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Assessment of Dietary Pattern and Nutritional Status in Macao School Children (Summary Report)

With full support from the Education and Youth Affairs Bureau of Macao, Centre for Health Education and Health Promotion of Faculty of Medicine, The Chinese University of Hong Kong had conducted a territory-wide study on the dietary pattern and nutritional status of school children in Macao in 2008. This is the first territory-wide study in Macao on the dietary pattern and nutritional status of school children, and this summary report summarizes the objectives, research methodology, main findings and follow-up recommendations of the study.

Objectives of the Study

To assess the knowledge, attitudes and practices of primary and secondary school students in healthy eating. To explore the knowledge and attitudes of primary school parents towards healthy eating, considerations and practices in choosing food for their children and parents' attitudes towards the promotion of healthy eating in school. To investigate the nutritional environments and policies in schools, including healthy eating policies, monitoring measures, and the provision of school lunch and snack in schools. To identify the possible factors that may affect students' dietary habits. To assess students' nutritional status and to identify the possible diet-related health risk factors among school-aged children. And to establish a local database concerning the dietary patterns and nutritional status of Macao students.

Research Methodology

The study composed of six components, including questionnaire survey of students, parents, and schools respectively, survey on school tuck shops and lunches, and physical and nutritional assessment of students. A stratified random sampling method was adopted in the study for the selection of participating schools. A total of 40 schools (accounting for a half of the total number of schools in Macao), randomly selected in proportion to the number and school types across the three education levels, were recruited to participate in the study. One class of students randomly selected from each grade was recruited from the study schools to participate in the questionnaire survey of student. For the physical and nutritional assessment, the sampling was based on the 2007/08 educational statistics provided by the Education and Youth Affairs Bureau. A total of 2000 subjects were randomly selected in proportion to the gender and age of the whole population.

Main Findings

1. Anthropometric and Nutritional Status of Students

Results of this study reflected that over-nutrition is common among students in Macao. It raised the alarm for all parties that overweight, central obesity, high cholesterol and high triglyceride occurred in primary school students. Among 1998 participating students (994 boys and 1004 girls) aged 5-22 years old, 17.2% of boys and 9.0% of girls were overweight, further 9.2% of boys and 4.9% of girls were obese. The prevalence of overweight and obesity is highest among boys in the 9-12 age group and girls aged between 10 and 11, in which the proportions of overweight or obese were around 40%. A significant gender differences was found in overweight and obesity. Across the age groups of 6 to 18, the prevalence of overweight and obesity among boys were always higher than that among the girls.

Regarding the body fat distribution, 15.6% of boy and 16.9% of girls were classified as having central obesity respectively. The prevalence of childhood obesity in Macao is not yet as high as that in the United States, Canada, the United Kingdom or Australia; it was higher than some of the major cities of Mainland China including Beijing, Shanghai, Guangzhou and other coastal cities. When comparing the data with a study conducted in Taiwan in 2001, the proportion of overweight students in Macao was slightly lower than that in Taiwan, but the proportion of obese students was higher than Taiwanese. The finding of the current study indicated that obesity among children and adolescents in Macao required urgent actions.

Among the 1963 subjects tested for total cholesterol, 28.0% of boys and 32.2% of girls had found to have borderline total cholesterol level, and a further 8.7% of boys and 12.9% of girls had their total cholesterol level regarded as high risk. Across the age groups of 6 to 18 years old, girls aged 6-8 and 11 and boys aged 8 and 10-11 had the highest prevalence of abnormal total blood cholesterol, in which, less than half of the subjects had a total cholesterol level within the normal range. For LDL, 18.1% of boys and 20.4% of girls were found to have a borderline LDL level; a further 9.3% of boys and 10.8% of girls were found to have a LDL level belonged to the high-risk category. In addition, 6.6% of boys and 4.0% of girls were found to have low HDL level according to the standards of HDL in children and adolescents established by Cook S. et al. Blood test results also indicated that one out of ten students had elevated blood triglyceride level. Girls in the 9-12 age groups were the most prevalent, in which, around one-fifth of the girls had an elevated blood triglyceride level. In other words, students in the 9-12 age groups not only had the highest rate of overweight, and also were the most prevalent for high blood cholesterol and high triglyceride levels.

For fasting blood glucose tests, among the 1983 valid samples, only 0.4% of girls and 1.7% of boys were found to have an impaired fasting glucose level according to the standards of American Diabetes Association.

