Reproductive Health

RESEARCH

Open Access

"Hit a bottleneck": a convergent mixed-methods approach to the Influencing factors and experience of fertility intention among mothers of childbearing age with two children in mainland China

Yao Yang[1†], Yuan Yang[1†], Rui Xia[1], Ying Zhou[1], Yuxia Yuxia[1], Di Tian[1], Yulan Ren[2], Qianzhi Lin[1], Muxi Cheng[1], Pingjuan Tan[3*] and Xi Su[1*]

Abstract

Background Fertility rates have been decreasing both worldwide and in China. Although current policies have been aimed at raising the birth rate in China, their overall effects have been unclear. Therefore, exploration of fertility intention and related influencing factors is crucial.

Methods This study used a convergent parallel mixed methods combining descriptive and cross-sectional designs with a framework analysis. Convenience sampling was used to select mothers of childbearing age with two children (n = 603), living in Guangdong Province, China. Participants completed an online questionnaire investigating sociodemographic characteristics, as well as determinants and attitudes regarding the third-child fertility intention. Correlation coefficients and multivariate regression analyses were used to present quantitative findings. Eleven interviews were conducted, and a framework analysis method was used for data analysis. The results for the qualitative and quantitative study components were analyzed separately and were subsequently integrated through side-by-side comparison and joint display.

Result Attitudes toward fertility intention were negative, and the rate of fertility intention was 10.4% in Guangdong Province. In the quantitative component, women's age, perceived value of having a third child, and attitudes were found to be factors promoting the intention to have a third child, whereas monthly family income, grandparents' health status, and policy support were found to be factors hindering the intention to have a third child. Four major themes emerged regarding the perceptions and experiences regarding fertility intention in the qualitative component. After integrated analysis, younger age, knowledge regarding policy support, and access to childcare support were found to be factors significantly affecting the intentions of mothers with two children regarding having a third child.

†Yao Yang and Yuan Yang contributed equally to this work as co-first author.

*Correspondence:
Pingjuan Tan
13715259180@163.com
Xi Su
282268513@qq.com
Full list of author information is available at the end of the article

Conclusion Fertility issues require continued attention. Our findings provide a reference for optimizing existing policies to increase fertility intentions. Providing policy support, such as public childcare support, flexible working hours for mothers, affordable childcare, and greater psychological support, would enable mothers to improve their parenting. In addition, increasing the dissemination of knowledge regarding policies is necessary to improve the level of public understanding and promote fertility intention.

Keywords Fertility intention, Influencing factors, Mothers of childbearing-age with two children, Convergent mixed methods

Background

In recent years, declining birth rates have been observed in most countries worldwide and are also a key issue of national concern in China [1]. The report *World Fertility and Family Planning 2020*, published by the United Nations, has indicated that the fertility rates in many middle- and high-income countries have been below the replacement fertility levels (2.1 births per woman) and will continue to decline [2]. In China, the fertility rate has reached 1.30, which is below the 1.5 warning line of the low fertility trap. Declining fertility is a key driver of the rapid overall aging of the population [3]. According to 2020 census data, the population 65 years of age or older has increased to 191 million, accounting for 13.52% of China's total population, up from 8.92% in 2010 [4]. Population aging alters the social structure, and consequently may lead to labor shortages and hinder economic and social development. To slow the pace of aging in society and promote balanced population development, the Chinese government made a series of national policy adjustments. The single child policy was end in 2015, and the two-child policy and the three-child policy was liberalized in 2015 and 2021 [5], respectively. These policies allowed couples to have two or three children, aiming at boosting the fertility rate. However, the fertility rate growth remains insignificant after the implementation of fertility policies [6]. According to the National Bureau of Statistics, 9.02 million people were born in 2023, with an annual birth rate of 6.39% (whereas the mortality rate was 7.87%, and the natural growth rate was −1.48%) [7]. Population growth continued to be negative from 2022 onward, which has hit a bottleneck [8]. China is the most populous country worldwide. Therefore, exploring factors affecting fertility in China is essential, and may also provide guidance that might be relevant worldwide.

According to the demographic "intention-behavior" model, fertility behavior can be predicted by understanding an individual's fertility intention. Fertility intention refers to the desire to have children and pursue childbirth—an important factor influencing fertility [9]. Fertility intention has been reported to have a strong, positive, independent effect on actual fertility, and it tends to be higher than the actual fertility in low-fertility countries [10]. However, multiple survey studies have concluded that the fertility behavior and fertility intention among women of childbearing age in China are both low [11, 12]. The fertility intention among the population of childbearing age, as reported by the National Bureau of Statistics, was only 1.8 in 2021. Namely, the average number of children the population of childbearing age was willing to have is 1.8 in China. Therefore, it is worthwhile to find out why is still such a low level of willingness to give birth after the implementation of the three-child policy.

Since the adjustment of the fertility policy, several studies have been conducted to explore the factors influencing fertility intentions. Xiang [13] has conducted a national cross-sectional survey indicating that region, education level, psychological factors, income, political status, and medical insurance significantly affect fertility intention and the number of children. Ning's [14] cross-sectional study has explored the fertility intentions to have a third child among the two-child population after the announcement of the "three-child" policy; the findings indicated that education level, policy support, and the sex of the first two children are significant factors in the decision to have one more child. In addition, several studies [15, 16] have investigated the experiences and factors associated with fertility through qualitative methods. To date, most studies of fertility intentions and its associated factors have involved all population of childbearing age. However, women of childbearing age (generally defined as 15–49 years [17]) are the main force driving fertility, whose fertility intention directly affects the fertility behavior and the fertility rate. This is especially true for mothers with two children, who are the main target group of the three-child policy. Besides, in order to remove confounding factors and clearly understand mechanisms, this study investigated the fertility intention among mothers of childbearing age who already had two children.

Of note, the aim of this study was to investigate the third-child fertility intention, as well as the related associated factors and how these factors affected the fertility intention and the fertility behavior. A mixed methods approach which integrates multiple research methods is conducted and it enables comprehensive evaluation of

the perceptions of willingness to the third child-birth, thus potentially revealing new factors and perspectives, and validating known factors. In addition, integration of multiple research methods may overcome the limitations (such as data insufficiency and limited generalizability) inherent in each method that may limit the scientific rigor of the study. The following research questions guided this study:

1. Quantitative question: which factors are the most important to affect the fertility intention?
2. Qualitative question: what are the perceptions and experiences regarding willingness to have another baby among mothers with two children?
3. Mixed methods question: how might these factors merging the findings from both of the questions affect the fertility intention and the fertility behaviour?

Theoretical framework

A conceptual model based on the theory of planned behavior (TPB) and social support theory was constructed to guide our research efforts (Fig. 1). The TPB, proposed by Ajzen [18] in 1991, considers three determinants: attitude, subject norms, and perceived behavioral control. According to the TPB, individuals' intentions to perform a behavior are the strongest factors of whether the individuals will engage in the behavior, and their intentions are shaped by their attitudes and norms toward the behavior, as well as their perceived behavioral control regarding performing the behavior. However, Courneya et al. [19] have argued that social support may be a more appropriate social influence than the concept of subjective norms. Social support theory, proposed by Barrera [20], refers to the system of spiritual or material help and support from all aspects of society, including parents, relatives, and friends. In addition, individuals' background factors (e.g., personal and social factors) are expected to influence these three immediate determinants of their behavior. Thus, merging the TPB with social support theory enabled us to explore the factors affecting willingness to have another child among mothers with two children, as well as how these factors affect the connection between intention and behavior.

Methods

Design

A parallel convergent methods design was used in this study (Fig. 2), involving quantitative (cross-sectional study) and qualitative (framework analysis methodology) approaches for data collection in the same period (January 2022–July 2023) and the same study area (Guangdong Province, China). The quantitative and qualitative research strands were conducted and analyzed independently, and parallel participants were chosen for enrollment in the study to avoid the limitations of repeated measurements and cross-sectionality of results due to inclusion of the same participants both in the quantitative and qualitative components. Quantitative and qualitative data were integrated in the overall interpretation.

