

**Success rates in fertility clinics.
Significant differences when comparing the
information given by fertility clinics in Mexico,
the international reports and those obtained
in a field study conducted in Mexico**

**Tasas de éxito en clínicas de fertilidad.
Notables diferencias al comparar la información
que proporcionan las clínicas de fertilización
asistida en México, la obtenida de los reportes
internacionales y la extraída de un estudio de
campo realizado en México**

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Abstract

A highly significant issue related to the frequent problem of infertility, is the high expectative of success when couples go to a fertility clinic, in order to perform procedures like In vitro Fertilization

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(FIVET), Intracytoplasmic Sperm Injection (ICSI) or Artificial Insemination. The success index announced by the fertility clinics use to be as high as 60% or even 90%. Although this index has always seemed exceedingly high, it has never been proven. Then, the present paper compares the success rates announced by fertility clinics in their web pages, with those obtained by three different sources: the international reports from the European Society of Human Reproduction and Embryology (ESHRE) and from the RED LARA (Latin American Network of Assisted Reproduction) as well as a field study conducted in Mexico. The results show very significant differences, thus analyzing the reasons for these discrepancies, highlighting the importance and advantages, for patients and even for the health staff, by offering trustworthy and comprehensive assistance to infertile couples. This especially due to the high vulnerability of those couples in an infertility situation, and by exploring the current information ecosystem on the topic of infertility in Mexico.

Keywords: infertility, infertility treatments, assisted human reproduction, success rates, comprehensive care.

I. Introduction

The problem of infertility is of increasing importance both worldwide and in Mexico, where it is estimated that approximately 1.5 million couples have had infertility problems (1), although only a small percentage of them go to a specialist for seeking treatment, as Zamora (2019) estimates that only between 15-20% of couples in reproductive age with infertility, seek treatment (2).

Regarding infertility rates in the Mexican population, there are two main studies: the *National Reproductive Health Survey* 2003 of the *Mexican Republic* analyzed by AS González Cervera, [1] who reports that 15% of the women interviewed have experienced at some time, an infertility period of 12 months or more. The second study is the carried out by E. Walker et al. (2010) [3], who found a preva-

lence of 17.5%, and which matches with that of other countries; concluding that infertility is a serious health problem both in Mexico as well as worldwide.

This relevance is not only due to the fact that some couples became aware of their infertility problem, but also to the extraordinary scientific-technological advances that have occurred in recent decades in the field of assisted reproduction and to the awareness of this phenomenon, which has gradually become a major health problem (4).

Many couples have faced this situation, and when trying to solve the problem without sufficient premeditation, or with incomplete information, they go through an even greater suffering, due to the long and complex process they are going through. There are cases different and at the same time very similar, where feelings, emotions, illusions and disappointments have been demonstrated by researchers such as Llavona (2008), (5) Donati (1993), (6) and Moreno Roset (2000) (7). In those couples the infertility phenomenon can cause, their moral and religious convictions affected, together with the legitimate desire to have a child, which give a unique intensity to the process they live. The psychological behaviors and consequent physiological reactions indicate that it is an inner experience where these elements constitute an important aspect in the knowledge of the phenomenon (8).

These situations are not exempt from the interests that fertility clinics have (economic, marketing, etc.) that usually promotes some misinformation regarding the risks to the mother or the embryo referred to before, during and after the corresponding procedures. Several current studies continue to indicate that the treatments offered by infertility clinics have been built based on specific interests, often linked to monetary flows, which ultimately have an important link with the desire for maternity and paternity (9).

The exact dimension of this phenomenon is more understandable with the review of the psychological analysis that evaluates the meaning of infertility for people in this situation. The observa-

tions made by Ramírez Morán (2019) (8); Álvarez Morales, (2019) [9]; Peñarrubia, (2019) (10) and Moreno-Rosset, (2009) (7), in infertile couples, highlight the specific experiences they went through, nuanced with symptoms of emotional disturbances such as anxiety, anguish and melancholy among others.

