Preschoolers' Socioeconomic Status (SES), Eating Environment and Growth in Hong Kong

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Abstract

Preschool childhood obesity is increasing globally and also in Hong Kong. Family food environments can foster overweight through influencing the eating and activity patterns of preschoolers, and may be associated with the socioeconomic status of the family, but this has not been examined locally, which was the aim of this study.

Interviews with caregivers, child's anthropometric measurements and three days of 24-hour dietary recalls were used to understand the family food environments, diets and growth of HK children aged three and four years by SES group by cross sectionally surveying 277 preschoolers from eight kindergartens.

Totally 12.5% (N=36) of the surveyed preschoolers were overweight/obese, but no differences in this overweight/obesity rate by SES group were found. A trend was seen in preschoolers from low SES families to have a significantly longer active playing duration (84±62 *vs* 71±64 mins; p =0.092) than their high SES counterparts. Only some of the family food environmental characteristics and feeding practices were associated with SES group, but the relationships found were in inconsistent directions. Dietary data showed that the number of servings of grains, vegetables and milks of most preschoolers was inadequate, although the high SES children consumed significantly more milk than their low SES counterparts (435±209 vs 327±229 ml; p<0.001). They also consumed more energy (1350±281 *vs* 1277±287kcal; p=0.033), calcium (516±193 *vs* 429±191 mg; p<0.001), vitamin C (99±80 *vs* 64±32 mg; p<0.001) and more energy intake from outside home (329±197 *vs* 265±211 kcal; p=0.011) than those from low SES families. Many interviewees failed to recognize the correct weight status of their preschooler. Most caregivers'

daily intakes of vegetable and fruit also failed to meet adequate levels and were associated with their children's consumption adequacy as well. Overweight/obesity were inversely associated with daily eating time (93±41 mins *vs* 114±53 mins; p=0.025) but positively associated with daily total screen time (107±73 mins *vs* 82±63 mins; p=0.036).

In conclusion, interventions and nutrition education in Hong Kong should target the feeding practices of parents/caregivers in order to improve family food environments for preschoolers.

Keywords: childhood obesity, diet, family food environments, feeding practices, physical activity patterns, eating pattern, SES, preschooler

論文摘要

香港跟世界的許多城市一樣，學前兒童的肥胖問題日益嚴重。家庭飲食環境對學前兒童的生活和飲食環境的影響甚大，也與社會經濟水平息息相關，可惜有關研究在本港非常缺乏。有見及此，本研究旨在調查上述幾項因素對學前兒童健康的關係。

本調查透過現況研究（橫切面調查），從八間幼稚園內的 277 名三及四歲學前兒童取得數據，包括測量學前兒童的體重、身高、與照顧者進行問卷訪問及取學童三天的飲食紀錄，以能了解不同社會經濟水平家庭的飲食環境，學童本身的飲食習慣及生長發育的情況。

研究結果發現，學童的整體肥胖率爲 12.5%（36 人），但不同社會經濟水平的學童肥胖率並無分別。生長於較低社會經濟水平的學前兒童，其每日活躍地玩耍的時間較生長於較高社會經濟水平的學前兒童稍長（84±62 比 71±64 分鐘; p=0.092）。另結果顯示，只有少數的家庭飲食環境特徵及餵食習慣與社會經濟水平有所關連，但方向並不一致。飲食數據指出，大部份學前兒童的五穀類、蔬菜及奶類食品的攝入量明顯不足，但生長於較高社會經濟水平的學前兒童相比生長於較低社會經濟水平的學童飲用較多的奶（435±209 比 327±229 毫升; p<0.001），而且他們每天攝取的熱量（1350±281 比 1277±287 卡路里; p=0.033）、鈣（516 ±193 比 429±191 毫克; p<0.001）、維他命 C（99±80 比 64±32 毫克; p<0.001）及在家外所攝取的熱量（329±197 比 265±211 卡路里; p=0.011）都比生長於較低社會經濟水平的學前兒童爲多。此外，有不少的受訪者並未能正確辨認學前兒童的體重狀況。很多照顧者每日的蔬菜和水果的攝取量並不足夠，而調查顯示這與學童的每日的蔬菜和水果的攝取量有密切關係。肥胖兒童的進食時間明顯

較短（93±41 比 114±53 分鐘; p=0.025）而看電視及使用電腦的時間則較長（107±73 比 82±63 分鐘; p=0.036）。

總括而言，營養教育的推廣應著重於家長或照顧者的餵食習慣上，從而改善學前兒童的家庭飲食環境。

要詞：兒童肥胖、膳食、家庭飲食環境、餵食習慣、運動模式、飲食模式、社會經濟水平、學前兒童

Publications

Some of the data in this thesis were presented by Ms. Lo as a poster entitled "Kindergarteners' obesity associated with low fiber and high meat intakes in Hong Kong" at the "4th Annual Meeting of the International Society of Behavioral Nutrition and Physical Activity" on 18th June, 2005 in Amsterdam, the Netherlands.

Some selected pieces of data will also be presented orally by Ms. Lo in the "2nd Asia-Pacific Conference on Health Promotion" on 5th November, 2005 in Hong Kong.

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List of Abbreviations

ADA	American Dietetic Association
AR	adiposity rebound
BMI	body mass index; calculated as weight in kilograms divided by the square of height in meters
Cal	kilocalorie
CDC	Centers for Disease Control and Prevention
CHO	carbohydrate
CSSA	Comprehensive Social Security Assistance
GH	growth hormone
HK	Hong Kong
HKSAR	The Government of the Hong Kong Special Administrative Region of the People's Republic of China
IOTF	International Obesity Task Force
KFRS	Kindergarten Fee Remission Scheme
KSS	Kindergarten Subsidy Scheme
NHANES	National Health and Nutrition Examination Survey
NPM	non-profit-making kindergartens
NS	not significant
PRC	People's Republic of China
SD	standard deviation
SES	socioeconomic status
SFA	Saturated fatty acids
WHO	World Health Organization

Chapter One: Introduction

1.1 Childhood obesity trends and measurement in Hong Kong and elsewhere in the recent decade

The prevalence of overweight among preschool children appears to be increasing in Hong Kong (HK). A survey conducted in 1993 (Leung *et al.*, 1996) of 25 000 Chinese children from birth to 18 years showed that the prevalence of childhood obesity in HK (defined by ≥120% median weight-for-height) among children aged three and four years was 3.4% (3.5% for boys and 3.3% for girls). However, the most recent estimate from a smaller study showed steep increases for girls and boys, respectively (Table 1.1). These estimates were generated using the weight and height measurements of 166 HK children aged three and four years collected from late July through September, 2003 (unpublished data, Food and Nutritional Sciences Programme, CUHK) and using the International Obesity Task Force (IOTF) references, which will be discussed in the following paragraphs. The prevalences for the 2003 data refer to overweight and obesity combined, whereas the 1993 rates refer to obesity only, as no definition of overweight exist in HK in 1993 or 1996.

Table 1.1 Comparison of the prevalence of obesity at ages 3 and 4 in 1993 (Leung *et al.*, 1996 HK references) and overweight and obesity in 2003 (Cole, 2000 references) by gender

Age (y)	1993		2003	
	Girls (N=1344) N (%)	Boys (N=1280) N (%)	Girls (N=81) N (%)	Boys (N=81) N (%)
3	9 (2.1)	12 (2.7)	5 (11.9)	7 (17.1)
4	35 (3.8)	33 (4.0)	6 (15.4)	6 (15.0)
All	89 (3.39)		24 (14.8)	

Both developing countries and developed countries share a similar rising trend of

childhood obesity as in HK (Bundred *et al.*, 2001; Chinn et al., 2001; de Onis and Blossner, 2000; Luo *et al.*, 2002; Ogden et al., 1997; Ogden *et al.*, 2002). In China, the prevalence of obesity increased from 4.2% in 1989 to 6.4% in 1997 among children aged two to six years (Luo *et al.*, 2002). In the United States, overweight has increased about 3% in children aged two to five years, from 7.2% to 10.4% between the National Health and Nutrition Examination Survey (NHANES) III, 1988-1994 and NHANES 1999-2000 (Ogden *et al.*, 2002).

However, it should be noted that the definitions of overweight/obesity used in the above studies were different. In the Chinese study, age- and sex-specific body mass index (BMI) cut-off points of overweight and obesity proposed by the International Obesity Task Force (IOTF) were used (Luo *et al.*, 2002), whereas in the US study, overweight was defined as at or above the 95th percentile of BMI for age, and at risk for overweight was defined as at the 85th percentile or higher of BMI for age, based on the 2000 Centers for Disease Control and Prevalence (CDC) growth charts for the United States (Ogden *et al.*, 2002).

The 95th percentile BMI cut-off values, which are often used to describe obesity in adults, are used to define children under six as overweight in the United States. This practice prevents the misclassification of the continually growing youths as overweight. The 85th percentile BMI cut-off values are used to classify the "overweight or at risk" group (Ogden *et al.*, 1997).

The IOTF-BMI cutoff values for children aged 2-18 years were first introduced in 2000 (Cole *et al.*, 2000). Although they are recommended to be used in international comparisons of obesity prevalence, reactions from the local authorities are mixed,

however. Fu *et al.* (2003) and Reilly *et al.* (2000) suggest that these might have a relatively low sensitivity, especially to the Asian populations. Therefore, further studies may be needed to confirm their applicability in Asian populations.

1.2 Health consequences of childhood obesity

Complications were that previously thought to be present in obese adults are now manifest in obese children as well, for example, hypertension (Sorof *et al.*, 2002), type 2 diabetes mellitus (with a ten-fold increase between 1982 and 1994 in the Cincinnati area) (Pinhas-Hamiel *et al.*, 1996), sleep apnea (Wing *et al.*, 2003; Mallory *et al.*, 1989) and hyperlipidemia (Freedman *et al.*, 1999). These complications, in turn, are adverse risk factors for atherosclerosis and cardiovascular diseases (Berenson *et al.*, 1998). An association between having type 2 diabetes mellitus in adulthood with the duration of obesity has also been observed in Japan (Sakurai *et al.*, 1999), in which a dose-response relationship was shown. The risk of diabetes mellitus among Japanese subjects who were obese for 0.1 to 9.9 years was about three-fold higher than that for non-obese subjects, while the risk in subjects with obesity for more than 20 years was nine-fold higher, after adjusting for age, recent obesity, smoking status, alcohol use and family history.

Several studies have also provided strong evidence that childhood obesity is a strong risk factor for adult obesity (Eriksson *et al.*, 2001; Guo *et al.*, 1999; Whitaker *et al.*, 1997). Data from a longitudinal study of 854 US subjects showed that the probability of obesity in adulthood increased with the age of obesity children from age three and the chance even exceeded 50% for obese children, when compared with about 10% for non-obese children, after six years of age (Whitaker *et al.*, 1997).

Childhood obesity is now a global epidemic. Due to the obesity-associated complications, and the persistence of childhood obesity in adulthood, we can no longer ignore the unfolding tragedy.

1.3 Determinants of childhood obesity

It is believed that the development of obesity is due to both genetics and environmental factors and their interactions. Children who have overweight parents are recognized to be at greater risk of overweight (Whitaker *et al.*, 1997). However, the dramatic increase in the prevalence of obesity may not be explained solely by genetic factors, as our genes have not changed substantially during these one or two decades (Hill and Peters, 1998). Environmental factors, such as the family food environments, media exposure, school environment and peer pressure, on the other hand, may provide a favorable condition for the development of childhood obesity by promoting excessive food intake and discouraging physical activity. When energy intake is larger than energy expenditure, obesity develops. The factors that favor obesity are called "obesogens" and the environments that promote obesity are known as "obesogenic environments" (Swinburn *et al.*, 1999).

Physical inactivity

The availability of recreation areas has been shown to be related to participation in physical activity in children (Garcia *et al.*, 1995; Sallis *et al.*, 1993). However, urbanization limits both the outdoor and indoor play areas for children in HK and other places like Japan (Kagamimori *et al.*, 1999). Advances in technology and transportation have also reduced the need for physical activity in our daily life (Hill and Peters, 1998), which has contributed to low physical activity levels and sedentary lifestyles. A recent survey showed that children aged six to seven in HK spent only 0.4

hour per day on average in doing exercise (Hui *et al.*, 2003). Three-quarters of 343 aged 6 to 7 years old subjects did not do any exercise during schooldays and 24% of them did no exercise on either schooldays or holidays, except for that done in physical education classes in schools (Hui *et al.*, 2003).

Children instead spend a lot of time in watching television and videos, or playing computer games, which require only minimal energy expenditure. By using the data from NHANES III, Storey *et al.* (2003) showed that the predicted BMI of the NHANES children increased by 0.25 ($p<0.001$) for each additional hour of television viewing. Also, a Canadian study showed that children and adolescents who usually watched more than five hours of television per day had 2.5 times the risk of overweight as those who watched television less than two hours (Hanley *et al.*, 2000). Scientists also suspect that the tendency to consume snack foods while watching television and the effects on consuming more advertised energy-dense foods (through the food purchase of parents) may pose indirect effects on childhood obesity (Lobstein *et al.*, 2004), as children under eight years old are often unable to distinguish between information and the persuasive intent of advertising (IOM, 2005).

