Original article

Correlation of 4-month infant feeding modes with their growth and iron status in Beijing

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Keywords: *infant; feeding mode; growth and development; hemoglobins*

Background Growth and development of infants has been an important topic in pediatrics for a long time. Infants must be provided with food containing all necessary nutrients. Breast milk is believed to be the most desirable natural and cheapest food for well-balanced nutrition. But with the progress in the development of substitute food in developed countries, it is thought that formula milk can meet the requirement for infant growth. During early infancy, growth, as the most sensitive index of health, is therefore a critical component in evaluating the adequacy of breast-feeding, mixed-feeding and formula feeding. Iron status is another important index of infant health. Iron deficiency anemia remains the most prevalent nutritional deficiency index in infants worldwide. This study is to compare infants in Beijing at 4 months who are on three different feeding modes (breast feeding, mixed feeding and formula feeding) in physical changes and iron status. The results may provide new mothers with support in feeding mode selection, which will also be helpful to the China Nutrition Association in feeding mode education.

Methods This is a cohort study. One thousand and one normal Beijing infants were followed regularly for 12 months. Body weight and horizontal length were measured. Hemoglobin, red blood cell counts, mean corpuscular volume, mean corpuscular hemoglobin and serum iron were analyzed at 4 months.

Results The breast feeding percentage in the first 4 months was 47.9%. The feeding mode was not significantly related to maternal delivery age, education, labor pathway nor infant sex (P >0.05). Infant boys and girls exclusively breast-fed from 0 to 4 months had the highest weight at 0–6 months. The anemia rate of breast-fed infant boys at 4 months was the highest.

Conclusions Breast feeding should be given more emphasis. It is compulsory for new mothers to breast-feed their infants if possible. Social environment should also guarantee the requirement for breast feeding. Furthermore the normal values of hemoglobin, mean corpuscular volume and serum iron, which were originally used to judge children's iron deficiency anemia, might not be optimal for evaluating infants. There might be a need to develop sex-specific cutoff levels of hemoglobin, mean corpuscular volume and serum iron for infants.

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It is well known that growth and development of infants has been an important topic in pediatrics for a long time. And infants gain weight and length at the peak rate of their life cycle. To meet the requirements of this rapid growth, infants must be provided with food containing all necessary nutrients. Breast milk is believed to be the most desirable natural and cheapest food for well-balanced nutrition. The protein, fat and carbohydrate in breast milk have proven to be the easiest to digest and absorb for infants. Therefore, breast feeding has been given special emphasis and promotion since the 1970s.[1,2] Moreover, it has been promoted worldwide since the 1980s.[3] Some studies indicate that exclusive breast feeding can provide optimal nutrition and health protection for the first 6 months of life.[2] Furthermore, the WHO and the American Dietetic Association suggest that infants should be exclusively breast feed till 6 months, which is expected to be the ideal feeding mode for infants.[4,5] In addition, the China Nutrition Association (CAN) and some pediatric experts prefer that mothers should breast-feed their infants from birth to 4 months while the infants can be properly breast-fed together with complementary foods after 4 months. Formula feeding can be given to the infants whose mother cannot breast-feed and where finances permit.[6]

According to Chinese traditions, a mother is expected to breast feed her infant and the mother who breast-feeds her infant wins wide respect and effective support in her family. Therefore, breast-feeding has been the most preferred mode in the past Chinese history. Other modes of feeding have to be utilized when the mother is unable to breast-feed her infant. But with the progress in the development of substitute food for breast milk in the developed countries, it is thought that formula milk can meet the requirement of infant growth. With the development of China, especially in the fast developing big cities, such as Beijing, there are competitions in

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human resources. Mothers face competition in their work life. They found that three months of breast feeding (vacation) affected their promotion to some extent. Since one couple are encouraged to have only one infant, some of them would rather choose to pay the expensive substitute foods than to commit to long-term breast feeding of their infant. This fact decreased the breast-feeding rate.[7]

