


BMJ Open Maternal depression and loss of children under the one-child family planning policy in China: a cross-sectional study of 300 000 women

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ABSTRACT

Objectives This study aims to explore the association between maternal depression and the loss of the only child under the family-planning (FP) policy.

Design Cross-sectional data from a Chinese population-based study were analysed.

Setting Population from 10 (5 rural and 5 urban) areas in China.

Participants Around 300 000 females were included in the study. The FP group was defined as women with one or two live births. Those with no surviving child were classified into the loss-of-only-child group. The non-FP group included women who had more than two live births. Logistic regression was used to assess the relationship between major depressive disorder (MDD) and family types, after stratification and adjustment.

Outcome MDD was assessed using the Composite International Diagnostic Inventory.

Results The odds of MDD are 1.42 times higher in the FP group in general (OR=1.42, 95% CI: 1.28 to 1.57), as opposed to the non-FP group. In particular, the odds of MDD are 1.36 times greater in the non-loss-of-only-child group (OR=1.36, 95% CI: 1.21 to 1.51) and 2.80 (OR=2.80, 95% CI: 0.88 to 8.94) times greater in the loss-of-only-child group, compared with the non-FP group. The associations between FP groups and MDD appeared to be stronger in the elderly population, in those who were married, less educated and those with a higher household income. The association was found progressively stronger in those who lost their only child.

Conclusions People in the FP group, especially those who lost their only child, are more susceptible to MDD than their counterparts in the non-FP group. Mental health programmes should give special care to those who lost their only child and take existing social policies and norms, such as FP policies, into consideration.

INTRODUCTION

The family-planning (FP) policy in China—broadly known as the one-child policy—was officially launched in 1982, a time when the country was facing the dual challenge of economic and social system breakdown after the Cultural Revolution, as well as a population size which doubled in only three decades.¹ Most families in the city were strictly

Strengths and limitations of this study

- This study is one of the first papers to incorporate a family planning policy dimension into research on the association between bereaved parents and major depressive disorder.
- This is the largest cross-sectional study in China that incorporates data on depression and the number of children.
- This study was only able to include mothers' age at the time of the survey. Maternal age at bereavement, the child's age at death and other related information were not included in the survey.
- This study is a cross-sectional study, rather than a longitudinal study.
- The data lacks information on people's coping mechanisms after child loss.

limited to one child, while some couples were allowed two if they lived in a rural area, worked in a high-risk occupation, were from minority ethnic groups or had a first child born with a disability.^{2,3} Since then, the policy has impacted millions of families.⁴ However, changes were officially made to the policy in 2015 and all couples were permitted to have two children.¹ Still, it remains a question as to what extent society and individual life have been changed under the policy. China has received credit for the effective control of population growth on one hand, but on the other, criticisms were raised regarding the deprivation of reproductive rights. Another consequence of the FP policy has been the emergence of a group of parents that lost their only child due to illness or accidents, commonly referred to as the 'Shidu'.⁵ Since 1982, more than 1 million families have lost their only child, with the number expected to reach 11 million by 2050.⁶

Major depressive disorder (MDD), characterised by recurrent symptoms including disrupted sleeping patterns, low mood and

difficulty concentrating, is a major contributor to the global burden of disease, suicide rates and the onset of non-communicable diseases like ischaemic heart diseases.^{7 8} In China, more than 54 million people are estimated to suffer from MDD.⁹ Grief and other relevant psychological disorders, including MDD, of parents who lost their child have been an area of research in many countries. The negative emotions from the loss of bond to the child or guilt of being unable to protect the child, for example, can lead to severe psychological disorders of the bereaved parents, including MDD.^{10–13} Using longitudinal data of 428 bereaved parents in Wisconsin, Rogers *et al*¹⁴ showed that the mental impact of child loss is long term. After an average of 18 years follow-up after a child's death, with parent age at a mean of 53, those who lost their child report more depressive symptoms than those who did not lose their child. Greater risk of hospitalisation due to psychological disorders or suicidal ideation, as well as decreased social functioning, were also found in bereaved parents, especially for bereaved mothers. Additionally, depressive symptoms can lead to increased health-damaging behaviours, a weakened immune system, and subsequently lower physical health.^{15–17}