High-fat diet

The young generation in urban areas in China and HK now tend to consume more high-fat food, processed sugar-based food, microwave food, soft drinks and fast foods due to the introduction of westernized diets (Leung *et al.*, 2000a). Although the dietary fat intake in a traditional Chinese diet was low at 14% in 1978 (Chen, 1995), the average fat intake of children aged 2 to 15 years in China rose to about 26% of total energy intake in the urban areas, based on a national survey conducted in 1992 (Ge *et al.*, 1999). In HK, the fat intake in children aged 1 to 7 years had risen to 30% of total

energy intake (Leung *et al.*, 2000). Based on the US dietary recommendation for total energy from fat, people who are over the age of 2 should eat no more than 30% of energy from fat (Lichtenstein *et al.*, 1998). Hence, the level of fat intake in HK children is already alarming.

1.4 Parental eating attitudes on family food environments

As a result of the above changes in diets and physical activity, relevant environmental factors that influence the establishment of children's dietary and physical activity patterns may also be promoting the development of childhood obesity. Especially during early childhood, children's eating habits are profoundly influenced by family food environments. These may differ across socioeconomic status (SES) and be swayed both by the attitudes of parents and caregivers toward their own dietary intake as well as by their perceptions of their child's feeding practices.

Home food purchasing and availability

Studies in Australia and Europe that focused on the socioeconomic patterning of food consumption have showed that people of comparatively low occupational status and educational level and with low income bought fewer types of fruits and vegetables, and less regularly, than those in higher SES groups (De Irala-Estevez *et al.*, 2000; Turrell *et al.*, 2002). Another study in Australia showed that less educated mothers were more likely to report that the quality of fresh fruits and vegetables in their area was poor (Campbell *et al.*, 2002). These studies showed that these low SES groups lived in areas with fewer large supermarkets, and hence the availability of healthy foods was limited and they were relatively expensive. The accessibility of large shopping facilities in these living areas was also low due to inadequate public transportation.

Parental food preferences may also influence the food availability in a household. One longitudinal study showed that many foods that were never tasted by children at age 8 years were actually disliked by their mothers (Skinner *et al.*, 2002a) and another study showed that vegetable variety of children aged 6 to 8 years was driven by mothers' vegetable preferences (Skinner *et al.*, 2002b). Therefore, the power of parental attitudes on children's food experiences in early childhood has been demonstrated.

Family meal frequency and location

Previous research has suggested that the frequency of families eating dinner together was associated with healthy dietary intake patterns (Campbell *et al.*, 2002; Gillman *et al.*, 2000; Haapalahti *et al.*, 2003), because children may learn and adapt eating behaviors by parental modeling, provided that parents have positive attitudes about eating. However, the results from the Campbell *et al.* (2002) study in Australia indicated that mothers with higher educational level found it more difficult to have dinner with their families together, probably due to their job nature.

The consumption of fast foods has long been associated with the childhood obesity epidemic (French *et al.*, 2000; McCrory *et al.*, 1999; Nielsen *et al.*, 2002). Burdette and Whitaker (2003) stated that children from low income families lived close to fast food shops in US. Although no related research has been found in HK, according to the Census and Statistics Department of the HKSAR, fast food shops account for nearly 20% of HK's total dining out market (Hong Kong, Census and Statistic Department, 2002) and in 2003, the total number of fast food shops increased from 520 to 593 since 2001. The popularity of fast food shops in HK is probably due to the

constant introduction of new menus and advertising campaigns. Other caterers such as food stalls may also provide high-fat but low-nutrient density pre-prepared foods. For example, chicken sausages and fish balls, for sale in addition to foods in fast food shops, may also be contributing to the childhood obesity in HK.

Child feeding practices – the food and eating rules

An experimental study has found that mother's restriction of children's access to snacks increased their children's preferences for those snacks (Fisher and Birch, 1999), indicating that children may lose their natural ability to self-regulate their energy intake upon great maternal restriction (Birch and Fisher, 2000). Moreover, it has also been found that the higher SES parents employed more food rules than their lower SES counterparts, especially for the unhealthy foods, such as carbonated drinks and chips (Hart *et al.*, 2003). In contrast, low SES parents were more likely to be flexible about children's food choices, such as by offering them alternatives for disliked foods or even stopping buying the disliked items, which avoids the need for food rules (Hart *et al.*, 2003).

1.5 The relationship of socioeconomic status and obesity

Although previously very little research targeted the relationship between obesity and SES in children (Wang *et al.*, 2001; Sobal and Stunkard, 1989), it is now generally accepted that such relationships exist, but vary across countries. SES of children is mainly characterized by their parents' characteristics (Wang, 2001), such as household income, parental education, parental occupation, type of housing and other aspects of family background (Ball *et al.*, 2002). Most of the studies involving SES used only one measurement (Gortmaker *et al.*, 1993; Turrell *et al.*, 1994; Wang *et al.*, 2001), although some used several indicators or composite scales in order to show the SES of

children (Sobal and Stunkard, 1989).

At the individual level, SES influences the risk of obesity in several ways. Household income may affect the resources available to buy food (Wardle *et al.*, 2002), especially nutritious healthy food for children, because healthier diets cost more than less healthy ones (Drewnowski and Specter, 2004). Fathers of a lower occupational status may have less spare time to participate in physical activities with their children. Low-status jobs also make it more difficult for parents to manage time effectively and adapt a healthy lifestyle (Wardle *et al.*, 2002). Gyillaume *et al.* (1997) working in Belgium observed that the mother being a housewife showed a negative relationship to children's physical activity but positive to her child's TV watching. Living amidst poorer household conditions may hinder the child's physical activity level due to safety concerns and limited community recreational resources (Fitzgibbon and Stolley, 2004).

Education level is a very important indicator associated with the attitudes and beliefs of parents, both in lifestyles and dietary patterns. A recent study in Sweden found that less educated men and women were more often physically inactive, smokers, used more often alcohol and had less healthy dietary attitudes than those with more education (Molarius, 2003). As we have seen, parents' own eating attitudes and behaviors (or those of the main caregiver), as well as their child-feeding practices can directly influence children's early experiences with food and their eating behaviors, for example, snacking habits, especially during early childhood (Birch and Davison, 2001). This impact on appetite regulation and fatness may last for the child's entire life (Baughcum *et al.*, 2001).

A cross-national comparison study based on 3 countries' national survey data showed that in developed countries such as the United States, the prevalence of obesity in children and adolescents was lower in the high-income group. By contrast, in developing countries such as China, the high income group was at a higher risk of obesity (Wang, 2001). It is quite easy to hypothesize that these variations are mainly due to the differences in food consumption patterns. In the United States, the higher SES groups usually consumed less percentage of kilocalories from fat (Crawford *et al.*, 1995) but preferred to eat more vegetables and fruits than low SES groups (Neumark-Sztainer *et al.*, 1996). In China, however, meat, processed and other energy-dense foods are more expensive than vegetables and fruits, and therefore, the high SES group in China ate more energy-dense food than the low SES group (Ge *et al.*, 1999; Kim S *et al.*, 2003), where obesity and meat eating appear to be culturally desirable as they are signs of status and affluence (Hindustantimes.com, 2005).

The economic status of households in Hong Kong

In HK, the income gap between the poorest and the richest families is widening. In 1997, the average income of the lowest 20% of earners was HK$44,016 a year but it dropped to only HK$25,600 a year in 1999. However, the Asian Crisis and the crash in the housing market of late 1997 seemed to have a relatively small influence on the elite group, whose average income increased from HK$436,764 in 1997 to HK$445,380 in 1999 (Berthier, 2003). Although there is no detailed report showing the latest data, as deflation has just begun to turn a corner, we can estimate that the average income of the poorest families is still low.

The Gini Coefficient is an economic indicator of the income distribution of a society, with zero representing absolute equality and one representing absolute inequality in

wealth. Developed countries such as the United States and Canada, have Gini Coefficients around 0.4. In China, the Gini Coefficient is 0.36. Indonesia, a place well known for having a very skewed wealth distribution, has a Gini Coefficient of 0.48. Hong Kong, however, has an even higher Gini value of 0.525 (Law, 1997), and is similar to that of developing countries such as Mexico.

Although there is no official poverty line established in HK, academics in HK (Lui, 1997; Nelson, 1982) have suggested the extent of poverty can be reflected by the number of recipients of the Comprehensive Social Security Assistance (CSSA) Scheme. Only the disabled and those in old age or having low income are qualified to receive CSSA. The free/subsidized education services for those eligible may also act as an indicator of the poor population. The total number of CSSA cases in 2002/03 was 271,893, whereas in 2003/04 it had climbed to 290,705 (Data provided by the Social Welfare Department). The total number of preschool children in the Kindergarten Fee Remission Scheme of 2002/03 was 55,782, with 25,627 students enjoying 1/2 fee remission, 19,858 students having 1/3 fee remission and 10,297 students having full remission (Data provided by Student Financial Assistance Agency SFAA). Overall, it was estimated that about 25% of children from birth up to age five were living in poor (Chow *et al.*, 2002).

To our knowledge, there is currently little information that allows us to characterize the relationships between childhood obesity and SES in HK. Are there any differences between the family food environments in high and low SES groups in HK? If there is a difference, will the relationships be more similar to those of developed countries like the United States, or to those of China? Also, are certain factors associated more strongly with childhood obesity than others? Although Hui *et al.* (2003) showed that

obesity in primary school children aged 6 to 7 in HK had no significant relationship with the parental education level and household income, do the same relationships exist among preschoolers aged three and four years?

1.6 Targeting children aged three and four years

Family food environments, greatly controlled by parental perceptions and SES of the family, play a very important role in the establishment of children's food preferences and dietary intake, especially during the first few years of a child's life. Several studies concluded that parents of three- to five-year-olds children had more control over their children's eating behaviors than parents of eight- to nine-year-olds (Birch and Fisher, 2000; Johnson and Birch, 1994; Robinson *et al.*, 2001), because the impact of the family food environment may be later diluted by other influences such as peers, media exposure and school environment when the child start studying in school.

Moreover, it has been observed that children's early food preferences persist into adulthood. A longitudinal study reported that children's food preferences at age 8 years were formed at ages two to three years (Skinner *et al.*, 2002a). The foods that they liked or disliked were the same over a six-year period. Another study in China found that the dietary intake patterns of nearly 50% of children tracked from childhood into adolescence, especially those who initially consumed a high fat, high carbohydrate, high vegetable and fruit, as well as a high meat diet (Wang *et al.*, 2002). Nutrient intakes have also been found to track from preschool to the early school years. Singer *et al.* (1995) in Framingham reported that carbohydrate and fat had very strong correlations in intake over time among children over a six-year period. From the above findings, we can see that children's diet patterns and food preferences formed in preschool years continue to have a strong influence on food choices throughout life.

Several studies have suggested that the three periods of adiposity rebound (AR) are critical periods for the development of obesity in later life (Dorosty *et al.*, 2000; Robertson *et al.*, 1999; Rolland-Cachera *et al.*, 2002). The second AR period of the onset of rapid body fat growth (the first period of rapid growth occuring during the first year of life) usually occurs between age five to seven. However, data from 0 to 6.9-year-olds who were examined in a nationwide epidemiological obesity case-control study in China (He *et al.*, 2000) indicated that the age of AR was about 4 years old for the obese boys and 3 years old for the obese girls. In the same study, more risk factors for childhood obesity were found after 3 year of age. This is another reason of choosing preschoolers aged 3 and 4 years as the focus of this study.

