

Short Communication

Identifying barriers to the implementation of nutrition education in South Korea

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To improve the nutritional status of children and adolescents, it is critical to identify the barriers to the implementation of nutrition education in schools. We carried out a cross-sectional study by analyzing data from 121 subjects (45 nutrition teachers and 76 school dietitians). Among the personal, environmental and systematic barriers, the top four barriers to the implementation of nutrition education were heavy workload (4.28 points), lack of a systematic curriculum (4.12 points), lack of perception of nutrition education by school administrators and teachers (4.07 points), and lack of continuing education for nutrition teachers and school dietitians (4.05 points). Additionally, poor working conditions, such as low pay, were identified as significant barriers to nutrition education for school dietitians compared with nutrition teachers (4.33 vs 3.47 points, $p < 0.001$). This research provides useful information for nutrition policy makers to promote nutrition education in schools in South Korea.

Key Words: barriers, nutrition education, nutrition teacher, school dietitian, South Korea

INTRODUCTION

School is the best place to implement nutrition education in South Korea due to the high accessibility of children and adolescents. One study insisted that nutrition teachers were aware of the importance of nutrition education and counselling, but their level of performance was low, indicating a larger gap between the level of performance and importance than other tasks such as sanitation and school meal management.¹ A recent study (2013) reported that significantly more nutrition teachers than dietitians implemented face-to-face nutrition education for the last year to students (nutrition teachers 36.4% vs school dietitians 10.0%).² The majority of students did not take a nutrition education class. School nutrition education is critical to improve the nutritional status of students because South Korea is facing the burden of malnutrition in youth.

Over-nutrition and under-nutrition coexist among children and adolescents in South Korea. According to the Korean National Health and Nutrition Examination Survey (KNHANES) 2013,³ 16.0% of children aged 6-11 years consumed less than 75% of the estimated energy requirements (EER), while 31.2% consumed more than 125% of the EER. Additionally, 31.5% of adolescents aged 12-18 years consumed less than 75% of the EER, whereas 18.8% of them consumed more than 125% of the EER. Calcium intake was low in both children and adolescents. Approximately 71.5% of children and 83.6% of adolescents consumed less than the estimated average requirement (EAR) for calcium. The dual burden of malnutrition and micronutrient deficiencies needs to be tackled through nutrition education in South Korea.

School meal service and nutrition education are mainly

provided by either nutrition teachers or school dietitians in South Korea. In 2006, the Nutrition Teacher System went into effect according to the South Korean Elementary and Secondary Education Act and School Meals Act.⁴ The schools started employing nutrition teachers on March 1, 2007. However, schools could also hire school dietitians in a difficult supply situation for nutrition teachers based on the Elementary and Secondary Education Act (article 40, paragraph 3). Nutrition teachers are permanently employed, while school dietitians are employed on a contract basis. According to the Ministry of Education, Science and Technology, 11,313 out of 11,575 schools hired either nutrition teachers or school dietitians, but the number of nutrition teachers hired in the schools was still only half of the total hires (nutrition teachers 49.6% vs school dietitians or other 50.4%).⁵ Although nutrition teachers and school dietitians perform the same tasks, school dietitians receive much lower wage and welfare benefits compared with nutrition teachers.⁶ Taking into account their unequal working conditions, the barriers to the implementation of nutrition education could differ between nutrition teachers and school dietitians.

Exploring the factors associated with the implementation of school nutrition education is very important. After

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the implementation of the Nutrition Teacher system, a few studies were conducted to assess the current status of nutrition education. However, most studies included only nutrition teachers as study subjects, not school dietitians.^{7,8} One study included nutrition teachers as well as school dietitians as study subjects, but they merged the study subjects for data analysis and did not divide subjects by the type of employment status.⁹ Although a few studies investigated the barriers to the implementation of nutrition education, most examined barriers such as either personal or environmental factors.¹⁰⁻¹² More students in schools where school dietitians were hired might miss nutritional education opportunities than peers in schools with nutrition teachers. Therefore, research that examines the potential barriers to the implementation of nutrition education by type of employment status is very limited.

