Keep it simple: Specific aspects of IUI in developing countries

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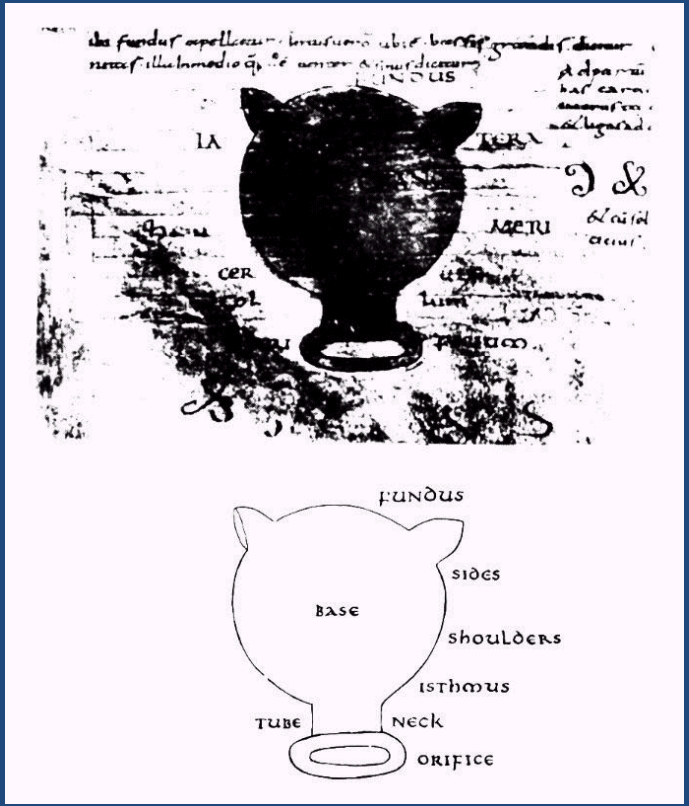
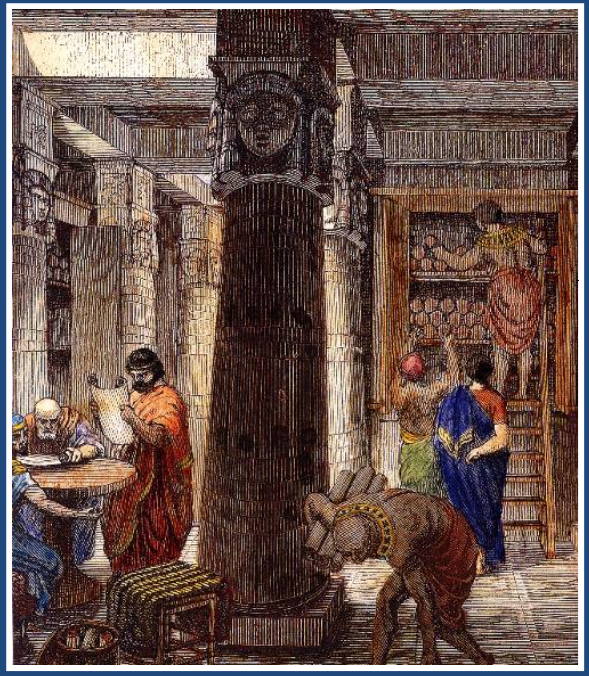
ESHRE Campus symposium "Artificial Insemination: an update",
Genk, Belgium, 13-15 December 2009

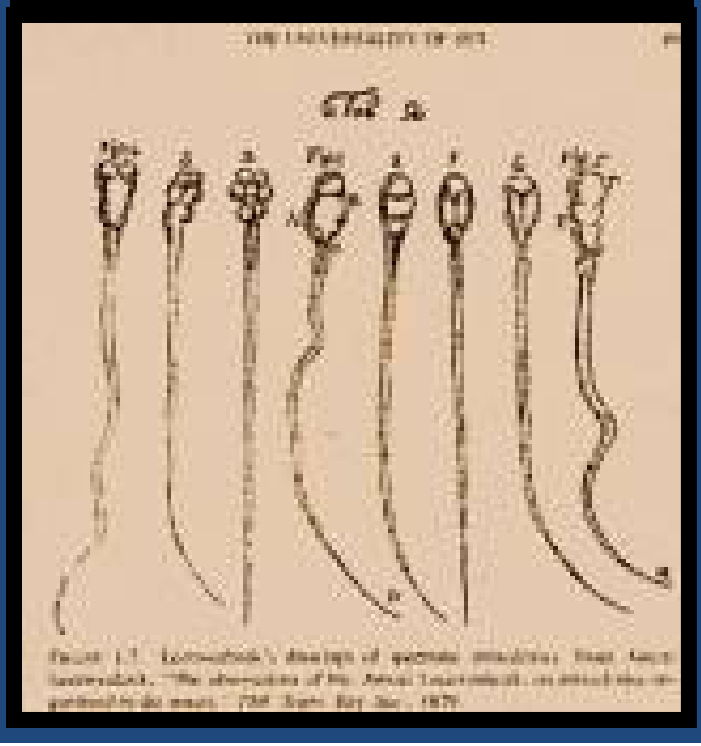
The old Alexandria medical school

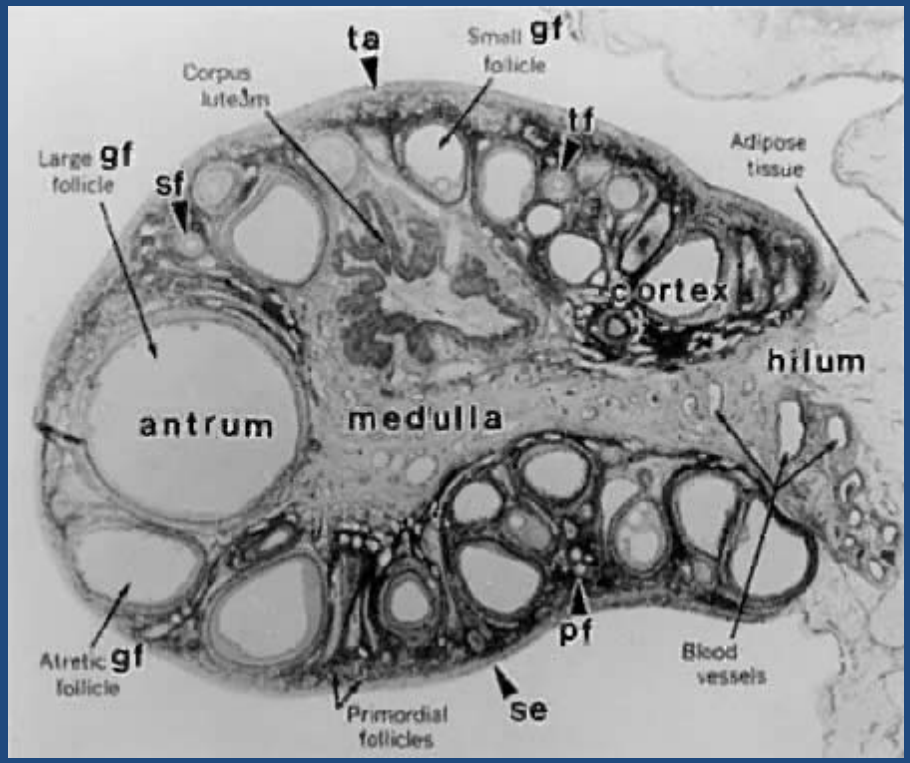




The lighthouse, the Library and the uterus after Soranus of Ephesus

Antony van Leeuwenhoek, (1632-1723), Dutch student of natural history and maker of microscopes, Delft





Regnier van De Graaf, born in Schoonhoven, Netherlands, 30 July 1641; died in Delft, Netherlands, 21 August 1673)

History of artificial insemination

Year	Event
14th Century	A.I. of Arab brood mares
17th Century	A.I. of fish by John Swammerdam (a Leyden physician) - unsuccessful
1742	A.I. of fish Ludwig Jacobi (successful)
1780	A.I. of dogs by Lazario Spallanzani of Modena (successful)
1790	AIH in humans by John Hunter of London (successful)
1838	AIH in humans by the French physician Girault (successful)

History of artificial insemination (cont…)

Year	Event
1866	James Marion Sims performed 55 AIH for 6 women (1 became pregnant) followed by a public outcry
1868	Girault publishes a series of 10 AIH (8 pregnancies including one pair of twins)
1884	First AID pregnancy in Philadelphia by Dr. William Pancoast. Case considered rape as patient was not informed
1941	Postal survey of 30.000 physicians reports 9489 cases of women achieving a least one pregnancy (5728 by AIH and 3510 by AID)
1949	Technique of sperm freezing developed
1953	First human baby from stored semen

Definition of developing countries

1. World Bank definition
2. UNDP definition

World Bank ranking

- High income countries

(GDP >3500 US$ per capita)

- High middle income countries

(GDP 2500 - 3500 US$ per capita)

- Low middle income countries

(GDP 1500 - 2500 US$ per capita)

- Low income countries

(GDP <1500 US$ per capita)

World Bank ranking

- High income countries

(GDP >3500 US$ per capita)

- High middle income countries

(GDP 2500 - 3500 US$ per capita)

- Low middle income countries

(GDP 1500 - 2500 US$ per capita)

- Low income countries

(GDP <1500 US$ per capita)

Table I. World Bank classification of countries by GNI per capita.

Low-income economies (53)		
Afghanistan	India	Rwanda
Bangladesh	Kenya	São Tomé and Principe
Benin	Korea, Dem Rep.	Senegal
Burkina Faso	Kyrgyz Republic	Sierra Leone
Burundi	Lao PDR	Solomon Islands
Cambodia	Liberia	Somalia
Central African Republic	Madagascar	Sudan
Chad	Malawi	Tajikistan
Comoros	Mali	Tanzania
Congo, Dem. Rep	Mauritania	Timor-Leste
Côte d'Ivoire	Mongolia	Togo
Eritrea	Mozambique	Uganda
Ethiopia	Myanmar	Uzbekistan
Gambia, The	Nepal	Vietnam
Ghana	Niger	Yemen, Rep.
Guinea	Nigeria	Zambia
Guinea-Bissau	Pakistan	Zimbabwe
Haiti	Papua New Guinea	
Lower-middle-income economies (55)		
Albania	El Salvador	Namibia
Algeria	Fiji	Nicaragua
Angola	Georgia	Paraguay
Armenia	Guatemala	Peru
Azerbaijan	Guyana	Philippines
Belarus	Honduras	Samoa
Bhutan	Indonesia	Sri Lanka
Bolivia	Iran, Islamic Rep.	Suriname
Bosnia and Herzegovina	Iraq	Swaziland
Cameroon	Jamaica	Syrian Arab Republic
Cape Verde	Jordan	Thailand
China	Kiribati	Tonga
Colombia	Lesotho	Tunisia
Congo, Rep.	Macedonia, FYR	Turkmenistan
Cuba	Maldives	Ukraine
Djibouti	Marshall Islands	Vanuatu
Dominican Republic	Micronesia, Fed. Sts.	West Bank and Gaza
Ecuador	Moldova	
Egypt, Arab Rep.	Morocco	

Upper-middle-income economies (41)

American Samoa
Argentina
Belize
Botswana
Brazil
Bulgaria
Chile
Costa Rica
Croatia
Dominica
Equatorial Guinea
Gabon
Grenada
Hungary
Kazakhstan
Latvia
Lebanon
Libya
Lithuania
Malaysia
Mauritius
Mayotte
Mexico
Montenegro
Northern Mariana Islands
Oman
Palau
Panama
Poland
Romania
Russian Federation
Serbia
Seychelles
Slovak Republic
South Africa
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Turkey
Uruguay
Venezuela, RB

High-income economies (60)

Andorra
Antigua and Barbuda
Aruba
Australia
Austria
Bahamas, The
Bahrain
Barbados
Belgium
Bermuda
Brunei Darussalam
Canada
Cayman Islands
Channel Islands
Cyprus
Czech Republic
Denmark
Estonia
Faeroe Islands
Finland
France
French Polynesia
Germany
Greece
Greenland
Guam
Hong Kong, China
Iceland
Ireland
Isle of Man
Israel
Italy
Japan
Korea, Rep.
Kuwait
Liechtenstein
Luxembourg
Macao, China
Malta
Monaco
Netherlands
Netherlands Antilles
New Caledonia
New Zealand
Norway
Portugal
Puerto Rico
Qatar
San Marino
Saudi Arabia
Singapore
Slovenia
Spain
Sweden
Switzerland
Trinidad and Tobago
United Arab Emirates
United Kingdom
United States
Virgin Islands (U.S.)