During early infancy, growth, as the most sensitive index of health, is a critical component in evaluating the adequacy of breast-feeding, mixed-feeding and formulas feeding.[8] Some studies indicate that the iron status of breast-fed infants is higher than that of the formulas-fed ones.[9-11] And iron deficiency anemia (IDA) remains the most prevalent nutritional deficiency index in infants worldwide. Many studies indicate that IDA rate of breast-fed infants are lower than the formulas fed ones.[12-16] However, some recent studies have shown that breast-feeding was a risk factor for IDA.[17-19]

Despite the general knowledge that breast feeding is the most desirable feeding mode for normal infants, due to the reasons mentioned above, it is evident that in Beijing the breast feeding rate is not as high as expected and many infants are currently fed with formulas. But what is the current nutritional status of these infants? Which feeding mode was supported by the data of infants IDA rate at 4 months? Is the breast-fed babies' IDA rate higher than mixed-fed and formulas-fed ones, or the contrary? We think this is an interesting topic in our developing city such as Beijing. Studies need to be conducted to investigate these questions. The statistical results may provide new mothers with support or correction in their feeding mode selection, which will also be helpful to the China Nutrition Association in their feeding mode propaganda. Subsequent social intervention studies will also be based on the results of this study. This study was designed to reveal the influence of feeding mode from birth to 4 months on infants' growth and development from birth to 12 months and analyzed their iron status and the prevalence of IDA at 4 months.

METHODS

Subjects

This was a cohort study. A total sample of normal healthy newborns (n=1001) was recruited from January 2003 to June 2004 at Beijing Haidian Maternal & Child Health Center. The criteria for participants included primipara, singleton birth, gestational length of 37–42 weeks, no birth defect or inborn disease, Chinese parents without anemia in the pregnant period, mothers with regular antenatal care, maternal age older than 23 years. Parents received both oral and written information about this study. A self-report dietary questionnaire was designed with particular emphasis on the mode of feeding and at which month complementary foods were added. They were also asked to fill in the brand of formula and the average grams of milk in each diet.

Among the 1001 infants investigated 517 were boys and 484 were girls. There were 953, 983, 867, 908, 846, 833, 709 and 758 case reports at 5, 6, 7, 8, 9, 10, 11 and 12 months respectively; some of which were not tracked regularly. In this sample, maternal education, delivery age, labor pathway, delivery season, gravidas and parity history were recorded. Maternal delivery age was divided into 4 groups with 25–29 years old considered as the optimal age[20] and older than 35 as elderly primi-para.[21] Similarly, maternal education was divided into 4 groups; those were lower than a high school education, associate degree, bachelorship and master degree or higher. The labor pathway included vaginal labor and cesarean section.

Growth

Weight (kg) and horizontal length (cm) of infants were used to evaluate their body size at birth, 42 days and each point of 3–12 months. Infant birth information was gathered in the maternity wards involved in this study. The same two nurses used the same measuring table and bathroom scale to measure the length and weight of infants at each time point. All the examinations were made within three days around the nominal ages of each point. Moreover, the weight was determined 1 hour after feeding at each point.

Feeding mode

According to three different feeding modes from birth to 4 months, infants were divided into three groups. The first group was exclusive breast-feeding, where infants received no other foods than breast milk, neither formula nor sugar; the second was mixed breast-feeding or mixed-feeding, under which infants received no more than 400 ml formula milk besides breast milk; and the third was formula feeding, under which infants received more than 90% energy from formulas.[22] The mixed-feeding group included some babies who were breast-fed in the first few months, but started to receive some formula for the rest of the first 4 months, and those who were fed with breast milk and formulas from birth to the end of the first four months.

Blood routine and iron status

At 4 months, routine blood parameters were measured from finger prick blood samples using the Beijing Sysmex KK-2 Hemoglobinometer. Hemoglobin (Hb), red blood cell (RBC), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and serum iron (SI) were analyzed at the Beijing Haidian Maternal & Child Health Center. The peripheral blood film and serum-iron were analyzed with a Beijing Bo-hui Chuang-xin BH5100 atomic absorption spectrum machine.

