

Chinese Consumers' Knowledge and Attitudes Towards Breastfeeding and Formula Milk

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ABSTRACT

The aim of this study is to identify Chinese parents' opinions between formula milk (FM) feeding and breast feeding. In order to understand their maternal and paternal knowledge towards both breast feeding and FM feeding.

1,200 people from 14 Chinese cities were selected, and the data was analyzed using Statistical Package for the Social Sciences (SPSS). Through the result, only 7.7% of the respondents have the conscious that breast milk is definitely superior to FM, while 82.9% of them agreed that breast feeding and FM feeding both have their own benefits both of them should be used during the baby feeding. 52% of the respondents think the breast feeding is not nutritious enough, so the FM can be a good supplement. 80.8% of the consumers claimed that they care about the formula of the FM, most of them cannot match the nutritional function with the additions. The content of the added ingredients (68.5%), brand (64.8%) and formula (57.2%) are the three main concerns of all the respondents. Mead Johnson as a foreign brand is ranking as the first choice with 42.8% of the participants purchasing it within one year. Chinese FM brands are closely behind, making up 2 of top 3.

Keywords

Breastfeeding, Formula milk, Infants, Adulthood.

Introduction

Breast milk is the best food for nearly all infants. It contains various nutritional and immune cells that ensure the best possible health, developmental and psychosocial outcomes for infants [1,2]. Breastfeeding benefits both mothers and their children in long-term, such as helping mothers to reduce the risk of breast cancer, epithelial ovarian cancer, and type II diabetes [3-5]. In addition, the breastfeeding can help infants to reduce the incidence of noncommunicable diseases and obesity risk in their future adulthood [6,7].

Although it is highly recommended by World Health Organization (WTO) since early 90s [8], breastfeeding may not always be possible due to various reasons, including insufficient breaks milk supply, return to employment, influences from family and society, and the lack of understanding the health benefits of breastfeeding [1,9-11]. IFM, as a substitute, is an industrial production for infant consumption. It is generally based on cow's milk or soymilk with

additional key nutritional ingredients, including iron, nucleotides fat, with an aim at mimicking breast milk [1]. However, there are significant differences between breast milk and IFM on both constitution and structure [12]. Breast milk has high contents of antioxidant and lactoferrin. Furthermore, there are remarkable differences in the positional distribution and stereo-chemical structure of fatty acids comparing to the infant formula milk [13-16].

To promote breastfeeding, Chinese government has constructed baby-friendly hospitals to raise awareness of breastfeeding, revised the feeding guidelines for providing correct feeding information, promulgated laws to promote women workers' breastfeeding rights and adopted the of Breastmilk Substitutes Management Measures to promote breastfeeding behaviors [17,18].

As shown in WTO's report in 2018, China consumes 24.7 kg FM per capita population for 0-6 months, compared to India which is 0.9 kg FM per capita population for 0-6 months [17]. A study conducted in Zhejiang province, China, said that most infants had consumed or consuming IFM by 6 months [20]. The reason behind

this trend might be breastfeeding has been largely neglected by medical practice [3] and mass media [19,21]. Even though the World Health Assembly adopted a code to prohibiting the unethical advertising and promotion of breastmilk substitutes, China has a history of weak Code legislation and implementation that was classified as having “few provisions in law” in 2016 (WHO, 2016) [17,22].

Nevertheless, in 2008, to misleading protein examination machine, the melamine, a man-made non-nutritive substance, was added into some infant formula and milk product in China [23]. The addition of Melamine in dairy product caused 294,000 infants and young children were diagnosed urinary tract stone and more than 50,000 infants has been hospitalized [24]. This scandal caused on-going concerns among consumers in China. After the incident, the government took a series of measures to solve the problem of food safety aiming at regaining consumers' confidence in domestic food [25-27].

Our study is trying to understand after all these years education and FM incidents why Chinese consumers still believe in FM, and the level of their knowledge and concerns behind their consumption.

Materials and Methods

Design

A quantitatively online survey study was conducted by China National Cereals, Oils and Foodstuffs Corporation Nutrition and Health Research Institute (COFCO NHRI) in China in 2018. A total of 1,200 consumers were recruited through a multistage sampling scheme. 14 cities were selected to represent four geographical distribution of Chinese population: north China city circle (Beijing, Tianjin, and Shijiazhuang), east China city circle (Shanghai, Nanjing, and Hangzhou), southwest city circle (Chengdu, Chongqing, and Lanzhou) and south China city circle (Guangzhou, Shenzhen, Foshan, and Dongguan), the sample size in each area cycle is average, according to general principles of consumer research.

Participants and sample selection

The participants were selected in 14 cities that fulfill with the following criteria, to ensure the similar level of knowledge towards breastfeeding and FM feeding.

