UNDERSTANDING INFANT AND YOUNG CHILD FEEDING CHALLENGES IN CHINA

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ABSTRACT
This paper reviews infant feeding challenges China faces in the current economic and social climate. Infant and young childhood is a critical period of growth and development and losses due to under-nutrition are often irreversible. In urban areas, there has been a rapid increase in childhood obesity since the market reform policies of the early 1980’s, with interventions focusing on school-aged children or young adults. Under-nutrition continues to be widespread in many rural areas of China, and while improvements have taken place, most efforts are focused on school-aged children. In both under- and over-nutrition, little attention has been paid to the role infant feeding plays. Through observations and interviews with healthcare workers, mother’s groups and rural-urban migrant women in Shanghai and Yunnan, we attempt to deconstruct social and economic determinants of infant and young child feeding practices in order to illuminate specific barriers and possible solutions. Infant feeding decisions, particularly those regarding breastfeeding, are closely linked to cultural, economic and social values. Education, a crucial component of improving nutritional outcomes, does not alone change infant feeding behavior. Rural-to-urban migration, re-negotiation of family roles, and media as the main source of nutrition information for households each pose unique barriers to providing infant and young children with proper nutrition. Infant feeding and nutrition programs should take a multi-pronged approach that includes education, awareness, and policy.

INTRODUCTION
The recent change from a centrally planned, socialist economy to one that is market-driven has stimulated economic growth and generated an increase in food availability scarcely seen before in China’s history. China has decreased the number of malnourished children between 1990 and 2006 by half (United Nations, 2008), yet a divide persists between the nutritional status of rural and urban children. Rural children are up to five times more likely to be underweight than their urban counterparts (United Nations, 2008). In China, where the majority of children still live in rural areas, understanding the problems contributing to malnutrition is of unprecedented importance.

Childhood obesity is also becoming a serious health threat in China. China’s approach to economic development, i.e. promoting consumerism, has been wildly successful in urban areas by

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improving access to capital, healthcare, education and expanding the labor market. By focusing on consumption to alleviate poverty and malnutrition, however, China now faces a rise in obesity and morbidity from non-communicable diseases such as congestive heart failure, chronic kidney disease and type-2 diabetes (Gong, et al., 2012).

Before the problems of both under- and over-nutrition can be fully assessed, they must be contextualized into China’s rapidly changing social and economic climate. For example, family planning policies are causing a re-adjustment of family roles, especially where breastfeeding is concerned. Consumer culture is driving an obesity epidemic in urban areas where choice and individuality are increasingly valued. Current infant feeding messages may not resonate with current issues families face, such as migration, consumerism, and emphasis on individuality. As more and more mothers migrate to larger Chinese cities for employment, their children’s caretaking, including infant feeding, is left in the hands of other family members such as grandparents. Little research has been done to understand how infant feeding decisions are made in this context.

Therefore, our purpose is to explore rural and urban perceptions of infant and young child feeding (IYCF) knowledge and behaviors, including education of healthcare workers and socio-cultural barriers to optimal infant feeding practices. We endeavor to make sense of China’s IYCF and nutrition challenges so that policy makers can begin to assess existing infant feeding practices and implement appropriate interventions. We begin this perspective with an overview of breastfeeding and infant nutrition, and move on to discuss childhood obesity, the use of infant formula and the one-child policy in urban China. We then outline issues in rural China, including maternal migration and the community health worker. We present trends in infant feeding between rural and urban China differently in order to highlight relevant differences between the two areas. Observations are included at the end of both sections to illuminate how individual, household, community, and national experiences are shaped in Chinese healthcare settings. We end with a discussion on the role of nutrition education and community participation in order to improve health outcomes.

METHODS

The bulk of the research on which this perspective is based comes from 14 months the lead author (LW) spent in China from August 2010-October 2011 collaborating with Xiaoyang Sheng and her team at the Shanghai Jiaotong University School of Medicine. The focus of this research was to explore IYCF practices in Shanghai and Xichou, Yunnan using the socio-ecological framework (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokols, 1996). Specifically, we looked at individual factors such as maternal identity in rapidly changing family and socio-economic systems, family-level factors involving decision-making between family members, and structural factors related to media advertising of formula and healthcare practices and policies.