1.7 Conceptual framework and study objectives

The objectives of this study were to investigate the key relationships of how the family food environments and the eating habits of HK children aged 3 and 4 years vary by SES and with respect to the risk of obesity. Monthly household income level was used as the main indicator of SES in our study. We hypothesized that low SES families will be less likely to be aware of the importance of healthy lifestyle, hence the family food environments created will be more obesogenic and less favorable for their children, and the risk of childhood overweight will be greater in these families than in high SES families. The conceptual framework for the study is shown in Figure 1.1, in which the family food environments are associated with the household characteristics, as well as the socioeconomic status:

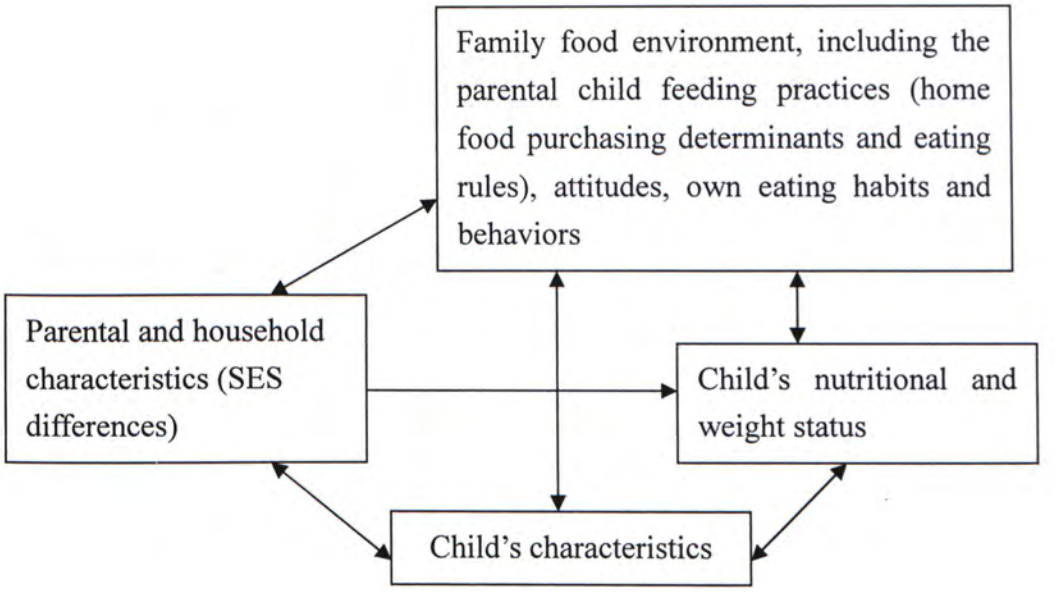


Figure 1.1 Conceptual framework of this study

Chapter Two: Survey Design

2.1 Sample design and subject recruitment

In order to recruit a suitable number of subjects to investigate the effect of socioeconomic status differences in nutrient and food intakes in preschoolers aged three and four years, the sample size was computed based on the study assumptions. After setting the number of variables of interest, as well as the level of confidence (95%) and level of precision (+/-5%), it was estimated that a sample of about 300 three- and four-year old children was needed for analysis, evenly distributed across the low and high socioeconomic (SES) groups. The formula is shown as follows:

$$n = [(z_\alpha + z_\beta)^2 * 2]/f^2 = 150 \text{ (for each SES group)}$$

where,

α: level of precision = $0.05/k$

β: 1-Power = 0.8

$f = d/\delta$, set as 1.5 in this study

δ: the standard deviation

d: the difference between the group means to be detected

k: number of variables in the questionnaire $\approx$ 80

Taipo and Shatin districts were selected as first stage units. Since the criteria required a sample from only local kindergartens, international kindergartens or kindergartens serving certain other non-Chinese ethnic groups were excluded at the sample selection stage. Moreover, only the non-profiting-making kindergartens that joined the Kindergarten Subsidy Scheme (NPM KSS) and private independent kindergartens were eligible to join the program because of their approximately

two-fold differences in tuition fees, as shown in Table 2.1. Invitation letters, subsequently followed up by telephone, which described the rationale and the tentative plan of the survey were sent to principals of 38 eligible local kindergartens. A copy of the invitation letter is enclosed in Appendix A.

Table 2.1 Differences between the tuition fees of different kindergartens

Kindergarten	Non-profit making (n=505)		Private-independent
	Joined KSS	Not joined	
No. of schools	389	116	272
Average annual fee ($)	11,924	17,685	23,013

Informal, verbal agreements were obtained between the principals of eight kindergartens and the investigator. A kindergarten with twenty preschoolers in total agreed to be our pre-test school, in which our drafted lifestyle questionnaire was pre-tested and revised with the parents of the preschoolers prior to administering them among parents of children in participating kindergartens. The anthropometric measurement procedures were also practiced in the pre-test in order to estimate the time required for measuring the height and weight. A list of children aged three and four years who were in their nursery and lower kindergarten grades was then obtained from each participating kindergarten. Child eligibility was determined by taking the measurement date for anthropometric data of each kindergarten as the reference date for defining eligible dates of birth. There were two fieldwork waves: (1) April to July 2004 and (2) Nov 2004 to April 2005. A second fieldwork wave was needed to obtain enough subjects. Eventually those eight kindergartens joined our survey; a summary of the background information of these schools is shown in Appendix B.

A consent form and letter introducing the details of the survey were sent to the

parent(s) or guardian(s) of each eligible preschooler. The form and letter are enclosed as Appendix C.

Souvenirs were given to encourage parents' participation. Paper fans with food pyramid pictures (Appendix D) were distributed to the kindergarteners after their anthropometric measurements, and individual health reports (Appendix E) focusing mainly on dietary improvements were given after the whole interview process.

2.2 Survey methods

Questionnaire and anthropometric measurements were used in this survey to obtain information on the lifestyle and dietary patterns and the growth and obesity of the children. Parent(s) or guardian(s) of each child gave written consent to:

- take their child's anthropometric measurements;
- participate in a face-to-face interview to provide information on the child's lifestyle and dietary habits along with general information about themselves and their household;
- provide three days of 24-hour dietary intake recall information on all food and drinks consumed by the child.

Anthropometric measurements

The height and weight of all subjects were obtained in stocking feet wearing only light physical education uniforms in the subjects' kindergartens. The anthropometric data were then used to calculate the Body Mass Index (BMI; in weight[kg]/height[m]^2).

The measurement of standing height was taken using a portable stadiometer (Seca®

Leicester Height Measure 214). The subject stood up straight on the foot plate, with heels together and touching the backstop. The child's head was positioned so that the head piece (the measuring arm) was horizontal. While maintaining this posture, the metric height was recorded to obtain their maximum unsupported height to the nearest 0.1cm. Two measurements were performed for each child and the average was taken.

The weight was measured to the nearest 0.1kg using a personal digital scale (TANITA® THD-305). The measurement was not taken at a standard time of day. Again, two measurements were performed for each child and the average taken.

Lifestyle questionnaire

The lifestyle questionnaire was developed based on a literature review of local and international studies on dietary and lifestyles habits of children or adapted from published sources (Birch *et al.*, 2001; Bourcier *et al.*, 2003; Campbell *et al.*, 2002; Fisher *et al.*, 1999; Hui *et al.*, 2003) and customized according to the Hong Kong situation. The references are listed in Table 2.2.

Table 2.2 Reference questionnaire and their sources

Countries	Sources
Australia	Family food environments of 5-6-year-old-children: does socioeconomic status make a difference? (Campbell *et al.*, 2002)
USA	Confirmatory factor analysis of the Child Feeding Questionnaire: a measure of parental attitudes, beliefs and practices about child feeding and obesity proneness (Birch *et al.*, 2001) Evaluation of strategies used by family food preparers to influence healthy eating (Bourcier *et al.*, 2003) Restricting access to foods and children's eating (Fisher *et al.*, 1999)
Hong Kong	Risk factors for childhood overweight in 6- to 7-y-old Hong Kong Children (Hui *et al.*, 2003)

Drafts of the questionnaire were reviewed by health professionals and several amendments were made. It was then translated into spoken Cantonese and a preliminary version was pre-tested for several rounds in the pre-test kindergarten among parents of sixteen students of mixed gender and kindergarten grades. Various modifications were made to reflect observations during the pre-test administrations. Feedback received from the parents showed that the length of the interview, 20 minutes, was acceptable. After revising the unclear wording and the inappropriate question order, the lifestyle questionnaire was finalized and appears as Appendix F.

The lifestyle questionnaire was composed of seven parts (Table 2.3) as follow: (1) profile of the respondents and their households, (2) home food purchasing and its determinants, (3) family meal frequency and location, (4) preschoolers' meal preparation activities, (5) food and eating rules and mealtime activities, (6) child's sedentary activities patterns and (7) parental perceptions of child's eating practices and weight status. These measures aimed to examine how the family food environments and the lifestyle and dietary habits were structured and how they differed across SES.

Table 2.3 Contents of the lifestyle questionnaire

Sections		
Demographic information	1.	Child's name, gender, date and place of birth, nationality, birth order, previous breastfeeding duration
	2.	Parents' ages, marital status, education levels, height and weight, occupations, origin
	3.	Household information: family structure, average household income
	4.	Custody of the child
Home food purchasing and its determinants	1.	Frequency of food shopping
	2.	Food preferences of caregiver
	3.	External factors that might influence the availability of foods in home: cost, quality (freshness), the ease of purchase (availability), food preferences of family members
Family meal frequency and location	1.	Frequency of family dining together
	2.	Frequency of eating out and preference of restaurants
	3.	Frequency of breakfast skipping
	4.	Snack habits: irregularity
Preschoolers' meal preparation activities	1.	Child participation in choosing meal foods and own snacks
	2.	Child participation in preparing family meals
	3.	Feeding utensils used
Food and eating rules and mealtime activities	1.	Presence of food restrictions and types
	2.	TV watching practice during meals
Child's sedentary activities patterns	1.	Parents' perception of child's physical activity level
	2.	Average amount of time the child spent on different activities on weekdays and weekend days
	3.	Frequency of going to park or playground per week
	4.	Time of TV on at home
Caregivers' perceptions	1.	of child's eating practices
	2.	of child's height and weight status

Three-day 24-hour dietary intake recall

The three days of multiple-pass 24-hour dietary intake recalls were used to assess the intake of foods, nutrients and energy and meal occasions and locations of all participating subjects and to investigate relationships between intakes of certain nutrients and subjects' health status. The 24-hour dietary intake recall method is widely used in children's studies and was found to be accurate and valid for

estimating the energy intake of a group of four to seven years old children (Johnson *et al.* 1996). It was developed by the USDA's nutrition monitoring program and used in the 1999-2000 U.S. National Health and Nutrition Examination Survey (Kubena KS, 2000). The advantages of the 24-hour dietary intake recall are its speed (approximately 15 minutes per interview) and ease of administration when compared with other methods, such as weighed dietary records and food frequency questionnaires (Johnson *et al.* 1996, Nelson *et al.* 1997). Another advantage of the 24-hour dietary intake recall is that the literacy of the respondent does not affect the accuracy of the method because it is the interviewer who fills in the responses (Labadarios *et al.* 1999). This method was therefore suitable for our targeted caregiver population with its wide range of educational levels represented.

The parent(s) or the guardian(s) were led through the dietary recall interviews step by step. Firstly, a quick list was performed. He/she was asked to recall everything the child ate or drank the previous day from waking up until going to bed. Secondly, the respondent had to describe the details of the foods eaten with the help of food portion models and a food booklet in the following order: the time and occasion of the meals, the ingredients of the foods, food preparation methods, the amount of foods eaten, and the place of intake. The respondent was then probed for any forgotten foods and eating occasions and finally a review was done by checking the entire list of foods mentioned (Johnson *et al.* 1996, Conway *et al.* 2004).

The three days of dietary intake recalls were completed within a seven-day measurement period and included two weekdays and one weekend day for each child because it has been found that intakes of certain nutrients and energy vary day to day (Stein *et al.* 1991). The first recall was done in person with parent(s) or the

guardian(s) after administering the lifestyle questionnaire. All foods or drinks that the child consumed from six o'clock in the morning on the previous day through six o'clock in the morning of the interview day, both in and out of the home, were quantified (with the aid of food portion models and a colorful food booklet describing the foods and beverages most commonly consumed by young children) and recorded, including the consumption of plain drinking water and supplements.

The types and amount of snacks that the child consumed during interview day school hours were provided by the principals of the kindergartens, and the time, occasion and places of intake of these and all other snacks were also recorded. Additional questions about the type of oil used at home and if the amount of foods eaten by the child on the dietary recall day was different from that consumed under usual circumstances, perhaps, of illness or going to a party, were asked. If the parent(s) or guardian(s) were confused or had difficulty in recalling the dietary intakes, that recall would be coded as "unreliable". The second and the third dietary recalls were conducted by telephone, using the same multiple-pass technique and with the same kinds of data collected. The 24-hour dietary recall forms are shown in Appendix G.

The food portion models included a plastic cup (300 ml), a plastic teaspoon, a plastic soupspoon, a plastic plate (23 cm in diameter) and a plastic bowl (250 ml). The first page of the food booklet included pictures of some children's feeding utensils such as different sizes of children's cups, bowls and spoons. The booklet was adapted from three other surveys (Leung *et al.* 1995; Li unpublished, Guldan – ICN project unpublished), but only the food items that are commonly consumed by children were depicted. Some pre-prepared food photos such as snacks and dairy products were downloaded from the Internet. About 150 food items were shown in the booklet, with

their photo, name and portion size in grams or milliliters (see Appendix H).

2.3 Data management and analysis methods

Anthropometric measurements

Descriptive statistics of the anthropometric measurements were analyzed for boys and girls separately in different age groups because preschoolers are at a stage of rapid growth, and there might be strong correlation between age and height and weight. The standard curves used in HK in previous studies, "Growth Standards for Hong Kong" (Leung *et al.* 1994), were based on data collected in 1993. Obesity using that set of references was defined as body weight greater than 120% median weight for height.

