

Preplanned Studies

Fertility Intentions Among Reproductive-Age Women — Three Provinces, China, 2023

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Summary

What is already known about this topic?

Low fertility rates have become the most important risk affecting the balanced development of the population in China.

What is added by this report?

About 80.0% of childless women had fertility intentions, 31.9% of women with one child and 11.3% of women with two children intended to have a second and third child, respectively. Women with one child who had an agricultural *Hukou*^{*}, were younger than 30 years old, were remarried, and had received a deduction or reimbursement for childbirth expenses during their first delivery were more willing to have a second child. Women with two children who had an agricultural *Hukou* and a upper-middle personal income, were self-employed, and had two daughters were more willing to have a third child.

What are the implications for public health practice?

In China, women's willingness to have more children is not optimistic. To increase their desire for more children, creating a more favorable fertility environment for reproductive-age women and providing more preferential fertility policies for pregnant women will be necessary.

The global decline in fertility rates is a pressing concern. The United Nations reports that the global fertility rate fell from 3.2 to 2.5 live births per woman between 1990 and 2019, with projections reaching 1.9 by 2100. Similarly, China's 2020 census revealed a total fertility rate of 1.3, signifying a very low fertility society. Despite policy adjustments since 2013, China's fertility rate continues to dwindle, with 1.38 million fewer newborns in 2021 compared to 2020 (1). In response, 17 government departments, including the

National Health Commission and the National Development and Reform Commission, introduced 20 fertility support measures in July 2022, encompassing taxation, insurance, education, housing, and employment (2). While fertility desire is a strong predictor of actual fertility behavior, research on fertility intentions across Chinese provinces since the implementation of these 20 measures remains limited. Therefore, this study investigates whether these supportive measures have effectively stimulated fertility intentions among childbearing-age women. A cross-sectional survey of 8,002 women aged 20–49 was conducted in Shandong, Hunan, and Yunnan provinces between August and September 2023. Preliminary findings indicate higher childbearing intentions among childless women. However, the intention for a second or third child remains notably low among one-child and two-child women, respectively. The decision to have children correlates with factors such as age, education, occupation, *Hukou*, marital status, income, children's gender, and childbirth expense reimbursements. Creating a more supportive fertility environment and providing preferential policies for pregnant women are crucial steps towards addressing this issue.

This cross-sectional survey was conducted in August and September 2023 in Shandong, Hunan, and Yunnan provinces. Within each province, the provincial capital (urban area) and one county under its jurisdiction (rural area) were selected as investigation sites. A multi-stage stratified random cluster sampling method was used to select women aged 20–49 years at each site. First, one street (urban) or town (rural) was randomly selected. Second, two neighborhoods (urban) or villages (rural) were randomly selected, stratified by distance from the administrative office to ensure representation of areas closer and farther away. Finally, within each selected

^{*}*Hukou* is a record in the system of household registration required by law in China. It officially identifies a person as a resident of an area and includes identifying information such as name, parents, spouse, and date of birth. There are two kinds of *Hukou* in China, namely agricultural *Hukou* and non-agricultural *Hukou*.

neighborhood or village, all eligible women aged 20–49 years were recruited until the target sample size was reached. Data were collected through face-to-face interviews. Ethical approval was obtained from the Ethical Review Committee of the National Center for Women and Children's Health, China CDC (No. FY2023-8), and all participants provided informed consent. Chi-square tests were used to compare differences between groups. A multiple logistic regression model examined factors associated with fertility intentions, with unwillingness (marked as 0) and willingness (marked as 1) as the dependent variables, and factors identified as statistically significant in the Chi-square analysis as independent variables.

This study included 8,002 women: 2,595 (32.4%) from Shandong Province, 2,767 (34.6%) from Hunan Province, and 2,819 (35.2%) from Yunnan Province. Of these, 4,410 (55.1%) resided in urban areas and 3,771 (47.1%) in rural areas. The women's average age was 34.11 ± 7.30 years. A total of 5,769 (72.1%) women had children, including 2,539 (31.7%) with one child and 3,051 (38.1%) with two children.

Among the 2,412 childless women, the majority were aged 25–29 (35.0%), resided in urban areas (61.0%), held non-agricultural *Hukou* (63.5%), had attained a college degree or higher (72.9%), and worked as professionals (e.g., doctors, teachers, engineers) (31.3%). Of the 2,539 one-child women, the largest group (25.8%) were aged 30–34, 67.3% had a college degree or higher, and 24.4% were professionals. Among the 3,051 two-child women, the largest group (32.2%) were aged 35–39. Most two-child women (69.8%) held agricultural *Hukou*, 74.7% had attained a senior high school diploma, and 31.5% worked as farmers. Detailed sociodemographic characteristics are presented in Table 1.