In this regard, one of the most significant issues, in relation to infertility, refers to the high expectations of success created in the couples when they go to fertility clinics to perform a procedure such as FIVET, ICSI or Artificial Insemination. In recent years, this growing interest in the prediction of a response to a treatment means that users wish to find out about it, although certainly the source of information is not always reliable, namely: social networks, doctors of the same fertility clinics or groups of people with infertility (10) (11).

This article tries to highlight the different success rates of Assisted Reproduction Therapies that were obtained in a field investigation carried out in Mexico (4), and which are compared to two international reports: the RED LARA, and ESHRE during the period from 2007 to 2010.

II. Methodology

In the first place, reference is made to the methodology of the field study in Mexico, and in the second place to the methodology used for the development of this article. Field study methodology (4):

Design. The field study presents a quantitative and qualitative approach and a non-experimental, cross-section, descriptive and correlational design.

Population and study sample. The sample consists of 566 individuals ($n = 566$) of medium and high economic level (4). Of these 125 questionnaires (22.4%) were answered by men and 434 (77.6%) by women. Respondents had an average age of 39.94 for men and 37.37 for women.

It is a non-probabilistic sample, while it is a directed sample, to ensure the representativeness of several entities of the Mexican Republic.

Instrument. The instrument of the field study carried out in Mexico (4), was specifically designed for the present investigation and the data were collected through a self-administered questionnaire of 56 closed, dichotomous, frequency and with Likert-type scales.

To confirm the internal consistency and homogeneity of the instrument, a reliability analysis was performed, calculating Cronbach's alpha coefficient (.498) for Likert reagents. In order to verify its validity, the questionnaire was submitted to the analysis of three experts in the area of Bioethics, Sociology and Philosophy; Recommendations were also received from 23 experts from Italy, Spain and Mexico, some of whom had already conducted field studies using a similar methodology or applying questionnaires to the pilot group to which they were submitted. Based on these previous results, it was concluded that the instrument is reliable.

The data presented in this paper were based on the following questions from that field study:

- a) How many attempts of the following ARTs did you make?
 - Artificial insemination.
 - In vitro fertilization.
 - ICSI (intra-cytoplasmic semen injection).

In these three possibilities, one could answer none, 1, 2 or more than 3 attempts.

b) If the answer to, is positive (you had some type of ART), answer the following questions:

- c) Did any of these attempts had as a result a pregnancy?
- d) If this answer is positive, then specify:

Because of these pregnancies, how many children were born alive?

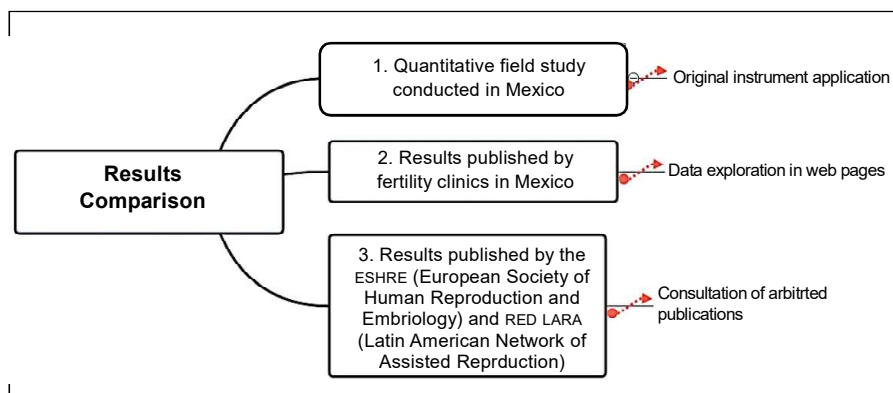
Methodology of this article. As already mentioned, this article compares the success rates obtained from four different sour-

ces: two international reports and those of infertility clinics in Mexico, and these three are compared with the reported success rates, when applying the questionnaire elaborated in the aforementioned field study (4) (Figure 1). Although the information collected cannot be generalized to a broader population, because it is circumstantial, it has a testimonial and legitimate value of those who have infertility, making it possible to explain and dimension the psychological, human, religious and existential part of the problem, whose findings enriched the analysis of the results obtained.

