

## ORIGINAL RESEARCH ARTICLE

# Association between socio-economic factors and female suicide in China: Evidence from world development indicators

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## Abstract

The present study examined the relationship between socioeconomic variables and female suicide in China from 2000 to 2022. The objective of the study was to assess how labor market conditions, educational attainment, income inequality, and urbanization influence suicide outcomes among women. The analysis of the study was based on longitudinal data collected from the World Bank. The results show that female unemployment, educational attainment, and urbanization are closely linked to changes in female suicide rates over time. Unemployment appears to increase vulnerability, whereas education serves as a protective factor. Urbanization introduces both risks and opportunities, contingent on the availability of social and institutional support, the observed trends underscore the need to address structural socioeconomic conditions alongside mental health interventions. Reducing female suicide in China requires policies that enhance economic security, broaden educational access, and ensure that mental health and social services are accessible within the context of urban development. (*Afr J Reprod Health* 2026; 30 [5]: 123-130).

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**Keywords:** Female suicide, school enrolment, urban population, China

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## Résumé

La présente étude examine la relation entre les variables socio-économiques et le suicide féminin en Chine de 2000 à 2022. Son objectif est d'évaluer l'influence des conditions du marché du travail, du niveau d'instruction, des inégalités de revenus et de l'urbanisation sur le suicide chez les femmes. L'analyse repose sur des données longitudinales de la Banque mondiale. Les résultats montrent que le chômage féminin, le niveau d'instruction et l'urbanisation sont étroitement liés à l'évolution des taux de suicide chez les femmes. Le chômage semble accroître la vulnérabilité, tandis que l'éducation constitue un facteur protecteur. L'urbanisation présente à la fois des risques et des opportunités, sous réserve de la disponibilité d'un soutien social et institutionnel. Les tendances observées soulignent la nécessité de s'attaquer aux conditions socio-économiques structurelles parallèlement aux interventions en santé mentale. Réduire le suicide féminin en Chine exige des politiques qui renforcent la sécurité économique, élargissent l'accès à l'éducation et garantissent l'accès aux services de santé mentale et aux services sociaux dans le contexte du développement urbain. (*Afr J Reprod Health* 2026; 30 [5]: 123-130).

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**Mots-clés:** Suicide féminin, scolarisation, population urbaine, Chine

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## Introduction

Suicide is a major cause of premature mortality worldwide and reflects profound social, economic, and psychological distress<sup>1</sup>. According to the World Health Organization (WHO), the global crude suicide mortality rate is approximately 10.6 per 100,000 population, and 79% of suicide deaths occur in low- and middle-income countries<sup>2</sup>. In

China, the suicide rate among women has historically exceeded that among men, and the disparity between rural and urban areas is nearly threefold<sup>3</sup>. China's rapid economic transformation, marked by industrialization, labor-market restructuring, and rising regional inequality, has significantly reshaped the socioeconomic conditions affecting women<sup>4</sup>. While economic growth has reduced absolute poverty, it has also

created new forms of insecurity, especially for women facing precarious employment, limited educational opportunities, and restricted access to social services.

Significant economic development and accelerated urbanization have been identified as primary explanations for changes in suicide rates<sup>5-7</sup>. However, the positive association between economic growth and reduced suicide rates appears to contradict Durkheimian theory, which posits that economic booms and increased urbanization erode social integration and control, potentially leading to higher suicide rates<sup>8</sup>. These findings suggest that the influence of economic development on suicide rates may vary across development stages. Additionally, previous research indicates that the impact of socioeconomic determinants on suicide rates differs by gender in the context of China's transformation<sup>9</sup>.

In China, increased employment rates and expanded educational opportunities resulting from recent economic development may have contributed to a reduction in the overall suicide rate<sup>10,11</sup>. In the past two decades, studies have documented a decline in the suicide rate from 22.9 to 15.4 per 100,000 between 1991 and 2000<sup>12</sup>, followed by a further decrease to 5.28 per 100,000 in 2011 (5.78 and 4.77 for urban males and females, respectively; 9.95 and 8.58 for rural males and females, respectively)<sup>13,14</sup>. However, despite these overall improvements in the past, suicide rates among young and older adults have increased in recent years<sup>14-16</sup>. Given China's population of 1.4 billion, the overall burden of suicide remains considerable subject of concern among scholars and policymakers<sup>17</sup>. Therefore, suicide continues to pose a significant public health challenge in China, highlighting the need for strengthened suicide prevention initiatives.