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Among the 1970 subjects completed the blood pressure measurement, only 1.6% of boys and 0.5% of girls were found to have hypertension. The results of the current study showed that prevalence of hypertension increased with the age of students. In the 20-year-old age group, particularly, 11.1% of male and female subjects were detected to have pre-hypertension. Early preventive measures should therefore be taken against hypertension.

2. Knowledge and Attitude of Students

Only 30% to 40% of students could correctly identify the recommended servings of vegetables or fruits for their age and the appropriate proportions of cereals, vegetables and meat in a healthy lunch box. Overall, students were familiar with foods that are high in fat, sugar and salt, and secondary school students also showed basic understanding on the relationship between eating habits and health. However, only 43.1% of upper school students and around 30% of secondary school students indicated that they would consider whether the food was good for health when choosing food. When choosing food, primary school students considered cleanliness and hygiene, taste, price, and whether the food was good to health as the four most important factors for decision making, while for secondary school students, taste was considered to be the most important factor, followed by cleanliness and hygiene, price, and convenience. Majority of the students considered their eating habits as fair. Only 36%, 22.8% and 25.1% of primary, junior secondary and senior secondary school students respectively regarding their own eating habits as healthy or very healthy. More than half of the students indicated that healthy eating habits were not easy to sustain, mainly because they preferred to consume food that was tasty but not too nutritious. Other major reasons included "healthy food not tasting good", and "parents and family unable to tie in with them".

3. Dietary Habits of Students

According to the recommendation of healthy eating pyramid, children aged 6-12 should consume 2 servings of vegetables and 1-2 servings of fruits daily, while adolescents aged 12-18 require 2-3 servings of vegetables and 2 servings of fruits daily. The results of current study showed that the dietary habits of students need improvement. The dietary habits among the secondary school students were significantly worse than that of the primary school students. Overall, around 30% of students consumed more than 2 servings of vegetables daily (upper school students = 25.8%, junior secondary school students = 26.7%, senior secondary school students = 32.4%). And only 40% of primary school students and 15% of secondary school students were able to meet the recommendation of daily fruits intake. Less than 20% of students could follow the principles of a balanced diet and with cereals being consumed as the major portion, followed by vegetables and finally meats in the least amount. Nearly 10% of students reported that they were meat lovers and their main meals were mainly consisted of a large amount of meat, followed by cereals, with vegetables being the least. Moreover, only 70% of the primary school students and half of the secondary school students ate breakfast every day. 14.5% of primary school students and 24.3% of secondary school students reported that they skipped breakfast for more than three days in the week prior to the survey.

When asked about the consumption of food that were high in fat, sugar or salt contents, less than half of the students claimed that they did not consume any chips and crisps in the week prior to the survey. The results of subgroup analysis revealed that there were significantly more primary school students liked eating chips and crisps than secondary school students, while the frequency of consumption of soda drinks and packed beverages with added sugar was significantly higher among the secondary school students than among the primary school students. Overall, around 20% of

students reported they drank soda drinks more than three times per week. Around half of the secondary school students and more than one third of the primary school students consumed packed beverages with added sugar more than three times a week. On the other hand, the frequency of consumption of high fat food, including deep-fried food, fried rice, fried noodles, processed meat and fatty cuts of meat were significantly higher among the secondary school students than the primary school students. The possible reason could be that secondary school students dined out or had take-away food for lunch or dinner more often. About 30% of secondary school students reported that they usually dined out or had take-away food for lunch during normal school days. Besides, around 15% of secondary school students reported eating out or had take-away food as dinner more than three times in the week prior to the study.

4. Exercise Habits of Students and Time Spent on Sedentary Activities

Inactivity is one of the main causes of childhood obesity. However, the results of current study showed that most of the students in Macao could not meet the exercise and screen time recommendation. Only 5.7% of primary school students and around 4% of secondary school students reported that they had engaged in at least 60 minutes of moderate exercise every day in the week prior to the study. And, there were one-third of primary school students and one-fourth of secondary school students indicated that they had never accumulated 60 minutes of moderate exercise in any day during the week prior to the study. On the contrary, more than 60% of students watched television for more than two hours on every normal school days. Besides, more than half of the secondary school students spent over two hours on other sedentary activities, such as playing video or computer games or using computer for non-academic purpose every day.