Comparison of Results. Success rates from four different sources:

- a) The field study conducted in Mexico (4) with a mixed approach (quantitative and qualitative), and reported down below.
- b) Percentages of success announced by fertility clinics in Mexico in the year 2010 through their web pages.
- c) Percentages of success obtained by the international reports of the ESHRE (European Society of Human Reproduction and Embryology) and

Figure 1. Study design.



Source. Self-made.

d) RED LARA (Latin American Network of Assisted Reproduction) during the period from 2007 to 2010, with support in the refereed publications that analyze and cite these reports.

III. Results

The success percentages reported by the four sources mentioned above are shown. Firstly, the field study in Mexico (A), subsequently reported on websites of assisted fertilization clinics (B), and finally reported by international societies, RED LARA and ESHRE (C).

A. Field study carried out in Mexico

Table 1 shows the results obtained and reported in the aforementioned thesis [4], related to the calculation of the success rates of Artificial Insemination and FIVET-ICSI. Data were extracted from the field study questionnaire

Of the 566 individuals interviewed, and with infertility problem, 320 (56.5%) had not undergone any ART. Of those who had

Table 1. Success rates of the field study conducted in Mexico (Cabrera, 2011) considering the number of pregnancies or births against the number of cases or the number of attempts. This was analyzed for both artificial insemination and FIVET-ICSI.

	No. of pregnancies vs. cases	No. of births vs. cases	No. of pregnancies vs. attempts	No. of births vs. attempts
Artificial insemination	19 of 202 9.40%	7 of 202 3.50%	19 of 557 3.40%	7 of 557 1.25%
FIVET-ICSI	55 of 134 41%	27 of 134 20.10%	55 of 251 21.90%	27 of 251 10.80%

Source. Self-made.

undergone, 112 (19.8%) resorted only to artificial insemination, 90 (15.9%) resorted to artificial insemination after FIVET and/or ICSI and 44 (7.8%) did so directly to FIVET and/or ICSI.

The percentages were obtained considering the number of pregnancies achieved and pregnancies carried out (births) against the number of cases or the number of attempts. We also analyzed the number of individuals in the sample who underwent ART, and the number of times they underwent the same or different techniques, allowing the calculation of the real success rate of ART.

In the cases in which a woman reported that two or more children were born, it was taken as one successful pregnancy, since with the information obtained it was not possible to know if the two or more children were in different pregnancies. However, everything suggests that they were double or triple twin pregnancies; of the 82 cases, 11 belong to this scenario.

Success rates considering the number of cases

Artificial insemination. 202 couples reported having resorted to this technique (112 who underwent only artificial insemination and 90 who did so first and having no positive results resorted to FIVET and/or ICSI). Of these 202 cases, there were 19 pregnancies, of which 7 were born alive (4 single and 3 twins) and 12 did not reach term. The final success rates for this scenario were 9.4%, taking into account the 19 pregnancies, and 3.5% if only 7 who were born alive (births) are counted.

FIVET and/or ICSI. 134 cases or individuals reported that they resorted to FIVET and/or ICSI (90 that presumably began by artificial insemination and 44 that directly resorted to FIVET and/or ICSI). In relation to the former, there were 55 pregnancies, of which 27 were born alive and 28 did not reach term. Which gives us a percentage of 41.0%, of pregnancies, and 20.1% of success, considering it success only in the case of live births.

Success rates considering the number of attempts. In the previous section, the success rates were assessed considering the

number of cases, regardless of the number of attempts made (Table 1). When each attempt is considered independently, the success rates decrease significantly.