The specific aim of this research was to explore the personal, environmental and systematic barriers to the implementation of nutrition education. We investigated whether differences in employment status (nutrition teacher vs school dietitian) influence potential personal, environmental and systematic barriers. Understanding barriers, nutrition education and the type of employment status will provide useful information for designing and implementing a school nutrition policy to improve the current nutrition education system.

MATERIALS AND METHODS

Subjects

We conducted a cross-sectional study to investigate barriers to the implementation of nutrition education in Gyeonggi-do, South Korea. We originally collected data from 246 subjects (130 nutrition teachers and 116 school dietitians) working in elementary, middle and high schools in August, 2012. Because we planned to explore barriers to conduct face-to-face nutrition education in subjects conducting indirect nutrition education, we included 121 subjects in our analysis, excluding 53 subjects not conducting any type of nutrition education, 56 subjects conducting face-to-face nutrition education, and 16 subjects with missing data. We received institutional review board approval at the Korea National Institute for Bioethics Policy, South Korea (P01-201507-23-004).

Survey questionnaire

We implemented the pilot study in 5 subjects and then revised and finalized the survey questionnaire based on their feedback.^{8,10,12} The questionnaire included age, workplace (elementary, middle, and high school), years of employment in the field, yearly wage, education level, and completion of a course in teacher training. We classified the types of nutrition education into direct education and indirect education. We defined direct education as face-to-face interventions to educate students about nutrition. Moreover, we defined indirect education as education to deliver nutrition information through leaflets, school websites and school bulletin boards. We limited this study to subjects who only conducted indirect education because we aimed to explore the barriers related to the implementation of direct education.

We conducted the survey by including personal, environmental and systemic barriers to implementation of

nutrition education. The personal barriers consisted of the following 3 items: 1) lack of interest in nutrition education, 2) lack of knowledge and skills related to nutrition education, and 3) limited information exchange among nutrition teachers and dietitians.

The environmental barriers consisted of the following 6 items: 1) low pay at work, 2) heavy workload, 3) lack of educational equipment, 4) lack of perception of nutrition education by school administrators and teachers, 5) lack of a standardized nutrition education program, and 6) omission of nutrition education in school curriculum planning at the beginning of the year.

The systematic barriers comprised the following four items: 1) lack of systematic curriculum of nutrition education, 2) absence of legislation on hours of nutrition education, 3) lack of budget, and 4) lack of continuing education for nutrition counselling and education skills. We employed a 5-point Likert scale to assess the level of barriers from 'strongly disagree' (1 point) to 'strongly agree' (5 points). Finally, we assessed the willingness to conduct nutrition education. The respondents chose one of the following four answers: 1) definitely willing, 2) willing, 3) unsure, and 4) not willing.

Statistical analysis

We used SPSS version 21 (SPSS Inc., Chicago, IL) for data analysis. To compare the barriers to implementation of nutrition education by employment status (nutrition teachers vs school dietitians), we performed chi-square tests for the analysis of categorical data and independent sample t-tests for analysis for continuous variables. We set the level of significance at a *p*-value of 0.05.

RESULTS

Demographic characteristics

Nearly half of the subjects (51.2%) were in their 30s (Table 1). Two thirds of nutrition teachers were in the 30s, while almost half of school dietitians (44.7%) were aged 40 years or older. Half of respondents (50.4%) worked in elementary schools. In terms of years of employment in the field, 42% of subjects responded that they had worked for 10 years or more, followed by 5 to less than 10 years (33.9%) and less than 5 years (24.0%). The majority of nutrition teachers (68.9%) received a yearly wage of 30 million Korean won (US\$ 27,420) or more, while the majority of dietitians (81.3%) were paid much less, less than 20 million Korean won (US\$ 18,280).¹³ More than half of the subjects (52.1%) had completed graduate school, followed by completion of a 4-year college training (28.1%), attending graduate school (10.7%) and completion of a 2-year college training (9.1%).

Personal barriers to the implementation of nutrition education

When asked to evaluate the degree of personal barriers, the factor with the highest score was 'limited information exchange among nutrition teachers and dietitians' (3.26 points) followed by 'lack of knowledge and skills related to nutrition education' (3.06 points), and 'lack of interest in nutrition education' (2.45 points) (Table 2).

