

**Table 1.** Baseline characteristics

Education level	Elementary school graduate or less (n=1590)	Middle school graduate (n=10996)	High school graduate (n=8354)	College graduate or higher (n=20606)	P-value
Female age	32.71 ± 5.63	29.84 ± 4.80	29.83 ± 4.59	31.34 ± 3.96	<0.001
Infertility duration	5.92 ± 4.52	4.10 ± 2.97	3.62 ± 2.52	3.11 ± 2.09	<0.001
BMI	23.53 ± 3.43	22.90 ± 3.47	22.57 ± 3.40	22.14 ± 3.12	<0.001
EM thickness	11.53 ± 3.44	11.31 ± 2.16	11.23 ± 2.67	11.25 ± 2.21	<0.001
No. of oocyte retrieved	11.18 ± 6.38	12.08 ± 6.45	11.85 ± 6.28	11.57 ± 6.27	<0.001
Infertility type					<0.001
Primary infertility	665 (42.06%)	5456 (49.97%)	4380 (52.65%)	12216 (59.65%)	
Secondary infertility	916 (57.94%)	5462 (50.03%)	3939 (47.35%)	8264 (40.35%)	
Protocol in the fresh cycle					<0.001
Agonist	1245 (78.30%)	9052 (82.32%)	6832 (81.78%)	16621 (80.66%)	
Antagonist	278 (17.48%)	1641 (14.92%)	1274 (15.25%)	3257 (15.81%)	
Other	67 (4.21%)	303 (2.76%)	248 (2.97%)	728 (3.53%)	
Fertilization type					<0.001
IVF	1219 (76.71%)	8390 (76.38%)	6335 (75.92%)	15591 (75.75%)	
ICSI	327 (20.58%)	2318 (21.10%)	1840 (22.05%)	4620 (22.45%)	
Half-ICSI	43 (2.71%)	276 (2.51%)	169 (2.03%)	372 (1.81%)	
Time of transfer					<0.001
Fresh embryo transfer	781 (49.12%)	4996 (45.43%)	3963 (47.44%)	9868 (47.89%)	
FET	809 (50.88%)	6000 (54.57%)	4391 (52.56%)	10738 (52.11%)	
No. of embryo transferred					0.206
1	656 (41.28%)	4731 (43.04%)	3632 (43.49%)	9012 (43.76%)	
2	926 (58.28%)	6227 (56.66%)	4687 (56.12%)	11528 (55.97%)	
3	7 (0.44%)	33 (0.30%)	33 (0.40%)	55 (0.27%)	
Live birth	739 (46.48%)	5781 (52.57%)	4473 (53.54%)	10923 (53.01%)	<0.001
Birth weight (kg)	3.11 ± 0.59	3.13 ± 0.61	3.14 ± 0.62	3.82 ± 42.80	0.500
Miscarriage	112 (13.41%)	935 (16.93%)	683 (15.74%)	1701 (15.73%)	0.037
Preterm birth	144 (9.06%)	1063 (9.67%)	858 (10.27%)	2105 (10.22%)	0.204
Clinical pregnancy	883 (55.53%)	6959 (63.29%)	5339 (63.91%)	12995 (63.07%)	<0.001
Mode of delivery					<0.001
Vaginal	159 (21.46%)	1379 (23.84%)	1108 (24.75%)	3046 (27.87%)	
Cesarean section	582 (78.54%)	4405 (76.16%)	3368 (75.25%)	7884 (72.13%)	
Fetal gender					0.342
Female	348 (46.96%)	2604 (45.01%)	2033 (45.41%)	5063 (46.33%)	
Male	393 (53.04%)	3181 (54.99%)	2444 (54.59%)	5866 (53.67%)	

BMI, body mass index; IVF, in vitro fertilization; ICSI, intracytoplasmic sperm injection; FET, frozen embryo transfer, EM endometrium.

**Table 2** Univariate analysis for live birth rate

Covariate	Statistics	OR (95%CI)	P-value
Female age	30.69 ± 4.47	0.92 (0.92, 0.92)	<0.001
Infertility duration	3.58 ± 2.64	0.96 (0.95, 0.97)	<0.001
BMI	22.48 ± 3.31	0.98 (0.98, 0.99)	<0.001
EM thickness	11.27 ± 2.35	1.04 (1.03, 1.05)	<0.001
No. of oocyte retrieved	11.75 ± 6.33	1.04 (1.04, 1.04)	<0.001
Infertility type			
Primary infertility	22717 (55.01%)	Reference	
Secondary infertility	18581 (44.99%)	0.78 (0.75, 0.81)	<0.001
Protocol in the fresh cycle			
Agonist	33750 (81.24%)	Reference	
Antagonist	6450 (15.52%)	0.55 (0.52, 0.58)	<0.001
Other	1346 (3.24%)	0.38 (0.34, 0.43)	<0.001
Fertilization type			
IVF	31535 (75.99%)	Reference	
ICSI	9105 (21.94%)	1.04 (0.99, 1.09)	0.106
Half-ICSI	860 (2.07%)	1.03 (0.90, 1.18)	0.682
Time of transfer			
Fresh embryo transfer	19608 (47.20%)	Reference	
FET	21938 (52.80%)	0.92 (0.89, 0.96)	<0.001
No. of embryo transferred			
1	18031 (43.42%)	Reference	
2	23368 (56.27%)	1.31 (1.26, 1.36)	<0.001
3	128 (0.31%)	0.71 (0.50, 1.01)	0.060

