Fertility intentions for a second child and related factors among Chinese nurses: A cross-sectional study

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Abstract

Background: The reproductive willingness of women of childbearing age and its related factors is key to coping with the change in population structure. This study aimed to explore fertility intention and associated factors for having a second child among Chinese nurses.

Methods: A cross-sectional multi-center study was conducted in three hospitals in Shandong, China, from November 2023 to January 2024. Participants were recruited through convenience sampling among female nurses. The survey was conducted face to face, enabling participants to ask questions and clarify difficulties with the questionnaire.
Data were analyzed via IBM SPSS 19.0. Multinomial logistic regression analysis was used to clarify the determinants of respondents' fertility intention (Yes, no, or not sure), with a p-value less than 0.05 considered statistically significant.

Results: Overall, 39.2% of participants reported that they would not have a second child under the current birth policy, which accounted for the highest proportion. Multinomial logistic regression analysis showed that those with higher work-family conflict, higher income, and late pregnancy were more likely to report a negative response toward fertility intention for a second child.

Conclusion: Family economic condition, age of the first child, and overloaded work were found to be significant influencing factors of Chinese nurses' fertility intention to have a second child. Existing policies in China should continue to be implemented, including policy support and ideological guidance, to ensure that nurses have fewer worries when deciding to give birth to their second child. Limited by the cross-sectional study design, more qualitative studies are needed to explore barriers among populations who do not intend to have a second child.

Highlights

What is current knowledge?

The expanding population of nursing professionals necessitates urgent investigation into their fertility intentions to evaluate implications for population development.

What is new here?

Family economic condition, age of the first child, and overloaded work could explain second-child reluctance among nursing professionals.

Introduction

Almost every country in the world is facing an aging population, a demographic transition that raises major issues for government policies. Population aging reflects both significant increases in longevity and significant decreases in fertility (1). Currently, 46 percent of the world's population lives in low-fertility areas, and this percentage is growing. It is predicted that 120 countries will experience below-replacement fertility levels by the mid-21st century. By 2050, those under 15 years old will have declined from 30% in 2000 to 19%, while those aged 65 years and above will increase from 6% to 18%. The fertility rate in China has also been declining every year since 2016. In 2020, it was reported that the number of births dropped by 580,000 and the birth rate was 10.48 per 1,000, indicating that existing policies could not meet the need to increase the fertility rate (2). Declining fertility rates pose economic, social, cultural, and political challenges worldwide (3). It is of great significance to understand the reproductive willingness of women of childbearing age and its related factors in order to cope with the change in population structure (4).

Fertility intention, which refers to an individual's or couple's subjective attitudes and expectations toward having children, is the result of a rational decision-making process in which the costs and benefits of any action are measured (5). Research on the influencing factors of fertility intention has always been the focus of demographic and sociological studies (4,6). Previous studies on the factors determining women's childbearing tend to focus on fertility policy, economic factors such as the cost of raising children, women's health-related factors including both past illness and current health status, and cultural factors (6-8). Additionally, previous studies about fertility intention have focused on the general population rather than on a specific group. However, fertility intention is highly diverse and complex, since it is shaped by social, economic, demographic, political, cultural, technological, and environmental factors (9,10). It should be noted that women's fertility intention may also vary with their working characteristics, even within the same policy or cultural context, which has not been specifically explored in previous studies.

There are over 4.1 million registered nurses in China providing healthcare services to 1.4 billion people (11), of whom 97% are women, and the vast majority are of childbearing age. Female nurses' fertility intentions are significantly challenged by the intense demands of their profession, the struggle to achieve work-life balance, systemic resource limitations within healthcare (Particularly in developing contexts), and the psychological burdens inherent in the role. With the continuous expansion of the size of this group (12), their fertility intention has a substantial impact on the development of China's population. However,

most current studies about nursing staff focus on employment quality, social support, work satisfaction, and similar aspects (13). A few scholars have included fertility status as an influencing factor of employment in their research, but few studies have paid attention to the fertility intention of female nurses. Based on the above, this study aimed to explore fertility intention and associated factors for having a second child among Chinese nurses.

Although some results have been confirmed by previous research on fertility intention, it is unclear whether these results are applicable to nursing staff. Based on this, the present study focuses on Chinese nursing staff and aims to investigate their fertility intention to have a second child and related influencing factors. The research results have important guiding significance for improving the social security system for nursing staff and enhancing the uptake of government fertility policy.