- Family is raising child/children with the age between 0 to 3 years old.
- Educational level is higher than high school
- Consumed infant formula for the last 3 months and frequency at least once a month.

Beside above, we required that first tier cities (included Beijing, Shanghai, Guangzhou, and Shenzhen) family monthly income above RMB 20,000 and second-tier cities (Tianjin, Shijiazhuang, Nanjing, Hangzhou, Chengdu, Chongqing, Lanzhou, Zhuhai, Dongguan, and Foshan) family income above RMB12,000. First-tier cities here were referred to metropolises that play an important or leading role in national political, economic and other social activities. Second-tier cities have a certain economic foundation and strong commercial vitality, attracting large companies, brands

and talents. Infant formula was easily available in these selected cities, and the minimum household income was to ensure the participants' affordability of infant formula.

Data Analysis

The data analyses were performed using SPSS version 23 (SPSS, Chicago, IL, USA), and results presented in tables. In all following statistical analysis, the significance level was set at 0.05. Table 1 summarizes sociodemographic characteristics of the sample.

Variables	Group	Frequency	Percentage
Gender	Male	393	32.8%
	Female	807	67.3%
Age	25-29	400	33.3%
	30-34	400	33.3%
	35-40	400	33.3%
City of Living	Beijing	219	18.3%
	Tianjin	48	4%
	Shijiazhuang	33	2.8%
	Shanghai	153	12.8%
	Nanjing	80	6.7%
	Hangzhou	67	5.6%
	Chengdu	156	13%
	Chongqing	84	7%
	Lanzhou	60	5%
	Guangzhou	132	11%
	Shenzhen	42	3.5%
	Zhuhai	51	4.3%
	Dongguan	32	2.7%
Educational level	PhD	19	1.6%
	Master's degree	212	17.7%
	Bachelor's degree	891	74.3%
	College	78	6.5%
Household monthly income (RMB) — first tier cities	20,000-24,999	184	15.3%
	25,000-29,999	161	13.4%
	30,000-39,999	99	8.3%
	40,000 and above	102	8.5%
Household monthly income (RMB) — other Cities	12,000-14,999	188	15.7%
	15,000-19,999	230	19.2%
	20,000-29,999	159	13.3%
	30,000 and above	77	6.4%

Table 1: Socio-Demographic Profile of the Sample (n = 1200).

Findings and Discussion

Participant's knowledge about relationship between breastfeeding and formula milk feeding

Participants' knowledge about relationship between breastfeeding and infant formula was reported in table 2. 82.9% of respondents commented that breast milk and infant formula provided both functional and nutritional benefits and they should be combined use. As contrast, 7.7% of respondents have the conscious that breast

milk is superior to formula milk. The result shows that majority of selected consumers have little knowledge that the formula is mimicking breast milk and the breast milk is more suitable and nutritional than IMF. Based on the educational distribution, none

of the participant with PhD selected “breast milk is better than formula”. By contrast, for the person who selected this, more than half are college. Thus, we may project that the knowledge of breast milk and formula is not associated with the education level.

Major Topics	Educational level	n (Percentage)
Breast milk is better than formula milk and the participants will not use milk if breast milk is available		92 (7.7%)
Both breast milk and formula milk have their own functions and they should be combined to use		995 (82.9%)
formula milk is backed up with more scientific evidences, indicating it is better than breast milk, and can be used to replace breast milk		113 (9.4%)

Table 2: Participant’s knowledge on the differences between breastfeeding and formula milk.

Participant’s understanding of the nutritional function of formula milk

We tested participant’s knowledge of IFM by asking them “What do you think is the main functions of formula?” 48.3% consumers believe that formula milk can act as a substitute when breast milks are in sufficient. The other 51.7% consumers think formula milk is a nutritional supplement of breast milk.

As aforementioned, breastfeeding with nutritional superiority is the best nutritional source for infants, whereas the formula milk is in its best attempt mimicking breast milk. The result on this question illustrates that over half of the respondents do not clearly know this, which means they have a poor knowledge of breast milk and FM.

Major theme	n (Percentage)
When breast milk is insufficient, formula milk can act as a substitute	580 (48.3%)
When Breast milk is nutritional inadequate, infant formula can act as a supplement	620 (51.7%)

Table 3: Participant’s knowledge about the function of formula milk.

Participant’s understanding of the key functional ingredient that formula milk contains

To understand the level of knowledge of participants on the functionals ingredients in IFM, the participants were initially required to response on 21 ingredients listed on the package of IFM based on their awareness. The results showed lactoferrin, vitamins, minerals dietary fiber and acid triglyceride gained the most popularity, where more than 50% participants recognize the ingredient except acid triglyceride with 48.3% (Table 4).