OR, odds ratio; CI, confidence interval; BMI, body mass index; IVF, in vitro fertilization; ICSI, intracytoplasmic sperm injection; FET, frozen embryo transfer; EM, endometrium.

**Table 3** Relationship between education level and live birth in different models

Education level	Crude Model <sup>a</sup>		Adjusted Model <sup>b</sup>	
	OR (95%CI)	P-value	OR (95%CI)	P-value
Elementary school graduate or less	Reference		Reference	
Middle school graduate	1.28 (1.15, 1.42)	<0.001	0.96 (0.84, 1.09)	0.539
High school graduate	1.33 (1.19, 1.48)	<0.001	1.01 (0.87, 1.14)	0.987
College graduate or higher	1.30 (1.17, 1.44)	<0.001	1.01 (0.88, 1.14)	0.947

OR, odds ratio; CI, confidence interval.

<sup>a</sup> We did not adjust other covariates.

<sup>b</sup> Adjusted for female age, infertility duration, BMI, EM thickness, no. of oocyte retrieved, infertility type, protocol in the fresh cycle (agonist, antagonist, other), fertilization type, time of transfer and no. of embryo transferred.

**Table S1.** Effect size of education level on live birth rate in prespecified and exploratory subgroups in each subgroup

Characteristic	No. of participants	OR (95%CI) <sup>a</sup>	P-value	P for interaction
Female age (y)				
Tertile 1 (<28)				0.258
Elementary school graduate or less	314	Reference		
Middle school graduate	3920	0.96 (0.76, 1.22)	0.751	
High school graduate	2889	1.03 (0.81, 1.31)	0.794	
College graduate or higher	2883	1.04 (0.90, 1.25)	0.267	
Tertile 2 (28-31)				
Elementary school graduate or less	420	Reference		
Middle school graduate	3656	0.93 (0.87, 1.25)	0.102	
High school graduate	3047	0.97 (0.92, 1.25)	0.123	
College graduate or higher	9210	1.06 (0.95, 1.33)	0.221	
Tertile 3 (>31)				
Elementary school graduate or less	856	Reference		
Middle school graduate	3420	1.02 (0.90, 1.36)	0.148	
High school graduate	2418	0.89 (0.93, 1.18)	0.288	
College graduate or higher	8513	0.97 (0.80, 1.27)	0.827	
Infertility duration (y)				0.292
Tertile 1 (<2)				
Elementary school graduate or less	227	Reference		
Middle school graduate	1849	1.12 (0.93, 1.31)	0.151	
High school graduate	1517	1.12 (0.92, 1.31)	0.171	
College graduate or higher	4574	1.11 (0.93, 1.38)	0.156	
Tertile 2 (2-3.5)				
Elementary school graduate or less	330	Reference		

Middle school graduate	3760	1.07 (0.86, 1.34)	0.549	
High school graduate	3330	1.12 (0.90, 1.41)	0.314	
College graduate or higher	9248	1.11 (0.89, 1.38)	0.373	
Tertile 3 (>3.5)				
Elementary school graduate or less	1018	Reference		
Middle school graduate	5287	1.03 (0.96, 1.42)	0.473	
High school graduate	3453	1.08 (0.90, 1.39)	0.386	
College graduate or higher	6621	1.08 (0.92, 1.26)	0.329	
EM thickness				0.183
Tertile 1 (<10.1)				
Elementary school graduate or less	343	Reference		
Middle school graduate	2684	1.06 (0.98, 1.41)	0.308	
High school graduate	2197	1.09 (0.91, 1.35)	0.205	
College graduate or higher	5439	1.09 (0.94, 1.41)	0.123	
Tertile 2 (10.1-11.9)				
Elementary school graduate or less	342	Reference		
Middle school graduate	2420	1.15 (0.92, 1.45)	0.215	
High school graduate	1972	1.01 (0.84, 1.35)	0.521	
College graduate or higher	4803	1.04 (0.94, 1.31)	0.621	
Tertile 3 (>11.9)				
Elementary school graduate or less	491	Reference		
Middle school graduate	3207	1.01 (0.83, 1.27)	0.068	
High school graduate	2403	1.03 (0.91, 1.41)	0.104	
College graduate or higher	6140	1.02 (0.86, 1.29)	0.093	
No. of oocyte retrieved				0.329
Tertile 1 (<8)				
Elementary school graduate or less	485	Reference		
Middle school graduate	2770	1.04 (0.65, 1.19)	0.483	
High school graduate	2176	1.03 (0.84, 1.29)	0.399	
College graduate or higher	5773	1.04 (0.89, 1.48)	0.843	
Tertile 2 (8-13)				
Elementary school graduate or less	627	Reference		
Middle school graduate	4213	1.08 (0.91, 1.28)	0.376	
High school graduate	3253	1.02 (0.95, 1.23)	0.178	
College graduate or higher	7853	1.05 (0.97, 1.25)	0.198	
Tertile 3 (>13)				
Elementary school graduate or less	469	Reference		
Middle school graduate	3955	1.11 (0.91, 1.36)	0.162	
High school graduate	2887	1.12 (0.99, 1.48)	0.150	
College graduate or higher	6877	1.15 (0.98, 1.33)	0.095	
Infertility type				0.843
Primary infertility				
Elementary school graduate or less	665	Reference		
Middle school graduate	5456	1.11 (0.97, 1.34)	0.107	