UNDP classification

The United Nations Development Programme (UNDP) takes into consideration three criteria for the evaluation of countries' development:

1. Low-income criterion,
2. Human resources weakness criterion
3. Economic vulnerability criterion.

Table II. List of the LDCs according to the UNDP.

1	Afghanistan[#]	26	Madagascar
2	Angola	27	Malawi[#]
3	Bangladesh	28	Maldives*
4	Benin	29	Mali[#]
5	Bhutan[#]	30	Mauritania
6	Burkina Faso[#]	31	Mozambique
7	Burundi[#]	32	Myanmar
8	Cambodia	33	Nepal[#]
9	Cape Verde*	34	Niger[#]
10	Central African Republic[#]	35	Rwanda[#]
11	Chad[#]	36	Samoa*
12	Comoros*	37	São Tomé and Principe*
13	Democratic Republic of the Congo	38	Senegal
14	Djibouti	39	Sierra Leone
15	Equatorial Guinea	40	Solomon Islands*
16	Eritrea	41	Somalia
17	Ethiopia[#]	42	Sudan
18	Gambia	43	Timor-Lesté*
19	Guinea	44	Togo
20	Guinea-Bissau*	45	Tuvalu*
21	Haiti*	46	Uganda[#]
22	Kiribati*	47	United Republic of Tanzania
23	Lao People's Democratic Republic[#]	48	Vanuatu*
24	Lesotho[#]	49	Yemen
25	Liberia	50	Zambia[#]

See Appendix for criteria of inclusion.
*Also SIDs (Small island developing countries).
[#]Also LLDCs (Land locked developing countries).
Reference: http://www.un.org/special-rep/ohrlls/ldc/list.htm

33 in Africa

Situation analysis

Level 1 – Basic infertility clinic:
Investigating infertility, semen analysis, hormonal assays, follicular scanning, PCT, ovulation induction, IUI

Level 2 – Advanced infertility clinic:
IVF, diagnostic endoscopy

Level 3 – Tertiary level infertility clinic:
ICSI, cryopreservation, operative endoscopy

Specific aspects of infertility in developing countries (DCs)

1. Prevalence of infertility in DCs
2. Causes of infertility in DCs
3. Infections: HIV, HCV
4. Consequences of infertility in DCs
5. Obstacles to treatment
6. Financial aspects
7. Cultural aspects

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Prevalence of infertility in DCs

Study	Country	Infertility (%)
Che and Cleland (2002)	China	9.3
Larsen (2005)	Tanzania	6.9
Sundby et al (1998)	Gambia	9.2
Barden-O'Fallon (2005)	Malawi	19.6
Fuentes and Devoto (1994)	Chile	25.7
Geelhoed et al. (2002)	Ghana	11.8
Unisa (1999)	India (Pradesh)	5
Zarger et al (1997)	India (Kashmir)	15.1
Che and Cleland (2002)	China (Shanghai)	3
Ericksen and Brunette (1996)	Sub-Saharan Africa	14.5
Larsen (2000)	Sub-Saharan Africa	16.4
Liu et al (2005)	China (National)	1.3

Boivin et al, Hum Reprod 22:1506–1512, 2007

Prevalence of infertility in Africa

Average	14.9%
Southern Africa	16.7 % - 21.4 %
Eastern Africa	9.8 % - 12.2 %
Namibia	14 – 32 %

Ericksen, K. and Brunette, T. Patterns and predictors of infertility among African women: A cross-national survey of twenty-seven nations. Social Science and Medicine 42(2):209-220, 1996

Secondary infertility

Asia	23 %
North Africa	16 %
Sub-Saharan Africa	52 %
Latin America	40 %

Cates, W. et al. Worldwide patterns of infertility: Is Africa Different? Lancet 2 (8455): 596-598, 1985

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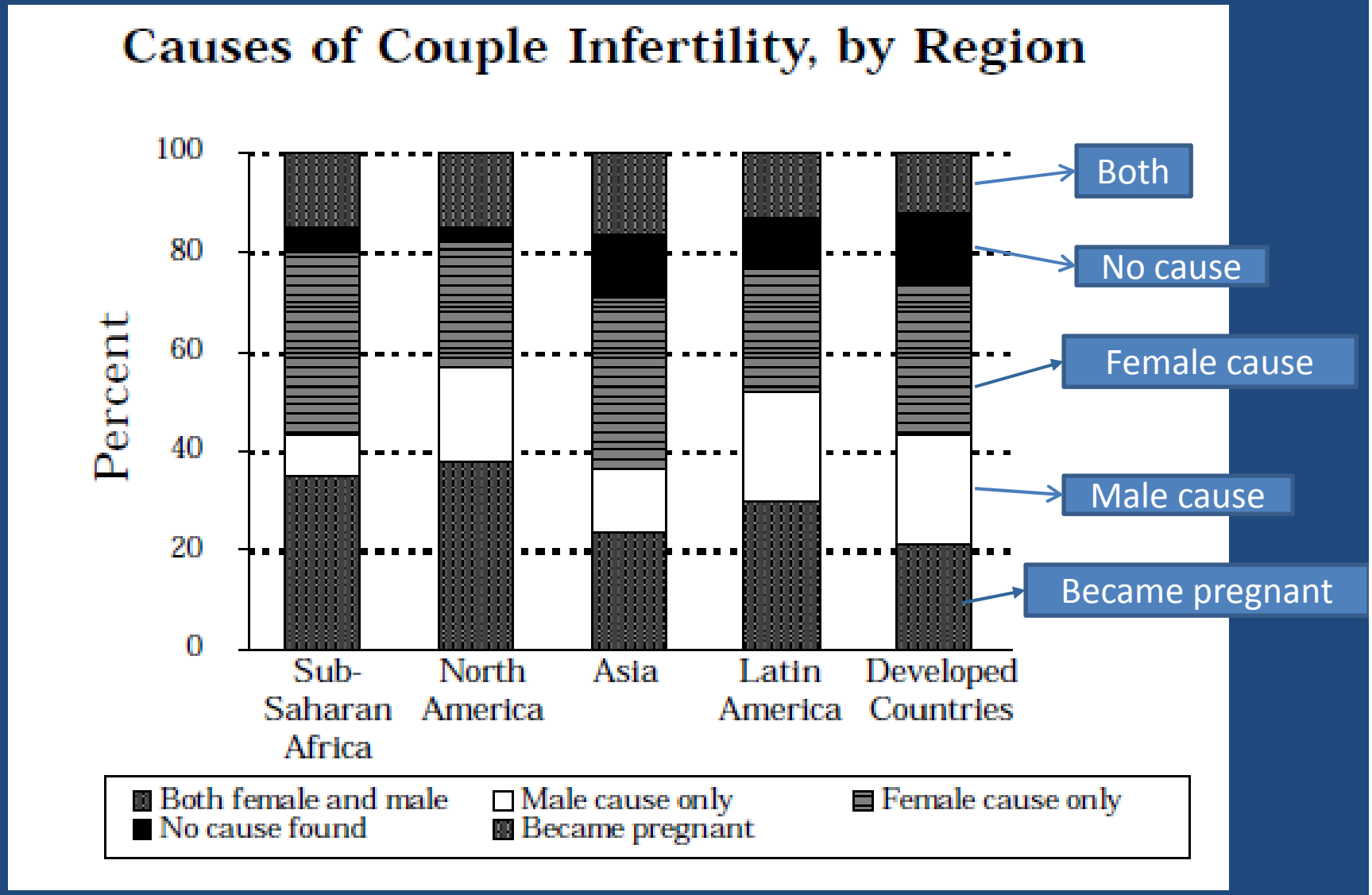
Causes of infertility worldwide

WHO study of 5,800 infertile couples from 33 medical centers in 22 developed and developing countries

Female causes	25 to 37 %
Male causes	8 to 22 %
Both male and female	21 to 38 %

Cates, W. et al. Worldwide patterns of infertility: Is Africa Different? Lancet 2 (8455): 596-598, 1985



Cates, W. et al. Worldwide patterns of infertility: Is Africa Different? Lancet 2 (8455): 596-598, 1985

Possible causes of variability in the prevalence of infertility in DCs

- Sexually transmitted, infectious, and parasitic diseases
- Health care practices and policies
- Exposure to potentially toxic substances in the diet or the environment

World Health Organization. Infertility: A Tabulation of Available Data on Prevalence of Primary and Secondary Infertility. Geneva, 1991

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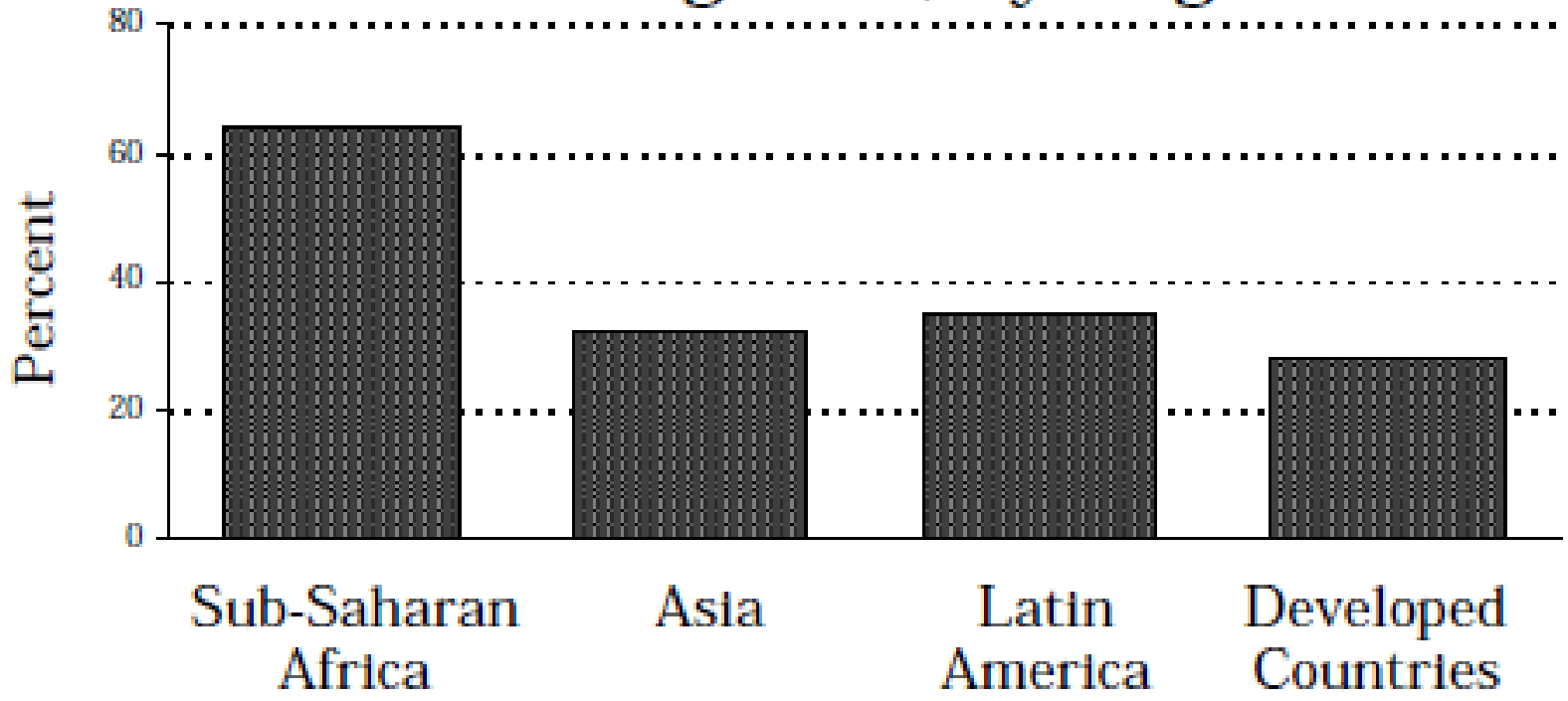
Percent of Infertile Women with Infection-related Diagnoses, by Region



