Italian Journal of
Gynæcology & Obstetrics
June 2016 - Vol. 28 - N. 2 - Quarterly - ISSN 2385 - 0868

Centiles of weight at term birth according to maternal nationality in a Northern Italian region

Fabio Parazzini[1,2], Sonia Cipriani[2], Giuseppe Bulfoni[2], Paola Agnese Mauri[1], Giorgia Carraro[2], Salvatore Andrea Mastrolia[3], Mauro Busacca[4], Giuseppe Trojano[4]

[1] Dipartimento di Scienze Cliniche e di Comunità, Universita' degli Studi di Milano, Milan Italy
[2] Fondazione IRCCS Cà Granda, Dipartimento Materno-Infantile, Ospedale Maggiore Policlinico, Milan, Italy
[3] Dipartimento di Ostetrica e Ginecologia AOU Policlinico di Bari Università degli Studi di Bari, Bari, Italy
[4] Dipartimento Materno-Infantile, ASST FBF-Sacco Ospedale Macedonio Melloni, Università degli Studi di Milano, Milan, Italy

ABSTRACT

Country specific birthweight curves may reflect the ethnic composition of that population and may offer information on the "true" birth weight distribution of new births from native and foreign mothers. In consideration of the fact that in Italy now about 30% new births born in foreigners, we analyzed the centiles of weight at birth separately for the native Italian women and foreign ones. We considered 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 2014. 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 37th to 42nd week of gestation at delivery for the total population and separately for native Italian and the five more common nationality of non Italian women (i.e. women born in Morocco, Albania and Romania, China and Egypt). These nationality were considered since they represent at least the 5% of all foreigner mothers. The values of centiles were higher in males than in females in all the gestational weeks and the different maternal nationality populations. Lower centiles values were observed in babies born by Italian women, the higher been observed in babies born by Chinese women and Maroccan and Egyptian ones with differences of about 100-200gr among babies born form mother with these nationality in comparison with babies born by Italian mothers. 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 curve.

Keywords: Centiles; birth; weight

SOMMARIO

Curve di peso alla nascita specifiche di una area geografica riflettono la composizione etnica di quella popolazione e possono offrire informazioni sulla "vera" distribuzione del peso nascita di nuove nascite da madri autoctone e straniere. In considerazione del fatto che in Italia ormai circa il 30% di nuovi nati nasce da madri straniere, abbiamo analizzato i centili di peso alla nascita separatamente per i nati da donne italiane native e da donne nate in altre nazioni. Abbiamo preso in considerazione i dati di tutte i parti avvenuti in Lombardia nel periodo compreso tra il 1° gennaio 2010 ed il 31 dicembre 2014. Sulla base di questi dati abbiamo calcolato il valore del 10°, 50° e 90° centile di peso alla nascita per i nati a termine (37°-42° settimana di gestazione al parto) per la popolazione totale e separatamente per le madri nate in Italia e le madri nate nelle cinque nazioni più comuni tra le donne non italiane (Marocco, Albania e Romania, Cina ed Egitto). I valori dei centili erano più alti nei maschi rispetto alle femmine in tutte le settimane di gestazione e le diverse nazionalità della madre. Sono stati osservati valori inferiori dei centili nei bambini nati da donne italiane, i più alti valori dei centili sono stati osservati nei bambini nati da donne cinesi, marocchine ed egiziane con differenze di circa 100-200gr tra i bambini nati da madri con queste nazionalità rispetto ai bambini nati da madri italiane . Questa analisi descrittiva dei centili di peso alla nascita in Lombardia offre agli ostetrici ed ai neonatologi curve di crescita fetale che meglio rappresentano la nostra popolazione.

Correspondence to: giutrojano@gmail.com

DOI: 10.14660/2385-0868-44

INTRODUCTION

The available percentiles of weight at birth by gestational age vary widely. Published data shown, for the same gestational week, differences of hundreds of grams for the median values or for the 5th and 95th percentiles[1-5]. Part of these differences are due to the criteria used for the definition of study births. For example, some studies have excluded pathological pregnancies, but some differences are likely due to the different populations considered. In fact maternal ethnicity is a determinant of low birth weight.