The cut-off points used for judging iron deficiency anemia were Hb $\leq$110 g/L, SI <9.85 μmol/L and MCV <80 fl. And the two latter indexes with the same cut-off points were used to identify iron deficiency.[22]

Table 1. Relation between feeding mode and different maternal delivery age, education, infants' sex, labor pathway, and delivery seasons (*n* (%))

Feeding modes	Maternal delivering age (y)				Maternal education			
	≤24 (%)	25–29 (%)	30–34 (%)	≥35 (%)	Lower than high school	Associate degree	Bachelor	Master and doctor
Breast feeding	27 (57.4)	213 (50.8)	195 (44.9)	44 (43.6)	109 (45.0)	15 (45.4)	271 (48.6)	84 (50.0)
Mixed feeding	13 (27.7)	119 (28.4)	134 (30.9)	33 (32.7)	72 (29.8)	9 (27.3)	163 (29.2)	55 (32.7)
Formulas feeding	7 (14.9)	87 (20.8)	105 (24.2)	24 (23.7)	61 (25.2)	9 (27.3)	124 (22.2)	29 (17.3)
Total	47 (100)	419 (100)	434 (100)	101 (100)	242(100)	33 (100)	558 (100)	168 (100)

Feeding modes	Infants sex		Labor pathway		Maternal delivery season			
	Boys	Girls	Vaginal	Cesarean	Spring	Summer	Autumn	Winter
Breast feeding	230 (44.5)	249 (51.4)	243 (51.3)	236 (44.8)	179 (45.7)	60 (54.1)	123 (52.3)	117 (44.5)
Mixed feeding	170 (32.9)	129 (26.7)	140 (29.5)	159 (30.2)	116 (29.6)	29 (26.1)	73 (31.1)	81 (30.8)
Formulas feeding	117 (22.6)	106 (21.9)	91 (19.2)	132 (25.0)	97 (24.7)	22 (19.8)	39 (16.6)	65 (24.7)
Total	517 (100)	484 (100)	474 (100)	527 (100)	392 (100)	111 (100)	235 (100)	263 (100)

Statistical analysis

The data obtained in this study pertained to all infants who entered the study. The parents were telephone-informed 3–5 days before each time point that their babies would receive medical examination. Experienced nurses measured the weight and horizontal length of the infants. Finger blood was gathered after finger cleaning and natural drying. All data recording and statistical analysis were executed with SPSS/PC+. Student's *t* test and chi-square test were used to identify differences between two groups and one-way analysis of variance (ANOVA) was used for differences between more than two groups with LSD to determine which groups differ. Cross-tabs exact chi-square was used to analyze the rate difference between more than two groups. The level of significance was taken as $P<0.05$.

RESULTS

Feeding mode and gender

The chi-square test of sex and feeding modes are showed in Table 1. The feeding modes were not significantly different between boys and girls ($P>0.05$).

Feeding mode and influencing factors

In the 1001 infants, 479 were exclusively breast feeding from birth to 4 months (47.9%), 299 were mixed feeding (29.9%), the rest 223 (22.2%) were formulas feeding (they were fed with infants normal formula, which were not minor element fortified). The mean delivery age was (30±4) years. About 77.5% mothers were primi-gravida and the others had abortion history. Four groups of maternal delivery age were ≤24, 25–29, 30–34 and ≥35. Table 1 shows that the feeding mode was not significantly different among the 4 maternal delivery age groups nor among the 4 maternal education groups ($P>0.05$). The feeding mode was not significantly different between the two baby sexes or two labor pathways ($P>0.05$). The difference of feeding mode was not significant among the four seasons either ($P>0.05$).