High school graduate	4380	1.03 (0.74, 1.12)	0.227	
College graduate or higher	12216	1.10 (0.92, 1.20)	0.524	
Secondary infertility				
Elementary school graduate or less	916	Reference		
Middle school graduate	5462	1.06 (0.74, 1.27)	0.648	
High school graduate	3939	1.09 (0.69, 1.30)	0.932	
College graduate or higher	8264	1.06 (0.85, 1.15)	0.401	
Protocol in the fresh cycle				0.482
Agonist				
Elementary school graduate or less	1245	Reference		
Middle school graduate	9052	1.03 (0.76, 1.38)	0.754	
High school graduate	6832	1.06 (0.86, 1.22)	0.639	
College graduate or higher	16621	1.07 (0.78, 1.43)	0.741	
Antagonist				
Elementary school graduate or less	278	Reference		
Middle school graduate	1641	1.04 (0.92, 1.39)	0.308	
High school graduate	1274	1.02 (0.83, 1.13)	0.411	
College graduate or higher	3257	1.07 (0.96, 1.58)	0.118	
Other				
Elementary school graduate or less	67	Reference		
Middle school graduate	303	0.94 (0.67, 1.39)	0.552	
High school graduate	248	1.01 (0.56, 1.80)	0.987	
College graduate or higher	728	1.09 (0.79, 1.63)	0.530	
Fertilization type				0.193
IVF				
Elementary school graduate or less	1219	Reference		
Middle school graduate	8390	1.01 (0.97, 1.37)	0.092	
High school graduate	6335	1.01 (0.96, 1.49)	0.101	
College graduate or higher	15591	1.05 (0.81, 1.20)	0.461	
ICSI				
Elementary school graduate or less	327	Reference		
Middle school graduate	2318	1.08 (0.73, 1.12)	0.631	
High school graduate	1840	1.04 (0.85, 1.41)	0.471	
College graduate or higher	4620	1.07 (0.74, 1.27)	0.413	
half-ICSI				
Elementary school graduate or less	43	Reference		
Middle school graduate	276	0.99 (0.66, 1.32)	0.262	
High school graduate	169	0.96 (0.74, 1.30)	0.234	
College graduate or higher	372	1.01 (0.53, 1.91)	0.981	
Time of transfer				0.297
Fresh embryo transfer				
Elementary school graduate or less	781	Reference		
Middle school graduate	4996	1.07 (0.86, 1.22)	0.841	

High school graduate	3963	1.07 (0.90, 1.32)	0.462
College graduate or higher	9868	1.08 (0.83, 1.20)	0.145
Frozen embryo transfer			
Elementary school graduate or less	809	Reference	
Middle school graduate	6000	1.06 (0.98, 1.35)	0.873
High school graduate	4391	1.09 (0.71, 1.30)	0.601
College graduate or higher	10738	1.03 (0.96, 1.42)	0.865
No. of embryo transferred			0.642
1			
Elementary school graduate or less	656	Reference	
Middle school graduate	4731	1.09 (0.89, 1.42)	0.833
High school graduate	3632	1.05 (0.94, 1.30)	0.491
College graduate or higher	9012	1.09 (0.90, 1.31)	0.742
2			
Elementary school graduate or less	926	Reference	
Middle school graduate	6227	1.08 (0.91, 1.27)	0.431
High school graduate	4687	1.03 (0.86, 1.23)	0.482
College graduate or higher	11528	1.02 (0.96, 1.31)	0.311
3			
Elementary school graduate or less	7	Reference	
Middle school graduate	33	1.06(0.85,1.39)	0.281
High school graduate	33	1.09 (0.78, 1.58)	0.928
College graduate or higher	55	1.02(0.92,1.19)	0.506

OR, odds ratio; CI, confidence interval; BMI, body mass index; IVF, in vitro fertilization; ICSI, intracytoplasmic sperm injection; EM, endometrium.

<sup>a</sup> Adjusted for the subgroup variable.