Interviews with healthcare workers, mother’s groups, migrant women and nutrition researchers were conducted in order to gain an understanding of IYCF. Relevant experiences include shadowing SJTU medical students on an IYCF study at the Kongjiang Community Health Clinic in Shanghai, collaborating with community advocates at La Leche League for breastfeeding education, and observing a randomized control trial, evaluating meat as a complementary food to breastfed infants, in rural Yunnan. Because of their exposure doing nutritional research in many provinces across China, medical students and community health workers were invaluable sources of information. They understood many problems in the healthcare system, including the different needs of rural and urban areas. The ability to triangulate our findings with local cultural and medical authorities, as well as scientific literature, provided us with a deeper insight of complex questions surrounding infant feeding perceptions and practices.
Breastfeeding and Infant Nutrition

Breastfeeding exclusively for the first six months promotes ideal infant growth patterns, has maternal, infant, and societal benefits, and remains the number one preventative measure to reduce infant mortality worldwide (Agency for Healthcare Research Quality, 2007). Infant and young child feeding practices have a direct effect on the nutritional status, growth and development of children less than two years of age (World Health Organization, 2008). Chief among IYCF practices that can have an effect on a child’s growth and development is breastfeeding. Exclusive breastfeeding, defined as no liquids or solids other than breast milk, for six months continues to be strongly recommended by the Chinese Pediatric Society. Despite efforts such as the “Breast-feeding Friendly Hospital Initiative to promote exclusive breastfeeding for infants until six months (Gottschang, 2007), rates of “exclusively breastfed” infants in China continue to decline from 78% at 4 months in 1996 down to 45.3% in 2002, with large differences between regions, ranging from a low of 22.4% of exclusive breastfeeding through 4 months in Chongqing to a high of 76.3% at 4 months in Chengde (Xu, Qiu, Binns, & Liu, 2009). In short, women and their families often choose a “mixed-feeding” regimen, providing both breast milk and infant formula.

The many reasons for the societal switch from exclusive breastfeeding through 6 months to mixed feeding are multi-factorial and include families having inadequate household resources to support a mother staying with her child, the effects of the media on influencing public opinion on breastfeeding, and a lack of policy and educational programs directed toward the public (Gottschang, 2007; Guldan, 2000). Families often display an inadequate understanding of the nutritional value of breast milk, and report that infant formula is superior for an infant’s growth and development (Jiang, et al., 2012; Wilkinson, 2011).

There are many reasons the decline in exclusive breastfeeding is concerning. First, it can be immediately deleterious to an infant’s health. Contaminated water may be used to mix formula, parents or other caregivers may dilute formula to save money, and families may use inappropriate breast milk alternatives that do not meet the child’s nutritional needs, such as cow milk or rice porridge (Li, Li, Ali, & Ushijima, 2003). If the child has an allergic reaction or does not tolerate infant formula, there are few appropriate alternatives if the mother’s milk supply has already diminished or ceased completely. Perhaps most concerning to Chinese parents, however, are the recent “milk scandals” surrounding infant formula products. In 2008, a total of 296,000 children fell ill and 4 infants died from contaminated milk powder used for infant formula (BBC News, 2010). Contaminants have been found in infant milk powder in China as recently as June 2012, where a top selling brand recalled 6-months worth of formula tainted with mercury (Hornby & Lee, 2012).

Long-term concerns include the protective role that exclusive breastfeeding plays against obesity. There are strong correlations between bottle-feeding and obesity in children, including among children in China (Liu, et al., 2009). Infant formula may be obesogenic for multiple reasons, including promoting prolonged bottle use (Gooze, Anderson, & Whitaker, 2011), inappropriate programming of leptin receptors (Singhal, et al., 2002), increased insulin response from formula (Lucas, et al., 1980), and the inability of formula-fed infants to self-regulate their intake as effectively as breastfed infants (Dewey, Heinig, Nommsen, Peerson, & Lonnerdal, 1993).

URBAN CHINA

Market reforms during the late 1970’s and early 1980’s have revolutionized life in urban China, creating improved standards of living for millions with an emphasis on consumption to promote economic growth. At the same time, family planning policies have changed family dynamics, with single-children attended to by multiple family members. Known as “Little Emperors” (French & Crabbe, 2010), these children often garner the exclusive attention of their parents and
grandparents. Together, economic demands and the one-child policy have affected IYCF practices and outcomes, including increased dependence on infant formula, perceptions of overweight infants as “healthy”, and changing caregiver-infant feeding behaviors.