Artificial insemination. Taking into account the individuals who underwent artificial insemination 2, 3 or more than 3 times, 557 attempts were obtained. Considering the 19 pregnancies, a percentage of 3.4% was obtained, and if the 7 cases that were born alive are taken, the percentage decreases to 1.25%.

FIVET and/or ICSI: The individuals who underwent FIVET and/or ICSI (134) and the number of attempts was 251. Considering the 55 pregnancies, of which 37 were born alive and 28 did not reach term, the outcome obtained was of 21.9 % for 55 cases of pregnancy and 10.8% for cases that were born alive.

B. Results published by fertility clinics in Mexico

The field study [4] also analyzed a random sample of the information on the websites of Assisted Fertilization Clinics, where they report their success rates. The results are analyzed in Figure 2. Four main types of reports are observed: a) Those that report results in specific and high percentages. b) Those that only mention that they have «very high» chance of success. c) Those that do not mention the success rates, and d) Those that mention real values.

Table 2. Success rates published by fertility clinics in Mexico for Artificial Insemination (AI), as well as for FIVET-ICSI.

	No. of pregnancies vs. cases	No. of births vs. cases	No. of pregnancies vs. attempts	No. of births vs. attempts
Infertility Clinics in México	FIVET-ICSI 35-90%		IA (10-30)% - (50-90)%	

Source. Prepared by the author, based on information on the clinic pages.

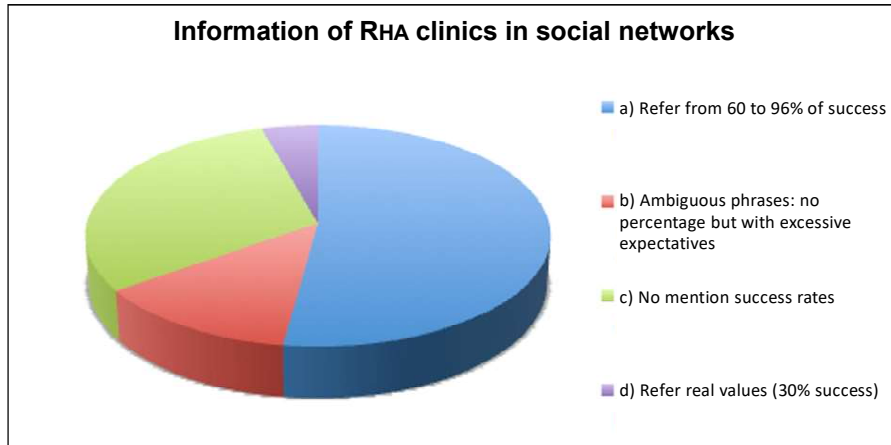


Figure 2. Analysis of the information of RHA clinics in social networks. We found four types of information depending on the clinics:

- a) Clinics that advertise high percentages of 60%-96% success.
- b) Clinics that do not mention a specific percentage, but that create a high expectation of success with ambiguous phrases such as «High fertility success rates» (Instituto Vida, 2019), or that offer, «100% Guarantee» (Unit of Reproduction, 2019) or openly false as «Millions of babies... have been born from IVF in Mexico» (CEMPI, 2019).
- c) Those that do not mention the issue of success rates.
- d) The clinic that announces success rates of 10%-30%, similar to that reported by international societies.

Source. See references on the websites of the Assisted Human Reproduction Clinics.

In addition, in most of the clinics' narratives, they do not offer details about whether these percentages refer to one or several cycles, nor do they refer to the number of embryos transferred per attempt, etcetera.

This imprecise way of providing information is also shown in the following two narratives that correspond to two specialist physicians of the same fertility clinic, who answer in an Internet forum the questions asked about the success rates. The first doctor points out:

«The Intratubal Transfer of Gametes has about 35% chances of pregnancy; in vitro fertilization, an average of 30%; ICSI, approximately 20%. It is logical that sometimes they despair because the treatments are long and uncomfortable. Sometimes one or the other fails, but, over time, statistics have shown that a woman who persists in several attempts... can reach up to 80%.»

