

# Factors Affecting Exclusive Breastfeeding Practices Between Rural and Urban Areas in Anhui Province, China: A Comparative Study

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**Abstract:** *Aim:* This study aimed to compare the factors influencing exclusive breastfeeding (EBF) practices between rural and urban areas in Anhui Province, China, with a focus on identifying biophysical, social, and cultural determinants. *Background:* The World Health Organization and UNICEF both recognize exclusive breastfeeding as the optimal method of infant nutrition. In China, breastfeeding practices vary significantly between urban and rural areas due to factors such as cultural beliefs, healthcare services, socioeconomic status, and employment. This study aims to fill the research gap in Anhui Province, a rapidly urbanizing region. *Methods:* A quantitative comparative research design was employed, with data collected from 200 lactating mothers (100 from urban and 100 from rural areas) aged 18 years and above. The study used self-administered questionnaires that assessed demographic characteristics, biophysical, social, and cultural factors influencing EBF practices. Poisson regression analysis was conducted to examine the association between urbanicity and breastfeeding practices, adjusting for key variables such as age, employment, and income. *Results:* The study indicated that mothers in both rural and urban Anhui Province engaged more in exclusive breastfeeding (EBF) when supported by biophysical and social factors. Cultural influences were notably greater for rural mothers. Biophysical and social factors showed no significant differences between the groups. Regression analysis identified maternal age (31–35 years) and female infant sex as significant predictors of EBF. Employment negatively affected social support in both environments, while education and income impacted cultural attitudes towards EBF differently. *Conclusion:* Regardless of location, mothers who exclusively breastfeed highly value biophysical, social, and cultural factors. In urban areas, factors such as age, employment, and higher income significantly influence breastfeeding, while in rural areas, infant gender, marital status, income, and employment status are more crucial. Furthermore, both urban and rural mothers consider biophysical and social factors, but cultural factors are more prominent in the breastfeeding practices of rural mothers than urban mothers.

**Keywords:** Exclusive breastfeeding; Rural-urban differences; Biophysical factors; Social support; Cultural practices; Breastfeeding practices; Anhui Province, China; Lactation support

## 1. Introduction

### 1.1. Background of the study

Breastfeeding is the optimal way to nourish infants and offers significant health benefits for both mothers and babies. The World Health Organization and UNICEF recommend exclusive breastfeeding until the baby is six months old, followed by the introduction of complementary foods until two years of age or longer. However, breastfeeding practices vary globally due to differences in social norms and cultural values. Studies show that, influenced by formula milk marketing, breastfeeding rates are higher in rural areas and among impoverished families. In China, national health policies increasingly emphasize and promote breastfeeding, reflecting significant differences in breastfeeding practices between urban and rural areas due to factors such as access to healthcare resources and educational levels.

Existing research covers a wide range of breastfeeding practices and their benefits. However, there is a lack of comprehensive studies comparing factors influencing exclusive breastfeeding in urban and rural areas of Anhui Province. This study compares factors influencing exclusive breastfeeding in urban and rural areas of Anhui Province, China, analyzing factors such as age, marital status, income, education level, employment status, and cultural beliefs. The study aims to identify barriers and facilitators to breastfeeding in public places, thereby informing targeted interventions and policies to support breastfeeding mothers. Given that breastfeeding is a crucial public health issue, understanding the challenges and facilitating factors in China's evolving social environment is essential. The findings will contribute to creating a supportive environment, providing valuable insights for healthcare providers, policymakers, and community leaders to foster a breastfeeding-friendly culture and ultimately improve maternal and child health in Anhui Province.

### 1.2. Research problem

The study aims to compare the factors affecting exclusive breastfeeding practices in urban and rural areas in Anhui Province, China. Specifically, this study aims to seek answers to the following:

- (1) What is the profile variable in the urban and rural areas in terms of:
  - a. Age
  - b. Marital status
  - c. Average Family Income
  - d. Educational Attainment
  - e. Employment Status
  - f. Sex of the Child?
- (2) What are the exclusive breastfeeding practices in the rural areas in terms of:
  - g. Biophysical
  - h. Social
  - i. Cultural?
- (3) What are the exclusive breastfeeding practices in the urban areas in terms of:
  - a. Biophysical
  - b. Social

c. Cultural?

d. Which profile characteristics significantly influence the exclusive breastfeeding practices in rural and urban areas of Anhui Province?

(4) Is there a significant difference in exclusive breastfeeding practices between rural and urban areas in terms of:

a. Biophysical

b. Social

c. Cultural?

### **1.3. Significance of the study**

This study highlights significant implications for nursing education, practice, and research by analyzing factors affecting exclusive breastfeeding in Anhui Province, China. It compares biophysical, social, and cultural influences on breastfeeding practices in rural versus urban areas, aiming to enhance breastfeeding support and policies to improve maternal and child health outcomes.

#### **1.3.1. Nursing education**

The study emphasizes the need for tailored nursing education curricula to prepare students for supporting breastfeeding mothers in diverse settings, particularly highlighting geographic differences between rural and urban areas. Cultural beliefs, such as postpartum confinement in Anhui Province, significantly influence breastfeeding practices, necessitating cultural competency training for nursing students. Social factors, including family support and workplace policies, further affect breastfeeding success, which nursing programs should address by teaching students to foster supportive environments. The disparity in healthcare resources between rural and urban mothers underscores the importance of practical lactation support training in nursing education. By incorporating knowledge of biophysical, social, and cultural influences on breastfeeding, nursing students can design relevant health education programs, advocate for breastfeeding in various communities, and provide evidence-based support throughout their careers.