Table 1. General characteristics of subjects

Variables	Total (n=121)	Nutrition teacher (n=45)	School dietitian (n=76)	χ^2 value
Age (yrs)				7.36*
<30	15 (12.4)	5 (11.1)	10 (13.2)	
30-39	62 (51.2)	30 (66.7)	32 (42.1)	
\geq 40-49	44 (36.4)	10 (22.2)	34 (44.7)	
School				3.13
Elementary school	61 (50.4)	26 (57.8)	35 (46.1)	
Middle school	37 (30.6)	14 (31.1)	23 (30.3)	
High school	23 (19.0)	5 (11.1)	18 (23.7)	
Working period (yrs)				11.1*
<5	29 (24.0)	15 (33.3)	14 (18.4)	
5-<10	41 (33.9)	7 (15.6)	34 (44.7)	
\geq 10-<15	51 (42.1)	23 (51.1)	28 (36.8)	
Yearly wage (10,000 Korean won)				87.0***
<2000 (<18,820 US \$)	62 (51.7)	1 (2.2)	61 (81.3)	
2000-< 3000 (18,820-<27,420 US \$)	27 (22.5)	13 (28.9)	14 (18.7)	
\geq 3000 (\geq 27,420 US \$)	31 (25.8)	31 (68.9)	0 (0.0)	
Education level				28.6***
2-y college	11 (9.1)	2 (4.4)	9 (11.8)	
4-y college	34 (28.1)	25 (55.6)	9 (11.8)	
Studying in graduate school	13 (10.7)	1 (2.2)	12 (15.8)	
Graduate school	63 (52.1)	17 (37.8)	46 (60.5)	

n (%)

* p <0.05, *** p <0.001.

1,000 Korean won=0.914 US \$ (2013).

Table 2. Personal barriers to implementation of nutrition education

Variables	Total (n=121)	Nutrition teacher (n=45)	School dietitian (n=76)	t-value
Lack of interest in nutrition education	2.45 \pm 0.90	2.42 \pm 0.92	2.47 \pm 0.90	-0.30 ^{NS}
Lack of knowledge and skills	3.06 \pm 1.08	3.27 \pm 0.99	2.93 \pm 1.12	1.64 ^{NS}
Limited information exchange among school nutritionists	3.26 \pm 1.01	3.31 \pm 0.93	3.24 \pm 1.06	0.39 ^{NS}

Mean \pm SD

NS: Not statistically significant.

The analysis was based on the 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

Environmental barriers to the implementation of nutrition education

We found that the subjects perceived a high level of environmental barriers to nutrition education. When the subjects scored each item, the means of the following 4 items were over 4 points: 1) heavy workload (4.28 points), 2) lack of perception of nutrition education by school administrators and teachers (4.07 points), 3) lack of a standardized nutrition education program (4.04 points), and 4) lack of adequate pay for their work (4.01 points) (Table 3). The mean score for a lack of educational equipment was 3.97 points, and the item with the lowest mean score was omission of nutrition education in school curriculum planning at the beginning of the year (3.58 points).

Systematic barriers to the implementation of nutrition education

We found that the strongest barrier preventing subjects from implementing nutrition education was 'lack of sys-

tematic curriculum for nutrition education' (4.12 points) (Table 4). The subjects then listed 'lack of continuing education for nutrition counselling and education skills' (4.05 points) and 'absence of legislation on hours for nutrition education' (4.04 points) as other strong barriers. Lastly, 'lack of budget' had a relatively high score (3.93 points) on the 5-point Likert scale.

Willingness to conduct nutrition education

The majority of subjects responded that they were willing to implement nutrition education (definitely willing 24.0%, willing 48.8%) (Table 5). Almost one in four subjects replied that they were unsure whether to perform nutrition education, and less than 2% of subjects were not willing to teach nutrition education to students.

