Creating health-promoting schools in China with a focus on nutrition

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SUMMARY

This pilot project in Zhejiang Province, China, aimed at improving the nutrition and health status of students, school personnel and parents, and developing a model project for nutrition interventions for the development of health-promoting schools (HPS) in China. Three primary and three secondary schools participated. Interventions included establishing school-based working groups, nutrition training for school staff, distribution of materials on nutrition, nutrition education for students, student competitions, school-wide health promotion efforts and outreach to families and communities. Results of a pre- and post-intervention survey one and a half years apart showed improvements in nutrition knowledge, attitudes and behavior among all target groups. Primary school students at the pilot schools made the greatest knowledge gains in the areas of Chinese dietary guidelines (increased from 49.2 to 78.0%, p < 0.01) and adequate dietary principles (increased from 42.9 to 68.0%, p < 0.01). Scores of secondary school students who reported liking school lunches rose at pilot schools from 17.9 to 45.2% (p < 0.01). School staff at control schools who reported taking breakfast declined from 81.4 to 66.6% (p < 0.01), while staff who reported taking lunch at school increased in pilot schools from 87.5% at baseline to 93.9% (p < 0.01). The largest increases in nutrition knowledge among all target groups occurred among parents and guardians. At the pilot schools parents increased their knowledge in the areas of nutritional deficiencies (from 35.0 to 66.2%, p < 0.01) and nutrient-rich foods (from 38.8 to 66.8%, p < 0.01). Talks with target groups confirmed changes in attitudes and behavior, and school visits revealed improvements to school facilities and school health services, establishing of school policies and a positive school climate. This study suggests that nutrition can effectively serve as an entry point to establish HPS in China and that the HPS concept is feasible to improve the dietary knowledge, attitudes and behavior of students, parents and school personnel.

Key words: China; nutrition; health-promoting schools

INTRODUCTION

Nutritional status is a powerful determinant of numerous health, developmental and educational outcomes among youth. In addition to affecting physical growth and maturation, it influences a young person’s attention span, learning capacity and ability to fully engage in educational experiences (Pollitt, 1990; Del Rosso and Marek, 1996; Levinger, 1996). Research from around the world has shown that undernourishment in early childhood has the potential to negatively influence school aptitudes, time of school enrollment, school
attendance and concentration [Pollitt, 1990; Levinger, 1996; World Health Organization (WHO), 1996]. Since poor nutrition interferes with the educational mission of schools, and since schools reach the vast majority of young people, they represent an ideal venue for nutrition programs and services. Furthermore, the dietary, hygienic and exercise habits that affect nutritional status are formed, and are thus susceptible to modification, during the school-age years (WHO, 1998a).

Since 1995, the Ministry of Health and the Ministry of Education in China have been collaborating with other domestic agencies and the WHO to establish health-promoting schools (HPS). The HPS calls for collaboration among health and education officials, teachers, students, parents and community leaders to foster health and learning through improvements in the school’s environment, policies and practices (WHO, 1998b). Chinese schools have achieved success with the HPS model in pilot tests using tobacco prevention and intestinal helminth reduction as entry points (Xu et al., 2000; Ma et al., 2002). Nutrition represents another viable point of entry for the creation of HPS in China.

Studies have shown that nutritional deficiencies and overnutrition are significant and growing problems in many parts of China (Fu et al., 2001; Ye, 2000). A national survey on diet and nutrition in 1992 revealed that the energy intake of young people ages 2–18 reached 97% of the recommended daily allowance (RDA), but nutrient intake was unbalanced (Chen, 1999). Another survey conducted in eight Chinese cities in 1996 revealed an increase in obesity from 3.4% in 1985 to 7.2% among 7–18-year-old students (Chen, 1999). Many researchers state that lack of knowledge regarding proper diet and healthy nutrition represents a major cause of both undernutrition and obesity among school-age children in China. They recommend high quality nutrition education for students, parents and teachers throughout the country (Lu et al., 2001; Sun et al., 2001; Zhang et al., 2002).

Studies have shown that good health and nutritional status enhance school enrollment, attendance, performance and retention among students (Vince-Whitman et al., 2001). School-based nutrition programs also have the potential to boost health, morale and quality of instruction among school staff (Jamison, 1993; Sandal, 1995; WHO, 1997; Vince-Whitman et al., 2001) and improve nutrition-related knowledge and practices among students’ families (Coates et al., 1981; Crockett et al., 1989; Hearn et al., 1992).