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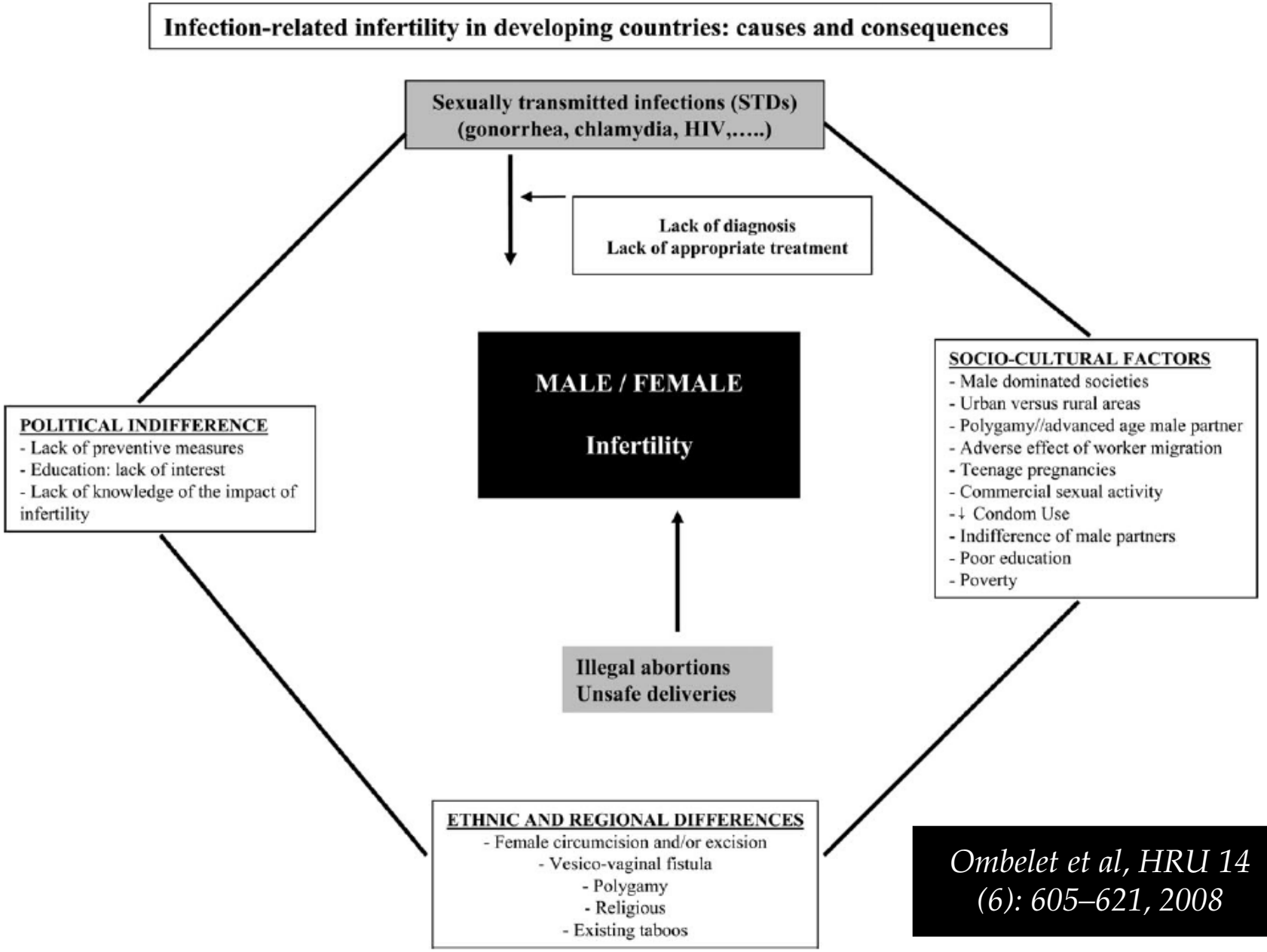
Infection-related infertility in developing countries: causes and consequences
Sexually transmitted infections (STDs)
(gonorrhea, chlamydia, HIV,…..)
Lack of diagnosis
Lack of appropriate treatment
MALE / FEMALE
Infertility
POLITICAL INDIFFERENCE
- Lack of preventive measures
- Education: lack of interest
- Lack of knowledge of the impact of infertility
SOCIO-CULTURAL FACTORS
- Male dominated societies
- Urban versus rural areas
- Polygamy//advanced age male partner
- Adverse effect of worker migration
- Teenage pregnancies
- Commercial sexual activity
- ↓ Condom Use
- Indifference of male partners
- Poor education
- Poverty
Illegal abortions
Unsafe deliveries
ETHNIC AND REGIONAL DIFFERENCES
- Female circumcision and/or excision
- Vesico-vaginal fistula
- Polygamy
- Religious
- Existing taboos
Ombelet et al, HRU 14 (6): 605–621, 2008

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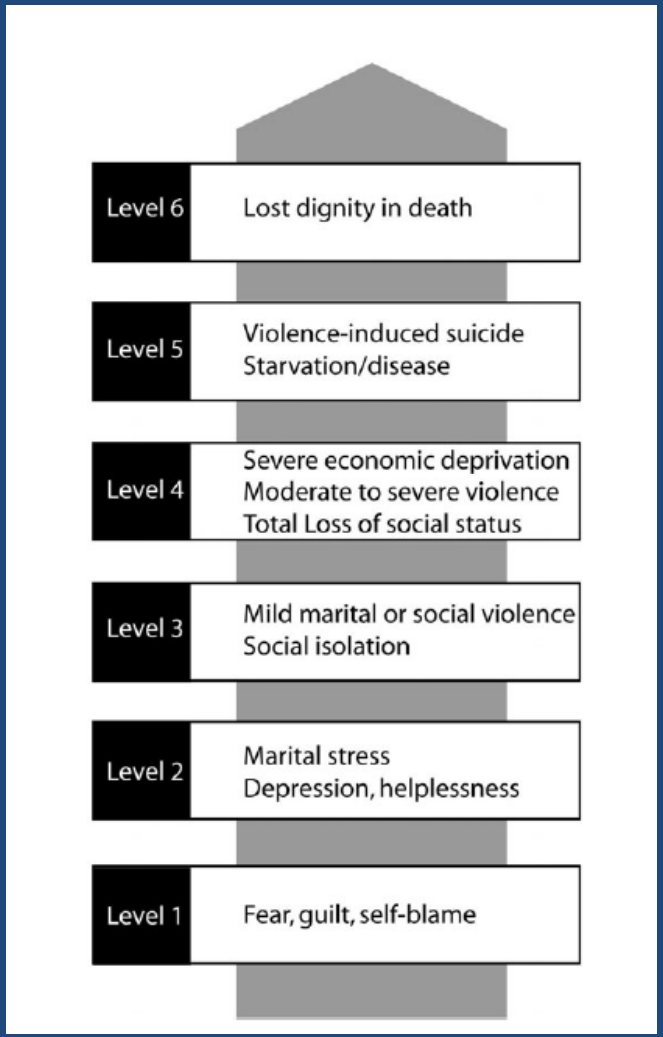
Consequences of infertility in DCs

1. Loss of social status
2. Social isolation
3. Marital instability
4. Loss of social security
5. Gender identity
6. Psychological consequences (guilt, depression, shame, grief, sense of worthlessness)
7. Continuity: funeral tradition



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Obstacles to treating infertility in developing countries

- Lack of services
- Lack of know how
- Lack of finance
- Lack of access to services
- Acceptance of fate (curse from God)
- Bad experience of neighbors
- Traditional healers

Nygren and Zegers-Hochschild, Hum Repropd Suppl 1: 5, 2008

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Global health spending

	Developing countries	Developed countries
Global population	84%	16%
Global disease burden	90%	10%
Global health spending	12%	88%

Schieber G. Health financing in developing countries. Economic viewpoint June 2006

Public share of total health spending

Country	Percentage of spending share
Low-income countries	29%
Lower-middle income countries	42%
Upper-middle income countries	56%
High income countries	65%

Schieber G. Health financing in developing countries. Economic viewpoint June 2006

Obstacles to funding infertility projects

- Infertility is not a disease
- Infertility is not a serious disease
- Infertility treatment is not effective
- Infertility treatment is expensive
- Treating infertility in an overpopulated country

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Cultural aspects of infertility in developing countries

- Stigmatization of infertile women/VAW
- The culture of son-preference
- Donor insemination
- Lesbian couples and non-traditional families

Infertility: a cause of violence against women

Infertility as a form of VAW

Number of infertile women	233
Experienced domestic violence	97 (41.6%)
Psychological torture	50 (51.5%)
Verbal abuse	38 (39.2%)
Ridicule	27 (27.8%)
Physical abuse	17 (17.5%)
Deprivation	6 (6.2%)
By the husband	47 (48.5%)
By female in-laws	31 (32%).

Ameh et al. Niger Med J 16(4):375, 2007

Discrimination against the female child

- In treatment
- In education
- In feeding

This Pakistani mother gave birth to twins. She breast-fed the boy and bottle-fed the girl. The girl died the following day this picture was taken.

The missing females

About 100 million women are missing (44m in China, 37m in India) due to:

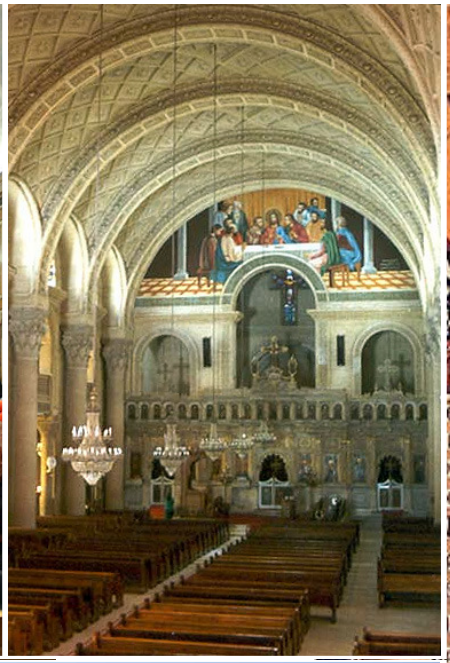
- Prenatal sex selection/abortion
- Discrimination against the female child
- Postpartum hemorrhage

Sen AK. Missing women, BMJ 304: 586-7, 1992
Sen A. Missing women – revisited, BMJ 367: 185-6, 2003

The missing females
World population by sex in 2008

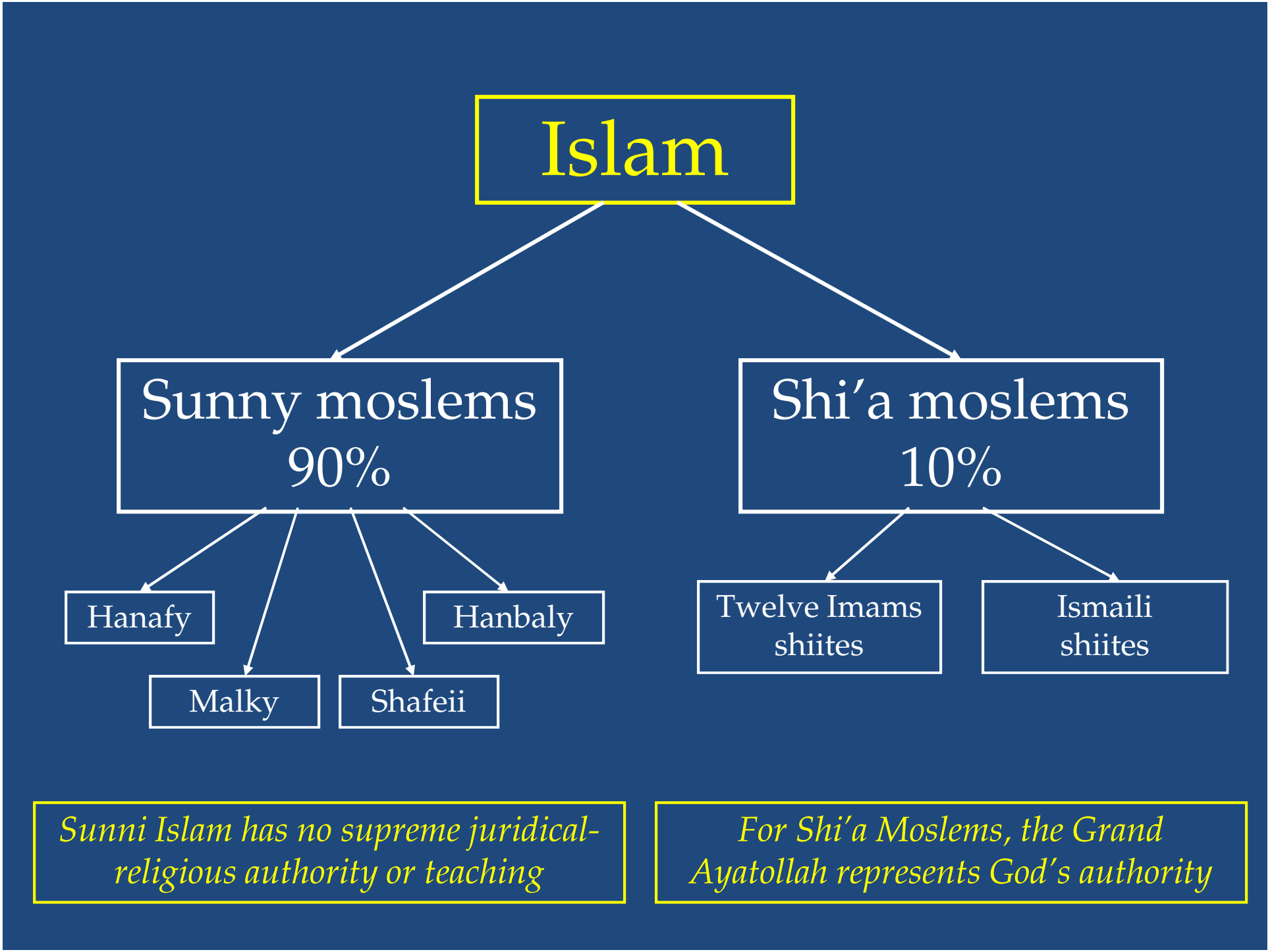
Population in thousands	Males	Females
World	3 442 851	3 386 510
High income	451 069	464 797
Low and Middle income	2 594 306	2 535 000