#### **1.3.2. Nursing practice**

This study explores the barriers and facilitators of exclusive breastfeeding in Anhui Province, providing healthcare professionals, especially nurses, with insights to offer targeted support to mothers. By addressing specific needs, nurses can enhance breastfeeding rates and duration, leading to the development of improved practices and guidelines for standardized care. The study highlights the role of nurses in advocating for public health initiatives that foster environments supportive of breastfeeding in both rural and urban settings.

#### **1.3.3. Nursing research**

This study addresses a gap in the literature regarding exclusive breastfeeding practices in Anhui Province, China, highlighting the significance of this rapidly urbanizing and culturally diverse region. It proposes a basis for future longitudinal studies to track changes in breastfeeding practices over time and assess the impact of interventions. The study's findings aim to enhance nursing education, practice, and research, ultimately improving support for breastfeeding mothers and informing policy development to promote maternal and child health outcomes in both rural and urban settings.

### 1.3.4. Scope and limitations of the study

This study investigates factors influencing exclusive breastfeeding practices in urban and rural areas of Anhui Province, China. It describes respondents' characteristics—biophysical, social, and cultural—and analyzes how these traits affect breastfeeding. The research is geographically confined to Anhui, enabling an examination of regional differences among a mixed urban-rural population, while considering factors such as age, marital status, family income, education, employment, and the child's sex.

## 2. Review of related literature

This chapter reviews the literature covering the impact of various personal characteristics, biophysical, social, and cultural factors, understanding which was essential to promote and support breastfeeding practices in Anhui Province, China.

### 2.1. Exclusive breastfeeding

WHO and UNICEF underscore the critical importance of exclusive breastfeeding (EBF) for infants' optimal growth, development, and health. Research by Chertok et al. (2019) shows that EBF significantly decreases infant mortality risk by preventing diseases like diarrhea and pneumonia, particularly in low- and middle-income regions <sup>[1]</sup>. Hossain et al. (2022) further emphasize EBF's protective effects against common infant illnesses such as respiratory infections and gastrointestinal diseases <sup>[2]</sup>. In China, the UNICEF Global Breastfeeding Scorecard reveals notable disparities in EBF rates between urban and rural areas, with urban settings displaying lower adherence. Chen et al. (2022) explain that urban mothers often encounter workplace challenges and aggressive marketing from formula companies, which contribute to earlier cessation of EBF <sup>[3]</sup>. In contrast, rural mothers typically struggle with limited access to professional breastfeeding support, complicating EBF adherence. Mei et al. (2024) find that countries with strong Baby-Friendly Hospital Initiatives (BFHI) report higher rates of EBF, indicating that systematic support frameworks are essential for sustaining EBF for the recommended six months <sup>[4]</sup>.

### 2.2. Profile characteristics and exclusive breastfeeding

In rural areas, maternal age significantly influences evidence-based feeding practices. Research by Zhang et al. (2021) indicates that younger mothers (under 25 years) in rural China struggle with adherence to these practices due to limited knowledge and support, while those aged 25–35 are generally more compliant, benefiting from maturity and family support <sup>[5]</sup>. Studies, including one on exclusive breastfeeding in rural western China, reveal that mothers with egalitarian perceptions of gender roles are more likely to practice exclusive breastfeeding, which underscores the importance of promoting gender equality in enhancing breastfeeding rates <sup>[5]</sup>. Family involvement has also been highlighted as a crucial factor, as caregivers' knowledge directly impacts exclusive breastfeeding practices, particularly in extended family contexts <sup>[6]</sup>.

Further, Wang et al. (2022) found that married mothers are more likely to exclusively breastfeed due to the emotional and financial support that marriage provides. In contrast, single or divorced mothers often face social and economic pressures that hinder their ability to maintain breastfeeding <sup>[3]</sup>. Education plays a crucial role too; Chen et al. (2022) demonstrated that mothers with secondary or higher education levels are better informed

about the health benefits of exclusive breastfeeding and are more likely to follow WHO guidelines and access healthcare post-childbirth<sup>[3]</sup>.

Economic factors also play a dual role. Baker (2023) showed that lower-income families tend to maintain higher rates of evidence-based feeding practices due to the prohibitive costs of infant formula, though economic hardship can also limit access to healthcare and breastfeeding education<sup>[7]</sup>. While exclusive breastfeeding presents as a cost-effective feeding option for low-income families, challenges such as inadequate lactation support persist<sup>[8]</sup>. Interestingly, unemployed or homebound mothers exhibit higher rates of exclusive breastfeeding compared to those in formal employment, as informal jobs often disrupt breastfeeding patterns<sup>[9]</sup>. Engagement in informal or self-employed work allows greater autonomy, enabling consistent breastfeeding<sup>[5]</sup>.

Cultural norms further complicate breastfeeding practices; Lin et al. (2023) found rural mothers preferentially breastfeed male infants first due to societal values that prioritize males for their perceived nutritional needs, leading to early complementary feeding for females<sup>[10]</sup>. This trend reflects cultural beliefs regarding gender roles and the nutritional needs of children, depicting a societal bias that often undervalues female infants' health requirements<sup>[11]</sup>.

