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ARTICLE

Assisted reproductive technologies in Latin America: the Latin American Registry, 2012

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Abstract Multinational data on assisted reproduction technologies were collected from 155 institutions in 14 Latin Amerian countries during 2012. Case-by-case data included 47,326 assisted reproduction technology cycles covering over 80% of cycles carried out in Latin America. Treatments included IVF, intracytoplasmic sperm injection (ICSI), frozen embryo transfers, oocyte donations and fertility preservation. Embryo transfer and IVF–ICSI was carried out in 39% of women aged 35–39 years and 31% of women aged 40 years or over. Delivery rate per oocyte retrieval was 20.9% for ICSI and 26.5% for IVF. Multiple births comprised 20.6% twins and 1.2% triplets and over. In oocyte donations, twins reached 27.8% and triplets and over 2.4%. Pre-term births in singletons were 14%. The relative risk of prematurity increased by 4.30 (95% CI 4.1 to 4.6) in twins and 43.8 (95% CI 28.5 to 67.4) in triplets and higher. Perinatal mortality increased from 25.2 per thousand in singletons to 44.4 in twins and 80.7 in triplets and over. Elective single embryo transfer was carried out in only 1.4%, of cycles, with a delivery rate of 30% in women 34 years or younger, and should be considered the way forward provided access is facilitated with public funding.

KEYWORDS: assisted reproductive technologies, epidemiology, IVF, Latin America, multiple births, outcomes, registry

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Introduction

The Latin American Registry of Assisted Reproduction (RLA) was established in 1990, as the first multinational and regional registry collecting data on assisted reproduction technologies. For the first 20 years, summary data were obtained electronically via a web page from every participating institution belonging to 12 countries in the region. Since 2010, new software has been developed and implemented, allowing the collection of individualized case-by-case data from every treatment cycle. Data collection is, therefore, recorded individually starting from ovarian stimulation until birth or spontaneous abortion. Today, individualized data is obtained from assisted reproduction technology treatments carried out in 155 institutions from 14 countries, covering more than 80% of assisted reproduction technology cycles carried out in the region. This report corresponds to the 24th edition of RLA. Reports produced between 1990 and 1998 are available in printed format; those published between 1999 and 2009 are available as PDF files, which can be freely downloaded from the web page of the Latin American Network of Assisted Reproduction (REDLARA) at http://www.redlara.com. Since 2010 onwards, annual reports have been published both in the *Journal Brasileiro de Reprodução Assistida* (Assisted Reproduction, the official journal of REDLARA), and online at http://www.redlara.com. This is the first report published simultaneously in *Reproductive BioMedicine Online*.

The main objectives of RLA have been to disseminate information on assisted reproduction technology procedures carried out in Latin America; monitor outcomes, as well as trends on safety and efficacy among centres and countries; empower infertile couples in their capacity to evaluate risks and benefits when requesting assisted reproduction technology treatments; and develop a robust database for epidemiological studies. In this report, information is presented on availability, effectiveness, and perinatal outcomes of assisted reproduction technology treatment carried out during 2012, and babies born up to September 2013. It is also our aim to describe regional trends on how assisted reproduction technology is practised in the region, including the number of embryos transferred, multiple births and its effect on preterm births and perinatal mortality.

Materials and methods

Data collection

One hundred and fifty-five centres from 14 countries (Supplementary Table S1) reported 47,326 assisted reproduction technology procedures started between January and December 2012. Treatments include in IVF, intracytoplasmic sperm injection (ICSI), oocyte donation (both fresh and frozen), frozen embryo transfer (FET), and pre-implantation genetic diagnosis and screening, registered together as PGD. As part of the accreditation programme, all participating institutions agree to have their data registered and published by the RLA. Given it is a multinational registry, no consent was required.

Data validation

Information provided by each centre is checked by the RLA central office for inconsistency before inclusion in the database. Any error or discrepancy not identified by the computer program is discussed with the centre, and the data are rectified if necessary.

Limitations of data collection

Some centres lack complete description of events surrounding deliveries, such as weight of newborns, gestational age at delivery, perinatal outcome, or both. In fact, in 1530 deliveries (23%), no data were available on the weight of newborns. This lack of information, although small, is especially prevalent in assisted reproduction technology institutions that are not associated with obstetric units.

Another potential limitation results from the fact that the inclusion of new cases, at the very start of a cycle, is not obligatory as in national registries, which are sometimes enforced by an independent body. Although we define an assisted reproduction technolgy cycle as initiated when ovarian stimulation is provided, in the RLA, new cases can be incorporated at the start of ovarian stimulation or at any time after that.