The second doctor expresses:

«Young couples with an alteration similar to the one you are presenting have a 40% or greater probability of getting pregnant per cycle, a percentage that has increased thanks to the possibility of freezing embryos not transferred in the initial cycle.»

C. International reports: from ESHRE as from the LARA network

The data of the two international reports, corresponding to the RED LARA Latin American Registry of Assisted Reproduction (year 2005), [12] and the second corresponds to the ninth report of results (year 2005), published in 2009 by the European Society of Human Reproduction and Embryology [13].

RED LARA Report. The first report of the year 2005 contains data from eleven Latin American countries. Three countries report the majority of the cycles obtained: Brazil (45%; 11,859), followed by Argentina (23%; 6,083) and Mexico (13%; 3,590). In Mexico, 22 Centers are reported, of which three are members and 19 are re-

Table 3. Success rates for IVF/ICSI reported by RED LARA and ESHRE.

	No. of pregnancies vs. cases	No. of births vs. cases	No. of pregnancies vs. attempts	No. of pregnancies vs. attempts
RED LARA	Not reported	28.5%	35.5%	20.3%
ESHRE	Not reported	30.0%	27.3%	17.7%

Source. Self-made.

gistered by the Lara Network. The RED LARA does not present data by country, except for the data corresponding to the number of cycles. The following data and percentages were found (Table 3).

Intracytoplasmic Sperm Injection (ICSI). In Latin America, 17,908 initiated cycles were reported, 16,594 of which (92.7%) reached the stage of egg aspiration, and 14,389, were fertilized and transferred (86.7% of aspirations). The number of clinical pregnancies was of 4,861 and the number of deliveries was 3,341. The clinical pregnancy rate reported in these cases was 31.9% and 33.8% respectively and the delivery rate for each aspiration was 20.1%.

***In Vitro* Fertilization with Embryo Transfer (FIVET).** In Latin America, 4,225 cycles were initiated; 3,770 (89.2%) reached egg aspiration and 3,350 embryos were transferred (89.0% of aspirations). The number of clinical pregnancies was 1,120, against 798 deliveries. The clinical pregnancy rate by aspiration and transfer was 29.7% and 33.4% respectively, and the aspiration delivery rate of 21.2%.

Total, ICSI-FIVET. Both procedures report 22,133 cycles initiated, 20,364 (92.0%) reached aspiration and 18,159 (89.2% of aspirations) were transferred. The number of clinical pregnancies is 5,981 and the number of births is 4,139. The clinical pregnancy rate by aspiration and transfer was 29.4% and 32.9% respectively, and the aspiration delivery rate of 20.3%.

ESHRE report. The European Society of Human Reproduction and Embryology (ESHRE) reported, as we read in Nyboe (2009) [13] the following results from 29 European countries:

Intracytoplasmic Sperm Injection (ICSI). Of 188,425 egg aspirations, 173,712 embryos were transferred (that is 89.1%). The number of clinical pregnancies was 53,384; and births 31,996. The pregnancy rate by aspiration and transfer was 28.3% and 30.7% respectively and the delivery rate by aspiration was 17.0%.

***In Vitro* Fertilization with Embryo Transfer (FIVET).** An amount of 100,623 aspirations was performed, 89,681 being trans-

ferred (92.2% of the total aspirations). The number of clinical pregnancies was 25,573 and births 19,132. The clinical pregnancy rate by aspiration and transfer was 25.4% respectively and the delivery rate by aspiration was 19.0%.

Total, ICSI-FIVET. Both procedures report 280,048 aspirations of which 263,393 embryos were transferred (91.1%). The number of clinical pregnancies was 78,957 while the total deliveries were 51,128. The clinical pregnancy rate by aspiration and transfer was 27.3% and 30.0% respectively; the delivery rate by aspiration, of 17.7%.