**Trends in Infant Feeding**

- **Obesity**

  Almost unheard of prior to market reforms thirty years ago, rates of childhood obesity in Shanghai are now up to 13.25% (Luo, Shen, & Tu, 2004), and incidence of type 2 diabetes has tripled among school-aged children (French & Crabbe, 2010). Discussions centered around infant feeding and its effect on obesity are especially salient as rapid weight gain in infancy is positively correlated with obesity later in life (Monteiro & Victora, 2005).

- **Use of Infant Formula**

  Economic demands of life in urban China require that many new mothers retain employment after birth, which may interfere with exclusive breastfeeding. As women continue working through their child’s infancy, infant formula becomes an attractive option for busy, working mothers. At the same time, infant formula companies continue to increase spending on artificial infant feeding research as well as ad campaigns in China. Nestlé, for example, paid $11.85 billion U.S. dollars to acquire Pfizer’s baby food market in China in early 2012 (Jones & Mao, 2012), and Mead Johnson boasted a 12% increase in net income, led by China and Hong Kong (The Associated Press, 2012).

- **Perceptions of Overweight Infants**

  Positive attitudes towards overweight and “chubby” babies continue to be pervasive throughout Chinese society, where overweight children are featured in advertisements and television shows (French & Crabbe, 2010) and may be perceived as the healthy growth pattern for infants and children. Indeed, many parents in China perceive their children being underweight when they are normal or normal when they are overweight (von Deneen, Wei, Tian, & Liu, 2011). Due to past years of famine and poverty, having an overweight infant may be seen as a sign of prosperity. Due to beliefs of the nutritional superiority of infant formula, a woman who wishes to exclusively breastfeed may be discouraged if her child is not growing “normally” according to her perceptions (Jiang, et al., 2012). In these cases, caregivers often add formula to promote perceived ideals of growth.

- **Complementary Foods**

  Delaying complementary foods until 6 months shows a protective effect against obesity (Schack-Nielsen, Sorensen, Mortensen, & Michaelsen, 2010). Grandparents often become the caregiver of choice when both parents are working, and are most likely the ones who initiate complementary foods. As primary caregiver, grandparents set the stage for feeding behaviors once the mother returns to work. As is typical in Chinese culture, these first foods include rice porridge (粥), egg yolks, but may quickly turn to higher calorie sweets or “junk” foods. Later, praise and affection is oftentimes given through snacks, food “treats”, fast-food and pocket-money (French & Crabbe, 2010).

**Observations**

Kongjiang Community Health Center is situated in a typical middle-class neighborhood in Shanghai, where observations of SJTU medical students conducting an infant feeding study were made during the winter/spring of 2011 (Ma, et al., In press 2012). Infant feeding questionnaires were administered orally to caregivers (either grandparents, parents, or nannies) about breastfeeding duration, bottle-feeding, and introduction of complementary foods. In addition, counseling was
provided to caregivers on proper IYCF techniques. Multiple family members would often accompany single infants, each of whom was actively engaged in asking questions, caring for the child, and interacting with clinicians. The average adult to infant ratio was between 3-4 adults to every child. Posters promoting formula were prominently displayed on the clinic walls, and a glass cabinet showcased “proper” infant feeding techniques, which included introducing complementary foods at 1-2 months.

Consistent with findings elsewhere (Jiang, et al., 2012), caregivers at the Kongjiang Community Health Center were concerned with the child being underweight when they were normal. Few caregivers were concerned with their child being overweight even as the prevalence of overweight and obese infants was high at almost 33% at 12 months, the majority of which were already obese at 6 months (Ma, et al., In press 2012).

Infant formula advertisements were seen throughout clinic walls, tolerated by clinicians who understood that women had to be away from their infants for large stretches of the day when working, or that grandparents and other family members wanted to take part in feeding the newborn. Education materials in the display case also recommended adding foods at as young as 1 month. Whether explicitly counseled by the clinic’s practitioners or not, the message from the display is that breast milk is not enough.

