REVIEW

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CURRENT DEVELOPMENTS IN NUTRITION

Complementary Feeding Practices among Young Children in China, India, and Indonesia: A Narrative Review

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ABSTRACT

Under- and overnutrition are co-existing health issues in several countries across Asia. Poor complementary feeding (CF) is a significant determinant of malnutrition in children and a major cause of morbidity and mortality. The purpose of this narrative review is to summarize the most recent evidence regarding the CF practices in 3 countries with a high prevalence of stunting and overweight, and currently undergoing rapid economic and nutritional transition: China, India, and Indonesia. We focused particularly on the adequacy of CF, based on the WHO feeding indicators (2021) regarding timing, frequency, diversity, as well as the consumption of specific food groups. According to the findings, the majority of infants in the 3 countries are introduced to CF at an inappropriate time: either too early (particularly in urban/rural areas of China and Indonesia) or too late (India) compared with the WHO recommendation. Furthermore, in all countries, diets are characterized by a low variety and frequency of CF and consist mainly of staple foods with poor nutritional quality, such as rice, cereals, or noodles. Nutrient-dense and protein-rich foods, such as foods of animal origin, are either inadequately consumed (rural areas of China and India) or introduced too late (urban areas of China and Indonesia) in the diets of children. In all countries, the consumption of fruit and vegetables, especially during the early CF period, is poor. In contrast, a significant proportion of both urban and rural children, particularly in Indonesia and India, are consuming energy-dense/nutrient-poor snacks and sugary drinks during the CF period. The described practices may pose a significant risk for the development of energy and/or nutrient gaps, magnifying the double and triple burden of malnutrition present in these countries. Further research is warranted to understand the significance of the observed practices for stunting and/or overweight/obesity risk. *Curr Dev Nutr* 2022;6:nzac092.

Keywords: infants, stunting, overweight, complementary feeding, nutrition

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Abbreviations used: CF, complementary feeding; IDHS, Indonesian Demographic Health Survey; IYCF, infant and young child feeding; MDD, minimum dietary diversity; MMF, minimum meal frequency; NFHS, Indian National Family Health Survey; SSB, sugar-sweetened beverage.

Introduction

Malnutrition, covering conditions such as undernutrition (i.e., stunting, wasting, or underweight) as well as overweight and obesity, constitutes a severe public health problem and is the leading cause of poor health globally (1, 2). While undernutrition conditions are a major contributing factor to child morbidity and mortality, childhood overweight/obesity may persist into adulthood, leading to diet-related noncommunicable diseases such as diabetes and cardiovascular disease (3). The coexistence of both undernutrition conditions along with overweight/obesity in a population across the life course (i.e., dual burden of malnutrition) poses a threat to children's long-term health currently in many low- and middle-income countries (4, 5). Moreover, a growing number of countries are now facing the challenge of a triple burden of malnutrition, referring to the coexistence of undernutrition, overweight/obesity, as well as micronutrient deficiencies in 1 population (2).

Approximately 70% of the world's malnourished children live in Asia (6). Although the ongoing rapid urbanization and economic development have reduced the prevalence of stunting, the absolute number of stunted children remains high. Especially in China, India, and Indonesia, which are highly populous countries, even a moderate level of stunting has a substantial contribution to the global stunting prevalence (7). In India, 38.7% of children under 5 y of age are stunted, and the stunting rates have actually increased over the last decade (8–10). High rates have also been reported in Indonesia, where 35.7% of children under 5 y are stunted (5, 11). For China, where stunting rates have decreased over the years (12), stunting still affects 11.6% of children under 5 y (13).