Unlike the RED LARA report, ESHRE reported data by country. Of the 29 countries considered, the six with the highest number of aspirations for the ICSI technique (France, Germany, Italy, Spain, England and Turkey) account for 73.0% of total aspirations. The aspiration delivery rate is 15.4%. The lowest rates by country are those of Italy and Turkey: 9.0% and 8.9% respectively. The highest by country are those of England and France: 25.3% and 18.9% respectively.

In the case of FIVET, the total of these countries represents 59.4% of the total aspirations. The aspiration delivery rate is 17.7%. Those of Italy, Spain and Turkey: 9.3%, 10.4% and 12.1% respectively. The highest by country are those of England and Germany: 24.3% and 18.2% respectively.

IV. Discussion

The present study analyzed the experience of a large group of patients who have undergone various treatments in RHA clinics, which was obtained based on a survey previously reported in a doctoral thesis, and compares them against two international reports (that of ESHRE and RED LARA), and the data presented on the websites of fertility clinics in Mexico. These four reports are summarized in Table 4.

Table 4. Comparison of success rates for IVF among the four reports analyzed in this study: RED LARA, ESHRE, fertility clinics in Mexico (CF-Mex) and the field study conducted in Mexico (EC-Mex).

	No. of pregnancies vs. cases	No. of births vs. cases	No. of pregnancies vs. attempts	No. of births vs. attempts
RED LARA	Not reported	28.49%	35.50%	20.30%
ESHRE	Not reported	30.00%	27.30%	17.70%
CF-Mex	Not reported	30-90%	Not reported	Not reported
EC-Mex	41.00%	20.10%	21.90%	10.80%

Source. Sel-made.

The success rates for the case of FIVET/ICSI reported by fertility clinics in Mexico range between 60% and up to 96%. While in our study, the percentage of pregnancies against attempts is (21.9%), which is much more similar to international reports, both from RED LARA (29.4%) and from the ESHRE report (27.3%).

Regarding the success rate, but considering live births against attempts, 10.8% in our report is relatively similar to the RED LARA report rate that is 20.3% and while the ESHRE is 17.7%. These rates seem much more real than the ones reported by fertility clinics of between 60 and up to 96%.

Some publications report higher success rates for Assisted Fertilization (IVF), up to 50%, but only when the couple undergoes several fertilization attempts (14), in what is called the index of cumulative live births (CLBR for their acronym in English: cumulative live-birth rate); but never the very high levels advertised by some laboratories that frequently mention success rates above 90%.

Summary of success rate for artificial insemination. Table five compares the results of the artificial insemination of our field study (4), and what was announced by the RHA clinics of Mexico in social networks.

Table 5. Comparison of reported success rates for artificial insemination, between fertility clinics in Mexico (CF-Mex) and our field study in Mexico (EC-Mex). Neither the RED LARA nor the ESHRE report results for artificial insemination.

	No. of pregnancies vs. cases	No. of pregnancies vs. cases	No. of pregnancies vs. attempts	No. of births vs. attempts
CF-Méx	Not reported	(10-30)% - (50-90)%	Not reported	Not reported
EC-Mex	9.40%	3.50%	3.40%	1.25%

Source. Self-made.

As for this artificial insemination, there are no data in the international reports (ESHRE and RED LARA) so that no comparison can be made with the data obtained in the present investigation. Therefore, they are only compared with the information on the websites of fertility clinics, where there are also large differences between what was obtained in our study and what was announced by the clinics.

Possible causes of these important differences. Because in Mexico there is no systematic report of the results obtained by fertility clinics, the reports are inconsistent in the promotional pages of these Mexican clinics for different reasons:

The possible percentages of Mexico could be lower than the average of the percentages of the countries that reported to the RED LARA; perhaps something similar to what is observed in the ESHRE report for the countries of Turkey, Italy and Spain that have a lower success rate than the other countries.

