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Mothers' Body Perception Biased to Obesity and its Effects on Nursing Behaviors

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Many women who have dieted in adolescence seem to become mothers without correcting their obesity-biased perceptions of the body. This study estimated the number of such mothers and analyzed the problems in their nursing: 1496 mothers to 790 babies aged 4 months and 706 children aged 18 months completed questionnaires addressing mothers' images of their own and their children's body, mothers' behaviors to reduce children's weight, their behavior patterns and mothers' experiences to reduce their own weight. The level of obesity was calculated with the body mass index (BMI) (weight in kilograms divided by height in meters squared) from the measurements of children's and mothers' body weight and height. Body image was distorted most in mothers for themselves, and then for babies and children: 23.2% and 58.2% of nonobese babies (BMI: 18 and 19, respectively) and 23.2% of nonobese children (BMI: 17) were regarded as obese. Mothers' objective evaluation by referring to the percentile values was less frequent than expected, and subjective evaluation such as "compared with other children" was noted. Weight reducing was practiced in 7.7% of nonobese babies and 17.2% of nonobese children. The high percentage level was due to mothers' body shape evaluation biased to obesity and worry about children's possible future obesity. In 10.5% of the babies and 11.8% of the children, the mothers took extreme dieting measures that could inhibit normal growth of children, such as diluting the concentration of breast milk or formula, reducing the frequency and amount of feeding, etc. Health participants should make young mothers understand the difference of fatness in nursing babies from adolescent obesity through health guidance given individually to mothers on any occasion. Furthermore, considering the effects of mass media, health participants should actively offer related information in printed matter familiar to mothers.

Key words: body shape evaluation; weight-reducing behavior; mothers; nursing babies; wish to be thinner

It is likely for young girls between preadolescent and adolescent periods to have self-images of body shape biased to obesity, which sometimes cause dieting behaviors as we observed in our previous studies (Ishitobi et al., 1991; Yakura et al., 1991, 1993). The distorted self-image of body shape drives many girls to want to be thinner and to excessive dieting practices, and not a few girls execute extreme measures (Ishitobi et al., 1991; Yakura et al., 1991, 1993). Because we have estimated that there are girls

Abbreviation: BMI, body mass index

who become mothers without correcting biased body images, the present study aimed to clarify how many mothers hold the biased perception, and how they nurse their babies.

Subjects and Methods

Municipal physical checkups are set up in Japan to examine and support growth and development of baby children. Between April 1993 and March 1994, Yonago City in Tottori Prefecture

Table 1. Contents of the questionnaire on body shape addressed for mother subjects who nurse babies

FOR CHILDREN

- 1) Age: _____ months old
Sex: (male or female)
Birth order: (1st or later)
- 2) Do you think your child is (fat, normal or thin)?
- 3) Which reason(s) helped you judge your child as in 2)?
 - a) Indicated by medical or nursing specialists
 - b) Indicated by family members or friends
 - c) Judged from the percentile values printed in the official maternity passbook
 - d) Judged from the standard body weight in age-matched children
 - e) Compared with other children
 - f) Vaguely inclined to judge so
 - g) Other
- 4) Are you worry about whether your child will be overweight in the future? (yes or no)
- 5) Have you ever inhibited your child's appetite, even if the child had a good appetite? (frequently, sometimes or hardly)
- 6) Which of the following, if any, have you carried out in order to control your child's weight?
 - a) Reduced the amount of breast milk or formula
 - b) Reduced the frequency of feeding breast milk or formula
 - c) Diluted the density of breast milk or formula
 - d) Gave no snacks
 - e) Changed the snack menu
 - f) Reduced the amount and frequency of baby food
 - g) Changed the baby's food menu
 - h) Exercised the child

FOR MOTHERS

- 7) Have you have dieted? (yes or no)
- 8) Do you regard your own body as (fat, normal or thin)?
- 9) Weight: _____ kg
Height: _____ cm

carried out physical checkups for 706 babies aged 4 months and 790 children aged 18 months. In total, the subjects involved were these children and their mothers reaching 1496.

We mailed questionnaires to mothers whose children were scheduled to receive the physical checkups during fiscal 1993. The completed questionnaires were collected on the days of the checkup. The collection rate was 85.3% for the babies and 82.3% for the children.

