Testing nutrition education materials in Polish schools[1]

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Food habits and behaviour are often formed early in life, and nutrition education of children can have a major role in ensuring appropriate dietary patterns and good health. In Poland, most children attend primary school, and the primary classroom is particularly well suited for teaching nutrition (Godlewska and Kierebiński, 1981; Grad, 1981; Proust, 1971). From February to April 1996, a nutrition education study to test the usefulness of educational materials was conducted in three randomly selected schools in Warsaw.

A total of 112 girls and 84 boys, aged 13 to 14 years, participated in four experimental lessons based on the FAO nutrition education package *Get the best from your food*. The package, developed by the FAO Food and Nutrition Division in 1995, consists of booklets for educators and teachers, leaflets for pupils and a poster. To aid the teacher and to improve the pupils' understanding, memory and practical use, a detailed conspectus and teaching aids were prepared at the Faculty of Human Nutrition of Warsaw Agricultural University.

The experimental lessons included the following subjects: nutrients and their main sources; nutritional requirements; maintaining proper body weight; and observing principles of hygiene. Pupils were asked eight questions before and after the lessons (Table 1).

The research showed a low level of knowledge about basic food and nutrition topics among the pupils prior to the lessons, as found in previous papers about nutrition knowledge among young people (Kołłajtis-Dołowy, 1994; Narojek and Kirschner, 1988). After the lessons based on the FAO education package, nutrition knowledge showed improvement, demonstrating the usefulness of the applied didactic method and the effectiveness of teaching. In an earlier nutrition education study conducted without the FAO nutrition education package (Warchoł, 1995) children's knowledge improved less, perhaps because the children had fewer auxiliary materials at their disposal (Table 2). The pupils using the FAO materials showed greater improvement than students participating in short lessons (six minutes) using conversation, a leaflet and video film (Kołłajtis-Dołowy, 1996).

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AWARENESS OF KEY TOPICS

While the students were aware of key topics such as energy, protein, fats, micronutrients, and dietary fibre, they were confused about food sources and their understanding was sometimes incomplete and inaccurate. Research at the Department of Human Nutrition, Warsaw Agricultural University, showed that more than 30 percent of pupils viewed carbohydrates as the component of food that determines a product's energy value (Kołłajtis-Dołowy, 1994; Narojek, Woroszylska and Kirschner, 1993). However, they did not include fats as sources of energy, although fats give roughly twice as much energy as carbohydrates. In this study, knowledge of energy sources was relatively low. Approximately 25 percent of the pupils thought that vitamins and minerals were included in this group. Such results indicate that the pupils did not understand the notion of energy value and confused it with nutritional value.

When pupils were asked about foods that cause people to become overweight, 75 percent of the pupils gave correct answers before the lessons. The responses about weight gain have not been confirmed in other studies (Narojek, Woroszylska and Kirschner, 1993).

Many pupils said that they had not heard about dietary fibre, its role and sources. Only one third of the pupils could accurately name a source of dietary fibre. Lack of knowledge of fibre may explain why average consumption of fibre in Poland is very low, about 14 g per day (Gronowska-Senger, 1995), in comparison with United States and World Health Organization recommended intake levels of 25 to 40 g per day. After the lesson, the number of correct answers to the question about dietary fibre increased to 102 (52 percent).

In previous research, a low level of knowledge on polyunsaturated fatty acids (PUFA) was also shown; 21 percent of pupils incorrectly believed that milk was a source of PUFA (Kołłajtis-Dołowy, 1994; Warchoł, 1995). In the present study the knowledge of PUFA was low before the lessons (one fifth gave good answers), but the number of correct answers improved by 98 (50 percent) after the lessons.