Feeding mode and infants' growth and development

Baby boys and girls in the three groups had no significant weight difference at birth. Figure 1 shows that from 42 days to 6 months breast feeding and mixed feeding baby boys had a higher weight than formula feeding boys ($P<0.05$). From 7 to 12 months mixed feeding baby boys had a higher weight than exclusively breast feeding baby boys. Formula feeding baby boys had the lowest weight. Figure 2 indicates that from 42 days to 6 months, exclusive breast feeding baby girls had higher body weight than baby girls in the other two groups ($P<0.05$). However, from 7 to 12 months, baby girls' weight showed no significant difference among the three feeding mode groups ($P>0.05$). Furthermore, the horizontal length of baby boys and girls at each point showed no significant difference ($P>0.05$).

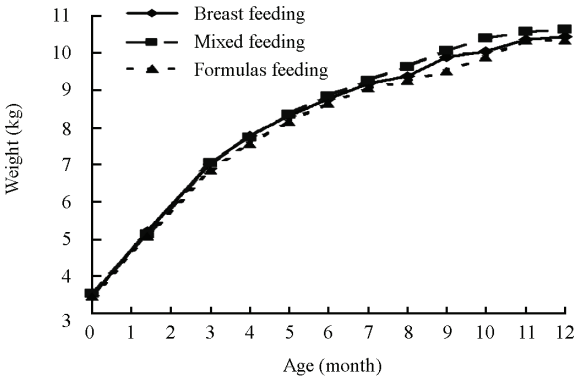

Figure 1. Boys weight among three feeding groups.

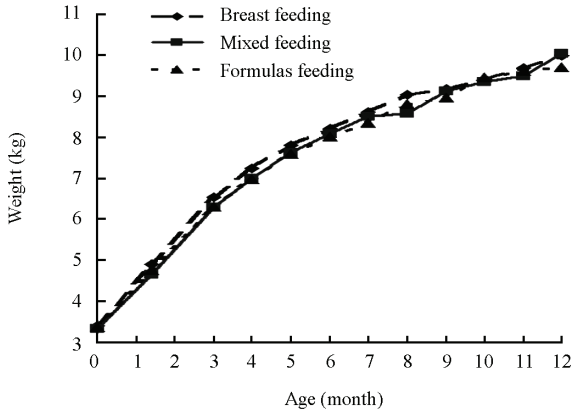

Figure 2. Girls weight among three feeding groups.

Weight-gain and length-gain

Table 2 shows that the weight-gain of both the exclusive breast-fed boys and girls from birth to 4 months was greater than the infants who received mixed feeding and formula feeding boys. The weight-gain of both mixed feeding baby boys and girls from birth to 12 months was

Table 2. Weight-gain and length-gain in the infants across feeding mode

Index	Boys				Girls			
	BF	MF	FF	*P* values	BF	MF	FF	*P* values
0–4 months								
Weight-gain (kg)	4.29±0.77	4.23±0.75	4.12±0.61	<0.05	3.80±0.68	3.65±0.69	3.57±0.66	<0.05
Length-gain (cm)	15.21±2.03	15.04±2.27	15.19±1.74	>0.05	14.01±1.93	13.76±1.66	14.10±2.42	>0.05
0–6 months								
Weight-gain (kg)	5.30±0.88	5.31±0.84	5.19±0.68	>0.05	4.77±0.75	4.71±0.90	4.64±0.77	>0.05
Length-gain (cm)	19.15±2.19	19.39±2.24	19.57±1.88	>0.05	18.16±2.13	17.99±2.15	18.29±2.66	>0.05
0–12 months								
Weight-gain (kg)	7.18±0.83	7.22±1.03	6.80±0.36	>0.05	6.49±1.09	6.80±1.08	6.32±0.83	>0.05
Length-gain (cm)	27.22±2.33	26.76±3.06	26.91±2.61	>0.05	25.90±2.96	26.45±3.02	26.86±2.17	>0.05

BF: breast feeding; MF: mixed feeding; FF: formulas feeding.

