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Association Between the Dietary Literacy of Children's Daily Diet Providers and School-age Children's Nutritional Status and Eating Behaviours: A Cross-sectional Study

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Abstract

Background

Overweight and obesity rates have increased rapidly in Chinese school-age children, and previous studies have indicated that poor dietary literacy can lead to poor eating behaviours. However, few studies have investigated the association between the dietary literacy of daily diet providers and the eating behaviours and nutritional status of school-age children raised by the providers. Thus, we aimed to explore this association.

Methods

We collected data on the eating behaviours and nutritional status of children in two primary schools in Anhui Province, as well as the dietary literacy of their daily diet providers. T-tests, one-way ANOVA, and multiple linear regression were used to analyse the association.

Results

We found significant differences in the scores on the Questionnaire of Children's Daily Diet Providers' Dietary Literacy (QCDDPDL) by region, relationship with the child, age, and educational level of the daily diet provider (all $p < .05$). Moreover, the children in the low QCDDPDL score group were inclined to engage in unhealthy eating behaviours ($p < .05$). In addition, the incidence of overweight and obesity was higher in the low QCDDPDL attitude score group than the high score group ($p = .006$).

Conclusions

Our study showed that the dietary literacy of diet providers may influence children's health and eating behaviours. Improving the dietary literacy of diet providers may promote the health status and eating behaviours of school-age children.

Introduction

The problem of overweight and obesity in children has become increasingly serious, affecting their current and even life-long health. A large sample taken in 2014 showed that the prevalence of overweight and obesity was 19.3% in Chinese students aged 7 to 18, which had increased significantly compared to decades ago [1]. Obesity increases the risk of physical and psychological problems, including type 2 diabetes, cardiovascular and liver disease as well as social discrimination, low self-esteem, and depression [2]. Obesity and malnutrition in children are mainly caused by poor eating behaviours, which means that obesity is related to dietary factors [3]; the American Dietetic Advisory Committee recommended that overweight and obese individuals lose weight by eating healthily [4].

The problem of obesity and malnutrition can be improved by strengthening dietary literacy, which is one of the important factors affecting public health [5]. In light of the age of children and their long-term relationships with diet providers, eating behaviours of children, such as food selection, are mainly affected by the dietary literacy of their diet providers. Providers with high dietary literacy are good at using nutritional information to make healthy decisions [6]. The knowledge, attitudes, and behaviours of diet providers affect their food choices and in turn affect their children's eating behaviours and health status. On the other hand, providers with low dietary literacy probably do not choose beneficial foods for their children by reading food labels and nutrient contents. In addition, providers' encouragement, occupational status, and educational level were found to be correlated with children's consumption of healthy food [7]. Therefore, the dietary literacy of children's daily diet providers affects not only their health but also children's health and eating behaviours [8].

Based on the above theories, this study investigated the nutritional status and eating behaviours of 1,137 children in grades 3 to 6 from two primary schools in urban and rural areas of Hefei, Anhui Province. The dietary literacy of children's daily diet providers was investigated to analyse the association between the dietary literacy of daily diet providers and children's nutritional status and eating behaviours.

Methods

Participants

One primary school from an urban area and another from a rural area were selected by stratified cluster sampling in Hefei, Anhui Province, which is in central China, in November 2018. All students in grades 3 to 6 were included in the investigation after informed consent was obtained from the children's daily diet providers and assent was provided by the students. A total of 1,137 children and their daily diet providers participated in this study. Those who did not complete the questionnaire and those who did not provide peripheral blood samples were excluded. Ultimately, 1,043 children were included, for an effective rate of 91.7%. Among these children, 693 (66.4%) were from the urban area and 350 (33.6%) were from the rural area; boys and girls accounted for almost half each, and their ages ranged from 7 to 13 years, with a mean of 9.89 ± 1.32 years. Ethics approval was given by the Biomedicine Ethics Committee of Anhui Medical University (No. 20170386).

