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Centiles of weight of spontaneous and medically induced preterm births in Lombardy

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ABSTRACT

Among preterm births, different clinical conditions are included: mainly spontaneous and medical induced. In fact, about 30% of preterm (particularly late preterm) births are medically indicated and the birth weight of these cases may differ from spontaneous preterm birth.
In this paper, we have analyzed separately the percentiles of weight at birth in preterm births according to spontaneous and induced births using data of all deliveries in Lombardy, in the period of time between 1st January 2010 and 31th December 2013. The centiles of weight were lower among medically induced births in all the considered week of gestation and among males and females.
This descriptive analysis of centiles of weight at birth in Lombardy provides Italian obstetricians and neonatologist with curves of fetal growth more closely representing the population under cure, in particular offer information at our knowledge not available before on the distribution of centiles of weight at birth on babies born preterm spontaneously or after induction or elective cesarean section.

Keywords: Preterm Births, Induced Births, Centile of Weight

SOMMARIO

Tra le nascite pretermine, sono incluse diverse condizioni cliniche: il parto spontaneo e quello indotto per una indicazione clinica. In questo lavoro, abbiamo analizzato separatamente i percentili di peso alla nascita delle nascite pretermine in base alle nascite spontanee e indotte utilizzando i dati di tutti i parti pretermine (28-34° settimana di gestazione) in Lombardia, nel periodo di tempo compre tra il 1 Gennaio 2010 e 31 dicembre 2013. I centili di peso erano più bassi tra i nati su indicazione medica in tutte le settimane di gestazione considerate e tra i nati di sesso maschile e i nati di sesso femminile.
Questa analisi descrittiva dei centili di peso alla nascita in Lombardia offre agli ostetrici ed ai neonatologi curve di peso alla nascita che rappresentano più da vicino la popolazione italiana, in particolare differenziando i centili di peso alla nascita dei bambini nati pretermine spontaneamente o dopo induzione medica o taglio cesareo elettivo.

INTRODUCTION

Preterm birth rate is increasing worldwide[(1)]; this trend is mainly due to the rise in late preterm (34-36 gestational week) births[(2)]. A recent study estimated that late preterm infants represent almost a third of ventilated infants; about 30% of late preterm infants required intensive care, and 15% presented with respiratory failure [(3)].

It has also been shown that elective cesarian section (CS) are responsible of the increasing rate of early term births[(5)].

Among preterm births, different clinical conditions are included: mainly spontaneous and medical induced. In fact, about 30% of preterm (particularly late preterm) births are medically indicated[(6)] and the birth weight of these cases may differ from spontaneous preterm birth.

The available percentiles of weight at birth by gestational age vary widely. Published data

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shown, for the same gestational week, differences of hundreds of grams for the median values or for the 5th and 95th percentiles[7-10]. This is particularly true for centiles of preterm births. Part of these differences are due to the criteria used for the definition of study births, further generally the studies have considered together spontaneous and medically induced preterm births. Thus it is important to be available data from each countries or regions and curves which consider separately spontaneous and induced preterm births.

In Italy percentiles of weight at birth for preterm births have been published[11, 12]. None of these analysis have, however, presented separately the percentiles according to spontaneous and induced births. In a companion analysis we have published the centiles of weight at term birth[13], in this paper we consider the centiles of preterm births among births occurred in Italy during the period 2010-2013.

METHODS

The general methodology of this study has been described in a companion paper[13].

Briefly, this is a population based analysis using data from two regional data base: CEDAP and SDO database.

We analyzed data of all deliveries in a Northern Italian Region (Lombardy) with a population of about 10 millions inhabitants, in period of time between 1st January 2010 and 31th December 2013. Gestational age was considered as completed week of gestation.

On the basis of these data we computed the 10th, 50th and 90th centile values of neonatal birthweight from the 28th to 36th week of gestation at delivery for the total population and separately for spontaneous and medically induced and deliveries by elective cesarean section.

In the computation of centiles we used the methods reported in previous publications [14]. To evaluate the quality of birthweight data, we compared the information reported in CedAP data base and SDO data base. We applied the Tukey's methodology [14, 15] to identify outliers. For each data base separately, we considered the distribution of birthweight by sex and gestational age. The cases with birthweight lower than the first quartile minus twice the interquartile range (lower Tukey limit) or higher than the third quartile plus twice the interquartile range (upper Tukey limit) were considered outliers. CedAP values were considered in the analysis. In the cases where CedAP value was an outlier and SDO value were not, CedAP data base value was corrected with SDO data base value. Then we applied Tukey's methodology to CedAP data base distribution and eliminated outlier cases.

For the purpose of the present analysis we have defined medically induced birth group all pharmacological induced deliveries and elective cesarean sections.

RESULTS

We identified in the CedAP data base a total of 361.756 singleton babies, born in Lombardy region (Northern Italy) during the period 1st January 2010 to 31st December 2013. This data base was linked with SDO (discharge register) data base: 8.189 (2,3%) records were deleted.

After the exclusion of cases with missing values on gestational age and sex of newborn (n=2850, 0,8%) and deletion of cases with outlier values of birthweight (n=1250, 0,4%) we considered 349.467 newborns.

Among these, 18.780 (5,4%) births 28-36 weeks of gestation were considered in present analysis.

Table 1 shows the distribution of maternal characteristics of total population and separately for spontaneous and medically induced births.

