

Table 1 Baseline characteristics of all FET cycles

Characteristic	Underweight (<18.5 kg/m ² N=1315)	Normal weight (18.5 - 24.9 kg/m ² N=6230)	Overweight (≥ 25 kg/m ² N=1210)	Underweight vs. normal weight	Overweight vs. normal weight	Overweight vs. underweight
Age of embryo transfer(years) ,mean (SD),	33.63±3.51	33.84±3.79	33.69±3.65	0.065	0.205	0.674
Duration of infertility(years),mean (SD),	3.57±1.28	3.62±1.35	3.69±1.62	0.472	0.352	0.219
BMI of women,mean (SD),	17.53±3.07	21.61±1.73	26.37±1.88	<0.001	<0.001	<0.001
Antral follicle count (n),mean (SD),	12.41±5.64	12.72±5.68	12.67±6.07	0.072	0.782	0.265
Infertility causes, n (%)				0.291	0.988	0.494
Tubal infertility	790(60.09%)	3917(62.87%)	762(62.98%)			
Male factor infertility	83(6.32%)	373(5.98%)	75(6.18%)			
Unexplained infertility	70(5.31%)	318(5.11%)	60(4.98%)			
Combined*	372(28.28%)	1622(26.04%)	313(25.86%)			
Basal FSH (mIU/mL),median (min-max)	5.77(0.18-9.99)	5.55(0.63-9.97)	5.43(0.43-9.99)	<0.001	0.008	<0.001
Basal LH (mIU/mL),median (min-max)	5.02(0.13-17.96)	4.63(0.15-18.32)	3.74(0.42-16.22)	<0.001	<0.001	<0.001
Basal E2 (pg/mL),median (min-max)	35.00(10.00-86.00)	33.00(10.00-88.00)	32.00(10.00-92.00)	0.017	0.154	0.009
Basal P (ng/mL),median (min-max)	0.30(0.10-0.90)	0.30(0.10-0.80)	0.30(0.10-0.90)	0.991	0.126	0.326
Type of infertility, n (%)				0.083	0.295	0.069
Primary	840(63.89%)	4107(65.93%)	808(66.79%)			
Secondary	475(36.11%)	2123(34.07%)	402(33.21%)			
Type of FET cycle, n (%)				0.031	<0.001	<0.001
HRT	325(24.71%)	1373(22.04%)	313(25.87%)			
Natural cycle	290(22.05%)	1303(20.91%)	169(13.97%)			
Ovarian stimulation	700(53.24%)	3554(57.05%)	728(60.16%)			
Endometrial thickness on transfer day,mean (SD)	10.31±3.32	10.47±2.92	10.44±2.24	0.078	0.686	0.253
Fertilization method, n (%)				0.088	0.245	0.112
IVF	838(63.73%)	3860(61.96%)	743(61.41%)			

ICSI	326(24.79%)	1720(27.61%)	356(29.42%)
Half IVF+half ICSI	151(11.48%)	650(10.43%)	111(9.17%)

Combined* was defined as two or more infertile causes mentioned above

Table 2 Reproductive outcomes following transferring blastocyst stage embryo

Characteristics

	Underweight ($<18.5 \text{ kg/m}^2$ N=1315)	Normal weight ($18.5\text{-}24.9 \text{ kg/m}^2$ N=6230)	Overweight ($\geq 25 \text{ kg/m}^2$ N=1210)	Underweight vs. normal weight	Overweight vs. normal weight	Overweight vs. underweight
Number of FET	1315	6230	1210			
Number of viable embryos after thawed	2390	11440	2193			
Embryo quality				0.296	0.171	0.402
High-quality embryos	2321(97.11%)	11135(97.33%)	2126(96.95%)			
Low-quality embryos	69(2.89%)	305(2.67%)	67(3.05%)			
Clinical pregnancy rate per transfer,%(n)	48.14%(633/1315)	53.85%(3355/6230)	51.32%(621/1210)	0.018	0.193	0.186
Implantation rate,%(n)	33.56%(802/2390)	37.26%(4263/11440)	35.48%(778/2193)	0.019	0.145	0.178
Miscarriage rate,%(n)	12.64%(80/633)	10.73%(360/3355)	13.37%(83/621)	0.119	<0.001	0.401
Multiple pregnancy rate,%(n)	26.69%(169/633)	27.06%(908/3355)	25.28%(157/621)	0.464	0.257	0.354
Ectopic pregnancy rate,%(n)	2.59%(17/654)	2.41%(81/3364)	2.04%(13/637)	0.431	0.352	0.321
Intrauterine and ectopic pregnancy rate,%(n)	0.61%(4/654)	0.83%(28/3364)	0.47%(3/637)	0.387	0.251	0.515
Ongoing pregnancy rate,%(n)	43.04%(566/1315)	50.47%(3144/6230)	46.45%(562/1210)	0.002	0.071	0.152
Live birth rate,%(n)	42.05%(553/1315)	45.97%(2864/6230)	43.64%(528/1210)	0.057	0.187	0.319