The participants’ knowledge of the nutritional functionality of these 5 ingredients were further investigated by commenting on the health nutritional statements list on Table 4.

Major theme	n (Percentage)
Lactoferrin (α -lactalbumin)	852 (71%)
Vitamins (such as vitamin A, vitamin C, etc.)	850 (70.8%)
Minerals (such as calcium, iron, zinc, etc.)	791 (65.9%)
Dietary fiber	639 (53.3%)
Acid triglyceride (OPO structural grease)	580 (48.3%)
Lactose	573 (47.8%)
Lutein	511 (42.6%)
Niacin, etc. (folic acid, pantothenic acid)	462 (38.5%)
Casein phosphopeptide (CPP)	450 (37.5%)
Galactooligosaccharides (GOS)	430 (35.8%)
Alpha-linolenic acid	420 (35%)
Linoleic acid	393 (32.8%)
Docosahexaenoic acid (DHA)	364 (30.3%)
Nucleotide	359 (29.9%)
Fructooligosaccharide (FOS)	351 (29.3%)
Taurine	290 (24.2%)
Polyfructose	282 (23.5%)
Arachidonic acid (AA)	260 (21.7%)
L-carnitine	219 (18.3%)
Choline	202 (16.8%)
Inositol	167 (13.9%)

Table 4: Participant’s knowledge about the function of formula milk.

Health statement	Lactoferrin	Vitamins	Minerals	Dietary fiber	Acid triglyceride
	n (percentage)	n (percentage)	n (percentage)	n (percentage)	n (percentage)
Promote intestinal health and prevent constipation	221 (25.9%)	213 (25.1%)	139 (17.6%)	374 (58.5%)	174 (30.0%)
Enhance resistance/protection	333 (39.1%)	373 (43.9%)	321 (40.6%)	157 (24.6%)	197 (34.0%)
Promote brain/intellectual development	242 (28.4%)	265 (31.2%)	301 (38.1%)	110 (17.2%)	159 (27.4%)
Ingredients are easier to digest and absorb	256 (30.0%)	254 (29.9%)	174 (22.0%)	302 (47.3%)	184 (31.7%)
Is close to the ingredients of breast milk	258 (30.3%)	171 (20.1%)	135 (17.1%)	92 (14.4%)	164 (28.3%)
Is a natural nutrient	199 (23.4%)	333 (39.2%)	224 (28.3%)	205 (32.1%)	128 (22.1%)
Promote bone development	218 (25.6%)	256 (30.1%)	478 (60.4%)	118 (18.5%)	131 (22.6%)
Help muscles grow and improve athleticism	244 (28.6%)	235 (27.6%)	315 (39.8%)	152 (23.8%)	158 (27.2%)
Help vision development	171 (20.1%)	286 (33.6%)	189 (23.9%)	116 (18.2%)	140 (24.1%)
Help sleep, baby crying less	204 (23.9%)	206 (24.2%)	191 (24.1%)	132 (20.7%)	148 (25.5%)
Essential micronutrients	264 (31%)	469 (55.2%)	471 (59.5%)	163 (25.5%)	180 (31.0%)
Other effects	14 (1.6%)	18 (2.1%)	19 (2.4%)	12 (1.9%)	27 (4.7%)

Although the participant claimed they know some additions in the IFM, Table 4 shows their real understanding. The association between the best-known additions (top 5) and the functions of those additions were tested by cross table. We found that there is no significant functional difference in their perception between different ingredients added in the IMF. The function of acid triglyceride is to promote babies' bone development, but the proportion of people who linked OPO to promote bone development did not differ significantly from the other options. Thus, we believe that they may only be aware of the name of these additives, but do not have enough knowledge of them.

In particular, less than one third of participants believed the selected ingredient is close to the ingredients of breast milk regardless of the top 5 ingredients, which indicating the low level of understanding of IMF. This finding provides further evidence that most of the participants do not really know the additions in FM is mimicking the breast milk.

Participant's attention is paying on what when purchasing the formula milk

Since participants only have limit sense of IFM additions, we would like to know if ingredients additions are one of the major factors they considered when they purchased IFM. We testified this by asking the participants "What are the top 5 factors will you consider when buying formula milk?" 68.85% choose ingredients as their top consideration. 57.2% chose scientific evidence of product formulation, which is also related to additions in formula milk. This means the majority of participants cares the ingredients added in the IFM despite the fact that they might or might not have a good understanding of the added ingredients.

Brands rank as the second that 64.8% participants chose this option, which is an indicator related to product safety [23]. Besides these findings, we also found that only 18.4% respondents list "imported or not" as a top 5 in their considerations. This may suggest that although the consumes are still concerned about the safety of IMF, most of them do not link domestic product as unsafe product anymore.