Next to the high absolute number of stunted children, the prevalence of childhood overweight/obesity is also rapidly increasing in these countries (4). China and Indonesia are among the Asian countries most affected by this double burden of malnutrition. The prevalence of overweight among children under 5 y old in China has been reported as 8–12% (4, 13–15) and for Indonesia as 8–17.7%, respectively (3, 11). In India, although the percentage of children with overweight under 5 y is reported to be low (1.9%) (4), a significant increase in the rates of childhood overweight/obesity among 1- to 18-y-old children has been observed: from 16.3% in the period of 2006–2010, to 19.3% in studies reported after 2010 (16). The rapid economic development along with the globalization of food markets has led to an increased availability of high-energy/nutrient-poor foods, resulting in a dietary transition towards a more "Western diet" (17, 18). This is suggested to have contributed to the observed increasing rates of overweight, yet information on (young) children is scarce (5, 19).

The first 1000 days of life represent a critical phase when adequate nutrition is essential for lifelong health and development (20). In particular, the period of 6–24-mo—that is, in which complementary feeding (CF) becomes increasingly important—encompasses a sensitive period when nutritious foods are required. According to the WHO, CF should be commenced at 6 mo of age in order to fill the increasing energy and nutrient demands. Suboptimal feeding practices during this period of life may pose a risk for the development of both undernutrition as well as overweight/obesity (21, 22). As the CF period is a vulnerable developmental phase and provides a window of opportunity to program later health, proper feeding during this time is of key importance to prevent later-life health issues. Therefore, the CF period provides an important window of opportunity for interventions targeting the prevention of malnutrition (20).

The WHO infant and young child feeding (IYCF) indicators have been developed to assess the coverage of optimal feeding practices (23). Three indicators measure the adequacy of CF—timing of CF: introducing CF between 6 and 8 mo; minimum meal frequency (MMF): providing at least 2 meals at 6–8 mo and at least 3 meals at 9–23 mo; and minimum dietary diversity (MDD): providing foods from at least 4 (of the 7) food groups. In addition to the 3 CF indicators, the WHO recently (24) released 4 additional IYCF indicators focused on CF practices. These indicators measure the proportion of 6–23-mo-old children consuming specific food groups—that is, egg and/or flesh foods, sugar-sweetened beverages (SSBs), sentinel foods (including sweet foods as well as fried and salty foods), and zero vegetables or fruit during the previous day. Previous studies have described the existence of insufficient feeding practices in several Asian countries using the previous indicators (25–27). Since large cultural/socioeconomic differences in feeding practices and food choices exist, targeted and locally adapted approaches may be needed to improve the diets of young children. The purpose of this narrative review is to illustrate the gaps and opportunities by reviewing the most recent evidence on CF practices in 3 specific countries at different stages of economic transition and together representing a large proportion of all Asian children under 5 y: China, India, and Indonesia. A particular focus is on the adequacy of CF practices, based on the indicators of the timing, frequency, and diversity of the diet (28). Next to that, we address existing evidence related to the consumption of the specific food groups addressed by the most recent IYCF indicators.

Methods

Literature search

We carried out an extensive literature search to obtain recent information on CF practices among children below 2 y of age in the selected countries (China, India, and Indonesia) using Medline and Google Scholar databases. The search was limited to human studies that were published between 1 January 2010 and 1 January 2022. We utilized studies published in English, with the exception of studies published in Chinese, where we could utilize the information from the English abstracts that were available. We used a search strategy including terms for "young children," "complementary feeding," and "Asia" (including terms specifying all countries). The search strategy described in the **Supplemental Material** was used for Medline, and formatting was adapted for the search in Google Scholar. In addition to the literature search, attempts to retrieve reports or other eligible studies from other sources were made by a hand search of references of the included articles.

Results

The literature search generated 4950 articles, which were narrowed first by inclusion of the search terms in the title or abstract. From the remaining 718 documents identified in the narrowed search, 68 documents with relevant titles were retained. Subsequent abstract screening allowed for the final selection of 56 papers relevant for the review. **Tables 1–3** provide a summary of the CF practices from the retrieved articles.

CF practices by country

China.

Timing and frequency of CF. The China Nutrition and Health Surveillance (2013) (29) indicated that both too early (<6 mo) and too late (>8 mo) CF introduction was prevalent in China. In urban areas (Chengdu), the majority of children (94%) received CF too early (30).

