

Setting Instructional Goals and Contents for Milk Nutritional Education Program through an Analysis of Milk Nutritional Awareness and Knowledge in Elementary/Middle/High School Students*

Jung-Hyun Kim[§], In-Kyung Yoon¹ and Myung-Hee Jang²

Department of Home Economics Education, PaiChai University, Daejeon 302-735, Korea.

¹*Department of Home Economics Education, Korea National University of Education, Cheongwon, Chungbuk 309-711, Korea.*

²*Korea Research Institute for Vocational Education & Training, Seoul 135-949, Korea*

For the purpose of developing Milk-based nutritional education program, this study analyzed the awareness of milk and milk nutritional knowledge of elementary/middle/high school students and set appropriate instructional goals for milk nutritional education program. According to the analysis results, 49.6% of total subjects know a little about the milk, otherwise 42.3% of total subjects don't know it. Elementary school students know better than other students. Therefore, the instructional goals of nutritional education program were set as follows, that improve the level of the awareness about milk, and to increase the understanding on the knowledge about milk, and to practice proper milk intake behavior. Based on these goals established as the above, educational contents were established that would be expected in elementary, middle, and high school students after milk nutritional education. Therefore, the development of education program and the evaluation of education effects were to be performed on the basis of educational goals and contents for milk nutritional education program.

Key words: Instructional goals, Milk nutritional awareness and knowledge, Milk nutritional education program

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INTRODUCTION

From when human beings started to drink milk? The milk of mammals, as a single foodstuff, provides all the nutrients human needs. Because all the ingredients of milk, which is a natural food, have significance to the body, it can be said as a food having intrinsic biological functions. Thus the nutritional value of milk has been highly evaluated in the aspect of ingesting a variety of balanced nutrients and its various physiological activities have been largely contributed to the improvement of public health and it has highly possible applicability as a new food source.¹⁾ The formation of proper dietary attitude in the growth period becomes the foundation of maintaining balanced dietary life and better health management in adults. In these aspects, milk is has more benefits than any other

foods. Many advantages of milk can be more beneficial during the growth period including infants. Thus, nutritional education on milk should be accomplished in school environment where growing children and adolescents spend most of their time.^{2,3)}

Nutrition education is to practice behavioral changes with scientific structure that changes the attitude for increasing the will, interests, and ability to practice dietary life and makes people to practice the dietary attitude by themselves with right understanding of nutritional knowledge for proper individual dietary management.⁴⁾ Nutritional education practiced in school education is significant not only in improving the national physique and physical strength, preventing the disease, and improving the individual's health but also in strengthening the national power through the acquisition of knowledge, attitude, and behavioral changes on nutrition and dietary life and the acquisition of concept and knowledge on nutrition, and the establishment of proper dietary attitude.^{5,6)} However, In case of students who are

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§ To whom correspondence should be addressed.
(E-mail : leess@hanyang.ac.kr)

important consumer of milk, the appropriate selection is difficult due to the lack of accurate information on milk and unconditional school meals without considering student's selective opinions. The degree of recognition on milk in children and adolescents may be low if accurate information on milk, which has been known as a perfect natural food, is not sufficiently provided. Thus, in fact, students recognize milk as a food item that should be taken unwillingly and preschool children have pointed milk as a disgusting food item. Therefore, It is necessary to provide accurate information on milk through school education to induce the attitude of elementary, middle, and high school students on milk to the favorable direction. Also, the attitude or interest for milk that can be established by experience, information, or education has important roles in accepting milk and improving satisfaction. Therefore, it is important to find out what kind of contents in school education can influence the attitude or interest for milk in students.

Yarbrough⁷⁾ reported that food fortification, school meal program, increased food supply, and improved food storage and distribution could be used as methods to improve nutritional status in the community, and that it was very desirable to use these methods if they were technically, politically, and economically possible. Thus, the nutritional education about milk can also be an important method to make these spontaneous and continuous attitude changes.