United Nations Report: Population prospects: the 2008 revision, 2009




ΙΓ ΣΥΝΟΔΟΣ ΝΑΙ ΠΑΤΕΡΩΝ


Ιησ
Πχς
Πνηρι
ιωΦτ


Islam
Sunny moslems
90%
Shi'a moslems
10%
Hanafy
Malky
Shafeii
Hanbaly
Twelve Imams
shiites
Ismaili
shiites
Sunni Islam has no supreme juridical-religious authority or teaching
For Shi'a Moslems, the Grand Ayatollah represents God's authority

Gamete donation

- Gamete donation is prohibited by Sunni Muslims but allowed by Shi'ite Muslims

- The Sunni Muslims opinion is based on the sanctity of the male inheritance line

- The Shi'ite Muslim decision is based on the fact that it does not involve sexual intercourse (Fatwa by Ayatollah Ali Hussein Khamenei in 1999)

Serour G. Infertility and Assisted Reproduction. Eds: Rizk et al, 737, 2008

THE TIMES

FOX NEWS .com Fair & Balanced

- Wombs for Rent: Commercial Surrogacy Growing in India, 30 December 2007
- Japanese Woman, 61, Gives Birth to Grandchild, 21 August 2008

Israeli gay couple in India has baby through IVF

Mumbai: A three-kilo-baby is literally a bundle of joy for Israeli gay couple Omer and Yonatan Gher. The couple had a baby through invitro fertilisation in a Mumbai-based clinic. [Prachi Jatania, CNN-IBN]

Wed, Nov 19, 2008 at 00:25

Advantages of IUI over IVF in DCs

- Less equipment necessary
- Easy technique to learn
- Less invasive
- Less expensive
- Reduced psychological burden
- Good couple compliancy (low dropout rate)
- Low risk for OHSS
- Low multiple pregnancy rate with natural cycles, clomiphene or low-dose HMG protocols

Ombelet, Hum Reprod 64S, 2008

IUI in developing countries

1. Simple stimulation protocols
2. Simple monitoring techniques
3. Evaluation of the semen sample
4. Simple sperm preparation techniques
5. Simple insemination devices
6. Timing of IUI
7. Single versus double insemination
8. AID, HIV and sex pre-selection

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Factors affecting the success of IUI

Table IV. Logistic regression model for predicting the success of intrauterine insemination

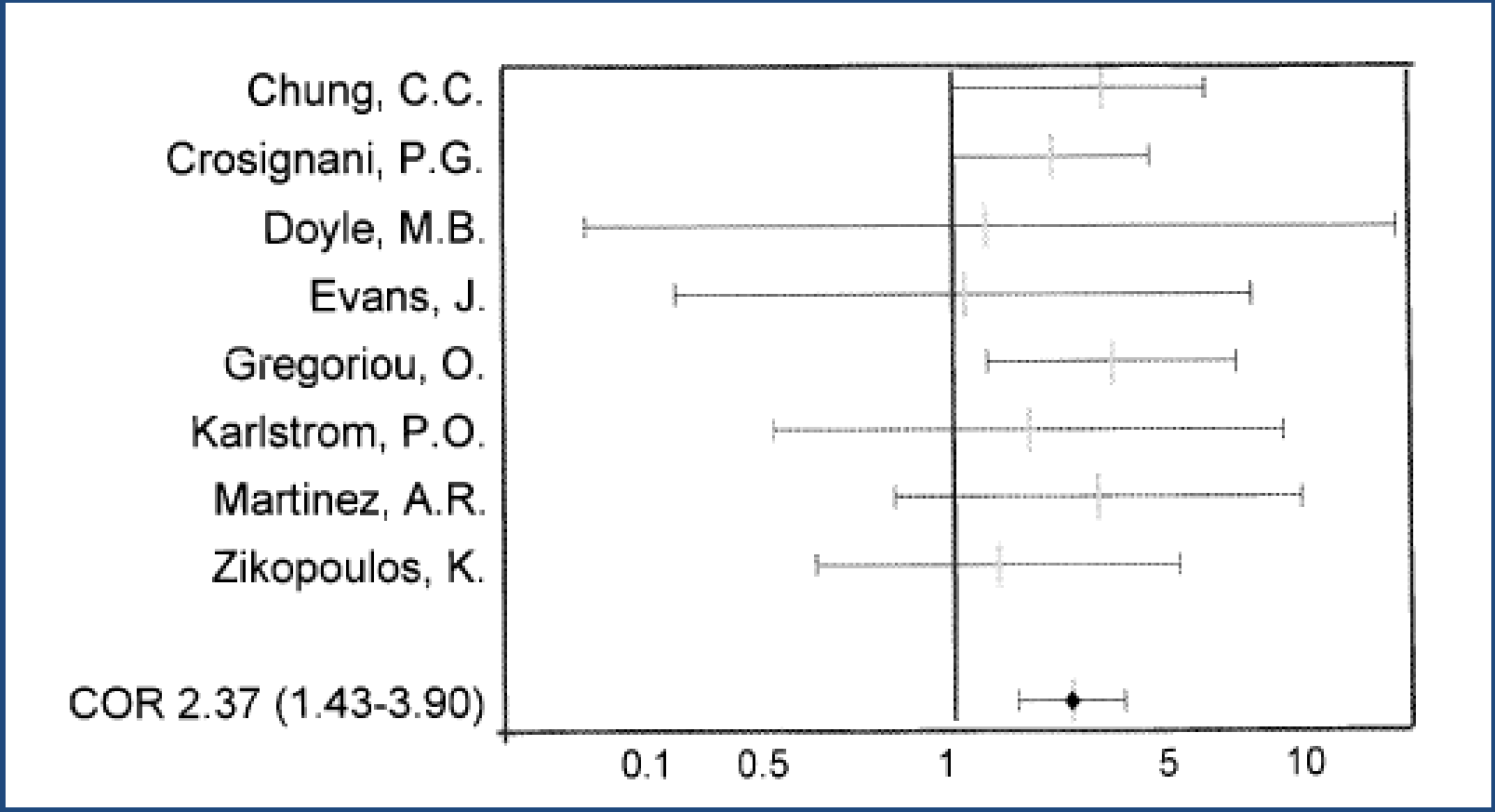
Variable	OR[a]	CI[b]	*P*
Age[c]			0.028
<40 (years)	3.24	(1.14, 9.23)	
Infertility duration[c]			0.017
⩽6 (years)	2.33	(1.16, 4.66)	
Infertility aetiology[c]			0.045
unexplained	2.79	(1.33, 5.87)	
Number of follicles (>16 mm)[c]			0.031
2	2.45	(1.16, 5.18)	
3	3.18	(1.48, 6.81)	
⩾4	2.51	(1.13, 5.55)	
Number of treatment cycle[d]			0.009
2	0.57	(0.34, 0.96)	
3	0.44	(0.24, 0.83)	
4	0.43	(0.19, 1.03)	
⩾5	0.22	(0.07, 0.75)	

[a]Odds ratio.
[b]95% confidence interval.
[c]Odds ratio in contrast to the poorest category.
[d]Odds ratio in contrast to the best category.

n = 811 cycles

Nuojua-Huttunen et al. Hum Reprod 14: 698, 1999

IUI with COH versus timed intercourse



Hughes, Human Reprod 12: 1865, 1997

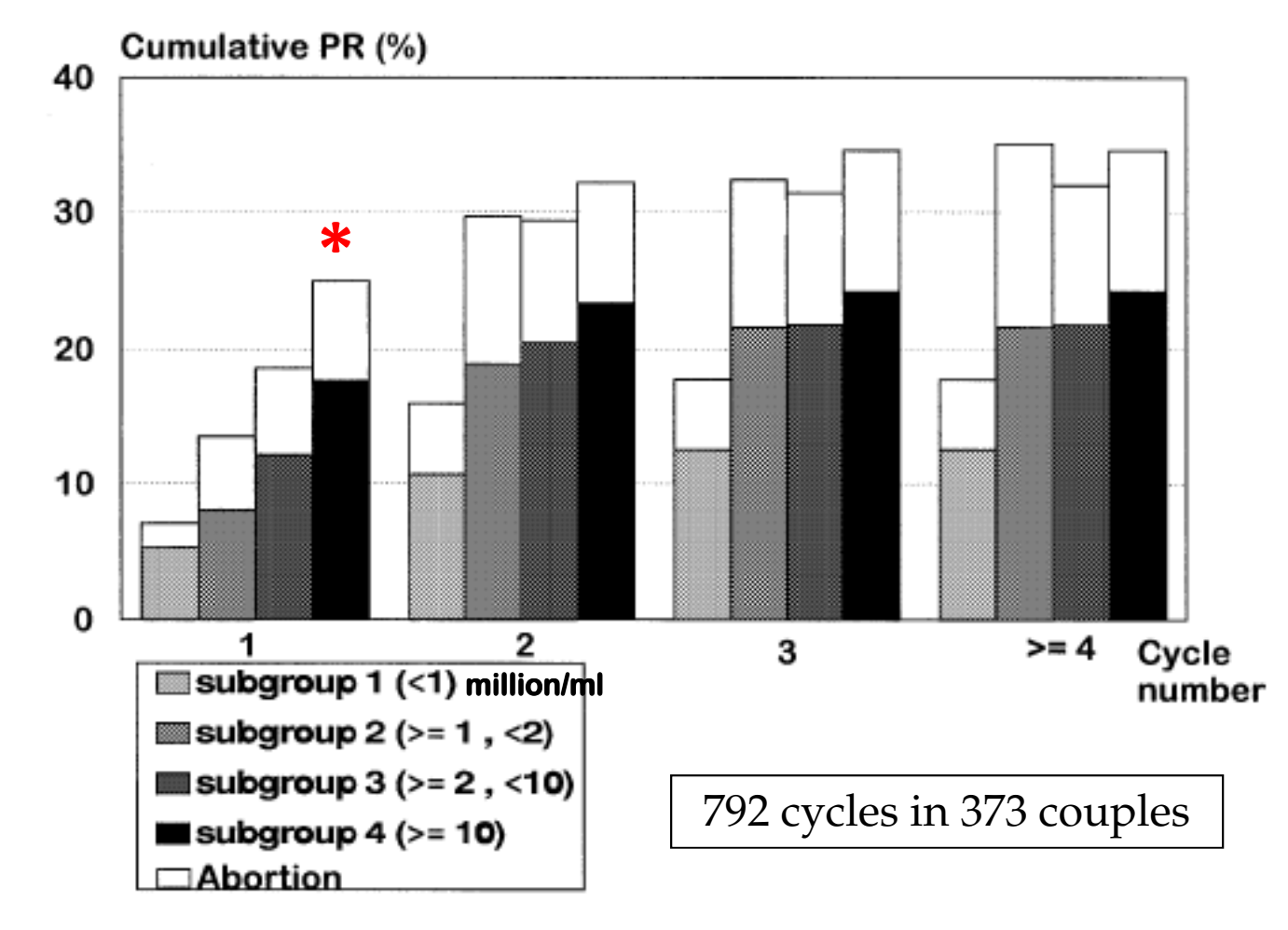
IUI with HMG

Pregnancy outcome	No. of patients
Pregnancies/cycle (%)	102/811 (12.6)
Live births	72 (70.6)
Miscarriages	24 (23.5)
Ectopic pregnancies	6 (5.9)
Multiple pregnancies	14 (13.7)
Multiple births/live births	12/72 (16.7)

Values in parentheses are percentages

Nuojua-Huttunen et al. Hum Reprod 14: 698, 1999

IUI with clomiphene citrate + HCG



792 cycles in 373 couples

Ombelet et al, Hum Reprod 12: 1458-63, 1997

CPR in IUI with CC v/s HMG (RCT)

Cycle rank	IUI with CC then HMG	IUI with HMG then CC	P value
1	7.4 %	6.9 %	NS
2	22.2 %	10.5 %	NS
3	35.2 %	18.6 %	NS
4	35.2 %	44.0 %	NS
Total	35.2 %	44.0 %	NS

Ecochard et al, Fertil Steril 73: 90, 2000

Minimal stimulation for IUI

Conventional stimulation

- CC from days 3 to 7
- HMG 150 IU/day from day 8
- HCG when follicle >17 mm and E2> 1500 pmol/L

Minimal stimulation

- CC from days 3 to 7
- HMG 150 IU once on day 9
- HCG when follicle >17 mm

Dhaliwal et al. J Obstet Gynaecol Res 28: 295–299, 2002

Minimal stimulation for IUI

Table 3 Outcome of treatment with both protocols

	Minimal stimulation	Full stimulation
No. of cases	100	100
No. of treatment cycles	216	204
No. of dominant follicles†	1.83 ± 0.71	3.16 ± 1.50
No. of visits for monitoring†	1	3.15 ± 1.21
No. of ampoules of hMG† (75 IU)	2**	12 ± 5.4
Pregnancy rate per couple	35%	39%
Pregnancy rate per cycle	16.20%	19.12%
Abortion	2 (5.7%)*	9 (23%)
Multiple gestation	–	2 (5.13%)
Hyperstimulation	–	6 (3%)

*$P < 0.05$; **$P < 0.01$.

hMG, human menopausal gonadotrophin.