Table 3. Blood routine test and iron status in 4-month infants across different feeding modes

Index	Breast feeding		Mixed feeding		Formulas feeding	
	Boys (*n*=211)	Girls (*n*=232)	Boys (*n*=159)	Girls (*n*=116)	Boys (*n*=105)	Girls (*n*=100)
Hemoglobin (g/L)	113.45±10.58	115.82±9.89	117.75±9.70**	116.65±9.61	119.08±11.07**	118.52±10.42*
Red blood cell ($\times10^{12}$/L)	4.10±0.39	4.09±0.38	4.22±0.36**	4.06±0.35	4.18±0.40	4.10±0.37
Mean corpuscular volume (fl)	76.60±3.57	78.26±3.62	77.14±3.47	78.84±3.48	77.66±3.61**	79.10±3.38*
Mean corpuscular hemoglobin (pg)	27.74±2.02	28.39±1.98	27.95±1.91	28.80±1.76*	28.61±2.10$^{**,\#}$	28.92±1.78*
Serum iron (μmol/L)	7.41±0.95	7.44±0.84	7.67±0.88**	7.60±0.89	7.63±0.80*	7.60±0.91

$^{*}P$<0.05 and $^{**}P$<0.01 compared with the breast feeding group; $^{\#}P$<0.05 compared with the mixed feeding group.

Table 4. Weight-gain and length-gain in IDA and normal infants

Index	Boys (*n*=475)		Girls (*n*=448)	
	IDA (*n*=188)	Normal (*n*=287)	IDA (*n*=139)	Normal (*n*=309)
0–4 months				
Weight-gain (kg)	4.27±0.77	4.21±0.71**	3.79±0.73	3.72±0.71
Length-gain (cm)	15.10±2.07	14.97±2.16	14.09±2.24	13.97±1.81
0–6 months				
Weight-gain (kg)	5.44±0.94	5.24±0.80	4.75±0.81	4.72±0.84
Length-gain (cm)	19.54±2.29	19.27±2.14	18.21±2.41	18.15±2.36
0–12 months				
Weight-gain (kg)	7.27±0.85	7.14±0.84	6.82±1.18	6.39±0.89
Length-gain (cm)	27.81±3.14	27.18±2.29	26.09±2.52	26.08±3.18

IDA: iron deficiency anemia. $^{**}P$<0.01 compared with IDA group.

the biggest. Both weight-gain and length-gain from birth to 6 months showed no significant difference among three different feeding mode groups. Among both baby boys and girls, weight-gain in the formula feeding groups was the lowest in the 0–4, 0–6, 0–12 months intervals. Furthermore, a difference in weight-gain and length-gain in the 0–4, 0–6, 0–12 month intervals was found between baby boys and girls. Weight-gain of all baby boys was 4.25 kg, 5.32 kg, 7.13 kg, respectively, and that of all baby girls was 3.74 kg, 4.72 kg, 6.60 kg. The length-gain of all baby boys was 15.01 cm, 19.36 cm, 27.49 cm and that of all baby girls was 13.96 cm, 18.06 cm, 26.25 cm, respectively.

Feeding mode and routine blood test and iron status

Routine blood test and iron status of all infants at 4 months are shown in Table 3. Although the mean Hb of the three feeding groups was in the normal range (>110 g/L), the Hb of the exclusive breast feeding baby boys was the lowest (P <0.001). MCV and MCH of exclusive breast feeding baby boys were lower than those of the formula feeding ones (P <0.05); RBC and SI of breast feeding infants were lower than those of the mixed feeding ones (P <0.01). For baby girls, Hb, MCV and SI showed no significant difference among the three feeding groups. MCH of exclusive breast-feeding baby girls was significantly lower than the other two groups (P <0.05). Mean MCV and SI of all infants were lower than the normal value (9.85 μmol/L). MCV of 70.3% of infants was lower than 80 fl. SI of 99.7% infants was lower than 9.85 μmol/L.