Very early CF (<4 mo) was reported to vary between 7% and 20% in urban areas (29–32); however, higher rates (64.8%) were reported for Jiaxing (33). In some cities, the mean age for CF introduction was as early as 3 or 4 mo (34). In addition, delayed CF was reported, occurring as late as after 9 mo (5.5%) (29). In rural areas of China, untimely CF was also highly prevalent. More than 70% of infants from different ethnic groups were given CF before 6 mo (35). The rates for very early CF (<4 mo) in rural areas were 13–26.8%, with the highest rates observed in the poorest areas (29, 36, 37). Controversially, delayed CF introduction was also reported to be prevalent in the general rural areas; 15% of children received CF only after 9 mo (29).

According to a nationally representative survey, the prevalence of meeting the MMF indicator was reported as 70% across urban areas of China and 45–75% for poor rural areas, respectively (38–40).

Diversity of CF. According to the Chinese National Nutrition and Health Survey, the prevalence of MDD across China was estimated as 52.5% (40). The highest rates were observed for urban areas (73.3%) and the lowest for poor rural areas (40.5%) (40). However, more

TABLE 1 Overview of the complementary feeding practices evaluated in the present study in China[1]

	China			
Feeding practice	**Urban**	**Reference**	**Rural**	**Reference**
Timing of complementary feeding[2]				
Very early (<4 mo)	7–64.8%	(29–32)	13–26.8%	(29, 36, 37)
Early (<6 mo)	94%	(30)	>70%	(35)
Delayed (>8 mo)	5.5%	(29)	15%	(29)
Feeding frequency[2]	70%	(40)	45–75%	(38–40)
Minimum dietary diversity[2]	73.3%	(40)	40.5–67.8%	(38–41)
Types of first complementary foods provided	Rice and rice products, noodles, cereals/porridge, vegetable paste	(30, 31, 34, 42, 43)	Cereals, potatoes	(39)
Consumption of food groups[3]				
Vegetables	37–50% daily (6–12 mo)	(42, 44)	50% never consumed (≥12 mo)	(36)
			77–78% ≥4 times/wk (18–24 mo)	(47)
	86–91% daily (35 mo)	(42, 44)		
Egg and/or flesh foods	69.6–96.5% (12–24 mo)	(31, 43, 44)	38–64.9%	(36, 45, 46)
			15.8% never consumed	(37, 47)
			21.6–31% <1 time/wk (18–24 mo)	(36)
Sugar-sweetened beverages	5%	(42)	16.7% (6–23 mo)	(50)
			33% (18–23 mo)	
Sentinel foods (sweets and salty foods)	14% sweets, desserts (6–8 mo)	(42)	—	
	25–40% sweets/desserts (11–35 mo)	(42)		

[1] "%" refers to the percentage of children reported across studies. IYCF, infant and young child feeding.
[2] According to the WHO IYCF guidelines.
[3] Refers to the percentage of children consuming each food group.

recent studies reported higher rates for rural areas (e.g., 62.3–67.8%) (38, 39, 41). The most common types of first complementary foods across both urban and rural areas were rice/rice products, such as rice paste or porridge (34, 42). Urban children were commonly introduced to noodles, vegetable paste, wheat porridge, and infant cereals (30, 31, 42, 43). Among rural areas, cereals and potatoes were also reported as typical first foods (39).