†(mean ± SD)

Dhaliwal et al. J Obstet Gynaecol Res 28: 295–299, 2002

Minimal stimulation for IUI

Table 4 Medication and monitoring expenses per cycle (in US$)

	Minimal stimulation	Full stimulation
Clomiphene citrate (100 mg × 5 days)	$2.00	$2.00
hMG	$27.00	$162.00
hCG (5000 IU)	$8.00	$8.00
Luteal phase 2000 IU × 3	$17.00	$17.00
Ultrasound	$3.50	$10.50
Serum estradiol	$6.00	$17.00
Total	**($63.50)**	**($216.50)**

hMG, human menopausal gonadotrophin; hCG, human chorionic gonadotrophin.

Dhaliwal et al. J Obstet Gynaecol Res 28: 295–299, 2002

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U/S versus U/S + E2 monitoring
(Cochrane review)

Clinical pregnancy rate per woman

RR = 1.07 (95% CI = 0.77 to 1.49)

Mean number of oocytes retrieved

OR = -0.55 (95% CI = -1.79 to 0.69)

Incidence of ovarian hyperstimulation

RR = 0.73 (95% CI = 0.30 to 1.78)

Kwan et al, Cochrane Database Syst Rev 2008 Apr 16;(2):CD005289

LH rise during ovulation induction

49% of spontaneous cycles

(Cunha-Filho et al, 2003)

24% of spontaneous cycles

(Cohlen et al, 1998)

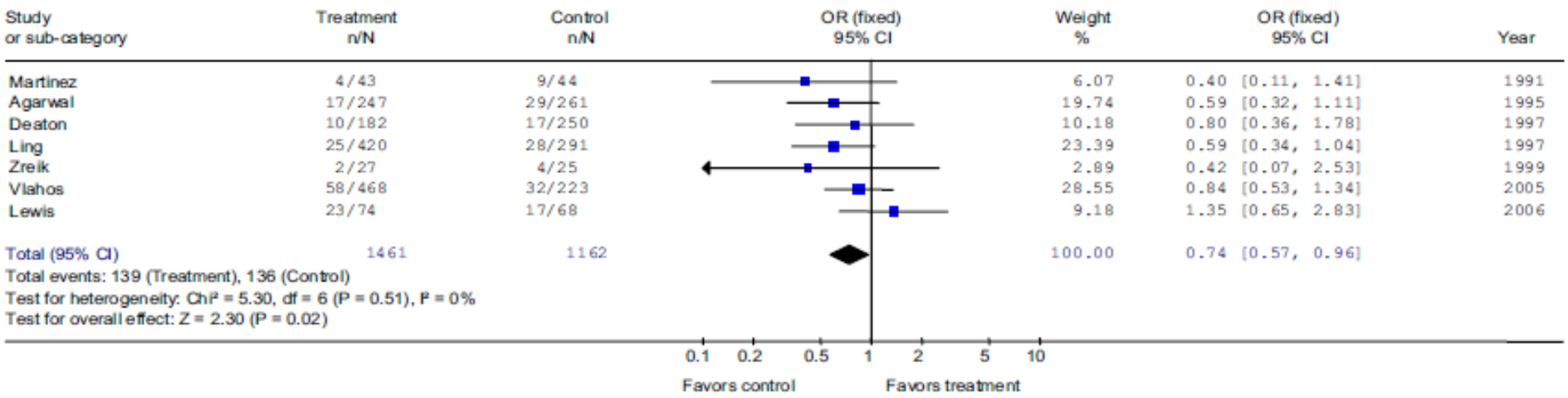
36% of spontaneous cycles

(Cantineau et al, 2007)

Cunha-Filho Reprod Biomed Online 7:194, 2003; Cohlen et al, Hum Reprod 13:1553, 1998 ; Cantineau et al, Fertil Steril 88: 107, 2007

CC + HCG versus LH monitoring (CPR)

Review: Clomiphene plus hCG versus Clomiphene plus LH
Comparison: 01 clomiphene + hcg vs clomiphene +Lh overall
Outcome: 01 clomiphene + hCG VS clomiphene + LH



Kosmas et al, Fertil Steril 87: 607, 2007

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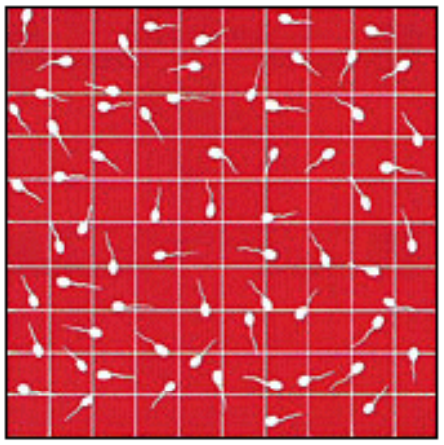
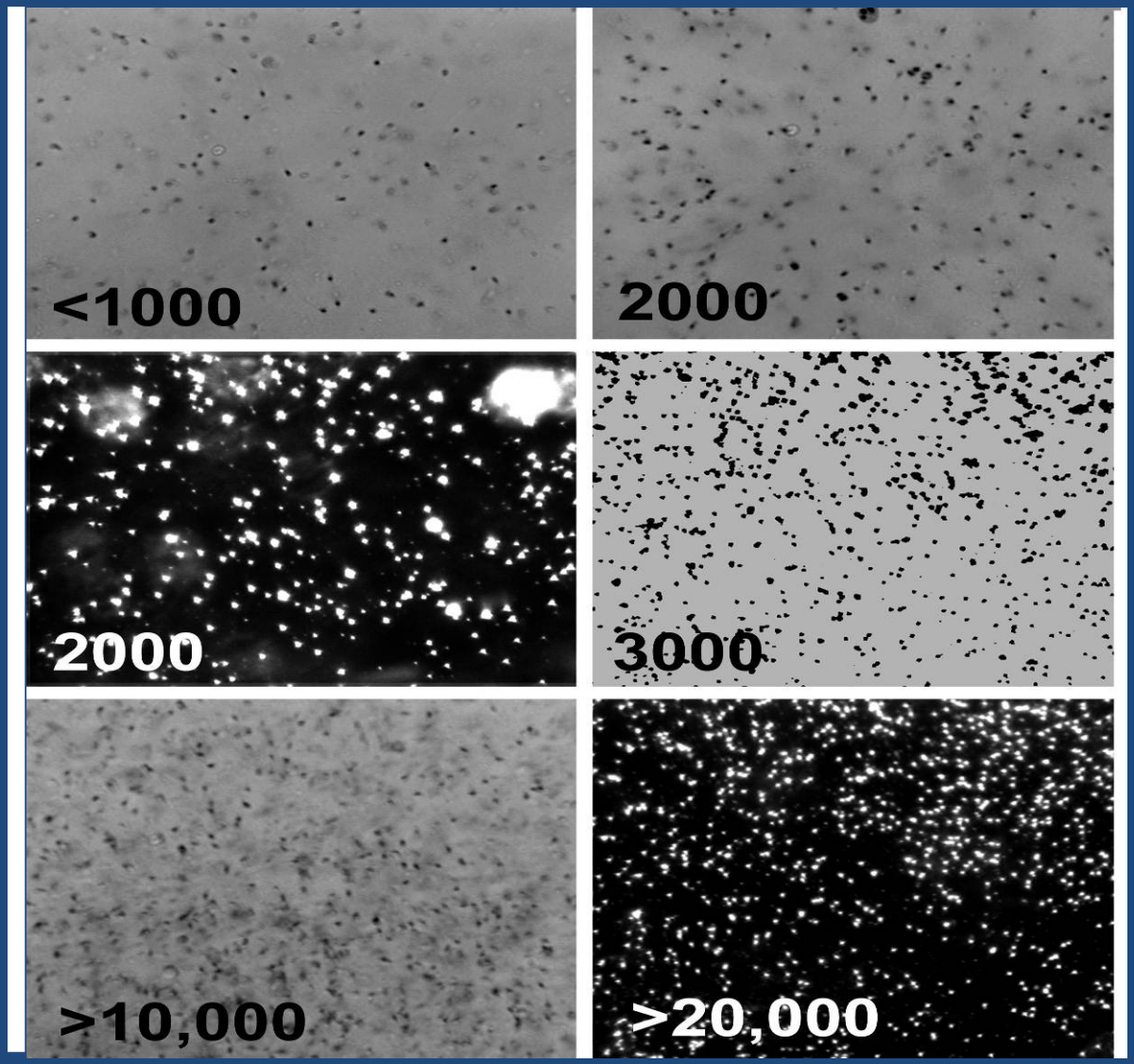
Sperm count



The number of spermatozoa counted in any strip of 10 squares indicates their concentration as millions per ML.

Sperm evaluation by pattern recognition



Curtsey of Professor Jonathan van Blerkom, Boulder, Colorado

Predictors of sperm fertilizing capacity

TABLE III
Multiple regression analysis taking the fertilization rate as the dependent factor.

Parameter	R^2	*t*	% *Contribution*
Age	0.041	–1.502	2.1
Sperm count	0.042	1.522	3.6
Grade A motility	0.033	1.353	15.6
Grade B motility	0.024	1.131	12.3
Grade C motility	0.003	–0.374	0.4
Grade A+B motility	0.037	1.421	31.9
Sperm velocity (µm/s)	0.076*	2.083	19.2
Linear velocity (µm/s)	0.029	1.258	10.4
Linearity index	0.008	–0.671	0.8
Strict morphology (%)	0.075*	2.070	3.3
HOS test (%)	0.017	0.946	0.3

*Statistically significant ($P < .05$)

Sallam et al. Int J Fertil 48: 88, 2003

Predictive value of the morphology score

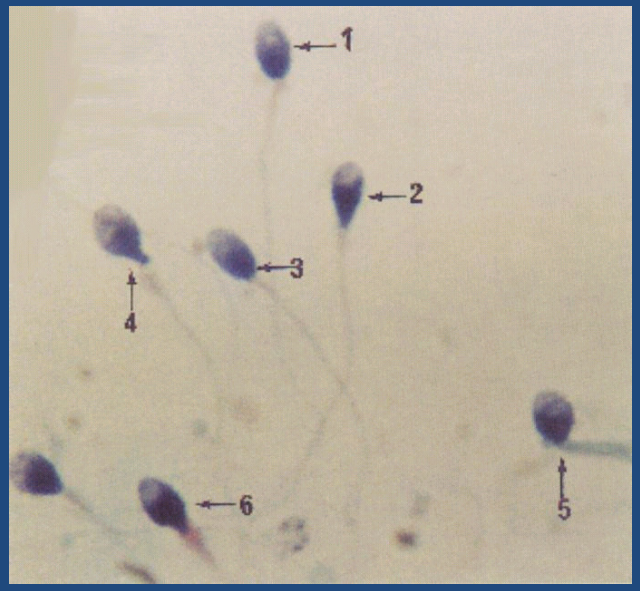
Table III. Comparison of the morphology score (mean value ± SD) in the different subgroups (1, 2, 3, 4)[a] for pregnant and non-pregnant couples

	Morphology score				Significance (unpaired *t*-test)
	Pregnant (n = 116)		Not pregnant		
	Range	Mean (± SD)	Range	Mean(± SD)	
Subgroup 1 (n = 56)	3.5–17	8.3 ± 4.0	0–16	5.0 ± 3.8	$P < 0.05$
Subgroup 2 (n = 37)	1–11	5.8 ± 2.6	1–16	6.9 ± 3.8	NS
Subgroup 3 (n = 156)	0–18	7.3 ± 4.0	0–15	6.6 ± 3.5	NS
Subgroup 4 (n = 124)	2–18	8.8 ± 3.7	2–22	9.2 ± 4.2	NS

NS = not significant.
[a]Subgroups defined by number of motile spermatozoa recovered after washing. Subgroup 1: $<1\times10^6$; subgroup 2: $\geq1-<2\times10^6$; subgroup 3: $\geq2-<10\times10^6$; subgroup 4: $\geq10\times10^6$.