Questionnaire

A self-report questionnaire was used to conduct a cross-sectional survey of children's daily diet providers; the questionnaire mainly included questions on the general demographic characteristics, such as the child's birthplace (urban, rural), sex (male, female), age, only child status of the child (yes, no) and the education level of the child's daily diet provider. Additionally, the dietary literacy of providers was evaluated by the Questionnaire of Children's Daily Diet Providers' Dietary Literacy (QCDDPDL), which was developed by our research group [9]. The questionnaire consists of 30 items that investigate the dietary literacy of daily diet providers from four dimensions, namely, attitude (7 items), actions (7 items), skills (9 items), and environment (7 items), by using a 4-point

Likert scale (0=very inconsistent, 3=very consistent). The score of each dimension and the total score were calculated. A higher score indicates a stronger ability of the child's daily diet provider to use dietary nutrition knowledge to improve the child's health status (Additional file 1: Supplement Table 1). In this study, the Cronbach's α coefficient, split-half reliability, and test-retest reliability of the QCDDPDL were 0.874, 0.813, and 0.878, respectively. To better compare the effects of dietary literacy of diet providers on children's eating behaviours and nutritional status, the score of each dimension and total score were divided into the low group (<P_{25}), moderate group (P_{25} to P_{75}), and high group (>P_{75}) [10]. The Children's Eating Behaviour Questionnaire (CEBQ), which was developed by the British scholar Wardle and colleagues in 2001, was used to assess children's eating behaviours [11]. The CEBQ contains 35 items that evaluate children's eating behaviours from 8 dimensions (satiety responsiveness, slowness in eating, food fussiness, food responsiveness, enjoyment of food, desire to drink, emotional undereating, and emotional overeating). The CEBQ entries are scored on a 5-point Likert scale (1= never, 5= always), and the score of each dimension is calculated separately. A higher score indicates stronger characteristics of this dimension. In this study, 64 school-age children were retested 1 week after the survey, and the retest reliability of the questionnaire score ranged from 0.86 to 0.93 for each dimension.

Detection of children's nutritional status

BMI and body fat percentage

The weight and height of children were measured to calculate BMI, using the formula BMI = weight (kg) / height^2 (m^2). The research subjects were divided into 3 categories (wasting, normal, and overweight or obese) according to the BMI standards for the nutritional status of children aged 7-18 in China [12]. For a detailed division, see Additional file 2: Supplement Table 2. For the children, skinfold thickness of the upper triceps and subscapular folds were measured by sebaceous callipers. The measured skinfold thickness was converted into body fat density using the Japanese Changling formula, and then the percentage of body fat was estimated using the modified formula of Brozek [13]. The body fat percentage was divided by quartile. P_{25} to P_{75} was considered the normal control group, < P_{25} was considered the low body fat group, and > P_{75} was considered the high body fat group [14].

Haemoglobin

A haemoglobin strip (dry chemical method) was used to test the haemoglobin content in the blood from the fingertips of children. Hb < 115 g/L in children aged 5 to 11 and Hb < 120 g/L in children aged 12 to 14 were used as the defining criteria for nutritional anaemia in children based on the WHO recommended standards [15].

Trace elements

Forty microlitres of blood from the fingertips of children was aspirated by using a micropipette and measured within 2 h after shaking. The contents of Zn, Ca, and Fe elements in the sample were detected by the standard curve method using a BH5500 atomic absorption spectrometer (Beijing Bohui Innovative Photoelectric Technology Co., Ltd., Beijing). The children's trace element contents were divided into normal and deficient groups by the detection criteria. Reference ranges of normal values of Ca, Fe, and Zn in children aged 6 to 11 years were 1.51 to 2.01 mmol/L, 7.36 to 9.34 mmol/L, and 67.72 to 103.84 μmol/L, respectively; reference ranges of normal values of Ca, Fe, and Zn in children aged 12 to 14 years were 1.42 to 1.90 mmol/L, 7.16 to 9.85 mmol/L, and 71.46 to 111.33 μmol/L, respectively.

Quality control

The children took the questionnaire home after school (an instruction manual was attached to guide the diet provider); the questionnaire was completed by their guardians who mainly provided meals for them and were returned the next morning. The headteacher was in charge of this process. The measurement of physical development was completed by child healthcare workers. All instruments for laboratory testing were calibrated, and the testing was completed by laboratory professionals.