Methods

Design
This was a cross-sectional, multi-centered study conducted in three hospitals in Shandong, China, from November 2023 to January 2024.

Participants
Participants were recruited through convenience sampling. Nurses who met the following inclusion criteria were recruited: registered clinical nurses aged between 18 and 45 years; had been working at the hospital for a minimum of 3 years; and had their first child already born. Exclusion criteria were: currently pregnant; history of infertility; severe pregnancy complications such as early-onset pre-eclampsia or severe intrahepatic cholestasis of pregnancy; or participation in another research or intervention program. The G-Power 3.1 statistical software was used to estimate the sample size, with two-tailed tests, effect size of 0.3, power of 0.95, and α value of 0.05, resulting in a calculated sample size of 134.

Data collection
Data were collected using a mixed approach: on-site face-to-face surveys, which allowed participants to ask questions and clarify any difficulties, alongside online questionnaires to reach a broader population. This combination ensured comprehensive and effective data gathering.

Data analysis
All data analyses were performed using IBM SPSS version 19.0 statistical software, with the level of statistical significance set at $p < 0.05$. Data were expressed as means ± standard deviation (SD) for continuous variables, and frequency and percentages for categorical variables.

The normality of the data was tested using the Kolmogorov-Smirnov test. Independent t-tests were used to analyze significant differences between the numerical variables of two groups, and one-way analysis of variance was used to examine significant differences between the variables of more than two groups. Comparisons of categorical variables were carried out using the chi-square test or Fisher's exact test, if appropriate.

Multinomial logistic regression was performed to examine the effect of independent variables on fertility intention. Independent variables with $p < 0.05$ were added to the multivariate logistic regression model. Logistic regression results were reported as odds ratios (OR) with 95% confidence intervals. To compare the characteristics of respondents who had the fertility intention with those who did not, the reference group in the model was specified as those who had the fertility intention.

Procedures
Fertility intention, the dependent variable and primary outcome, was measured by one question: "Do you intend to have a second child?" The response options were: "do not intend," "intend," and "uncertain."

Study covariates were selected following a literature search through the databases PubMed, Web of Science, Embase, CNKI, Wanfang, and VIP from January 2000 to December 2022. The Chinese keywords included fertility desire, fertility intention, fertility plan, fertility purpose, fertility motivation, and nurse. The English keywords included fertility desire, fertility intention, fertility plan, fertility willingness, and nurse. Combinations of subject terms and free words were used, determined after careful pre-search inspection.

Data were collected using a self-administered questionnaire that included demographic information and details about participants' first child, both of which were found to influence fertility intention. Briefly, we included socio-demographic variables such as age, educational level, professional title, family monthly income, and age at the time of the last pregnancy; as well as information about the first child, including age, mode of delivery, exclusive breastfeeding, primary caregiver, gender, and grade.

Work-Family Conflict Scale. The 18-item Work-Family Conflict Scale developed by Carlson, and further translated and revised into Chinese by Bai et al. (14) was used. The scale measures the conflict between work and family, encompassing three forms of work–family conflict: time, strain, and behavior, as well as two directions of work–family conflict: work interference with family and family interference with work. Responses are rated on a 5-point Likert scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree." Higher scores indicate greater work-family conflict. The reported Cronbach's alpha for this scale among Chinese endoscopy nurses was 0.863 (15).

Results

Socio-demographic characteristics
A total of 200 questionnaires were distributed, and after excluding respondents who withdrew halfway and those with missing information, 181 were included in the final analysis, yielding a response rate of 90.5%. Analyses were based on responses collected from 181 married clinical nurses with only one child. The socio-demographic characteristics are presented in Table 1.

The mean age of participants was 33.6 ± 5.22 years, ranging from 20 to 45 years. The mean age at marriage was 26.17 ± 2.47 years, and the mean age at the time of the first pregnancy was 28.23 ± 2.93 years.

Levels of family monthly income were: 21.0% (≤ 5000 CNY), 30.4% (5000-7000 CNY), and 48.6% (> 7000 CNY) (Table 1). Comparing demographic characteristics between the "yes" and "no" groups, respondents with a younger child, shorter years of working time, and lower scores on the work-family conflict scale were more likely ($p < 0.05$) to report the intention to have a second child compared to those who did not.

