

Original Article**The growth rate in children before and after supplementary diet***Habibollah Hosseini*, Leili Alipour*, Khadijeh Borumandfar*****Abstract**

Background: Physical growth is influenced by different factors including genetics, environment and nutrition. This study aimed to recognize the factors may affect children's growth at the beginning of supplementary diet.

Methods: This longitudinal-analytical study surveyed 75 randomly selected babies less than 8 month of age under the supervision of Felaverjan Health Center and their mothers in 2005. The data were collected by a questionnaire composed of three sections; babies' demographic and caring characteristics, mothers' demographic characteristics, and babies' weight in 5th and 7th months of age as well as some questions about mothers' taking care of their babies. Data were analyzed using descriptive statistics and Mann-Whitney, Wilcoxon, and Pearson correlation coefficient tests in SPSS software.

Results: 36% of the babies were girls and 64% were boys. 52% of babies were the first child. The mean birth weight was 3021.6 ± 046.7 g. The mean age of mothers was 25.5 ± 6.3 years; 65.3% of mothers had primary school education and about 50% were economically well-off. However, the results showed no significant relation between mothers' demographic characteristics and babies' growth pattern. It was a significant direct relation between growth pattern and the weight of babies at the time of supplementary diet ($p = 0.03$) and birth weight ($p = 0.001$). Also It was a significant relation between growth pattern and mothers' care of babies ($p = 0.048$).

Conclusion: Elements of birth weight, weight before and after supplementary diet, and mothers' care of babies are important factors in the babies' growth after taking supplements.

Key words: Weight loss; children; growth pattern; supplementary diet; baby care

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Children are the most sensitive and vulnerable group in the society in nutrition and nourishment aspects. They need appropriate living conditions in order to reach optimum growth. Any disturbing factor can negatively affect their growth.

The appropriate growth of babies and children is a sign of their health. The first three years of life are very significant and irretrievable for the growth. During this period, taking good care of babies including proper diet and providing them a lovely surrounding and caring is essential for their growth.¹

Gaining no weight during two following months is the first sign of disorder in children's growth. Based on the children's growth charts,

disorder usually begin with supplementary diet.²

Studies showed that 28% of children under five years old in the world, 44% in developing countries, and 11% in Iran suffer from moderate to severe low weight.³ Monthly statistics of Iranian health care system show baby's weight loss in month 6 of life and especially after the supplementary diet starts.³ Actually this weight loss can be due to the wrong diet of these children because of lack of knowledge about nutrition and improper nourishment of babies.⁴ Also, the available statistics in some areas of Isfahan Province showed that in babies under one year old that supplementary diet was started for them, weight loss is prevalent;³ also according

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to the Felaverjan health care statistics of, the number of children under third percentage of weight increased in 2001 compared to 2000.⁵ Baby's diet is totally breastfeeding for the first 6 months of life and they usually have a normal growth.⁵ However, when they start the supplementary diet, they may lose weight and get off the normal growth for many reasons including parents' lack of knowledge about how to prepare and use food and how to use the supplementary vitamins. This is more common in less-experienced young parents, non-educated and also working mothers. In 1998, Dirham-bakhsh in a study on the mothers' knowledge of supplementary diet for children under 4 years old reported that there was a significant relation between mothers' knowledge about supplementary diet and their education, age and career.⁶ Also Shami in his study on the educational needs about baby care for mothers of children under 5-year old showed a relation between mothers' age, education and career with educational needs about baby care.⁷

Considering the importance of growth in early ages, it is necessary to pay special attention to the nutrition and its impact on the weight of children in these ages. Appropriate nutrition in the first two years of life is reported to be the main factor of health in later years.⁷ Moreover, supplementary diet, multivitamins and iron drops alongside the breastfeeding in the first two years of life are significant for babies' nourishment. Therefore, it is important to find the factors related to the growth pattern of children especially in the first year of life, when the growth is much faster than the rest of life. This study aimed to determine some factors related to the growth pattern of babies less than 8 month of age and since the supplementary diet begins at month 6, the study focused on the growth pattern of babies from month 5 to 8 before and after the supplementary diet.

Methods

This was a longitudinal analytical study conducted in two steps. The study population included babies less than 8 month of age under the supervision of Felaverjan Health Center and

their mothers, who referred to the health houses for monthly check up in 2005.

Sampling method was simple random and the number of studied samples was 75 with the rest power of 67% and the confidence coefficient of 1.96 in a pilot study on 20 babies (standard deviation=106 g and error=24 g). Data were collected using a questionnaire completed by interviewing mothers. The health information was gathered from babies' files and measuring their height, weight and head circumference in 5th and 8th months of age. The questionnaire had three sections. The first section on babies' demographic and caring characteristics included 17 closed and open-ended questions about babies weight, height and head circumference at the time of birth, babies' weight in 5th and 8th of months age and when the supplementary diet started, the time and amount of iron drops and AD vitamins, the type and frequency of supplementary food, gender, the baby's rank in the family. The second section was about the mothers' demographic characteristics including 7 closed questions about age, occupation, education, number of pregnancies, income and the number of family members. The third section was a checklist form about how the mothers behaved with their babies during supplementary feeding. This section was completed by interviewing mothers to measure the emotional care of the babies.