As regards the best sources of iron, apples were chosen by about one third of the pupils, probably because fruit and

TABLE 1
Distribution of pupils' answers before and after experimental lessons

Question[a]	Percentage of answers	
	Before experimental lessons	After experimental lessons
1. Which nutrition components are decisive for product energy value?		
Carbohydrates and proteins	20	12
Proteins and fats	20	7
Fats and vitamins	8	1
Vitamins and mineral components	23	18
Carbohydrates and fats	19	62
I don't know	10	2
2. Which of the below-mentioned products is the best source of protein?		
Beans	23	12
Potatoes	4	2
Buckwheat	7	8
Peas	5	9
Chicken	19	64
None of the listed products	29	5
I don't know	13	0
3. Which of the below-mentioned products is a source of polyunsaturated fatty acids (PUFA)?		
Sunflower oil	21	68
Butter	15	2
Milk	21	11
Meat	10	9
Yoghurt	14	9
I don't know	19	1
4. A source of dietary fibre is:		
Margarine	9	6
Milk	18	6
Buckwheat	30	82
Yoghurt	13	2
Sausage	5	3
I don't know	25	1
5. The best source of calcium and protein is:		
Butter	6	3
Apples	5	8
Milk	72	76
Vegetable oil	6	10
Margarine	2	3
I don't know	9	0
6. The best source of iron is:		
Milk	13	5
Butter	3	1.5
Apples	13	6
Margarine	9	5
Meat	47	82
I don't know	15	0.5
7. Overweight is caused by excessive consumption of:		
Fats and carbohydrates	80	88
Dietary fibre and energy	0	1
Calcium and fats	14	9
Vitamin C and dietary fibre	0.5	1
I don't know	0.5	1
	5	0
8. From the below-mentioned products (at least five) make a correct breakfast menu.		
Butter, brown bread, cabbage (leaves), jam, cheese, milk, roll, farm cheese, tea with lemon	18[b]	81[b]

[a] Shading indicates correct answer.
[b] Percentage of good answers.

TABLE 2
Improvement in the level of nutrition knowledge with and without FAO educational materials

Scope of question	Increase in correct answers after lessons[a]	
	With the use of FAO materials	Without the use of FAO materials[b]
Sources of high-quality protein	3.5	1.4
Sources of PUFA	3.2	1.5
Sources of fibre	2.8	2.7
Sources of iron	1.7	1.3
Making a correct breakfast menu	4.8	4.5

[a] 1.0 was taken as the level of knowledge before classes.
[b] Selected results from Warchoł, 1995.

vegetables are often said to be main sources of minerals (including iron) and the pupils related this information to all products of the group. Milk was listed as a source of iron by 25 pupils (13 percent).

The pupils found the question about creating a proper breakfast menu very difficult. Only 35 pupils could pick the components of a good breakfast prior to the lessons. Pupils thought that combining milk with fruit or vegetables in the meal was improper (Kołłajtis-Dołowy, 1994). After the classes, 159 pupils managed to create an appropriate breakfast menu. This large increase may be explained by the pupils' relatively high interest in information that they need to use in their everyday lives.

FACTORS IN CHILDREN'S KNOWLEDGE

The results were analysed to determine whether there were differences in pupil's knowledge based on sex, parents' education and participation in meal preparation. When heads of households have higher educational levels, nutrition knowledge is increased and the meals in the home become more rational and diversified (Grad, 1991). This study and previous research suggest that children's knowledge on nutrition comes from the home more often than from the school (Narojek and Kirschner, 1988; Narojek *et al.*, 1973).

Parents' educational level

In most Polish families the mother decides what foods the family will eat and prepares the meals. Prior research had confirmed a relation between mothers' educational level and children's knowledge on nutrition (Narojek, 1993; Narojek and Kirschner, 1988; Narojek, Woroszylska and Kirschner, 1993). Little association was found between the pupils' nutrition knowledge and the educational level of fathers. In this study, the majority of the children's parents had secondary or university education (Table 3). Considering that children with less-educated parents have less information on proper nutrition at home, the task of providing nutrition education should be undertaken by the school (Narojek and Kirschner, 1988).

TABLE 3
Parents' educational level (percentage of pupils)

Educational level	Mother	Father
Elementary	40	53
Secondary	26	15
University	34	32

Gender and meal preparation

All but 25 of the children declared that they helped in meal preparations at home. There was an association between accurate knowledge of nutrition and the sex of the pupils, as found elsewhere (Kołłajtis-Dołowy, 1994; Kołłajtis-Dołowy, 1996; Narojek and Kirschner, 1988). Girls did better on the final test. This result may be related to the association between gender and meal preparation, as girls participate in food preparation more often than boys. There was no association between the father's education and the pupil's involvement in preparation of meals.