Currently, the milk nutrition education in Korea^{8,9)} has been carried out as a part of nutritional education, in which education through school meal program in elementary students and parts of regular subjects such as home economics in middle and high school students, and thus professional and intensive milk nutrition education has not yet been accomplished. In case of nutritional education carried out in school environment, it has been reported that nutritional education with presentation, discussion, and visual aids has been highly preferred. Therefore, milk nutrition education using understanding-oriented education method is urgently required, that can draw the attention of students instead of general lecture-type education.

Knol developed empirical learning theory, 'Professional perspective: Learning and learning style' in which learning is considered as a process of socialization that creates knowledge through experience.⁴⁾ Empirical learning theory lets a learner not only control his/her experience but also find significance from the experience by applying an integrated functions that a learner is feeling, watching, thinking, and acting, to the learning.

It considers that learning is a process of modification and knowledge is continuously created and re-created. It may be significant that this theory is applied to milk nutrition education and the supervisor of this nutritional education should teach with contents and activities that can experience this process.

Therefore, this study was performed, in relation to milk with new features complying with currently developing food science technology, to convey correct milk nutrition knowledge and to increase the intake frequency of milk and dairy products and to ultimately promote the growth and health maintenance of growing children and adolescents, with final purpose of developing teaching-learning education data in actual education field and performing and milk nutrition education and evaluating its effects. To accomplish these purposes, this study was investigated to establish goals and contents for nutrition education program by analyzing the awareness and nutritional knowledge of milk for feeling, watching, thinking, and acting for milk in elementary, middle, and high school students.

METHODS

1. Subjects

Subjects in this study were selected from 2 elementary schools, 2 middle schools, and 2 high schools located in Seoul, in which elementary school students were divided into 2nd graders (lower grade) and 5th graders (higher grade) to make a total of 4 groups. The number of subjects was 432 including 274(63.4%) female students and 158(36.6%) male students. The distribution of subjects by school and grade was 122(28.4%) each for elementary school and middle school, and 186(43.2%) for high school. Elementary school students were divided into lower grades and higher grades due to its age characteristics, with 62(14.2%) for each grade group (Table 1). The survey tools developed for the subjects was performed from September 15 to September 25, 2004.

2. Study Contents

In this study, the proper survey tool was developed for the purpose of the study on the basis of literature reviews⁴⁾ and preliminary studies.⁵⁻⁹⁾ Based on the purpose of this study, physical development status and overall dietary attitude of subjects were investigated and the survey questionnaire related to nutritional awareness factors and nutrition knowledge about milk was deve-

Table 1. Distribution of gender and grade of subjects

		Number(%)
Gender	Male	158(36.6)
	Female	274(63.4)
School Grade	Lower Elementary	62(14.2)
	Higher Elementary	62(14.2)
	Middle	122(28.4)
	High	186(43.2)
Total		432(100.0)

Table 2. Number of questionnaire used for the analysis

(unit : number of copy)

Subjects Type	Distributed	Collected	Analyzed
Elementary	135	132	124
Middle	130	125	122
High	200	196	186
Total	465	453	432

veloped, modified and complemented. The questionnaire developed was verified for the feasibility by investigator and 5 elementary and middle school teachers. Also, the preliminary investigation was performed for 2 classes in one school from each elementary and middle school, and then it was modified, complemented, and verified for reliability. In case of elementary students, 2 classes in the same grade were selected and in middle and high school students, 4 classes were selected from each school to make a total of 12 classes. The survey tool was distributed to 465 students and collected from 453 students, and then 432 survey questionnaire that had sufficient answers were used for the final analysis.

The contents studied were as follows:

1) Physical development status: Health status recognized by the self was examined to investigate the physical development status of subjects, and the body mass index was calculated on the basis of height and weight.