Centres need to be certified by an independent body (accreditation programme) formed of a biologist and a clinician from a different country before their data can be included in the RLA. This is indeed a restriction for many centres that provide assisted reproduction technology treatments in the region. Although the reasons for not reporting are numerous, we estimate that a proportion of them refrain from reporting because their facilities would not pass the accreditation programme. Nevertheless, today, RLA has complete data from over 80% of procedures carried out in the region.

Statistical analysis

Chi square test was used to analyse independence of categorical variables. When comparing two outcomes, the risk ratio (RR), and its corresponding 95% confidence interval (95% CI) are presented. When multiple variable analyses were conducted (i.e. logistic regression or lineal regression), the dependent variables were considered significant if $P < 0.05$.

Results

Participating centres

One hundred and fifty-five centres belonging to 14 reported their assisted reproduction technology procedures carried out during 2012. They included 31,857 initiated autologous fresh IVF–ICSI cycles; 10,073 FETs (both autologous and heterologous), 5396 embryo transfers with donated oocytes, and 1764 initiated cycles for fertility preservation.

Access to assisted reproduction technology procedures, defined as the sum of IVF–ICSI initiated cycles, FET and oocyte

Table 1 Assisted reproduction technology procedures and access in 2012.

	Number of clinics	Assisted reproductive techniques						Access[f]
		IVF/ICSI initiated cycles[a]	IVF[b]	ICSI[b]	Frozen embryo transfer[c]	Oocyte donation	Fertility preservation[d]	Total[e]	
Argentina	25	6461	504	5515	3027	1543	429	11,031	1193
Bolivia	1	215	148	62	14	8	923	237	96
Brazil	57	16,030	1070	13,937	4252	1170	0	21,452	447
Chile	8	1563	131	1321	549	197	48	2309	595
Colombia	11	977	293	622	262	247	13	1486	139
Ecuador	6	608	216	324	165	154	107	927	254
Guatemala	1	100	38	62	7	17	0	124	37
Mexico	27	3345	1222	2017	1046	1140	114	5531	196
Nicaragua	1	91	46	41	0	9	0	100	67
Panama	1	245	7	192	86	33	9	364	452
Peru	6	1264	298	875	430	547	114	2241	308
Dominican R.	2	80	42	35	5	26	0	111	48
Uruguay	2	293	20	233	77	46	2	416	585
Venezuela	7	585	369	184	153	259	5	997	148
Total	*155*	*31,857*	*4404*	*25,420*	*10,073*	*5396*	*1764*	*47,326*	*367.0*

[a]Initiated cycles.
[b]Oocyte retrieval.
[c]Includes the transfer of own and donated oocytes.
[d]Initiated fertility preservation cycles.
[e]Excludes fertility preservation.
[f]Number of cyclesper million women aged15–45 years.
ICSI = intracytoplasmic sperm injection.

donations, per million women aged 15–45 years, reached 367 in 2012.

Size of participating institutions

In 2012, excluding fertility preservation, a total of 47,326 cycles were reported. The average number of initiated cycles reported was 309 (range 25–2552 cycles). One-half of the centres reported less than 179 cycles, whereas six centres reported more than 1000 cycles. The overall distribution of institutions according to the number of cycles reported was as follows: 100 cycles or less (27%); between 100 and 250 cycles (36%); between 251 and 500 cycles (18%); between 500 and 1000 cycles (14%); and 1000 cycles or more (4%).

Assisted reproduction technology procedures and access

Most cycles were reported by Brazil, representing 45% ($n = 21,452$), followed by Argentina with 23% ($n = 11,031$) and Mexico 12% ($n = 5531$) (Table 1).

Out of 31,857 initiated autologous cycles, 1008 were cancelled before aspiration (3.16%). Furthermore, in 1025 follicular aspirations, no oocytes were recovered (3.21% of initiated cycles). In 29,824 oocyte retrievals, with at least one oocyte recovered, 4404 (15%) corresponded to IVF and 25,420 (85%) to ICSI. Furthermore, 80.6% ($n = 24,047$) of oocyte retrievals were followed by embryo transfer, and the main three reasons for no transfer were total embryo freeze ($n = 3393$), complete fertilization failure ($n = 991$) and abnormal or no embryo development ($n = 823$). Other reasons accounted for the remaining 570 cases.