In 1998, the WHO and the Food and Agriculture Organization of the United Nations (FAO) co-published Healthy Nutrition: An Essential Element of a Health-Promoting School (WHO, 1998a). This report provides guidance for integrating nutrition interventions within the various components of a HPS.

To address the nutritional problems outlined above, the Chinese Ministries of Health and Education requested in 1999 WHO’s assistance with the development of HPS with a focus on nutrition in the Zhejiang Province. A Provincial Working Group, based at the Health Education Institute of Zhejiang Province Center for Disease Control and Prevention, selected six pilot schools, developed a work-plan using Healthy Nutrition as a guide, and drafted a baseline survey. See Table 1 for an overview of the project’s goals and objectives.

**METHODS**

**Setting**

Three primary and three secondary schools from Zhejiang Province, located in the south-eastern part of China, were selected for this project. Four of the schools were located in the Jianggan District of Hangzhou—one primary and one secondary school in the town and one of each in the rural part of the district. Hangzhou, the capital of Zhejiang Province, has a population of about 6 million. The remaining two schools (one primary and one secondary) were located in

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<th>Table 1: Goals and objectives of the China/WHO School Nutrition Project</th>
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<td><strong>Overall goals:</strong> To contribute to the improvement of the nutrition and health status of students in the project schools through health and nutrition interventions. To develop a model project for nutrition interventions as an entry point for the development of health-promoting schools, which can be replicated by other schools in China.</td>
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<td><strong>Project objectives:</strong> To improve the food intake and dietary behaviors of the target groups (students, school personnel and parents) through improved nutrition education, improved school meal services and other interventions as appropriate. To introduce changes in the project schools in order to meet the basic (bronze medal) standards of the WHO Health Promoting Schools.</td>
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urban Wenzhou, an industrial port with a population of approximately 7 million. Another set of six schools, three primary and three secondary, were also selected from Hangzhou and Wenzhou as a control group.

An investigation by the Medical School of Zhejiang University revealed that the rates of nutritional deficiencies and overweight/obesity were 22.5 and 24.6%, respectively, in 1230 primary and secondary school students in Hangzhou (Yang et al., 2000). The 1999 medical examinations of Wenzhou's students revealed that 17.1% of the primary school population and 32.6% of the middle school population are malnourished (Wenzhou City Centre for Disease Control and Prevention, unpublished data).

Participants

The participants of the six pilot schools included a target audience of approximately 7500 students and their families as well as 800 teachers and school staff.

The baseline survey included students in grades 3, 4 and 5 of the primary schools and grades 1 and 2 of the secondary schools. In May 2000, across the pilot and control schools, 2575 primary school students and 4277 secondary school students completed the baseline survey. The average ages of the primary students were 10.5 years in pilot schools and 10.4 years in control schools. The average ages of the secondary students were 13.7 years in pilot schools and 13.6 years in control schools.

Half of the school personnel at all participating schools were randomly sampled and the parents and guardians of students in two classes of one identified grade in each school were interviewed. This led to an adult sample of 661 school personnel and 998 parents/guardians for the baseline investigation.

In December 2001, the survey was administered a second time at the participating schools with a similar sample for the final evaluation. Surveys were completed by 2389 primary school students, 3346 secondary school students, 679 school personnel and 1158 parents/guardians. The two surveys covered the same group of students.

Training and mobilization

In order to prepare participating schools and communities to initiate the project, the Provincial Working Group arranged for the following activities.

HPS workshop with a focus on nutrition

In April 2000, a training workshop was conducted by experts from WHO, FAO, EDC and Chinese universities for school health officials from provincial and county Departments of Health and Education; headmasters, teachers, food and health service representatives from the pilot schools. The goals of this workshop were to: (a) introduce the WHO/FAO document Healthy Nutrition: An Essential Element of a Health-Promoting School and review its relevance to the development of the pilot project, (b) review the methodologies and findings of a national survey of the nutrition status of China's school-age population and (c) review and improve the one-year project work-plan developed by the Provincial Working Group. The workshop facilitators also conducted site visits to all four pilot schools in Hangzhou.

Site visits to HPS

In October 2000, working groups from each pilot school visited HPS in Jiaxing City. These schools described their experiences and lessons learned from using tobacco prevention as an entry point for creating a HPS. In early December 2001, members of the Provincial Working Group visited a high-performing HPS in Wuhan to obtain additional information.