The iron deficiency anemia (Hb ≤110 g/L, MCV <80 fl, SI <9.85 μmol/L) rate of exclusive breast-feeding baby boys (48.8%) was higher than that of the mixed-feeding (32.1%) and the formulas feeding baby boys (32.4%, P <0.001). Among baby girls there was no significantly different (P >0.05); the rates in the three groups were 30.3%, 37.1%, and 25.0%, respectively.

Table 4 shows that weight-gain and length-gain of both anemic boys and girls in 0–4, 0–6, 0–12 months intervals were a little more than for the normal babies;.but there was no significant difference (P >0.05). The weight-gain of IDA boys was greater than for normal children in the 0–4 months interval (P <0.01).

DISCUSSION

In this sample, the proportion of infants' sex and birth pathway was similar to Lai's results.[23] Though some cases were missing in the following visits.

The United Nations Children's Fund claimed in April 1989 that 0–4 month-old infants should be exclusively breast-fed.[24] In this study, the exclusive breast feeding rate in the first four months was 47.9%, which was higher than Wang's results in Beijing in 2001 (35.2%).[25] This should be attributed to the propagandas of the advantages of breast feeding.

These results showed that maternal age, education and labor pathway did not influence the selection of feeding mode, and the feeding mode of infants was not influenced by the infants' sex either, although babies born by cesarean were more likely to be formulas feeding.[26] The reasons may be (1) the whole family was paying adequate attention to the one baby due to our national family planning policy; (2) the rate of cesarean section is getting higher owing to the successful cesarean section technology, the rate of cesareansection in this sample (47.4%) was consistent with some recent studies in China which indicated that more cesarean sections are selected by pregnant women without cesarean signs.[27] However the selection of feeding mode was not significantly different due to the delivery pathway.

In the Chinese traditional view, it is believed each mother has enough milk for her baby. Labor Law permits every new mother to have at least 3 months delivery vacation. All families paid exclusive attention to their nutrition in order that babies had enough breast milk. In fact, nearly each mother received more nutrition than required and she normally had more beast milk than her baby really needed. Mothers normally breast-feed babies according to their needs and the babies' needs; hence, there was always excessive breast-feeding to some extent. Some new mothers said "I breast-feed my baby as soon as he cries.", "I will breast-feed my baby when my breast becomes distending and becomes painful." Very few women collected their milk for future feeding or gave it to other babies whose mother had not enough milk.

The weight of the exclusive breast feeding infants at each time point for the first 6 months was greater than that of the other two groups, although there was no significant weight difference among the three feeding groups at birth. This result supported that breast milk was the most ideal natural food for infants because it has well balanced nutrition. The infants could not absorb all the nutrients from the formulas because their gastrointestinal function was feeble and digestive enzymes were not mature, which accounted for the fact that weight of all formula feeding infants was the lowest. This result was consistent with Rong's study in Anhui Province, China.[28] The result was also supported by Carvalho's study that frequent and unrestricted breast-feeding increased early milk production and excessive infant weight-gain.[29] Although in a study conducted some years ago, data obtained suggested that formula could meet the requirement of infants only 56 days,[30] it was evident that formula did not help these Beijing infants gain the same weight as breast-feeding in this sample, despite that the formulas in this study were famous brands manufactured by global companies.

The mixed feeding infants' weight from 42 days to 4 months was between those of the breast feeding and formulas feeding groups. After 4 months all parents gave babies complementary food according to CNA because babies needed more and more nutrients when their organs were getting gradually more mature. Although breast milk or formula was still important for infants' growth and development, infants weight in 6–12 months was not significantly correlated with their first 4 months feeding modes, perhaps because the quantity and quality of complementary foods contributed more to their weight-gains. The higher weight in the exclusive breast-feeding group in 4–6 months could be owed to the continuous effect of first four months feeding mode. It was expected that the amount of solid foods was relatively small in this interval, although parents gave babies yolk or some jams.