It has been suggested that birthweight centiles are generally higher among term infants born to mothers who immigrate in elevated income countries than those of infants born in their respective native countries[6]. Thus it is important to be available data from each countries or regions. In fact, country specific birthweight curves may reflect the ethnic composition of that population and may offer information on the "true" birth weight distribution of new births from native and foreign mothers.

In Italy percentiles of weight at birth for gestational age have been published in 1995 and 2010[7-9]. These analysis, however, have not presented separately the percentiles according to maternal nation of birth.

Nowadays in Italy now about 30% new births born in foreigners so, it is useful to analyze the centiles of weight at birth separately for the native Italian women and foreign ones.

Further, it has been shown that birthweight mean increased over recent decades, thus up-to-date centiles for birthweight for gestational age are useful in clinical practice[10].

METHODS

This is a population-based study using data from a regional data-base.

In Lombardy, a standard form is used to register all births and neonatal discharges from public or private hospitals.

All admissions and discharges are codified according to the International Classification of Diseases 9th edition – Clinical Modification (ICD-9-CM), Italian version. For all deliveries, information is available for maternal age, maternal country of birth and reason for admission Further at delivery, a specific form is filled by midwives including information on pregnancy on maternal characteristics type of conception (spontaneous/ non spontaneous (i.e., after ART or medically induced ovulation only), course of pregnancy, delivery and maternal outcome at birth (CedAP data base). Data from this data base have been linked with the hospital discharge data base in order to obtain detailed information on delivery, pregnancies and maternal characteristics.

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 2014. 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 37th to 42nd week of gestation at delivery for the total population and separately for native Italian and the five more common nationality of non Italian women (i.e. women born in Morocco, Albania and Romania, China and Egypt).These nationalities were considered since they represent at least the 5% of all foreigner mothers.

In the computation of centiles we used the methods reported in previous publications[11,12] 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[12] for identifying 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 outliers cases.

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 2014. This data-base was linked with SDO (discharge register) data-base: 8.189 (2,3%) records were deleted due to a lack of link between the two data base

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

Among this, 330.007 (94,4%) term births

(gestational age ≥37 weeks) were considered in present analysis.

The distribution of maternal characteristics and course of pregnancy of considered births are shown in **Table 1** according to maternal nationality. Italian women were older and nulliparae and more frequently reported non spontaneous conception and previous cesarean section.

The 10th, 50th and 90th centiles of weight at birth for gestational age in the total population and in strata of maternal nationality are shown in **Table 2**.

The values of centiles were higher in males than in females in all the gestational weeks and the different maternal nationality populations. Lower centiles values were observed in babies born by Italian women, the higher been observe in babies born by Chinese women and Moroccan and Egyptian ones.

DISCUSSION

The objective of the present analysis is to offer information on centiles of weight at birth for term births in Italian and not Italian women, considering women who delivered in the period 2010-2014 in Lombardy.

Potential limitations of this analysis should be briefly discussed.

Information considered are based on routinely

Table 1.
Distribution of maternal characteristics according to country of birth.

	Total series		Italy		Morocco		Romania		Albania		Egypt		China	
	No.°	%	No.°	%	No.°	%	No.°	%	No.°	%	No.°	%	No.°	%
Maternal age at delivery (years)														
<=19	4563	1,4	1893	0,8	363	2,8	477	4,4	416	4,8	121	2,2	83	1,6
20-29	101984	31,0	53401	22,8	6871	53,4	6166	56,3	6092	70,7	3596	65,9	3110	61,1
30-39	199985	60,8	159846	68,3	5063	39,4	4127	37,7	2017	23,4	1659	30,4	1793	35,2
40+	22330	6,8	18827	8,0	561	4,4	179	1,6	86	1,0	81	1,5	106	2,1
Parity														
No	176656	53,5	132595	56,5	4618	35,8	6407	58,1	4520	52,4	1587	29,0	2297	44,9
Yes	153351	46,5	102003	43,5	8283	64,2	4618	41,9	4111	47,6	3879	71,0	2816	55,1
Previous CS														
No	292750	88,7	209707	89,4	11159	86,5	10213	92,6	7800	90,4	4070	74,5	4706	92,0
Yes	37257	11,3	24891	10,6	1742	13,5	812	7,4	831	9,6	1396	25,5	407	8,0
Spontaneous conception														
No	5603	1,7	4959	2,1	44	0,3	91	0,8	48	0,6	27	0,5	20	0,4
Yes	322374	97,7	228417	97,4	12729	98,7	10847	98,4	8433	97,7	5404	98,9	5085	99,5
Presentation														
Vertex	317392	96,2	225135	96,0	12517	97,0	10555	95,7	8335	96,6	5314	97,2	4976	97,3
Breech	11251	3,4	8481	3,6	330	2,6	422	3,8	271	3,1	124	2,3	122	2,4
Other	1364	0,4	982	0,4	54	0,4	48	0,4	25	0,3	28	0,5	15	0,3
Total	330007		234598		12901		11025		8631		5466		5113	