Mobilization meetings

Each pilot school held a mobilization meeting after the baseline investigation. The objectives of these meetings were to inform the school community about the key findings from the baseline survey, discuss plans for the specific nutrition promotion activities to be conducted by the school, and encourage teachers, students, parents and community leaders to participate in the project.

Baseline data collection

In May 2000, the Provincial Working Group conducted a baseline investigation of participating students, school personnel and parents at both pilot and control schools.

Instrument

Scientists from the Provincial Working Group collaborated with researchers from Zhejiang
University’s Medical College to design a questionnaire, which was reviewed and revised by the international experts and school representatives at the training meeting. It was pre-tested on a small scale. The survey assessed participants’ knowledge of and attitudes toward nutrition and other health issues as well as their dietary and hygienic habits.

**Survey administration**

Health professionals at the health education Institutions and the provincial Centers for Disease Control and Prevention administered the surveys with unified methods. No consent was needed as the questionnaire was done anonymously.

**Intervention**

Pilot schools conducted numerous health promotion activities school-wide, including the following.

**School-based working groups**

Each school established a working group comprised of the headmaster, teachers, parents and community leaders. The groups planned, initiated and coordinated project activities at their particular schools and consulted with experts from the local health and education bureaus as needed.

**Nutrition training for school staff**

Experts from the Provincial Working Group and the Nutrition Department at Zhejiang University’s Medical College provided nutrition training to teachers, health care providers and cafeteria staff at the pilot schools. Topics included the importance of a balanced diet, nutritional deficiencies and their effects, and good hygienic practices.

**Distribution of materials on school nutrition**

FAO, EDC and the Provincial Working Group provided pilot schools with educational materials. Each pilot school also developed its own nutrition materials and resources for students, staff and parents.

**Nutrition education for students**

Pilot school students attended a health education class once every two weeks. Diverse instructional techniques were employed within these classes. If a health class was missing from a school’s curriculum, nutrition-focused morning or afternoon talks and/or other extracurricular activities were offered. Pilot schools often integrated instruction about nutrition-related topics into traditional academic subjects such as arts and language composition. Other creative instructional methods included training students to: prepare nutritious food, help plan the school lunch menu, organize a television team and conduct broadcasts on nutrition- and health-related topics and create websites on nutrition.

**Student competitions**

The Provincial Working Group organized composition and drawing competitions titled “Nutrition, Health, and Me”, as well as a nutrition and health knowledge contest for students in the pilot schools.

**School-wide health promotion efforts**

All of the pilot schools supplemented their nutrition education activities with improvements in health-related school policies and the school environment, including renovations to school facilities and grounds.

**Outreach to families and communities**

Students passed along information about good nutrition to their families and to the community. Parents received leaflets about healthy nutrition as well as school lunch menus with a variety of balanced meals that they could prepare at home. Parents and community members were invited to the schools for lectures and workshops, and students went on the streets to hand out or read health and nutrition information to passersby.

Routine health education activities continued in the control schools without additional interventions. These routines provide knowledge on hygiene, nutrition, physical development, etc.

**Evaluation**

**Mid-term/process evaluation**

The intervention activities were implemented in pilot schools from May 2000 through to March 2001, and then a mid-term evaluation meeting was held in Wenzhou in April 2001.

Although it was determined that the project was progressing well, the pilot schools were encouraged to increase and improve their efforts to: collect quality data on project activities, provide easy-to-understand nutrition information and education to parents, increase support from and provide more nutrition information to the broader community, and implement nutrition
activities for students, staff, families and community members during winter and summer holidays.

**Final evaluation**

The pilot schools continued to implement their nutrition and health promotion activities from May through to November 2001. In December 2001, the final survey was administered to students, school personnel and parents at pilot and control schools.

**RESULTS**

The findings from the survey data are presented in four sections by target group. See Tables 2–4 for data on changes in knowledge, attitudes and behavior from baseline to final survey.

**Primary school students**

*Nutrition knowledge*

Knowledge about diet and nutrition improved significantly from baseline to final survey among all participating primary school students (PSS). Although knowledge gains were evident among PSS at the control schools, pilot schools achieved more frequent increases of \( p < 0.01 \) than control schools. PSS at pilot schools reached on average 10 percentage point higher levels of knowledge about diet and nutrition than control schools. PSS at the pilot schools made the greatest knowledge gains in the areas of Chinese dietary guidelines (increased from 49.2 to 78.0\%, \( p < 0.01 \)) and adequate dietary principles (increased from 42.9 to 68.0\%, \( p < 0.01 \)).