Characteristics of respondents' first child
Among the 181 respondents, 71 (39.2%) reported that they would not have a second child under the new birth policy, accounting for the highest proportion; 25.4% reported their intention to have a second child, and 35.4% stated they were not sure. Nearly half of the participants (Or their husbands) were the only child of their parents, partially due to the past one-child policy in China. The sex ratio of the first child among participants was 1.18 (Girls = 98, boys = 83). About two-fifths (42.5%) reported that their first child had not yet started school, followed by kindergarten (26.0%), elementary school (21.5%), and junior high school or higher (9.9%). Data showed that the main caregiver of the first child was the participants' parents (51.4%), followed by the participants themselves (33.7%), and babysitters or others (14.9%). Significant differences were found in the age and grade of the first child among the three groups ($p < 0.01$), while no other significant differences were detected (Table 2).

Factors affecting fertility intention for a second child: Multinomial logistic regression analysis
A multinomial logistic regression was conducted to examine the factors affecting fertility intention for a second child. Respondents were divided into three groups according to their answers: "yes," "no," and "not sure." The model showed that, compared to those with relatively low family monthly income (Less than 5000 CNY), respondents with relatively higher family monthly income had more than 20 times greater odds of expressing a "no" opinion (AOR = 24.084, 95% CI = 5.5–105.457, $p < 0.001$), after controlling for other predictors. Increasing age of the first child and late pregnancy significantly increased the likelihood of expressing a "no" opinion (AOR = 2.695, 95% CI = 1.357–5.235, $p = 0.004$; AOR = 2.102, 95% CI = 1.051–4.201, $p = 0.03$, respectively) compared to those who expressed a "yes" opinion. Likewise, respondents with high work-family conflict scores were significantly more likely to express a "no" opinion. Compared to the reference group, individuals who expressed either a negative or an uncertain opinion did not significantly differ by professional title or age at marriage. Detailed information is shown in Table 3.

Table 1. Socio-demographic characteristics of participants

Characteristics	Total N=181	Yes, n (%) N=46	No, n (%) N=71	Not sure, n (%) N=64	P-Value
Professional title					
Nurse	24 (13.3)	8 (17.4)	3 (4.2)	13 (20.3)	0.006 **
Senior nurse	75 (41.4)	22 (47.8)	25 (35.2)	28 (43.8)	
Nurse-in-charge	82 (45.3)	16 (34.8)	43 (60.6)	23 (35.9)	
Education level					
Technical school	35 (19.3)	9 (19.6)	12 (16.9)	14 (21.9)	0.765 **
College or higher	146 (80.7)	37 (80.4)	59 (83.1)	50 (78.1)	
Family monthly income Yuan (CNY)					
≤ 5000	38 (21.0)	22 (47.8)	7 (9.9)	9 (14.1)	<0.001 **
5000~7000	55 (30.4)	14 (30.4)	24 (33.8)	17 (26.6)	
> 7000	88 (48.6)	10 (21.7)	40 (56.3)	38 (59.4)	
Only child (Participants)					
Yes	81 (44.8)	26 (56.5)	27 (38)	28 (43.8)	0.142 **
No	100 (55.2)	20 (43.5)	44 (62)	36 (56.3)	
Only child (Husband)					
Yes	107 (59.1)	27 (58.7)	38 (53.5)	42 (65.6)	0.360 **
No	74 (40.9)	19 (41.3)	33 (46.5)	22 (34.4)	
Mean ±SD					
Age (Year)	33.6±5.22	31.46±4.31	35.75±5.59	32.77±4.55	< 0.001 *
Age of marriage (Year)	26.17±2.47	25.63±2.42	25.79±2.14	26.98±2.66	0.004 *
Age at last pregnancy (Year)	28.23±2.93	27.17±2.27	28.01±2.16	29.22±3.71	0.001 *
Length of employment (Years)	6.3±3.19	4.91±2.31	7.01±2.85	6.52±3.76	0.002 *
Work-family conflict	50.65±11.86	47.72±12.4	53.28±12.9	49.84±9.60	0.036 *

*t-test
** χ2 test

Table 2. Characteristics about respondents' first child (N=181)