°In some cases the sum does not add up the total due to missing values

Table 2.
Centiles of weight at birth according to gestational age and maternal country of birth.

Country of birth/ Gestational age at birth	Male				Female			
	No.	10th	50th	90th	No.	10th	50th	90th
Total series								
37	11731	2500	3000	3530	10320	2380	2870	3370
38	36263	2740	3210	3730	33064	2610	3080	3580
39	48350	2870	3350	3860	45920	2750	3200	3700
40	46019	3000	3480	4000	44850	2870	3330	3830
41	25739	3100	3600	4110	24202	2980	3440	3950
42	1753	3080	3570	4130	1796	2950	3420	3920
Italy								
37	8270	2490	2990	3500	7314	2350	2850	3330
38	25849	2730	3200	3710	23827	2600	3060	3550
39	34329	2860	3330	3840	32778	2740	3190	3670
40	32621	2990	3460	3960	31785	2860	3310	3800
41	18399	3100	3580	4080	17070	2960	3420	3920
42	1157	3070	3550	4110	1199	2940	3400	3910
Morocco								
37	337	2550	3060	3670	322	2500	2930	3500
38	1212	2800	3310	3830	1030	2750	3190	3740
39	1746	2940	3440	3980	1595	2860	3300	3820
40	1971	3060	3560	4090	1985	2960	3430	3950
41	1219	3160	3670	4190	1274	3030	3500	4030
42	102	3100	3605	4110	108	3070	3550	3940
Romania								
37	390	2560	3090	3650	375	2500	2950	3440
38	1109	2780	3240	3810	992	2660	3135	3650
39	1642	2920	3400	3910	1548	2820	3270	3740
40	1536	3030	3540	4070	1549	2900	3390	3900
41	907	3150	3660	4210	826	3020	3515	4010
42	72	2950	3640	4220	79	3090	3550	3900
Albania								
37	256	2510	3095	3540	237	2460	2980	3420
38	760	2805	3285	3800	689	3680	3140	3630
39	1199	2970	3450	3950	1197	2840	3260	3780
40	1317	3100	3560	4070	1273	2980	3410	3900
41	804	3190	3700	4200	734	3090	3520	4020
42	89	3120	3550	4080	76	3040	3445	4000
Egypt								
37	202	2610	3150	3770	155	2450	2930	3600
38	690	2850	3300	3815	599	2690	3160	3700
39	819	2990	3460	3950	744	2840	3260	3790
40	713	3070	3560	4140	723	2970	3410	3940
41	356	3200	3690	4200	388	2990	3490	4040
42	39	3170	3630	4420	38	2860	3375	3990
China								
37	158	2600	3115	3640	131	2500	2930	3320
38	521	2850	3290	3800	430	2685	3130	3680
39	839	3000	3420	3910	768	2870	3310	3790
40	802	3110	3580	4050	749	3020	3420	3930
41	316	3230	3625	4210	368	3080	3555	4010
42	14	3310	3710	4000	17	2770	3510	3780

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 cases.

We have no information on the quality of definition of gestational age. However, in Italy, less than 4% of pregnant women undergo the first examination after the 12 week of gestation[13].

The results of this analysis shows differences of about 100-200gr among babies born form mother with different nationality in comparison with babies born by Italian mothers. These differences are consistent with those reported in other countries[14]. The discussion of these differences is beyond the scope of this analysis. The presented figures give the "true" centiles in Lombardy, thus they reflect the different age and parity distribution of mothers born in different countries.