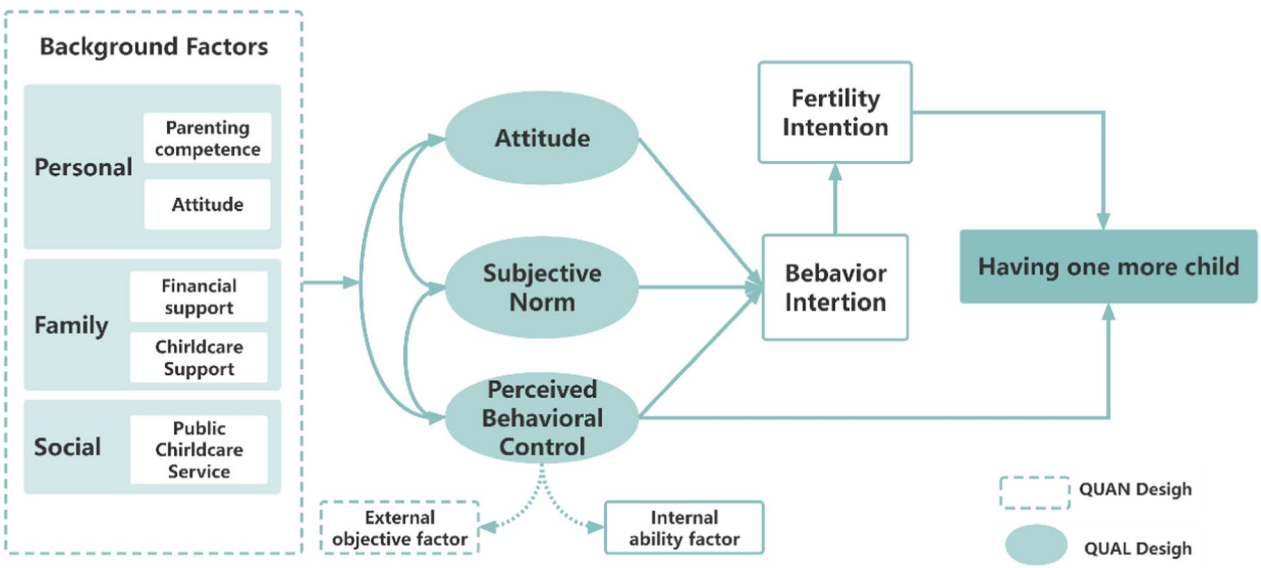

Fig. 1 Conceptual model of fertility intentions

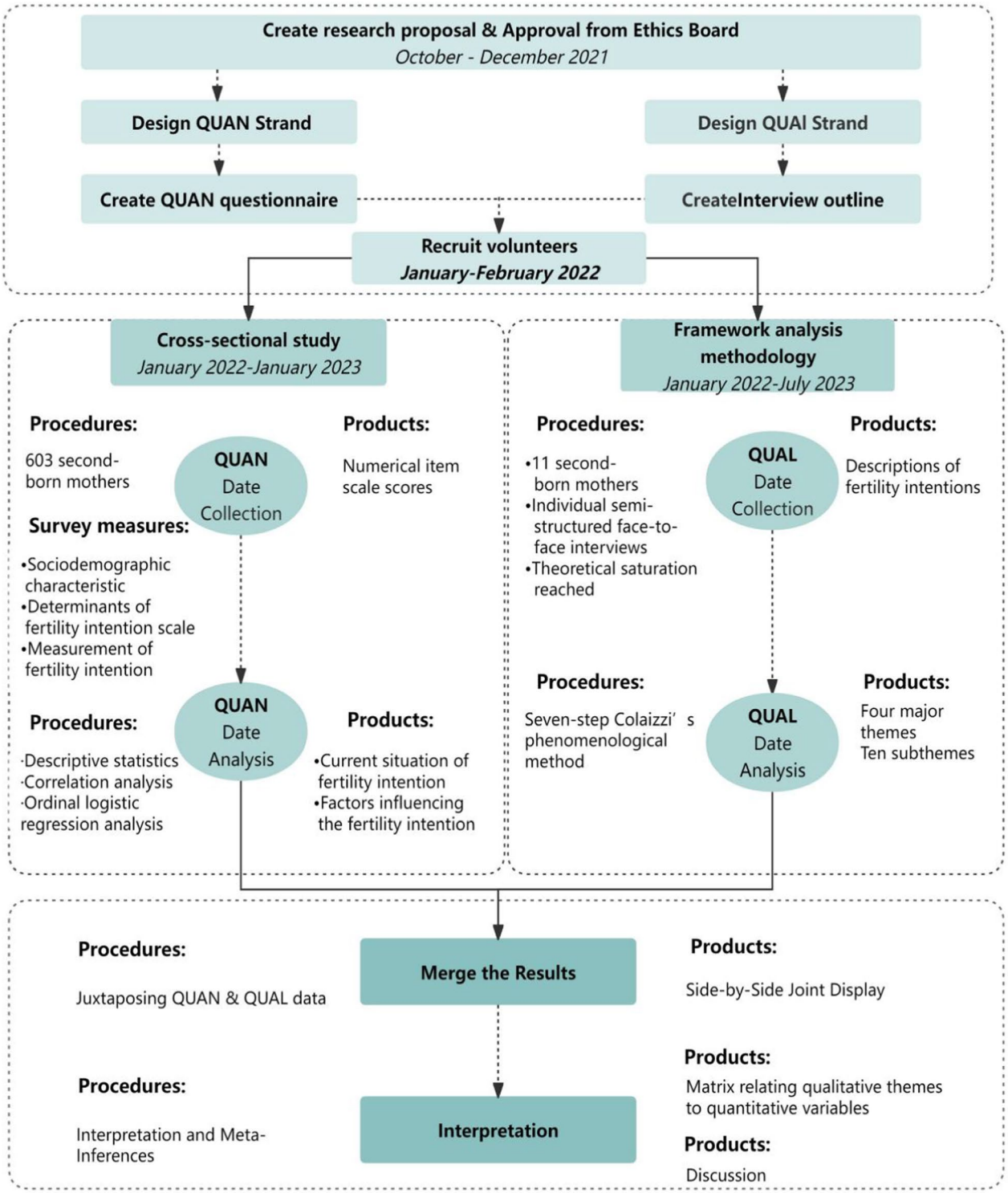

Fig. 2 Flowchart describing the research method

Quantitative component

In the quantitative phase, a descriptive cross-sectional study was conducted to explore factors affecting fertility intention to among two-child mothers. The quantitative phase of this study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) [21] reporting guidelines.

Sample and setting

Participants were recruited into this study from Guangdong Province through convenience sampling through the community networking groups on WeChat software. Eligibility criteria for participants include the following inclusion criteria: ① age range of 20–49 years; ② married with two children (including twins) [13]; and ③ consent to participate. Participants were excluded from the survey if they ① had a history of mental illness or any cognitive disability or ② were pregnant (given that psychological health can be affected by changes in hormone levels).

According to the empirical method, the sample size of a regional social research study needs to be greater than 500 [22]. A total of 631 participants were enrolled in the study, and 28 invalid questionnaires were excluded because of incomplete or contradictory responses. Finally, 603 valid questionnaires were used in the final analysis.

Measurements and instruments

Quantitative data were collected with the following three instruments.

1. Sociodemographic characteristic

A self-designed questionnaire was used to investigate and collect the sociodemographic characteristics through 12 questions pertaining to age, highest education level, monthly family income, occupation, children's sex and main caregivers, maternity insurance, old-age insurance, whether participants and their husbands were singleton, and the children's grandparents' physical health status and life support.