Characteristics	Total	Yes	No	Don't know	P-value
N (%) / Mean (SD)	181 (100)	46 (25.4)	71 (39.2)	64 (35.3)	
Age of the first child	5.53±5.22	4.35±3.4	8.02±5.94	3.6±4.3	< 0.001 *
Gender of the child					
Boy	83 (45.9)	22 (47.8)	38 (53.5)	23 (35.9)	0.117 **
Girl	98 (54.1)	24 (52.2)	33 (46.5)	41 (64.1)	
Mode of delivery					
Vaginal delivery	124 (68.5)	36 (78.3)	42 (59.2)	46 (71.9)	0.073 **
Caesarean	57 (31.5)	10 (21.7)	29 (40.8)	18 (28.1)	
Exclusive breastfeeding					
Yes	77 (42.5)	19 (41.3)	31 (43.7)	27 (42.2)	0.966 **
No	104 (57.5)	27 (58.7)	40 (56.3)	37 (57.8)	
Cared for by husband during puerperium					
Yes	163 (90.1)	40 (87)	64 (90.1)	59 (92.2)	0.664 **
No	18 (9.9)	6 (13)	7 (9.9)	5 (7.8)	
Primary child caregiver					
Couples	61 (33.7)	14 (30.4)	28 (39.4)	19 (29.7)	0.231 **
Grandparents	93 (51.4)	26 (56.5)	29 (40.8)	38 (59.4)	
Other	27 (14.9)	6 (13)	14 (19.7)	7 (10.9)	
Child's grade					
Had not started school	77 (42.5)	16 (34.8)	20 (28.2)	41 (64.1)	< 0.001 **
Kindergarten	47 (26.0)	20 (43.5)	14 (19.7)	13 (20.3)	
Elementary school	39 (21.5)	9 (19.6)	23 (32.4)	7 (10.9)	
Junior high school or above	18 (9.9)	1 (2.2)	14 (19.7)	3 (4.7)	

*t-test
** χ2 test

Table 3. Multinomial logistic regression analysis of respondents' fertility intention

Variables	Do you want to have a second child? Adjusted OR (95% CI) [a]	
	No (Vs. Yes)	Not sure (Vs. Yes)
Age	0.453 (0.239-0.858) *	0.812 (0.494-1.335)
Age of the first child	2.695 (1.357-5.235) **	1.396 (0.807-2.415)
Age of marriage	0.855 (0.598-1.223)	1.04 (0.732-1.479)
Age at last pregnancy	2.102 (1.051-4.201) *	1.53 (0.842-2.78)
Length of employment	1.363 (1.049-1.772) *	1.04 (0.815-1.329)
Work-family conflict	1.018 (0.953-1.044) *	0.977 (0.934-1.023)
Professional title		
Nurse	0.859 (0.084-8.744)	4.019 (0.572-28.22)
Senior nurse	0.757 (0.206-2.775)	1.391 (0.376-5.149)
Nurse-in-charge [R]	Reference group	Reference group
Family monthly income, CNY		
> 7000	24.084 (5.5-105.457) ***	10.60 (2.818-39.89) ***
7000~5000	9.952 (2.379-41.64) **	3.911 (1.105-13.84) *
≤ 5000 [R]	Reference group	Reference group
Child's grade		
Preschool [R]	Reference group	Reference group
Kindergarten	0.200 (0.043-0.938) *	0.160 (0.035-0.742) *
Elementary school	0.238 (0.025-2.237)	0.152 (0.013-1.706)
Junior high school or above	0.192 (0.001-24.61)	0.429 (0.002-80.84)

Note: independent variables with $p < 0.05$ were included in the multivariate logistic regression model.
*$P < 0.10$, **$P < 0.05$, ***$P < 0.01$; CI: Confidence Interval

Discussion

Fertility has always been a focus of discussion in China and around the world. This cross-sectional study explored Chinese female nurses' intention to have a second child and its influencing factors. We found that family economic condition, age of the first child, and overloaded work were significant influencing factors of Chinese nurses' fertility intention to have a second child, which could provide new insights into how China and other countries might develop better fertility policies.

The worldwide trend of population aging reflects both significant increases in longevity and significant decreases in fertility. To address the serious challenges of population aging and increase the fertility rate, many countries have established a series of pronatalist and incentive policies. For example, the Chinese government has successively issued the "universal second-child" policy and the three-child policy (Allowing couples to have three children and enjoy supporting measures) (16). At the advent of these policies, it was expected that more than 90 million couples would be eligible for a second child, and it was believed this would be an effective way to relieve the aging tendency of the population. However, declining fertility rates over the past decade suggest that current childbearing cohorts will have fewer children than their predecessors (17). Our study also suggested that fertility intention did not increase as much as the government expected, at least in the nursing group. Several critical factors influencing fertility intention among Chinese nurses-family economic condition, age of the first child, and overloaded work-could provide important insights for optimizing and promoting the current birth policy.