However, these references could not adequately describe the growth in height and weight of the current population of children in HK, because there appears to have been a secular change in growth and development continuing over the last decade as has recently been shown in China (Li *et al.*, 1999). In order to assess the weight status of the subjects, another reference was also used. Obesity and overweight were also defined with the use of the International Obesity Task Force (IOTF) references, which were determined by pooling international data sets to obtain sex-age-specific international BMI cut-offs that correspond to BMIs of 25 for overweight and 30 for obesity at age 18 (Cole *et al.* 2000). These specific cut-off points defining overweight and obesity at half-year age intervals from age two to eighteen were developed based on six large nationally representative cross sectional children's anthropometric surveys from Brazil, Britain, Hong Kong, the Netherlands, Singapore, and the United States.

Lifestyle questionnaire

After the lifestyle questionnaires were systematically coded, the data were then entered into the computers along with the anthropometric data. The data were then verified in order to correct keypunch errors. Finally, after some further data cleaning and management, descriptive analyses and statistical tests of association, such as chi-square tests (to explore the relationship between two categorical variables), 2-tailed independent *t*-tests (to compare the mean values of two different groups of subjects) and ANOVA tests (to compare the mean values of more than two different groups of subjects), were carried out using statistical software package SPSS 13.0 for Windows. Confidence levels were set at the 95% ($p<0.05$). The variables accessed by five-point Likert scale, ranging from strongly disagree to strongly agree, were collapsed into three groups: "disagree", "neutral" and "agree" during analysis, and the items that were accessed by frequency scale that ranged from "never" to "all the time" were also collapsed into three groups: "seldom or never", "sometimes" and "often".

Three-day 24-hour dietary intake recall

The food consumption data collected from the dietary recalls were analyzed for nutrient composition by the Nutrition Data System for Research (NDS-R) program version 4.06_34 from the University of Minnesota Nutrition Coordination Center (NCC). However, because the database was developed in the United States, not all local Chinese foods were included. In such cases, nutrients of the local foods were calculated based on nutrient content of substituted foods of similar nutrient content and types that were identified in the different database. The child's daily energy and nutrient intakes including the total energy, total protein, total carbohydrate, total fat, % energy from fat, protein and carbohydrate, total fiber, saturated fat,

polyunsaturated fat, cholesterol, vitamins and minerals were calculated. The average intakes were also compared with the DRIs suggested by the United States and China for the studied age group. Associations of nutrient intakes with various environmental features and caregiving practices were also examined. Descriptive analyses revealing child's main food groups and macronutrient intakes, such as fruit and vegetables, meat and carbohydrates, were shown and relationships between child intake variables and childhood obesity and the parental intake variables were examined using chi-square and independent sample *t*-tests. Confidence intervals were also set at the 95% ($p<0.05$).

Socioeconomic status (SES) of the subjects (households)

Kindergarteners were divided into low and high socioeconomic (SES) groups according to their monthly household income. Their housing types, parental occupations and education levels were also examined and considered. Other measurements included whether the family received any financial assistances such as the Comprehensive Social Security Assistance (CSSA) and the Kindergarten Fee Remission Scheme (KFRS), and the tuition fees of the kindergarten the child attending.

2.4 Ethics

This survey received ethical approval from The Survey and Behavioral Research Ethics Committee (SBREC) of The Chinese University of Hong Kong. All the personal information collected was kept confidential and not disclosed to anyone not involved in the study. After completing all the interviews each participating caregiver also received an individual health and diet report and some preschooler diet recommendation pamphlets from the Department of Health of HKSAR.

Chapter Three: Results

3.1 Response to various components of the survey

Of the 656 eligible kindergarteners identified from the eight schools, parents of 57% (N=378) agreed to join our survey. The response rate of each kindergarten varied as some of the kindergartens allowed fewer dates for interviews than others, so only those who could fit the limited schedule could join the survey. Some school principals also revealed that their students' parents were generally less active in participating extracurricular activities (Table 3.1). The response rate of low tuition kindergartens was slightly higher than that of the high tuition schools but difference was not significant (p=0.219).

Of the 319 participants with a completed lifestyle questionnaire, all had anthropometric measurements, but only 91% completed all three 24-hour dietary recalls (Table 3.2). Those who did not complete the recalls were excluded from the analysis because the incompleteness of the dietary data could not accurately reflect the child's diet and eating patterns. Analyses for this survey were therefore based on 289 cases, all with completed lifestyle questionnaire and three 24-hour dietary intake recalls, so the actual response rate for those with complete data was 44.1%.

Table 3.3 shows that the interviewees were mainly mothers of the children (82.4%), with 6.9% being the child's father, 8.7% grandparents and other relatives, and the remaining 2% domestic helpers, babysitter and neighbors. There were no significant differences in interviewees between the low and high tuition groups.

Table 3.1 No. of eligible respondents, no. of respondents, and response rate of low- and high- tuition kindergartens (p=0.219)

School	Monthly tuition (HK$)	No. of eligible students	No. of respondents (with parental consent)	Response rate (%)
Low tuition				
1	951	50	30	60.0
2	1,037	63	23	36.5
3	973	171	142	83.0
4	1,114	78	42	53.9
5	859	59	21	35.6
Mean	987			61.3
Sub-total	-	421	258	
High tuition				
1	2,098	98	60	61.2
2	2,280	99	43	43.4
3	2,376	38	17	44.7
Mean	2,551			51.1
Sub-total	-	235	120	
Grand total	-	656	378	57.6

* only children aged three and four years on the day of anthropometric measurements were eligible

Table 3.2 Response to interview and 24-hour dietary recalls by gender

Completed information	Gender					
	Girls		Boys		All	
	N	%	N	%	N	%
Lifestyle questionnaire (all)	143	100	176	100	319	100
Lifestyle questionnaire with:						
Three-day 24 hr recalls	127	88.8	162	92.0	289	90.6
Two-day recalls, both week and weekend days	0	0	2	1.1	2	0.6
Two-day recalls, only weekdays	6	4.2	8	4.5	14	4.4
Only one-day recall	7	4.9	4	2.3	11	3.4
No recall at all	3	2.1	0	0	3	0.9

Table 3.3 Interviewees by tuition group (p=0.190)

Interviewees	Kindergarten tuition group		
	Low N (%)	High N (%)	All N (%)
Mother	148 (80.4)	90 (85.7)	238 (82.4)
Father	12 (6.5)	8 (7.6)	20 (6.9)
Other relative*	20 (10.9)	5 (4.8)	25 (8.7)
Domestic helper	1 (0.5)	2 (1.9)	3 (1.0)
Other**	3 (1.6)	0 (0)	3 (1.0)
All	184 (100)	105 (100)	289 (100)

*Sixteen (64%) of the "other relative" category were grandparents, the remaining were aunt and grandaunt

**"Other" category included babysitter and neighbors

3.2 Socioeconomic status and related characteristics of the households

As described, several methods are commonly used to define household socioeconomic status. In this report, preschoolers were divided into low and high socioeconomic groups according to their reported monthly household income range. Other measurements, including their housing types, parental occupations and educational levels, and whether the family received any financial assistance such as the Comprehensive Social Security Assistance (CSSA) and the Kindergarten Fee Remission Scheme (KFRS) were also used as indictors of socioeconomic status and to examine some of the nutrient and eating practice differences.

In this study, children were recruited through both non-profiting-making kindergartens which joined the Kindergarten Subsidy Scheme (NPM KSS) and the private independent kindergartens. As was shown in Table 3.1, these two types of kindergartens had an approximately two-fold tuition difference (refer to Table 2.1 in Chapter 2), and therefore were considered suitable for recruiting children from different socioeconomic status (SES) households. Among the 289 households, only 277 provided us their monthly household income ranges. Figure 3.1 shows that the distributions of the monthly household income ranges in the low and high tuition

kindergartens were significantly different ($p<0.001$).

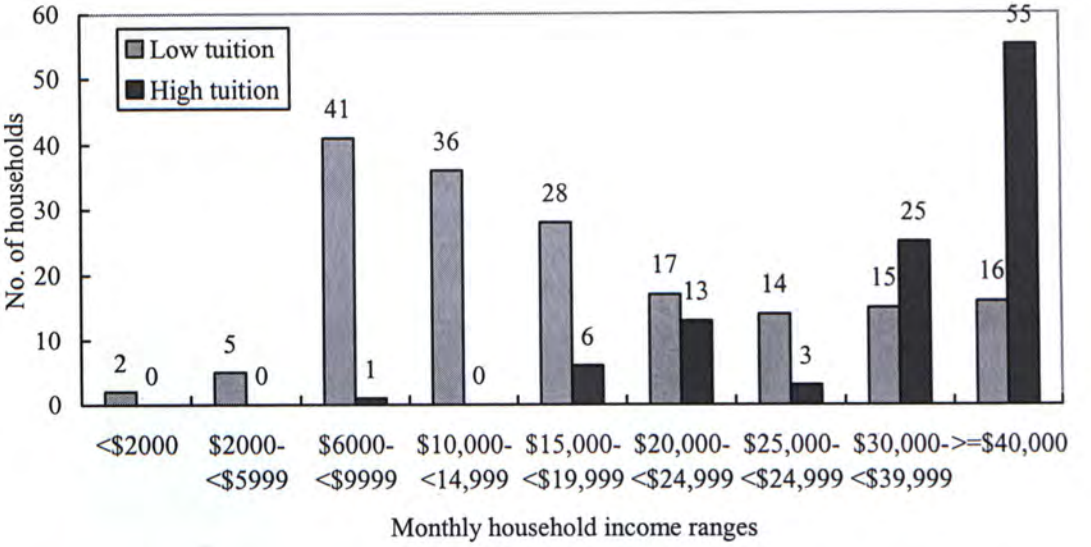


Figure 3.1 Distribution of the monthly household income range by kindergarten tuition group ($p<0.001$)

In order to examine the children's eating environments by SES, this variable was collapsed into two categories: (1) Low SES: households with monthly income below $20,000 and (2) High SES: those earning $20,000 or above. This cut-off was based on the latest Population Census statistics for the median Hong Kong household income ($18,705) provided by the Census and Statistics Department of the HKSAR (Hong Kong, Census and Statistics Department, 2002). Levels of household income were hypothesized to be associated with the children's food and eating environments affecting food availability and variety of the children's diets due to differing resources. Therefore, throughout this chapter, analyses referring to SES were mainly based on the division of the 277 households into these two monthly household income groups.

The division into the low and high SES groups was approximately even, with 43% (N=119) of the households in the lower SES group. Most of the higher income

families whose children were in low tuition kindergartens attended one larger school that had a reputation for being a "good" school and was, reportedly, the only one located in that residential area. While only seven low SES preschoolers attended high tuition kindergartens, slightly more than one-third of the high SES group children attended low tuition kindergartens (Figure 3.2).

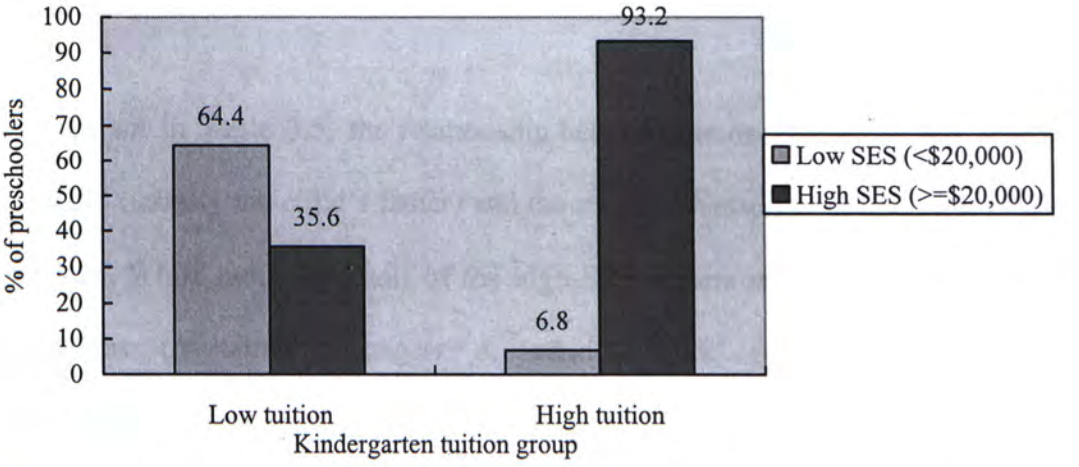


Figure 3.2 SES group composition by kindergarten tuition group ($p<0.001$)

Parents who had completed upper secondary school or above were recoded as having high educational level, and those who completed lower secondary educational level or less were recoded as having lower educational level. About ninety percent of all mothers and fathers from high SES households were of the higher education group, compared to approximately 40% of their lower income counterparts (Table 3.4).