2. Determinants of the fertility intention scale

The fertility intentions scale was designed by Zhou [23] to explore the factors affecting fertility intention. This scale contains 32 items, assessing eight dimensions: support in the form of available resources, social support, policy support, perceived values, emotional values, perceived risk, perceived behavioral control, and attitudes. After obtaining copyright permission for the scale, we modified several expressions to reflect the purpose of this research. For instance, "fertility risk has a significant impact on fertility intention" was modified to "fertility risk has a significant impact on third-child fertility intention," thus providing a more targeted understanding of the third-child fertility intention. This multidimensional scale was scored on a Likert scale of 1 to 5 ("strongly agree" to "strongly disagree"). In our study, this fertility intention scale has good internal consistency (Cronbach's $\alpha = 0.818$).

3. Measurement of fertility intention

We used the question: "Do you have the intention to have a third child?" to explore the third-child fertility intention. The response options were "no intention at all," "no intention," "uncertainty," "intention," and "strong intention." "No intention at all" and "no intention" were defined as no desire to have a third child, whereas "intention" and "strong intention" were defined as a desire to have a third child. The intention to have a third child served as the dependent variable and the primary outcome.

Data collection

We Chat was the main venue for disseminating recruitment announcements for population selection. The Questionnaire Star website was used to disseminate questionnaires, because it is the most popular social media platform in China, with 1.15 billion active users. Second-born mothers of childbearing age living in Guangdong Province were invited to fill out the questionnaire. We compiled a standardized set of instructions including the purpose, significance, and content of the survey. Participants were informed that their participation was anonymous and voluntary. To ensure effective data collection, all survey items were required to be answered before the form could be submitted. Participants were assigned identification numbers, each of which could be used only once. After the data collection, the questionnaire responses were collated and examined. Questionnaires were excluded if ① responses to at least one-third of the total questions were lacking; ② only one answer choice was chosen across the entire questionnaire; and ③ answers were not filled in as instructed.

Statistical analyses

Data analysis was conducted in SPSS 27. 0 software (IBM Corp., Armonk, NY, USA). We used Q-Q plots to test the normality of the data, thus confirming a normal distribution. In the descriptive analysis, frequencies and proportions were calculated for categorical and ranked variables. For continuous variables, we calculated means

and standard deviations (SDs). Univariate analysis was performed with the chi-square test and the Kruskal–Wallis test for categorical and ranked variables. Ordinal logistic regression analysis was performed to investigate the factors of fertility intention, and the odds ratio (OR) and corresponding 95% confidence interval (CI) were calculated. Variables with statistical significance of 0.25 or less in the univariate analysis were entered into the logistic regression model. All statistical analyses were two-tailed, and the criterion for statistical significance was set at 5%.

Qualitative component

Qualitative research is a branch of science, which devoted to the understanding of social phenomena from the perspective of the subjects and to describe their cognition and thoughts in the way that they have experienced [24]. Perceptions and views of participants on the third child fertility intention are worth exploring to complement the results of quantitative research. Hence, on the basis of framework analysis methodology, a semi-structured interview was conducted to investigate the perceptions and consideration of mothers of childbearing age with two children regarding the willing to have another baby. Reporting followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) [25] guidelines.

Measurements and instruments

A preliminary interview outline was developed by the research team according to analysis of the available studies on this topic and the conceptual model. Subsequently, we conducted two rounds of consultations with five experts with master's degrees or above, and senior professional status. All experts had more than 10 years' work or research experience in the fields of obstetrics nursing, psychology nursing, sociology, or public health medicine. The effective response rate in both rounds of expert consultations was 100%, and the advice presentation rate was 80% in the first round and 40% in the second round. The authority coefficient of the experts ranged from 0.86 to 0.88, thus indicating that the results of the expert consultations were highly credible. Subsequently, the pre-interview outline was formulated primarily on the basis of the consultations. Next, two mothers of childbearing age with two children who met the inclusion and exclusion criteria were selected for pre-interviews. After several modifications were made according to the results of these pre-interviews, the final outline of the interview script, including nine items, was created (Appendix A).

Data collection

Data were collected through individual semi-structured face-to-face interviews conducted in the Chinese language at the time and place as agreed upon by the two parties. First, we hid the information of each participant and pseudonymized by number. Subsequently, the interview was conducted in a quiet setting to ensure confidentiality and privacy (e.g., in a secluded garden). Two interviewers who had not had any contact with the participants before the study conducted the interviews. One interviewer conducted an in-depth interview with the participants by referring to the interview outline, and the other was responsible for recording the required details and re-questioning when necessary. To establish trust and effective communication with the participants, the interviewer posed several general questions at the beginning of the interview. Next, according to the interview outline, the interviewer commenced the interviews by referring to topics associated with the fertility willingness. Each topic was introduced with an open-ended question before follow-up questions were asked, and prompts were used when needed. Each interview lasted approximately 20–30 min. All semi-structured interviews were audio-recorded and transcribed verbatim in full in Chinese. Field notes provided important details, such as the atmosphere and participants' non-verbal behaviors and emotions, thereby enriching the data analyses. After the eleventh interview, data saturation was reached, because no new themes were identified. Consequently, the data collection process was terminated.

Statistical analysis

The framework method was used to analyze the semi-structured interview data. In the first and second phase, after the interview, audio recordings were transcribed verbatim by trained research assistants within 24 h and reviewed by the second researcher to ensure content accuracy. After transcription, the transcriptions were reconfirmed by the study participants to ensure that the transcription text matched the content of the interviews and familiarisation with the interview. In the third and fourth phase, on the basis of the conceptual model, we formulated general meanings for significant statements until a consensus was reached. All the interview data were coded with Nvivo12plus. Significant statements and high-frequency words were refined. We arranged these statement meanings into clusters of themes to identify common significant concepts, which were prototypes of themes. In the fifth and sixth phases, the research team conducted a brainstorming session to detail early themes by further refining significant concepts and comparing similar themes to extract common viewpoints, which then formed the emerging themes. Subsequently, these emerging themes were organized into major themes and subthemes, and three or four typical statements were included for each, to provide support. In the final phase,

all themes were discussed among the research team and modified if required.

Mixed methods integration

The quantitative data obtained from the questionnaires and the categories derived from the inductive qualitative analysis were compared through side-by-side comparisons and joint displays, to merge them visually, and to elaborate upon how they complemented each other, thereby generating additional inferences [26].

By integrating the findings of both methods, we developed deeper insights and a better understanding of the various factors that impact the intention on the third child. Given the exploratory nature of this study, multivariate results were considered during the mixed methods integration for quantitative findings.

Ethical considerations

This study was approved by the Ethics Board of Guangzhou Medical University in Guangzhou City, China (approval number 202201001). All participants recruited for this study, in both the quantitative component and the qualitative component, provided informed consent. Respondents were assured that they could cease participation in the research at any time and would not experience any consequences. Their responses and personal information were kept confidential and used only for research and data analysis.

Results

Quantitative findings

Baseline characteristics of participants

A total of 63 participants had an explicit intention to have a third child, 103 had an uncertain attitude, and 438 did not want a third child; thus, the fertility intention rate was 10.4% among participants. A total of 93.4% of the participants were 25–44 years old, and the average age was 35.2 years. Other sociodemographic characteristics of all participants are shown in Table 1.

As shown in Table 1, the willingness to have a third child significantly differed by age ($H=24.658$, $P<0.001$), education level ($H=11.364$, $P=0.010$), occupation ($H=19.114$, $P=0.039$), monthly family income ($H=4.410$, $P=0.220$), education level of two children ($\chi 2=10.310$, $P=0.112$), pension insurance ($H=5.293$, $P=0.071$), maternity insurance ($H=5.526$, $P=0.062$), being single ($H=3.033$, $P=0.220$), and the health status of the children's grandparents ($H=14.614$, $P=0.006$).

An ordinal logistic regression analysis was conducted to determine the factors affecting intentions to have a third child. The parallel regression test ($\chi^2=50.531$, $P=0.103$) indicated that ordered multi-classification logistic regression was suitable in this study. The P value of the likelihood ratio test was less than 0.001, thus indicating adequate model fit.