DISCUSSION

This research examined the personal, environmental and systematic barriers to the implementation of face-to-face

Table 3. Environmental barriers to the implementation of nutrition education

Variables	Total (n=121)	Nutrition teacher (n=45)	School dietitian (n=76)	t-value
Underpaid at work	4.01±1.08	3.47±1.04	4.33±0.99	-4.57***
Heavy workload	4.28±0.89	4.16±0.85	4.36±0.91	-1.20
Lack of educational equipment	3.97±0.83	3.87±0.79	4.03±0.85	-1.03
Lack of perception of nutrition education by school administrators and teachers	4.07±0.96	3.78±0.95	4.25±0.93	-2.69*
Lack of a standardized nutrition education program	4.04±0.93	4.07±0.96	4.03±0.92	0.23
Omission of nutrition education in school curriculum planning at the beginning of the year	3.58±1.21	3.40±1.01	3.68±1.31	-1.34

mean±SD

* $p<0.05$, *** $p<0.001$.

The analysis was based on the 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

Table 4. Systematic barriers to implementation of nutrition education

Variables	Total (n=121)	Nutrition teacher (n=45)	School dietitian (n=76)	t-value
Lack of systematic curriculum of nutrition education	4.12±0.86	4.09±0.70	4.14±0.95	-0.37
Absence of legislation regarding hours of nutrition education	4.04±0.99	3.93±1.01	4.11±0.97	-0.93
Lack of budget	3.93±0.92	3.69±0.90	4.07±0.91	-2.20*
Lack of continuing education for nutrition counselling and education skills	4.05±0.91	3.96±0.85	4.11±0.95	-0.87

mean±SD

* $p<0.05$

The analysis was based on the 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

Table 5. Willingness to conduct nutrition education

Variables	Total (n=121)	Nutrition teacher (n=45)	School dietitian (n=76)	χ^2 value
Definitely willing	29 (24.0)	7 (15.6)	22 (28.9)	18.06***
Willing	59 (48.8)	33 (73.3)	26 (34.2)	
Unsure	31 (25.6)	5 (11.1)	26 (34.2)	
Not willing	2 (1.7)	0 (0.0)	2 (2.6)	

n (%)

*** $p<0.001$

nutrition education by nutrition teachers and school dietitians in South Korea. We included a total of 121 subjects consisting of 45 nutrition teachers and 76 school dietitians. The top four barriers to performing nutrition education among the personal, environmental and systematic barriers were 1) heavy workload (4.28 points), 2) lack of systematic nutrition education curriculum (4.12 points), 3) lack of perception of nutrition education by school administrators and teachers (4.07 points), and 4) lack of continuing education for nutrition counselling and education skills (4.05 points). The mean scores were significantly different between the nutrition teachers and school dietitians, respectively, as follows: 1) low pay at work (3.47 points vs 4.33 points), 2) lack of perception of nutrition education by school administrators and teachers (3.78 points vs 4.25 points), and 3) lack of budget (3.69 points vs 4.07 points). Tackling these barriers is critical to promoting nutrition education in South Korea.

The research subjects reported that the largest barrier to implementing nutrition education is heavy workload. According to the enforcement ordinance of the school feed-

ing law (article 8), the job tasks of school dietitians are the same as the tasks of nutrition teachers,¹⁴ which are as follows: 1) meal composition and examination, 2) sanitation, safety, operation management and test eating of food to be served, 3) guide of healthy eating, provision of nutrition information, and nutrition counselling, 4) guidance and supervision of cooking staff, and 5) other tasks related to school feeding.¹⁵ To strengthen school feeding safety management, a HACCP (Hazard Analysis and Critical Control Points) system was applied in schools in 2000.¹⁶ Additionally, an allergenic food labelling system has been in place since 2013, and nutrition teachers or school dietitians must manage students with food allergies.¹⁶ To support the school food system, they have more duties, such as assessment of microbiological hazards in the food service facilities, examination of detergent residues in dishes, operating parental monitoring of the school feeding system, employing a system for the prevention of foodborne disease, etc. Taking into consideration their many duties as the manager of the school feeding system, it would be hard to find time for the preparation and implementation

of nutrition education. After conducting a job analysis of nutrition teachers and school dietitians, we need to reduce their current workload through the development of a systematic and automated working process or by sharing some accounting and administrative tasks with other school staff.