One hundred and thirty-six centres reported 10,073 FET cycles, and 136 centres reported 5396 fresh oocyte donation. Of these, 57% corresponded to exclusive donors (i.e. women undergoing ovarian stimulation and oocyte retrieval with the only purpose of donating their oocytes), whereas 43% were egg-sharing (i.e. patients undergoing ovarian stimulation and oocyte retrieval, for an autologous treatment and simultaneously donated a proportion of their gametes to a third party).

Pregnancies and deliveries

The clinical pregnancy rate and delivery rate per oocyte retrieval and embryo transfer are shown in Tables 2 and 3. The clinical pregnancy rate and delivery rate per oocyte retrieval in ICSI cycles was 26.5% and 20.9%, respectively; in IVF, however, it reached 32.8% and 26.5%, respectively (Table 2). Therefore, the relative risk to achieve a clinical pregnancy and a delivery for IVF compared with ICSI was 1.29 (95% CI 1.22 to 1.37) and 1.27 (95% CI 1.20 to 1.34), respectively.

In oocyte donation cycles, the clinical pregnancy rate and delivery rate after fresh embryo transfers were 47.8% and 39.9%, respectively; which dropped to 40.0% and 28.1%, respectively, when FET were used. In FET with autologous oocytes, the clinical pregnancy rate and delivery rate were 31.6% and 24.3%, respectively (Table 3).

Table 2 Clinical pregnancy rate and delivery rate in fresh autologous IVF and intracytoplasmic injection[a] cycles in 2012.

Assisted reproduction technology procedure	*Oocyte retrieval*	*Clinical pregnancy rate per oocyte retrieval (%)*	*Delivery rate per oocyte retrieval (%)*
ICSI	25,420	26.5	20.9
IVF	4404	32.8	26.5

[a]One case was labelled as 'other'.
ICSI = intracytopolasmic sperm injection.

Table 3 Clinical pregnancy rate and delivery rate in oocyte donation, frozen embryo transfer, frozen embryo transfer (oocyte donation) cycles in 2012.

Assisted reproduction procedure	*Embryo transfer (%)*	*Clinical pregnancy rate per embryo transfer (%)*	*Delivery rate per embryo transfer (%)*
Oocyte donation	5396	47.8	39.9
Frozen embro transfer	7880	31.6	24.3
Oocyte donation (frozen embryo transfer)	2193	40.0	28.1

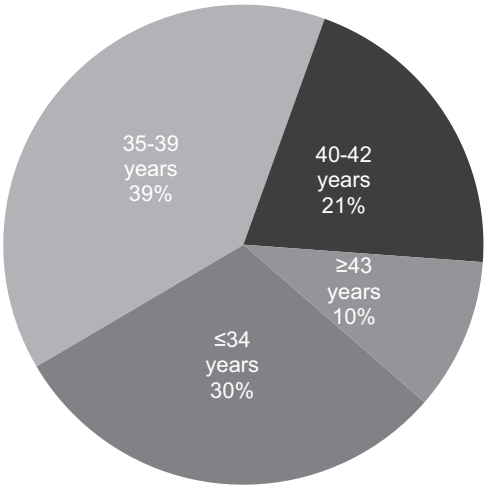

Figure 1 Age distribution of women undergoing autologous IVF and intracytoplasmic sperm injection, 2012.

Age of women undergoing fresh autologous and heterologous IVF–ICSI and its effect on delivery rate

The mean age of women undergoing IVF–ICSI was 36 years (SD 4.6). The age distribution is shown in Figure 1: initiated cycles included women aged 34 years or younger (30%); women aged 35–39 (39%); women between 40 and 42 years (21%) and women 43 years or older (10%). Therefore, 31% of women undergoing IVF–ICSI were 40 years or older.

As expected, the delivery rate per embryo transfer in autologous reproduction significantly decreased from 35.4% in women aged 34 years or younger to 10.3% in women aged 43 years or older ($P < 0.001$) (Figure 2A). On the other hand, when donor oocytes were used, the age of oocyte recipients did not systematically affect the outcome of embryo transfer (Figure 2B). Delivery rate per embryo transfer in oocyte recipients aged 34 years or younger ($n = 421$ embryo transfers) was 46.8%; in women aged 35–39 years 39.2% ($n = 943$ embryo transfers); in women aged 40–42 years 42.2% ($n = 1288$ embryo transfers); and in women aged 43 years or older 38.0% ($n = 2744$ embryo transfers).