The questionnaire (Table 1) contained mothers' images of their children's body shape, mothers' behaviors to reduce children's weight when they regard their children as obese, contents of mothers' behaviors, mothers' body weight and height, mothers' self-image of body shape, and mothers' experiences in reducing their own weight. Children's body weight and height were measured during the physical checkup.

The level of obesity for the mothers and children was determined by body mass index (BMI) (weight/height² expressed in kg and m) (W/H²): the babies, children and mothers were determined to be obese when the BMI was 20 and over, 18 and over and 25 and over, respectively (Kamioka and Imamura, 1992; Ministry of Health and Welfare, 1994).

The data were analyzed with Student's *t*-test and chi-squared test at 5% level of significance.

Results

Mothers' body shape evaluation

BMI distribution classified by body shape evaluation

The mothers were requested to assess their own and their children's bodies as fat, normal or thin. The assessed subjects were classified into 9 groups of mothers, babies and children by fat, normal or thin body images. Table 2 shows comparison of BMI values (mean ± SD) among the 9 groups: the BMI of mothers, babies and children was highest in the fat-image groups, respectively, followed by normal-image groups and thin-image groups. As seen in the table, the mean BMI was significantly correlated with

Table 2. BMI values in groups classified by body shape evaluation by mothers

	BMI value		
	Fat-image subject	Normal-image subject	Thin-image subject
Mother [1390]	23.4 ± 2.5 [478]	←**→ 20.1 ± 1.3 [767]	←**→ 17.9 ± 1.0 [145]
Baby† [699]	19.0 ± 1.3 [199]	←**→ 17.3 ± 1.3 [459]	←**→ 16.2 ± 1.2 [41]
Child‡ [780]	17.2 ± 1.2 [91]	←**→ 16.0 ± 1.0 [567]	←**→ 15.1 ± 1.2 [122]

Mean ± SD.
 [], number of subjects.
 † 4 months old; ‡ 18 months old.
 ** $P < 0.01$

mother's body shape evaluation. However, in each fat-image group of mothers, babies and children, the mean BMI was lower than the standard body weight, respectively (Table 2).

Fat body image

The subjects were classified by the BMI distribution, and further divided by mothers' evaluation of self-perceived obesity, respectively (Figs. 1–3). Mothers regarded themselves as fat from a BMI of 17 (Fig. 1): when the BMI was 22 and over, the rate of mothers who regarded themselves as fat suddenly increased: 28.6% of nonobese mothers with a BMI of 24 or less regarded themselves as obese.

The babies (Fig. 2) were regarded as obese from a BMI of 16, and the rate of fat-image babies was as high as 58.2% when the babies' BMI was 19: 21.8% of nonobese babies, whose BMI was 19 or less, were regarded as fat. Concerning the children (Fig. 3), fat image was held from a BMI level of 15. At a BMI of 17, 23.2% of the children were regarded as obese. As a whole, 8.4% of nonobese children with a BMI of 17 or less were judged to be fat. The mothers' body shape evaluation was biased toward fatness mostly for themselves, then for the babies and for the children, with significant differences ($P < 0.0001$) between the mother group and either of the baby or child groups.

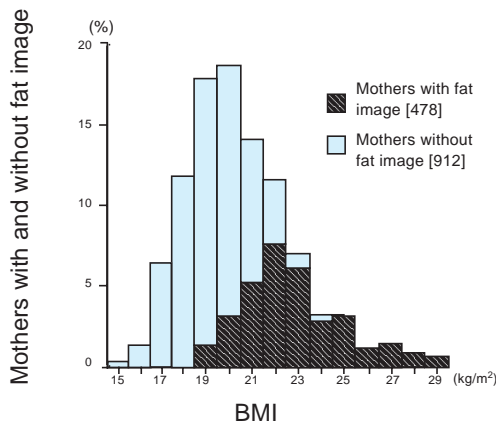


Fig. 1. BMI distribution in mothers classified by their body image as obese or not: BMI ≥ 25 is determined to be obese. [], number of subjects.