*Nutrition attitudes*

Prior to the intervention, there was no significant difference in the number of PSS at pilot versus control schools who stated that having three adequate meals each day was important (80.7 and 79.9\%, respectively). Although the final survey revealed significant improvement on this item among PSS at all participating schools, greater improvement was demonstrated by those students at pilot schools (increase to 87.4\%, \( p < 0.01 \)) as compared with those at control school (increase to 83.3\%, \( p < 0.05 \)).

*Nutrition behaviors*

Students stating that they liked the lunch provided by the school increased from 44.3 to

| Table 2: Nutrition knowledge of all participants from baseline to final survey (%) |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                  | Nutrients-rich foods | Deficiency symptoms | Nutrients-n-rich foods | Chinese dietary guidelines |
|                                  | B     | F     | P     | B     | F     | P     | B     | F     | P     | B     | F     | P     | B     | F     | P     |
| Pilot schools                   | 60.4% | 78.8% | **b** | 35.5% | 72.9% | **b** | 47.3% | 50.0% | 56.7% | 77.5% | **b** | 35.5% | 44.5% | **b** | 40.2% | 45.2% | **b** |
| Control schools                 | 66.9% | 86.3% | **b** | 35.0% | 66.2% | **b** | 40.2% | 44.5% | 57.2% | 45.2% | **b** | 35.0% | 56.8% | **b** | 38.8% | 46.8% | **b** |
| SSS                             | 68.6% | 88.4% | **b** | 38.8% | 66.8% | **b** | 38.8% | 56.8% | 38.8% | 56.8% | **b** | 38.8% | 46.8% | **b** | 38.8% | 46.8% | **b** |
| SS                              | 71.1% | 86.9% | **b** | 38.8% | 66.8% | **b** | 38.8% | 56.8% | 38.8% | 56.8% | **b** | 38.8% | 46.8% | **b** | 38.8% | 46.8% | **b** |
| PG                              | 67.2% | 86.9% | **b** | 35.5% | 72.9% | **b** | 47.3% | 50.0% | 56.7% | 77.5% | **b** | 35.5% | 44.5% | **b** | 40.2% | 45.2% | **b** |
| B, baseline survey; F, final survey. | \( p < 0.01 \); \( p < 0.05 \); ns \( p > 0.05 \).
56.6 \((p < 0.01)\) at pilot schools and from 43.4 to 45.0 \((p < 0.05)\) at control schools. As part of the intervention, cooks had received training on how to make the lunches more nutritious and varied. Hygienic habits also improved. At pilot schools, the rate of students who reported avoiding expired and decayed food rose from 96.2 to 98.9\% \((p < 0.01)\) and the rate of students who reported washing their hands after using the toilet rose from 91.1 to 94.0\% \((p < 0.01)\). PSS at control schools also demonstrated improved hygienic habits from baseline to the final survey in the areas of hand-washing—both before meals (from 81.1 to 85.9\%, \(p < 0.01\)) and after using the toilet (from 88.4 to 91.9\%, \(p < 0.01\)).

**Secondary school students**

**Nutrition knowledge**

Secondary school students (SSS) at the pilot schools had significant knowledge gains for each item measured. The largest increases occurred in the areas of nutrient-rich foods (increased from 36.0 to 59.6\%) and adequate dietary principles (increased from 61.9 to 85.8\%). At control schools, the only significant post-intervention
change among SSS was a decrease from 57.2 to 45.2% \( (p < 0.01) \) in knowledge about nutritional deficiencies and their symptoms.

**Nutrition attitudes**

Pilot schools showed significant improvements for each attitude measured by the final survey. While two-thirds of the SSS at pilot schools stated that nutrition is important for overall health at baseline, by the final survey that number had increased to 85.4% \( (p < 0.01) \). An even greater change occurred in the attitude of SSS regarding the need to eat three adequate meals each day. While half believed that it was important at baseline, 86.6% believed that it was important after the intervention \( (p < 0.01) \).

**Nutrition behaviors**

The percentage of SSS who reported liking school lunches also rose significantly at pilot schools (from 17.9 to 45.2%, \( p < 0.01 \)). At control schools, significantly fewer SSS reported liking school lunches in the final survey (from 14.4 to 8.1%, \( p < 0.01 \)). Although there was no significant change in the percentage of SSS who reported avoiding expired and decayed food and unboiled water after the intervention, hand-washing habits did improve among pilot school students. At baseline, 66.4% of SSS at pilot schools reported washing their hands before eating and 87.5% reported washing their hands after using the toilet. These numbers rose to 89.8 and 93.6%, respectively \( (p < 0.01) \) after the intervention. Hygienic habits among the SSS at control schools either did not change significantly after the intervention or, in one case (not drinking unboiled water), worsened.