2) Dietary attitude: To analyze the overall dietary attitude of study subjects, survey the questionnaire used in the preliminary study by was modified and complemented, and then developed into questions including the attitude on meals, balance with side dishes, and harmony with life. Such developed survey questionnaire was preliminarily tested and then Cronbach's alpha was used to measure the internal consistency of questions on dietary attitude and calculated to apply 1 point, 3 points, and 5 points to each evaluation question.

3) Recognition and awareness for milk and dairy

Table 3. Contents of the questionnaire for milk nutritional knowledge

Nutritional knowledge	Questions
1. Nutrients	Milk calcium has the most digestibility & absorption among calcium in foods.
2. Nutrients & storage	Vitamins in milk are destroyed when milk is exposed to sunlight.
3. Nutrient interaction (synergistic effect)	Drink milk along with cereals to increase the quality of milk protein.
4. Food scientific function	When left at room temperature for 3-4 days, milk naturally turns into yogurt.
5. Nutritional function	Low-fat milk never promote weight gain because the fat is totally eliminated.
6. Food scientific function	coffee cream is a dairy product made of milk.
7. Digestion & absorption	Milk is not a easily digestible food and causes abdominal cramp and diarrhea.
8. Food scientific function	White milk makes dark skin lighter.
9. Nutritional value	Nutritional value of strawberry, banana, or chocolate flavored milk is the same as that of plain white milk.
10. Nutritional value	Milk with savory taste also has higher nutritional values.

products: Survey questions that examine the degree of recognition on food were introduced and divided to answer the degree of recognition on milk and dairy products as 'very well recognized', 'somewhat recognized', 'not well recognized', 'never recognized', or 'not want to know'. Also, the recognition for milk and dairy products was investigated by questioning the meaning of milk and dairy products as foodstuff.

4) Nutritional knowledge: A total of 10 questions were made nutritional factor, functional factor, health factor, and aesthetic factor to analyze the nutritional knowledge about milk (Table 3). Subjects were asked to answer each question with one among 'right', 'wrong', or 'not sure' and then the percentage of correct knowledge: ratio of correct answers/ratio of checking 'right' or 'wrong' was calculated.^{5,6)}

3. Data Analysis & Statistics

Study results were analyzed using SPSS Win 10.0. Also, differences among groups and descriptive statistics such as frequency and percentage were verified by using t-test and ANOVA.

RESULTS & DISCUSSION

1. Physical Development Status of Subjects

The body mass index was calculated to evaluate the physical status of subjects by height and weight and then

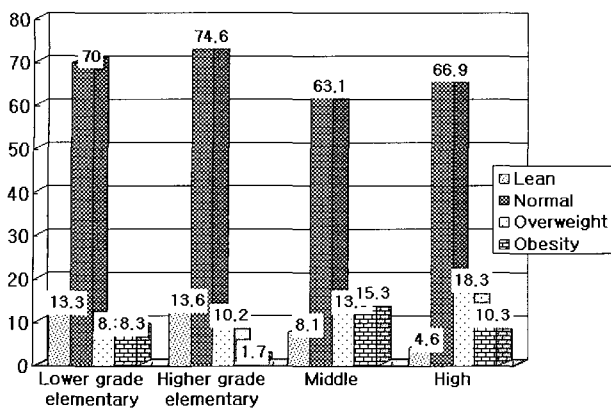


Fig. 1. Physique status of elementary, middle, and high school students

the physique was divided into thin, normal, overweight, and obese and analyzed as below(Fig. 1).

The body mass index of elementary students showed that normal state was 70.0% in lower grade and 74.6% in higher grade and overweight and obese state was 16.6% in lower grade and 11.9% in higher grade, showing higher ratio of overweight state in lower grade elementary students. These results could support the report that the degree of obesity in elementary students was increased from 7-9% in 1984 to over 16-19% in 1994, as shown in the previous study. Thus, the number of overweight children has been gradually increased.^{10,11)}

In middle and high school students, the ratio of normal physical state was slightly lower compared to those of elementary lower grade(70.0%) and higher grade(74.6%), and was 63.1% in middle school students and 66.9% in high school students. In case of overweight and obese groups, the ratio was 28.8% in middle school students and 28.6% in high school students, in particular, the ratio of obese was 15.3% in middle school students and 10.3% in high school students.