From the statistical analysis of the effect of feeding mode on infant growth and development, we can conclude that the breast feeding mode should be given more emphasis. And breast-feeding rate should be increased. It should be compulsory for new mothers to breast feed their infants if possible. The social environment should also support the requirement for breast feeding.

Mean MCV and SI in this sample were lower than the normal, and the MCV rate and SI rate were higher than the anemia rate. The higher anemia rate and lower MCV and SI rate displayed the high iron deficiency rate in this sample. This was similar to Yip's result.[31] Iron deficiency meant inadequate iron storage, and anemia was an indication that all storage of iron was exhausted. So the iron deficiency rate is usually greater than the anemia rate. It was worthwhile to point out that the normal values of Hb, MCV and SI referenced here were originally used to judge childrens' iron deficiency anemia. We think maybe these values do not fit infants so well. We have read reports that reduced values have been put into use in clinics in Taiwan, China and Hong Kong, China. In mainland of China we will get our more suitable values through future research.

In this series of subjects the anemia rates of exclusive breast feeding baby boys was much higher. This was comparable to Tantracheewathorn's result.[18] The anemia rate of breast feeding baby boys (48.8%) was comparable to the result of Willows in Canada in 2000,[32] but this was lower than 55.9% IDA of formulas feeding.[19]

This study also showed that feeding mode of infants in the first 4 months influenced anemia rate of baby boys and girls differently. Other studies had shown similar gender difference.[14,15] There were several possible reasons for baby boys' higher risk of iron deficiency. The

first one was the bigger postnatal weight-gain of baby boys in 0–4 months interval. Recent studies had demonstrated that infants who grew more rapidly also had a lower SI concentration.[16] Higher weight-gain of the baby boys partly accounted for their higher anemia rate. The Second reason might be that gender played a role in infants' iron status, and girls had higher iron stores than boys at birth, despite their lower birth weight. Domellof, who concluded that there are gender difference in MCV, supported this.[33] SI values in infancy might be due to genetic and hormonal factors.[33] Moreover, recent studies in adolescents and adults suggests that there might be other sex-related differences, such as hormonal changes or differences in growth, which caused some indicators of iron status to vary between sexes,[34] or the internal kinetics of iron metabolism of the two sexes might be different.[33] The third reason is that baby boys might have larger intestinal iron losses or lower iron absorption than girls.[30]

Our results showed that infant boys and girls exclusively breast-fed from 0 to 4 months had the highest weight at 0–6 months. The anemia rate of breast-feeding infant boys at 4 months was the highest. The results implied that infant boys had a significantly higher risk of iron deficiency.

But, can we study this phenomenon in the reverse direction? There might be a need to develop sex-specific cutoff levels of Hb, MCV, and SI for infants. Sex-specific cutoffs for these indexes could only be established through a larger population-based study in term infants. This will be the content of our future research.

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News

WHO alarms HIV infection among tuberculosis patients

World Health Organization (WHO) on Feb. 20 urged Asian countries to harness the growing trend of HIV and TB (Tuberculosis) co-infection and its resulting deaths in the region.

A statement released by the Manila-based WHO Western Pacific Region office said people living with HIV who develop TB are 10 times more likely to die earlier than those who do not.

Dr. Shigeru Omi, WHO's regional director, said unfortunately to this day new TB patients have insufficient access to HIV testing.

"This contributes to very high case fatality rates of 25–50 percent among new TB patients in the Western Pacific Region," Omi said, adding that half of TB patients infected with HIV would have died during TB treatment, if antiretroviral therapy is not provided. Omi said HIV testing should be made part of TB diagnosis.

Although antiretroviral therapy access has greatly expanded in the region since 2004, HIV testing in TB patients and TB screening among people with HIV remain low, WHO said. TB is a major problem in the Western Pacific Region, which accounts for about one third of the global TB burden.

WHO said health officials from nine Asian countries, including China, Malaysia and the Philippines, have agreed to take steps to address the problem through the increase of testing and screening, the early access to antiretroviral therapies, and improved infection control.

(Source: Xinhuanet)