### **2.3. Urban EBF practices**

Urban mothers aged 30 and older, particularly those with higher education, are more likely to exclusively breastfeed compared to younger mothers, who face challenges from formula marketing and social pressures to return to work quickly<sup>[12]</sup>. In urban environments, the age-related trends are nuanced; mothers aged 30–34 exhibit the highest exclusive breastfeeding rates, likely due to their education, planned pregnancies, and better access to maternity services<sup>[13]</sup>. Education plays a key role; higher education correlates with increased breastfeeding, as mothers gain easier access to health information<sup>[13]</sup>. Additionally, marital status significantly impacts breastfeeding rates, with married mothers benefiting from shared childcare responsibilities, maternity leave, and support that facilitates exclusive breastfeeding<sup>[14]</sup>. Conversely, single mothers often experience social stigmas and inadequate policy support, contributing to lower rates. Interestingly, higher household income does not always correspond to improved breastfeeding rates; wealthy urban families tend to prefer formula feeding due to convenience and social perceptions of modernity<sup>[3]</sup>. High-income mothers often have greater access to formula and childcare support, which can lead to reduced breastfeeding duration<sup>[5]</sup>. Those with workplace support are more successful in maintaining exclusive breastfeeding<sup>[15]</sup>. Cultural biases persist, influencing breastfeeding practices; for instance, working mothers may feel pressured to breastfeed male infants while using formula for females, indicating lingering gender discrimination<sup>[10,16]</sup>.

### **2.4. Biophysical factors that promote exclusive breastfeeding**

Biophysical factors such as maternal health and infant conditions significantly influence exclusive breastfeeding (EBF). Maternal anemia and malnutrition reduce milk production, causing early breastfeeding cessation, as highlighted by Shankar et al.<sup>[17]</sup>. Complications like blocked milk ducts and mastitis from untreated breast symptoms also lead to early cessation<sup>[10]</sup>. Maternal stress, particularly linked to postpartum depression, further impedes breastfeeding success, necessitating comprehensive support systems<sup>[18]</sup>. Infant-related issues, such as latching difficulties in preterm infants, adversely affect EBF. Zhang et al. (2020) demonstrated that kangaroo mother care improved breastfeeding outcomes<sup>[19]</sup>. A 2020 review emphasized that timely lactation consultant support addressing issues such as pain and perceived low milk supply significantly increased EBF rates among

young mothers<sup>[20]</sup>.

## 2.5. Social factors that promote exclusive breastfeeding

Social support is crucial for achieving exclusive breastfeeding (EBF). A 2022 Cochrane review by Gavine et al. found that support interventions, including help from partners and family, significantly reduced the number of women discontinuing EBF at six months (risk ratio 0.90, 95% CI 0.88 to 0.93)<sup>[21]</sup>. Additionally, a 2023 study showed that lactating women with higher perceived social support had greater breastfeeding success rates<sup>[22]</sup>. This underscores the need for comprehensive support systems involving family, healthcare providers, and employers to encourage mothers and address challenges, ultimately improving health outcomes for mothers and babies. Furthermore, a 2024 study in *BMJ Open* revealed that community peer counseling effectively promoted EBF among Chinese mothers with low breastfeeding self-efficacy<sup>[23]</sup>. Mothers receiving peer support were more likely to practice EBF, enhancing confidence through practical and emotional guidance<sup>[23]</sup>. Workplace support also plays a vital role in enabling EBF among working mothers, particularly in urban areas. A 2021 systematic review indicated that interventions such as lactation rooms and flexible scheduling were essential for promoting breastfeeding, although inconsistent implementation hindered their effectiveness<sup>[15]</sup>. The review emphasized the importance of a supportive work environment to enhance EBF rates among working mothers<sup>[24]</sup>.

## 2.6. Cultural factors promoting exclusive breastfeeding

Cultural beliefs and norms significantly impact exclusive breastfeeding (EBF) practices in China. Traditional postpartum customs, such as the “confinement period,” encourage breastfeeding<sup>[25]</sup>. Research indicates that mothers with equal gender role perceptions are more likely to practice EBF, suggesting that promoting gender equality in rural areas may enhance EBF rates<sup>[5]</sup>. Family caregivers’ knowledge plays a crucial role, particularly in rural settings with extended families. Various studies emphasize the influence of sociocultural attitudes, maternal education, and support systems on breastfeeding practices across different regions<sup>[13]</sup>. In urban areas, the perception of formula feeding as modern, fueled by aggressive marketing, has contributed to declining EBF rates<sup>[26]</sup>. Culturally sensitive education integrated into healthcare services has shown potential in improving EBF rates by tailoring interventions to local beliefs and practices<sup>[27]</sup>.

## 2.7. Synthesis

The WHO emphasizes that exclusive breastfeeding is crucial for infant health, but socioeconomic changes in China have presented challenges to its practice. In Anhui Province, rural mothers benefit from traditional support but lack professional breastfeeding resources, while urban mothers face the dual pressures of work demands and formula milk marketing, both of which affect the duration of breastfeeding. Multiple biophysical, social, and cultural factors influence the maintenance of exclusive breastfeeding, highlighting the need for comparative studies of breastfeeding practices among urban and rural mothers. This study aims to analyze these factors to provide a basis for nursing education and policy interventions to improve the breastfeeding environment.