Table 3 Perinatal outcome stratified by BMI

Birth characteristic	Singleton births
----------------------	------------------

	Underweight ($<18.5 \text{ kg/m}^2$ N=399)	Normal weight ($18.5\text{-}24.9 \text{ kg/m}^2$ N=2062)	Overweight ($\geq 25 \text{ kg/m}^2$ N=394)	Underweight vs. normal weight	Overweight vs. normal weight	Overweight vs. underweight
Birth weight(g),%(n)						
<1500 g	0.75%(3/399)	0.58%(12/2062)	2.03%(8/394)	0.451	0.009	0.112
1500-2499 g	3.51%(14/399)	3.44%(71/2062)	4.82%(19/394)	0.522	0.129	0.239
$\geq 2500 \text{ g}$	95.74%(382/399)	95.98%(1979/2062)	93.15%(367/394)	0.503	0.368	0.414
Gestation weeks at delivery (weeks),%(n)						
<32	0.75%(3/399)	0.82%(17/2062)	2.03%(8/394)	0.589	0.038	0.112
32-36	5.01%(20/399)	5.53%(114/2062)	7.36%(29/394)	0.401	0.113	0.126
≥ 37	94.24%(376/399)	93.65%(1931/2062)	90.61%(357/394)	0.484	0.354	0.371
Child's sex, %(n)						
Male	54.64%(218/399)	54.51%(1124/2062)	46.45%(183/394)	0.507	0.053	0.104
Female	45.36%(181/399)	45.49%(938/2062)	53.55%(211/394)	0.511	0.085	0.101
Mode of delivery, %(n)						
Vaginal	39.09%(156/399)	34.58%(713/2062)	23.35%(92/394)	0.131	0.001	<0.001
Cesarean section	60.91%(243/399)	65.42%(1349/2062)	76.65%(302/394)	0.223	0.033	0.022

Table 4 Incidence of birth defects in live-born infants and type of malformations according to the classification from code Q00-Q99 in the international classification of Disease,tenth editon

Characteristics

	Underweight ($<18.5 \text{ kg/m}^2$ N=707)	Normal weight ($18.5\text{-}24.9 \text{ kg/m}^2$ N=3663)	Overweight ($\geq 25 \text{ kg/m}^2$ N=662)	Underweight vs. normal weight	Overweight vs. normal weight	Overweight vs. underweight
Number of birth defects, %(n)	20(2.83%)	66(1.81%)	12(1.81%)	0.058	0.541	0.151
Singletons	12/399(3.01%)	43/2061(2.09%)	9/394(2.28%)	0.175	0.462	0.347
Multiples	8/308(2.59%)	23/1602(1.44%)	3/268(1.12%)	0.117	0.478	0.168
Birth defects, by sex,%(n)						
Male	13/378(3.44%)	43/1956(2.19%)	8/358(2.23%)	0.114	0.544	0.233
Female	7/329(2.13%)	23/1707(1.35%)	4/304(1.32%)	0.203	0.612	0.324
Detailed birth defects,%(n)						
Q00-Q07 nervous system	0	2(0.05%)	0	0.411	0.393	/
Q10-Q18 eye, ear, face, and neck	2(0.28%)	3(0.08%)	0	0.187	0.486	0.525
Q20-Q28 circulatory system	11(1.56%)	36(0.98%)	7(1.06%)	0.129	0.495	0.289
Q30-Q34 respiratory system	0	2(0.05%)	1(0.15%)	0.411	0.393	0.734
Q35-Q37 cleft lip and cleft palate	0	4(0.11%)	0	0.587	0.393	/
Q38-Q45 digestive system	0	2(0.05%)	0	0.411	0.393	/
Q50-Q56 genital organs	2(0.10%)	2(0.05%)	1(0.15%)	0.126	0.393	0.525
Q60-Q64 urinary system	2(0.10%)	5(0.14%)	1(0.15%)	0.317	0.631	0.525
Q65-Q79 musculoskeletal system	1(0.14%)	1(0.03%)	2(0.31%)	0.298	0.063	0.476
Q80-Q89 other malformations	1(0.14%)	8(0.25%)	0	0.559	0.589	0.734
Q90-Q99 chromosomal abnormalities	1(0.14%)	1(0.03%)	0	0.298	0.283	0.734

Table 5 Adjusted ORs of pregnancy and neonatal outcomes

	underweight vs. normal weight Adjusted Odds Ratio(95% CI)	overweight vs. normal weight Adjusted Odds Ratio(95% CI)
Clinical pregnancy rate	0.78 (0.64–0.94)	0.68 (0.18–2.86)

Miscarriage rate	1.21 (0.91–1.64)	1.65 (1.17–2.34)
Ongoing pregnancy rate	0.81 (0.67–0.95)	1.41 (0.59–3.31)
Live-birth rate	0.65 (0.21–2.26)	0.93 (0.79–1.09)
PTD	0.94 (0.79–1.11)	1.07 (0.94–1.22)
Very PTD	1.08 (0.95–1.23)	1.55 (1.11–2.21)
LBW	1.17 (0.88–1.55)	1.13(0.94–1.34)
Very LBW	1.07(0.91–1.29)	1.48 (1.41–1.54)

PTD(preterm delivery:<37 weeks of gestation), very PTD(very preterm delivery:<32 weeks of gestation), LBW(low birth weight: birth weight < 2,500 g);VLBW(very low birth weight: birth weight < 1,500 g). Analyses were adjusted for maternal age, infertility duration, endometrial thickness, embryo quality, number of embryos transferred, and embryo developmental stage.