In urban areas, the most commonly introduced protein-rich foods included mashed egg, pork/ham, or fish, which were consumed by the majority (81–96.5%) by the age of 24 mo (31, 43). However, in another study, the proportion of 12–23-mo-olds ever consuming meat/fish/poultry or eggs was only 69.6% and 71.2%, respectively (44). In rural areas, the consumption of animal-source foods varied widely across studies: 38–64.9% (36, 45, 46). At 18–24 mo, 21.6–31% consumed animal-source foods less than once per week (37, 47). Furthermore, 15.8% never consumed animal-source foods (36). Daily consumption of vegetables among urban children was reported to be only 37–50% at 6–12 mo but increased to 86–91% at 35 mo of age (42, 44). Similarly, among rural areas, only 50% of children 12 mo or older consumed vegetables/fruits daily (36). According to another study (47), the majority (77–78%) of 18–24-mo-old children in rural areas consumed vegetables/fruit at least 4 times/wk. Fruit juice was commonly introduced, and by 24 mo of age, nearly all infants (98%) across urban and rural areas consumed fruit juice (31). The proportion of infants consuming sweets/desserts in urban areas was reported to increase from 14% at 6–8 mo to about 25% at 11 mo (42). At 21–35 mo, over 40% of the children consumed at least 1 type of sweets per day. The consumption of SSBs was found to be more common among children from rural areas than children from urban areas (42, 48, 49). Only 5% of urban children consumed SSBs at 6 to 35 mo of age (42). However, among rural children, 16.7% of 6–23-mo-olds consumed SSBs, and this increased to 33% at 18–23 mo (50).

India.

Timing and frequency of CF. In India, CF is usually introduced between 6 and 9 mo of age (51). According to the Indian National Family Health Survey (NFHS) in 2007, however, only half (55%) of Indian children were introduced to CF between 6 and 8 mo of age (25). Strikingly, the most recent (2017) NFHS data indicated an even lower estimate (45%) (9, 52). Other studies across India reported the prevalence of a timely CF introduction as 42–61%, yet with wide regional variation (53–56). The highest estimates were reported in the south (61%) and lowest in the central and northern parts of India, where only 38% received CF between 6 and 8 mo of age (56). The prevalence of very early (<4 mo) and early (<6 mo) CF was estimated as 8% and 11%, respectively (9). However, higher rates (27–52%) for early CF were reported among rural areas (57, 58). Furthermore, 20–47.4% of children across India were given pre-lacteal feeds or nonmilk liquids (e.g., juice) before 6 mo of age (9, 59). Delayed CF was reported to be common, particularly in the central and northern parts of India; 20–42% received CF only at 9–11 mo and 14–36% at 12–17 mo, respectively (9, 60). Another study showed that the mean age of starting CF was 13.4 mo, and that 16% of 2-y-olds had not started CF at all (61). The proportion of children meeting the MMF indicator was, in general, low (12–42.5%) (9, 56), but varying estimates (24–86%) were reported among different areas (54, 56, 62).

TABLE 3 Overview of the complementary feeding practices evaluated in the present study in Indonesia[1]

Feeding practice	Indonesia	
	All (urban and rural)	Reference
Timing of complementary feeding[2]		
Very early (<4 mo)	Directly after birth: 4.5%	(74)
	<1 mo: 8.4%	(74)
	2–3 mo: 17.8%	(71)
Early (<6 mo)	50–81%	(71–73)
Delayed (>8 mo)	—	
Feeding frequency[2]	67–71.7%	(71)
Minimum dietary diversity[2]	22.6% (6–8 mo)	(71, 74)
	74.3% (18–23 mo)	(71, 74)
Types of first complementary foods provided	Rice (boiled/porridge), vegetables, milk porridge, mung bean porridge, cereal, carrots, biscuits/crackers, and soup broth	(71, 72, 77, 78)
Consumption of food groups[3]		
Vegetables	78–81%	(71)
Egg and/or flesh foods	60% meat, 53% eggs, 10.5% dairy	(71)
Sugar-sweetened beverages	2.0% (6–11 mo)	(80)
Sentinel foods (sweets and salty foods)	46.5% biscuits, savory snacks (6–11 mo)	(80)
	60% instant noodles, 50.4% fried snacks, 15% fast foods (6–59 mo)	(82)

[1] "%" refers to the percentage of children reported across studies. IYCF, infant and young child feeding.
[2] According to the WHO IYCF guidelines.
[3] Refers to the percentage of children consuming each food group.