We found that lack of perception of nutrition education by school administrators was a significant barrier to implementing nutrition education. One study found that school administrators placed a significantly lower level of importance on nutrition education compared with nutrition teachers (4.10 vs 4.54 points).¹⁷ Our study also found that this barrier was a major barrier to implementing nutrition education. Moreover, school dietitians perceived it as a significantly larger barrier than nutrition teachers. In February 2014, the Ministry of Education established a regulation that nutrition teachers must present nutrition education at least twice a month in schools,¹⁶ while duty hours for nutrition education were not assigned for school dietitians. Because nutrition education is not a traditional subject such as mathematics and science, we can teach nutrition education in after-school classes, Saturday programs or school lunch time. School administrators' willingness to engage in nutrition education is critically important to obtaining assigned hours to teach nutrition classes in schools.

Nutrition teachers and school dietitians do the same tasks, but there is a large wage gap between the two groups in South Korea. Sung (2008) reported that average monthly income for nutrition teachers was almost two times higher than for school dietitians, 2.42 million Korean won (US \$2,212) for nutrition teachers vs 1.29 million (US \$1,179) Korean won for school dietitians.¹⁸ Because there is no promotion system for school dietitians, the wage gap grows with time of employment.¹⁹ Lee (2008) investigated nutrition teachers and school dietitians' reasons for not teaching nutrition education. The school dietitians replied that their heavy workload was the main reason, while the nutrition teachers responded that the exclusion of nutrition classes from the annual school curriculum was the first reason not to implement nutrition education.²⁰ Because wages are much lower for school dietitians than school teachers, dietitians seem to perceive their workload to be heavier than nutrition teachers. We need to narrow the gap in wage, welfare benefits, and other working conditions between nutrition teachers (permanent employees) and school dietitians (contracted employees), taking into account their equivalent roles. Once this is accomplished, school dietitians would be more motivated to conduct nutrition education and be satisfied that their wages were fair compensation for their heavy workload.

Identifying the barriers to nutrition education is critical to promoting nutrition education in schools because schools are the best place for nutrition education in terms of accessibility and availability of children and adolescents in South Korea. Based on the findings of this study, we recommend the following actions. First, we need to require systematic and automated working processes to reduce the heavy workload for nutrition teachers and school dietitians. To focus on food service and nutrition education, some of their accounting and administrative

tasks should be shared with other school staff. Second, it is essential to develop a systematic curriculum of nutrition education from elementary school to high school to take into account important nutrition issues and the level of knowledge. Third, we need to increase the perceived level of importance of nutrition education among school administrators and teachers through education. Fourth, it is important to provide continuing education for nutrition counselling and education skills for nutrition teachers and school dietitians to build their capacity. Lastly, we need to narrow the gap in working conditions such as wages and financial support for nutrition education between nutrition teachers and school dietitians. This study provides useful information for nutrition policy makers to target the important barriers that must be overcome to promote nutrition education in schools in South Korea.

AUTHOR DISCLOSURES

The authors declare no potential conflicts of interest and they did not receive any research funding for this research.

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確認南韓執行營養教育的障礙

為了改善兒童及青少年的營養狀況，確認學校執行營養教育時面臨的障礙是必要的。我們執行一個橫斷性研究，共分析 121 名研究對象（45 名營養學教師及 76 名學校營養師）。在個人、環境及系統障礙間，執行營養教育的前四個障礙為工作負荷量大（4.28 分）、缺乏系統性課程（4.12 分）、學校行政人員及教師缺乏對營養教育的認知（4.07 分）、營養學教師及學校營養師缺乏繼續教育（4.05 分）。此外，相較於營養學教師，工作條件差，例如低薪，被認為是學校營養師執行營養教育的顯著障礙（4.33 vs 3.47 分， $p < 0.001$ ）。這個研究提供營養政策制定者在促進南韓學校營養教育上有用的訊息。

關鍵字：障礙、營養教育、營養學教師、學校營養師、南韓