Table 3.4 Parental educational levels by SES group ($p<0.001$ for both maternal and paternal education)

Educational levels	SES group		
	Low (N=119) N (%)	High (N=158) N (%)	All (N=277) N (%)
Maternal			
Low (F.3 or lower)	70 (58.8)	15 (9.5)	85 (30.7)
High (F.4 or above)	49 (41.2)	143 (90.5)	192 (69.3)
All	119 (100)	158 (100)	277 (100)
Paternal			
Low (F.3 or lower)	75 (63.6)	19 (12.1)	94 (34.2)
High (F.4 or above)	43 (36.4)	138 (87.9)	181 (65.8)
All	118 (100)	157 (100)	275 (100)

As is shown in Table 3.5, the relationship between the occupation of the head of household (usually the child's father) and the monthly household income was closely associated. While more than half of the high SES fathers worked in "non-manual" occupations (including managers & administrators, professionals, associate professionals, clerks, service/sales workers, and others such as pastor or assistant pastor), more than half of the low SES fathers worked in "manual" occupations (craft workers, plant & machine operators/assemblers, elementary occupations and agriculture & fisheries). This association was also seen for mother's employment status and occupation distribution, with the majority (74.6%) of the mothers being housewives in the low SES group while only 34.2% of their high SES counterparts were housewives. The vast majority (86.5%) of the high SES working mothers worked in "non-manual" occupations. Moreover, working mothers were more likely than housewives ($p<0.001$) to be born in Hong Kong but not China or other places.

Also, as shown in Table 3.6, only 20.2% of the low SES households received no social benefits, but around 90% of the high SES households did not receive any ($p<0.001$). Paralleling the SES group differences, more than three-quarters of the households whose father worked in a manual occupation were receiving social

benefits, while a similar high proportion of those in non-manual occupations did not receive either of these social benefits (see Appendix J1).

Table 3.5 Paternal and maternal employment status and occupation by SES group ($p<0.001$ for both parents)

Parental employment status and occupation	SES group		
	Low (N=119) N (%)	High (N=158) N (%)	All (N=277) N (%)
Paternal employment status and occupation			
Unemployed/retired	14 (11.9)	2 (1.3)	16 (5.8)
Working:			
Manual	63 (53.4)	14 (8.9)	77 (27.9)
Non-manual	24 (20.3)	110 (69.6)	134 (48.6)
Public servant	3 (2.5)	13 (8.2)	16 (5.8)
Self-employed	14 (11.9)	19 (12.0)	33 (12.0)
All	118 (100)	158 (100)	276 (100)
Maternal employment status and occupation			
Housewife/unemployed/retired	88 (74.6)	54 (34.2)	142 (51.4)
Working:			
Manual	2 (1.7)	0 (0)	2 (0.7)
Non-manual	27 (22.9)	90 (57.0)	117 (42.4)
Public servant	0 (0)	5 (3.2)	5 (1.8)
Self-employed	1 (0.8)	9 (5.7)	10 (3.6)
All	118 (100)	158 (100)	276 (100)

Table 3.6 Households receiving social benefits by SES group ($p<0.001$)

Social benefits received	SES group		
	Low (N=119) N (%)	High (N=158) N (%)	All (N=277) N (%)
Not receiving	25 (21.2)	144 (91.7)	169 (61.5)
Either CSSA or KFRS	81 (68.6)	12 (7.6)	93 (33.8)
Both CSSA or KFRS	12 (10.2)	1 (0.6)	13 (4.7)
All	118 (100)	157 (100)	275 (100)

Table 3.7 shows that the main carers and feeders of the preschoolers also differed by SES group, with fewer preschoolers in the high SES group taken care of ($p<0.001$) or fed by ($p<0.001$) their mothers. In contrast, high SES preschoolers were more likely to be cared for and fed by domestic helpers and other relatives.

Table 3.7 Main carer and feeder at home by SES group ($p<0.001$)

	Main carer		Main feeder	
	Low SES N (%)	High SES N (%)	Low SES N (%)	High SES N (%)
Mother	91 (76.5)	58 (36.7)	86 (72.3)	47 (29.7)
Father	3 (2.5)	3 (1.9)	4 (3.4)	5 (3.2)
Other relatives*	14 (11.8)	36 (22.8)	18 (15.1)	33 (20.9)
Domestic helper	9 (7.6)	60 (38.0)	9 (7.6)	71 (44.9)
Other	2 (1.7)	1 (0.6)	2 (1.7)	2 (1.3)
All	119 (100)	158 (100)	119 (100)	158 (100)

*44 (81.5%) of other relatives are grandmother

The majority (83.5%) of the high SES preschoolers lived in private housing (Table 3.8), while less than half (42.0%) of the low SES preschoolers did. About the same proportion of low SES preschoolers (43.7%) lived in public housing, and about 13% of preschoolers from each group lived in other types of housing. Only 2.1% (N=6) of the households (all in low SES group) reported that they ran out of food in the previous month, and all surveyed children were reported to be living in households with both refrigerator and microwave oven.

Table 3.8 Types of housing by SES group ($p<0.001$)

Types of housing	Low N (%)	High N (%)	All N (%)
Public housing	52 (43.7)	7 (4.4)	59 (21.3)
Subsidized-scale flat	12 (10.1)	14 (8.9)	26 (9.4)
Private housing	50 (42.0)	132 (83.5)	182 (65.7)
Temporary housing	2 (1.7)	0 (0)	2 (0.7)
Other (hostel)	3 (2.5)	5 (3.2)	8 (2.9)
All	119 (100)	158 (100)	277 (100)

In summary, lower SES preschoolers were more likely to study in low tuition kindergartens, be cared for and fed by a housewife mother, have parents with lower educational level whose fathers worked in manual occupations, and live in public housing, whereas the higher SES preschoolers were more likely to study in high tuition kindergartens, be taken care of and fed by a domestic helper or relatives other than the mother, and have parents with higher educational levels and both working in

"non-manual" jobs, with the vast majority of them living in private housing.

3.3 Characteristics of the preschooler and their carers

Preschoolers' weight status

The characteristics of the preschoolers, including age distribution, birth order and ever breastfeeding rate were virtually identical among boys and girls (Appendix J2). However, the distribution of the mean height and weight measurements by gender, as well as the prevalence of overweight and obesity combined using the International Obesity Task Force (IOTF) references and the prevalence of obesity by the HK local references 1993 (Tables 3.9a-b) differed, confirming the trend found in other HK children's studies finding more boys' than girls' obesity, especially in the high SES group (p=0.026 for IOTF references; p=0.019 for HK local references). Totally 36 (12.5%) of the preschoolers were overweight or obese as defined by the IOTF references, but the rates were similar in low and high SES groups. The parental weight status and their mother's birth place by gender of the child did not differ significantly, however.

Table 3.9a Preschooler's weight status by age, gender and SES group (IOTF references)

Age	Weight Status	Low SES (N=119)			High (N=158)		
		Girls (N=48) N (%)	Boys (N=71) N (%)	Sig. *p*	Girls (N=71) N (%)	Boys (N=87) N (%)	Sig. *p*
3	Healthier weight	28 (90)	28 (85)	NS	34 (94)	38 (86)	NS
	Overweight/Obese	3 (10)	5 (15)		2 (6)	6 (14)	
	Overweight	3 (10)	3 (9)	-	2 (6)	4 (9)	-
	Obese	0 (0)	2 (6)		0 (0)	2 (5)	
4	Healthier weight	14 (82)	34 (89)	NS	33 (94)	34 (77)	0.055
	Overweight/Obese	3 (18)	4 (11)		2 (6)	9 (21)	
	Overweight	1 (6)	3 (8)	-	2 (6)	6 (14)	-
	Obese	2 (12)	1 (3)		0 (0)	3 (7)	
All	Healthier weight	42 (88)	62 (87)	NS	67 (83)	72 (83)	0.026
	Overweight/Obese	6 (12)	9 (12)		4 (6)	15 (17)	
	Overweight	4 (8)	6 (8)	-	4 (6)	10 (11)	-
	Obese	2 (4)	3 (4)		0 (0)	5 (6)	

Table 3.9b Preschooler's weight status by age, gender and SES group (HK local references 1993)

Age	Weight Status	Low SES (N=119)			High (N=158)		
		Girls (N=48) N (%)	Boys (N=71) N (%)	Sig. *p*	Girls (N=71) N (%)	Boys (N=87) N (%)	Sig. *p*
3	Healthier weight	26 (84)	26 (79)	NS	32 (89)	34 (77)	NS
	Obese	5 (16)	7 (21)		4 (11)	10 (23)	
4	Healthier weight	14 (82)	31 (82)	NS	32 (91)	32 (74)	0.052
	Obese	3 (18)	7 (19)		3 (9)	11 (26)	
All	Healthier weight	40 (83)	57 (80)	NS	64 (90)	66 (76)	0.019
	Obese	8 (16)	14 (20)		7 (9)	21 (19)	

Preschoolers' growth

Due to the economic growth in the recent decade, current HK children are more likely to obtain adequate nutrient intakes than previous generations. Their heights and weights showed secular changes approaching their growth potential. As shown in Figures 3.3a-b, both the heights and weights of the preschoolers showed increasing trends from 1963 to the present study. The growth in boys and girls by SES group were similar, but the weight of boys aged 3 (16 kg *vs* 14 kg; p=0.044) and height of

girls aged 4.5 (108 cm *vs* 104 cm; p=0.043) from high SES families were greater than those of their low SES counterparts, respectively, as analyzed by 2-tails independent t-test. As the increase in height since 1993 was less than that of weight, the BMI kept increasing as well (Figure 3.3c). The obesity rate of these surveyed preschoolers was more than twice that found in 1993, rising from 4.8% in 1993 to 18.7% (N=54) in 2005, using local references.

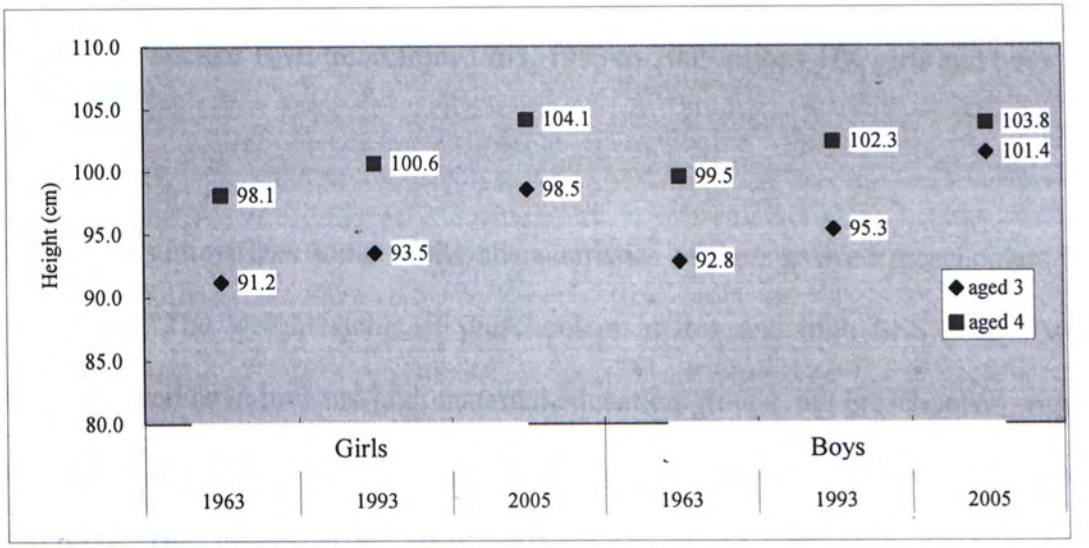


Figure 3.3a Secular height trend from 1963, 1993 to 2005 among HK girls and boys aged 3 and 4

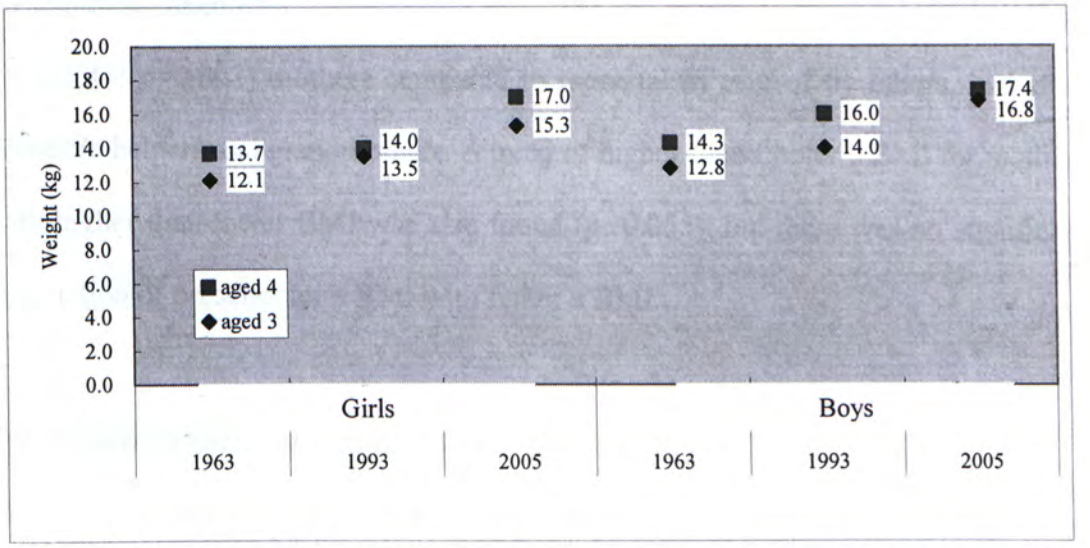


Figure 3.3b Secular weight trend from 1963, 1993 to 2005 among HK girls and boys aged 3 and 4