Number of embryos transferred and multiple deliveries

Autologous reproduction

The outcome of 24,047 IVF–ICSI transfers stratified by the number of embryos transferred is shown in Table 4. Overall, the mean number of embryos transferred was 2.2, and the proportion of double embryo transfer and tripple and over embryo transfers were 55.7% and 28.8%, respectively. The overall proportion of multiple births was 21.8%, of which 20.6% were twins and 1.2% triplet and higher. When two embryos were transferred, 21.5% of deliveries were twins and 0.4% triplets. The proportion of triplets increased to 3.3% when three embryos were transferred.

Heterologous reproduction

The outcome of 5396 fresh oocyte donation transfers cycles stratified by the number of embryos transferred are shown in Table 5. The mean number of embryos transferred was 2.3, and the proportion of double and tripple and over embryo transfers were 63.2% and 30.8%, respectively The overall proportion of multiple births was 30.2%, of which 27.8% were twins, and 2.4% triplets and higher. When two embryos were transferred, 27.8% of deliveries were twins and 0.9% triplets. The proportion of triplets increased to 5.6% when either three or four embryos were transferred ($P < 0.001$).

Frozen–thawed embryo transfers

A total of 7880 cases of autologous FET stratified by the number of embryos transferred are presented in Table 6. The mean number of embryos transferred was 2.1, and the proportion of double, triple and higher order multiple embryos were 59.7% and 22.8% respectively. The overall rate of multiple births was 20.9%, of which 19.6% were twins and 1.3% triplets or more. When two embryos were transferred, 20.7% of deliveries were twins and 0.2% triplets. The proportion of triplets increased to 4.8% when three embryos were transferred ($P < 0.001$).

A total of 2193 cases of FET with donated oocytes are presented in Table 7. The mean number of embryos transferred was 2.1. As expected, when compared with autologous transfers, the clinical pregnancy rate and multiples was higher in each category of embryos transferred.

Elective single and double embryo transfer

Elective single embryo transfer (eSET) and elective double embryo transfer (eDET) accounted for 1.4% ($n = 347$) and 21.0% ($n = 5038$) of embryo transfers, respectively.