Statistical analysis

The database was established by entering the contents of the questionnaire into EpiData 3.1, and SPSS 21.0 was used for statistical analysis. We performed Student's *t*-test and one-way ANOVA to compare the dietary literacy scores of daily diet providers based on different demographic characteristics. Meanwhile, the relationships between different dietary literacy groups of daily diet providers and the nutritional status of school-age children were examined by chi-square test. Multiple linear regression analysis (controlling for confounding factors) was used to explore the association between daily diet providers' dietary literacy and school-age children's eating behaviours. $p < .05$ was considered significant.

Results

In total, 1,043 participants completed our research, for a response rate of 91.7%. Table 1 shows that there were significant differences in the school-age children's daily diet providers' dietary literacy dimensions and total scores by region, relationship with the child, age, and educational level of the daily diet provider. The scores of all dimensions were higher for diet providers from urban areas than those from rural areas, and the dietary literacy scores were generally higher for younger parents, had a higher educational level and had a better self-assessed economic status.

Table 2 shows that there was no significant difference in the distribution of the percentage of body fat or haemoglobin content among the different dietary literacy groups. However, there was a significant difference in the distribution of BMI among children of daily diet providers with different dietary literacy attitudes ($p = .006$). For comparison of trace elements among different dietary literacy groups, Table 3 shows that the contents of calcium, iron, and zinc did not differ significantly among children in the low, moderate, and high dietary literacy groups for each dimension and the total score. Table 4 shows that

children raised by diet providers with high total dietary literacy compared with those raised by diet providers with low total dietary literacy had lower scores in various eating behaviours except for slowness in eating.

Multiple linear regression analysis was performed using the score of each dimension of school-age children's eating behaviours as the dependent variable, the score of each dimension of daily diet providers' dietary literacy of school-age children as the independent variable, and area of residence, gender, age, only child status, and education as covariates. Table 5 shows that the high total score group of providers' dietary literacy was associated with the reduced occurrence of poor eating behaviours (satiety responsiveness, slowness in eating, food fussiness, food responsiveness, desire to drink, emotional undereating, and emotional overeating) ($\beta < 0$, $p < .05$) and the formation of healthy eating behaviours (enjoyment of food) of children ($\beta > 0$, $p < .05$), while the differences in the influence of the moderate score group on children's eating behaviours compared with the low score group were not particularly obvious.

Discussion

The results of this survey showed that diet providers' dietary literacy was indeed related to the eating behaviour of their children. However, no correlation was found between the nutritional status of the child (body fat percentage, haemoglobin, calcium, iron, zinc) and the dietary literacy of their diet providers in these two primary schools. Meanwhile, we found that providers who lived in cities with ages ranging from 30 to 40 had better dietary literacy, which was consistent with previous research [16]. For urban children who live in better educated families, their daily diet providers pay more attention to dietary nutrition and purchase more suitable food for children's growth and development [17]. Compared to other providers, well-educated providers are able to make more informed decisions in caring for their children, so as the main daily diet providers, they will help their children develop healthy eating behaviours.

In our study, the association between the daily dietary literacy score of providers and children's BMI was statistically significant only in the attitude dimension. A reasonable explanation was that the high dietary literacy score of providers who find their children overweight would take measures to prevent their children from being overweight and obese [18]. However, we did not find an association between the contents of trace elements in the children's peripheral blood and the providers' dietary literacy. On the one hand, with the development of the economy, dietary providers have access to abundant food; thus, children's intake of nutrients is sufficient. In addition to sources of various trace elements from the daily diet, children can also obtain calcium, iron, and other nutrients through supplements [19]. Therefore, this may obscure the effect of the dietary literacy of providers on children's trace element status [20].

