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The influencing factors and countermeasures of low fertility in China

Ruiyang Zhang

School of Public Health, Nanjing Medical University, Nanjing, Jiangsu Province, China

zhangruiyang@stu.njmu.edu.cn

Abstract. Fertility helps maintain the stability of the population and social security to ensure the continuation of economic growth. However, low fertility rate is becoming a problem that plagues the world, which has become particularly serious in China. The relevant research data have shown that the low fertility in China are associate with the changes of physical health status, and survival and social environments. Unless the relevant factors affecting the fertility rate are improved at some stage in the future, these impacts cannot be eliminated in a short time since the low fertility continued over time. Therefore, some measures to improvement of personal physical health, such as forbidden overload work to prompt diseases recovery. In this review, the author explores China's population health issues through analyzing the influence factors for China's declining in fertility rate, aiming to rise people awareness of this important population issue, and provide some possible suggestions to promote population growth by increasing the number of new births.

Keywords: low fertility; physical health; survival environment; social environment

1. Introduction

Fertility is important for maintaining the stability of the population and social security to ensure the continuation of economic growth. However, low fertility rate is becoming a problem that plagues the world, which has become particularly serious in China. In recent years, the relevant research data have shown that the declination of fertility rate in China are associated with the changes in physical health status, and survival and social environments, eventually leading to a series of impacts with the continued fertility declining, such as the pressure on population resources has been effectively alleviated because of more women entering the labor market [1]. In addition, low fertility accelerated population aging, resulted in more pressure on health care, and limited economic growth. Unless the relevant factors affecting the fertility, rate are improved at some stage in the future, these impacts cannot be eliminated in a short time since the low fertility continued over time. Therefore, some measures to improvement of personal physical health, such as forbidden overload work, thereby reducing people's work pressure, will help the recovery of certain diseases that affect fertility. Furthermore, increasing environmental protection efforts will also benefit to establish a good living space that promotes fertility [2]. In response to social factors, formulating more physical in-kind policy and increasing support for kindergarten services will have a positive effect on promoting fertility. In this review, the author explores China's population health issues by analyzing the reasons for China's declining in fertility rate, aiming to rise people awareness of this important population

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issue, and provide some possible suggestions to promote population growth by increasing the number of new births.

2. Factors affecting fertility

2.1. Factors affecting fertility in physiology

The living standard has accelerated with the economy developed rapidly after reform and open policy. Many young people have developed bad living habits, including smoking, drinking, overeating, weight loss and excessive dieting, lack of exercise, long-term exposure to electronic products, and staying up late.

In the past few decades, the number of smokers in China has been rising. In addition, as the social economy improves, China's drinking culture becomes increasingly rich, leading to a considerable number of drinkers. The relevant studies have shown that excessive smoking is associated with reduced fertility. No accurate data showed that drinking alcohol is related to fertility. However, the consumption of high alcohol is associated with an increased risk of infertility [3].

Although exact data may be difficult to obtain accurately, the number of people engaged in mental work in China is constantly increasing with long hours work and lack of exercise. Existing research data suggests the exercise duration related to fertility. A survey data obtained from the University of Queensland, showed that the risk of low fertility reduced about 20% in women who have highly active in comparison with low level of physical activity (PA) controls. In addition to this, the level of body mass index (BMI) is negative association with duration of exercise, which is also inversely proportional to fertility [4]. The same survey pointed out BMI is negative relationship with fertility in a dose-response manner. The percentage of low fertility in women with overweight is higher 18% than those with a normal BMI, which reached 36% in obese populations.

The eating habits of Chinese young people have also changed according to economic development. Data shows that the obesity rate among Chinese young people is increasing daily because of much oil and fat in diet. On the contrary, many young people choose excessive dieting to lose weight in order to pursue physical beauty. Indeed, there is a strong correlation between healthy eating habits and high fertility, thereby proper nutrition is beneficial to maintaining high fertility compared to poor eating habits with reduced fertility [5].

Research data shows that radiofrequency or electromagnetic radiation (RF-EMR) derived from wireless devices can damage male reproductive function. High-intensity RF-EMR can also reduce testosterone levels. In addition, RF-EMR have a negative impact on the function of the anterior pituitary gland and the hormones it produces. These influences also become more significant with the increase of RF-EMR intensity and the prolongation of their exposure time [6].

Sleep has been linked to disruption of the menstrual cycle, reduction of sperm motility, and natural fertility. Poor sleep quality includes insufficient sleep, sleep chronotype changing, and night shift work. These behaviors affect reproductive ability through changed the level of melatonin, which acts on the hypothalamic-pituitary-gonadal axis in the endocrine and reproductive systems. For women, poor sleep quality may lead to ovarian dysfunction and menstrual cycle disorders. The later a man goes to bed, the worse his sperm motility. In terms of sleep time types, the nocturnal type has the worst natural fertility compared to the intermediate and morning types. Those sleeping individuals with evening type who prefer to activity in the evening and sleeping late, has the worst natural fertility compared to morning type individuals and intermediate type individuals [7].

2.2. Factors affecting fertility in environment

In addition to personal physiological factors, the impact factors of living environment on fertility cannot be underestimated. Over the past 20 years, public health authorities have focused on identifying environmental chemical substances that can adversely affect hormone function, known as endocrine disruptors (EDs), including chemicals with harmful effects on human's reproductive systems. Studies have shown that endocrine air pollutants can alter fertility by altering the

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hypothalamic-pituitary-gonadal axis. Toxic chemicals produced in industry are easily released into the environment and then leach into water or soil, and ultimately enter the human body through the food chain. In addition, air pollutions can also have adverse effects on the fertility of women who use assisted reproductive technology [2].