Table 2 shows the results from the ordinal logistic regression analysis conducted to determine the factors associated with the third-child fertility intention. The age, monthly family income level, and health status of the participants' parents, as well as perceived value, policy support, and attitude, were significantly associated with fertility intention. Among women 20–24 years old, perceived value and attitude were found to be factors promoting the intention to have a third child. Meanwhile, a monthly family income of less than 5000 CNY, poor health status of the children's grandparents, and policy support were found to be factors hindering the fertility intention.

Qualitative findings

Eleven participants provided qualitative data via the voice recording application. The age range was 33–49 years, and more than half of participants had a college degree or higher. The proportion of participants with a son and a daughter was equal to the proportion with two daughters (59.4%), whereas three participants had two sons. The total transcription duration was approximately 3.3 h, and the total number of words was 70,115. Four major themes and ten subthemes emerged from the data analysis (Fig. 3). These themes and their illustrative quotations are shown in Table 3.

Theme 1: Attitude toward fertility

Negative attitude toward having one more child Most participants were not willing to have one more child, and their friends and relatives also had similar attitudes. Many respondents reported that they were satisfied with having two children, and they did not have sufficient energy to raise another child.

A shift in fertility perspective leads to inactive attitudes The interview research indicated that, in contrast the traditional belief of "more children, more happiness" [27], the ideal number of children was two for most participants. Most participants believed that when a family has only one child, the child may easily develop negative character traits, such as selfishness and not learning how to share, and will have a high burden in adulthood of supporting their older relatives. Having one more child enables siblings to grow up together and avoid the development of negative character traits. Siblings can also share the responsibility of supporting their older relatives in the future. In addition, some mothers with two children believed that having two children could enhance family stability and happiness, and motivation to work.

Table 1 Characteristics of all respondents (n = 603)

Variable	Total (N = 603)	Have intention (N = 63)	Uncertainty (N = 102)	Have no intention (N = 438)	H/X^2	*P*
	n (%)	n (%)	n (%)	n (%)		
Age (years)					24.658	< 0.001*
20–24	25 (4.1)	8 (12.7)	8 (7.8)	9 (2.1)		
25–35	277 (45.9)	28 (44.4)	55 (53.9)	194 (44.3)		
36–44	247 (41.0)	19 (30.2)	32 (31.4)	196 (44.7)		
45–49	54 (9.0)	8 (12.7)	7 (6.9)	39 (8.9)		
Degree					11.364	0.010*
Primary school and below	64 (10.6)	12 (19)	16 (15.7)	36 (8.2)		
Middle school	64 (10.6)	11 (17.5)	8 (7.8)	45 (10.3)		
College	391 (64.8)	29 (46)	70 (68.6)	292 (66.7)		
Master's degree and above	84 (13.9)	11 (17.5)	8 (7.8)	65 (14.8)		
Occupation					19.114	0.039
Workers	48 (8.0)	13 (20.6)	7 (6.9)	28 (6.4)		
Teachers	70 (11.6)	5 (7.9)	16 (15.7)	49 (11.2)		
Medical staffs	147 (24.4)	14(22.2)	23(22.5)	110(25.1)		
Company employees	125 (20.7)	12 (19.1)	22 (15.6)	91 (20.7)		
Housewives	72 (11.9)	6 (9.5)	10 (9.8)	56 (12.8)		
Students	25 (4.1)	4 (6.3)	6 (5.9)	15 (3.4)		
Others	116 (19.2)	9 (14.3)	18 (17.6)	89 (20.8)		
Monthly family income (CNY)					4.410	0.220*
≤ 5000	103 (17.1)	11 (17.5)	16 (15.7)	76 (17.4)		
5001–10000	183 (30.3)	22 (34.9)	38 (37.3)	123 (28.1)		
10,001–20000	177 (29.4)	13 (20.6)	28 (27.5)	136 (31.1)		
20,001–30000	78 (12.9)	5 (7.9)	13(12.7)	60 (13.7)		
> 30,001	62(10.3)	12(19.0)	7(6.9)	43(9.8)		
Gender of two children					1.591	0.451
A boy and a girl	358 (59.4)	38 (60.3)	67 (65.7)	253 (57.8)		
Two girls	148 (24.5)	18 (28.6)	19 (18.6)	111 (25.3)		
Two boys	97 (16.1)	7 (11.1)	16 (15.7)	74 (16.9)		
Education level of two children					10.310	0.112*
Infants (0–3 years old)	179 (17.9)	13 (7.30)	29 (16.2)	137 (75.6)		
Kindergartens	320 (32.1)	25(7.8)	46(14.4)	249(77.8)		
Primary schools	295 (29.6)	28 (31.1)	52 (35.4)	215 (31.7)		
Middle school	109 (11.9)	13 (14.4)	17 (11.6)	79 (11.6)		
College and above	95 (9.5)	17 (18.9)	14 (9.5)	65 (9.6)		
Main caregivers of children					4.945	0.551
Mothers	470 (43.2)	47 (45.2)	75 (41.0)	348 (43.4)		
Fathers	256 (23.6)	26 (25)	50 (27.3)	180 (22.5)		
Grandparents	323 (29.7)	25 (24)	52 (28.4)	246 (30.7)		
Others	39 (3.6)	6 (5.8)	6 (3.3)	27 (3.4)		
Pension insurance of couples					5.293	0.071*
Both side	450 (74.6)	45 (71.4)	68 (66.7)	337 (76.9)		
One side	104 (17.2)	9 (14.3)	24 (23.5)	71 (16.2)		
Neither side	49 (8.1)	9 (14.3)	10 (9.8)	30 (6.8)		
Maternity insurance of couples					5.526	0.062*
Both side	354 (58.7)	30 (47.6)	56 (54.9)	268 (61.2)		
One side	143 (23.7)	17 (27)	25 (24.5)	101 (23.1)		
Neither side	106 (17.6)	16 (25.4)	21 (20.6)	69 (15.8)		

Table 1 (continued)

Variable	Total (N = 603)	Have intention (N = 63)	Uncertainty (N = 102)	Have no intention (N = 438)	H/X^2	P
	n (%)	n (%)	n (%)	n (%)		
Whether single child					3.033	0.220*
Both side	136 (22.5)	10 (15.9)	23 (22.5)	103 (23.5)		
One side	76 (12.6)	12 (19)	14 (13.7)	50 (11.4)		
Neither side	391 (64.8)	41 (65.1)	65 (63.7)	285 (65.1)		
Healthy status of children's grandparents					14.614	0.006**
Very well (have no basic disease)	146 (24.2)	24 (38.1)	28 (27.5)	94 (21.5)		
Better (have basic disease and control well)	219 (36.3)	24 (38.1)	36 (35.3)	159 (36.3)		
Moderate (have basic diseases and control stable)	199 (33.0)	12 (19)	32 (31.4)	155 (35.4)		
Poor (have basic diseases and poor control)	26 (4.3)	1 (1.6)	2(2.0)	23 (5.3)		
Extreme poor (have many basic diseases and need care)	13 (2.2)	2(3.2)	4(3.9)	7(1.6)		
Life support of participants' parents					0.692	0.708
Both side	291 (48.3)	30 (47.6)	53 (52)	208 (47.5)		
One side	175 (29.0)	18 (28.6)	31 (30.4)	126 (28.8)		
Neither side	137 (22.7)	15 (23.8)	18 (17.6)	104 (23.7)		

* p < 0.25, **p < 0.05

Table 2 Ordinal logistic regression model analysis of third-child fertility intention (all independent variables included in the model are listed in Appendix B)