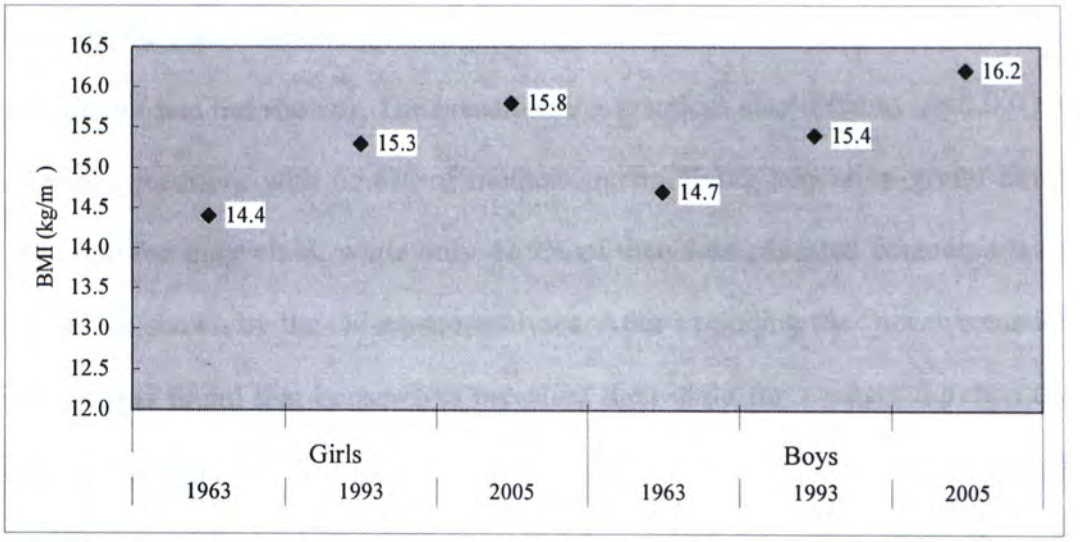


Figure 3.3c Secular BMI trend from 1963, 1993 to 2005 among HK girls and boys aged 3 and 4

Table 3.10 summarizes some of the characteristics of the surveyed preschoolers by SES group. The weight status of preschoolers in low and high SES groups was similar as well as in low and high maternal education groups, but preschoolers with a working mother were more likely to be overweight or obese (18.0% *vs* 7.5%; p=0.007). The preschoolers' BMI was not correlated with their birth weight (p=0.714) or their place of birth (p=0.511), but was significantly lower for preschoolers taken care of (15.7±1.45 *vs* 16.3±1.43; p=0.002) or fed by (15.7±1.48 *vs* 16.2±1.41; p=0.002) mothers compared to those taken care of by others, including domestic helpers and grandmothers. A trend of higher preschooler's BMI for mothers with higher than lower BMI was also found (p=0.055), but there was no significant association of preschooler's BMI with father's BMI.

Other characteristics of the preschoolers

More than a half (58.6%) of the preschoolers were ever breastfed, with the mean duration of 160 days. A significantly higher percentage (66.9% *vs* 47.1%; p=0.001) of preschoolers in the high SES group were ever breastfed than in the low SES group.

However, the mean duration of breastfeeding was shorter in the high than in the low SES group (data not shown). The breastfeeding practices also differed ($p<0.001$) by maternal education, with 65.8% of mothers in the higher education group having ever breastfed their child, while only 42.9% of their less educated counterparts had done so, as shown by the chi-square analyses. After excluding the "never breastfed" cases, it was found that housewives breastfed their child for a longer duration than working mothers, and 26.5% of the housewives breastfed their child for six months or more.

Mothers born in Hong Kong were more likely to breastfeed their child for a shorter duration than mothers born outside HK ($p=0.007$), with the mean days of 132 days for those born in HK, and 50% of them breastfeeding their child less than 45 days. The mean duration of breastfeeding provided by mothers born outside Hong Kong was 205 days (nearly seven months).

As also shown in Table 3.10, high SES mothers were more likely to be born in HK, and over half of the low SES mothers were born in Mainland China. The mothers' ages ranged between 22 and 45 years, with the mean age of 35±4.7 years and the fathers' ages ranged between 32 and 46 years, with the mean age of 39±5.6 years. Mothers in the high SES group were older than their low SES counterparts (aged 36 *vs* 33 years; $p<0.001$) but this age difference by SES group was not seen for fathers' age (Appendix J3). Seven (2.4%) households only were single parent households.

Three quarters (75%) of the preschoolers in this survey attended morning (a.m.) kindergarten session, and the remaining attended afternoon (p.m.) sessions, with

significantly more lower SES preschoolers attending the latter (p=0.035).

More smokers were found in low SES households (p<0.001). More than half (N=65, 54.6%) of the low SES households had at least one smoker living with the preschooler, as compared to less than a quarter (N=37, 23.4%) of their high SES counterparts.

Table 3.10 Summaries some of the characteristics of the surveyed preschoolers by SES group and altogether

Characteristics and sig. p value	SES groups		
	Low N (%)	High N (%)	All N (%)
Child's weight status by IOTF references (p=0.884)			
Healthier weight	104 (87.4)	139 (88.0)	243 (87.7)
Overweight/obese	15 (12.6)	19 (12.0)	34 (12.3)
Overweight	10 (8.4)	14 (8.9)	24 (8.7)
Obese	5 (4.2)	5 (3.2)	10 (3.6)
Age of child (p=0.064)			
3 years	64 (53.8)	80 (50.6)	144 (52.0)
4 years	55 (46.2)	78 (49.4)	133 (48.0)
Child's birth place (p=0.170)			
Hong Kong	110 (92.4)	152 (96.2)	262 (95.6)
Other places*	9 (7.6)	6 (3.8)	15 (5.4)

*other places included China, United States, Canada, Malaysia, and Macau

Table 3.10 Summaries some of the characteristics of the surveyed preschoolers by SES group and altogether (continued)

Characteristics and sig. p value	SES groups		
	Low N (%)	High N (%)	All N (%)
Child's birth order (p=0.055)			
Only child/First	54 (45.4)	94 (59.9)	148 (53.6)
Second	48 (40.3)	48 (30.6)	96 (34.8)
Third or above	17 (4.3)	15 (9.6)	32 (11.6)
Ever breastfed (p=0.001)			
Yes	63 (52.9)	52 (33.1)	115 (41.7)
No	56 (47.1)	105 (66.9)	161 (58.3)
Maternal weight status (p=0.275)			
Underweight	16 (13.6)	23 (14.7)	39 (14.2)
Normal weight	65 (55.1)	94 (60.3)	159 (58.0)
Overweight	31 (26.3)	37 (23.7)	68 (24.8)
Obese	6 (5.1)	2 (1.3)	8 (2.9)
Paternal weight status (p=0.074)			
Underweight	10 (8.8)	4 (2.6)	14 (5.2)
Normal weight	54 (47.8)	70 (44.9)	124 (46.1)
Overweight	37 (32.7)	67 (42.9)	104 (38.7)
Obese	12 (10.6)	15 (9.6)	27 (10.0)
Mother's birth place (p<0.001)			
HK	46 (38.7)	125 (78.5)	170 (61.4)
China	62 (52.1)	31 (19.6)	93 (33.6)
Other places**	11 (9.2)	3 (1.9)	14 (5.1)
Child's class session (p=0.035)			
a.m. class	81 (68.6)	126 (79.7)	207 (75.0)
p.m. class	37 (31.4)	32 (20.3)	69 (25.0)
Smokers at home (p=0.001)			
Yes	54 (45.5)	121 (76.6)	175 (63.2)
No	65 (54.6)	37 (23.4)	102 (36.8)

**places included Indonesia, Thailand, Macau, Australia, and Pakistan

3.4 Home food purchasing and its determinants

Half of the interviewees went food shopping frequently (4-6 times a week or more) and 40% of them purchased foods for their family every day. Most (59.2%) of them also reported that other family members such as their spouse and the grandmothers, as well as domestic helpers also shopped for food. Significantly more interviewees from the low SES group went food shopping daily than from the high SES group (p<0.001), in which interviewees usually shopped for food only 1-3 times a week.

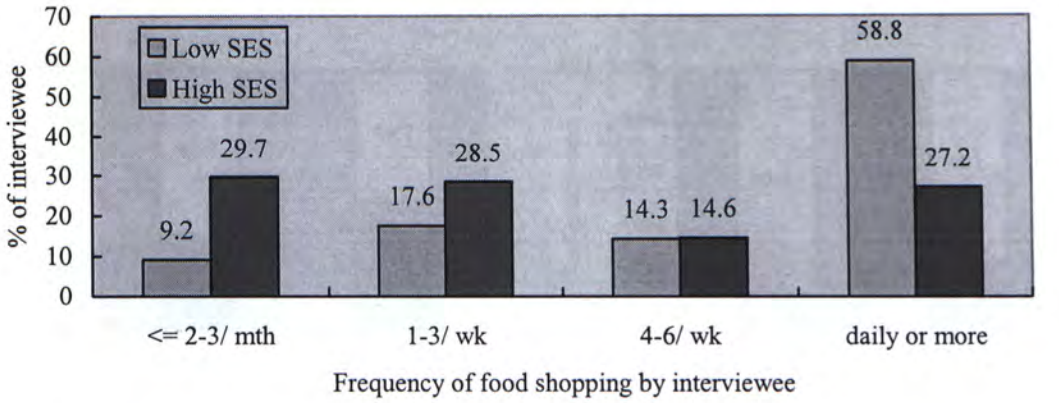


Figure 3.4 Frequency of food shopping by interviewee by SES group ($p<0.001$)

The interviewees' reports of factors that influenced their purchase of fruits, vegetables, whole grain foods, pre-prepared foods and snack foods were also examined (See Appendix J4). While the reported influence of cost among the queried food items was not significantly different by SES group (Appendix J5), the preferences of other family members when purchasing pre-prepared and snack foods did show significant associations by maternal education level and their employment status. As shown in Figures 3.5a-b, trends were seen in which low educational level mothers were more likely to consider other family members' preferences when buying pre-prepared foods and snack foods than their highly educated counterparts ($p=0.086$ and $p=0.088$, respectively). The same pattern applied to housewives too, for they were more likely to consider other family members' preferences than were the working mothers ($p=0.081$).

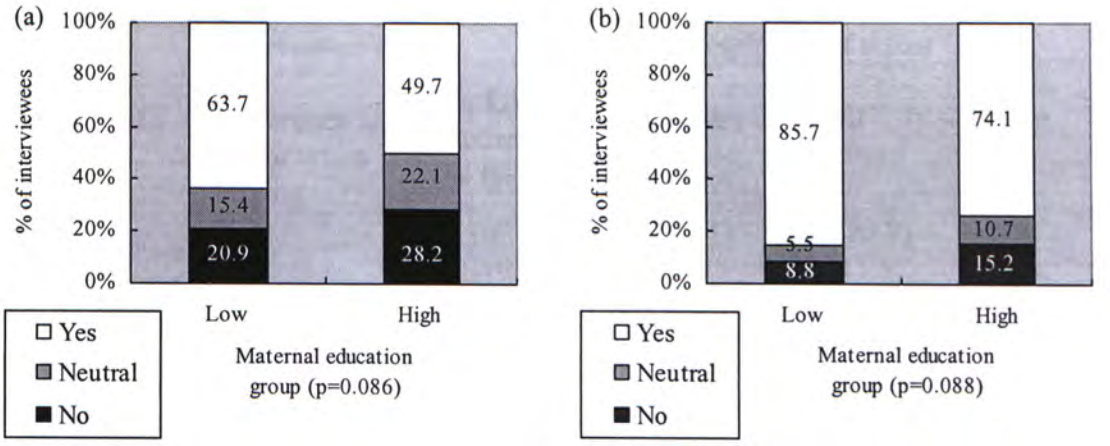


Figure 3.5 Preferences of other family members influencing (a) pre-prepared foods and (b) snack foods by maternal education group (p=0.086 and p=0.088, respectively)

However, housewives were more likely to report that their own preferences for fruits and vegetables influenced their purchases of these food items than were the working mothers (p=0.026 and p=0.093, respectively), as shown in Table 3.11. In contrast, working mothers were more concern about the availability when purchasing fruits and vegetables, and therefore, a significantly higher proportion of working mothers agreed that availability was an influential factor in buying fruits (p=0.001) and vegetables (p=0.002) than the housewives. No other significant associations were seen, however.