Studies have shown mixed evidence towards risk factors of parental depression after child bereavement. A study showed that the grief of the bereaved parents can be predicted by the child's age at death, cause and unexpectedness of death and the number of remaining children. Moreover, characteristics of parents themselves, including gender, religious affiliation and professional help-seeking, also play a role.¹⁸ Rogers *et al*¹⁴ also found that having other children at the time of death might be associated with lower depression. Additionally, a recent cross-sectional study conducted in China found that mothers, after an only child died, rated higher on depression scales if they had low education or income, or were single.¹⁹ Another study also addressed that parents that lost an only child had higher scores on depression, post-traumatic stress disorder and worse scores on general mental health scales, when compared with parents with their only child alive.²⁰

Past research exhibits several limitations. First, there have been abundant studies about grief and related psychological outcomes of bereaved parents globally, but few that may apply to China, given the vastly different political and cultural context.²¹ Second, although there were a few studies conducted in China on this topic, representativeness might be limited due to sampling methodologies, which were neither population based nor well structured, producing results that cannot be extrapolated to a broader scale.^{19 20 22 23} Moreover, additional research is required in the Chinese context on the link between the loss of reproductive rights, subsequent involuntary formation of one-child families and extended grief after an only child's death. As such, a comparison between those who lost their only child, and the general population is lacking. In other words, the combined effect of losing reproductive rights and losing the only

child on parent mental health is not shown. With reference to the issues above, this paper utilises a database of 300 000 mothers in China to explore quantitatively the association between depression and the FP policy, with the loss of an only child.

METHODS

Sampling

The data were obtained from the baseline survey of a large cohort study conducted between 2004 and 2008 in 10 defined areas (5 urban and 5 rural) in China. Details of the study design and sample characteristics are described elsewhere.²⁴ The regional study sites were selected carefully to retain geographic and social diversity, as well as maximise differences in disease rates and risk exposure. Potential participants were approached in person by community health workers in clinical settings, with over 99% consenting to participate in the baseline assessment. In total, 512 891 adults, including 302 632 (59%) women aged 30–79 years, and representing approximately 30% of the total population of the 10 regions sampled, were recruited and completed an interviewer-administered electronic questionnaire and clinic visits.

We only included female participants in the current study. As the implementation of the FP policy at a national level began in 1982,²⁵ female participants who had already experienced menopause in 1982 (N=10 148) were not affected by the FP policy. While the mean age for menopause in the present sample was 48 years old, we exclude females older than 48 in 1982 from the analysis. We also excluded females who did not present information about the live birth count or the number of children or gave contradictory information (N=5129). The final sample size of the current study is 287 082 women aged 30–73.

Measurements

Participants were asked about their live birth count and the number of children alive at the time of the survey. In the present study, the FP group was defined as females with one or two live births, as in most rural areas, some urban areas and minority ethnic groups, the policy allowed families in which the first child was a girl to have a second child.²⁶ In FP families, females with a child/children left were further classified into non-loss-of-only-child group. Females with no child left at the time of the survey were classified into loss-of-only-child group. Females who had more than two live births were classified into the non-FP group. Those who had no live births were categorised as childless.

Outcomes

MDD was assessed by the Chinese version of the computerised Composite International Diagnostic Inventory-Short Form (CIDI-SF), which was delivered face to face by trained health workers at local clinics. The CIDI is a diagnostic instrument, based on the criteria of the

Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), which is considered to be moderately consistent with psychiatric interviews in clinical settings.^{27 28} The Chinese version of the CIDI produces similar population estimates of MDD as the Structured Clinical Interview of the DSM.²⁶ Briefly, participants were asked a set of questions and were defined as MDD cases if, during the past 12 months, they had felt 'sad, blue or depressed' for more than 2 weeks. An additional set of symptoms were also considered when making the diagnosis, including the presence of dysphoria and/or anhedonia accompanied by clustering of somatic, cognitive and behavioural disturbances, including appetite or weight change, sleeping problems, feelings of guilt or worthlessness, psychomotor changes, fatigue, concentration problems and thoughts of suicide. Details on logistics and scoring can be found elsewhere.²⁶

Other covariates

Demographic and socioeconomic characteristics collected in the baseline survey, specifically age at study date, household size, highest level of education, household income, occupation and marital status, were included as covariates in the analysis. Age at study date was collected as a continuous variable and was classified into <60 and ≥60 years old in the analysis. If the region has an average live birth count of lower than two per family, the region was classified as a one-child region, otherwise the region was classified as a two-children region. The household size was categorised into 1 or 2, 3, 4 or ≥5 people. The highest level of education was categorised into primary school and below, middle and high school, and college/university graduate and above. Annual household income was classified into less than ¥10 000 (US\$1≈¥7.61 in 2007); ¥10 000–¥19 999; ¥20 000–¥34 999 and ≥¥35 000. Occupation was categorised into agriculture and related workers, factory workers, clerks (ie, administrator/manager, professional/technical, sales and service workers, self-employed and others) and unemployed (ie, unemployed, retired and housewife). Marital status was classified into married, widowed or divorced. Participants' health behaviours, including smoking habits and alcohol intake, were assessed by self-reported lifestyle status and classified as 'frequent,' 'occasional,' and 'non' smoker/drinker.