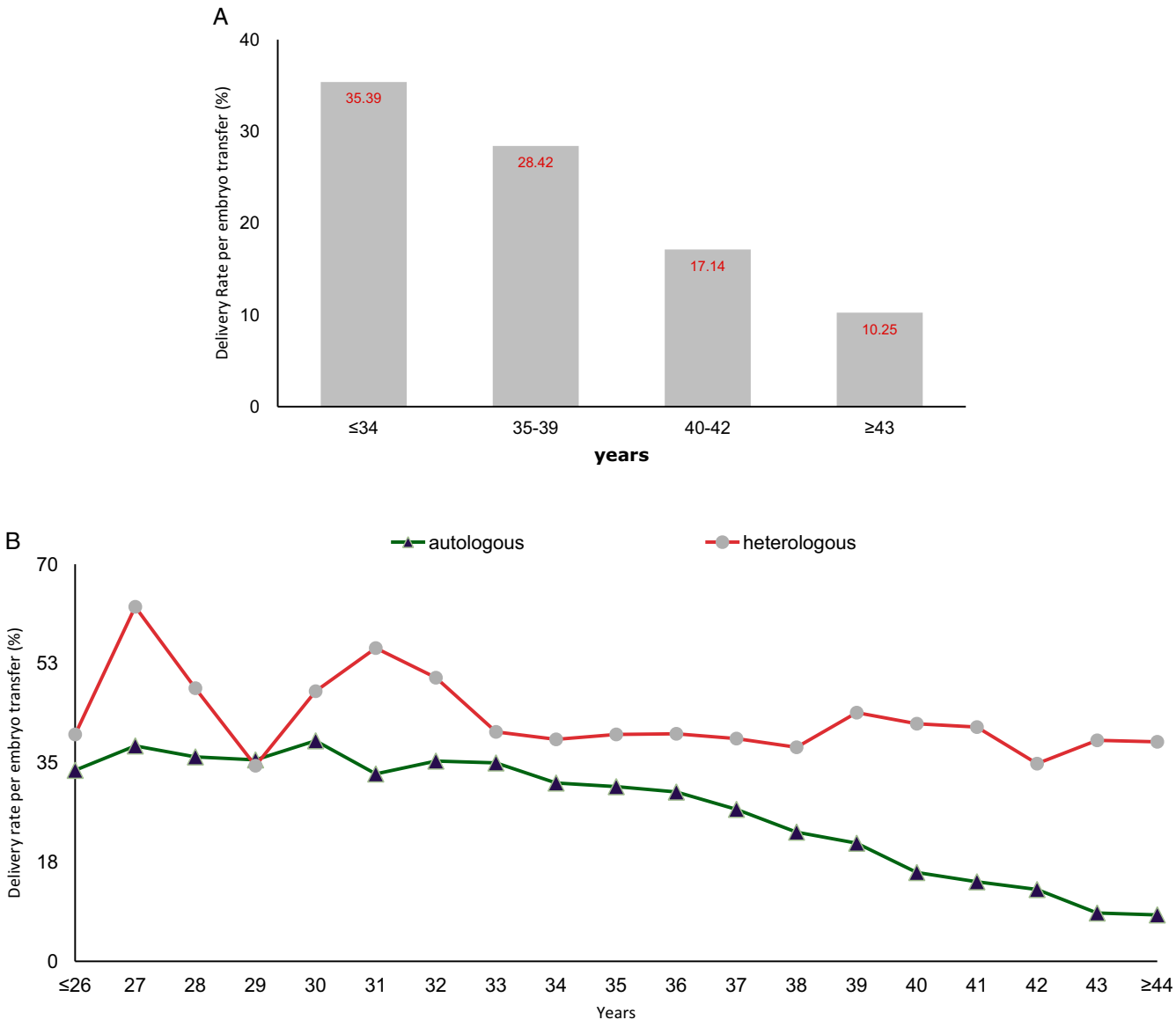

Figure 2 Delivery rate per embryo transfer according to age of the woman in fresh autologous and heterologous IVF and intracytoplasmic sperm injection (ICSI) cycles, 2012. (A) Delivery rate per embryo transfer in different age categories of women in fresh autologous IVF–ICSI cycles, 2012; (B) delivery rate per embryo transfer according to age of woman n fresh autologous and heterologous IVF–ICSI cycles, 2012.

Table 4 Clinical pregnancy rate, delivery rate and gestational order according to the number of embryos transferred in fresh autologous IVF and intracytoplasmic sperm injection cycles in 2012.

Number of transferred embryos	*Total embryo transfer*		*Clinical pregnancy rate per embryo transfer (%)*	*Deliveries*			
	Number	*%*		*Total (number)*	*Singleton (%)*	*Twin (%)*	*Triplets or higher order multiples (%)*
1	3731	15.5	16.9	470	96.2	3.8	0.0
2	13,392	55.7	36.9	4025	78.1	21.5	0.4
3	6052	25.2	37.8	1770	73.1	23.5	3.3
≥4	872	3.6	34.5	216	82.4	16.7	0.9
Total	24,047	100.0	34.2	6481	78.2	20.6	*1.2*

Table 5 Clinical pregnancy rate, delivery rate and gestational order according to the number of embryos transferred in fresh heterologous IVF and intracytoplamic sperm injection cycles in 2012.

Number of transferred embryos	Total embryo transfers		Clinical pregnancy rate per embryo transfer (%)	Deliveries			
	Number	%		Total (number)	Singleton (%)	Twin (%)	Triplets or higher order multiples (%)
1	329	6.1	35.6	97	95.9	4.1	0.0
2	3408	63.2	48.2	1376	71.2	27.8	0.9
3	1482	27.5	49.1	607	62.8	31.6	5.6
≥4	177	3.3	52.5	72	66.7	27.8	5.6
Total	5396	100.0	47.8	2152	69.8	27.8	2.4

Table 6 Clinical pregnancy rate, delivery rate and gestational order according to the number of embryos transferred in autologous frozen embryo transfer cycles in 2012.

Number of transferred embryos	Total embryo transfer		Clinical pregnancy rate per embryo transfer (%)	Deliveries			
	Number	%		Total (number)	Singleton (%)	Twin (%)	Triplets and higher order multiples (%)
1	1381	17.5	22.6	227	97.4	2.6	0.0
2	4703	59.7	33.9	1230	79.0	20.7	0.2
3	1617	20.5	32.5	417	69.3	25.9	4.8
≥4	179	2.3	32.4	38	84.2	13.2	2.6
Total	7880	100.0	31.6	1912	79.2	19.6	1.3

Table 7 Clinical pregnancy rate, delivery rate and gestational order according to the number of embryos transferred in frozen embryo transfer (oocyte donation) cycles in 2012.