The scores of the dietary literacy attitude, behaviour, skill, and environment dimensions and the total dietary literacy score of school-age children's daily diet providers were significantly correlated with most eating behaviours of the children. The multiple linear regression results suggested that the total score of daily dietary literacy of diet providers was negatively associated with children's satiety responsiveness, slowness in eating, food fussiness, food responsiveness, desire to drink, emotional undereating, and emotional overeating behaviours but positively associated with children's enjoyment of food. Previous studies showed that obese children were more sensitive to the smell of food and more likely to overeat after exposure to preferred foods than normal-weight children. Overreaction to food may not be limited to food choices but also include beverages, especially sugar-sweetened beverages, which are associated with weight gain [21, 22]. A study on dietary patterns and nutritional status of Kenyan Nairobi children found that the higher the providers' dietary literacy score, the more fruit, vegetables, and milk their children consumed daily [23]. Another study found that parents' dietary habits and feeding strategies were the most important determinants of children's eating behaviours and food choices [24]. Generally, unhealthy eating behaviours can increase the risk of obesity and even some diseases, such as diabetes, hyperlipidaemia, and cardiovascular disease [25]. As an important factor affecting children's eating behaviours [26], it is necessary to improve the dietary literacy of diet providers of children. For children's development, parents should provide children with sufficient and healthy food to choose from. At the same time, parents should strengthen their dietary literacy and transmit their healthy eating behaviours and dietary concepts to future generations.

Limitations

There were some deficiencies in this study. First, more than one person may provide children with their daily diets, such as when both parents participate; however, this study only investigated the dietary literacy of one provider, and the results may not be sufficiently accurate. In addition, due to dietary culture, religious beliefs, and other factors, there are large differences in food choices in different regions. This study only conducted a sample survey in one region, and the survey results cannot be generalized. It is necessary to survey a larger sample population in future studies.

Conclusions

In this study, the dietary literacy of school-age children's daily diet providers affected children's eating behaviours. Although no association was found between the nutritional status of children and the dietary literacy of their dietary providers, previous studies have shown that unhealthy eating behaviours increase the risk of some chronic diseases. Therefore, we can improve the dietary literacy of children's diet providers to cultivate children's healthy eating behaviours. Additionally, appropriate intervention measures should be formulated with full consideration of socioeconomic and educational levels to reduce the risk of children's nutrition-related diseases and promote children's physical and mental health. In addition, based on the proposed interventions, community trials can be carried out to evaluate the effects of the interventions.

Abbreviations

QCDDPD: The Questionnaire of Children's Daily Diet Providers' Dietary Literacy; CEBQ: The Children's Eating Behaviour Questionnaire; BMI: Body mass index; ANOVA: Analysis of Variance.

Declarations

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Authors' Contributions

GFW and PYS supervised this work. YH and SSC collected the data. YHL, TTZ, MYY, and LLS analyzed the data. JJC and NX wrote the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The data presented in this study are available upon request to the corresponding author.

Ethics approval and consent to participate

This study was approved by The Biomedicine Ethical Committee of Anhui Medical University (No.20170386). All methods were performed in accordance with the relevant guidelines and regulations. Informed consent was obtained from the caregives of the participants involved in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that there is no conflict of interest.

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Tables

Table 1 Comparison of daily diet providers' dietary literacy scores between different demographic characteristics

Characteristics	N (%)	Attitude	Behaviour	Skill	Environment	Total score
		Mean SD	Mean SD	Mean SD	Mean SD	Mean SD
Region						
Cities	693(66.4)	15.0 2.7	15.3 3.5	19.0 4.1	14.0 2.8	63.2 10.3
Countryside	350(33.6)	13.6 3.2	14.3 3.9	18.1 4.5	12.8 3.2	58.7 11.5
p		< .001	< .001	.001	< .001	< .001
Relationship with child						
Parents	894(85.7)	14.7 2.8	15.1 3.5	18.9 4.1	13.8 2.8	62.5 10.4
Grandparents	128(12.3)	13.2 3.4	13.7 4.1	17.3 4.9	12.4 3.5	56.6 12.7
Other	21(2.0)	13.1 3.6	13.8 4.5	19.0 4.6	12.6 3.7	58.3 13.3
p		< .001	< .001	< .001	< .001	< .001
Diet provider age						
30 years	44(4.2)	14.4 3.1	14.6 4.1	19.0 4.7	13.1 3.3	61.0 12.6
30~40years	649(62.2)	14.8 2.8	15.2 3.4	19.0 4.0	13.9 2.8	62.9 10.1
40~50years	223(21.4)	14.3 3.0	15.0 3.7	18.4 4.4	13.4 3.1	61.1 11.2
50~60 years	47(4.5)	13.5 3.5	14.5 4.6	18.3 4.3	13.3 3.5	59.5 12.5
60years	80(7.7)	13.2 3.2	13.3 3.8	16.9 4.9	12.0 3.3	55.3 12.1
p		< .001	< .001	< .001	< .001	< .001
Education						
Primary school or lower	197(18.9)	13.3 3.2	13.8 4.0	17.8 4.8	12.4 3.1	57.2 12.0
Junior middle school	417(40.0)	14.6 3.0	15.0 3.5	18.7 4.2	13.9 2.8	62.2 10.4
High school	233(22.3)	15.0 2.6	15.5 3.8	19.3 4.1	13.9 3.0	63.6 11.1
College and higher	196(18.8)	14.9 2.6	15.3 3.1	18.9 3.7	13.8 2.8	62.9 9.5
p		< .001	< .001	.001	< .001	< .001