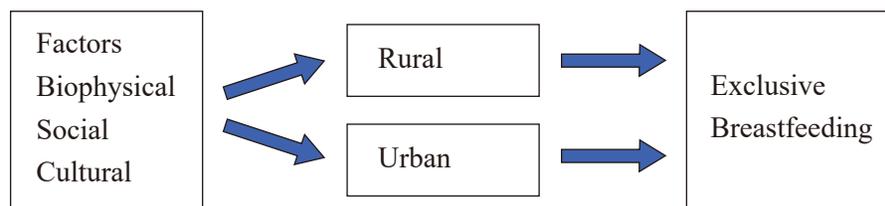
## 2.8. Theoretical framework

This study applied the Nola Pender Health Promotion Model to analyze factors affecting exclusive breastfeeding in Anhui Province, China. Key personal characteristics influencing breastfeeding include age, education, and

cultural beliefs. Younger mothers face more barriers compared to older ones, while higher education correlates with greater awareness of breastfeeding benefits. Behavior-specific cognitions such as perceived benefits, barriers, and self-efficacy significantly impact mothers' breastfeeding practices. Commitment to breastfeeding is linked to intention and the development of supportive plans. Additionally, competing demands like work and social expectations play a crucial role. Overall, the Health Promotion Model offers insights into the complex factors influencing exclusive breastfeeding, outlining strategies for effective interventions to enhance support for mothers in Anhui Province.

## 2.9. Research paradigm

The theoretical framework is shown in **Figure 1**.



**Figure 1.** Theoretical framework: Nola Pender's Health Promotion Theory

Hypothesis: There is no significant difference in the practice of exclusive breastfeeding in terms of biophysical, social, and cultural factors among lactating women residing in urban and rural areas in Anhui Province, China.

## 2.10. Definition of terms

### 2.10.1. Exclusive breastfeeding practice

(1) Conceptual definition: Exclusive breastfeeding practice refers to feeding infants only breast milk without any additional food, drink (not even water), or other fluids, except oral rehydration salts, vitamins, minerals, or medically indicated medications.

(2) Operational definition: Exclusive breastfeeding practice can be measured by assessing whether infants are fed only with breast milk from birth to at least six months of age.

### 2.10.2. Biophysical factor

(1) Conceptual definition: Biophysical factors encompass the physical and biological influences of both mother and infant that affect the initiation and maintenance of exclusive breastfeeding. Key elements include maternal health, lactation physiology, and the infant's feeding capabilities, which are essential for successful breastfeeding<sup>[13]</sup>.

(2) Operational definition: Biophysical factor refers to physical and biological factors related to the mother and infant that influence the ability to initiate and maintain exclusive breastfeeding. Biophysical aspects can be assessed through a researcher-made 4-item questionnaire answerable by "yes", "no", or "not applicable" focused on indicators related to the health and biological readiness of mothers and infants.

### 2.10.3. Social factor

(1) Conceptual definition: Social factor refers to the influence of interpersonal relationships, social structures,

and community support systems on exclusive breastfeeding (EBF). This includes family dynamics, partner support, peer counseling, workplace adaptation, and wider societal attitudes toward breastfeeding <sup>[21]</sup>.

(2) Operational definition: Social factor can be measured utilizing an 11-item researcher-made questionnaire answerable by “yes”, “no”, or “not applicable” that captures family dynamics, partner support, peer counseling, workplace adaptation, and wider societal attitudes toward breastfeeding.

#### **2.10.4. Cultural factor**

(1) Conceptual definition: Cultural factor refers to the shared beliefs, traditions, customs, and values in a community or society that influence attitudes and behaviours towards exclusive breastfeeding. These cultural norms shape people’s views on breastfeeding, the role of mothers, and acceptable feeding practices for infants <sup>[28–29]</sup>.

(2) Operational definition: Cultural factor can be measured by utilizing a 7-item researcher-made questionnaire answerable by “yes”, “no”, or “not applicable” focused on specific cultural influences and customs associated with exclusive breastfeeding.

### **3. Research methodology**

This chapter contains research design methods, study setting, population and sampling, study protocol, statistical treatments, and ethical considerations.

#### **3.1. Research design**

This study used a quantitative comparative research design to compare the factors affecting exclusive breastfeeding practices between rural and urban areas in Anhui Province, China. It allows for the comparison of different variables between different groups, specifically personal characteristics, biophysical factors, social factors, and cultural factors that influence breastfeeding practices.

#### **3.2. Population and sampling**

There were 200 respondents in a study on exclusive breastfeeding (EBF) practices, equally divided between rural and urban areas in Anhui Province, China, with no attrition. Participants were lactating mothers aged 18 and above with infants aged 6 months to two years. Mothers under 18 were excluded due to unique factors affecting EBF. A non-probability consecutive sampling method was employed to recruit participants, ensuring a representative sample over one month. A G power analysis, guided by a biostatistician, calculated the necessary sample size for testing EBF associations, resulting in a target of 197 participants based on a medium effect size and standard power level.

#### **3.3. Research locale**

The study was conducted in four counties/districts (two urban and two rural) in Anhui, China, to represent various socioeconomic and cultural backgrounds. Breastfeeding mothers were consecutively selected from healthcare facilities and community settings within each district using a consecutive sampling technique.

### 3.3.1. Rural

Hospital R1 is a privately owned facility with one independent ward in Yingshang County, providing various health services, including obstetrics and gynecology.

Hospital R2, located in Huaji Town, Linquan County, is a government-run comprehensive public institution offering services such as medical treatment, preventive care, and rehabilitation, with a strong focus on various clinical departments.

Hospital R3, a second-level government hospital in Wangdian Town, Fuyang City, operates under a maternal and child health framework, recognized for its quality care and public satisfaction. It combines medical treatment, preventive health services, and education.