A standardized 50 g weight scale used for measuring weight and a cloth tape used for the height measuring. The data of babies growth pattern, supplementary diet, and using vitamin A+D and iron drops were also reliable because all health centers throughout the country use a specified standard questionnaire for babies' growth data.

Once the scientific validity and reliability of the questionnaire were approved, the researcher and his colleagues went to the Health Houses in Felavarjan and explained the research aims to the nurses and mothers with a 5 months old baby who referred for the monthly check up. The studied samples were selected based on the inclusion criteria. Babies with known diseases or incomplete files were excluded. Then, their

weight, height and head circumference were measured and the demographic questionnaire as well as the babies health files form were completed. The weight and height of the babies were measured once again in their 8th month of age and the rest of forms were completed. The questionnaire of the mothers' emotional care for babies was completed by interviewing them. Data were analyzed using descriptive and Mann-Whitney, Wilcoxon, and Pearson correlation coefficient tests via SPSS software.

Results

The findings showed that mean age of mothers was 25.5 ± 6.3 years. A majority of mothers (56.3%) had just primary school education and more than half of them had average income. The interval between 2 pregnancies was more than three years in 85% and 52% had just one child.

The mean weight of the babies was 3021.6 ± 460.7 g and 64% were boys. 52% of the babies were the first child and in 62.7% of cases the supplementary diet began at the end of month 6. Moreover, most of these babies (76%) took iron drops and supplementary vitamins.

The mean weight was 6810.6 ± 6.200 g in fifth month which means children had normal weight gain based on the standards of third percentile. Also, the mean weight in month 8 was 7934.6 ± 68.7 g which showed appropriate weight gain based on the third percentile chart.

Regarding the relation between mothers' personality and characteristics with their babies' growth rate, the results showed that the babies' growth pattern at 8th month of age had no significant relation with their mothers' age, education, number of pregnancies and number of children ($p > 0.05$).

The findings also showed no significant relation between babies' gender and rank with their growth rate ($p > 0.05$). However, there was a significant direct relation between the babies' growth rate and their birth weight ($p < 0.05$ and $r = 0.054$). Also, there was a significant direct relation between babies' growth rate and weight at the beginning of supplementary diet ($p < 0.05$ and $r = 0.01$).

Table 1: Distribution of the babies' weight in fifth month of age

Weight in 5 th month	number	percentage
Less than 6000 g	12	15.9
600-6999 g	29	38.5
7000-7999 g	28	37.3
More than 8000 g	6	7.8
Total	75	100

Table 2: Distribution of the babies' weight in eight month of age

Weight in 8 th month	number	percentage
Less than 6999 g	10	13.4
7000-7999 g	28	37.3
8000-8999 g	21	27.9
More than 9000 g	16	21.3
Total	75	100

There was also a significant relation between emotional care for the babies and their growth rate ($P < 0.05$ and $r = 0.019$).

Tables 1 and 2 show the distribution of the babies' weight in fifth and eighth months of age.

Discussion

The findings showed that Elements of birth weight, weight before and after supplementary diet, and mothers' care of babies are important factors in the babies' growth after taking supplements.

The babies' weight at the birth, 5th and 8th months of life were between the 50th and 90th percentile and seems to be ideal.¹ During the first month of life, babies need frequent love, caress and attention. Mothers' care and attention during the first six months of life provide the foundation of trust and self-confidence, and eventually develop babies to an independent and strong person.⁸ Nelson wrote that holding babies in arm will really fasten her/his growth and development.⁹ According to the results, the babies' weight in this study was good in 8th month of age and in accordance with the fifth percentile of the chart. Also, statistical analysis showed a significant relation between weight at

the time of birth, 5th month, 8th month (when the supplementary diet has already begun) and mothers emotional care. It can be concluded that all the factors affected the normal growth of babies positively. Moreover, since most families in the study belonged to the middle class of society, it can be concluded that the mothers' care and attention for the babies and the instructions they received by health care assistants (based on the usual monthly check-ups) had some impact on the normal growth and weight of the babies after beginning of the supplementary diet, more studies on untrained mothers is necessary to find a reliable conclusion.

In addition, the findings showed no significant relation between mothers' age, education, number of pregnancies and children, babies' gender and birth rank and their growth rate. But in a study by Habibabadi, a significant relation between mothers' age and family income was found.¹⁰

Because the babies and mothers' characteristics in the study sample were similar, therefore, the role of mothers' care and the instructions by

health houses are more significant; of course, more studies on untrained mothers is necessary to find a reliable conclusion. Shahneh in her study reported a significant relation between educational courses on caring for children and mothers' knowledge and attitude.¹¹

The results of this study brings hope that developing the activities of health care assistants and their education can bring about positive results on the children's growth. The findings of this research are useful for the health care assistants and health centers to plan educational courses for mothers and involve families in the identification of effective factors on physical growth of children. Also, the findings of this study can be useful for mothers to be careful about what may cause growth failure and loss of weight in their children and prevent it. It is also a hint for further studies on the subject from different prospective and various aspects of it in the society.

Finally, the authors declare that have no conflict of interest in this study and they have surveyed under the research ethics.

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