Through data analysis, the researchers have shown that air pollution has seriously affected the fertility rate of Chinese people, not only having a negative effect on their actual fertility outcomes, but also on their willingness to have children, such as the content of particulate matter (PM)2.5 in the air. Moreover, these effects are more significant for couples living in cities with better economic development [2].

In addition to environmental toxicological factors, regional geographical environment also has a certain impact on fertility, such as high-altitude areas like Tibet. Studies have shown that the hypoxic effects of high altitude in Tibet can also impair fertility [8]. The side effects suggest that the fertile population can choose suitable locations to travel for increasing fertility.

2.3. Factors affecting fertility in society

In traditional Confucian concepts of encourage procreation, there is an opposing attitude towards childlessness. But with the development of the ages, people's thoughts have changed. Firstly, public tolerance for childlessness is gradually increasing. Secondly, the group's awareness of independence without children has increased, especially in urban areas. Similarly, the percentage of population who do not rely on their children is increasing compared to twenty years ago [9]. In addition, both the neighbor relationships and local economic levels also affect fertility rates. According to the willingness for second child in women, research data showed significant differences in the factor of neighborhood relationship. In comparison of women who lived in affluent neighborhoods, the women in poorer neighborhoods preferred to having a second child. Communities that provide shared child care facilities increasing women's desire to have children [10].

Social factors that affect fertility also include the education level and income of the public. Among them, the per capita years of education negatively related to the increase in fertility, while the higher education individuals had a positive impact on the fertility rate [1]. The choice of children's number is related to economic factors suggesting that financial support promotes population growth through increasing more children's willing [11].

2.4. Other Factors

Other factors influence fertility include gender, age, and psychological health. In terms of gender, women are more willing to be childless than men. In terms of age, late marriage is positive association with lower fertility rates [9]. Personal psychological stress, such as depression and anxiety, is also an important factor to reduce fertility intentions [12]. The influence factors are list in Table 1.

Table 1. Factors affecting fertility

Classifications	Factors	Examples
Physiological factors	Bad living habits Wireless devices Lack of sleep	The risk of low fertility reduced about 20% in women who have highly active in comparison with low level of physical activity controls.
Environmental factors	Endocrine disruptors Air pollution Regional geography	The content of particulate matter (PM)2.5 in the air not only has a negative effect on Chinese people's actual fertility outcomes, but also on their willingness to have children.
Society factors	People's thoughts Neighbor relationships Local economic level Education level	The women who lived in poorer neighborhoods preferred to having a second child in compared to affluent neighborhoods individuals.

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3. The influences of low fertility and measures to promote fertility

3.1. The influences of low fertility

The decline in the fertility rate means that women are less restricted by themselves, their families or their ideas, which helps more women enter the labor market. In addition, the decline in fertility rate will help alleviate the pressure on consumption of natural resources. However, the decline in fertility also means population aging, which leads to heavier pressure on the medical insurance system and deepening difficulties in social care for the elderly [13]. This trend can be seen from the fact that China's social insurance burden has increased year by year. At the end of 2000, the number of people participating in pension insurance was 136.174 million, which number had reached to 1,053.073 million until 2022. At the same time, the old-age dependency ratio has been increasing from 9.9% in 2000 to 21.8% in 2022 [14].

3.2. The measures to promote fertility

Methods to increase the fertility rate in the short term include formulating more in-kind policies and comprehensive support for the three-child policy. Similar to China, South Korea's population has also entered negative growth in 2022. In response to the declining population growth rate year after year, the South Korean government has adopted a series of policies, including providing cash, substances, voucher, and discounts in education and public facilities employing. The research results showed that significant impacts were observed between physical in-kind policy and the initial value of fertility rate [15]. In addition, in view of personal physiological factors, this article advocates that society strengthen the publicity and education of physiological health and fertility, thereby reducing the risk of involuntary infertility. In view of natural environmental factors, the government should increase efforts and at the same time strengthen publicity on environmental protection. In view of social environmental factors, this author recommends increasing support for early childhood services, such as establishing more childcare institutions. In addition to this, attention should also be paid to depression in non-fertile people and providing them with appropriate intervention and treatment.

4. Conclusions

A suitable newborn population can help maintain the stability of population structure and quantity, whereas the reduction of fertility rate has become a challenge in the global public health field. In response to the current downward trend in China's fertility rate, this article analyzes the reasons from three aspects including personal physiology, natural environment, and social environment, introduces the possible related impacts of this trend, and finally proposes a more feasible solution based on the above three aspects. This article draws attention to the phenomenon of declining fertility rates in China.

Although China's declining fertility rate has become a fact, this article believes that the government will further improve relevant policies and take more targeted measures in the future, such as strengthening education and publicity, improving the social support system, and increasing scientific and technological innovation and environmental protection. Since there are international precedents for improving fertility rates through policy measures, such as France, Sweden and other European countries, this article also recommends that China strengthen international cooperation and exchanges, learn from the successful experiences and practices of other countries, and jointly respond to fertility challenges on a global scale, to promote the development of global reproductive health.

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