In conclusion 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 it offers information at our knowledge not available before on the distribution of centiles of weight at birth on babies born from foreign mothers in Italy and underlines the role of using birth weight curves tailored to maternal country of birth[15].

REFERENCES

1) Dobbins TA, Sullivan EA, Roberts CL, Simpson JM. **Australian national birthweight percentiles by sex and gestational age**, 1998–2007. Med J Aust. 2012;197(5):291–4;

2) Sankilampi U, Hannila ML, Saari A, Gissler M, Dunkel L. **New population-based references for birth weight, length, and head circumference in singletons and twins from 23 to 43 gestation weeks.** Ann Med. 2013;45(5–6):446–54

3) Goldenberg RL, Cutter GR, Hoffman HJ, Foster JM, Nelson KG, Hauth JC. **Intrauterine growth retardation: standards for diagnosis.** Am J Obstet Gynecol. 1989 Aug;161(2):271-7. Review

4) Bonellie S, Chalmers J, Gray R, Greer I, Jarvis S, Williams C. **Centile charts for birthweight for gestational age for Scottish singleton births.** BMC Pregnancy Childbirth. 2008 Feb 25;8:5. doi: 10.1186/1471-2393-8-5.

5) Fok TF, So HK, Wong E, Ng PC, Chang A, Lau J, Chow CB, Lee WH; Hong Kong **Neonatal Measurements Working Group Updated gestational age specific birth weight, crown-heel length, and head circumference of Chinese newborns.** Arch Dis Child Fetal Neonatal Ed. 2003 May;88(3):F229-36

6) Boshari T, Urquia ML, Sgro M, De Souza LR, Ray JG **Differences in birthweight curves between newborns of immigrant mothers vs. infants born in their corresponding native countries: systematic overview.** Paediatr Perinat Epidemiol. 2013 Mar;27(2):118-30

7) Parazzini F, Cortinovis I, Bortolus R, Fedele L, Decarli A. **Weight at birth by gestational age in Italy.**Hum Reprod. 1995 Jul;10(7):1862-3.

8) Gagliardi L, Macagno F, Pedrotti D, Coraiola N, Furlan R, Agostini L, Milani S. **Standard antropometrici neonatali prodotti dalla task-force della Società Italiana di Neonatologia e basati su una popolazione italiana Nord-Orientale.** Riv Ital Ped 1999; 25: 159-169.

9) Bertino E, Spada E, Occhi L, Coscia A, Giuliani F, Gagliardi L, Gilli G, Bona G, Fabris C, De Curtis M, Milani S. **Neonatal anthropometric charts: the Italian neonatal study compared with other European studies.** J Pediatr Gastroenterol Nutr. 2010 Sep;51(3):353-61. doi: 10.1097/MPG.0b013e3181da213e.

10) Bonellie S, Chalmers j Gray R Greer I Jarvis S Williams C **centile charts for birth weight for gestational age for Scottish singleton births** BMC Pregnancy Childbirth 2008 Feb 25; 8:5

11) Li Z, Umstad MP, Hilder L, Xu F, Sullivan EA **Australian national birthweight percentiles by sex and gestational age for twins**, 2001-2010. BMC Pediatrics 2015:15;148.

12) Tukey JW. **Exploratory data analysis, vol. 231. Reading**, MA: Addison-Wensley; 1977.

13) **Certificato di assistenza al parto (CeDAP) Analisi dell'evento nascita** http://www.salute.gov.it/imgs/C_17_pubblicazioni_2024_allegato.pdf

14) Ray JG, Sgro M, Mamdani MM, Glazier RH, Bocking A, Hilliard R, Urquia ML. **Birth weight curves tailored to maternal world region.** J Obstet Gynaecol Can. 2012 Feb;34(2):159-71

15) Marcelo L. Urquia PhD MSc , Howard Berger MD, Joel G. Ray MD MSc; for the Canadian Curves **Consortium Risk of adverse outcomes among infants of immigrant women according to birth-weight curves tailored to maternal world region of origin** CMAJ, 2015, 6:187(1)