5. Family Factors

Less than 40% of the parents could correctly indicate the recommended daily intake of vegetables or fruits for school children aged 6-12 or the appropriate proportions of cereals, vegetables and meat in a healthy lunch box. Among all the questions related to nutritional knowledge, the question on recommended

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daily fruits intake was best answered by parents, yet only 46.9% of respondents answered that correctly. Regarding the availability of snacks that were high in fat, sugar or calories at home, analysis results revealed that around 50% - 60% of parents reported that sometimes or often they would stock soda drinks or packed beverages with added sugar at home. In addition, around 40% of parents reported that candy and chocolate, and chips and crisps were sometimes or often available at home. And 10% families indicated that they often kept sweet biscuits or bread with stuffing or puff pastry that were high in fat and calories at home. Provision of unhealthy snack at home not only poses a threat to excessive intake of calories, sugar or fat among children and adolescents, but may also affect their appetite during main meals and resulted in the reduced consumption of vegetables and other nutritious food.

Most of the parents (77.0%) indicated that they would consider whether the food is good for health when choosing food for their children. However, there were half of the parents expressed the preference of their children was their main considerations in choosing food for them. The perception parents have on the eating habits of their children matched quite well with what children thought about their own eating habits. Only 38.9% of parents considered the eating habits of their children to be healthy or very healthy. Similar to that reported in students' survey, 60% of parents expressed it was not easy for their children to sustain healthy eating habits, mainly because their children liked food that was tasty but not too nutritious. The other major reasons reported by parents included healthy food not tasting good, lacking time for preparing healthy food and difficult to buy healthy food in the market. In addition, 12% of parents also indicated they did not understand what healthy eating habits should be.

Recommendations

Childhood obesity is one of the emerging global public health issues. Findings of this territory-wide nutrition survey revealed that the problem of over nutrition was common among students in Macao. One in four boys and one in seven girls was overweight, one in six children was a case of central obesity. Thirty percents of

students had abnormal LDL levels which is an important risk factor of cardiovascular diseases. In addition, results of sub-group analyses affirmed that body weight of children and adolescents is closely associated with the risk factors of cardiovascular diseases, including central obesity, high blood pressure, low HDL level, high LDL and triglyceride levels. Heart disease and stroke (cardiovascular diseases) are the second and third causes of death in Macao. It is therefore imperative to act now in addressing and combating the problems of childhood obesity and hyperlipidemia. All segments of the society should unite together to establish comprehensive, specific, effective and long-term strategies to halt and turn back the growing threat of obesity and its associated health risks and safeguard the health and well-beings of people in Macao.

Obesity, and its associated physical, mental and behavioural problems, is a complicated public health and social issue. There is no single solution or shortcuts available to resolve the problem. An integrated approach which involves inter-departmental and multidisciplinary collaboration and integration of the comprehensive strategies and actions advocated in the "Healthy Communities" and "Health Promoting Schools" campaign is recommended.

Parents play a significant role in sustaining a healthy eating habit in children and adolescents. Parents should act as a role model to foster a healthy eating and healthy lifestyle in the family. Foods and beverages that are high in fat, sugar or salt and of low nutritional value should be cut at home. Parents are encouraged to actively participate in health promotion activities organised by schools and in the community so as to equip themselves with health knowledge and skills and to enjoy healthy lifestyle with their children.

Organisation responsible for the study:

Centre for Health Education and Health Promotion, School of Public Health and Primary Care, Faculty of Medicine, the Chinese University of Hong Kong
Excerpted from: «Perfect Parents» the 27th issue, November 2009

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全心为市民——氹仔教育活动中心 为市民提供多元服务

随着澳门及离岛社区的发展，市民对教育及消闲等各类服务的需求日增。1999年，教青局在氹仔布拉干萨街濠景花园第24至26座之间设立氹仔教育活动中心，为教育、康乐和文化活动提供多用途的场地，作为市民在余暇中举行有利成长和修身活动的地方。中心总面积15,629平方呎，2006年根据服务需要而重新装修之后，中心的空间及设施得以重整，突显了亲子、成人及青少年教育及余暇活动的设计，环境及服务条件得以优化。

提供有利亲子活动的环境设施

教青局对家庭教育十分重视，除了透过报章、电视及出版《百分百家长》杂志等不同的方式和媒体加强亲子教育外，辖下的氹仔教育活动中心经常为家长举办各类亲子教育活动，中心同时亦设置各种亲子活动设施，让家长能够在良好的环境下促进与子女的沟通。

“万有引力挑战站”：位于中心亲子活动区内，它可以为儿童提供两种的不同玩法，有以一般波波池形式的传统玩法，亦有以风力推动令气球不断飘浮于空中的动感玩法，游戏每半年轮换一次。

“玩具俱乐部”：有大量的玩具，不少更适合亲子共同玩耍的，父母可以在陪伴游戏的过程中，教导子女学习与人分享，以及培养收拾玩具的美德。

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