Variables	*β*	*SE*	*P*	*OR*	95%*CI*
Age					
20–24	2.133	0.766	0.005	8.437	[0.632, 3.634]
25–35	0.937	0.534	0.079	2.552	[−0.109, 1.083]
36–44	0.211	0.500	0.673	1.235	[−0.769, 1.191]
45–49	Reference				
Monthly family income (¥)					
≤ 5000	−1.03	0.496	0.038	0.357	[−2.001, −0.058]
5001–10,000	−0.63	0.43	0.143	0.533	[−1.474, 0.213]
10,001–20,000	−0.841	0.43	0.051	0.431	[−1.684, 0.002]
20,001–30,000	−0.627	0.467	0.179	0.534	[−1.541, 0.288]
> 30,001	Reference				
Healthy status of grandparents					
Very well (have no basic disease)	−0.803	0.736	0.275	0.448	[−2.245, 0.639]
Better (have basic disease and control well)	−0.576	0.724	0.427	0.562	[−1.995, 0.844]
Moderate (have basic diseases and control stable)	−0.894	0.723	0.216	0.409	[−2.310, 0.523]
Poor (have basic diseases and poor control)	−2.098	1.028	0.041	0.123	[−4.113, −0.082]
Extreme poor (have many basic diseases and need care)	Reference				
Policy support	−0.429	0.131	0.001	0.651	[−0.685, −0.173]
Perceived value	0.640	0.226	0.005	1.896	[0.196, 1.083]
Attitude	1.736	0.210	0.000	5.674	[1.325, 2.147]

OR odds ratio, *CI* confidence interval

Theme 2: Perceived behavioral control over fertility intention

Aging reduces parenting competence Age is an important factor restricting the desire to have more children. The average age of participants was 38.5 years; a high risk of pregnancy complications is associated with age above 35 years. Most interviewees described that if they were younger, they would consider having one more child. They believed that with increasing age, their physical func-

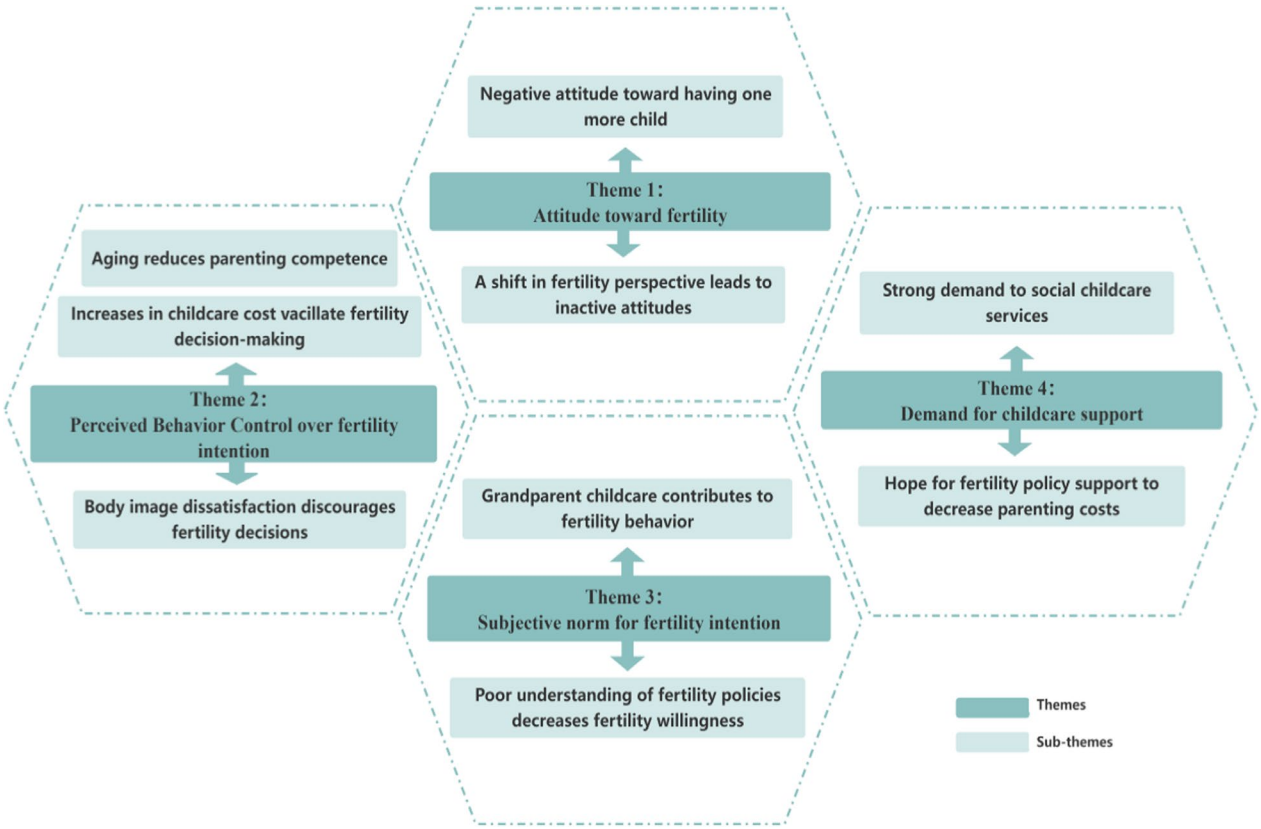

Fig. 3 Thematic map including themes and subthemes

tion and energy declined. Giving birth to one more child would increase the risk of complications in pregnancy and negatively affect their health. In addition, many interviewees described that raising children requires more time and energy for companionship, particularly when the children are of primary school age and below, and that more time and energy are necessary to pay attention to children's studies, homework, and psychological condition. They indicated that maintaining the energy needed for childcare would be difficult.

Increases in childcare cost vacillate fertility decision-making Parenting cost is a major consideration in fertility intention, and the increased economic costs of parenting were universally recognized. The perceived affordability of parenting is decreasing. The increased cost of childcare caused mothers of two children to be more hesitant with respect to fertility decision-making. Education expenditure was a factor of high concern. Most respondents indicated that they were willing to spend more money to support their children's schooling so that they could receive a better education, including expenditure on extracurricular classes and tutorial classes. However, the cost of education adds to family financial burden and affects the decision to have more children. The participants did not believe that they would be able to afford to pay for the education of an additional child.

Body image dissatisfaction discourages fertility decisions Some interviewees described reluctance to have another child because an increase in weight during pregnancy can cause women to "feel fat," particularly in areas other than the abdomen, such as the face and limbs, thus worsening women's satisfaction with their body image. Most mothers with two children were frustrated about their difficulty in regaining their previous beauty and body weight after childbearing.

Theme 3: Subjective norm for fertility intention

Grandparent childcare contributes to fertility behavior Grandparents' assistance in childcare was the main reason for willingness to have more children. Most interviewees stated that the main reason why they were willing to have two children in the first place was that the children's grandparents had the time and energy to provide assistance in childcare. However, most mothers with two children considered that as the grandparents' age