Among the 2,412 childless women, 1,933 (80.1%) intended to have at least one child, with 1,015 (42.1%) desiring one child and 918 (38.0%) desiring more than one. The remaining 479 (19.9%) reported no intention to have children. Fertility intentions for a first child varied by region: 39.2% (273/697) in the east, 45.6% (450/986) in the central region, and 40.1% (292/729) in the west. Univariate analysis revealed that childless women who were more likely to intend to have children ($P < 0.05$) shared the following characteristics: residence in the eastern region (84.4%) or rural areas (85.6%), agricultural *Hukou* (82.4%), age between 35–39 years (92.4%), junior high school education or lower (92.3%), first marriage (90.3%),

employment as farmers (89.4%), average monthly individual income (87.9%) or household income (85.5%) between 5,000–9,999 Yuan, sexually active (88.7%), history of pregnancy (91.9%), and presence of reproductive system diseases (84.9%) (Table 1).

Among one-child women who intended to have a second child (31.9%, $n=810$), univariate analysis revealed significant associations ($P < 0.05$) with several factors. These included residing in a rural area (36.3%), having an agricultural *Hukou* (36.4%), being younger than 25 years old (50.0%), being remarried (42.7%), being unemployed (36.3%), and having a spouse younger than 25 years old (45.0%). Additionally, a history of abortion (36.7%), complications during first childbirth (40.3%), abnormal delivery history (39.2%), receiving free antenatal care (33.1%), and receiving childbirth expense deductions or reimbursements (33.7%) were also significantly associated with the intention to have a second child (Table 1).

Among two-child women, only 98 (11.3%) intended to have a third child. Univariate analysis revealed that the following characteristics were significantly associated with a higher likelihood of intending to have a third child ($P < 0.05$): agricultural *Hukou* (12.5%), self-employment (15.1%), average monthly income of 10,000–30,000 Chinese Yuan (CNY) (25.0%), having daughters (14.4%), and a history of abortion (13.3%) (Table 1).

Multiple logistic regression analysis revealed distinct factors associated with the willingness to have more children. Childless women residing in rural areas, possessing an agricultural *Hukou*, aged 35–39 years, with a junior high school education or lower, married, and having an average monthly household income of 3,000–9,999 CNY demonstrated a higher willingness to have children. Among one-child women, factors associated with a greater willingness to have a second child included having an agricultural *Hukou*, being younger than 30 years old, being remarried, and having received deductions or reimbursements for childbirth expenses during their first delivery. Two-child women who were more willing to have a third child were more likely to have an agricultural *Hukou*, an average monthly income of 5,000–3,000 CNY, be self-employed, and have daughters (Table 2).

DISCUSSION

This study, the first known cross-sectional survey in China to employ a multi-stage stratified random

TABLE 1. Univariate analysis of the association of characteristics with fertility intentions in Shandong, Hunan, and Yunnan provinces, China, 2023.

