HUMAN ASSISTED REPRODUCTION IN DEVELOPING COUNTRIES

A REVIEW OF THE CURRENT SITUATION AND POSSIBILITIES OF NEW REPRODUCTIVE TECHNOLOGIES

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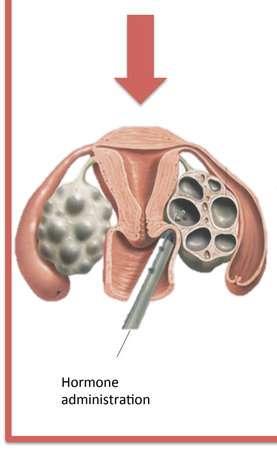
Introduction

Worldwide more than **180 million couples** in developing countries suffer from infertility. Although reproductive health education and prevention of infertility are number one priorities, the need for accessible new assisted reproductive technologies (ART) is very high. This study would try to characterize the situation of new reproductive technologies in developing countries and to emphasize in the points where it is necessary to improve.

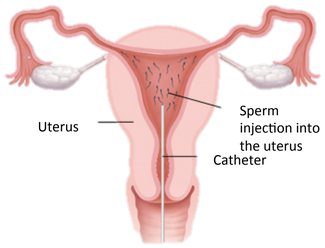
Human assisted reproduction technologies

Assisted reproduction technologies for humans, sometimes simplified as ART, arise with the main objective of maximizing the chances of fertilization and viable pregnancy. The principal technologies are:

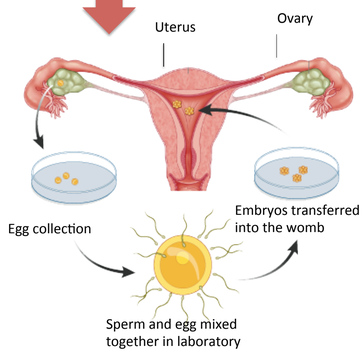
✧ **Ovarian stimulation**



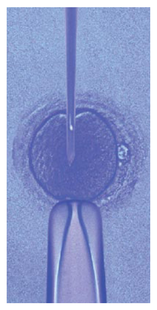
✧ **Artificial insemination**



✧ **In vitro fertilization (IVF)**



✧ **Intracytoplasmic sperm injection (ICSI)**



Causes and consequences

Prevalence of infertility in developing countries: **4-17%**

Causes:

✧Sexually transmitted diseases (STD)
✧Medical intervention under unhygienic conditions
✧Environmental factors
✧Socio-cultural factors

Consequences:

✧Stigmatization
✧Isolation
✧Ostracize
✧Disinheritance
✧Abandonment by husband

Availability

The country where ART is more available is **Israel** with 4,140 cycles per million inhabitants, and the country with the lowest availability is **Guatemala** with 6 cycles.

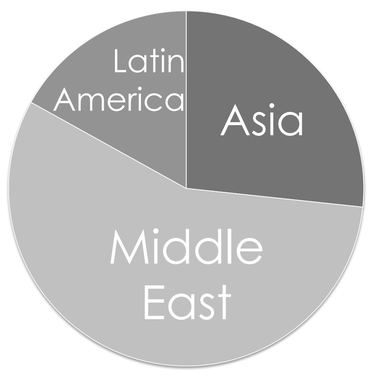


Figure 1. Availability of cycles per million inhabitants by region.

Table 1. Number of centers providing infertility treatments.

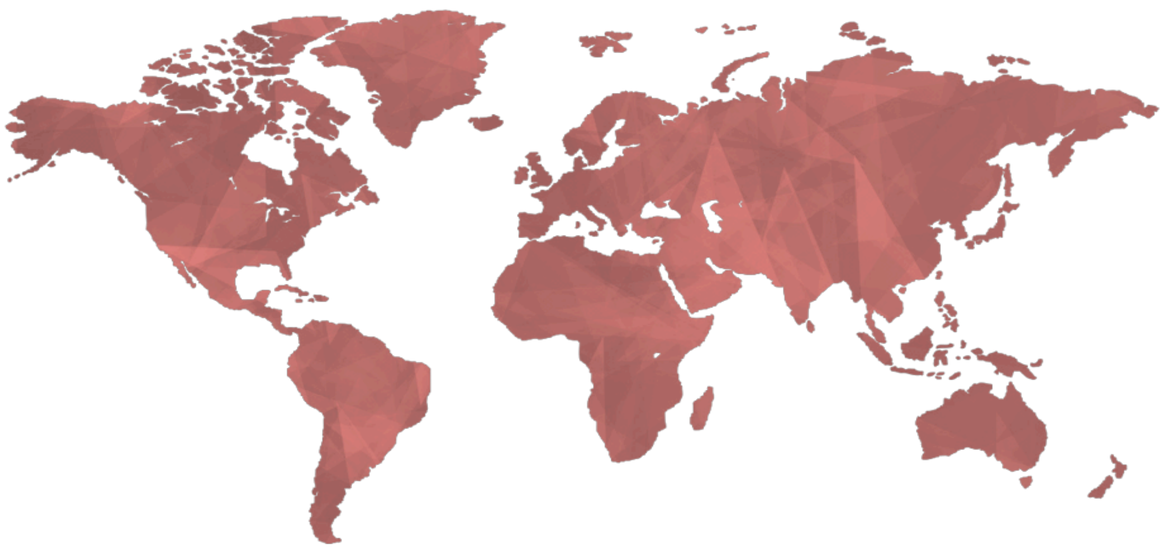
Country	N (2013)	Country	N (2013)
Argentina	30-44	**Mexico**	30
Brazil	200	**Peru**	6
Cameroon	2	**Senegal**	2
Chile	7	**South Africa**	15
Colombia	27	**Togo**	1
Congo	1	**Tunisia**	12
Ecuador	11	**Turkey**	131
Egypt	58	**Uganda**	2
India	500-600	**Uruguay**	4
Kazakhstan	12	**Venezuela**	10
Libya	8-10	**Vietnam**	13

Religion

Authority of specific religious viewpoints will influence in the number of adherents.