Table 2 Comparison of partial nutritional status of children in different dietary literacy groups

Dietary literacy	N (%)	Body fat percentage[a]			BMI[b]			Haemoglobin[c]	
		Normal	High	Low	Normal	Wasting	Overweight or obesity	Normal	Deficiency
Attitude									
Low score <13	233(22.3)	109	63	61	147	21	65	219	14(6.0)
Moderate score 13-17	652(62.5)	327	166	159	483	31	138	590	62(9.5)
High score >17	158(15.2)	79	35	44	103	14	41	142	16(10.1)
χ^2		2.00			14.29			3.01	
p		.735			.006			.222	
Behaviour									
Low score <13	246(23.6)	116	66	64	178	12	56	226	20(8.1)
Moderate score 13-18	610(58.5)	306	153	151	432	39	139	554	56(9.2)
High score >18	187(17.9)	93	45	49	123	15	49	171	16(8.6)
χ^2		0.86			3.15			0.26	
p		.930			.532			.878	
Skill									
Low score <16	222(21.3)	109	58	55	157	17	48	202	20(9.0)
Moderate score 16-22	605(58.0)	290	162	153	420	40	145	551	54(8.9)
High score >22	216(20.7)	116	44	56	156	9	51	198	18(8.3)
χ^2		3.79			2.87			0.08	
p		.435			.581			.960	
Environment									
Low score <12	251(24.1)	121	65	65	183	16	52	228	23(9.2)
Moderate score 12-16	614(58.9)	294	160	160	429	39	146	557	57(9.3)
High score >16	178(17.0)	100	39	39	121	11	46	166	12(6.7)
χ^2		3.98			1.67			1.16	
p		.409			.797			.561	
Total score									
Low score <55	258(24.7)	125	66	67	183	16	59	236	22(8.5)
Moderate score 55-70	550(52.7)	261	153	136	393	39	118	500	50(9.1)
High score >70	235(22.6)	129	45	61	157	11	67	215	20(8.5)
χ^2		6.96			5.59			0.11	
p		.138			.232			.949	

[a] P_{25}-P_{75} was used as normal group, < P_{25} as low body fat group, > P_{75} as high body fat group; [b] Detailed BMI classification was shown in Supplemental Table 2; [c] HB < 115 g/L in children aged 5 to 11 and Hb < 120 g/L in children older than 11 were considered as deficiency.

Table 3 Comparison of trace elements status among children in different dietary literacy groups