While previous research has primarily focused on psychological and cultural explanations for suicide, increasing evidence indicates that macro-level socioeconomic factors play a critical role in shaping suicide risk<sup>18</sup>. There remains a lack of visual analyses using data to illustrate trends and patterns in how socioeconomic variables affect female suicide prevalence. Addressing this gap is essential for developing interventions and policies that respond to the specific needs and

vulnerabilities of female populations. This study aims to address this deficiency by providing a comprehensive analysis of how socioeconomic issues such as female unemployment, secondary school enrollment and urban population have influenced female suicide prevalence in China. By employing graphical methods, the study empirically examines how these socio-economic variables affect women's mental health outcomes.

### **Literature review**

Yang *et al.*<sup>19</sup> investigated the association between meaning in life and suicidal ideation, examining moderators such as regional economic differences, measurement tools for suicidal ideation, and the impact of a public health emergency. The results indicated a negative correlation between meaning in life and suicidal ideation. Subgroup analyses showed that the association was stronger in underdeveloped regions, when specific measurement tools were used, and during a public health emergency.

Yuhua *et al.*<sup>20</sup> analyzed suicide rate trends in China from 2002 to 2019, distinguishing the effects of age, period, and cohort by gender and residence. Using the Joinpoint regression model, the study estimated the average annual percentage change (AAPC) in suicide rates and ratios across these subgroups. The findings showed a significant decline in suicide mortality rates, associated with economic development and urbanization, though the magnitude of this decline varied by gender and region. The age-period-cohort analysis indicated a pronounced increase in the effect of age, alongside an overall reduction in the influence of both period and cohort on suicide mortality rates.

Yanji *et al.*<sup>21</sup> analyzed the nationwide distribution of city-level intensity of online suicidal ideation in China and its underlying social determinants. The study identified moderate spatial clustering of suicidal ideation, with intensity decreasing from east to west and from developed to less developed areas within provinces. Socioeconomic inequality, social fragmentation (as indicated by single-generation households and religiosity), and a higher proportion of older adults were positively associated with suicidal ideation. Social deprivation, the divorce rate, and the male-

to-female sex ratio had significant adverse effects, whereas the marriage rate was not significantly associated. Zhang *et al.*<sup>22</sup> investigated socioeconomic factors and mechanisms underlying fluctuations in suicide rates, using a statistical model with provinces as the unit of analysis. The study found that the overall male-to-female suicide rate ratio in China increased with rising GDP per capita. The most pronounced reversals in gender ratios occurred in large municipalities.

Ying *et al.*<sup>23</sup> conducted a meta-analysis to identify factors associated with suicidal behavior in mainland China. The results indicated that mood disorders and stressful life events increased the risk of suicide ideation across the general population. Among youth, socio-family environment and unhealthy behaviors were additional risk factors for suicide ideation. Unhealthy behaviors, mood disorders, and stressful life events were identified as primary risk factors for attempted suicide. Individuals residing in rural areas, those with lower educational attainment, those with mood disorders, or those with a history of adverse life events faced a higher risk of complete suicide. Furthermore, the study found that, prior to 2000, females in China exhibited a significantly higher rate of completed suicide than males. Despite these findings, gender-specific analyses are limited, and few studies integrate macroeconomic indicators with female suicide outcomes. The present study addresses this gap by explicitly modeling the socioeconomic drivers of female suicide across Chinese provinces.

## Methods

A descriptive analysis approach was used to examine the association between socioeconomic indicators and female suicide in China. Using five-year interval data from 2000 to 2022, obtained from the World Development Indicators (WDI) by the World Bank<sup>24</sup>, the study analyzed relationships among female unemployment rates, educational attainment, urbanization levels, public health expenditure, and overall female suicide prevalence in China.

## Data analysis

This study employed a comparative analysis framework to address the study's objective. Drawing on longitudinal data from 2000 to 2022 World Bank's World Development Indicators (WDI)<sup>24</sup> records we first conducted a graphical analysis comparing female suicide rates with key socioeconomic indicators. Graphs help identify, observe, and see the pattern, trend, or change over time within the data, owing to their representational clarity on the topic or issue being studied.<sup>25, 26</sup>

## Ethical considerations

This research utilized anonymized, aggregated statistical data from the World Development Indicators (WDI), ensuring that no identifiable information was disclosed or at risk. No personal data was included, and the authors strictly adhered to the data providers' usage guidelines. The analysis followed a rigorous methodology, and the results are presented objectively. Ethical approval was not required, as the study did not involve human or animal subjects.