### 3.3.2. Urban

Hospital U1 is a government facility in Fuyang City with 13 clinical departments, including a key obstetrics and gynecology department, alongside 7 medical and technical departments and 13 administrative departments.

Hospital U2, located in Huaibei City, is a third-level maternal and child health hospital recognized as a national baby-friendly hospital. It is a leading institution for maternal and child health services in Anhui Province.

Non-lactating mothers or mothers unwilling to participate in the study were excluded.

## 3.4. Research instrument

This study in Anhui Province consisted of three parts. The first part included a researcher-made profile with 7 characteristics: age, marital status, residence, family income, education, employment, and child's sex.

Part 2 was a 22-item self-administered questionnaire with “yes”, “no”, or “not applicable” options, validated by experts, achieving a Cronbach's alpha above 0.70. It focused on three sub-variables: biophysiological (4 items), social (11 items), and cultural (7 items).

The findings suggest that mothers are more inclined to practice exclusive breastfeeding if the mean score of these factors exceeds the median score.

Reliability analysis: The reliability of the scale indicates its stability, consistency, and accuracy for data measurement, typically assessed using Cronbach's alpha.

A pilot study with 40 items involved 20 participants from rural and urban areas; however, the full-item reliability yielded a low Cronbach's alpha. A comparison of original and reduced items demonstrated that the reduced item version achieved a higher internal validity index of at least 0.70 across all factors (**Table 1**).

**Table 1.** Internal validity of the breastfeeding factors questionnaire

Factors	Full items	Reduced items*
Biophysical factor (BF)	0.49	0.72
Social factor (SF)	0.06	0.74
Cultural factor (CF)	0.47	0.72

Note: \* Items retained: BF (items 3, 4, 5, 8); SF (items 1, 2, 3, 6, 7, 8, 9, 10, 13, 14, 15); CF (items 4, 5, 6, 7, 8, 9, 15)

The study's scale analysis reveals a high reliability (Cronbach's alpha > 0.7) for both rural and urban pilot findings. SPSS 24.0 assessed internal consistency, yielding a minimum validity index of 0.70 across three factors. Responses were counted while reversing negatively stated items for biophysical, social, and cultural factors. A maternal and child health expert further evaluated the researcher-developed questionnaire, reducing items to four for biophysical factors, eleven for social factors, and seven for cultural factors, aligning maximum scores with retained items.

### **3.5. Research protocol**

This study employed a systematic approach, divided into five phases:

The first phase involved obtaining ethical approval and permission from the relevant healthcare institutions.

The second phase consisted of a pilot study with 40 participants to validate the questionnaire.

The third phase focused on recruiting participants through the distribution of flyers and ensuring participant privacy and adherence to specific inclusion criteria.

The fourth phase was the data collection phase, where respondents answered questions under the guidance of the researchers.

The fifth phase involved data analysis and interpretation: the collected data was managed securely; paper documents were locked away, and digital data was password-protected.

Detailed data analysis was performed using SPSS software, employing descriptive statistics for categorical variables and inferential statistics (including chi-square tests and analysis of variance) to assess the associations and differences in breastfeeding behavior across different demographic characteristics.

## **4. Data analysis**

### **4.1. Test of association**

Two stages were utilized to analyze the difference in factor scores by urbanicity, accounting for profile characteristics. The first stage involved the Kruskal–Wallis rank test due to the non-normal distribution of factor scores, which follow a Poisson distribution as count data. In the second stage, Poisson regression was performed to assess the relationship between urbanicity and the factor scores, adjusting for profile variables that had significant *P*-values from the initial analysis.

### **4.2. Ethical consideration**

Before starting the research, the study obtained ethical approval from the Far Eastern University Ethical Review Committee (FEU-ERC), following the health research ethical principles outlined in the National Code of Ethics. These principles encompass seven key elements: social values, informed consent, the vulnerability of participants, risks, benefits and safety, privacy and confidentiality, fairness, and transparency.

Ensuring the health and safety of vulnerable participants was crucial. The review by the Institutional Ethics Research Committee provided safeguards for the moral and legal rights of both researchers and participants, emphasizing the necessity of compliance with research ethics protocols to adequately address these ethical considerations.

### **4.3. Social value**

This study highlights the social value of understanding factors influencing public breastfeeding, suggesting that a law-making body could create supportive policies for mothers, facilitating convenient breastfeeding in public places.

### **4.4. Informed consent**

The researcher ensured full disclosure of the study's purpose, protocol, risks, safety, and benefits, while respecting participants' rights to choose participation or withdrawal. Informed consent approved by FEU-ERC was obtained, and participants received a copy of the consent form. They were also asked about their willingness to engage in the research process, with the researcher acknowledging their right to refuse participation.

### **4.5. Vulnerability of research participants**

The research participants in this study were breastfeeding mothers in Anhui Province, China, who may face several vulnerabilities that require careful consideration to ensure ethical research practices:

#### **4.5.1. Psychological vulnerabilities**

Participants may feel stressed or emotionally uncomfortable discussing personal breastfeeding experiences, social attitudes, and health issues related to their infants.

#### **4.5.2. Social vulnerabilities**

Fear of judgment or discrimination from family, community, or peers regarding breastfeeding practices, especially in public settings, may affect participants' willingness to disclose information.

#### **4.5.3. Economic vulnerabilities**

Participants from lower socioeconomic backgrounds may face challenges related to transportation costs, time constraints, or financial pressures that may affect their ability to fully participate.