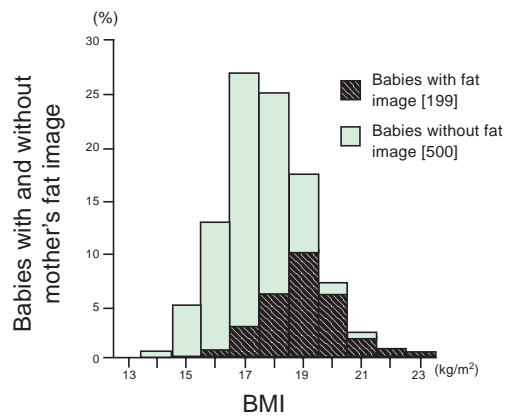


Fig. 2. BMI distribution in 4-month-old babies classified by mothers' body image as obese or not: BMI ≥ 20 is determined to be obese. [], number of subjects.

The rate of fat-image subjects evaluated by the mothers was compared by the order of birth for nonobese children. There was no difference in the babies; however, in the children, 10.0% of the first children were regarded as obese, as well as 6.9% of the second or later children: the rate was significantly higher for the first children ($P < 0.05$).

Criteria for body shape evaluation

Mothers were requested in the questionnaire to mark any of the following 7 criteria for thinking their children obese (Table 3), and the marked items were compared between groups of the babies and children: i) indicated by medical or nursing specialists, ii) indicated by

family members or friends, iii) judged from the percentile values printed in the official maternity passbook, iv) judged from the standard body weight in age-matched children, v) compared with other children, vi) vaguely inclined to judge so and vii) other reason(s). The babies were judged overweight most frequently by the percentile values (39.7%), followed by the standard weight (25.2%) and comparison with other children (22.0%). The children were most frequently judged overweight by comparison with other babies (37.3%), followed by the percentile value (33.6%) and by vague inclination to judge so (19.6%).

Mothers' behaviors to reduce children's weight

Weight-reducing practice rate classified by the BMI

Among the 698 babies, mothers practiced weight-reducing for those with a BMI from 15 to 21, and the number of dieting babies was 62 (8.8%). Dieting was practiced most frequently at a BMI of 19 (16.4%), but differences in BMIs were not significant. As a whole, 54 of 620 nonobese babies (8.7%) with a BMI of 19 or less were involved in weight-reducing behavior by their mothers (Fig. 4).

Among the 781 children, dieting was practiced throughout all levels of the BMI, and the number totaled up to 158 with a mean practice rate of 20.2%. The practice rate showed a tendency to put children on a diet as a BMI increased, but there were no significant

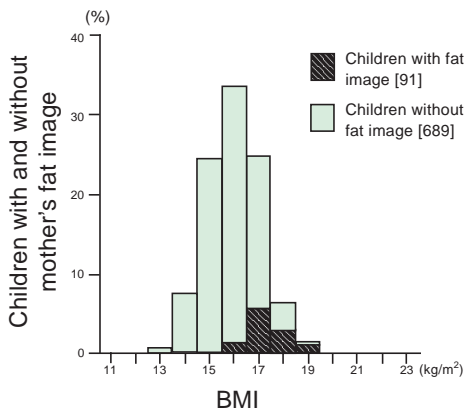


Fig. 3. BMI distribution in 18-month-old children classified by mothers' body image as obese or not: BMI ≥ 18 is determined to be obese. [], number of subjects.

Table 3. Criteria for mothers' deciding their children overweight

Criteria	Children aged	
	4 months [686]	18 months [759]
Indicated by medical or nursing specialists	13.7**	7.0
Indicated by family members or friends	18.7*	14.1
Judged from the percentile values printed in the official maternity passbook	39.7*	33.6
Judged from the standard body weight in age-matched children	25.2*	20.7
Compared with other children	22.0	37.3**
Vaguely inclined to judge so	16.6	19.6
Others	1.6	1.4

* $P < 0.05$, ** $P < 0.01$: 4-month-old babies versus 18-month-old children.

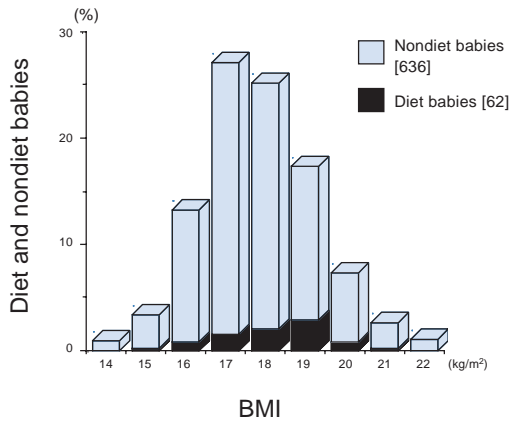


Fig. 4. BMI distribution and 4-month-old babies treated and not treated with weight-reducing behaviors by mothers. [], number of subjects.