Diversity of CF. According to the Indian NFHS (9), only 23% of the 6–23-mo-old children met the criteria of the MDD indicator. However, varying estimates (6–57%) were reported in different areas, with the lowest estimates (<10%) among rural children (25, 51, 54, 55). The main types of complementary foods were legumes, rice, and grains/cereals (51, 55, 63, 64). Cereals (such as *Ragi*, a traditional Indian grain) were consumed by 96% (65). Biscuits were also reported as a common first food (32%) (66). Among urban areas, the proportion of children who reported consuming dairy products in the preceding day was 44.9% (67). Among these children, only 5.7% consumed meat, fish, and/or poultry and 12.4% consumed eggs, respectively (67). Similarly, the consumption of fruits/vegetables was reported to be low: 9.2% for vitamin A–rich fruits/vegetables and 9.8% for other fruits/vegetables (67). However, in other studies, fruit/vegetable consumption showed large geographical variation, from 95.4% in rural populations to only 1.45% in other areas (51). Commercial complementary foods, with an age-specific nutritional composition, were consumed only by 15%, and mostly among the highest socioeconomic group (68). Sugary snack foods, such as chocolate/sweets, were widely consumed; 63% of 6–12-mo-olds and 78% of 12–24-mo-olds had consumed sugary snacks during the preceding day (67, 69). For fried and salty snack foods, the consumption in the same age groups was 34% and 66%, respectively. Similarly, among rural villages, the majority (79.3%) of 6–39-mo-olds consumed sweets, biscuits, cake, or sweet rice during the previous day (70). The consumption of SSBs was reported as 2.1% at 6–11 mo and 9.3% at 12–23 mo (67).

Indonesia.

Timing and frequency of CF. Evidence from studies across Indonesia indicates that early CF is markedly prevalent. According to the Indonesian Demographic Health Survey (IDHS), 50% received CF at 4–5 mo, and by 6–8 mo, more than 90% were consuming complementary foods (71). According to other studies, 50–81% of children were introduced to CF before 6 mo of age, with a mean age of CF introduction of 4.4 mo (72, 73). Very early CF was also reported: directly after birth (4.5%), before 1 mo (8.4%) or between 2 and 3 mo (17.8%) (71, 74). Furthermore, providing pre-lacteal feeds, such as sugar water or honey directly after birth, was a common practice (75). Already during the first week of life, infants were provided with complementary foods, such as regular cow milk, grains, pumpkins, and sweet potatoes (76). Approximately 14% of infants were given (sweetened) tea at 6 mo (72). The prevalence of meeting the MMF indicator was 67–71.7% across Indonesia (71).

Diversity of CF. The proportion of children meeting the MDD was shown to increase with age: from 22.6% at 6–8 mo to 74.3% at 18–23 mo of age (71, 74). However, regional differences exist, and the lowest rates (24–25%) were reported in West Papua and West Sulawesi (71). Homemade complementary foods were widely consumed, consisting mainly of grains (typically rice) and vegetables (71, 77). In Nias Island, commonly provided foods were rice porridge, milk porridge, mung bean porridge, and boiled rice (72). In West Java, common foods at 6–11 mo were rice, infant cereal, carrots, biscuits/crackers, and soup broth (78). According to IDHS (71), the consumption of meat/poultry, eggs, and dairy products among 6–23-mo-old children was reported as 60%, 53%, and 10.5%, respectively. However, in Aceh, the proportion of 6–23-mo-old children never consuming meat or fish/eggs was reported as 60% and 20%, respectively (74). The consumption of plant protein, such as tempeh and tofu, was low (<20%) (79). Of all infants, 78–81% consumed fruits and vegetables, usually 5 times/wk (71). Consumption of energy-dense, nutrient-poor snack foods and SSBs during the CF period was common across urban and rural areas (80, 81). Of all 6–59-mo-old children, nearly 60% consumed instant noodles, 50.4% fried snacks, and 15% fast foods on a weekly basis (82). Furthermore, children from the lowest socioeconomic group consumed noodles every day, and even up to 5 times/d (78). In Bandung City, nearly half (46.5%) of 6–11-mo-olds