## Results

Figure 1 illustrates the long-term co-movement between female suicide rates (FSR) and female unemployment (FUNEMP) in China from 2000 to 2022. In 2000, female suicide rates were relatively high, while female unemployment was moderate. Over the observed period, the female suicide rate shows a clear downward trend, declining by 10.5%, with the most significant decrease occurring from the early 2000s to the mid-2010s. This reduction aligns with sustained decreases in female unemployment, which was recorded at 44.6, suggesting that increased labor market participation and income stability may have contributed to improved mental health outcomes among women. In 2020, female unemployment fluctuated slightly at 44.9, while suicide rates continued to decline at a slower rate, reaching 7.1%.

**Table 1:** Measurement of variables

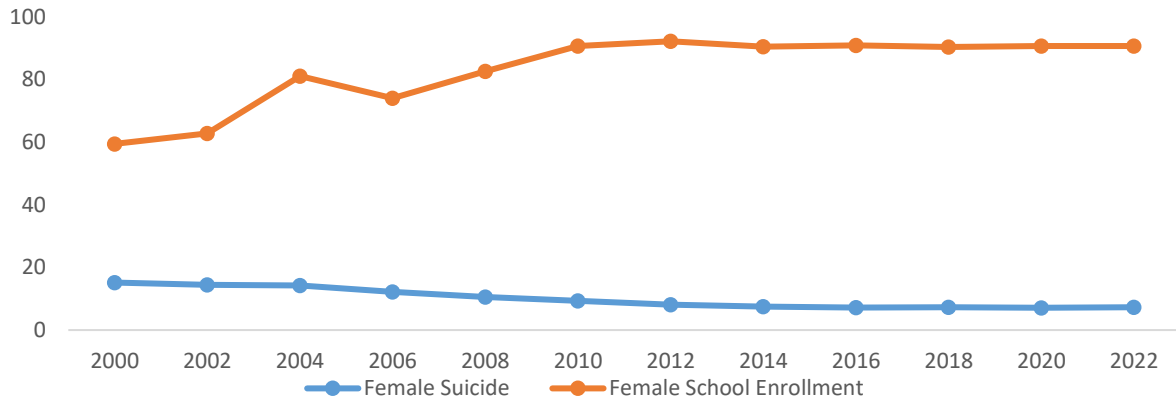
Variable	Code	WDI Indicator Name	Measurement	Source
Female suicide rate	FSR	Suicide mortality rate, female (modeled estimate)	Death per 100,000 females	WDI
Female unemployment	FUNEM P	Unemployment, female (% of female labor force)	Percentage	WDI
Education	EDU	School enrollment, secondary, female (% gross)	Percentage	WDI
Urbanization	URB	Urban population (% of total population)	Percentage	WDI
Income inequality	GINI	Gini index	Index (0-100)	WDI



**Figure 1:** Female suicide and female unemployment in China  
Source: Authors` Computation

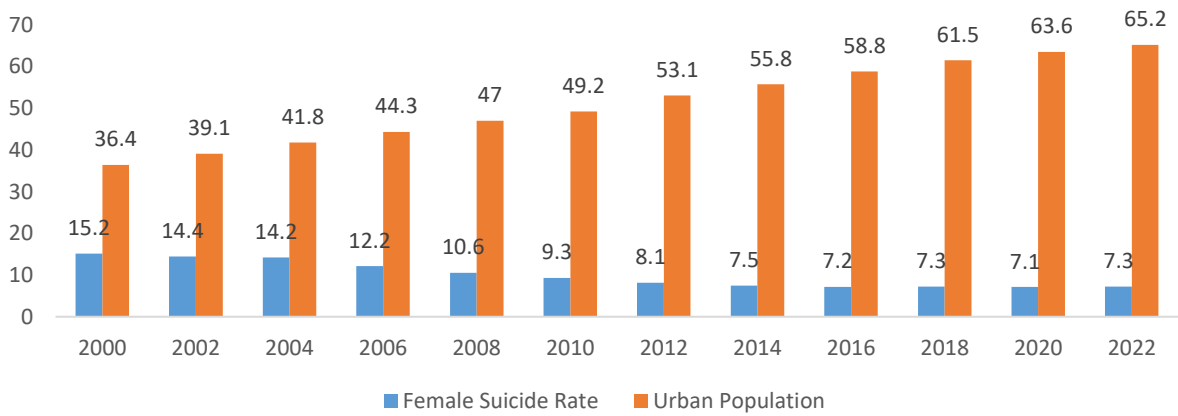
This pattern suggests that additional factors, such as urbanization, social support systems, healthcare access, or cultural changes, may also influence suicide trends. Figure 2 presents data from 2000 to 2022 on the relationship between female suicide rates (FSR) and female school enrollment (EDU) in China. In 2000, female school enrollment was 59.5, while the female suicide rate was 15.2%. This pattern suggests that limited educational access will likely reduce economic opportunities and social mobility, thereby increasing vulnerability to mental distress. As female school enrollment increased steadily through 2006, the female suicide rate declined to 12.2%. By 2010, this inverse relationship had become more pronounced. Between 2015 and 2020, school enrollment rose to 90.8, while female suicide rates declined further to 7.1%. Figure 3 shows the association between urbanization (URB) and female suicide rates (FSR)