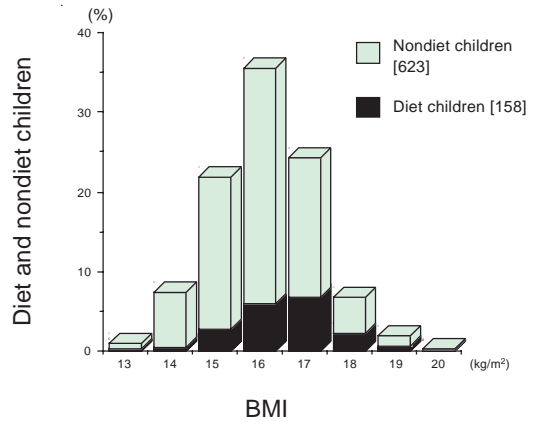


Fig. 5. BMI distribution and 18-month-old children treated and not treated with weight-reduced behaviors by mothers. [], number of subjects.

differences in BMI distribution. As seen in Fig. 5, weight-reducing behavior was practiced in 134 of the 713 nonobese children (18.8%) with a BMI of 17 or less.

Weight-reducing practice rate classified by body shape evaluation

The practice rate of weight reducing was analyzed in nonobese subjects classified by mothers' body image into fat, normal or thin. In each of the mother, baby and child groups, the practice rate was highest in fat-image subjects, followed by normal-image subjects and by thin-image subjects (Fig. 6).

Weight-reducing practice rate with and without mothers' experience of dieting

In nonobese children, the practice rate of weight reducing was compared to mothers' experiences of dieting: 11.5% (24/209) in 4-month-old babies whose mothers had dieted; 7.4% (30/407) in 4-month-old babies whose mothers had not dieted; 21.8% (53/243) in 18-month-old children whose mothers had dieted; and 17.3% (80/463) in 18-month-old children whose mothers had not dieted. Both in the babies and children, the practice rate was higher for those whose mothers had dieted, but without significant differences.

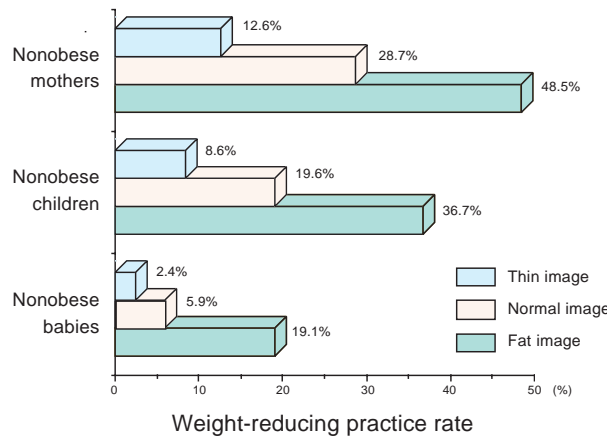


Fig. 6. The practice rate of weight reducing in nonobese mothers, babies and children classified by body image held by mothers.

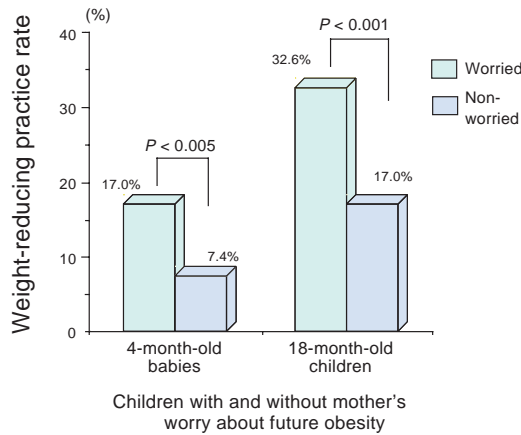


Fig. 7. Comparison of the weight-reducing practice rate in nonobese children whose mothers worried about children’s future overweight and not.