VIEWS OF STUDENTS AND TEACHERS

According to the students, the most interesting lesson was that on nutrients and their main sources. At the same time, this was the most difficult topic. The pupils said they obtained new information during lessons on maintaining proper body weight, nutritional requirements and observing principles of hygiene. The children found the *Get the best from your food* leaflet to be an interesting and useful set of information on food and nutrition in everyday life. They also found the numerous drawings illustrating its contents advantageous.

All teachers thought the lessons and materials were well prepared from the perspective of methodology and subject matter. They found the materials comprehensive and clear and thought they had an appropriate level of detail. The proposed education aids proved useful and sufficient in terms of quantity. It was suggested that two sessions were insufficient to teach the material regarding the role and sources of nutrients. They also suggested that the materials could include more practical elements, e.g. making menus. The teachers found that the educational materials were effective in teaching nutrition. They thought there was a need for lessons on similar topics especially for younger children (e.g. ten-year-olds). According to the teachers, recognition of the importance of nutrition has increased in recent years, and this was proved by the increased interest of young people in the subject. ♦

REFERENCES

Godlewska, Z. & Kierebiński, Cz. 1981. Popularyzacja wiedzy o żywieniu ważnym czynnikiem w racjonalizacji żywienia (Popularization of nutrition knowledge, an

important factor in rationalization of nutrition). *Przgląd Gastronomiczny* (Gastronomic Review), 2: 5-6.

Grad, W. 1981. Problemy upowszechniania zasad racjonalnego żywienia (Problems of rational nutrition education). *Żywienie Człowieka i Metabolizm* (Human Nutrition and Metabolism), 2: 105.

Grad, W. 1991. Społeczno-demograficzne uwarunkowania sposobu żywienia (Social and demographic conditions of nutrition). *Żywienie Człowieka i Metabolizm* (Human Nutrition and Metabolism), 2.

Gronowska-Senger, A. 1995. Zalecenia żywieniowe – korzyści i kontrowersje (Nutrition recommendations – merits and controversies). *Żywienie Człowieka i Metabolizm* (Human Nutrition and Metabolism), 2: 186-188.

Kołłajtis-Dołowy, A. 1994. Polskie błędy w poglądach o żywieniu (Errors in views on nutrition in Poland). *Gospodarstwo Domowe* (Home Economics), 1: 2-4.

Kołłajtis-Dołowy, A. 1996. *Stan wiedzy o żywności i żywieniu w wybranych grupach młodzieży oraz jego zmiany pod wpływem upowszechniania* (State of knowledge of food and nutrition in selected groups of youth in Poland and changes caused by education). Warsaw, Poland. (Doctoral dissertation)

Narojek, L. 1993. *Niektóre aspekty uwarunkowań zachowań żywieniowych*, p. 62-66. Warsaw, Poland, IŻŻ.

Narojek, L. & Kirschner, H. 1988. Poziom wiedzy z zakresu żywienia i jego związki z zachowaniami żywieniowymi rodzin warszawskich (Level of nutrition knowledge and its relevance to nutrition behaviours in Warsaw families). *Roczniki PZH* (Annals of the State Institute for Hygiene), 2: 99-105.

Narojek, L., Kulesza, W., Kopczyńska, B. & Szczygłowa, M. 1973. Wpływ czynników pozaekonomicznych na sposób żywienia młodzieży szkół warszawskich (The impact of extra economic factors on youngsters' nutrition in Warsaw schools). *Roczniki PZH* (Annals of the State Institute for Hygiene), 4: 445, 451-453.

Narojek, L., Woroszylska, J. & Kirschner, H. 1993. Model żywienia prawidłowego w opinii młodzieży warszawskiej (A model of proper nutrition in opinions of Warsaw youth). *Roczniki PZH* (Annals of the State Institute for Hygiene), 5-6: 429.