**School staff**

**Nutrition knowledge**

Although nutrition-related knowledge did not change significantly among school staff (SS) at control schools, it did improve in many areas among SS at pilot schools. The largest knowledge gain among SS at pilot schools, from 38.8% at baseline to 81.8% at final survey \( (p < 0.01) \), occurred in the area of adequate dietary principles. Significant post-intervention gains \( (p < 0.01) \) were also detected among SS at pilot schools in the areas of nutrients and their functions, nutritional deficiencies and their symptoms, and nutrient-rich foods.

**Nutrition behaviors**

While there was no significant change in the percentage of SS at pilot schools who reported eating breakfast from baseline to final survey, the percentage of SS at control schools who reported taking breakfast declined from 81.4 to 66.6% \( (p < 0.01) \). The percentage of SS at control schools who reported taking lunch at school also declined (from 95.9 to 93.1%, \( p < 0.05 \)). However, the percentage of SS at pilot schools who reported taking lunch at school increased from 87.5% at baseline to 93.9% \( (p < 0.01) \) after the intervention. When taking lunch at school, the percentage of SS who reported paying attention to nutrition increased from 24 to 38% \( (p < 0.01) \) at pilot schools while it decreased from 27 to 19% \( (p < 0.01) \) at control schools.

**Parents and guardians**

**Nutrition knowledge**

Parents and guardians (PG) at both pilot and control schools demonstrated significant knowledge gains in three areas: nutrients and their functions, Chinese dietary guidelines and adequate dietary principles. However, the gains demonstrated by PG at the pilot schools were approximately twice as great as those made by PG at control schools. PG at the pilot schools increased their knowledge in the areas of nutritional deficiencies and their symptoms (from 35.0 to 66.2%, \( p < 0.01 \)) and nutrient-rich foods (from 38.8 to 66.8%, \( p < 0.01 \)), while knowledge of these areas did not change significantly amongst PG at control schools.

**Nutrition behaviors**

The percentage of PG who reported eating breakfast did not change significantly from baseline to final survey at pilot or control schools. However, avoiding food that is expired or decaying and correctly storing food in the home improved amongst PG at pilot schools \( (p < 0.01) \).

In addition to the survey data, meetings with students and parents at the pilot schools revealed a few striking behavioral changes. At a meeting with parents in Hangzhou in May 2002, the mother of one pilot school student stated that the project helped her family in three ways: her husband quit smoking; her family started eating breakfast every day, including eggs and milk; and they began to eat a greater variety of foods throughout the day.

A meeting with a group of students at one of the pilot schools in Hangzhou in May 2002 revealed that their parents had made the
following changes: reduced the amount of fried and fatty foods eaten by their families, increased milk intake as well as overall breakfast consumption, refused to give the students money to purchase less nutritious food at street vendors, and realized the importance of preparing food for their children rather than having them prepare food for themselves.

**School visits**

Site visits to all six pilot schools revealed that the project also stimulated a variety of positive environmental changes in each pilot school.

**School facilities**

Physical and operational improvements were made to all of the schools’ kitchens and dining areas, and the quality of the lunches improved. Changes in cafeteria practices included increased use of uniforms such as hats and gloves, greater enforcement of hygienic practices, and regular medical exams for all cafeteria staff. Schools’ restrooms, gardens and sports fields were cleaned or renovated. Three schools upgraded their medical equipment. At least two schools made supplies with clean drinking water available, and the rest of the pilot schools provided boiled water for drinking.

**School health services**

All of the participating schools initiated regular health exams for students and teachers and began to keep files with students’ health records. When an exam revealed a problem or students became ill, school personnel communicated with parents; they also began to make more referrals to appropriate health care institutions in the community. Three schools also started to offer counseling sessions.

**School policies and climate**

The six schools established policies that place a high priority on health and nutrition promotion. For instance, they further developed policies against insults and physical punishments, posted “No Smoking” signs, and increased their emphasis on collaboration among students, teachers and other school staff. Two of the pilot schools even delayed the time at which students have to report to school from 07:30 to 08:00 in the morning in order to allow students sufficient time to rest and eat a healthy breakfast.