2. Dietary Attitude

The appropriate dietary attitude helps the growth of children and adolescents and becomes the foundation of keeping body and mind properly. As pointed out in many preliminary studies,^{7,8)} the dietary attitude of growing children has been largely affected by the socioeconomic condition of a household and the dietary attitude of parents, and thus the establishment of proper dietary attitude in growing children is greatly emphasized.

In this study, the survey tool for dietary attitude investigation made of 15 questions on eating behavior, variety of food intake, and balance with lifestyle was used and analyzed with 5-point Likert scale (Table 4).

Table 4. Dietary attitudes of elementary, middle, and high school students

	Mean(SD)				
	Elementary		Middle	High	Total
	Lower grade	Higher grade			
1. Enjoy meals everyday	4.24 (0.88)	4.15 (0.94)	3.95 (0.87)	3.99 (0.76)	4.02 (0.85)
2. Take sufficient time to eat	3.52 (1.24)	3.23 (1.30)	3.08 (1.11)	3.11 (1.15)	3.16 (1.15)
3. Eat a variety of foods everyday	3.77 (1.00)	3.89 (1.03)	3.40 (1.06)	3.38 (0.96)	3.50 (1.02)
4. Have interests in foods	3.37 (1.23)	3.69 (1.08)	3.47 (1.09)	3.61 (1.04)	3.55 (1.72)
5. Eat fast foods (hamburger, fried chicken) often	3.70 (1.15)	3.56 (1.05)	3.76 (0.91)	3.28 (1.01)	3.54 (1.53)
6. Eat side dishes made of vegetables, potatoes, sweet potatoes everyday	3.41 (1.07)	3.39 (1.05)	3.20 (1.05)	3.22 (1.02)	3.29 (1.06)
7. Eat fish, meat, tofu everyday	3.90 (1.01)	3.56 (1.07)	3.36 (0.96)	3.32 (0.94)	3.37 (1.02)
8. Eat foods using oils everyday	2.52 (1.00)	2.72 (1.02)	2.96 (0.90)	3.03 (0.95)	2.91 (0.95)
9. Eat milk and dairy products (cheese, yogurt) everyday	3.26 (1.40)	3.65 (1.27)	3.35 (1.19)	3.33 (1.18)	3.41 (1.38)
10. Eat too little or too much	3.67 (1.10)	3.85 (0.89)	3.36 (1.03)	3.18 (1.04)	3.35 (1.06)
11. Take nutritional supplements such as vitamins everyday	2.93 (1.41)	2.92 (1.45)	3.83 (1.09)	3.90 (1.13)	3.58 (1.29)
12. Like to eat instant foods such as ham, sausage, and ramyen (fried noodles)	3.00 (1.12)	2.87 (1.25)	2.61 (1.03)	2.66 (0.96)	2.65 (1.09)
13. Like to drink carbonated beverages and sports beverages	3.10 (1.35)	2.84 (1.25)	2.46 (1.05)	2.61 (1.06)	2.63 (1.14)
14. Like to eat sweet snacks such as cookies, chocolate, and ice cream	3.15 (1.33)	2.77 (1.21)	2.36 (1.02)	2.26 (0.97)	2.48 (1.11)
15. Eat three meals a day regularly	4.21 (1.19)	3.92 (1.35)	3.37 (1.17)	3.18 (1.31)	3.49 (1.33)
total score (based on 75 points)	52.18 (5.90)	50.77 (6.94)	48.57 (5.17)	47.92 (5.06)	48.9 (6.29)
overall average	3.45 (0.41)	3.40 (0.46)	3.23 (0.34)	3.20 (0.35)	3.26 (0.42)