in China from 2000 to 2022. In 2000, rapid urban population growth coincided with a relatively high female suicide rate of 15.2%. By 2010, urbanization had increased to 49.2, while female suicide rates remained elevated at 9.3%. In 2022, further urban expansion to 65.2 was associated with a gradual decline in female suicide rates to 7.3%. Figure 4 shows the association between income inequality and female suicide rate in China from 2000 to 2022. From 2000 to 2010, Gini index rose from 41.8 to 43.7. Meanwhile, 2011 marked a significant decline in Gini index, which continued to decline sustainably to 36 at the end of the analysis. Whereas, in 2000, female suicide rate was relatively high with 15.2%. By 2012, Gini index has reduced to 42.2, while female suicide rates have equally reduced drastically to 8.1%, which further reduced gradually and consistently in the subsequent years till the end of the analysis.



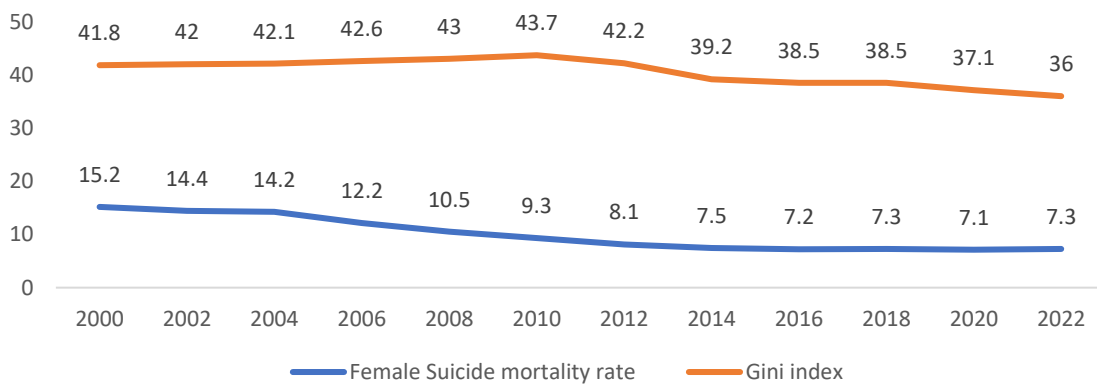
Source: Authors` computation

**Figure 2:** Female suicide rate and school enrollment in China



Source: Authors` computation

**Figure 3:** Urban population and prevalence of female suicide in China



Source: Authors` computation

**Figure 4:** Income inequality and female suicide rate in China

## Discussion

The findings demonstrate a pressing and significant connection between women's suicide in China and key socioeconomic factors, including unemployment, education, urbanization, and income inequality. Notably, the positive correlation between female unemployment and suicide rates identifies labor market instability as a crucial determinant of unfavorable mental health outcomes for women. Economic uncertainty associated with job loss and lack of employment opportunities exacerbates psychological burden, undermines support networks, and leads to an increased risk of suicidal behavior. This corroborates previous work in the field of gender and mental health, highlighting that employment offers significant protection due to its translation into economic independence, integration within society, and, importantly, availability of resources. In a way, female unemployment should not only be considered from the economic viewpoint but should also be approached with priority as a serious public health problem.