Table 3.11 Interviewee's own preference as a factor influencing the purchase of fruits, vegetables, whole grain foods, pre-prepared foods and snack foods by mother's employment status

Food	Interviewee's own preference as factor when buying	Mother's employment status			Sig. *p*
		Working mothers N (%)	Housewives N (%)	All N (%)	
Fruits	Yes	93 (67.4)	117 (80.1)	210 (73.9)	0.013
	Neutral	23 (16.7)	9 (6.2)	32 (11.3)	
	No	22 (15.9)	20 (13.7)	42 (14.8)	
	All	138 (100)	146 (100)	284 (100)	
Vegetables	Yes	86 (62.8)	107 (72.8)	193 (68.0)	0.093
	Neutral	27 (19.7)	16 (10.9)	43 (15.1)	
	No	24 (17.5)	24 (16.3)	48 (16.9)	
	All	138 (100)	146 (100)	284 (100)	
Whole grain foods	Yes	82 (59.9)	96 (65.8)	178 (62.9)	0.208
	Neutral	24 (17.5)	15 (10.3)	39 (13.8)	
	No	31 (22.6)	35 (24.0)	66 (23.3)	
	All	138 (100)	146 (100)	284 (100)	
Pre-prepared foods	Yes	59 (42.8)	66 (44.9)	125 (43.9)	0.682
	Neutral	43 (31.2)	39 (26.5)	82 (28.8)	
	No	36 (26.1)	42 (28.6)	78 (27.4)	
	All	138 (100)	146 (100)	284 (100)	
Snacks	Yes	65 (46.8)	77 (52.4)	142 (49.7)	0.507
	Neutral	38 (27.3)	32 (21.8)	70 (24.5)	
	No	36 (25.9)	38 (25.9)	74 (25.9)	
	All	138 (100)	146 (100)	284 (100)	

3.5 Family and preschooler meal frequency and location

Over 60% of the interviewees reported that their family had dinner together "daily", nearly 10% did so "4-6 times a week", around 17% did so "1-3 times a week", while only 3.6% did so "never", "once a month" or "2-3 times a month". After regrouping the frequency into "daily" or "not daily", interviewees from low SES families were more likely to dine daily with their family than those from high SES families (69.8% *vs* 50.5%; $p<0.001$). Fewer families in the higher maternal education group than their less educated counterparts (58.8% *vs* 71.1%; $p=0.045$), and fewer working mothers

than housewives (47.8% *vs* 76.7%; $p<0.001$), reported having dinner with their family every day (Figure 3.6).

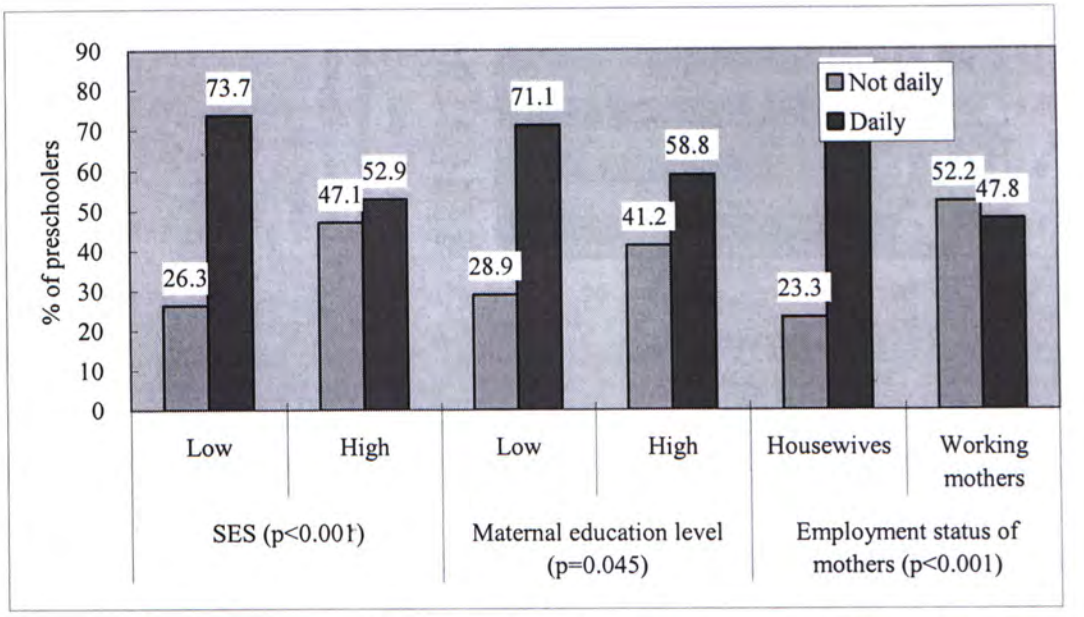


Figure 3.6 Frequency of whole family dining by SES group ($p<0.001$), maternal education level ($p=0.045$) and maternal employment status ($p<0.001$)

When the interviewees were asked about eating out or having take-away meals from different types of caterers, interviewees from the higher SES group were more likely to report having meals in non-Chinese restaurants ($p=0.007$) and Chinese restaurants ($p=0.021$) than their lower SES counterparts (Figure 3.7). The frequencies for having meals in fast food shops and stalls were similar in the two SES groups, but the overall percentages indicated that fewer families went to fast food shops or stalls as often as they did to non-Chinese and Chinese restaurants (Appendix J6).

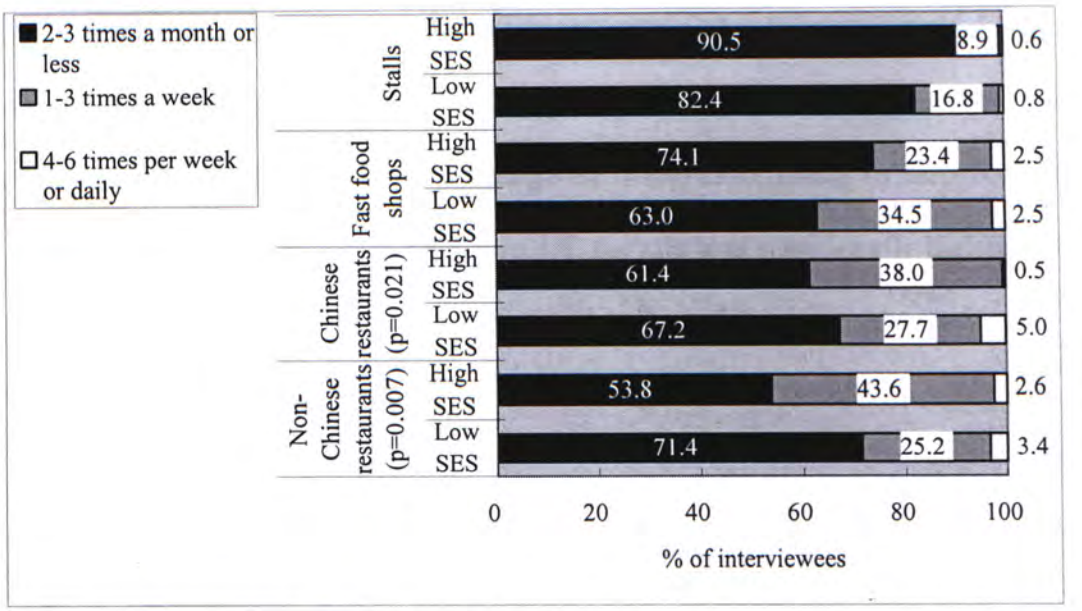


Figure 3.7 Frequencies of eating out or having take-away meals from non-Chinese (p=0.007) and Chinese restaurants (p=0.021) by SES group

Frequencies of eating out in non-Chinese restaurants, Chinese restaurants and stalls were significantly different by high and low maternal education levels. Interviewees with higher maternal education levels were more likely to bring their child to non-Chinese restaurants and Chinese restaurants more frequently than their lower maternal education level counterparts (p=0.004 and p=0.047, respectively). Over 90% of the high maternal education families never or less than 2-3 times a month had meals in or bought take-away meals from stalls, as compared to only 81% of the low maternal education families whose interviewees reported doing this (p=0.025). Housewives were more likely to go to fast food shops with their family than working mothers (p=0.019), but also displayed a trend for fewer meals in Chinese restaurants (p=0.094) by the chi-square test.

About one-tenth of the interviewees reported that the preschooler did not eat breakfast every day, with 4.8% never eating breakfast during the week. By defining subjects who skipped at least one breakfast per week as breakfast-skippers, the

breakfast-skipping rate did not differ by gender of preschooler or their weight status but did differ by the session of school they were attending. Preschoolers who were attending the p.m. classes of the kindergarten were more likely to skip breakfast (p<0.001). Moreover, as shown in Figure 3.8, the rate was significantly higher in the lower SES group (p=0.017) and with preschoolers of mothers who had a lower educational level (p=0.005), as well as for working mothers (p=0.021).

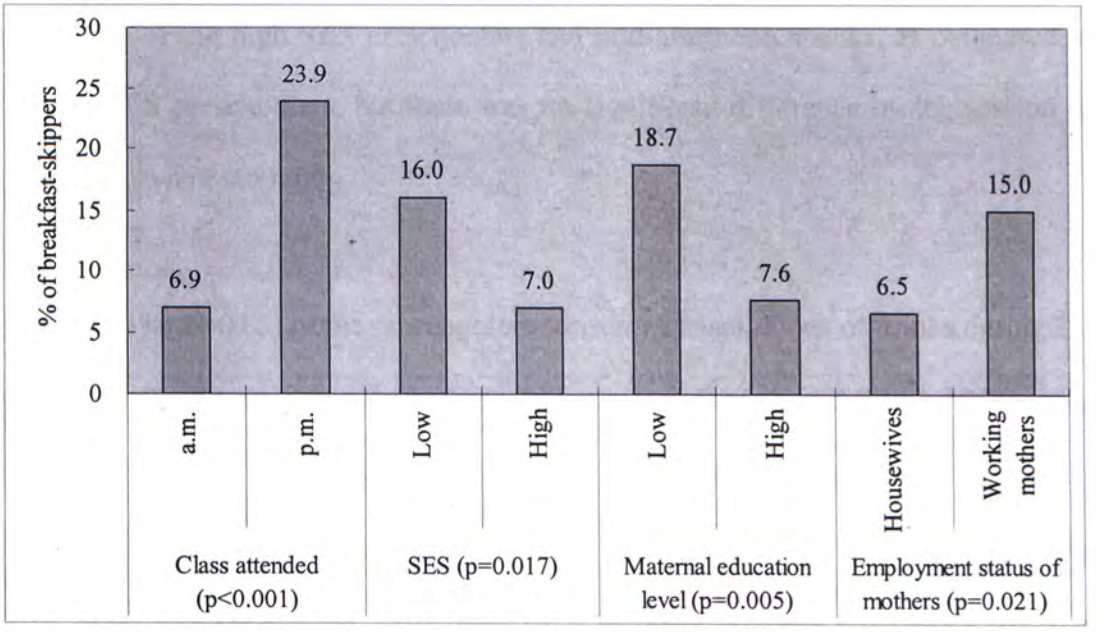


Figure 3.8 Breakfast-skipping rates varied by different characteristics of households

Excluding the snacks provided by kindergartens during mid-morning (for a.m. classes) and mid-afternoon (for p.m. classes), only about 60% of the interviewees reported that the preschooler had regular snack times. There was no significant difference by session of school they were attending. A trend was seen that a higher proportion of the high SES preschoolers (65.2%) were reported to be having regular snacks, as compared to only 53.8% of the low SES preschoolers (p=0.055). This trend was repeated as interviewees in the high maternal education group (p=0.058) and working mothers group (p=0.075) also reported higher rates of regular snacks, as compared to their counterparts of lower maternal education level or housewives.

The times of snacking were asked in the lifestyle questionnaire for interviewees whose children reported had regular snack times. After categorizing the snacks as morning snack (eaten between waking until lunch), afternoon snack (eaten between lunch and dinner) and evening snack (after dinner to bedtime), it was found that 46% of the preschoolers ate afternoon snacks, whereas 5.5% of them consumed an evening snack and only 1.0% had a morning snack. Another 5.5% of preschoolers consumed an afternoon and an evening snack daily. A trend was seen that a higher proportion of the high SES preschoolers had mid-afternoon snacks, as compared to the low SES preschoolers, but there was no significant difference by the session of school they were attending.

Most (63.3%; N=183) of the preschoolers consumed snack foods or drinks during TV viewing, with the top five most commonly consumed foods and drinks by SES group listed in Tables 3.12 and 3.13, respectively. Although the top five most commonly consumed snack foods were not significantly different by SES group, interviewees from high SES families or those who were working mothers were more likely to report preschoolers drinking follow-up formulae, which were the most commonly consumed beverages during TV time, than their low SES counterparts or preschoolers of housewives (44.1% *vs* 17.8% of reported beverages; p=0.011 for SES group, and 44.8% vs 20.8%; p=0.022 for mother's employment status).