A previous study showed that among women who met the requirements of China's two-child policy, only 39% planned to have a second child. In our study, only 46 respondents reported "yes" regarding fertility intention, accounting for 25.4% of total participants-an even lower rate compared to the general population. In China, the ratio of doctors to registered nurses was 1:1.14 in 2019 (18), far below the national standard of 1:2. Nurses have been bearing high-risk and overloaded work, disproportionate salaries, and stressful working conditions.

Our study showed that work-family conflict scores among those reporting a "no" opinion were significantly higher than in the other two groups. This result was consistent with Lau's study: among women who already had a first child, the lack of a full-time occupation increased their second-child intention, whereas those who rejected the idea of a second child reported a heavy workload and lack of childcare help as the primary reasons (19).

The evidence strongly suggests that the Chinese government should consider nurses' working characteristics in its ongoing health policy reform and develop interventions to increase fertility intention.

Despite their heavy workload, nurses in China may be considered a relatively high-income group. Consistent with Cao's study (20), our study also found that higher income was significantly associated with decreased willingness to have children, which was also confirmed in other countries such as North America and Europe (21). Conversely, some studies pointed out that higher economic hardship was associated with higher odds of trying not to conceive (22). Neither of these two opposite results should be overlooked, as cultural or group differences may influence the outcomes. Notably, income is a very sensitive topic in China, and people are often reluctant to disclose their income levels in surveys. Thus, it was difficult to accurately estimate participants' economic level, which may have resulted in information bias. Therefore, more studies on the effects of economic level on fertility intention are still needed. In any case, it is essential to foster uptake of the birth policy through creative measures, such as improving welfare systems to empower young people to raise families and accept childbearing, improving mothers' working conditions and childcare services, and providing financial incentives and paternal leave.

Besides work-related factors, several child-related factors were examined in this study. First, unlike previous studies, the gender of the first child did not play a significant role in participants' decisions about having a second child, although gender preference-including son preference, daughter preference, or the intention to have one son and one daughter-was a common phenomenon in past decades (23,24). This may reflect changing attitudes in the new century. Second, participants were more likely to express a negative response toward fertility intention as the age of the first child increased, which could partly be due to the unsupportive attitude of the first child. However, previous studies reported that the firstborn's unsupportive attitude toward further reproduction by their mother could weaken with age, which seems contradictory to our results. We considered it reasonable since most of the participants' children in our study were under 12 years old, with developing rather than mature perspectives. Results may differ if these children were older or at another developmental stage. At the same time,

this finding also suggested that previous results may be applicable only to children within a certain age range. In addition, the time since the nurses' last pregnancy was significantly and negatively related to fertility intention in our study. Since the timing of the last pregnancy determines the interval for another birth, studies have shown that the duration of the last birth interval is also linked to stopping childbearing.

As the world's most populous country, China's exploration of the factors affecting fertility has guiding significance for the world. This study provides knowledge on the fertility intentions of Chinese nurses of childbearing age. However, several limitations should be noted. First, the findings were limited to a small number of participants, which could lead to wide confidence intervals in some categories of variables. Furthermore, the cross-sectional study design precluded inferences about the direction of causality. Therefore, longitudinal studies with larger samples should be encouraged in the future to verify the results. In addition, previous studies have not paid enough attention to the particularity of the nursing group under the current birth policy, so in this study we only made comparisons with the general population.

Conclusion

Family economic condition, age of the first child, and overloaded work were found to be significant influencing factors of Chinese nurses' fertility intention to have a second child. Existing policies in China should continue to be implemented, including policy support and ideological guidance, to ensure that nurses have fewer worries when deciding to give birth to their second child. Limited by the cross-sectional study design, more qualitative studies are needed to explore barriers among populations who do not intend to have a second child.

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Ethical statement

The Medical Ethics Committee approved the study procedures [Approval number: 2023YX038], and all participants agreed to the informed consent prior to enrollment. The purpose and process of the study were explained to all participants before the delivery of the anonymous self-reported questionnaire. Participants were free to consult with the researchers if they had any questions and could withdraw at any time during the investigation.

Conflicts of interest

The authors declare there are no competing interests.

Author contributions

All authors whose names appear on the submission made substantial contributions to this work. Shixiang Chen contributed to the conception and design of the study. Yue Zhao, Guiyu Qu, and Zhichao Liu contributed to data analysis. Shixiang Chen, Yaqi Huang, and Jialu Li drafted the manuscript. All authors reviewed and approved the final manuscript for publication.

Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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