Data analysis

Descriptive analysis illustrated the basic demographic, socioeconomic and lifestyle characteristics by different family types. The association between family types and MDD was analysed using logistic regression. The non-FP group was the reference group in all models. Two types of logistic regression models were fitted: (1) unadjusted or (2) adjusted for the one/two children region, self-rated health, occupation, education, marital status, household income, smoking and alcohol. The adjusted model selected variables based on previous literature.^{5 19 29 30} Socioeconomic factors, including region, occupation, education, marital status and household

income, have been considered as associated with both family type and MDD.^{5 19 29–36} Smoking and alcohol use have long been associated with MDD.³² The number of offspring and family structure has also been associated with lifestyle factors.^{33 34} Thus, smoking and alcohol were included in the model. Similarly, self-rated health was associated with both MDD and family structure and was included in the model.^{35 36} P values were calculated to show the significance of the association. All p values refer to two-tailed tests. To understand how age, household income, education and marital status potentially modify the associations between family types and MDD, a series of stratified analyses were performed using the unadjusted and adjusted models (excluding the stratification variable in adjustment) described above. Analyses were conducted using SAS V.9.4 statistical software (SAS Institute).

RESULTS

Socioeconomic and lifestyle characteristics

Basic characteristics of the study sample by family types are shown in [table 1](#). Of all 287 082 participants included in the analysis, 68.56% are FP families, 98 094 non-FP families (31.03%) and 1160 childless families (0.40%). Participants in the non-FP group tended to be older (mean age: 58.41, SD: 9.19) compared with other groups. The majority of participants in the childlessness group were living in urban areas (72.46%). Participants in the non-FP group tended to have lower education, with most of them having primary school or below education (81.54%) compared with other groups. The distribution of participants' household income was similar across four groups. Unemployment was more common in the non-FP group (44.83%). The distribution of marital status was similar across these four groups, with a higher percentage of widowed and divorced people in the non-FP group (16.08%). The distribution of smoking and alcohol use were similar across these four groups, but with a lower proportion of women who never used alcohol (47.42%) in the childless group and a higher proportion of women who never smoked (96.21%) in the non-loss-of-only-child group. Due to the large sample size, analysis of variance (ANOVA) and t-test all produced significant p values and thus the results from ANOVA and t tests were not displayed.

Association between family types and MDD

[Table 2](#) presents the prevalence and ORs (95% CI) of MDD in different family types. The prevalence of MDD in the non-loss-of-only-child, loss-of-only-child, non-FP and childless groups was 0.76%, 1.97%, 0.84% and 1.29%, respectively. In the unadjusted model, non-loss-of-only-child group and FP families in general had decreased odds of MDD (OR=0.90, 95% CI: 0.82 to 0.98), compared with Non-FP group. However, in the adjusted model, the odds of MDD are 1.36 times higher in

Table 1 Basic characteristics of participants

	Family types			
	FP			
	Non-loss-of-only-child group	Loss-of-only-child group	Non-FP	Childlessness
N, %	196 679, 68.51%	152, 0.05%	8 909 4 31.03%	1160, 0.40%
Sociodemographic characteristics				
Mean age, years (SD)	46.77 (8.10)	47.65 (10.11)	58.41 (9.19)	46.43 (11.19)
Region is urban, %	50.12	45.21	31.18	72.46
One child region, %	57.21	55.92	32.00	68.45
Household size, %				
≤2	14.24	27.40	29.70	50.86
3	36.73	34.93	9.22	25.39
4	23.80	16.44	14.92	10.93
≥5	25.23	21.23	46.17	12.82
Socioeconomic characteristics				
Highest education, %				
Primary school/below	44.30	49.32	81.54	28.57
Middle and high school	49.65	43.15	17.69	53.36
College and university	6.04	7.53	0.76	18.07
Household income, %				
<¥10 000	22.63	36.99	43.48	26.08
¥10 000–¥19 999	29.43	27.40	29.94	33.65
¥20 000–¥35 000	27.92	25.34	17.12	21.17
>¥35 000	20.02	10.27	9.46	19.10
Occupation, %				
Agriculture and related	36.96	42.47	50.46	15.40
Factory workers	15.30	20.55	1.36	16.70
Clerk	17.21	15.75	3.34	29.69
Unemployed	30.53	21.23	44.83	38.21
Marital status				
Married	95.68	93.42	83.92	93.28
Widowed/divorced	4.32	6.58	16.08	6.72
Lifestyle factors				
MET(hours/day), mean, SD	22.08 (13.08)	21.96 (11.46)	17.71 (11.57)	18.41 (11.32)
BMI (kg/m ²), mean, SD	23.83 (3.35)	23.71 (3.86)	23.84 (3.64)	23.31 (3.60)
Smoking, %				
Never	96.21	94.52	92.96	90.10
Occasional	2.15	2.74	3.55	4.30
Regular	1.64	2.74	3.49	5.59
Alcohol, %				
Never	60.64	62.33	69.47	47.42
Occasional	35.62	35.62	27.74	43.98
Regular	3.73	2.05	2.80	8.61