If the total score for all questions is over 60 points(more than upper 20%), dietary attitude can be said as excellent on the whole, and if the score is less than 45(less than lower 40%), it can be pointed out that the dietary attitude has problems on the whole. The overall average of subjects in this study was 48.9±6.29, showing 'normal' dietary attitude. The survey by grades showed that the dietary attitude of elementary lower grade students was

Table 5. Degree of recognition for milk in elementary, middle, and high school students

Grade	Recognition	Well recognized	Somewhat recognized	Not well recognized	Never recognized	Not want to know	Total
Lower grade	Elementary	7 (11.7)	33 (55.0)	18 (30.0)	1 (1.7)	1 (1.7)	60 (100.0)
Higher grade	Elementary	6 (9.8)	35 (57.4)	16 (26.2)	1 (1.6)	3 (4.9)	61 (100.0)
	Middle	2 (1.6)	56 (45.9)	56 (45.9)	1 (0.8)	7 (5.7)	122 (100.0)
	High	1 (0.5)	84 (45.2)	97 (52.2)	1 (0.5)	3 (1.6)	186 (100.0)
	Total	26 (3.1)	423 (49.7)	360 (42.3)	9 (1.1)	34 (4.0)	852 (100.0)

the highest (52.18 ± 5.90) and that of high school students was the lowest (47.92 ± 5.06). In particular, it was very interesting phenomenon that the score of dietary attitude became decreased as the grade increased, which might be related to the risk for nutritional state of middle and high school students.^{10,11)}

Among 15 questions for dietary attitudes, 'Enjoy meals everyday' was the highest as 4.02, and then in the order of 'Take nutritional supplements such as vitamins everyday'(3.58) and 'Have interests in foods'(3.55). The lowest score for dietary attitude was from the question 'Like to eat sweet snacks such as cookies, chocolate, and ice cream'(2.48), and then in the order of 'Like to drink carbonated beverages and sports beverages'(2.63) and 'Like to eat instant foods such as ham, sausage, and ramyen(fried noodles)'(2.65). Although the dietary attitude for instant foods such as ham, sausage, and ramyen(fried noodles) was low, the dietary attitude for fast foods such as hamburger and fried chicken was appeared as high as 3.54.

The analysis of the response to the question related to milk 'Eat milk and dairy products (cheese and yogurt) everyday' showed that the overall average was 3.41 ± 1.38 and the highest score was 3.65 ± 1.27 in elementary higher grade and the lowest score among 4 groups was 3.26 ± 1.10 in elementary lower grade group.

3. Milk Recognition and Awareness

The degree of recognition for milk(Table 5) and the awareness of milk as what kind of food(Table 6), and the reason for consuming milk(Table 7) were investigated in elementary, middle, and high school students.

1) Degree of Recognition for Milk

The degree of recognition for milk showed that the overall ratio of response 'somewhat recognized' was 49.7% while the response 'not well recognized' was

Table 6. Awareness of milk in elementary, middle, and high school students

Grade	Recognition	frequency(%)					Total
		Meal	Snack	Beverage	Nutritional supplement	Other	
Lower grade	Elementary	.	9 (15.3)	1 (1.7)	46 (78.0)	3 (5.1)	59 (100.0)
Higher grade	Elementary	1 (1.9)	10 (16.7)	3 (5.0)	44 (73.3)	2 (3.3)	60 (100.0)
	Middle	3 (2.5)	33 (27.0)	10 (8.2)	70 (57.4)	6 (4.9)	122 (100.0)
	High	6 (3.3)	63 (34.2)	9 (4.9)	101 (54.9)	5 (2.7)	184 (100.0)
	Total	16 (1.9)	213 (25.2)	44 (5.2)	551 (65.1)	22 (2.6)	846 (100.0)

42.3%, showing similar tendency. From the current point of time in which the importance of milk intake during the growth period has been continuously emphasized, these results may become important basis to emphasize the need for milk nutrition education. This result showed that most of elementary, middle, and high school students in this study, the degree of recognition of more than 'somewhat recognized' was about 50%, suggesting the urgent need for milk nutrition education during the growth period.