TABLE 2 Overview of the complementary feeding practices evaluated in the present study in India[1]

	India					
Feeding practice	**All**	**Reference**	**Urban**	**Reference**	**Rural**	**Reference**
Timing of complementary feeding[2]						
Very early (<4 mo)	8%	(9)	—		—	
Early (<6 mo)	11%	(9, 59)	—		27–52%	(57, 58)
Delayed (>8 mo)	20–47.4% pre-lacteal feeds 9–11 mo: 20–42% 12–17 mo: 14–36% At 24 mo: 16% had not started CF	(9, 60) (9, 60) (61)	—		—	
Feeding frequency[2]	12–86%	(9, 54, 56, 62)	—		—	
Minimum dietary diversity[2]	6–57%	(9, 25, 51, 54, 55)	—		<10%	(25, 51, 54, 55)
Types of first complementary foods provided	Legumes, rice, grains/cereals, biscuits	(51, 55, 63–66)	—		—	
Consumption of food groups[3]						
Vegetables	9.2% vitamin A–rich fruits/vegetables; 9.8% other fruits/vegetables	(67) (51)	—		95.4%; 1.45% (other areas)	(51)
Egg and/or flesh foods			5.7% meat, fish 12.4% eggs	(67)	—	
Sugar-sweetened beverages	2.1% (6–11 mo) 9.3% (12–23 mo)	(67) (67)	—		—	
Sentinel foods (sweets and salty foods)			63% chocolate, sweets	(67, 69)	79.3% sweets, biscuits, cake (6–39 mo)	(70)
			34% fried and salty snacks (6–12 mo)			
			78% sugary snacks	(67, 69)		
			66% fried and salty snacks (12–24 mo)			

[1] "%" refers to the percentage of children reported across studies. CF, complementary feeding; IYCF, infant and young child feeding.
[2] According to the WHO IYCF guidelines.
[3] Refers to the percentage of children consuming each food group.

were regularly consuming snack foods, such as sweet biscuits and savory snacks, and 2.0% consumed SSBs, respectively (80).

Discussion

The recent evidence presented in this narrative review regarding the CF practices from China, India, and Indonesia showed suboptimal practices related to the timing, frequency, and variety of CF. The majority of infants in these countries are introduced to CF at an inappropriate time—either too early or too late—compared with the WHO recommendation. Furthermore, diets are characterized by a low variety and frequency of CF and consist mainly of foods with a poor nutritional quality.

The timing of CF introduction showed substantial variation both within and between countries. In both urban and rural areas of China and in Indonesia, early introduction of CF, even before 3 mo of age, was common. Delayed CF seems to be an issue particularly in the central and northern parts of India. Introducing CF at an inappropriate time may contribute to stunting due to several reasons (83). First, too early CF may lead to reduced consumption of breast milk and an increased risk for diarrheal or infectious diseases (20). Too late CF may lead to deficiency with regard to energy as well as other key (micro)nutrients, such as iron (84). In addition, delayed CF can also lead to difficulties in food and texture acceptance, increasing the risk of a monotonous diet (85).

Insufficient feeding practices regarding the frequency, and particularly the diversity of CF were also reported for the countries. Poor meal frequency seems to be an issue, especially in the rural areas of China and across India, yet with large geographical differences (51). Feeding frequency, which is a proxy for energy intake, has been associated with stunting and poor linear growth (86). In all countries, diets were characterized by relatively few food items, mainly staple foods, such as rice, cereals, or noodles with a low nutrient density and a poor mineral bioavailability. Despite the higher prevalence of adequate MDD in the urban areas of the different countries, staple foods were typically consumed first foods also among the urban populations. Presently, the most consumed type of rice/noodles in China are refined and unfortified, providing a poor source of micronutrients and fiber (87). The consumption of rice also seems to increase steadily with age, being the number 1 source of energy by 24 mo of age (88).