BMI, body mass index; FP, family planning; MET, Metabolic Equivalent of Task; MET, metabolic equivalent of task; SD, standard deviation.

non-loss-of-only-child group (OR=1.36, 95% CI: 1.21 to 1.51), and 1.42 times higher in the FP group in general (OR=1.42, 95% CI: 1.28 to 1.57), as opposed to the non-FP group. For the loss-of-only-child group, the odds of MDD are 2.80 times greater than the non-FP group,

though odds are not significant (OR=2.80, 95% CI: 0.88 to 8.94). The childless group also had higher odds of MDD compared with non-FP group, though the result was not significant in terms of p value (OR=1.71, 95% CI: 1.00 to 2.92, p=0.57).

Table 2 Prevalence and relative odds (95% CI) of depression in different family types

Family types		N, total	Depressed %	Unadjusted OR	Adjusted* OR	P value
FP	Non-loss-of-only-child group	196679	0.76	0.90 (0.82 to 0.98)	1.36 (1.23 to 1.51)	<0.05
	Loss-of-only-child group	152	1.97	2.37 (0.76 to 7.45)	2.80 (0.88 to 8.94)	0.20
	Total FP	196831	0.76	0.90 (0.82 to 0.98)	1.42 (1.28 to 1.57)	<0.05
Non-FP		89094	0.84	1	1	–
Childlessness		1160	1.29	1.54 (0.92 to 2.58)	1.71 (1.00 to 2.92)	0.57

*After adjusting for one/two children region, self-rated health, occupation, education, marital status, household income, smoking, alcohol. FP, family planning.

Modified association between family types and MDD in different social-economic categories

As is shown in table 3, we explored possible effect modification of some adjusted variables, including age, household income, highest education and marital status. In the fully adjusted model, the higher odds of MDD for non-loss-of-only-child group were only observed in the age ≥ 60 group (OR=1.42, 95% CI: 1.11 to 1.82). Compared with the non-FP group, the non-loss-of-only-child group had greater odds of having MDD in both household income groups, with slightly higher odds in people with a $<¥10\,000$ household income (OR=1.49, 95% CI: 1.27 to 1.75). There were significantly increased odds of MDD observed in the loss-of-only-child group (OR=4.45, 95% CI: 1.08 to 18.83) and childless group (OR: 2.30, 95% CI: 1.28 to 4.13) for people with a $\geq ¥10\,000$ household income.

Higher odds of MDD were observed in people with their highest education being primary school and below for non-loss-of-only-child group (OR=1.48, 95% CI: 1.32 to 1.67), while there was no such association in people with a highest education of junior high and above. Additionally, people who are married have significantly higher odds of MDD as opposed to the reference group in both the non-loss-of-only-child (OR=2.04, 95% CI: 1.67 to 2.50) and loss-of-only-child groups (OR=8.81, 95% CI: 1.05 to 74.11).