Table 3 Illustrative quotations related to themes

Themes and subthemes	Illustrative quotes
Theme 1: Attitude toward fertility	
Subthemes 1: Negative attitude toward having one more child	Q1: To birth the third child? No, I don't want. It's enough for me and my family to have two kids now Q2: I don't have such desire (to have a third kid). I also heard that my relatives and friends around me have same intention. Most people feel that two children are enough and raising another child would put a lot of pressure on the family's finances
Subthemes 2: A shift in fertility perspective leads to inactive attitudes	Q3: From the perspective of home education, I worry that only one child's character will become more egoistic and selfish, with siblings he knows how to share and care for others and have a good physical and mental health Q4: Nowadays, young people have a lot of pressure from life and work. If I have two children, when I am old, the alimony will be shared and their pressure will be less Q5: My children play a great support to me. They come to comfort me and encourage me when I am sad due to my work. And this makes me want to work better and bring them better material living conditions
Theme 2: Perceived behavioral control over fertility intention	
Subthemes 1: Aging reduces parenting competence	Q6: Even if the policy encourages me, I should not want to have children, because I am already old, which is very dangerous, has a lot of complications, and the energy is not very able to support me in birthing and bringing up Q7: If I were 10 years younger, I would definitely consider having a third child. But now the age is so old, and the body is not qualified
Subthemes 2: Increases in childcare cost vacillate fertility decision-making	Q8: Nowadays, when it comes to raising a child for education, nowadays it's free, just the teachers who teach don't pay, but the cost of books, living expenses and so on are quite high. A small child's schooling costs tens of thousands of dollars a year. Smaller children, custodial fees are more expensive, the public (custodial institutions) four or five thousand yuan, and its private is more expensive, about 9,000, doubled compared for public. Expense of two kids are already stressful, I don't think I can afford one more kid Q9: Since primary school, it's a lot of time and effort to spend every day with him (the child) doing his homework. If you don't keep an eye on the child, he won't do his homework. Taking care of the kids is exhausting enough with two of them
Subthemes 3: Body image dissatisfaction discourages fertility decisions	Q12: After giving birth children, my body are out of shape. There is a circle of flesh on my abdomen, and my beautiful dresses cannot wear, which affects my mood and confidence. Not only that, others say "why did you become so fat, haven't you lost weight after giving birth?" So, I will not have one more child Q13: I felt that my body had deteriorated and my back would hurt all the time after having two kids. What's more, my body has also become fat, and there is really no idea to have another one
Theme 3: Subjective norm for fertility intention	
Subthemes 1: Grandparent childcare contributes to fertility behavior	Q13: When I had the second child, I considered that his grandparents were at home and healthy. I have someone to take care of the child, so I dare to give birth Q14: The grandparents has a good family support for me, as long as I say I need to work overtime, you need to help me recently, I may come back late recently, they all say you just do your business, you don't worry about the family affairs. They took good care of the three children so that they allowed me to work without worries, which was an important reason why I wanted to have another child Q15: I wouldn't have a baby without my grandparents to take care of the children. I can't make money while raising the kids Q16: Grandparents are now older and have many underlying and chronic illnesses, and it's already a struggle to assist with two children now, so I'm afraid they won't be able to take care of them if they have three children

Table 3 (continued)

Themes and subthemes	Illustrative quotes
Subthemes 2: Poor understanding of fertility policies decreases fertility willingness	Q17: Didn't bother to find out (about the country's relevant maternity policy) because this is something it's not like watching the news as it used to be, now it's directly from the internet, it seems like there is an insurance policy for small children but it doesn't appeal to me much Q18: For self-employed people like us who don't have a flat, there aren't many benefits from the policy that we can enjoy, and it doesn't help us much Q19: I think these policies can only treat the symptoms, not the root cause, and no matter how many subsidies and maternity leave there are, raising a child is not something that you can just rely on Q20: Because of the nature of my work, I still understand this aspect, and this policy still has a certain promotion effect on me. Because I have enjoyed parental leave, when I gave birth to my brother (second child), the maternity leave and parental leave were longer than when I gave birth to my sister (first child), so I can feel the change in the policy and the encouragement of childbearing, so that we can have a longer period of time to repair our bodies after giving birth, as well as to make a harmonious arrangement with the family
Theme 4: Demand for childcare support	
Subthemes 1: Strong demand to social childcare services	Q21: It would be great if there were pro bono (childcare services). In fact, it doesn't really need to be pro bono, the cheaper price is great. If it is a state-subsidised childcare institution, it'll be more secure, there won't be any child abuse and so on, and it'll be hosted for a bit during the day, and we'll pick it up from work and take it home in the evening. If it can be so well-equipped, I think it's fine to have another one Q22: It would certainly be nice to have this kind of childcare facility, just to help out a little bit with the problem of not having grandparents to care kids. If it's a public service, then I would definitely reconsider having more children Q23: It would certainly be nice to have this kind of public childcare facility. It can provide a place for children to have lunch breaks and meals, so they don't have to sleep on their backs at school. It would be best if they could be hosted in the evening as well, and tutored to get their homework done
Subthemes 2: Hope for fertility policy support to decrease parenting costs	Q24: I hope that some policies can be enacted on children's education, such as pre-school education, and if 12 years of compulsory education can be made universal, the pressure will be reduced a lot Q25: I think at the very least children should be exempted from medical treatment until they are 3 years old, because children are at the greatest risk at that stage Q26: It's best if mothers have 3 years leave because children can go to school when they turn one and it's easier when they go to school, and if the parental leave time is extended, I think people who might have three children would think about it more

increases and their health condition declines, having one more child might increase their childcare burden.

Poor understanding of fertility policies decreases fertility willingness The results of the interviews suggested that most respondents did not have good understanding of fertility policy support, thus resulting in a high level of negative sentiments toward the fertility policy. Respondents were unwilling to learn about the relevant policies because most mothers believed that the policy support would not help them in their desire to have children. Some interviewees also suggested that because they were self-employed, they would be unable to receive the relevant policy support, such as maternity insurance and childcare leave. Thus, they did not want to learn about fertility policies, and were not inclined to have one more child.

However, one mother described that she knew about fertility policies for work reasons but was not actively learning about them. She felt that the fertility policies currently in place contributed to her desire to have children.

Theme 4: Demand for childcare support

Strong demand for social childcare services Most interviewees described that they would very much like to increase the number of social childcare organizations to assist them in taking care of their children. On the one hand, they considered that public childcare institutions

were affordable and secure, thus decreasing the pressure to find childcare during working hours, particularly for mothers with two children without grandparental assistance. In contrast, most respondents considered that it would be better optimal if childcare institutions were public welfare organizations, and that charging fees would be acceptable. They earnestly hoped that the fees of childcare services could be lowered, to w help them reduce education costs.

Hope for fertility policy support to decrease parenting costs Most interviewees expressed a need for increased maternity assistance policies in education, children's medical treatment, and parental leave time, which would reduce the cost of parenting care.

Integration of quantitative and qualitative findings

The integration of the findings revealed that the four identified factors were complementary and supplementary across the quantitative and qualitative components (Table 4). Beyond these findings, considerable inconsistencies were found. In the quantitative component, perceived value and monthly family income were the factors significantly affecting fertility intention. In the qualitative component, factors such as high parenting costs and changes in body image were correlated with the fertility intention.

Discussion

In this study, both subjective and objective factors influencing the fertility intention to have one more child among two-child mothers were explored through a mixed methods design. These complementary and supplementary research methods identified the most important factors to the third child-birth, namely, age, policy support, and grandparental childcare. Furthermore, several previously reported factors were confirmed (e.g., attitude, policy support, and income), and new factors were identified from the participant interviews (e.g., parenting cost and changes in body image).

Attitudes toward fertility intention were negative, but fertility rates were higher than those in other regions

In 1980, the single child policy was implemented to control the rapid population growth successfully, which produced a profound impact on China's population structure and social development. Meanwhile, it ameliorated the health and welfare of women and children [13]. With the development of society and the change of population structure, the fertility policy was changed to face the aging population and the shrinking workforce in recent years. The two-child policy and three-child policy was promulgated to promote the fertility rate and balance the development of the population. Thus, investigating the third-child fertility intention may be assist in estimating the effect on the population demographic of the three-child policy.

However, the attitudes toward fertility intention were negative in our study, and the rate of intention to have a third child was 10.4%, a higher percentage than reported in previous studies. Ning et al. [14] have reported a rate of 9.6% among 1308 participants with two children in a national cross-sectional study, while Zhu et al. [9] have reported a rate of 9.4% among childbearing-age couples with two children in Shanghai.

This difference in findings might be attributable to regional differences. Guangdong has been the only province with a birth population of more than 1 million for three consecutive years, and it has had the highest fertility rate for five consecutive years. After the "comprehensive two-child" policy took effect, the peak number of births in Guangdong reached approximately 1.51 million in 2017. In recent years, although the number of births has decreased in Guangdong with respect to other provinces, the decline in Guangdong has been small, and the number of births has remained high, because the belief of "more children, more happiness" remains prominent in most regions of Guangdong (e.g., Chaoshan and Zhanjiang). Most elders in the family encourage their children to have more children because of the concept of "raising children for old age." Therefore, our study explored the current situation and important influencing factors of the third-child fertility intention among the childbearing age mothers with two children in Guangdong by convergent parallel mixed method, which has important reference value for comprehensively improving fertility rate.