On the other hand, the inverse relationship between the educational level of women on the one hand, and the rate of suicides, underscores the strong protective effects of education. The degree to which more school enrolment protects against mental health emergencies is seen in the positive effects on job security, financial stability, and social empowerment. This implies that the need to maintain investment in the education of women has been highlighted, including as an integral measure in the approaches to the prevention of suicides in the country.

Urbanisation, on the other hand, creates another complicated issue that may be considered equally urgent. High rates of female suicides occurring early on within the urbanisation process highlight the absence of social integration, less direct community support, greater skills competition within the urban employment sector, living situations, inadequate mental health support, especially among migrants. Overall, this indicates the rapid growth of urbanisation was more than what the social sector could cover regarding the mental state of females. However, the reduced rates clearly show the improvement within the city's

support structures, resulting in the lowering of rates, indicating that urbanisation can result in more or less risk, depending on the support.

The risks are further magnified by income inequality. Times of increasing inequality are associated with high female suicide rates, while later inequality reductions coincided with steep declines in suicide incidence. This correspondence suggests that inequality is a structural stressor, which amplifies economic insecurity, social fragmentation, and unequal life opportunities. Women are especially susceptible to such pressures due to the residual presence of gender norms, labour market segmentation, and heavy caregiving responsibilities. The strong implication of these findings is that redistributive policies, inclusive growth strategies, and strong social protection systems have the potential to make a determining difference in lowering suicide risk. Overall, the evidence makes clear that female suicide in China is not an isolated psychological phenomenon but a profound reflection of structural socio-economic vulnerabilities. Urgent, coordinated interventions that reduce female unemployment, expand educational access, manage urbanization more inclusively, and address income inequality are essential to mitigating this critical public health challenge

## Strengths and limitations

This study offers important insights into the socioeconomic determinants of female suicide in China by analyzing long-term trends in indicators such as female unemployment, educational attainment, and urbanization. The use of graphical methods facilitates a clear, accessible presentation of temporal patterns, benefiting policymakers and non-technical audiences. Drawing on nationally and internationally recognized data sources enhances the reliability and consistency of the findings. Furthermore, the use of aggregated and anonymized secondary data addresses ethical concerns about individual identification, thereby reinforcing methodological rigor. Nevertheless, several limitations should be acknowledged. First, the analysis relies on a limited set of socioeconomic proxies, which may not fully capture the complex social and psychological processes underlying

female suicide. Factors such as access to mental health care, family structure, cultural expectations, social stigma, and regional disparities are not directly addressed. This gives room for further future empirical investigations in this regard. Future research employing causal methodologies and incorporating additional social variables would further advance understanding and support the development of more targeted interventions. While we recognize that the absence of controls for potential sources of confounding restricts the ability of the results of the current investigation to fully address the research issues under consideration, additional research needs to be conducted in order to establish the nature of the relationships

### ***Policy implications***

The findings of this study underscore several key policy considerations for addressing female suicide in China. First, policies that reduce female unemployment are likely to play a significant role in improving women's mental health. Expanding labor market inclusion through job creation, skills development, and employment protections for women can mitigate economic insecurity, which is closely associated with suicide risk. Second, sustained investment in girls' education is a vital long-term strategy. Expanding access to secondary and tertiary education can strengthen women's economic independence, social empowerment, and resilience to psychological distress. Educational policies should therefore be recognized as both economic instruments and preventive measures for mental health. Third, the complex effects of urbanization require targeted urban policies. Early phases of urban growth should be supported by investments in mental health services, social support networks, and affordable housing, particularly for migrant and low-income women. Integrating mental health care into primary care and community-based services in urban settings may further reduce suicide risk. In summary, a coordinated policy framework that integrates labor market reforms, educational advancement, and urban social infrastructure is essential to address the socioeconomic determinants of female suicide.

## **Conclusion**

This study examined the association between key socioeconomic factors and female suicide in China using graphical trend analysis. The findings indicate that female unemployment, educational attainment, and urbanization are closely linked to changes in female suicide rates over time. Unemployment appears to increase vulnerability, whereas education serves as a protective factor. Urbanization introduces both risks and opportunities, contingent on the availability of social and institutional support. Although causality cannot be established, the observed trends underscore the need to address structural socioeconomic conditions alongside mental health interventions. Reducing female suicide in China requires policies that enhance economic security, broaden educational access, and ensure that mental health and social services are accessible within the context of urban development

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