Major theme	n (Percentage)
Ingredients addition (eg, add DHA, add OPO, etc.)	822 (68.5%)
Brand	777 (64.8%)
Formulation with scientific evidence	686 (57.2%)
Taste	489 (40.8%)
Place of Origin	432 (36%)
Functional claims (e.g. Strengthen the immune system, deepen the sleep, etc.)	418 (34.8%)
Price	406 (33.8%)
Product detailed in ingredient list	405 (33.8%)
Shelf life	400 (33.3%)
Imported or not	221 (18.4%)
Processing technology	127 (10.6%)
New product or not	82 (6.8%)
Discount or not	69 (5.8%)
Package	62 (5.2%)
Spokesperson	7 (0.6%)

Table 6: Participant's attention is paying on what when purchasing the formula milk.

Participant's knowledge channels of formula milk

Top 3 participant's knowledge channels of IFM are all on website, including parenting website community, parenting APP and Mom WeChat social group. Only about 1/3 of them get the knowledge from doctors in the hospital. the knowledge on the website, which is populated by FM companies, may include the information that are misleading. This may explain why the participants care ingredients most, but only have limited knowledge about the function of ingredients. Because manufacturers claim that their IMF is rich in nutrients, but do not explicitly point out the efficacy of this nutrient and that it is simply imitating breast milk formula. This may also suggest that exposure to formula marketing contributes to supplementation and premature cessation [30].

Brand

Table 6 shows the IFM brands the participants bought within one year. Mead Johnson (imported) ranks the top brand that 42.8%

participants brought it within one year. Beingmate, as a China domestic brand, is close behind, in second place. Chinese formula milk brands make up 2 of top 3. We may see from this table that over one third of participants bought Chinese IFM within one year, suggesting that Chinese consumer is recovering confidence of domestic dairy brand.

Major theme	n (Percentage)
Mom Forum, parenting website community (such as baby tree)	775 (64.6%)
Parenting APP	760 (63.3%)
Mom WeChat Group / QQ Group	605 (50.4%)
TV (such as TV commercials/programs, etc.)	527 (43.9%)
Recommended by others (such as friends, family, experts, etc.)	506 (42.2%)
In-store (such as in-store display, shelves, stacks, etc.)	482 (40.2%)
Weibo famous parenting blogger	450 (37.5%)
Personal computer (such as shopping website / brand official website / portal / games, etc.)	448 (37.3%)
Listen to doctors in the hospital	410 (34.2%)
Mobile devices (such as APP ads, etc.)	343 (28.6%)
Product packaging information	289 (24.1%)
Magazines (such as advertisements/articles, etc.)	252 (21%)
Newspapers (such as advertisements/articles, etc.)	172 (14.3%)
Outdoor (including buildings/large advertisement boards, etc.)	165 (13.8%)
On-site participation of expert lecture	145 (12.1%)
Broadcast (such as advertising/programs, etc.)	130 (10.8%)

Table 7: Participant's knowledge channel of formula milk.

Major theme	n (Percentage)
Mead Johnson (import)	514 (42.8%)
Beingmate (China)	424 (35.3%)
Feihe (China)	383 (31.9%)
Wyeth (import)	334 (27.8%)
Frisomum (import)	329 (27.4%)
Abbott (import)	297 (24.8%)
Yili (China)	297 (24.8%)
Nestle (import)	281 (23.4%)
Biostime (import)	264 (22%)
Aptamil (import)	221 (18.4%)
Nutrilon (import)	217 (18.1%)
Yashili (China)	211 (17.6%)
Dumex (import)	189 (15.8%)
Wandashan (China)	146 (12.2%)
Cow&gate(import)	107 (8.9%)
Friso (import)	84 (7%)
Hipp (import)	75 (6.3%)
Meiji (import)	73 (6.1%)
NutraCare (import)	67 (5.6%)
Karicare (import)	51 (4.3%)

Table 8: Formula milk brands the participants bought within one year.

Limitations of this study

The limitation of this study is that the sample is selected by some conditions. Participants were all well-educated and the family incomes are above the average income in China, Therefore, the attitudes and knowledge found above may not be representative for the larger population in China.

Conclusion

The results in this study suggested that the majority of consumers in China believe that formula milk can replace or be a substitute of breast milk. This may point out that the majority of Chinese consumers only have limited knowledge of both breast milk and formula milk in various aspect, including do not know the benefits breast milk, not clearly know the function of ingredients added in the IFM. They care about the ingredients being added into the IMF, but do not show comprehensive understanding the functions of those ingredients. In addition, we found that while Chinese consumers continuously trust imported brands, the confidence of domestic production is recovering.

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