Weight-reducing practice rate with and without mothers’ concern about children’s future obesity

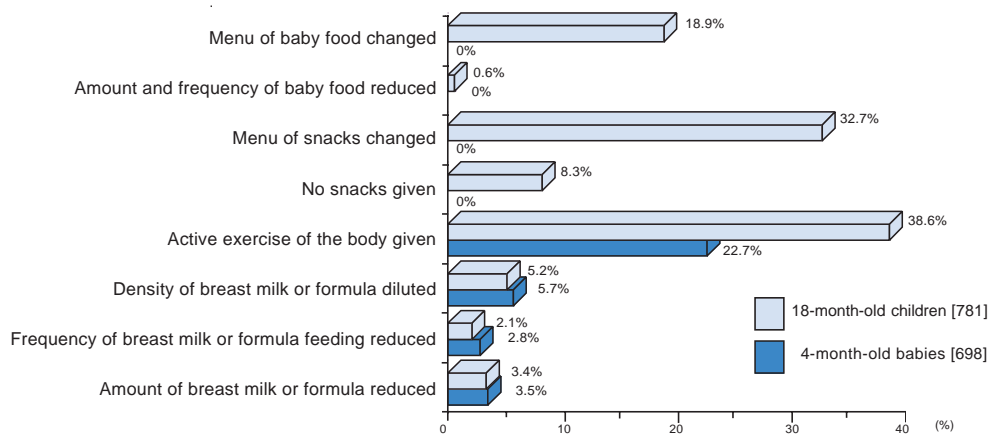
We compared the weight-reducing practice rate between nonobese children whose mothers worried about their children’s possible future obesity and those who did not worry. The practice rate in worried and nonworried groups was 17.0% and 7.4% for the babies, respectively, and (28) 32.6% and 17.0% for the children,

respectively. The rate was significantly higher in the worried groups, respectively (Fig. 7).

In addition, we analyzed relations between the weight-reducing practice rate and sexual differences or birth order of children, but observed no significant differences.

Means to prevent children’s obesity

The mothers were requested to mark in the questionnaire any of 8 items they carried out for preventing future obesity in their children (Table 1). In analyzing the data of nonobese children, mothers were most frequently careful for their children to have active exercise of the body (22.7% of the babies and 38.6% of the children). Other behaviors noticed in several percentages each were reducing the amount of breast milk or formula, reducing the frequency of breast milk or formula feeding, and diluting the density of breast milk or formula. Noted behaviors other than exercise were, in decreasing order, changing the menu of snacks (32.7%), changing the menu of baby food (18.9%), giving no snacks (8.3%) and reducing the amount and frequency of baby food (0.6%) (Fig. 8). The mothers taking such extreme dieting measures as reducing the amount and frequency of baby food, giving no snacks, diluting formula, reducing the frequency of breast milk or formu-



Pattern and ratio of weight-reducing behaviors

Fig. 8. The pattern and ratio of weight-reducing behaviors practiced by mothers compared between nonobese children aged 4 and 18 months. [], number of subjects.

la feeding reached 10.5% for the babies and 11.8% for the children.

Discussion

Body shape evaluation

A considerable number of mothers have a distorted self-image that their body is fat. The level of impact of being obese is not so severe as in adolescent girls, but about 25% of non-obese mothers seem to hold the obesity-biased body image, as reported by us (Ishitobi et al., 1991; Yakura et al., 1991, 1993) and others (Aoyama, 1978; Matsuura et al., 1988; Tanaka et al., 1988; Furukawa et al., 1993). The obesity-biased body image is held not only by young girls, but by females covering a wide range of age (Nakai et al., 1983; Furukawa, 1993). What lies in the background of a prevalence of such distorted perceptions? Ladies' fashion journals are clear evidence that being thin is a requirement for beauty accepted today. Based on the recognition that obesity is a factor related to adult disease, people have widely favored dieting or jogging for health. Definitely, there are dominant social cultures which praise a slender body shape and in which a human coping pattern toward that direction is already formed.

Once when the "fat-cells theory" was advocated for fear of obesity during infancy, baby obesity was regarded as a disorder to be inhibited, and even health guidance for children's fatness was widely given. Even toy dolls that have acquired long-maintaining wide popularity among babies and young girls have slender body shapes. There is also the fact that there is increasing social pressure on women to be thin.