Clinicians and medical students showed a clear understanding of the dichotomy between infant feeding messages from health organizations (exclusive breastfeeding until 6 months is recommended, then continuing to breastfeeding with the addition of complementary foods until two years) and practice (mixed-feeding with infant formula and premature addition of complementary foods). Breastfeeding discussions regarding the nutritional superiority of breast milk often became less relevant than concerns regarding work, family opinion, and insufficient milk supply. These messages, coupled with the display case and posters on the walls promoting infant formula, illustrate ways in which this particular clinic does not promote 6 months of exclusive breastfeeding.

La Leche League (LLL), an international organization that supports breastfeeding through mother-to-mother support, has formed groups in Shanghai and Beijing. In China, mothers as well as fathers, grandparents and nannies attend meetings. Run exclusively by volunteers, the meetings take place in a semi-formal lecture format, with families socializing casually with each other before and after. Certified Lactation Consultants and physicians were available for specific questions in Shanghai, which were answered to the group. In this way, family members have the opportunity to ask questions freely and obtain answers from healthcare professionals.

This environment was much more attuned to the needs of new mothers and families for a number of reasons. First, families are free to mingle with each other and exchange advice on how to optimize breastfeeding outcomes while a competent healthcare professional gently guides new mothers through difficulties. Barriers could be discussed with professionals or other families, and myths are quickly dispelled. Infant feeding education in a community setting such as LLL is much more suited to the new socio-economic environment where collective “parenting” of mothers, fathers, and grandparents is reality.

RURAL CHINA

The economic and social status of rural Chinese has greatly improved over the last thirty years. Compared to urban Chinese, however, those living in rural areas overall have unequal access to food, healthcare, and resources (Wang, Wang, & Kang, 2005). While malnutrition in infancy and early childhood is closely linked to poverty in rural areas, inappropriate infant feeding and care, limited access to health services, and inaccurate health and nutrition information also contribute.
Poverty alleviation and improving the quality of rural life in China will no doubt help improve nutritional status of rural infants, but an examination of China’s urban obesity epidemic suggests that appropriate policies addressing other issues related to nutrition education are needed as well. Treating malnutrition with consumption leads to obesity.

Trends in Infant Feeding

- Breastfeeding

Historically in China, breastfeeding was commonplace in rural areas up through twelve months and later (Shen, Habicht, & Chang, 1996). Recent trends show while breastfeeding rates remain high (98.22%), a smaller number of infants are exclusively breastfed (24.36%). These rates are much lower compared to urban areas (52%), due to early introduction of complementary foods (Wang, et al., 2005). Those who are exclusively breastfed show lower rates of pneumonia and diarrhea, leading to better growth and development.

If the mother is unable to breastfeed, there is often little for her infant in terms of breast milk alternative support. This is especially true after the 2008 Sanlu Milk Powder scandal, where families in China have become extremely cautious about what brand of infant formula they feed their children (Seror, Amar, Braz, & Rouzier, 2010). This has had a positive effect on breastfeeding rates overall in China, but poses a special challenge to rural mothers. Caregivers will often buy foreign brand formulas in urban areas to avoid domestic tainted formula; this tends to be prohibitively expensive for rural families, who often have no choice but to buy domestic formula.

- Complementary Feeding

Very little is currently known about complementary feeding practices in rural China or what drives weaning behavior (Guldan, et al., 2000). Protein intake in infants is most likely insufficient because of a lack of health knowledge, and rural people may be more influenced by traditional feeding practices than nutritional recommendations from clinicians. The extent of caregiver’s knowledge has not been systematically studied.

- Maternal Migration

Due to urban growth and development, rural Chinese are migrating to urban areas in order to find better financial opportunities. According to China’s State Council, there are now over 221 million Chinese migrants, representing over 17% of China’s total population (Wang, 2011). Women of childbearing years represent more than one-third of these workers. Pregnant women will many times deliver their child in their natal township and return to work in the city post-partum in order to provide needed income to their family. Children and infants of migrant women are often left behind in their natal village with grandparents as caregivers when the mother migrates. Estimates put these “left-behind children” at 58 million (Stack, 2010).

While statistics show that overall breastfeeding rates in rural areas are high, infant feeding patterns and preferences of migrant women have not been studied.