Ombelet et al, Hum Reprod 12: 1458-63, 1997

Sperm morphology evaluation



COMPLETELY NORMAL	%			
HEAD		Regular	%	Irregular
Oval				
Tapering - pear shaped				
Round				
Duplicate				
Amorphous				
Pinhead				
MID PIECE		Normal		
Cytoplasmic remnant				
Abnormal implantation / broken				
Too broad				
FLAGELLUM		Normal		
Coiled				
Duplicate				
Irregular - frayed				
Too short				
REMARKS				

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Sperm preparation techniques

1. Sperm washing
2. Swim up technique
3. Glass wool filtration
4. Gradient centrifugation
5. Electrophoretic sperm selection
6. Magnetic-activated cell sorting

Sperm preparation techniques (RCT)

Clinical correlates of the methods of sperm preparation for IUI.

Variable	Method of sperm preparation		
	Double centrifugation	Multiple-tube swim-up	Percoll density gradient separation
No. of treatment cycles	53	49	51
Estradiol level (pg/mL)	962 ± 430	882 ± 457	879 ± 469
No. of follicles	4.4 ± 2.2	4.1 ± 2.5	4.1 ± 2.2
Initial total motile sperm ($\times 10^6$)	60 ± 47	92 ± 68	92 ± 109
Final total motile sperm ($\times 10^6$)	29 ± 25*	6 ± 6*	27 ± 24*
Percentage recovery	52 ± 32*	7 ± 6*	38 ± 29*
Final normal morphology (%)	14 ± 8*	20 ± 12*	27 ± 11*
No. of pregnancies	8	7	10
Cycle fecundity	0.15	0.14	0.20

Note: Values are means ± SD unless otherwise indicated.
*$P<0.05$.

Dodson et al, Fertil Steril 70: 574, 1998

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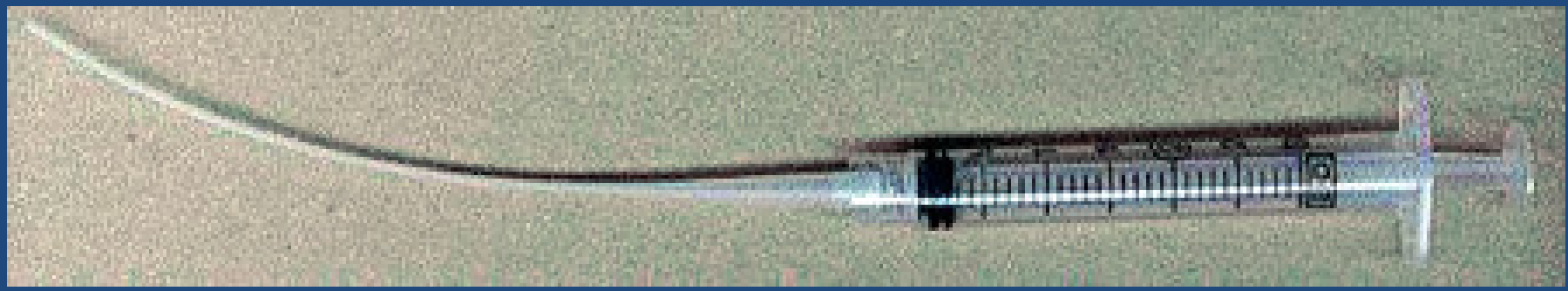
Tomcat IUI catheter



Miller et al, Fertil Steril 83: 1544, 2005

Rigid vs flexible catheters for IUI (RCT)

TABLE 1

Demographic and outcome data for Tomcat and Cook catheter groups.

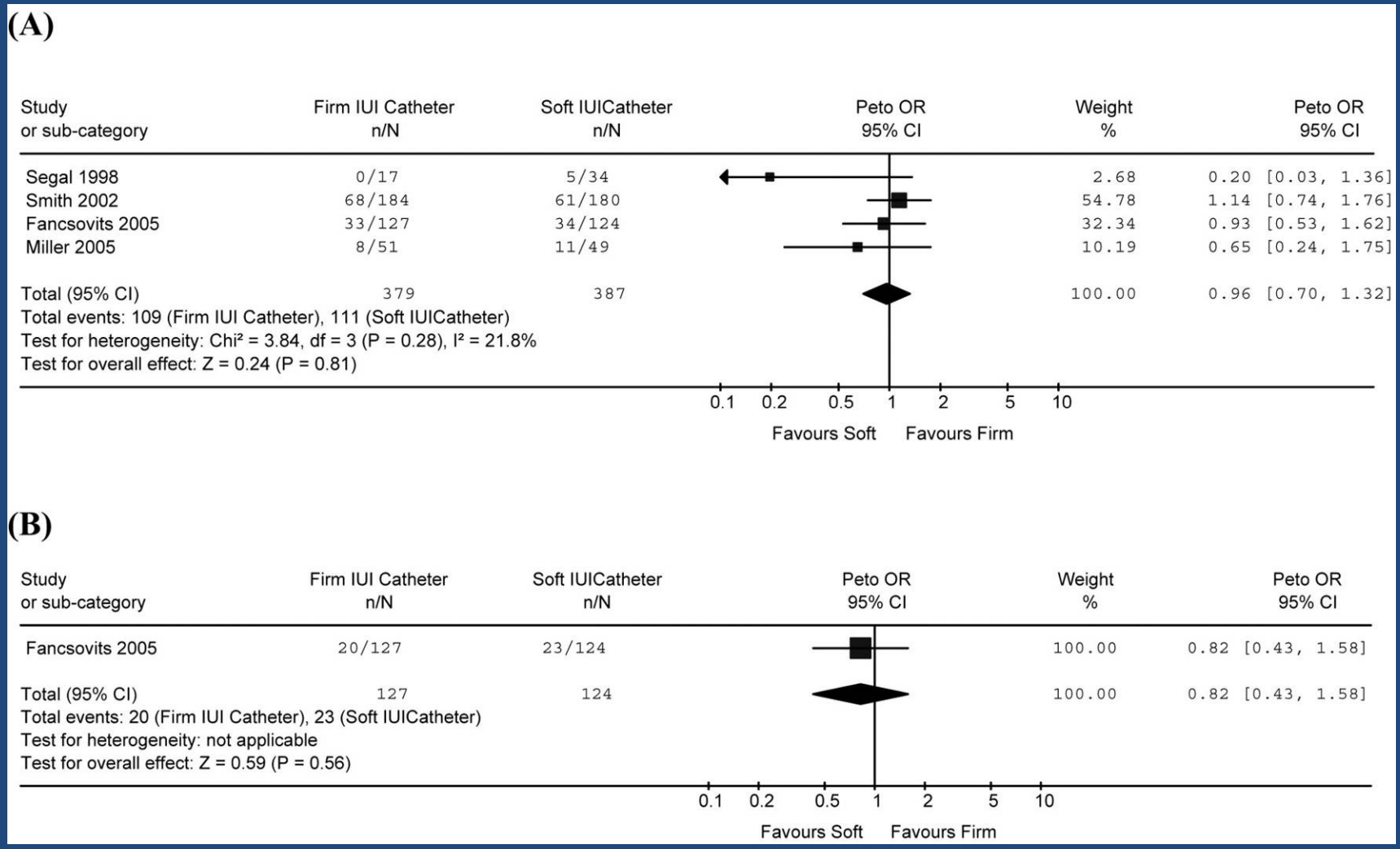
	Tomcat (n = 51)	Cook (n = 49)	*P*
Age[a]	31.4 ± 3.2	30.9 ± 3.7	.46
Number of prior IUI[a]	2.1 ± 0.9	2.4 ± 0.8	.20
Days of abstinence[a]	3.78 ± 2.0	4.25 ± 2.9	.38
Total motile sperm (× millions)[a]	113 ± 90	114 ± 104	.99
Difficulty rating[a]	1.3 ± 0.7	1.2 ± 0.4	.32
Cycle type[b]			.36
Natural	4	1	
Clomiphene citrate	23	26	
Minimal stimulation	24	22	
Diagnoses[b]			.90
Ovulatory dysfunction	40	41	
Endometriosis	9	6	
Male factor	1	1	
Uterine/tubal factor	1	1	
Pregnancy rate[b]	16%	22%	.45

[a] Values are means ± SD; Student's *t*-test.
[b] χ^2 analysis.

Miller. Flexible vs. rigid insemination catheters. Fertil Steril 2005.

Miller et al, Fertil Steril 83: 1544, 2005

Firm versus soft catheters for IUI



Abou-Setta et al, Hum Reprod 21: 1961, 2006

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Timing IUI (CCT)

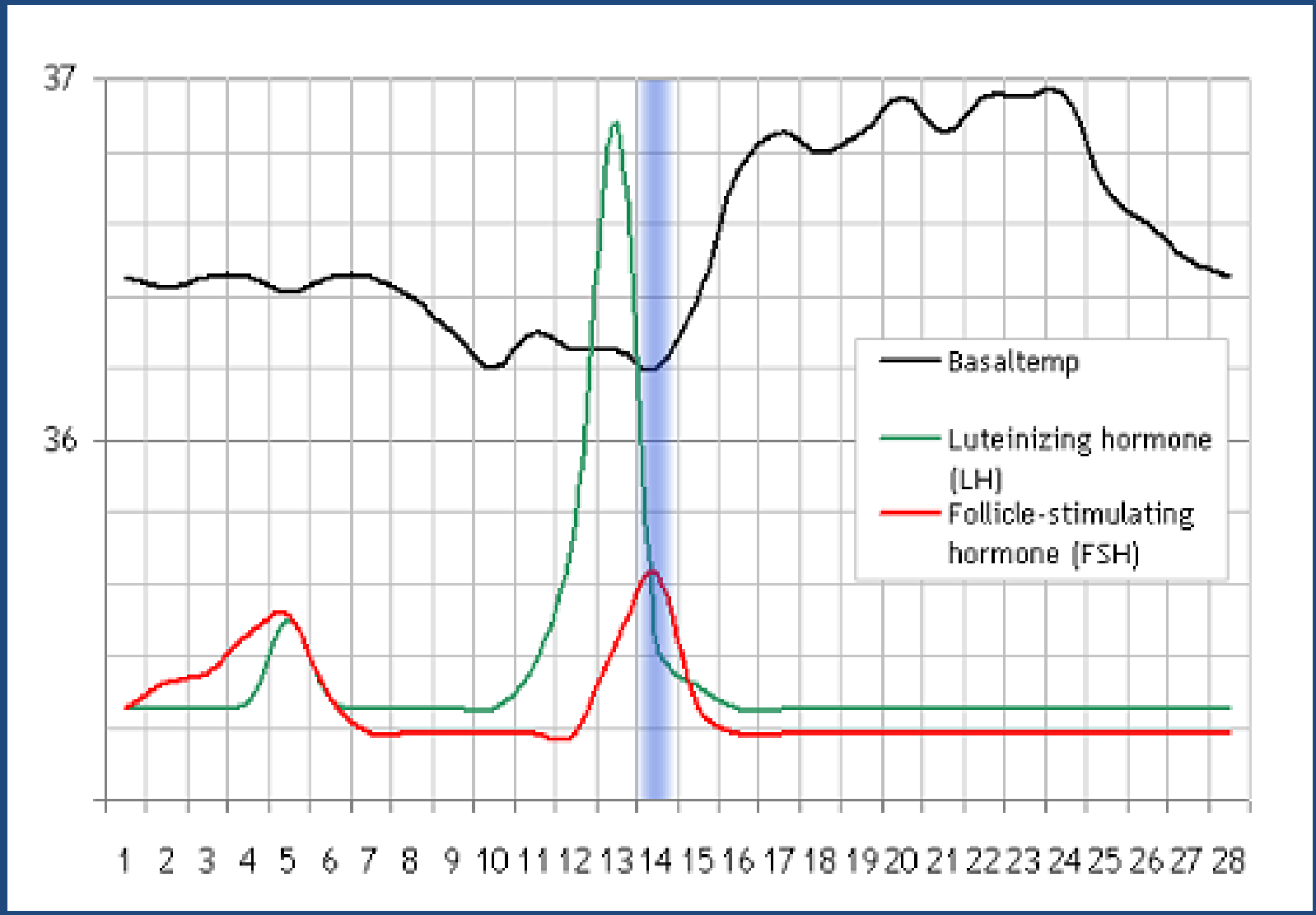
	Single 24 hours	Double 24 + 36 hours	Single 36 hours
N	150	150	150
Pregnancies	17	21	26
Pregnancy rate	11.3%	14.0%	17.2%