On the last day of the final evaluation, all six pilot schools were awarded the Bronze Medal from the National HPS Steering Committee, which granted them standing as official HPS.

**DISCUSSION**

The schools had implemented a wide range of nutrition education and other health promotion activities, and the final evaluation revealed significant improvements.

**Nutrition knowledge**

Increases in nutrition-related knowledge from the baseline investigation to the final evaluation were apparent among participants in all four target groups—PSS, SSS, SS and PG. The changes were most significant for PG, which indicates that parents benefited the most from this intervention. Significant knowledge gains among PSS and PG occurred at both pilot and control schools since control schools received health education according to the national teaching program; however, knowledge gains among SSS and SS occurred only at pilot schools.

**Nutrition attitudes**

Improvements in nutrition-related attitudes occurred among PSS at both pilot and control schools, but only among SSS at pilot schools though the improvements were greater among PSS at the pilot schools than at the control schools. Since the examination of attitudes in this investigation was limited to students, future research should study the nutrition-related attitudes of SS and PG.

**Nutrition behaviors**

The results on breakfast behavior are inconclusive. Future research needs to ensure that the survey questions define what “eating breakfast” means. Other nutrition-related behaviors did improve at pilot schools while they either did not significantly change or worsened at control schools. For example, SSS and PG at pilot schools reported an increase in food safety behaviors, such as proper food storage and avoidance of expired food. Discussions with parents and students at pilot schools also revealed improvements in eating habits, such as eating more varied diets.

Since PSS at both pilot and control schools demonstrated significant improvements in
nutrition-related knowledge, attitudes and behaviors, but SSS at pilot schools alone demonstrated such improvements, it seems that this intervention was particularly effective for the latter group.

These findings support the recommendations of Zhang (Zhang, 2002), Sun (Sun, 2001) and Lu (Lu, 2001) that improvements in nutrition knowledge are needed for students, parents and teachers in China. While the survey measured changes in nutrition-related knowledge and attitudes as well as food hygiene behavior, but did not clearly establish a link between knowledge gain and behavior changes, discussions with participants revealed repeatedly that increased knowledge about healthy nutrition led to behavior changes in food choices.

Environmental changes
This intervention stimulated the pilot schools to make significant improvements to their school settings. School facilities—including cafeterias, restrooms and grounds—were cleaned and renovated, health services for students and teachers were either initiated or enhanced, and a variety of policies were established to make the schools safer and healthier places to learn and work. This pilot project showed that well-resourced schools could have a significant impact by improving their facilities to foster health and nutrition. Future interventions will also include less-resourced schools.

School and community support
Another factor that contributed to the project’s success was the enthusiasm of the participants. Discussions with students, school staff and parents revealed that nutrition information and education was very much appreciated and needed, particularly as these societies experienced recent and rapid economic and social changes and improving the education and health of their residents became a high governmental and public priority, which the pilot schools were excited to address. This enthusiasm was maintained throughout the duration of the project, and, after the final evaluation, it was clear that the six pilot schools were committed to nutrition education and the overall HPS model.

Lessons learned
The experiences with this project confirmed the importance of a coordinated approach that includes the whole school as well as the parents and community. Interventions covered not only nutrition education in the classroom but also changes to the school policy and school environment, to school-based health and nutrition services, and active outreach to family and community members. More limited activities would probably not have yielded similar effects.

Yet schools alone could not meet this need for increased nutrition information and education. It became apparent that school projects should seek close collaboration with institutions from the health and other sectors from the very beginning. Also, complementary action targeted to the community is imperative.

It is necessary to ensure that the teachers involved are well prepared. This requires attention to both content and instructional methods. Quality teacher training to upgrade their nutrition knowledge and pedagogical approaches was mentioned by many of the project participants as a crucial pre-condition for effective nutrition education.

Nutrition training for both students and school staff has to compete for time with many other important academic and professional development topics. The vast majority of the activities undertaken by the pilot schools in this project were extracurricular. Although they were valuable and effective in promoting positive changes among the target groups, establishing nutrition and health education as a regular element of the school curriculum remains an important objective.

The observed changes are likely to last as the pilot schools have become mentors to new HPS in their surrounding areas, and the project team is in the process of implementing an expansion of HPS throughout the entire province.

Conclusion
This study suggests that nutrition can effectively serve as an entry point to establish HPS in China. Furthermore, the HPS concept is feasible to improve the dietary knowledge, attitudes and behaviors of students, parents and school personnel in Zhejiang Province, China.

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