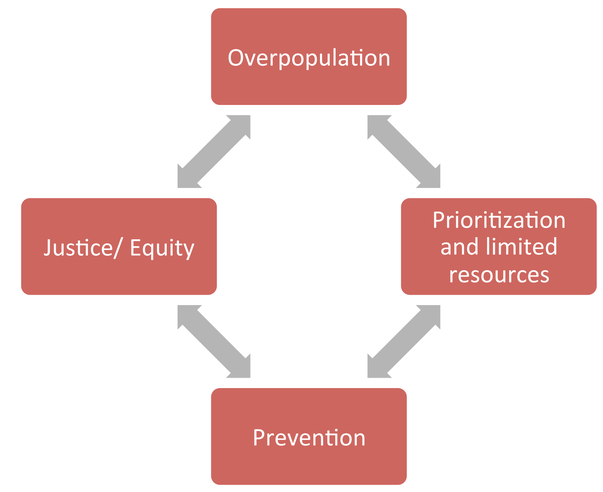
Table 2. Allowance of IVF and AI within religions.

Religion	IVF	AIH/AID
Jewish	**Permitted** with gametes from husband and wife.	**Permitted** if there's no other methods/ In **discussion,** adultery?
Catholic church	**Not permitted** separates procreation from sexual intercourse.	**Not permitted**
Islam	**Permitted** with gametes from husband and wife; adoption not accepted.	**Permitted/ Not permitted**, adulterous.



Ethical issues

Some ethical concerns made unable to fully implement the concept of reproductive health. The main reasons are:



Economic approaches

There is no country in the developing world where the cost of an IVF cycle is less than half of an average individuals annual income. This fact is the principal reason that makes economic difficulties become one of the biggest burdens in access to infertility treatment.

Table 3. Cost of IVF cycle by region (prices in USD).

Country	Cost per IVF cycle
Argentina	$4,000
Brazil	$4,000
Dominican Republic	$8,000
India	$2,500
Iran	$1,300
Israel	$3,000
Kenya	$5,000
Nigeria	$2,000 - $2,700
Pakistan	$1,300
South Africa	$3,200
Thailand	$3,000
Turkey	$2,000

Low-Cost ART

Implementing low-cost ART is only possible if we succeed in simplifying new reproductive technologies in such a way that they still are effective and save but affordable and without compromise the quality. For that:

1. Simplify the recruitment of oocytes for an IVF program
2. Simplify laboratory procedures and equipment

In 2010 **the Walking Egg** non-profit organization has been created with the aim of implement accessible infertility programs in developing countries.

Policies

The expansion of the availability of ART in developing countries raises important questions concerning the quality of services in terms of safety and the insurance coverage provided by the public or private sector.

Table 5. Type of insurance in 22 developing countries.

Country	Type of insurance
Argentina	Private insurance
Brazil	No coverage
Cameroon	No coverage
Chile	National health plan
Colombia	No coverage
Congo	No coverage
Ecuador	No coverage
Egypt	No coverage
India	No coverage
Kazakhstan	National health plan
Libya	Private insurance
Mexico	No coverage
Peru	No coverage
Senegal	No coverage
South Africa	No coverage
Togo	No coverage
Tunisia	National health plan
Turkey	National health plan
Uganda	No coverage
Uruguay	No coverage
Venezuela	No coverage
Vietnam	No coverage

Table 4. Type of legislation of 22 developing countries.

Country	Legislation	Guidelines	Licensing body	Laboratory accreditation
Argentina	✓	✓		✓
Brazil	✓	✓	✓	✓
Cameroon		✓		✓
Chile				✓
Colombia	✓			
Congo	-	-	-	-
Ecuador	-	-	-	-
Egypt		✓	✓	✓
India		✓		✓
Kazakhstan	✓	✓	✓	✓
Libya	✓		✓	
Mexico			✓	
Peru			✓	
Senegal				✓
South Africa	✓	✓	✓	✓
Togo			✓	
Tunisia	✓			✓
Turkey	✓	✓	✓	
Uganda				✓
Uruguay	-	-	-	-
Venezuela				✓
Vietnam		✓	✓	✓

It is interesting to observe that coverage of infertility treatments is often connected with the age of women, the fertility rate and the population growth rate. It is also found that in some regions the government funds a fixed number of cycles, meaning that with those who need more they have to pay for.

Conclusions

The conclusions of the study could be summarized with a question: "Is ART really necessary in developing countries?". The answer is affirmative without doubt. Even if reproductive health is not considered as a primary health need, couples are allowed to decide when to have a children. This takes more importance when considering all the consequences that infertile women are exposed to. The implication of the government in public reproductive education is vital. Moreover, implementation of a low-cost ART would be a breakthrough, as long as quality and safe of these technologies is not compromised. Global access to infertility care can only be achieved when good quality but affordable infertility care is linked to more effective family planning and safe motherhood programs.

Relevant references

(1) Ory JS. (2013). IFFS Surveillance. (2) Gerrits T. (2012). FV&V in ObGyn. 1; 6. (3) Ombelet W. (2011). FV&V in ObGyn. 3; (4): 257-266. (4) Bahamondes L, *et al*. (2014). Reproductive biology and endocrinology. 12: 87.