- Community Health Workers

China’s rural healthcare system is comprised of government run village clinics, township health centers, and county hospitals run by doctors and nurses who are mainly educated through a junior college or secondary school programs (Meng, Yuan, Jing, & Zhang, 2009). Training programs typically take two years, but may be more or less depending on the needs and resources of the community (Anand, et al., 2008). Responsibilities range from providing vaccinations to HIV prevention strategies.
Community health workers are often extremely effective as health educators in rural areas as they have an intimate understanding of how traditional beliefs can be incorporated into nutrition and health education. Successful intervention studies based on community based participation, led by community health workers, (Israel, Eng, Schulz, Parker, & Satcher, 2005) have been effective in reducing the prevalence and incidence of infant malnutrition among certain minority populations in rural areas of China (Y. Li, et al., 2007). These programs have taken into account traditional and cultural beliefs of individual women and families, and have coupled them with participation at the community level. The role of the community health worker in IYCF programs in rural China warrants further investigation, as there is promising evidence that this cadre can help nutrition and growth outcomes to be successful (Zhang, Shi, Wang, & Wang, 2009).

Observations

Xichou is a rural community in southern Yunnan province, where two authors (LW and XS) worked with a team of physicians at the Xichou Women and Children’s Preventative Hospital. Throughout discussions on IYCF, poverty and inadequate education were the two most frequently mentioned reasons for undernutrition among children in rural areas. When asked about major nutrition challenges in rural areas, many turned directly to economic policy. “It is more important to influence economic policy so [rural people] can buy a refrigerator for meat”, explained one urban medical student who had spent time in Xichou. Many parents must migrate to an urban area to find economic opportunities in order to alleviate poverty. A young mother expressed financial hardship by explaining how she had to make the painful choice of leaving her child in the village while she moved to the city to make money for her aging parents, whose farm was unable to support a family in the current economic environment.

One young woman we spoke with had to leave her son when he was two-months old as her husband was from a different rural area than she, neither of them sharing a hukou, China’s household registration system. An individual’s hukou determines many social services, including insurance, childcare, and education. Her parents were taking care of her son, and she expressed concern about having to give him domestic infant formula because of the “milk scandal”. Structural barriers such as these pose challenging difficulties for migrant women to be with their infants. In order to promote successful programs, these women will need additional support to translate the desire to breastfeed with the ability for her to be with her baby.

Along with attention being paid to structural barriers, multiple physicians and community health workers also noted nutrition education as an important component of improving the health of rural Chinese infants. According to the Department Head of Pediatrics at the Xichou Women and Children’s Preventative Hospital, Xichou has between 225-270 community healthcare workers to serve a population of 200,000. Interviews revealed perceptions of community health workers being too busy with other tasks to bother with infant feeding education. Grandparents and individuals reported low level of understanding of child appropriate foods (foods high in iron, zinc, or protein), but according to both rural physicians and urban medical students working in rural areas, community healthcare workers also knew very little in terms of IYCF nutrition. This has been reported elsewhere in the literature (Wang, et al., 2005).

THE ROLE OF INFANT FEEDING EDUCATION

In the changing landscape of an increasingly mobile society, designing nutrition education programs that are easily translatable from urban to rural areas is essential. As the disease burden shifts from communicable to non-communicable, healthcare policies that promote better IYCF practices must be implemented across economic regions.
With China’s family planning policy, nearly all mothers are inexperienced with infant feeding and rely heavily on advice from close relatives or media sources such as the internet and advertisements. New mothers in China are influenced more by family members than healthcare workers in IYCF practices (Zhang, et al., 2009), yet perinatal information regarding breastfeeding is rarely directed at entire families. If healthcare workers are able to reach out to the whole family for breastfeeding education, however, breastfeeding is likely to be more successful (Hector, King, Webb, & Heywood, 2005; Jiang, et al., 2012; Wilkinson, 2011).

Accurate, unbiased information regarding appropriate breastfeeding practices is difficult to find in the new consumer-driven economic system (Gottschang, 2007). Formula companies have opportunities to capitalize on low public understanding of optimal infant nutrition and may provide inaccurate or inadequate information to healthcare practitioners who have been charged with public health education. Providing proper IYCF training to healthcare workers, who can then be trained to educate mothers and their families, should be a priority of policy-makers and healthcare professionals.