Proust, J.C. 1971. Nutrition education in schools – teacher training and teaching methods. *FAO Nutrition Newsletter*, 9(4): 171.

Warchoł, E. 1995. *Opracowanie konspektów do nauczania prawidłowego żywienia w szkole podstawowej oraz zbadanie ich efektywności* (How to make conspectuses for proper nutrition education in primary schools and to check their effectiveness). Warsaw, Poland. (Master's thesis) ◆

Summary/Résumé/Resumen

Testing nutrition education materials in Polish schools

Nutrition education of children can have an important role in ensuring appropriate dietary patterns and good health. A nutrition education study to test the usefulness of educational materials was conducted in three randomly selected schools in Warsaw, Poland from February to April 1996. A total of 112 girls and 84 boys, aged 13 to 14 years, participated in four experimental lessons based on the FAO nutrition education package *Get the best from your food*. To improve the pupils' understanding, memory and practical use, a detailed conspectus and teaching aids were prepared at the Faculty of Human Nutrition, Warsaw Agricultural University.

The experimental lessons discussed nutrients and their main sources; nutritional requirements; maintaining proper body weight; and principles of hygiene. Pupils were asked eight questions before and after the lessons. The research showed a low level of knowledge about basic food and nutrition topics prior to the lessons. Students were aware of key topics such as energy, protein, fats, micronutrients and dietary fibre, but they were confused about food sources and their understanding was incomplete and inaccurate. For instance, the pupils did not understand the notion of energy value and they confused it with nutritional value. Many pupils had not heard about dietary fibre, its role and sources, and only one third could accurately name a source of dietary fibre.

The results were analysed to determine whether there were differences in pupils' knowledge based on gender, parents' education and participation in meal preparation. There was an association between accurate knowledge of nutrition and the gender of the pupils. Girls had higher scores on the final test than boys, perhaps because girls participated in food preparation more often than boys.

The students thought the most interesting lesson was that on nutrients and their main sources, although they thought this was the most difficult topic. The pupils said they obtained new information during the other three lessons. They found the *Get the best from your food* leaflet to be an interesting and useful set of information on food and nutrition in everyday life. Teachers thought there was a need for lessons on similar topics, especially for younger children (e.g. ten-year-olds). According to the teachers, recognition of the importance of nutrition has increased in recent years, as proved by the increased interest of young people in the subject.

Vérifier l'efficacité des matériels d'éducation nutritionnelle dans les écoles polonaises

L'éducation nutritionnelle des enfants a un rôle déterminant pour garantir des modèles alimentaires corrects et une bonne santé. Une enquête sur l'éducation nutritionnelle, visant à vérifier l'utilité des matériels d'enseignement, a été conduite dans trois écoles de Varsovie (Pologne) choisies au hasard, de février à avril 1996. Un total de 112 filles et de 84 garçons, âgés de 13 à 14 ans, ont participé à quatre leçons expérimentales fondées sur un ensemble d'éducation nutritionnelle mis au point par la FAO et intitulé *Profitons au mieux de notre nourriture*. Afin d'améliorer la compréhension, la mémoire et l'utilisation pratique par les élèves, des matériels didactiques ont été mis au point à la Faculté de nutrition humaine de l'Université d'agronomie de Varsovie.

Les leçons expérimentales ont traité des éléments nutritifs et de leurs principales sources, des besoins nutritionnels, du maintien d'un poids corporel adéquat, et des principes d'hygiène. On a posé aux élèves huit questions avant et après les leçons. L'étude a montré un faible niveau de connaissances sur les thèmes de l'alimentation et de la nutrition avant les leçons. Les étudiants connaissaient les thèmes principaux tels que l'énergie, les protéines, les matières grasses, les oligoéléments et les fibres alimentaires, mais avaient une idée confuse, incomplète et inexacte des sources d'aliments. Par exemple, les élèves ne comprenaient pas la notion de valeur énergétique et la confondaient avec la valeur nutritionnelle. Beaucoup d'entre eux n'avaient jamais entendu parler de fibres alimentaires, de leur rôle et de leurs sources, et seul un tiers pouvait citer avec précision une source de fibres alimentaires.