DISCUSSION

There are three main findings in the present study. First, women in FP families in general were found to have higher odds of depression compared with those in

Table 3 Adjusted ORs (95% CI) of family types with depression, stratified by age at study date, urban/rural, household income and highest education

	Family types			
	FP		Non-FP	Childlessness
	NLOC	LOC		
Age at study date				
Age $<60^*$	1.12 (0.99 to 1.27)	2.17 (0.52 to 8.97)	1	1.45 (0.82 to 2.56)
Age $\geq 60^*$	1.42 (1.11 to 1.82)	3.66 (0.49 to 27.68)	1	0.80 (0.11 to 5.78)
Household income				
$<10\,000^\dagger$	1.49 (1.27 to 1.75)	1.69 (0.23 to 12.49)	1	0.55 (0.14 to 2.27)
$\geq 10\,000^\dagger$	1.27 (1.11 to 1.46)	4.45 (1.08 to 18.33)	1	2.30 (1.28 to 4.13)
Highest education				
Primary school/below‡	1.48 (1.32 to 1.67)	3.30 (0.79 to 13.74)	1	0.73 (0.18 to 2.96)
Junior high/above‡	1.12 (0.92 to 1.38)	1.99 (0.27 to 14.83)	1	1.76 (0.96 to 3.25)
Marital status				
Married§	2.04 (1.67 to 2.50)	8.81 (1.05 to 74.11)	1	–
Widowed/divorced§	1.26 (1.12 to 1.41)	2.15 (0.53 to 8.12)	1	2.14 (1.26 to 3.63)

*After adjusting for one/two children region, self-rated health, occupation, education, marital status, household income, smoking, alcohol.

†After adjusting for age at study date, self-rated health, occupation, education, marital status, household income, smoking, alcohol.

‡After adjusting for age at study date, one/two children region, self-rated health, occupation, marital status, household income, smoking, alcohol.

§After adjusting for age at study date, one/two children region, self-rated health, education, occupation, household income, smoking, alcohol. FP, family planning; LOC, loss-of-only-child; NLOC, non-loss-of-only-child.

non-FP families in this study. Second, within FP families and at point estimation level, greater odds of depression were found among females in the loss-of-only-child group compared with females in the non-loss-of-only-child group. However, the result was not statistically significant. Third, the study found that women who lost a child under the FP policy were even more vulnerable in terms of depression if they were older, married, with lower education level or higher household income.

The overall prevalence of MDD was 0.76% among participants under the FP policy and 0.84% among participants who did not follow the policy in this study. This is consistent with recent studies using the same database, in which they also reported an MDD prevalence under 1%.^{37 38} However, the prevalence was lower than the global estimates and other estimates in China.^{39 40} Estimates using the global burden of disease in 2010 found that the global prevalence of MDD was 4.4% in 2010.⁴⁰ A study found that the 12-month prevalence MDD was 2.3% from 2001 to 2010 in China.³⁹ The difference could be attributed to the measurement tool, selection bias and cultural influences.^{37 41} CIDI-SF, which is a valid and widely used tool and is employed in this study, was found to generate different results from other tools.⁴¹ The current study recruit participants who were voluntarily involved in the survey and it is possible that people with MDD were less likely to participate in a survey. Besides, in China, depression may be stigmatised and people may tend to deny their mental condition due to the stigmas.³⁷ The interpretation of the current study should consider the lower than usual MDD prevalence in the study database.

Women under the influence of the FP policy were found to be more susceptible to depression in their later life in China. While it is possible that having a lower number of children is associated with higher depression rates for mothers, we also include the notion of 'biopower' as another possible explanation to elucidate our findings. Introduced by Foucault as a political technology, biopower operates through the 'extension of state power over both the physical and political bodies of a population, in the name of improving the life, health, and welfare of the individual and population'.⁴² This view critically assesses the consequences of biopower the state exercised, suggesting that such power can have negative consequences.⁴³ As an apparatus of biopower, the one-child policy enforced specific fertility regulation practices and behavioural change at individual and population levels regardless of individual freedom in reproductive choice. Although there is no evidence showing a clear linkage between the high prevalence of depression and the experiences of living with state-required FP programmes, some ethnographic research shows that such experiences can deprive women of sexual and reproductive health rights in opposition to the interests of family, community and local tradition.⁴⁴

The point estimate of MDD odds for those who lost their only child was high, though the result was not significant. These findings were consistent with past literature, which

suggests that bereaved mothers had 91% higher risk of mood disorder than those not bereaved.¹⁵ In another follow-up study, bereaved parents after child loss experienced 40% greater risk of depression, and bereaved mothers were more likely to have severe and long-lasting depression.⁴⁵ It is worth recognising that there was a long-standing tradition to see families with more children, and sons in particular, as blessed in China.⁴⁶ Families may desire more children, especially sons, based on this tradition, which was in opposition to the policy. Tension in families and communities might be induced by the collision between one-child policy and local culture. This might contribute to the high depression prevalence among bereaved mothers because in local culture, communities could be regarded as unfortunate by others. Besides, it is important to note that the aggregated odds of MDD among participants who lost their only child were not statistically significant. We maintained that the non-significant result was mainly due to the small sample size in this group, but it could be that the result is due to chance. The interpretation should be made with consideration of the statistical significance, sample size and the point estimate.