Number of transferred embryos	Total embryo transfers		Clinical pregnancy rate per embryo transfer (%)	Deliveries			
	Number	%		Total (number)	Singleton (%)	Twin (%)	Triplets and higher order multiples (%)
1	290	13.2	25.9	56	96.6	5.4	0.0
2	1420	64.8	38.5	407	76.7	23.1	0.3
3	453	20.7	39.3	144	63.2	33.3	3.5
≥4	30	1.4	36.7	9	55.6	33.3	11.1
Total	2193	100.0	37.0	616	78.8	24.0	1.1

The overall delivery rate per embryo transfer was 24.5% with eSET and 38.8% with eDET. These values were significantly higher than non-elective SET and DET where delivery rates were 11.4% in 3384 transfers and 24.9% (n = 8354), respectively ($P < 0.0001$).

When stratified by the age of the female partner, in women 34 years or younger the delivery rate after eSET and eDET increased to 30.0% and 42.0%, respectively ($P < 0.0001$). Similarly, in oocyte donation fresh cycles the delivery rate per embryo transfer after eSET and eDET was 29.5% ($n = 329$ embryo transfer), and 40.4% in eDET, respectively ($n = 3{,}408$ embryo transfers).

Perinatal outcome

The duration of gestation was reported in 13,313 deliveries, of which 10,048 were singletons, 3054 twins, and 211 triplets or more. Among singletons, the mean gestational age at delivery was 37 weeks of amenorrhoea, 35 weeks of amenorrhoea in twin deliveries and 32 and 29 weeks in triplets and quadruplets, respectively ($P < 0.001$).

The percentage of preterm birth, among singletons was 14.0% ($n = 1405$). The relative risk of preterm birth for twins increased by 4.30 (95% CI 4.1 to 4.6), and 43.8 (95% CI 28.5 to 67.4) for triplets and higher order multiples. Furthermore, the percentage of very preterm birth (i.e. before

Table 8 Perinatal mortality according to gestational order in 2012.

	Singleton			*Twin*			*≥Triplets*		
	Live birth	*Still birth*	*Neonatal death*	*Live birth*	*Still birth*	*Neonatal death*	*Live birth*	*Still birth*	*Neonatal death*
IVF–ICSI	4947	102	20	2571	68	29	213	11	12
Frozen embro transfer	1473	34	7	715	20	13	67	4	2
Oocyte donation	1460	35	7	1124	52	22	146	2	5
Frozen embryo transfer (oocyte donation)	451	6	4	282	10	4	18	3	0
Total	8331	177	38	4692	150	68	444	20	19
Perinatal mortality per 1000	25.2			44.4			80.7		

ICSI = intracytoplasmic injection.

Table 9 Intrauterine insemination cycles in 2012.

Intrauterine insemination	*Cycles*	*Deliveries per cycle (%)*	*Gestational order*		
			Singleton (%)	*Twin (%)*	*Triplets or higher order multiples (%)*
Husband	5372	12.3	89.4	9.3	1.4
Donor	1029	17.8	88.0	8.2	3.8

completing 32 weeks of amenorrhoea in singletons was 1.7% ($n = 171$), 7.1%% ($n = 217$) in twins and 32.2% ($n = 68$) in triplets and higher order multiples ($P < 0.0001$).

Table 8 shows perinatal mortality according to gestational order. Singletons had a perinatal mortality of 25.2 per thousand, compared with 44.4 per thousand in twins and 80.7 per thousands in ≥ triplets ($P < 0$ .0001). Thus, compared with singletons, the relative risk of perinatal mortality among twins was 1.4 (95% CI 1.3 to 15.), and 5.4 (95% CI 4.4 to 6.6) among triplets and higher order.

Spontaneous abortion rate

In fresh autologous IVF and ICSI pregnancies, the overall spontaneous abortion rate was 18.4%. When stratified by age, spontaneous abortion rate increased from 14.4% in women aged 34 years or younger, to 18.5% in women aged 35–39 years; 24.1% in women between 40 and 42 years; and 20.4% in women over 42 years ($P < 0.001$). Within each age category, the rate of spontaneous abortion did not differ significantly when comparing women with and without PGD.

In fresh-oocyte recipients, the spontaneous abortion rate was 15.4%, and no significant differences were found when stratified by age of recipients. Furthermore, spontaneous abortion rate in pregnancies after autologous FET was 22.0%. No subgroup analysis was carried out in this case, as the RLA reports the age of women at the time of embryo transfer not at the time of embryo freezing.

Pre-implantation genetic diagnosis

The RLA registers PGD and PGS together. Seventy-four centres from Argentina, Brazil, Chile, Colombia, Mexico, Panamá, Peru and Venezuela reported 1664 cycles of PGD. Of these, 20 cases were polar body biopsies, 65 cases were biopsies of cleaving-embryos, whereas 1579 PGD were carried out in blastocysts.