Les résultats ont été analysés afin d'établir s'il existait des différences de connaissances en fonction du sexe, du niveau d'instruction des parents et de la participation à la préparation des repas. On a constaté un lien entre les connaissances exactes de nutrition et le sexe des élèves. Les filles ont obtenu de meilleurs résultats au test final que les garçons, peut-être parce que les filles participaient davantage à la préparation des aliments que les garçons.

Les élèves ont estimé que la leçon la plus intéressante portait sur les nutriments et leurs principales sources, même s'ils ont trouvé que c'était aussi le sujet le plus difficile. Ils ont déclaré avoir appris quelque chose de nouveau durant les trois autres leçons. Ils ont estimé que la brochure *Profitons au mieux de notre nourriture* était un outil intéressant et un ensemble utile d'informations sur l'alimentation et la nutrition pour la vie de tous les jours. Les enseignants ont jugé qu'il fallait instituer des cours sur des sujets similaires, en particulier pour les plus jeunes élèves (par exemple de 10 ans). D'après les enseignants, la reconnaissance de l'importance de la nutrition a augmenté ces dernières années, comme le prouve l'intérêt accru des jeunes pour ces matières.

Experimentación de material de educación nutricional en escuelas polacas

La educación nutricional de los niños puede tener una importante función para establecer pautas dietéticas apropiadas y asegurar una buena salud. De febrero a abril de 1996 se realizó un estudio sobre educación nutricional para verificar la utilidad de los materiales didácticos en tres escuelas, seleccionadas al azar, de Varsovia, en Polonia. Unas 112 niñas y 84 niños de 13 a 14 años de edad participaron en cuatro lecciones prácticas basadas en un paquete de educación nutricional de la FAO titulado *Saque el máximo provecho de los alimentos que come*. Para mejorar la comprensión de los alumnos, su memoria y aprovechamiento práctico, se preparó un folleto detallado y ayudas didácticas en la Facultad de Nutrición Humana de la Universidad de Agronomía de Varsovia. En las lecciones se analizaban los nutrientes y sus fuentes principales, las necesidades nutricionales, el mantenimiento de un peso corpóreo adecuado, así como principios de higiene. Se hacían a los alumnos preguntas antes y después de las lecciones. La investigación preliminar arrojó un bajo nivel de conocimientos sobre temas básicos de alimentación y nutrición. Los alumnos estaban al tanto de temas fundamentales como energía, proteínas, grasas, micronutrientes y fibra dietética, pero no tenían ideas claras sobre las fuentes de alimentos, y sus conocimientos eran incompletos e inexactos. Por ejemplo, no entendían la noción de valor energético, que confundían con valor nutricional. Muchos no habían oído nunca hablar de fibra dietética, su importancia y sus fuentes, y sólo una tercera parte de los alumnos podía citar con exactitud una fuente de fibra dietética.

Se analizaron los resultados para determinar si había diferencias en los conocimientos de niños o niñas y en función de la educación de los padres y su participación en la preparación de las comidas. Se observó una correlación entre los conocimientos precisos en materia de nutrición y el género de los alumnos. Las niñas obtenían mejor puntuación en la prueba final que los niños, tal vez porque participaban más a menudo que los niños en la preparación de los alimentos.

Los alumnos consideraban que las enseñanzas más interesantes eran los nutrientes y sus fuentes principales, aunque estimaban que eran los temas más difíciles. Decían que en las lecciones adquirían nuevas informaciones y que consideraban que el folleto titulado *Saque el máximo provecho de los alimentos que come* era una serie interesante y útil de información sobre alimentación y nutrición en la vida diaria. Los maestros pensaban que era necesario impartir lecciones sobre temas análogos, especialmente para los niños de más tierna edad (por ejemplo, de 10 años). Según los maestros, en éstos últimos años ha aumentado el reconocimiento de la importancia de la nutrición, como lo demuestra el mayor interés de los jóvenes por estos temas. ♦