should be interpreted with caution, particularly given the large sample size. Moreover, the observed associations may be influenced by potential confounding factors and should not be interpreted as indicating causal relationships. In this context, lower Apgar scores and more frequent NICU admissions among neonates of primiparous women may indicate differences in early neonatal adaptation. Further studies using adjusted analyses are needed to better understand the underlying mechanisms and clinical significance of these findings.

Limitations of study

We analysed multiple periparturient variables, which offer a comprehensive overview of labour in primiparas and multiparas. Therefore, our findings may contribute to a better understanding of differences in labour between primiparous and multiparous women and may inform future research in this area. Our study pertains to an area with limited up-to-date research and includes a large study group, which translates into higher heterogeneity of the population analysed. It was carried out in one hospital, thus minimising the risk of errors during the data gathering process. At the same time, we are well aware that conducting a study in a single centre can potentially limit the possibility of result generalisation, which results, amongst other things, from a limited number of variables that determine the characteristics of the people surveyed, which were collected and made available at the center from which the data were obtained. In addition, the retrospective design and the use of routinely collected clinical data limited the availability of detailed and standardised definitions of some variables and may have introduced variability in their coding. Furthermore, the study did not include an in-depth analysis of subsequent childbearing decisions in relation to previous childbirth. These limitations should be taken into account when interpreting the results, and further multi-centre studies with more detailed data collection and adjusted analyses are warranted.

CONCLUSIONS

In our study, primiparous women more frequently experienced periparturient complications and medical interventions during labour compared to multiparous women. Multiparity was associated with fewer complications in subsequent labours. Further studies, particularly those including adjusted analyses, are needed to better understand the observed differences and their clinical significance. Increasing awareness of parity-related differences may support further research and discussion in perinatal care.

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