Tonguc et al, Fertil Steril. 2009 Sep 25. [Epub ahead of print

Probability of conception relative to BBT

	Day - 6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 0
Barrett et al, 1969		0.13	0.20	0.17	**0.30**	0.14	0.07
Schwartz et al, 1980	0.04	0.14	1.20	0.20	**0.34**	0.14	0.07
Royston, 1982	0.01	0.12	0.22	0.23	**0.35**	0.17	0.07

Schwartz D, J Gynecol Obstet Biol Reprod 9(6): 607, 1980;
Royston JP, Biometrics 38(2):397, 1982


37
36
Basaltemp
Luteinizing hormone (LH)
Follicle-stimulating hormone (FSH)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

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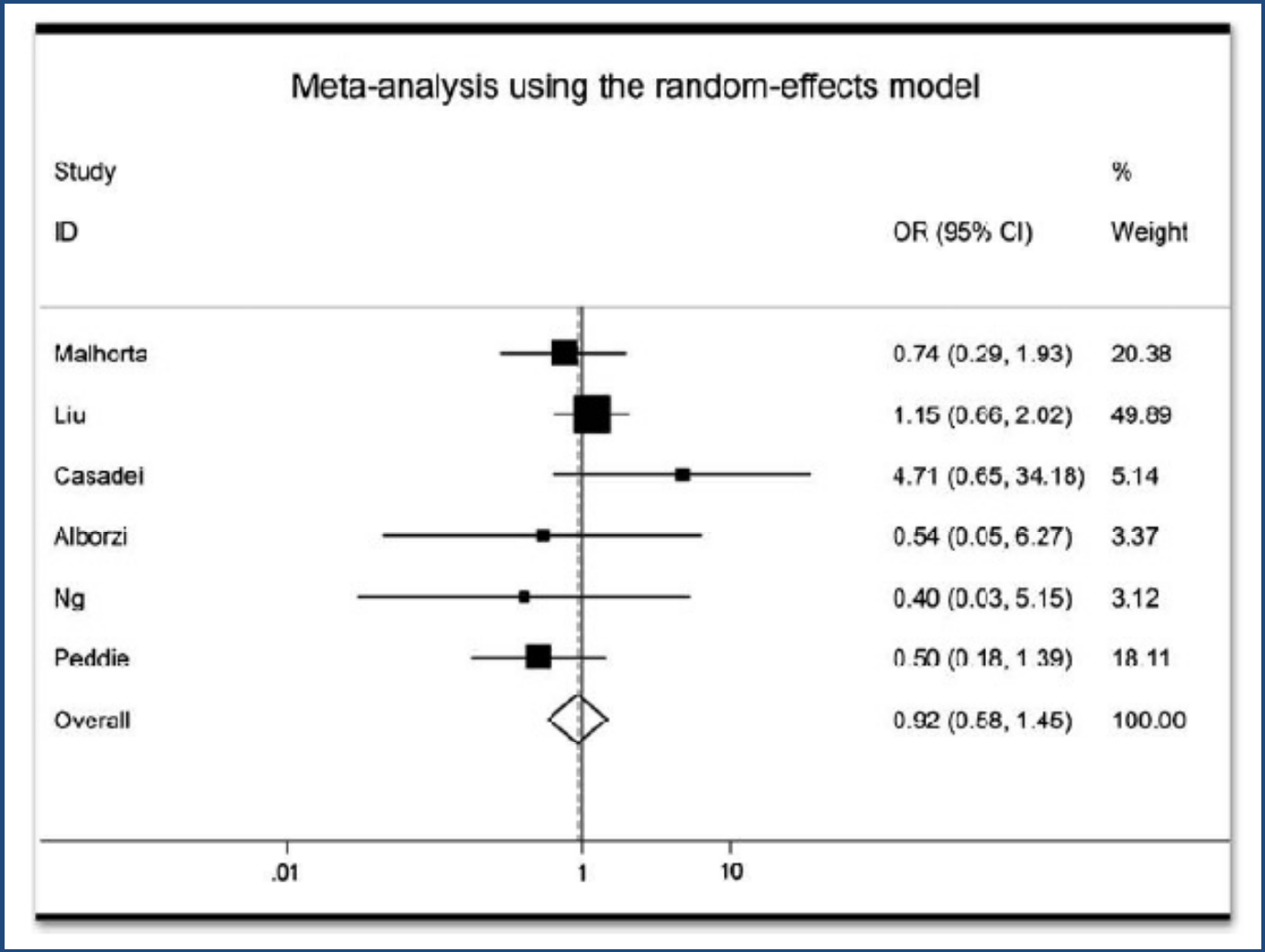
Single versus double insemination (Cochrane review)

OR = 1.45; 95% CI = 0.78-2.70

P=0.715

Cantineau et al, Human Reprod 18: 541, 2003

Single versus double insemination



Polyzos et al, Fertil Steril. 2009 Aug 7. [Epub ahead of print]

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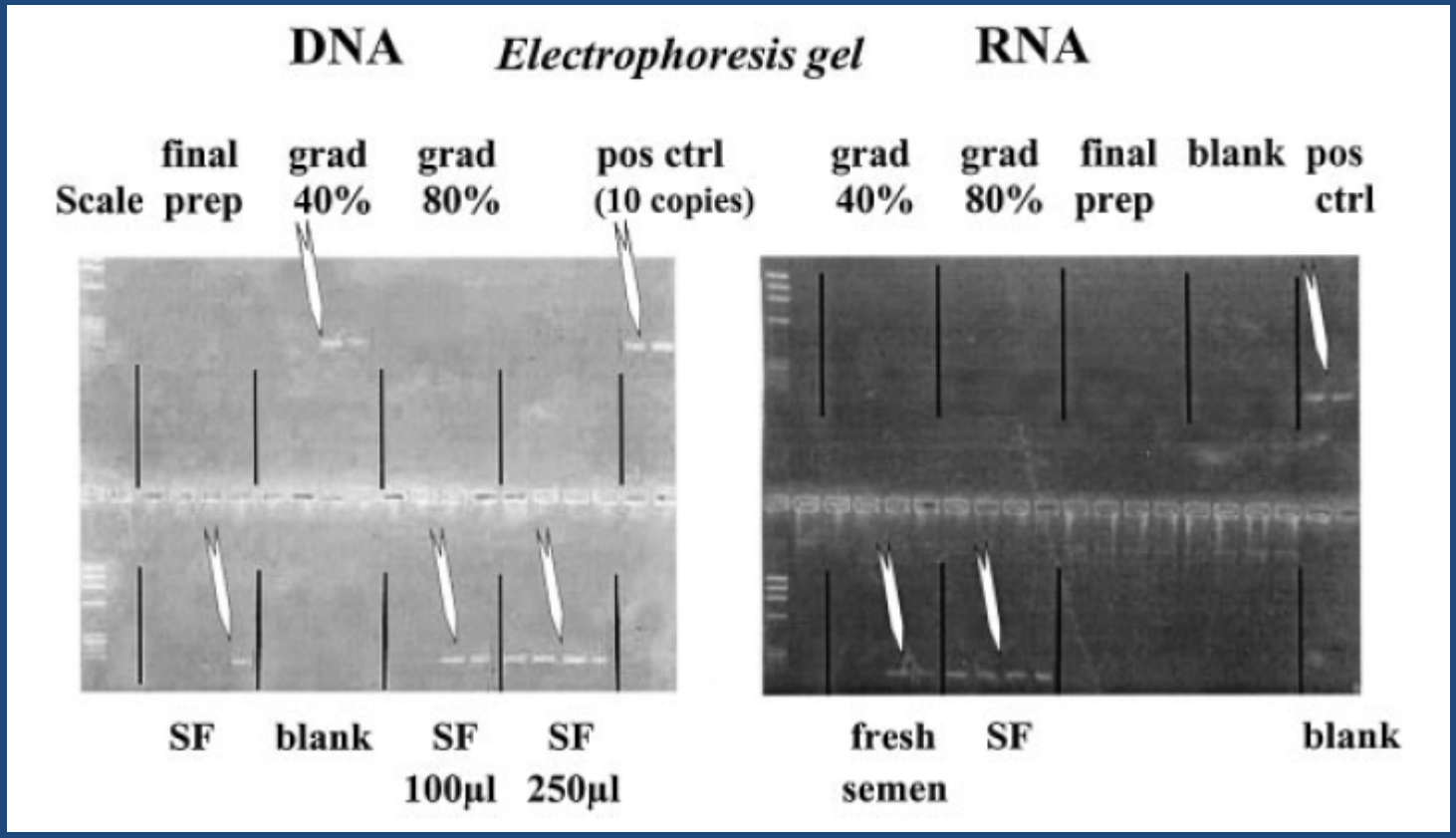
HIV PCR detection (RNA and DNA) before, during and after sperm preparation



Englert et al, HRU 10: 149, 2004

Sperm preparation for HIV +ve samples

Blood viral load	Primary testing	%	Final testing
$x < 50$	7/41	17	0/41
$50 < x < 1000$	7/20	35	0/20
$1000 < x < 10\ 000$	4/8	50	0/8
$x > 10\ 000$	15/16	94	6/16 (37)
Total	33/85	39	6/85 (7)

Englert et al, HRU 10: 149, 2004

IUI for HIV or HCV patients

- Systematic screening before IUI
- Treating chronically infected patients
- Separate "infected laboratory"
- Adapted procedures
- ? systematic use of ICSI
- HIV testing post preparation

Englert et al, HRU 10: 149, 2004

Conclusions

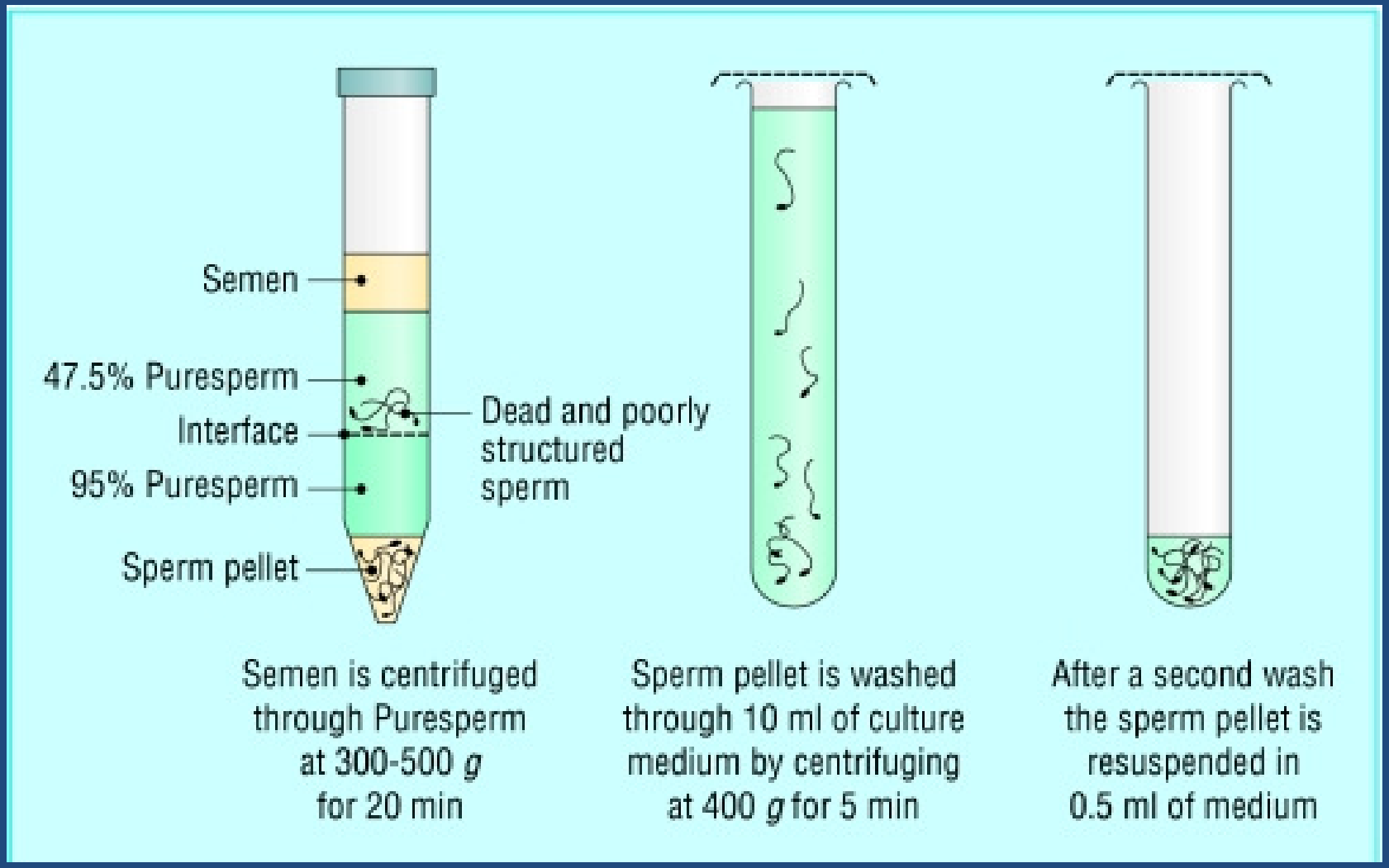
- IUI is an ideal first choice ART treatment in infertile women from developing countries who have at least one patent tube
- The technique is easy to learn, inexpensive and is associated with good couple compliance
- It requires mild ovarian stimulation, simple monitoring techniques and is associated with low risks of multiple pregnancies and OHSS
- It should reduce psychological burden on the infertile couple, a particularly important factor in developing countries