Characteristics	Fertility intentions of childless women			Fertility intentions to have a second child of one-child women			Fertility intentions to have a third child of two-child women		
	N	n (%)	P	N	n (%)	P	N	n (%)	P
Region			0.001			0.407			0.696
Eastern	697	588 (84.4)		870	267 (30.7)		965	116 (12.0)	
Central	986	785 (79.6)		796	268 (33.7)		941	104 (11.1)	
Western	729	560 (76.8)		873	275 (31.5)		1,145	125 (10.9)	
Place of residence			<0.001			<0.001			0.083
Urban	1,472	1,128 (76.6)		1,381	390 (28.2)		1,449	179 (12.4)	
Rural	940	805 (85.6)		1,158	420 (36.3)		1,602	166 (10.4)	
Age, years			<0.001			<0.001			0.081
<25	570	379 (66.5)		1,220	21 (50.0)		921	4 (28.6)	
25–29	833	654 (78.5)		1,319	168 (43.4)		2,130	26 (14.4)	
30–34	386	332 (86.0)			240 (36.7)			73 (9.4)	
35–39	249	230 (92.4)		2,406	143 (28.5)		2,867	108 (11)	
40–44	182	159 (87.4)		133	79 (19.2)		184	78 (11.7)	
45–49	192	164 (85.4)			159 (29.3)			56 (12.9)	
Hukou			<0.001	42		<0.001	14		0.017
Non-agricultural	1,532	671 (76.3)		387	330 (27)		181	77 (8.3)	
Agricultural	880	1,262 (82.4)		654	480 (36.4)		773	268 (12.5)	
Ethnicity			0.199	502		0.382	983		0.5
Han	2,266	1,822 (80.4)		411	763 (31.7)		665	327 (11.4)	
Minority	146	111 (76.0)		543	47 (35.3)		435	18 (9.8)	
Educational level			<0.001			0.498			0.625
Junior high school or below	336	310 (92.3)		323	112 (34.7)		773	90 (11.3)	
Senior high school	317	283 (89.3)		507	157 (31)		2,278	75 (10.4)	
College or higher	1,759	1,340 (76.2)		1,709	541 (31.7)		1,559	180 (11.8)	
Marital status			<0.001			<0.001			0.118
First marriage	1,327	1,243 (93.7)		2,348	756 (32.2)		2,849	314 (11.0)	
Remarriage	72	65 (90.3)		89	38 (42.7)		149	26 (17.4)	
Single	1,013	625 (61.7)		102	16 (15.7)		53	5 (9.4)	
Occupation			<0.001			0.001			0.046
Farmer	359	321 (89.4)		376	133 (35.4)		960	105 (10.9)	
Factory worker	103	87 (84.5)		148	30 (20.3)		115	10 (8.7)	
Civil servant	243	175 (72)		278	82 (29.5)		203	25 (12.3)	
Doctor/teacher/engineer	754	586 (77.7)		619	225 (36.3)		580	63 (10.9)	
Clerk	228	190 (83.3)		226	65 (28.8)		163	19 (11.7)	
Service staff	214	169 (79.0)		304	80 (26.3)		326	30 (9.2)	
Self-employment person	235	195 (83.0)		286	90 (31.5)		383	58 (15.1)	
Unemployed	155	122 (78.7)		175	67 (38.3)		209	22 (10.5)	
Other	121	88 (72.7)		127	38 (29.9)		112	13 (11.6)	
Average monthly income, CNY			0.001			0.216			0.002
<3,000	882	688 (78)		833	246 (29.5)		1,402	146 (10.4)	
3,000–4,999	976	767 (78.6)		1,055	332 (31.5)		980	101 (10.3)	

Continued

Characteristics	Fertility intentions of childless women			Fertility intentions to have a second child of one-child women			Fertility intentions to have a third child of two-child women		
	N	n (%)	P	N	n (%)	P	N	n (%)	P
5,000–9,999	322	283 (87.9)		448	156 (34.8)		333	48 (14.4)	
10,000–30,000	55	42 (76.4)		32	11 (34.4)		32	8 (25.0)	
>30,000	18	14 (77.8)		14	5 (35.7)		22	1 (4.5)	
No income	159	139 (87.4)		157	60 (38.2)		282	41 (14.5)	
Have insurance			0.261			0.084			0.176
Yes	1,776	1433 (80.7)		2,044	636 (31.1)		2,175	235 (10.8)	
No	636	500 (78.6)		495	174 (35.2)		876	110 (12.6)	
Have maternity insurance			0.398			0.296			0.086
Yes	1,410	1132 (80.3)		1,588	485 (30.5)		1,372	155 (11.3)	
No	366	301 (82.2)		456	151 (33.1)		803	72 (9.0)	
Family average monthly income, CNY			<0.001			0.265			0.45
<3,000	547	406 (74.2)		414	124 (30)		798	103 (12.9)	
3,000–4,999	818	646 (79.0)		732	229 (31.3)		936	105 (11.2)	
5,000–9,999	691	591 (85.5)		960	300 (31.3)		928	93 (10.0)	
10,000–30,000	312	255 (81.7)		401	147 (36.7)		342	38 (11.1)	
>30,000	44	35 (79.5)		32	10 (31.3)		47	6 (12.8)	
Gender of children			–			0.708			<0.001
Boys	–	–		1,443	456 (31.6)		743	80 (10.7)	
Girls	–	–		1,096	354 (32.3)		749	108 (14.4)	
Boy and girl	–	–		–	–		1,559	235 (10.8)	
History of abortion			0.099			0.006			0.021
Yes	201	185 (92.0)		788	289 (36.7)		1,080	144 (13.3)	
No	1,060	933 (88.0)		1,259	388 (30.8)		1,292	126 (9.8)	
Complications of pregnancy			–			<0.001			0.115
Yes	–	–		365	147 (40.3)		426	55 (12.9)	
No	–	–		2,174	663 (30.5)		2,625	290 (11.0)	
History of abnormal delivery			–			0.045			0.441
Yes	–	–		153	60 (39.2)		217	28 (12.9)	
No	–	–		2,386	750 (31.4)		2,834	317 (11.2)	
Mode of delivery			–			0.915			0.687
Vaginal delivery	–	–		1,521	484 (31.8)		1,720	191 (11.1)	
Caesarean section	–	–		1,018	326 (32.0)		1,331	154 (11.6)	
Free antenatal examination			–			0.035			0.693
Yes	–	–		962	318 (33.1)		1,388	140 (10.8)	
No	–	–		1,055	303 (28.7)		1,192	137 (11.5)	
Deduction or reimbursement for childbirth expenses			–			0.012			0.357
Yes	–	–		1,575	531 (33.7)		2,151	222 (11.1)	
No	–	–		964	279 (28.9)		900	103 (11.9)	
Painless delivery						0.332			0.258
Yes	–	–		1,076	332 (30.9)		1,137	119 (10.5)	
No	–	–		1,462	478 (32.7)		1,914	226 (11.8)	