Young women have become the main force driving fertility

Our findings indicated that age was a significant factor affecting the willingness to have one more child. The quantitative results indicated that participants 20–24 years old were more willing to have a third child than participants in other age ranges among mothers with two children. This finding was similar to those from previous studies in which increasing age was associated with a gradual decline in the intention to have a third child [28]. In older mothers, age might be associated with reduced fertility and a perceived higher risk of pregnancy and neonatal complications [29]. The optimal reproductive age for women is before the age of 35, as confirmed by several studies. In our research, the average age of participants was 38.5 years, and half the participants were older than 35 years, thus potentially explaining the negative attitudes to the third child.

In addition, an interesting finding was that body image dissatisfaction was important factor associated

Table 4 Integrative findings of the intention to have a third child

Factors	Quantitative findings	Qualitative findings	Integrative findings
Attitude			
	• Low rate of fertility intention to have the third child, accounting for 10.4%	• Theme 1: Attitude toward fertility • Sub-theme: Negative attitude to have one more child	• Findings were supplementary. Most of participants had a negative attitude towards fertility intention, with only 10.4% having a positive desire to have the third child. This is related to the fact that fertility attitudes have changed and two children have become the ideal number for most family
	• Associations were found between attitude and fertility intention (OR = 5.674, 95% CI 1.325, 2.147)	• Theme 1: Attitude toward fertility • Sub-theme: Shifting in fertility perspective leads the inactive attitudes	
Younger age			
	• Women aged 18–24 (OR = 8.437, 95% CI 0.632, 3.634) was the promoting factor of fertility intention	• Theme 2: Perceived Behavior Control over fertility intention • Sub-theme: Aging reduces parenting competence	• Findings were supplementary. Age is an important factor restricting the desire to have more children. It may be that older mothers' age is associated with reduced fertility and a perceived higher risk of pregnancy and neonatal complications
Childcare support			
	• Grandparents are the main childcare supporters, 29% of participants' grandparents take on childcare work	• Theme 3: Subjective norm for fertility intention • Sub-theme: Grandparent childcare contributed to fertility behavior	• Findings were supplementary. Grandparents are an important auxiliary force in taking care for children in China, which can reduce childcare stress and improve the parenting competence, but their parenting competence often receives an impact due to their health status. Thus, participants would like to increase the number of social childcare organizations to assist them in taking care of their children
	• Grandparents with basic diseases (OR = 0.123, 95% CI −4.113, −0.082) was an impediment for the fertility intention	• Theme 4: Demand for childcare support • Sub-theme: Strongly demand to social childcare services	
Poor understanding of policy support			
	• Understanding of policy support (OR = 0.651, 95% CI −0.685, −0.173) was negatively related with fertility	• Theme 3: Subjective norm for fertility intention • Sub-theme: Poor understanding of fertility policies drops the willingness of fertility	• Findings were supplementary. Negative attitude toward fertility intention may attributed to poor understanding of policy among participant, due to their low policy awareness and perceived accessibility

with negative fertility attitude in our study, which has been less mentioned in previous studies. Furthermore, according to the results of our study, body image dissatisfaction among childbearing-aged women in the distant postnatal period also warrants attention. During pregnancy, women experience vast and very noticeable physiological changes during pregnancy (such as abdominal area growth, overall weight gain, and changes in hair and skin appearance) and lead to body image dissatisfaction [30]. However, Tiggemann [31] pointed out that the feeling towards the body and body appreciation are believed to improve with age. Given that young women have become the main force driving fertility, it is necessary to pay attention to their inner needs such as health and image maintenance during pregnancy to promote increased fertility rates. Thus, although the government has issued fertility insurance to promote preconception health, greater focus should be placed on promoting mental health among women of childbearing age and increasing public psychological counseling clinics for childbearing-aged women, to enhance their internal psychological fertility motivation.

The perceived affordability of childcare plays an important role in fertility intention

Economic factors are among the best established determinants of fertility intentions. We found that family income constraints among participants with a monthly family income less than 5000 CNY were associated with low willingness to have a third child. In addition, the cost of childcare is an important consideration regarding the third child-birth, as observed in the qualitative interviews. With the continuing development of China's social economy, most families focus on children's emotional well-being and quality education.

Great importance is placed on the quality of childcare, and fertility intention might be repressed because of concerns regarding service costs. More than half the participants (62.8%) suggested that their income level was not sufficient for them to raise more children, particularly regarding education costs. Yang [32] has shown that the perceived affordability of childcare services is more important than the actual costs in influencing fertility intention. Our findings provide further evidence that the cost and affordability of education and childcare services play important roles in fertility intention. This result echoes the quality-quantity tradeoffs proposed by Becker and Lewis [33], such that parents who value children's quality of education raise their expected costs of having children, thereby decreasing their fertility intention.

Increased childcare support would increase fertility intention

Participants with grandparental childcare support intended to have a third child in most families. The upbringing, care, and education of children are time- and energy-consuming. Regardless of occupation among the childbearing-age group, a busy work schedule, coupled with parenting multiple children, can exhaust parents. Declining childcare competence was also a major reason for a desire not to have three children. Thus, grandparents are an important auxiliary force in childcare in China, and can decrease childcare stress and improve parenting competence among mothers with two children. In our prior study, we have found that grandparents have a high sense of parenting competence, but their parenting competence is often affected by their health status. As the proportion of older people with diseases, such as diabetes and hypertension, increases, their parenting competence decreases, thus potentially increasing the economic pressure, e.g., of medical expenses, on families. Therefore, most participants had a strong desire for public childcare facilities.

In the Chinese context, owing to the lack of public subsidized childcare services, market-based childcare has become mainstream, thus substantially increasing the cost of childcare. Consequently, increasing financial investment in public childcare services and reducing educational costs for children of school age would contribute to increasing fertility intention and behaviors promoting the birth of more children.

Promotion of policy understanding would increase fertility intention

According to our quantitative research results, policy support hinders the willingness to have a third child, in contrast to findings from previous studies. The target population for our investigation of three-child fertility intention had a low level of understanding of fertility policies, in agreement with findings from a previous study [13]. In the interview study, we further found that the reason for the low knowledge regarding fertility policy was attributable to low policy awareness and low perceived accessibility among mothers with two children. In addition, most participants had negative attitudes toward the third-child willingness because of their age; therefore, they were reluctant to learn about fertility policies. Indeed, the Chinese government has recently issued many fertility promotion policies focusing primarily on policy support, economic support, and ideological guidance. Economic factors, such as income, are important factors affecting the choice of the number of children and fertility intention, and are reflected in economic subsidies

and fertility incentives in the form of economic support. The government should take these factors into account when optimizing fertility policies, particularly regarding education level and childcare services, both of which were policy demands that were frequently described in the interviews. In addition to focusing on policy availability, policymakers should prioritize public awareness of fertility policies and expand publicity regarding fertility policies to increase public understanding and awareness.

Limitations

Although this study is the first to use a mixed methods approach to explore fertility intention among mothers with two children, two limitations warrant mention. First, owing to the uniqueness of fertility characteristics and the large number of births in the previous year, participants were recruited through convenience sampling from only one area in Guangdong Province, China. Consequently, the distribution of the population might have been imbalanced, given that more than 50% of participants were from the eastern part of Guangdong Province. Thus, in our next study, we will include all cities of China in the research program. Second, participant selection bias could not be avoided, and the intention of the spouse was not considered in this research. Thus, more surveys should be conducted to investigate willingness to have a third child among spouses and other family members.