Overall, 708 embryo transfer cycles were carried out. The mean age of women was 38 years (22–48 years). A mean of four embryos were analysed in each cycle, and a mean of one embryo was reported as normal. Out of 264 clinical pregnancies and 218 deliveries, a total of 252 babies were born; none of which was reported as having birth defects.

Assisted hatching

Institutions in Argentina, Brazil, Chile, Ecuador, Mexico, Peru, Venezuela and Uruguay reported 4775 cycles with assisted hatching and 4243 embryo transfers, generating 1441 clinical pregnancies and 1082 deliveries. Of these, 846 were reported as singletons, 220 as twins and 16 as triplets. The mean age of the women undergoing assisted hatching was 38 years (18–55 years).

Intrauterine insemination

The results of intrauterine insemination (IUI) cycles are presented in Table 9. These are reported by clinics located in nine different countries, either with semen of the husband (IUI-H) or donor (IUI-D).

Eighty-three clinics in 10 countries reported 5372 cycles of IUI-H. The delivery rate per cycle was 12.3%, of which 9.3% were twins and 1.4% triplets and higher order multiples. Sixty-five clinics in 10 countries reported 1029 cycles of IUI-D. The delivery rate per cycle was higher, 17.8%. The multiple-delivery rate was 12.0%: 8.2% twins and 3.8% triplets and higher-order multiples.

Table 10 Cumulative delivery rate in autologous IVF and intracytoplasmic sperm injection cycles with at least one oocyte recovered in 2012.

	n	*Delivery rate per oocyte retrieval (%)*
Total oocyte retrieval	29,824	
Deliveries IVF–ICSI	6481	21.7
Deliveries frozen embryo transfer	1912	6.4
Cumulative delivery	8393	28.1

ICSI = intracytoplasmic sperm injection.

Cumulative and total delivery rate

The cumulative delivery rate corresponds to the number of deliveries resulting from one initiated or aspirated assisted reproduction technology cycle, including the cycle when fresh embryos are transferred, and subsequent frozen–thawed embryo transfers. This rate is used when less than the total numbers of embryos fresh, frozen–thawed, or both, have been used from one assisted reproduction technology cycle. In future years, it will be possible to calculate cumulative events by each person. In 2012, the cumulative delivery rate in Latin America reached 28.1% (Table 10).

Fertility preservation

Ninety-five centres from 10 different countries reported 1764 initiated cycles for fertility preservation. Of these, 93 were carried out for cancer and 1258 for social reasons; in 413 cases, the reason was not available. Overall, the mean age of women undergoing this procedure was 36 years (17–48 years). The mean number of oocytes preserved was 6 (from 0–39). In most cases, the preferred technique for cryopreservation was vitrification, which represented 99% of the cycles. There was only one report of Ovarian hyperstimulation syndrome and one report of haemorrhage.

Complications

Clinics reported 145 cases of moderate to severe ovarian hyperstimulation syndrome, corresponding to a rate of 0.5%. Other less frequent complications included 11 cases of haemorrhage and four cases of infection. It is likely, however, that complications are mis-registered.

Discussion

This is the 24th version of the RLA, which has been published consecutively since 1990. The RLA covers most assisted reproduction technology procedures carried out in Latin America. Over the years it has evolved, and now includes the collection and analysis of more complex information, allowing readers to download the registry in PDF file from our web page (http://www.redlara.com).

With the 2010 register, an individualized case-by-case register was implmented, making it the first multinational registry to use this form of data entering. The software used was developed by RLA, and was field-tested in several institutions in the region. To implement this new software, workshops were carried out in different countries, and we believe, that the programme is still in a developmental phase, and continuous check-in systems are being incorporated as problems arise during its implementation.

One of the important requirements of any national or regional registry is to agree on common terminology. All clinics reporting to RLA use the glossary defined in 2009 by the International Committee for Monitoring Assisted Reproductive Technologies and the World Health Organization (Zegers-Hochschild et al., 2009). Another requirement for a reliable registry is to implement an external and independent accreditation programme, with the autonomy to check the quality and the validity of the data voluntarily reported by every participating institution. This has been successfully implemented by REDLARA since the year 2000.

In 2012, 155 centres of 14 countries reported 47,326 assisted reproduction technology cycles. Compared with 2011, this represents an increase of 12.9% in the number of cycles and 10 more centres (Zegers-Hochschild et al., 2013). In this year, the use of ICSI instead of conventional IVF continued to be the preferred insemination procedure. In 2012, ICSI represented 85% of oocyte pick-ups, which has remained almost unchanged since 2008.