The survey by grades showed that the ratio of response 'not well recognized' was 30.0% in elementary lower grade students and 26.2% in elementary higher grade students. In case of middle and high school students, on the other hand, the ratio of response 'not well recognized' was 45.9% in middle school students and 52.2% in high school students. While elementary school students who were on school meal program including milk had lower ratio of response 'not well recognized', the ratio of that response in middle and high school students became gradually higher, pointing out the lack of recognition for milk in middle and high school students as a problem.

Table 7. Reasons for choosing milk in elementary, middle, and high school students

frequency(%)

Reason	Grade	Simple preference	For increasing height	For relieving hunger	Asked by others	Health purpose	Do not know	Other	Total
Elementary	Lower grade	17 (17.7)	32 (33.3)	.	7 (7.3)	32 (33.3)	1 (1.0)	7 (7.3)	96 (100.0)
	Higher grade	22 (21.8)	43 (42.6)	2 (2.0)	15 (14.9)	15 (14.9)	2 (2.0)	2 (2.0)	101 (100.0)
Middle		58 (29.9)	77 (39.7)	10 (5.2)	9 (4.6)	28 (14.4)	9 (4.6)	3 (1.5)	194 (100.0)
High		108 (38.5)	86 (30.7)	24 (8.6)	9 (3.2)	21 (7.5)	16 (5.7)	16 (5.7)	280 (100.0)
Total		412 (25.3)	487 (34.6)	81 (5.8)	83 (5.9)	238 (16.9)	56 (4.0)	49 (3.5)	1406 (100.0)

2) Awareness of Milk

The awareness of milk in elementary, middle, and high school students was investigated by asking what kind of meaning was given to milk (Table 6).

The awareness of milk is generally recognized as a nutritional supplement in relation to calcium nutrition, and reported that the highest degree of recognition was from the response that milk has a variety of nutrients. According to,¹⁰⁻¹²⁾ 78.9% of students answered that elementary students had to drink milk to grow healthy, suggesting relatively high degree of recognition for the nutritional significance of milk.

In this study, most students recognized the significance of milk as a nutritional supplement(65.1%) on the whole. The survey by grades showed very high ratios in elementary lower grade students(78.0%) and elementary higher grade students(73.3%), but 57.4% in middle school students and 54.9% in high school students, which tended to be lower than those of elementary students. On the other hand, middle and high school students had relatively higher ratio for snack than for nutritional supplement.

3) Reasons for Choosing Milk

The significance of milk was examined through the survey on the reasons for choosing milk in study subjects. Multiple response was used for checking all reasons applicable among provided examples. The results as presented in (Table 7) showed that major reasons for drinking milk were 'for increasing height (for growing tall)' and 'for health purpose' as 33.3% and 32.3%, respectively, in elementary lower grade students, and these tended to be slightly different in higher grades. That is, 'for health purpose' was decreased to 14.9% while 'for increasing height' was increased to 42.6%. Also, the ratio of 'simple preference' for drinking milk was slightly increased from 17.7% in lower grade

students to 21.8% in higher grade students. In case of middle school students, this tendency was similar to that of elementary higher grade students and showed higher ratios in 'for increasing height(39.7%)' and 'simple preference(29.9%)' and still lower ratio in 'for health purpose(13.9%)'. This tended to be more distinct in case of high school students, that is, 'simple preference (38.5%)' was the highest and then came 'for increasing height(30.7%)' for reasons for drinking milk. On the other hand, 'for health purpose' was only 7.5%, which was the major reason in elementary lower grade students. These results suggest that, when considering the study results reporting milk was rejected because of the taste, odor or causing abdominal cramp,¹⁰⁻¹⁵⁾ it is possible to change the attitude for milk in the future by changing the recognition for the taste of milk through school meal program including milk in the elementary school and various education & dietary guidance related to continuous intake of milk in the middle school.