#### **4.5.4. Health vulnerabilities**

Maternal health issues, breastfeeding difficulties, or concerns about infant health may increase stress and affect participants' physical and mental health during the study.

#### **4.5.5. Cultural vulnerabilities**

Cultural beliefs and different understandings of research concepts may hinder participants' understanding of research procedures and the informed consent process.

Addressing these vulnerabilities includes ensuring confidentiality, providing adequate support and resources, respecting cultural sensitivities, and maintaining open communication throughout the research process to protect the well-being and rights of all participants.

### **4.6. Risks, benefits, and safety**

This study used questionnaires to compare personal characteristics and factors influencing breastfeeding in

public. The research indicated that, for the participants, potential influences were rarely perceived as risky, and a cost-benefit analysis was not considered necessary. The researchers gave little consideration to any potential harm that might result.

#### **4.7. Privacy and confidentiality of information**

All personal information gathered in the study was treated anonymously, with only names recorded. Access to this data was limited to researchers, research consultants, and statisticians, ensuring confidentiality. After the study, the data were securely stored and will be shredded prior to manuscript publication to safeguard participant privacy.

#### **4.8. Justice**

The researcher prioritized fair treatment and respect for participants' rights, ensuring no discrimination. Participants' benefits and choices are prioritized, and their decision to withdraw does not negatively impact their relationship with the investigator or other participants.

**Transparency:** The researchers ensured transparency by disclosing any potential conflicts of interest and guaranteeing the safety and respect of all study participants. They provided comprehensive information about the study's purpose, risks, benefits, and participants' rights to refuse or withdraw at any time. Additionally, they confirmed that all parties understood the procedures, shared the digital log form exclusively, and fully communicated the research results, including their scientific relevance and practical implications for participants.

### **5. Presentation, analysis, and interpretation of data**

This chapter contains information on the findings, analysis, and interpretation of the collected data using adapted statistical methods, presenting the importance of data presentation and analysis in understanding the comparison of factors that influence exclusive breastfeeding practices between rural and urban areas in Anhui Province.

**Table 2** reveals that 62.5% of mothers aged 31–35 maintain exclusive breastfeeding (EBF), with urban mothers (60%) showing slightly lower compliance than rural mothers (65%). Education influences EBF rates, as urban mothers have a higher primary education rate (46%) but lower higher education (14%) compared to rural mothers (34% and 21%, respectively). Marital status also affects EBF, with married mothers benefiting from more spousal support; 89% of urban mothers are married versus 61% in rural areas. Economic factors play a role, as 38% of participants earn under RMB 5,000, mainly among rural mothers (44%), while urban households earning above RMB 5,000 account for 68%. Employment status is a barrier for working mothers, with 60% employed in both contexts. Urban self-employment (19%) slightly surpasses rural (16%), suggesting more flexibility in EBF for self-employed mothers. Cultural beliefs prioritize male infants for longer breastfeeding, aligning with the birth ratio of male (51.5%) to female (48.5%) infants, especially in rural areas (56% male).

**Table 2.** Demographic characteristics of the participants, by urbanicity

Demographic Characteristics	Urban	Rural	Total
N	100 (50.0%)	100 (50.0%)	200 (100.0%)
Age group			
26–30 years old	40 (40.0%)	35 (35.0%)	75 (37.5%)
31–35 years old	60 (60.0%)	65 (65.0%)	125 (62.5%)
Educational attainment			
None	10 (10.0%)	10 (10.0%)	20 (10.0%)
Primary education	46 (46.0%)	34 (34.0%)	80 (40.0%)
Secondary education	30 (30.0%)	35 (35.0%)	65 (32.5%)
Tertiary education	14 (14.0%)	21 (21.0%)	35 (17.5%)
Marital status			
Divorced	11 (11.0%)	39 (39.0%)	50 (25.0%)
Married	89 (89.0%)	61 (61.0%)	150 (75.0%)
Average family income			
Less than 5000RMB	32 (32.0%)	44 (44.0%)	76 (38.0%)
More than 5000RMB	68 (68.0%)	56 (56.0%)	124 (62.0%)
Employment status			
Unemployed	23 (23.0%)	22 (22.0%)	45 (22.5%)
Employed	58 (58.0%)	62 (62.0%)	120 (60.0%)
Self-employed	19 (19.0%)	16 (16.0%)	35 (17.5%)
Sex of the baby			
Male	47 (47.0%)	56 (56.0%)	103 (51.5%)
Female	53 (53.0%)	44 (44.0%)	97 (48.5%)

**Table 3** indicates that cultural factors (Mean=5.55) significantly influence mothers in rural areas, outpacing biophysical (Mean=2.74) and social factors (Mean=3.81). In Anhui, China, healthy conditions for both mother and infant support exclusive breastfeeding, though limited resources and health issues pose challenges. Cultural practices like “sitting the month” enhance breastfeeding acceptance, while strong social support is essential; however, factors such as spouses working away can diminish this network, affecting the support available to mothers.