The age of women undergoing IVF–ICSI cycles continues to increase. In 2012, the proportion of initiated IVF–ICSI cycles in women aged 35–39 years was 39%, similar to 2011 when it was 38% (Zegers-Hochschild et al., 2013). In 2012, however, the proportion of IVF–ICSI cycles in women aged 40 years or over reached 31%, compared with only 17% in 2011. Furthermore, 10% of autologous IVF–ICSI were carried out in women aged 43 years or over. As the age of the female partner is one of the most important prognostic factors, this demographic reality is important to consider when analysing regional trends in number of embryos transferred and other markers of therapeutic outcomes.

The delivery rate per oocyte retrieval in autologous fresh IVF–ICSI reached 21.7% (21.4% in 2011), and the cumulative delivery rate reached 28.1% (27.5% in 2011). When examining delivery rate separately in IVF and ICSI, the higher rate in IVF must be considered with caution because of the lack of randomization of treatment alternatives.

It is worth mentioning that a delivery rate per embryo transfer of 10.25% (Figure 2A) with a spontaneous abortion rate of only 20.4% in women over 42 years seems too good, but in small numbers, this can be the result of mere chance. It is also possible that, in this age category, autologous IVF is

only offered to a sub-group of women exhibiting optimum fertility markers.

The mean number of transferred embryos in autologous fresh IVF–ICSI decreased from 2.4 in 2010 to 2.2 in the actual report (Zegers-Hochschild et al., 2012). In most cases, two embryos were transferred. it is still concerning that, in one-quarter of embryo transferes, more than three embryos were transferred, and in 4%, four or more embryos were transferred.

Both in autologous IVF–ICSI and oocyte donation cycles, the transfer of more embryos resulted in a high proportion of triplets and higher order deliveries. Interestingly, the increase in the risk of twin-deliveries and triplet and higher order deliveries was only evident when three embryos were transferred.

As shown in this and previous reports, even twin deliveries increase the risk of preterm birth and perinatal mortality (Zegers-Hochschild et al., 2013). We believe that the main reason to transferring more embryos is the pressure from patients and clinicians to achieve pregnancy as early as possible, without considering the risk of multiple deliveries and associated prematurity. In Latin America, most patients undergoing infertility treatment are self-funding, and are not eligible for reimbursement by national or private health insurances. This report, however, is quite reassuring, as the results associated with eSET and eDET, especially in younger patients undergoing IVF–ICSI, and oocyte delivery cycles, are quite acceptable. Therefore, clinicians and patients under 35 years should consider the transfer of one or at the most two embryos, and cryopreserve the rest for delayed transfer.

This report examines observational data, so the comparison of results cannot be considered hard evidence in favour or against certain procedures. For example, PGD was not associated with either a significant increase in the delivery rate, nor a reduction in the spontaneous abortion rate. This might be explained by the fact that the number of procedures is still low and RLA does not register differently PGD and PGS. Furthermore, the selection of women having PGD can be very different to the rest of the population, even when stratified by age. The same applies for assisted hatching, which does not increase delivery rate, as no statistical significance was reached; however, caution must be exercised when analysing these data.

The frequency of complications associated with assisted reproduction technology procedures was rather low; only 145 cases of ovarian hyperstimulation synderome were reported, which represented a risk of 0.5% of initiated cycles. Furthermore, only 11 cases of genital haemorrhage and one case of infection were reported. Nevertheless, this low frequency might represent a recollection bias, which needs to be improved.

This is the sixth report of IUI cycles. Clinics reported 5372 IUI with husband's semen, and 1029 cycles with donor semen. These figures are lower than those reported in 2011, or even lower than those reported in 2009, when 13,410 IUI-H and 2,430 IUI-D cycles were reported (Zegers-Hochschild et al., 2011, 2013). This may be explained by the labour-consuming work that represented adapting IUI services into an individualized case-by-case register.

In summary, this is the third case-by-case register published by the RLA. It is reassuring for patients and clinics that the results of assisted reproduction technology procedures carried out in the region are similar or even better than many countries (Ferraretti et al., 2013; Sullivan et al., 2004; Zegers-Hochschild et al., 2013). Nevertheless, REDLARA has to enforce the reduction in the number of embryos transferred in IVF–ICSI and oocyte donation cycles, in order to prevent multiple births, or at least, high-order multiples and decrease the corresponding perinatal complications.

Appendix: Supplementary material

Supplementary data to this article can be found online at doi:10.1016/j.rbmo.2014.10.003.

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