4. Degree of Understanding the Nutritional Knowledge on Milk

The results for nutritional knowledge on milk in responded elementary, middle, and high school students were analyzed in Table 8. The overall ratio of correct answers for a total of 10 questions in all subjects was 47.7%, which was less than 50% correctness. The survey by grade showed that the ratio was 44.2% in elementary lower grade students, 49.4% in elementary higher grade students, and 54.3% in middle school students and 49.9% in high school students. The grade with more than 50% of overall correctness was middle school students, and the elementary lower grade students showed the lowest correctness.

Also, the analyzed results for the degree of understanding the nutritional knowledge on milk showed that the correctness for 'Nutritional value of strawberry,

Table 8. Degree of understanding the knowledge on milk

(unit: correctness, %)

Question	Grade	Elementary		Middle	High	Total
		lower grade	higher grade			
1. Milk calcium has the most digestibility & absorption among calcium in foods.		64.5	53.2	52.1	41.9	49.6
2. Vitamins in milk are destroyed when milk is exposed to sunlight.		41.9	51.6	42.6	47.3	43.6
3. Drink milk along with cereals to increase the quality of milk protein.		35.5	33.9	33.6	34.6	38.5
4. When left at room temperature for 3~4 days, milk naturally turns into yogurt.		38.7	45.2	54.1	57.5	48.8
5. Low-fat milk never promote weight gain because the fat is totally eliminated.		21.0	45.9	62.3	67.2	44.9
6. coffee cream is a dairy product made of milk.		30.6	12.9	32.8	26.3	27.2
7. Milk is not an easily digestible food and causes abdomina cramp and diarrhea.		66.1	59.7	72.1	53.8	57.6
8. White milk makes dark skin lighter.		45.2	75.8	75.4	69.9	66.6
9. Nutritional value of strawberry, banana, or chocolate flavored milk is the same as that of plain white milk.		80.6	75.8	83.6	65.1	70.0
10. Milk with savory taste also has higher nutritional values.		17.7	40.3	34.4	34.9	29.6
Overall ratio of correct answers		44.2	49.4	54.3	49.9	47.7

banana, or chocolate flavored milk is the same as that of plain white milk' was the highest as 70.0%. The survey questions showing the lack of nutritional knowledge on milk were coffee cream is a dairy product made of milk' with the lowest ratio as 27.2% and 'Milk with savory taste also has higher nutritional values' with the second lowest ratio as 29.6%, and 'Drink milk along with cereals to increase the quality of milk protein' as 38.5%. Thus, study subjects knew that the nutritional value of strawberry, banana, or chocolate flavored milk and that of plain white milk is different while answered with the highest ratio for wrong information that coffee cream is a dairy product made of milk. Also, they showed false understanding for 'Milk with savory taste also has higher nutritional values' and the lack of understanding for 'Drink milk along with cereals to increase the quality of milk protein'. The question showing difference by grade was 'Low-fat milk never promote weight gain because the fat is totally eliminated' with the lowest ratio of correctness in elementary lower grade students.

Therefore, on the basis of this study results, the correct understanding for milk nutrition knowledge such as knowledge for 'savory taste', correct understanding for milk products, and milk protein nutrition, should be selected as educational goals, and then should be used as data for the establishment of education contents for the development of milk nutrition education program in the future.^{16,17)}

5. Establishment of Educational Goals and Contents for the Development of Education Contents for Milk Nutrition

In this study, the goals and contents of milk nutrition education were established and selected on the basis of the analyzed results of milk nutrition contents in textbooks of elementary, middle and high schools⁴⁾ and milk nutrition related problems of elementary, middle and high school students in this study. Also, the evaluation of effects after the nutrition education is planned through the development of nutrition education media and the education performance in the future based on the goals and contents of milk nutrition education established through this study.¹⁸⁻²⁰⁾

In this study, the following goals of milk nutrition education program were established on the basis of analyzed study results.