**Table 3.** Exclusive breastfeeding practices in rural areas in terms of biophysical, social, and cultural factors

Factors	Mean	SD	Median	Interpretation
Biophysical	*2.74	1.40	2.00	More likely to affect EBF practice
Social	*3.81	2.90	3.50	More likely to affect EBF practice
Cultural	*5.55	1.79	5.50	More likely to affect EBF practice

Note: \* > Median means more likely to affect EBF practice

**Table 4** indicates that urban mothers in Anhui Province are more influenced by biophysical (mean = 2.61) and social factors (mean = 3.69) when practicing exclusive breastfeeding compared to cultural factors (mean = 4.94). Cultural influences are less significant due to modernization and changing family structures, leading to a mix of traditional and modern practices. Urban mothers have access to alternative feeding methods and reduced emotional support from extended families, especially as they often return to work soon after childbirth, impacting their breastfeeding practices. While biophysical factors remain a considerable challenge, urban mothers face additional stressors that may hinder their breastfeeding efforts despite having better health resources.

**Table 4.** Exclusive breastfeeding practices in urban areas in terms of biophysical, social, and cultural factors

Factors	Mean	SD	Median	Interpretation
Biophysical	*2.61	1.37	2.00	More likely to affect EBF practice
Social	*3.69	2.49	3.50	More likely to affect EBF practice
Cultural	4.94	1.85	5.50	Less likely to affect EBF practice

Note: \* > Median means more likely to affect EBF practice

**Table 5** analyzes the factors influencing exclusive breastfeeding in Anhui Province, China, focusing on the impact of cultural, biophysical, and social factors. Key demographic characteristics included education level, marital status, household income, and employment status, with well-educated mothers in stable families being more likely to follow positive breastfeeding practices.

**Table 5.** Influence of profile characteristics on exclusive breastfeeding practices in rural and urban areas in Anhui Province

Factors	Rural			Urban				
	**AOR	95% CI	P-value	AOR	95% CI	P-value		
(A) Biophysical								
Age group (ref. 25 – 30)								
31–35	1.53	1.19	1.98	*0.00	1.08	0.83	1.41	0.55
Educational attainment (ref. None/ Primary Education)								
Secondary/ tertiary education	1.07	0.82	1.4	0.60	0.83	0.65	1.07	0.15
Marital status (ref. Married)								
Divorced	0.9	0.74	1.09	0.28	1.33	0.92	1.91	0.13
Average family income (ref. Less than 5000RMB)								
More than 5000RMB	0.86	0.7	1.06	0.15	0.89	0.69	1.16	0.40
Employment status (ref. Unemployed)								
Employed	1.12	0.9	1.41	0.31	1.3	0.86	1.97	0.21

**Table 5 (Continued)**

Factors	Rural				Urban			
	**AOR	95% CI	P-value	AOR	95% CI	P-value		
Self-employed	0.96	0.73	1.26	0.74	0.87	0.68	1.11	0.26
Sex of the baby (ref. Male)								
Female	0.97	0.77	1.24	0.83	1.75	1.32	2.31	*0.00
(B) Social								
Age group (ref. 25 – 30)								
31 -35	1.5	1.16	1.93	*0.00	1.34	0.97	1.85	0.07
Educational attainment (ref. None/ Primary Education)								
Secondary/ tertiary education	1.2	0.93	1.55	0.16	0.92	0.71	1.19	0.54
Marital status (ref. Married)								
Divorced	1	0.8	1.24	0.97	0.61	0.42	0.88	*0.00
Average family income (ref. Less than 5000RMB)								
More than 5000RMB	1.03	0.81	1.31	0.82	1.55	1.12	2.13	*0.00
Employment status (ref. Unemployed)								
Employed	0.29	0.18	0.46	* < 0.00	0.3	0.19	0.46	* < 0.00
Self-employed	1.08	0.8	1.47	0.60	0.4	0.25	0.64	*0.00
Sex of the baby (ref. Male)								
Female	1.09	0.85	1.4	0.50	0.76	0.56	1.04	0.08
(C) Cultural								
Age group (ref. 25 – 30)								
31 -35	0.98	0.83	1.16	0.81	0.91	0.76	1.1	0.34
Educational attainment (ref. None/ Primary Education)								
Secondary/ tertiary education	1.29	1.05	1.59	0.0159	0.68	0.57	0.81	* < 0.00
Marital status (ref. Married)								
Divorced	1.02	0.89	1.17	0.80	0.82	0.7	0.96	*0.01
Average family income (ref. Less than 5000RMB)								
More than 5000RMB	0.79	0.67	0.93	*0.00	0.9	0.8	1.01	0.08
Employment status (ref. Unemployed)								
Employed	1.11	0.86	1.42	0.42	1.3	1.02	1.66	*0.03
Self-employed	1.07	0.84	1.35	0.58	1.17	1.07	1.28	*0.00
Sex of the baby (ref. Male)								
Female	0.94	0.79	1.13	0.52	1.03	0.91	1.17	0.60

Note: \*@0.05 alpha level of significance, \*\* Adjusted Odds Ratio

## 5.1. Biophysical factors

Biophysical research findings show that rural mothers aged 31–35 have a higher adjusted odds ratio (AOR) for exclusive breastfeeding compared to urban mothers (AOR = 1.53), while infants in urban areas receive better biophysical support (AOR = 1.75).

## 5.2. Social factors

Employment status significantly impacts social support; working mothers are 70% less likely to receive positive social support, and urban divorced mothers face numerous obstacles due to limited maternity leave.

## 5.3. Cultural factors

Cultural support also varies; well-educated rural mothers are associated with stronger breastfeeding support (AOR = 1.29), while increased education levels in urban areas have a negative impact on breastfeeding support (AOR = 0.68) (Table 6). Despite these challenges, urban working mothers can still utilize various online resources to enhance cultural support for exclusive breastfeeding.