The lack of nutrient-dense foods, such as protein-rich foods of animal origin, as well as fruit and vegetables, was consistently described in the diets of young children across the countries. Furthermore, in urban areas of China and Indonesia, a significant proportion of infants are introduced to protein-rich foods relatively late. The lack of protein-rich foods is likely to limit the intake of both macro- and micronutrients. In Indonesia, around 45–74% of rural and 28–57% of urban children were reported to have an inadequate protein intake (89, 90). Furthermore, lower-than-recommended fat intakes have been reported at least in India and China (88, 91). With regard to micronutrients, especially for iron, calcium, and zinc, inadequate intakes among young children have been consistently reported in all countries (89, 92–94). Lack of type II nutrients (protein, zinc, magnesium, phosphorus, and potassium), is a particular concern, since they are required for linear growth (95).

In contrast, while the low consumption of nutrient-rich foods is an issue, a significant proportion of both urban and rural children in Indonesia and India are consuming energy-dense/nutrient-poor snacks and SSBs already during the CF period—between 6 and 24 mo. A previous review from Indonesia indicated that nearly all children under 5 y of age consumed snacks daily (96). However, the consumption of energy-dense/nutrient-poor snacks or SSBs during the CF period was not reported by other reviews (34, 51, 97). The consumption of SSBs and fast food has been associated with an increased risk of overweight/obesity among older children in Asia (49, 82). Furthermore, the low-cost snack foods are not consumed only by the wealthier families but even more often by the poorest children (19, 98). This is a particular problem among the stunted children, who are at increased risk for developing overweight/obesity (99). The limited dietary diversity and the replacement of nutritious foods by nutrient-poor snack foods are likely to contribute to the development of the double burden of malnutrition in these countries (100). Due to the fast-growing rates of childhood overweight/obesity, further studies among young children are urgently needed to understand dietary determinants for the double burden of malnutrition.

Underlying factors that were consistently shown to be associated with inappropriate CF in Asia include poverty, low level of maternal education, lower frequency of antenatal visits, and limited/no exposure to media (101). In South India, only 8% of mothers had proper knowledge of all aspects of CF (61). Unfortunately, in many countries, health care professionals receive limited training on the importance of infant nutrition, contributing to the inadequate nutrition support for parents (20). In contrast, where governments have prioritized nutrition training and education programs, significant improvements in nutritional status in the community have been observed (26). Besides these factors, cultural beliefs and traditions also play an important role in feeding decisions, such as initiating CF very early or providing pre-lacteal feeds (e.g., sugary water, cow milk or other foods) (34). In China, parents traditionally prefer to feed rice to their infant since rice is culturally believed to help with digestion (47). Furthermore, utilization of available food resources, particularly animal-source foods including high-quality proteins and fats, may be limited due to the belief that the child is too small to digest these (102). In addition, parents may refrain from feeding fish due to a fear of worm infestations (103). Such reasons are likely to limit and/or delay the consumption of appropriate protein-rich foods, causing insufficient intakes of energy, fat, and protein.

The gaps in CF practices highlighted in this narrative review may contribute to nutrient deficits alone, or in combination with either energy shortage or excess, and if maintained, posing a risk for the development of stunting, micronutrient deficiencies, and overweight/obesity (or both). It should be noted, however, that since high-quality, longitudinal data on feeding and dietary status during the CF period in these countries are currently lacking, particularly for rural areas, an evaluation of the feeding practices and their significance for health outcomes in these countries is challenging (26). Therefore, future studies using the recently adapted IYCF indicators are urgently needed to understand the key dietary determinants of child growth faltering and, particularly, of childhood overweight/obesity in these countries.

In conclusion, this narrative review provides comprehensive evidence regarding the IYCF indicators related to the adequacy of CF. According to our findings, young children in China, India, and Indonesia

are at high risk for suboptimal feeding regarding the timing, frequency, and variety of CF. The described differences in the feeding practices within and between countries suggest that a country-specific approach, taking into account the cultural diversity in feeding, is needed in order to improve the feeding of young children. The provided insights may facilitate the development of educational tools as well as create awareness for parents and health care professionals in the community about the importance of diet during the CF period.

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