The odds of depression were found to be higher for women aged above 60 than that of women aged below in the loss-of-only-child group, which was consistent with the finding from a previous cross-sectional study on depression among bereaved Chinese parents in loss-of-only-child families.⁵ Some past studies, however, suggest that parental age does not significantly influence the long-term risk or pattern of depression among bereaved parents.^{18 19 47}

In the loss-of-only-child group, higher odds of depression were observed in mothers with a lower education level. This is consistent with previous findings, which indicate that higher education is associated with lower severity of grief,¹⁸ risks of hospitalisation for mental illness¹⁵ and depression among bereaved parents. It was postulated that people with a higher education tend to have a more fulfilling occupation that might distract their attention and provide them with better resources to cope with adverse events.⁴⁸ Evidence has also shown that chronic depression was more prevalent in people with lower education due to socioeconomic inequality, which adds on further obstacles for people to recover from child loss.⁴⁹

Most previous studies have found that bereaved parents of a lower income or less financial means usually experience more emotional loneliness, complicated grief or depression.^{19 29 45 50 51} One paper has found no significant relationship between income and depression among bereaved parents.⁴⁷ This is contrary to our finding, which suggests that lower income may be associated with a smaller chance of having depression among bereaved mothers under China's FP policy.

Married women in the loss-of-only-child group were found to have eight-fold greater odds of depression. Past research has found mixed findings regarding the effects

of marital status in moderating the relationship between loss of child and mother's depression. According to a recent cross-sectional study conducted in China, marriage might protect people from depression after the loss of an only child.¹⁹ In another follow-up study, the odds of depression for parents with child loss was not associated with marital status.⁴⁷ However, in our study cohort, the number of divorced or widowed women was relatively small in the loss-of-only-child group, and whether the divorce took place before or after the bereavement remained unknown. Further research is needed to understand the mechanism of marital status in moderating the association between women's risk of depression and child loss.

This paper makes several important contributions. First, although the data is cross-sectional, there is an inherent temporal effect between the loss of child and the time of the survey. Second, it is the first paper that incorporates a policy dimension into the research between bereaved parents and depression. The results clearly show that mothers who obeyed the FP policy tend to have a higher chance of depression than mothers who have multiple children, though whether the higher chance of depression is due to loss of reproductive rights or having a smaller number of children remains unknown. In addition, the data we used is the largest cross-sectional study in China that incorporates data on depression and the number of children. The sample was representative to infer an association at a population level.

The paper has several limitations, however. First, the study was only able to include mothers' age at the time of the survey. Maternal age at bereavement, the child's age at death, and other related information were not included in the survey. Past research suggested that the time elapsed since bereavement and child's age at death might influence mother's depression.^{5 15 49} Second, the study is a cross-sectional study instead of a longitudinal study. While people's situations may change with the elapse of time, longitudinal data would allow a better understanding of different coping mechanisms and trajectories of mental health after child loss. Third, the data lacks information on people's coping mechanisms after child loss. Past studies suggest that how people cope with the pain of child loss remains a complicated psychological pathway that permeates into multiple trajectories and time alone may not be a reliable predictor.^{30 47} However, this study focuses more on the risk of depression in women that ever experienced child loss in general. Another possible limitation is that the number of women with child loss was relatively undersized in this study, which may result in less statistical power and less accurate estimations for some results. Nevertheless, the major findings of this paper are not affected.

CONCLUSION

In this study, we found that people in the FP group, especially those who lost their only child, were more

susceptible to depression than their counterparts in the non-FP group. The susceptibility was stronger in older, less educated, wealthier and married populations. Several potential public health implications could be inferred from this paper. First, mental health interventions should give special care to those who lost their only child, as their risk of developing depression is significantly higher than the rest of the population. Second, relevant programmes should also consider the effect of FP policy on the risk of depression, as presented in this paper. Third, when designing mental health programmes, existing social policies and norms should be considered as they could impact mental health at a population level. The Chinese government has announced in 2015 that China's one-child policy has been lifted and is to be replaced by a universal two-child policy, which could possibly influence people's mental health. Further studies are needed to identify the potential positive or negative effects of the new policy on the well-being of the Chinese people.

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