Note: “–” means no data.

Abbreviation: CNY=Chinese Yuan.

TABLE 2. Multiple logistic regression model for fertility intentions — Shandong, Hunan, and Yunnan provinces, China, 2023

Variables	estimated β	Wald χ^2	P	OR	95% CI
Fertility intentions of childless women					
Place of residence					
Urban				Ref	
Rural	0.421	11.034	0.001	1.52	1.19, 1.95
<i>Hukou</i>					
Non-agricultural				Ref	
Agricultural	0.422	11.426	0.001	1.53	1.19, 1.95
Age, years					
<25				Ref	
25–29	0.209	2.15	0.143	1.23	0.93, 1.63
30–34	0.331	2.668	0.102	1.39	0.94, 2.1
35–39	0.655	5.118	0.024	1.92	1.09, 3.39
40–44	0.092	0.102	0.750	1.10	0.62, 1.93
45–49	0.635	3.32	0.068	1.89	0.95, 3.74
Educational level					
College or higher				Ref	
Senior high school	0.389	2.187	0.139	1.48	0.88, 2.5
Junior high school or below	0.472	4.683	0.030	1.60	1.05, 2.46
Marital status					
Single				Ref	
First marriage	1.943	158.727	<0.001	6.98	5.16, 9.44
Remarriage	1.241	7.916	0.005	3.46	1.46, 8.21
Household average monthly income, CNY					
<3,000				Ref	
3,000–4,999	0.595	12.406	<0.001	1.81	1.30, 2.53
5,000–9,999	0.768	15.911	<0.001	2.16	1.48, 3.14
10,000–30,000	0.433	3.119	0.077	1.54	0.95, 2.49
>30,000	0.715	2.35	0.125	2.04	0.80, 5.10
Fertility intentions to have a second child of one-child women					
<i>Hukou</i>					
Non-agricultural				Ref	
Agricultural	0.317	9.685	0.002	1.37	1.13, 1.68
Marital status					
First marriage				Ref	
Remarriage	0.535	4.517	0.034	1.71	1.04, 2.80
Single	-0.849	6.510	0.011	0.43	0.22, 0.82
Age, years					
45–49				Ref	
<25	0.747	4.167	0.041	2.11	1.00, 4.33
25–29	0.549	10.005	0.002	1.73	1.23, 2.44
30–34	0.184	1.390	0.238	1.20	0.89, 1.63
35–39	-0.213	1.605	0.205	0.81	0.58, 1.12
40–44	-0.547	8.573	0.003	0.58	0.40, 0.84

Continued

Variables	estimated β	Wald χ^2	P	OR	95% CI
Deduction or reimbursement for childbirth expenses					
No				Ref	
Yes	0.266	6.292	0.012	1.31	1.10, 1.61
Fertility intentions to have a third child of two-child women					
<i>Hukou</i>					
Non-agricultural				Ref	
Agricultural	0.691	6.606	0.010	2.00	1.18, 3.40
Average monthly income, CNY					
<3,000				Ref	
3,000–4,999	0.020	0.005	0.942	1.02	0.59, 1.76
5,000–9,999	0.787	5.530	0.019	2.20	1.14, 4.23
10,000–30,000	1.590	7.418	0.006	4.91	1.56, 15.40
>30,000	-17.451	0.000	0.998	0.00	
No income	0.442	1.461	0.227	1.56	0.76, 3.19
Gender of children					
Boy				Ref	
Girl	0.953	10.404	0.001	2.59	1.45, 4.63
Boy and girl	0.113	0.146	0.703	1.12	0.63, 2.00
Occupation					
Farmer				Ref	
Factory worker	-0.105	0.019	0.890	0.90	0.20, 3.97
Civil servant	-1.342	1.670	0.196	0.26	0.03, 2.00
Doctor/teacher/engineer	0.540	2.421	0.120	1.72	0.87, 3.39
Clerk	0.339	0.406	0.524	1.40	0.50, 3.98
Service staff	0.243	0.312	0.577	1.28	0.54, 2.99
Self-employed	0.901	7.554	0.006	2.46	1.30, 4.68
Unemployed	0.560	1.722	0.189	1.75	0.76, 4.04
Other	0.891	2.920	0.088	2.44	0.88, 6.77