Such a social background is related to a biased evaluation of body shape by mothers of their children, as observed in the present study. To our knowledge, this is the first report on mothers' perception of the body biased to obesity and its effects on nursing behavior, and no relevant reports are available from literature. However, we expected the presence of such mothers from the results of the series of our

previous studies: the observed ratio of such mothers was 22.0% for 4-month-old babies and 8.4% for 18-month-old children. Comparison of these data clearly show that maternal tendency toward the biased perception was more marked in mothers of 4-month-old babies. These mothers have little knowledge that their baby has a physiologically normal body shape at this stage of development, when body weight gain is large and rapid. It is noteworthy that the mothers showed a strong tendency to regard the babies' normal shape as obese.

By the way, it is reasonable to presume that mothers' experience of nursing affects the appropriate evaluation of the baby's body shape. The present results show, however, that mothers' nursing experience was reflected in body shape evaluation only for 18-month-old children but not for 4-month-old babies. As noted above, weight gain is quite remarkable during this stage of growth. So, it is likely that mothers have a false impression.

As for our questionnaire addressing the criteria for body evaluation of children, many mothers marked reasons without any scientific basis such as "compared with other children" and "vaguely inclined to judge so." Besides, some mothers showed a tendency not to refer to the percentile values written in the official maternity passbook. These facts suggest that health participants should give more guidance on good occasions for mothers to heighten their recognition of the percentile values.

Pressure on adult women to drive themselves to be slender is never irrelevant to children's growth. This fact also indicates that the pressure could be a disturbance also for children in having correct body images of themselves.

Weight-reducing behaviors

We analyzed the relation between the practice rate of weight reducing and mothers' body shape evaluation, and observed that the rate was decreased in the order of fat-image, normal-image and thin-image subjects in each of the mother, child and baby groups, respectively. However, the relation between the practice rate and body image in the babies was reversed with

that in the children. That is, the practice rate was considerably lower in the babies whose mothers were more inclined to have fat images, while the practice rate was considerably higher in the children whose mothers were less inclined to have fat images. This reverse phenomenon may be attributed to our method of data collection, in which mothers' preventive behaviors such as "gave active exercise of the body" or "changed the menu of snacks or baby food" were counted as a pattern of dieting behaviors.

We should pay attention to the existence of mothers who practice extreme dieting measures for nursing babies, as mentioned above. In the present study, we found a group of mothers who greatly worried about their children's future obesity, and the worry seems to be hidden in the background of their behaviors. Today, young mothers generally live in two-generation families and are under nursing environments separated from experienced helpers to nurse babies. We think that their hidden fear of children's obesity may drive them to act so. In 1990, the Ministry of Health and Welfare, Japan, published tabulated data on physical growth in nursing babies, but the mean body weight among the data was lower than that published in 1980. This body weight decrease seems to be relevant to the problems discussed in the present article.

It is well known that obesity is a factor significantly related to chronic disease, and what is required for good health is to achieve and maintain a healthy body weight throughout the life-cycle. We have no objection to preparing from infancy against future obesity; however, we should also inform mothers of the fact that dieting measures injurious to health are often practiced, irrespective of children's will or true needs.

It is desirable that on the occasion of babies' physical checkups at health centers, health participants should make young mothers understand that fatness in nursing babies differs from adolescent obesity (Imamura, 1987). Furthermore, detailed health guidance should be given individually to mothers on such occasions, so as to make them assess children's shape properly. In addition, because these problems have been deeply related to the attitude of mass media

(Nishizono, 1989; Baba, 1990; Furukawa, 1993), health participants should actively offer related information not only to medical journals, but also to lady's home journals or everyday TV programs young mothers like to watch.

In the present study, we observed that not a few mothers recognized normally growing healthy round bodies of their children as obese. Such mothers felt some misgivings about future overweight of their children, and in excessive cases, mothers practiced weight reducing for their children. What was hidden in the background of their behaviors was difficult personal experiences, a flood of one-sided information from the mass media, or isolated nursing environments separated from experienced helpers. We infant health professionals should not emphasize any aspect of a phenomenon in treating health problems of infants more than obesity.

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