The goals were established to obtain correct understanding and positive awareness of milk in growing students through school education and thus to establish sound dietary behavior and further to help nutritional and health improvements in adolescents, by inducing proper understanding and consumption of milk that will contribute to the health improvement of growing students.

The following detailed goals were established for the purpose.

Goal 1. Improve the awareness of milk

Goal 2. Increase the understanding on the knowledge

about milk

Goal 3. Practice proper milk intake behavior through Goal 1 and Goal 2

Based on these goals established as the above, educational contents were established that would be expected in elementary, middle, and high school students after milk nutritional education.

Instructional contents were

1. Recognize the significance of milk nutrition
2. Understand the relationship between ingredients of milk nutrients and health
3. Understand food characteristics, processing, and storage of milk
4. Practice proper dietary attitude in relation to milk intake
5. Understand the hygienic management of milk

Therefore, the development of education program and the evaluation of education effects were to be performed on the basis of educational goals and contents for milk nutritional education program.

CONCLUSIONS

This study was performed to analyze the degree of understanding for the awareness and nutritional knowledge of milk in elementary, middle, and high school students to establish the educational goals and contents before developing educational data for milk nutrition education.

The study results showed that the degree of recognition for milk showed that the overall ratio of response 'somewhat recognized' was 49.6% while the response 'not well recognized' was 42.3%, and thus from the current point of time in which the importance of milk intake during the growth period has been continuously emphasized, these results may become important basis to emphasize the need for milk nutrition education. Also, most students recognized the significance of milk as a nutritional supplement(65.1%) on the whole, and the survey by grades showed very high ratios in elementary lower grade students(78.0%) and elementary higher grade students(73.3%), but 57.4% in middle school students and 54.9% in high school students, which tended to be lower than those of elementary students. On the other hand, middle and high school students had relatively higher ratio for snack than for nutritional

supplement.

The results showed that major reasons for drinking milk were 'for increasing height (for growing tall)' and 'for health purpose' as 33.3% and 32.3%, respectively, in elementary lower grade students, and these tended to be slightly different in higher grades. That is, 'for health purpose' was decreased to 14.9% while 'for increasing height' was increased to 42.6%. Also, the ratio of 'simple preference' for drinking milk was slightly increased from 17.7% in lower grade students to 21.8% in higher grade students. In case of middle school students, this tendency was similar to that of elementary higher grade students and showed higher ratios in 'for increasing height (39.7%)' and 'simple preference(29.9%)' and still lower ratio in 'for health purpose(13.9%)'. This tended to be more distinct in case of high school students, that is, 'simple preference(38.5%)' was the highest and then came 'for increasing height(30.7%)' for reasons for drinking milk.

The analyzed results for the degree of understanding the nutritional knowledge on milk showed that the correctness for 'Nutritional value of strawberry, banana, or chocolate flavored milk is the same as that of plain white milk' was the highest as 70.0% and the correctness for coffee cream is a dairy product made of milk' was the lowest ratio as 27.2%.

On the basis of these study results, the goals were established to obtain correct understanding and positive awareness of milk in growing students through school education and thus to establish sound dietary behavior and further to help nutritional and health improvements in adolescents, by inducing proper understanding and consumption of milk that will contribute to the health improvement of growing students.

Therefore, this study has emphasized the significance of acquiring knowledge and information on milk that should be properly for students in the growth period through school education in the current circumstances where accurate understanding for milk is absolutely insufficient due to commercially overflowing information.

It may be of significance, on the basis of these study results, to introduce interesting and beneficial teaching-learning activities related to milk with various teaching-learning methods and data using printed media for the milk nutrition education in elementary, middle, and high school students, and finally to establish the foundation of proper dietary behavior in the growth period.

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