**Table 6.** Difference in exclusive breastfeeding practices between rural and urban areas in terms of biophysical, social, and cultural factors

Factors	UrbanM (SD)	RuralM (SD)	P-value*	Interpretation	Decision
Biophysical factors (BF)	2.61 (1.37)	2.74 (1.40)	0.71	No significant difference	Accept Ho
Social factors (SF)	3.69 (2.49)	3.81 (2.90)	0.97	No significant difference	Accept Ho
Cultural factors (CF)	4.94 (1.85)	5.55 (1.79)	*0.01	With Significant difference	Reject Ho

Note: \*Test of difference using Kruskal–Wallis equality-of-populations rank test at .05alpha level of significance

The study reveals significant cultural differences between urban and rural mothers regarding breastfeeding, with rural mothers scoring higher on cultural influences (Mean= 5.55) compared to urban mothers (Mean= 4.94), indicating a  $P$ -value of 0.0104. Biophysical challenges such as breast complications and preterm birth are equally prevalent ( $P = 0.71$ ), emphasizing that lactation issues affect all mothers. Social support shows nearly identical effectiveness in both settings ( $P = 0.97$ ), highlighting the importance of family, healthcare providers, and workplace policies. While urban mothers have greater access to formal health services, rural areas benefit from strong informal support networks. Workplace policies vary, with urban environments offering more maternity leave and flexible hours, yet rural communities provide essential family care. Cultural postpartum customs strongly influence exclusive breastfeeding (EBF) practices, with rural mothers adhering more closely to traditional norms than higher-income urban families who may opt for formula feeding.

## 6. Summary, conclusions, and recommendations

### 6.1. Summary of findings

This study aimed to explore factors influencing exclusive breastfeeding (EBF) practices in Anhui Province,

China, with a particular focus on comparing rural and urban areas. The main findings are as follows:

### **6.1.1. Demographic profile**

This study analyzed 200 mothers, primarily aged between 31 and 35 years old. Urban mothers had higher levels of primary education and household income, while rural mothers also had higher education levels and divorce rates. Both groups of mothers had high employment rates, and there were slightly more male infants among rural mothers than urban mothers.

Exclusive breastfeeding (EBF) practices were influenced by biophysical, social, and cultural factors. Rural mothers showed a stronger cultural inclination towards exclusive breastfeeding (Mean=5.55), while urban mothers were influenced by biophysical factors (Mean=2.61) and social factors (Mean=3.69), although the influence of cultural factors (Mean=4.94) was relatively smaller.

### **6.1.2. Predictors of EBF factors**

Biophysical factors: Older rural mothers (31–35 years) are more likely to practice EBF than the younger (25–30 years old). Mothers in the urban areas are more likely to practice EBF if they have female infants.

Social factors: Employment status was negatively associated with EBF in both urban and rural areas. Higher-income mothers in urban areas have increased social support to practice exclusive breastfeeding. Divorce in urban areas reduced social support to practice exclusive breastfeeding.

Cultural factors: Higher education positively influenced exclusive breastfeeding among rural mothers, while negatively affecting urban counterparts. Employment correlated positively with cultural support for urban mothers. Higher income negatively impacted exclusive breastfeeding practices in rural areas.

### **6.1.3. Practice of exclusive breastfeeding between urban and rural**

No significant difference was found in breastfeeding practices between urban and rural mothers when considering biophysical and social factors; however, cultural factors revealed significant differences in Anhui Province, indicating that rural mothers were more influenced by cultural traditions ( $P = 0.01$ ).

## **6.2. Conclusion**

Evidence indicates that exclusive breastfeeding among mothers is influenced by biophysical, social, and cultural factors regardless of location. In urban areas, variables such as age, employment, and higher income significantly affect breastfeeding rates, while in rural areas, key factors include the sex of the baby, marital status, and socioeconomic status. Additionally, while both rural and urban exclusive breastfeeding mothers rely heavily on biophysical and social factors, cultural factors play a more critical role in rural breastfeeding practices.

## **6.3. Recommendations**

### **6.3.1. Strengthening social and cultural support systems**

Urban areas: City policies should strengthen support for breastfeeding in the workplace and conduct public health campaigns to promote breastfeeding and counter the marketing of infant formula.

Rural areas: While cultural norms support breastfeeding, increasing access to professional lactation support and maternal education is crucial to encouraging mothers to breastfeed.

### **6.3.2. Targeted education programs**

Educational interventions on maternal health and breastfeeding need to be region-specific, addressing urban and rural contexts. Tailoring these programs to local cultural beliefs and socioeconomic realities is crucial for enhancing breastfeeding practices.

### **6.3.3. Policy and financial support**

Policymakers should provide financial incentives for exclusive breastfeeding and offer paid maternity leave and workplace accommodations for breastfeeding mothers, helping low-income and informally employed individuals access the necessary support.

### **6.3.4. Further research**

Future research should explore longitudinal studies to examine the long-term effects of breastfeeding interventions on maternal and child health outcomes. Comparative studies in other provinces and regions could provide broader insights into the factors that influence breastfeeding practices in China and globally.

## **6.4. Limitations**

The study's reliance on self-report data could lead to biases affecting response accuracy. Its geographical focus on Anhui Province may limit the findings' applicability to other regions in China.

Additionally, the non-probability continuous sampling technique used may have introduced selection bias, resulting in a sample that does not fully represent all breastfeeding mothers, particularly those who did not seek care at the recruited health facilities or community centers.

## **Disclosure statement**

The author declares no conflict of interest.

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