Table 1. Barriers to optimal infant and young child feeding

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<tr>
<th>Level</th>
<th>Urban</th>
<th>Rural</th>
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<tbody>
<tr>
<td>Individual</td>
<td>Mother returning to work</td>
<td>Migration</td>
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<tr>
<td></td>
<td>Perceived inadequate milk production</td>
<td>Traditional beliefs</td>
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<tr>
<td>Household</td>
<td>Desirability of overweight infants</td>
<td>Economic hardship</td>
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<td></td>
<td>One-child policy causing restructuring of family roles</td>
<td>Migration</td>
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<td></td>
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<td>Grandparents as primary caregivers</td>
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<td></td>
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<td>Lack of knowledge</td>
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<td>Community</td>
<td>Consumer culture driving formula use</td>
<td>Poorly trained community health workers</td>
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<tr>
<td>National</td>
<td>Corporate advertising</td>
<td>Corporate advertising</td>
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<tr>
<td></td>
<td>Absence of IYCF counseling</td>
<td>Economic inequality</td>
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CONCLUSION

Exclusive breastfeeding through 6 months, and continued breastfeeding with the addition of complementary foods until two years thereafter, continues to be recommended for all infants in China. Due to the current economic and social situation, however, women and families often lack appropriate support for the success of exclusive breastfeeding. On one hand, clinicians and families understand that breastfeeding is the preferred method to infant feeding. On the other, issues such as migration, economic stability, the one-child policy, and cultural perceptions of healthy infants reduce exclusive breastfeeding.

As China moves towards an urban, consumer-based society, childhood obesity rates rise, and influencing factors of under- and over-nutrition are continually affected by fluid changes in economic, political, social and technological systems. In rural areas, barriers include the separation of parents from their child, a decline in breastfeeding rates, and low-level understanding of age-appropriate foods. In urban areas we also observe a decline in breastfeeding rates, although there we see a rise in childhood obesity and an increase in morbidity from non-communicable disease.

Costs from health problems associated with obesity promise to be massive due to rising demand for healthcare (French & Crabbe, 2010). Lifestyle habits and choices that may lead to obesity are much easier to shape from early childhood. Obesity programs for adults tend to be costly and have poor outcomes.
Up to 600,000 deaths could be avoided each year if exclusive breastfeeding and appropriate weaning practices were utilized worldwide. Societal costs of undernutrition include hospitalizations and loss of future income due to cognitive difficulties. Breastfeeding promotion remains the single most cost-effective intervention to decrease child mortality (Jones, et al., 2003).

Policy-makers should focus on reforms that promote more appropriate infant-feeding practices that span geographic and economic regions, including cultivating nutrition-training programs, breastfeeding promotion that welcomes family participation, and limiting infant formula advertisement.

Community participatory techniques have been successfully piloted in rural China and should be utilized wherever feasible. In Beijing and Shanghai, La Leche League utilizes community participation in order to promote breastfeeding, and comparable programs would likely succeed in rural areas, headed by a trained community healthcare worker. This is an extremely cost-effective way to improve outcomes associated with infant feeding practices in China.

In summary, revising IYCF programs to acknowledge barriers such as migration, household resources, and the effects of the media and advertisements in shaping public opinions must be addressed before successful breastfeeding policies and programs can be created. We suggest that along with enhancing nutrition education of community health workers, larger issues of family dynamics and community participation must be investigated further. Infant feeding programs can be an incredibly cost-effective lever for improving population health, and can and should be seized to help China fully realize its potential.

Key Points

- Optimal infant feeding is critical for the health of a nation, and can reduce both over- and under-nutrition
- In urban China, major barriers to optimal infant nutrition include re-negotiating the role of the working mother, the desirability of overweight infants, the one-child policy causing a restructuring of family roles, and a consumer culture driving formula advertisement and use
- In rural China, major barriers to optimal infant nutrition include rural-to-urban migration, grandparents as the primary caregivers, a lack of knowledge, poorly trained community health workers, and economic inequality
- Solutions to optimize IYCF practices include taking a community-based participatory approach to infant feeding education, including the entire family in infant feeding discussions, and limiting infant formula marketing.

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