Dietary literacy	N (%)	Calcium		Iron		Zinc	
		Normal	Deficiency	Normal	Deficiency	Normal	Deficiency
Attitude							
Low score	233(22.3)	192	41	189	44	213	20
Moderate score	652(62.5)	494	158	533	119	565	87
High score	158(15.2)	126	32	131	27	141	17
χ^2		4.77		0.20		3.94	
p		.092		.903		.140	
Behaviour							
Low score	246(23.6)	191	55	203	43	213	33
Moderate score	610(58.5)	480	130	497	113	537	73
High score	187(17.9)	141	46	153	34	169	18
χ^2		0.91		0.13		1.47	
p		.636		.938		.481	
Skill							
Low score	222(21.3)	178	44	177	45	185	37
Moderate score	605(58.0)	469	136	498	107	541	64
High score	216(20.7)	165	51	178	38	193	23
χ^2		1.01		0.80		6.15	
p		.605		.671		.146	
Environment							
Low score	251(24.0)	198	53	211	40	224	27
Moderate score	614(58.9)	474	140	500	114	540	74
High score	178(17.1)	140	38	142	36	155	23
χ^2		0.37		1.41		0.50	
p		.830		.495		.777	
Total score							
Low score	258(24.7)	206	52	212	46	228	30
Moderate score	550(52.7)	429	121	451	99	479	71
High score	235(22.6)	177	58	190	45	212	23
χ^2		1.48		0.18		1.55	
p		.478		.914		.460	

The cut-offs of dietary literacy are the same as Table 2; Reference ranges of normal values of Ca, Fe, and Zn in children aged 6 to 11 years were 1.51 to 2.01 mmol/L, 7.36 to 9.34 mmol/L, and 67.72 to 103.84 μmol/L, respectively; Reference ranges of normal values of Ca, Fe, and Zn in children aged 12 to 14 years were 1.42 to 1.90 mmol/L, 7.16 to 9.85 mmol/L, and 71.46 to 111.33 μmol/L, respectively.

Table 4 Comparison of eating behavior of children in different dietary literacy of daily diet providers

Dietary literacy	Satiety responsiveness	Slowness in eating	Food fussiness	Food responsiveness	Enjoyment of food	Desire to drink	Emotional undereating	Emotional overeating
	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD
Attitude								
Low score	12.7 3.7	10.3 3.5	16.1 4.1	11.4 4.2	13.1 3.8	6.6 3.0	10.3 3.3	8.2 3.5
Moderate score	12.4 3.3	10.0 3.2	15.2 4.1	10.4 3.9	13.8 3.7	6.1 2.9	10.0 3.1	7.2 3.0
High score	11.9 2.9	9.6 3.2	14.2 4.2	10.1 4.0	14.5 4.1	5.9 2.8	9.8 3.4	6.3 2.9
F	3.17	1.79	9.74	6.77	6.64	2.91	1.06	18.6
p	.042	.167	< .001	.001	.001	.055	.347	< .001
Behaviour								
Low score	12.8 3.5	10.1 3.3	15.9 4.1	11.1 4.0	13.2 3.7	6.7 3.1	10.3 3.3	7.9 3.2
Moderate score	12.4 3.2	10.1 3.3	15.3 4.0	10.6 4.0	13.8 3.6	6.1 2.8	10.0 3.1	7.2 3.1
High score	11.9 3.5	9.8 3.3	14.3 4.6	9.7 3.6	14.2 4.3	5.8 3.0	9.7 3.4	6.7 3.1
F	3.85	0.77	7.82	7.11	3.80	5.74	1.84	7.84
p	.022	.466	< .001	.001	.023	.003	.159	< .001
Skill								
Low score	12.9 3.3	10.5 3.5	16.7 4.3	11.1 4.0	13.4 3.5	7.0 3.2	10.1 3.4	7.5 3.4
Moderate score	12.6 3.3	10.0 3.3	15.2 3.8	10.7 3.9	13.6 3.6	6.1 2.7	10.1 3.1	7.3 3.1
High score	12.0 3.4	9.7 3.0	14.0 4.4	9.7 4.0	14.5 4.3	5.6 3.0	9.7 3.4	7.0 3.2
F	3.74	4.23	25.47	7.28	5.56	12.72	1.26	1.94
p	.024	.015	< .001	.001	.004	< .001	.283	.144
Environment								
Low score	13.0 3.6	10.3 3.3	16.0 4.0	11.2 4.2	13.0 3.8	6.5 2.9	10.2 3.2	7.9 3.4
Moderate score	12.4 3.3	10.0 3.4	15.2 4.2	10.6 3.9	13.9 3.7	6.3 3.0	10.1 3.2	7.2 3.0
High score	11.6 3.0	9.9 3.0	14.6 4.2	9.5 3.8	14.1 4.0	5.3 2.6	9.3 3.3	6.6 3.2
F	8.81	0.87	5.95	10.22	6.92	10.90	5.88	9.44
p	< .001	.419	.003	< .001	.001	< .001	.003	< .001
Total score								
Low score	12.9 3.6	10.3 3.3	16.2 4.1	11.6 4.0	13.2 3.5	6.6 3.0	10.4 3.4	8.1 3.4
Moderate score	12.4 3.3	10.0 3.3	15.3 4.0	10.6 4.0	13.7 3.7	6.2 2.8	10.0 3.8	7.2 3.0
High score	11.8 3.1	9.8 3.2	14.2 4.5	9.4 3.6	14.4 4.2	5.6 3.0	9.6 3.4	6.6 3.0
F	6.96	1.30	14.05	18.73	6.12	6.99	3.35	14.85
p	.001	.274	< .001	< .001	.002	.001	.036	< .001