Conclusion

Our findings suggest that the level of third-birth intention among the childbearing-aged population is not high. Exploring the factors affecting third-birth intention aids in understanding of fertility desires among different groups of people and provides clues for exploring potential fertility drivers. Younger age, understanding of policy support, and childcare support were the important factors affecting the willingness to have a third child among mothers with two children. These findings not only support existing policies but also may provide further recommendations for optimizing policies that enable mothers to improve their parenting competence, including public childcare support, flexible working hours for mothers, affordable childcare, and increased psychological support. In addition, increasing the dissemination of knowledge regarding policies is necessary to increase public understanding, thereby promoting fertility intention.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12978-024-01888-w.

Supplementary Material 1.

Supplementary Material 2.

Acknowledgements

The authors wish to thank all participants who participated in this study. We are grateful to Guangdong Provincial Department of Education and Guangzhou Medical University for their financial support. We thank International Science Editing (http://www.internationalscienceediting.com) for editing this manuscript.

Author contributions

XS and Yao Yang planned the study and conducted a survey. RX, YZ, YL R, DT, YX L, QZ L and MX C collected the data. Yao Yang and Yuan Yang analyzed the data and wrote the manuscript. XS and PJ T revised the important intellectual content, Yuan Yang submitted the study. QZ L assisted in revising the manuscript. All authors critically reviewed the final version of the article submitted to the journal.

Funding

This work was supported by the Education Science Planning Project of Guangdong Provincial Department of Education (2022GXJK304); the Innovation Project of Undergraduate Education Research of Guangzhou Medical University (2022134); the Higher Education Teaching Reform Programmes of Guangdong Provincial Department of Education (2023-919) and the Education Science Planning Project of Guangzhou Education Bureau (202213957); Guangzhou Municipal Educational Science Planning Topic (Teaching Achievement Cultivation Project) (2024111263).

Availability of data and materials

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Written informed consent has been obtained from each participant. This protocol has been approved by the Ethics Board of the Guangzhou Medical University in Guangzhou city, China (approval number: 202201001).

Competing interests

The authors declare no competing interests.

Author details

[1] School of Nursing, Guangzhou Medical University, Guangdong, China. [2]Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong, China. [3]Shenzhen Pingle Orthopaedic Hospital, Guangdong, China.

Received: 12 March 2024 Accepted: 11 October 2024
Published online: 05 November 2024

References

1. Vollset SE, Goren E, Yuan CW, Cao J, Smith AE, Hsiao T, et al. Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100: a forecasting analysis for the Global Burden of Disease Study. Lancet (London, England). 2020;396(10258):1285–306.
2. Nations U. World Fertility and Family Planning 2020 Highlights. In: Affairs DoEaS, editor. https://www.un.org/development/desa/pd/content/world-fertility-and-family-planning-2020-highlights; 2020.
3. Oura P. Sociodemographic indicators of birth rate in a low fertility country-a nationwide study of 310 finnish municipalities covering > 5,000,000 inhabitants. Front Public Health. 2021;9: 643561.
4. Yang H. Dynamic trend of China's population ageing and new characteristics of the elderly. Popul Res. 2022;46:104–16.
5. Wang Y, Kong F, Qiao J. Gender equity, caregiving, and the 1-2-3-child policy in China—Authors' reply. Lancet (London, England). 2021;398(10304):953–4.
6. Fan SL, Xiao CN, Zhang YK, Li YL, Wang XL, Wang LAO. How does the two-child policy affect the sex ratio at birth in China? A cross-sectional study. BMC Public Health. 2020;20(1):789.
7. Nations U. Statistical Communiqué of the People's Republic of China on the 2023 National Economic and Social Development. In: Affairs DoEaS,

editor; 2024. https://www.stats.gov.cn/sj/zxfb/202402/t20240228_1947915.html.
8. Statistics NBo. http://www.ce.cn/xwzx/gnsz/gdxw/202401/18/t20240118_38870849.shtml. In: Development SBoNEaS, editor; 2024.
9. Zhu C, Yan L, Wang Y, Ji S, Zhang Y, Zhang J. Fertility intention and related factors for having a second or third child among childbearing couples in Shanghai, China. Front Public Health. 2022;10: 879672.
10. Beaujouan E, Berghammer C. The gap between lifetime fertility intentions and completed fertility in Europe and the United States: a cohort approach. Popul Res Policy Rev. 2019;38:507–35.
11. Zhang C, Wei L, Zhu Y, Teng L, Zhang W, Xu J, et al. Fertility intentions among young people in the era of China's three-child policy: a national survey of university students. BMC Pregnancy Childbirth. 2022;22(1):637.
12. Tatum M. China's three-child policy. Lancet (London, England). 2021;397(10291):2238.
13. Xiang Z, Zhang XY, Li YQ, Li JR, Wang YL, Wang YJ, et al. Fertility intention and its affecting factors in China: a national cross-sectional survey. Heliyon. 2023;9(2): e13445.
14. Ning N, Tang J, Huang Y, Tan X, Lin Q, Sun M. Fertility intention to have a third child in china following the three-child policy: a cross-sectional study. Int J Environ Res Public Health. 2022;19(22):15412.
15. Weiwei T, Zhengnu C, Dan C. Qualitative research on professional women's fertility view under background of 'comprehensive two child policy.' Chin Nurs Res. 2017;31(26):3310–4.
16. Jangqiong L, Zhangyang Z, Wei T, Feifei D. A qualitative study of the fertility intentions and needs of second-child mothers under the "three-child" policy. Health Voc Educa. 2023;41(01):89–91.
17. Ding Y, Zhong F. Effect of childbearing-age women's family status on the health status of three generations: evidence from China. Front Public Health. 2023;11:1244581.
18. Bosnjak M, Ajzen I, Schmidt P. The theory of planned behavior: selected recent advances and applications. Eur J Psychol. 2020;16(3):352–6.
19. Courneya KS, Plotnikoff RC, Hotz SB, Birkett N. Social support and the theory of planned behavior in the exercise domain. Am J Health Behav. 2000;24:300–8.
20. Langford CP, Bowsher J, Maloney JP, Lillis PP. Social support: a conceptual analysis. J Adv Nurs. 1997;25(1):95–100.
21. STROBE statement--checklist of items that should be included in reports of observational studies (STROBE initiative). Int J Public Health 2008; 53(1)**:** 3–4.
22. Yuan J, Li K. Comparative study on sample size calculation methods. Stat Decis. 2013;01:22–5.
23. Guohong Z, Yulu H, Junzhong Y. Why is "the Main Force of Childbearing" Merely Nominal?-Analysis of 743 Questionnaires based on Urban Youth Fertility Intention. Zhejiang Soc Sci 2021, 297(05): 77–86+157–158.
24. Adams C, van Manen M. Teaching phenomenological research and writing. Qual Health Res. 2017;27:780–91.
25. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349–57.
26. Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs-principles and practices. Health Serv Res. 2013;48(6):2134–56.
27. Youhua C, Yongjian S. Fertility culture, fertility system and fertility rate: the effect of the three-child policyand lts supporting measures. J Hohai Univ Philos Soc Sci. 2024;26(01):12–28.
28. Yan Z, Hui L, Wenbin J, Liuxue L, Yuemei L, Bohan L, et al. Third birth intention of the childbearing-age population in mainland China and sociodemographic differences: a cross-sectional survey. BMC Public Health. 2021;21(1):2280.
29. Lane M, Robker RL, Robertson SA. Parenting from before conception. Science. 2014;345(6198):756–60.
30. Crossland AE, Munns L, Kirk E, Preston CEJ. Comparing body image dissatisfaction between pregnant women and non-pregnant women: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2023;23(1):709.
31. Tiggemann M, McCourt A. Body appreciation in adult women: relationships with age and body satisfaction. Body Image. 2013;10(4):624–7.
32. Yang H, Han R, Wang Z. Third-child fertility intention and its socioeconomic factors among women aged 20–34 years in China. BMC Public Health. 2023;23(1):821.
33. Encarnacion J. Becker on the interaction between quantity and quality of children. Philipp Rev Econ Bus. 1984;21(1–2):113–5.

Publisher's Note