Medically induced birth were associated with older maternal age, nulliparity and foreign nationality.

The 10th, 50th and 90th centiles of weight at birth for gestational age in the total population and separately for spontaneous and medically induced (induction and elective cesarean section) births are shown in **Table 2**. The centiles of weight were lower among medically induced births in all the considered week of gestation and among males and females.

DISCUSSION

The objective of the present analysis is to offer information on centiles of weight at birth for preterm births in Italy, considering women who delivered in the period 2010-2013 in Lombardy.

As discussed in the companion paper, information considered in the analysis are based on routinely collected data base. However, the quality and completeness of data considered was generally satisfactory. For example there was no missing values on birth weight and gestational week of delivery was missing in less than 1% of

Table 1. *Characteristics of study subjects*

	Total Series		Spontaneous Delivery		Pharmacological induced		Elective cesarean section	
	N	%*	N	%*	N	%*	N	%*
Native								
Italian	12833	68,4	4633	66,4	1426	70,2	3958	71,0
Other country	5924	31,6	2344	33,6	604	29,8	1615	29,0
Maternal age (yrs)								
<20	320	1,7	186	2,7	42	2,1	44	0,8
20-29	5298	28,3	2289	32,9	651	32,1	1208	21,7
30-39	11285	60,3	3986	57,3	1176	58,0	3589	64,6
40+	1799	9,6	496	7,1	157	7,7	715	12,9
Parity								
No	10738	57,2	3844	55,0	1161	57,1	3268	58,6
Yes	8042	42,8	3146	45,0	871	42,9	2310	41,4
Assisted reproduction								
Yes	713	3,8	154	2,2	58	2,9	318	5,7
No	17991	96,2	6810	97,8	1968	97,1	5233	94,3
All	18780		6990		2032		5578	

Table 2a. *Birthweight centiles in total series and by type of delivery: male births*

Gestational age (weeks)	Total series				Spontaneous delivery				Pharmacologically induced				Elective cesarean section			
	N	10th	50th	90th	N	10th	50th	90th	N	10th	50th	90th	N	10th	50th	90th
28	129	780	1130	1380	26	950	1200	1470	1	1140	1140	1140	52	740	1015	1380
29	160	865	1240	1505	37	1090	1310	1700	0	--	--	--	63	660	1140	1460
30	230	965	1445	1920	55	1280	1600	2660	3	1390	2420	2490	93	850	1250	1860
31	315	1100	1640	2050	93	1410	1760	2160	3	1650	1650	1850	126	1050	1400	1950
32	415	1290	1820	2250	123	1620	1950	2390	9	1490	2000	2350	160	1130	1620	2115
33	685	1510	2050	2670	213	1800	2180	2800	27	1650	2080	2880	244	1410	1830	2490
34	1244	1730	2270	2820	404	2000	2400	2890	111	1900	2330	2800	426	1530	2070	2740
35	2209	2020	2550	3070	866	2160	2610	3110	262	2090	2530	3030	578	1830	2470	3070
36	4775	2230	2770	3280	2055	2370	2820	3290	646	2200	2740	3230	1088	2040	2700	3270

Table 2b. *Birthweight centiles in total series and by type of delivery: female births.*

Gestational age (weeks)	Total series				Spontaneous delivery				Pharmacologically induced				Elective cesarean section			
	N	10th	50th	90th	N	10th	50th	90th	N	10th	50th	90th	N	10th	50th	90th
28	127	710	1000	1330	21	840	1090	1450	1	1220	1220	1220	62	670	910	1270
29	135	800	1220	1490	34	1080	1325	1520	0	--	--	--	56	750	1000	1380
30	192	970	1375	2350	52	1220	1580	2940	3	1300	2350	2800	73	850	1240	1700
31	268	1050	1460	1900	64	1370	1660	1990	4	1750	1945	2210	131	990	1300	1770
32	366	1230	1745	2270	103	1640	1900	2570	6	1510	1735	3120	177	1090	1530	2180
33	595	1440	1970	2630	175	1720	2100	2890	23	1760	2240	3220	217	1300	1770	2350
34	1059	1610	2170	2630	344	1910	2255	2700	123	1700	2170	2610	369	1480	2000	2500
35	1875	1880	2440	2940	696	2060	2500	3020	241	1950	2430	2960	558	1670	2300	2870
36	4001	2130	2640	3160	1629	2280	2720	3200	569	2120	2600	3060	1105	2000	2570	3160

cases. We have no information on the quality of definition of gestational age. This point could be of major relevance considering early gestational ages. However, in Italy, less than 4% of pregnant women undergo the first examination after the 12 week of gestation (http://www.salute.gov.it/imgs/C_17_pubblicazioni_2024_allegato.pdf 16). An interesting finding of this analysis is the opportunity of analyzing separately centiles of weight separately for spontaneous and induced births: the centiles were lower among induced births and births by elective cesarean section. This finding should be considered in clinical practices, in particular when we consider the centiles of birth weight among spontaneous preterm deliveries.

In conclusion this descriptive analysis of centiles of weight at birth in Lombardy provides Italian obstetricians and neonatologists with curves of fetal growth more closely representing the population under curve, in particular offer information at our knowledge not available before on the distribution of centiles of weight at birth on babies born preterm spontaneously or after induction or elective cesarean section.

Competing interestes: The authors declare that they have no competing interests.

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