The cut-offs of dietary literacy are the same as Table 2; The df of analysis of variance between groups and within groups are 2 and 1040, respectively.

Table 5 Effect of daily diet providers' dietary literacy score on children's eating behaviours

Dietary literacy	Satiety responsiveness			Slowness in eating			Food fussiness			Food responsiveness			Enjoyment of food			Desire to drink			Emotional undereating			E o
	β	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*	*β*	*t*	*p*	*β*
Attitude																						
Moderate score	-0.02	-0.62	.535	-0.06	-1.53	.126	-0.09	-2.28	.023	-0.10	-2.58	.010	0.08	2.05	.040	-0.09	-2.44	.015	-0.04	-0.95	.342	-0 -. .0
High score	-0.07	-1.93	.053	-0.10	-2.60	.010	-0.15	-4.15	< .001	-0.09	-2.54	.011	0.12	3.18	.002	-0.10	-2.80	.005	-0.04	-1.10	.271	-0 -. .0
Behaviour																						
Moderate score	-0.04	-0.97	.334	-0.01	-0.05	.958	-0.06	-1.60	.109	-0.04	-1.02	.310	0.07	1.79	.074	-0.12	-3.28	.001	-0.05	-1.30	.194	-0 -. .(
High score	-0.08	-2.103	.036	-0.05	-1.22	.223	-0.14	-3.79	< .001	-0.12	-3.12	.002	0.08	2.11	.035	-0.14	-3.69	< .001	-0.07	-1.76	.080	-0 -. .(
Skill																						
Moderate score	-0.07	-1.74	.082	-0.10	-2.70	.007	-0.19	-4.92	< .001	-0.03	-0.71	.478	0.02	0.58	.561	-0.16	-4.05	< .001	-0.01	-0.12	.907	-0 -. .(
High score	-0.09	-2.28	.023	-0.12	-3.02	.003	-0.27	-7.02	< .001	-0.13	-3.24	.001	0.10	2.66	.008	-0.20	-5.13	< .001	-0.05	-1.39	.164	-0 -. .(
Environment																						
Moderate score	-0.07	-1.79	.074	-0.03	-0.89	.375	-0.10	-2.65	.008	-0.07	-1.86	.064	0.11	2.87	.004	-0.04	-1.16	.249	-0.01	-0.29	.771	-0 -. .(
High score	-0.13	-3.54	< .001	-0.06	-1.67	.095	-0.12	-3.16	.002	-0.15	-3.98	< .001	0.09	2.54	.011	-0.18	-4.84	< .001	-0.11	-2.83	.005	-0 -. .0
Total score																						
Moderate score	-0.06	-1.57	.116	-0.05	-1.36	.175	-0.11	-2.89	.004	-0.10	-2.75	.006	0.05	1.42	.157	-0.09	-2.46	.014	-0.05	-1.38	.167	-0 -. .(
High score	-0.11	-2.82	.005	-0.08	-2.16	.031	-0.19	-5.09	< .001	-0.20	-5.39	< .001	0.11	2.77	.006	-0.17	-4.43	< .001	-0.09	-2.44	.015	-0 -. .0

The groups of dietary literacy are the same as Table 2 and the low score group was taken as the reference group.

Supplementary Files

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