Keep it simple: Specific aspects of IUI in developing countries

Hassan N. Sallam,
MD, FRCOG (England), PhD (London)
Professor and Chair, Obstetrics and Gynaecology,
The University of Alexandria, and
Director of the Suzanne Mubarak Regional
Center for Women's Health and Development

ESHRE Campus symposium "Artificial Insemination: an update",
Genk, Belgium, 13-15 December 2009

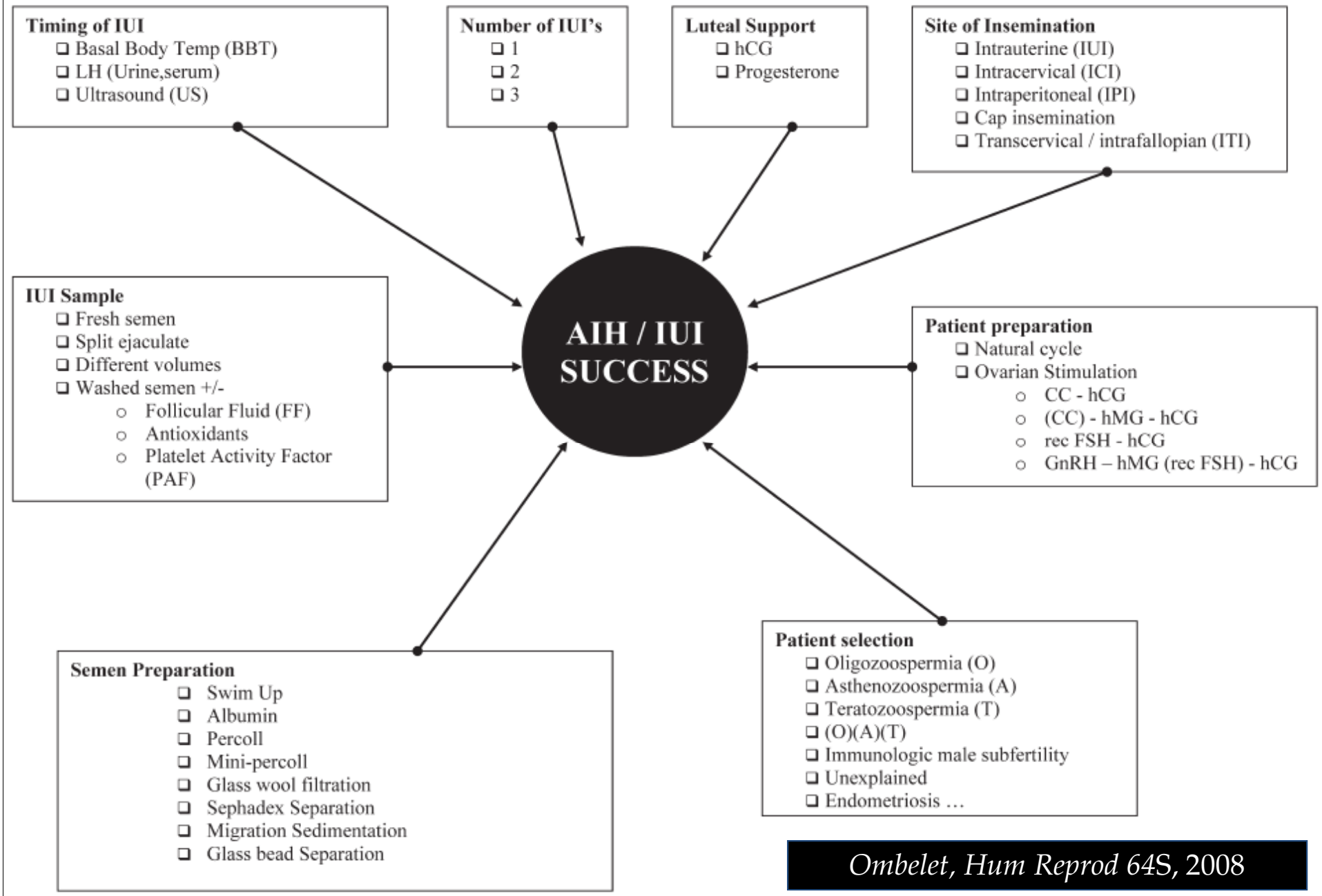
Percoll gradient



Prevalence of infertility in Africa

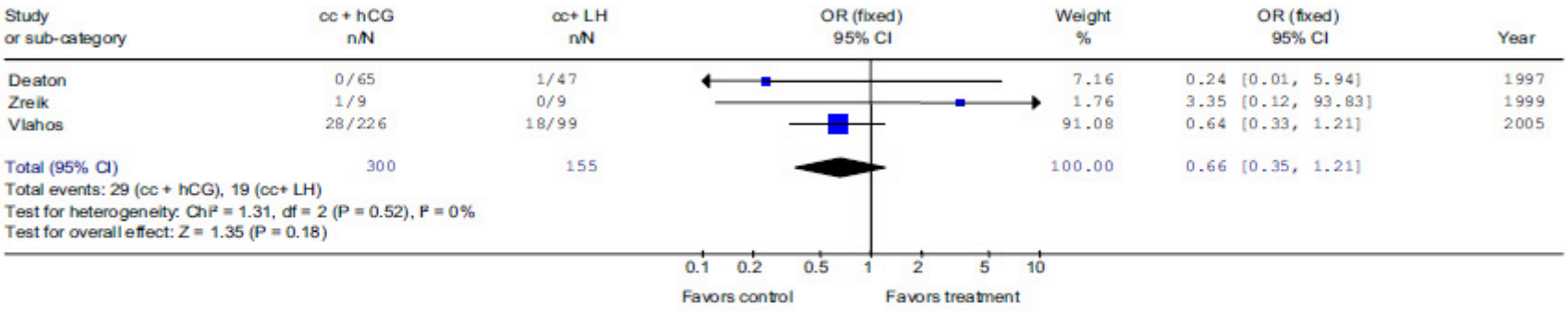
Average	14.9%
Range	12.7 % - 16.9 %
Southern Africa	16.7 % - 21.4 %
Eastern Africa	9.8 % - 12.2 %
Namibia	14 – 32 %

Ericksen, K. and Brunette, T. Patterns and predictors of infertility among African women: A cross-national survey of twenty-seven nations. Social Science and Medicine 42(2):209-220, 1996

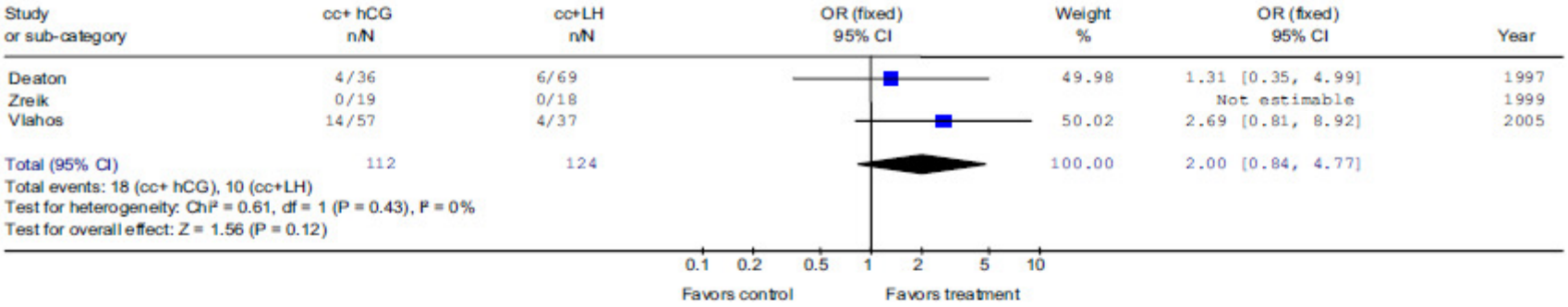


Ombelet, Hum Reprod 64S, 2008

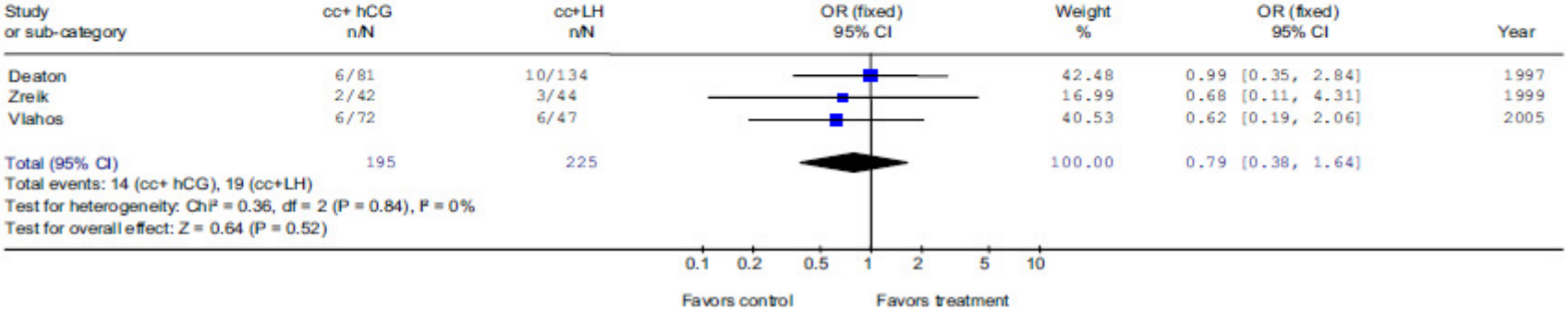
Review: Clomiphene plus hCG versus Clomiphene plus LH
Comparison: 02 CC + hCG VS CC+Lh male factor
Outcome: 01 male factor



Review: Clomiphene plus hCG versus Clomiphene plus LH
Comparison: 03 cc+hCG VS cc+LH ovulatory dysfunction
Outcome: 01 ovulatory dysfunction



Review: Clomiphene plus hCG versus Clomiphene plus LH
Comparison: 04 cc+ hCG VS CC+LH unexplained infertility
Outcome: 01 unexplained infertility



Timing IUI

32-34 hours versus 38-40 hours after HCG

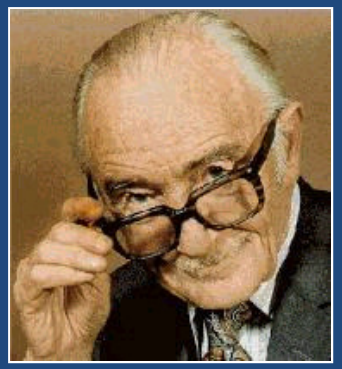
OR = 1.28 (95% CI = 0.70-3.15)

Cantineau et al, Cochrane database, submitted


COUNTING CHAMBER
MAKLER
SEFI MEDICAL INSTRUMENTS

Aristotle the first teacher

Alexander
the Great



Archibald
Cochrane

Logic = common sense = evidence-based science