Abbreviation: CNY=Chinese Yuan; CI=confidence interval; OR=odds ratio.

cluster sampling method to examine fertility intentions and associated factors among women of childbearing age across different regions, revealed discrepancies in fertility intentions compared to previous research (3–6). The current study found a lower intention rate for a second child among one-child women (31.9%) than Jing's 2022 survey (55.6%) (3) and a lower intention rate for a third child among two-child women (11.3%) than previous surveys (12.2%) (5). These differences may be attributed to the online methodology of the previous surveys, potentially attracting a higher proportion of participants who were already interested in fertility policies and having more children. Notably, this study observed higher fertility intentions for a first child among childless women

(45.6%) and for a second child among one-child women (33.7%) in Hunan compared to Chen Qian's 2022 Hunan-based study (6), which also employed a multi-stage sampling method but found that 35.9% of childless women and 29.7% of one-child women intended to have a/nother child. This suggests that the continuous adjustment of fertility policy and implementation of supportive measures may lead to a gradual realization of childbirth potential among childless and one-child women.

This study found that residing in rural areas or having an agricultural *Hukou* was associated with higher fertility intentions, consistent with previous research (7–9). Notably, *Hukou* was the only factor influencing childbearing desires across all three groups:

childless, one-child, and two-child women. This aligns with previous findings (8) suggesting that traditional cultural influences contribute to a stronger desire for larger families among rural women. Furthermore, the differential impact of the one-child policy — imposing looser restrictions on women with agricultural *Hukou* and stricter ones on those with non-agricultural *Hukou* — might explain the slower increase in childbearing desires among urban women following the policy's relaxation.

This study revealed that childless women aged 35–39 exhibited the strongest desire for children. This finding may be attributed to younger women prioritizing educational attainment and career advancement, leading to delayed marriage and childbearing. By ages 35–39, with increased career stability, the desire for children may become more pronounced. Additionally, advancements in Chinese medical technology and reproductive policies likely contribute to this trend. These improvements offer greater support for high-risk pregnancies, potentially boosting the confidence of older women considering childbearing.

Consistent with previous studies, women with middle or higher household incomes were more likely to intend to have children than those with lower incomes (10). This suggests that financial stability, which allows families to meet both childcare and daily expenses, may increase the desire for children. However, while higher individual income was positively correlated with birth intentions, a large majority (77.7%) of self-employed women also reported intending to have a child. Furthermore, among women with two children, professional women constituted the largest group intending to have a third child. These findings suggest that flexible work schedules, often available to self-employed and professional women, may mitigate the negative career impacts associated with larger families.

Contrary to previous studies, this study found no association between education level and the intention to have more children. Instead, maternity subsidies, such as free antenatal examinations and hospital delivery subsidies, emerged as major influencing factors. This suggests that effectively implemented fertility support measures could further increase desired family size. Additionally, univariate analysis revealed that women with a history of miscarriage or previous pregnancy complications were more likely to have a second child, highlighting the need for targeted support for this demographic.

This study reveals a low intention to have second or third children among Chinese women. To effectively increase birth rates, China must cultivate a more supportive fertility environment. This includes implementing measures to eliminate employment barriers for mothers and alleviate work-family conflict. Additionally, expanding access to preferential fertility policies, particularly those supporting pregnant women, is crucial to enhancing reproductive desires.

This study benefits from its multi-stage stratified random cluster sampling method across diverse regions. Furthermore, it uniquely examines the influence of socio-demographic characteristics, pregnancy history, and service utilization during pregnancy on fertility intentions.

There were some limitations in this study. First, the geographic limitation to six counties/districts within three provinces may restrict the generalizability of findings to regional and national levels. Second, factors like childcare and children's education were not considered in this study.

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