Not all clinics where FIVET and/or ICSI in Mexico are performed are registered with RED LARA. It is very likely that the percentages of the centers or establishments that are not accredited by RED LARA, have a lower technology and professionalism and, therefore, their success rates would be even lower. In fertility clinics, as already has been mentioned, there is a tendency to present high

success rates to their patients, which are also very different between clinics. In addition, sufficient consistency and adequate professionalism are not observed when presenting these results, since the criteria by which they are governed (age of the woman, number of embryos transferred per cycle, number of cycles, etc.) are so varied, and rarely explained, that its interpretation is not easy and the comparison between them is practically impossible.

It is important to consider that currently the RED LARA reports its results differently: as of 2012, the statistics are shown by countries. On the other hand, the number of cycles increased from 26,646 in 2005 to 85,474 in 2016. As well as the number of reported clinics increased to 178 clinics compared to 130 registered in 2005 throughout Latin America.

Embryo transfer has decreased in women under 24 years by 5.7%. There are also changes in ICSI practice regarding FIVET: 28.3% (FIVET) and 27.4 (ICSI) in 2016 against 21.2 (FIVET) and 20.1 (ICSI) in 2005.

It is well known that the success of assisted reproduction depends largely on the age of the patient and the quality of the ovules; the age with the best result to achieve a delivery after transferring an embryo is 28 years (14).

Regarding the transfer of embryo, current trends also increasingly recommend the transfer of no more than 2 embryos, as well as low-impact techniques (15). In these cases, only one egg is used per patient, thus avoiding some of the main problems of in vitro fertilization, such as the accumulation of frozen embryos, multiple pregnancies and ovarian stimulation that carry a high risk of maternal and newborn morbidity and mortality.

On the information that fertility clinics provide on the Internet, there are some changes observed in the marketing used, since success cases are often highlighted in order to positively influence in the emotions of infertile couples, in addition to the considerable increase in promotion in both spectacular ads, radio capsules and social media ads such as Facebook, Twitter, etc.

In Mexico, there is no legal regulation regarding the quality and quantity of information, nor the execution of the techniques presented by the services of fertility clinics.

V. Conclusions

The present work showed that the success rates announced by many RHA clinics on the Web pages are too high, and that it is demonstrated by comparing them against three scientific reports—the Mexico field study and the RED LARA and ESHRE reports—which shows that these clinics are failing to tell the truth.

Although this lack of veracity on the part of the RHA clinics has been an element that has been previously noted (16, 17), this work demonstrates it clearly and reliably.

Sometimes the cause of this lack of veracity seeks to create an optimistic atmosphere around the chances of success, masking failure rates (16). Although this attempt to create an optimistic atmosphere, could support the patient during their therapy, it has the disadvantage that it is manipulative and on the other hand, it creates false expectations that can later produce more frustration in the patient and even increase the claim when they are not successful. For all the foregoing, it is important to insist that informed consent requires the wide disclosure of all consequences and risks of a medical, social or emotional nature (16).

The above is part of the information ecosystem that exists around the success rates of fertility clinics in Mexico, although it is not exclusive to our country, since we also observe it in information from RHA clinics also from other countries.

It is important to adjust and delve into the issue because of the importance it represents in today's society, since the handling of these data must be cautious, real and should even be legally regulated. Especially the psychological vulnerability of patients with infertility problems is another reason to show the urgency of regu-

lating both the issue of information provided by these clinics, as well as aspects of assisted fertilization.

The present work shows the need and advantages –both for patients and for the same health personnel– to offer reliable information to infertile couples, especially since many times patients with infertility problems demand very high results, but this can also be secondary to the excessive expectations created through false information. Therefore, despite the great accusation that this work represents, it is important to show RHA clinics the advantages and the high human and even competitive value that will give them to speak truthfully, providing success rates and informed consent attached to reality.

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