Table 3.12 Top five most commonly consumed foods during TV viewing by SES group

Top 5 foods	SES group			Sig. *p*
	Low N (%)	High N (%)	All N (%)	
Crackers	30 (38.0)	22 (26.5)	52 (32.1)	0.134
Breads	14 (17.7)	19 (22.2)	33 (20.4)	0.475
Candies	16 (20.3)	14 (16.9)	30 (18.5)	0.523
Fruits	6 (7.6)	6 (7.2)	12 (7.4)	0.887
Chocolates	4 (5.1)	1 (1.2)	5 (3.1)	0.147

Table 3.13 Top five most commonly consumed beverages during TV viewing by SES group

Top 5 beverages	SES group			Sig. *p*
	Low N (%)	High N (%)	All N (%)	
Follow-up formulae	8 (17.8)	15 (44.1)	23 (29.1)	0.011
Water	7 (15.6)	3 (8.8)	10 (12.7)	0.373
Juice	5 (11.1)	4 (11.8)	9 (11.4)	0.928
Soy milk	6 (13.3)	3 (8.8)	9 (11.4)	0.532
Yakult	3 (6.7)	2 (5.9)	5 (6.3)	0.887

3.6 Preschoolers' meal preparation activities

Four questions about meal preparation activities were asked to assess the extent to which the preschoolers were involved in meal preparation. Though not significant, there was a trend for more low SES preschoolers and those whose mother was housewife to go food shopping with the interviewee (p=0.058 for SES group and p=0.094 for mother's employment status). The majority (63.9%) of the preschoolers were not involved in preparing meals for the family, but two-fifths of them often selected their own snack-foods (Table 3.14). However, when we examined the differences by maternal education level, a significantly higher proportion of preschoolers from low maternal education group than their high maternal educated counterparts would help in preparing meals for the family (p=0.034) and the same relationship with maternal education was seen as a trend in terms of selecting their own snack-foods (p=0.064).

Table 3.14 Frequency of preschooler helping in various meal preparation activities by SES group

	SES group			
	Low N (%)	High N (%)	All N (%)	Sig. *p*
Selecting foods for family				
Seldom or never	44 (37.0)	67 (42.7)	111 (40.2)	
Sometimes	49 (41.2)	63 (40.1)	112 (40.6)	0.515
Often	26 (21.8)	27 (17.2)	53 (19.2)	
Selecting own snacks				
Seldom or never	20 (16.8)	30 (19.1)	50 (18.1)	
Sometimes	46 (38.7)	63 (40.1)	109 (39.5)	0.794
Often	53 (44.5)	64 (40.8)	117 (42.4)	
Going food shopping with interviewee				
Seldom or never	24 (20.2)	38 (24.2)	62 (22.5)	
Sometimes	53 (44.5)	84 (53.5)	137 (49.6)	0.058
Often	42 (35.3)	35 (22.3)	77 (27.9)	
Preparing for family meals				
Seldom or never	69 (58.0)	108 (68.4)	177 (63.9)	
Sometimes	37 (31.1)	38 (24.1)	75 (27.1)	0.200
Often	13 (10.9)	12 (7.6)	25 (9.0)	

The types of utensils used to feed the preschoolers were queried (Appendix J7), and surprisingly, 51.2% of the interviewees reported that their child was still using an infant bottle. More of the 3-year old preschoolers were using infant bottles than older ones aged four (58.4% *vs* 44.2%; p=0.016), but infant bottle use did not differ by SES group, maternal education level or mother's employment status. As shown in Figure 3.9, the higher SES preschoolers were more likely to use a fork as one of their utensils (p<0.001) during meals, and fewer of them used chopsticks (p=0.020), when compared with their low SES counterparts.

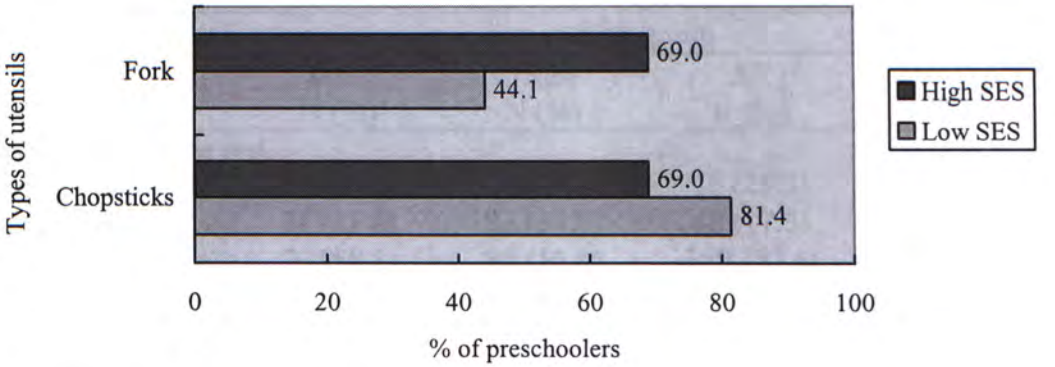


Figure 3.9 Use of fork (p<0.001) and chopsticks (p=0.020) by preschoolers by SES group

3.7 Food and eating rules and mealtime activities

Around half of the interviewees reported that they imposed some kinds of eating or food restrictions on their child, such as requiring them to finish the food served, or limiting the access to sweets and high-fat foods (such as instant noodles and potato chips), and keeping snack foods out of reach, with the frequency of each restrictive practice virtually identical in both SES groups. A trend (p=0.055) toward higher proportion of interviewees from high SES families reporting limiting their child's intake of high-fat foods, as compared to the low SES households was seen. The low SES interviewees, in contrast, significantly (p=0.024) more frequently reported giving food rewards, for example, chips and sweets, than the high SES interviewees (Table 3.15). Moreover, mothers with higher educational level were twice as likely to report limiting high-fat foods often, as compared to their lower educational level counterparts (p<0.001).

Table 3.15 Frequency of restriction practices by SES group

	SES group			
	Low N (%)	High N (%)	All N (%)	Sig. *p*
Finishing foods served				
Seldom or never	24 (20.2)	46 (29.1)	70 (25.3)	
Sometimes	25 (21.0)	23 (14.6)	48 (17.3)	0.146
Often	70 (58.8)	89 (56.3)	159 (57.4)	
Limiting access of sweets				
Seldom or never	16 (13.4)	30 (19.0)	46 (16.6)	
Sometimes	18 (15.1)	18 (11.4)	36 (13.0)	0.365
Often	85 (71.4)	110 (69.6)	195 (70.4)	
Liming access of high-fat foods				
Seldom or never	49 (41.2)	44 (27.8)	93 (33.6)	
Sometimes	13 (10.9)	17 (10.8)	30 (10.8)	0.055
Often	57 (47.9)	97 (61.4)	154 (55.6)	
Giving food rewards				
Seldom or never	34 (28.6)	70 (44.3)	104 (37.5)	
Sometimes	61 (51.3)	60 (38.0)	121 (43.7)	0.024
Often	24 (20.2)	28 (17.7)	52 (18.8)	

The mealtime television viewing practices were assessed by asking the interviewees how often the preschooler viewed TV during breakfast, lunch, dinner and snacks. About half of the preschoolers watched TV often during dinner (49.1%), but many also watched TV during other meal times, as well: lunch (35.3%), snacks (26.3%) and breakfast (20.6%).

TV viewing practices during mealtimes differed by SES and maternal education group. Most of preschoolers in both groups seldom or never watched TV during breakfast. However, interviewees from the low SES group were more likely to report viewing TV more often during lunch, dinner and snacks, as compared to their high SES counterparts (Table 3.16). Also, interviewees in the lower maternal education group were more likely to report their preschooler watched TV more often during lunch (p=0.002) and dinner (p=0.047), as compared to their high maternal education counterparts.

Table 3.16 TV viewing practices during different occasions by SES group

TV viewing frequency during eating occasions	SES group		
	Low N (%)	High N (%)	All N (%)
Breakfast (p=0.365)			
Seldom or never	71 (63.4)	110 (71.0)	181 (67.8)
Sometimes	16 (14.3)	15 (9.7)	31 (11.6)
Often	25 (22.3)	30 (19.4)	55 (20.6)
Lunch (p=0.024)			
Seldom or never	47 (39.5)	78 (49.4)	125 (45.1)
Sometimes	21 (17.6)	37 (23.4)	58 (20.9)
Often	51 (42.9)	43 (27.2)	94 (33.9)
Dinner (p=0.013)			
Seldom or never	30 (25.2)	66 (41.8)	96 (34.7)
Sometimes	18 (15.1)	30 (19.0)	48 (17.3)
Often	71 (59.7)	62 (39.2)	133 (48.0)
Snack (p=0.003)			
Seldom or never	46 (38.7)	89 (56.3)	135 (48.7)
Sometimes	34 (28.6)	35 (22.2)	69 (24.9)
Often	39 (32.8)	34 (21.5)	73 (26.4)

Over 80% of the interviewees reported that their child did other activities, such as chatting with other family members, reading, running around and watching TV during dinner. High SES preschoolers were less likely to watch TV during dinner (p=0.027), but a trend showed that they were more likely to read (p=0.079) during that period, as compared to their low SES counterparts (Figure 3.10). The proportions of preschoolers chatting and running around during dinner did not differ by SES group (Appendix J8).

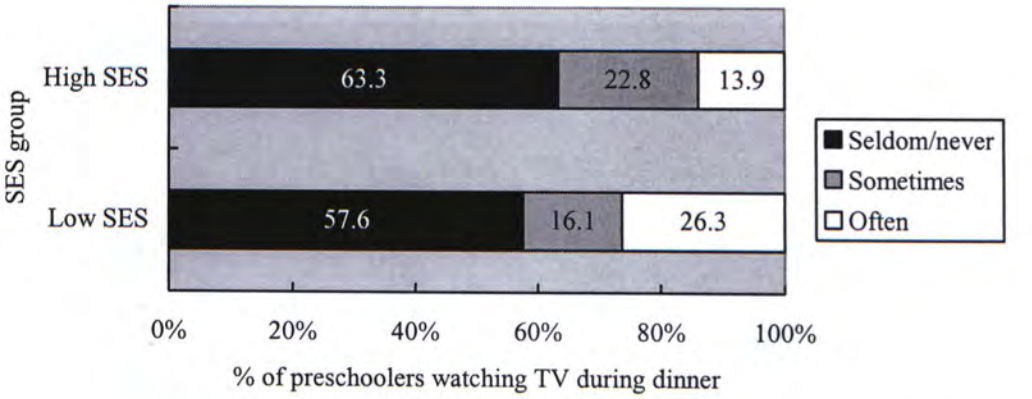


Figure 3.10 TV watching frequencies during dinner by SES group (p=0.027)

3.8 Child's sedentary activities patterns and parental perceptions

About 6% (N=17) of the interviewees never brought their child to park or playground, and only about 13% (N=37) of them brought their child once a day. The frequency of playing in park or playground varied and differed by SES group (Figure 3.11). The interviewees reported that boys were more likely to be brought to park or playground than girls (p=0.021), with the mean value of 12±11 times per month for boys and 9.1±8.7 times per month for girls (Table 3.17), but there was no significant difference in the frequency of being brought to park or playground by maternal education levels and mother's employment status.

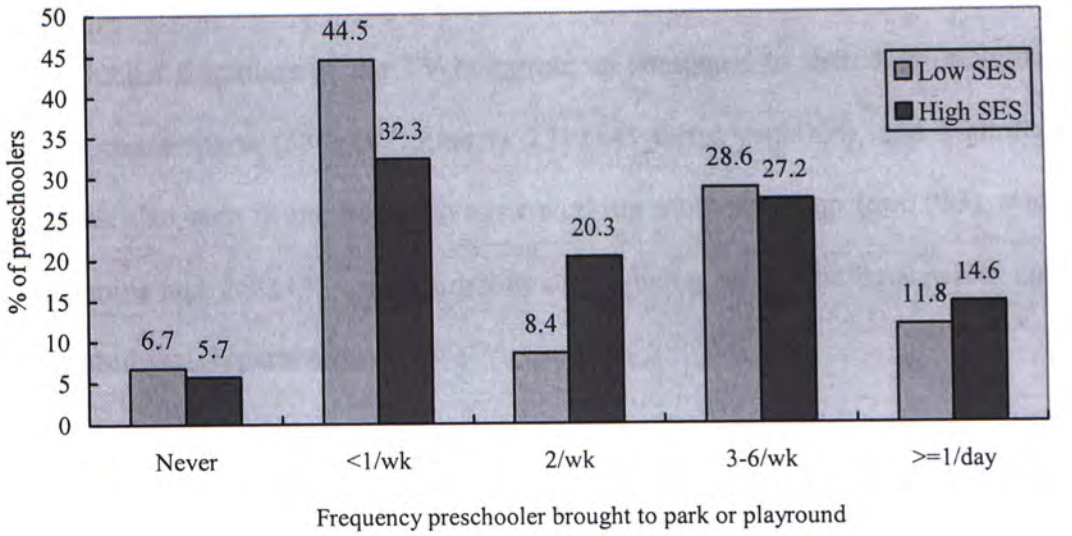


Figure 3.11 Frequency preschooler brought to park or playground by SES group (p=0.049)

Table 3.17 Mean (SD) number of times the preschoolers being brought to park or playground by gender (p=0.021)

Gender of the preschoolers	N	Mean (SD)	Min.	Max.
Girls	127	9.1 (8.7)	0 (N=7)	30 (N=10)
Boys	162	11.7 (10.8)	0 (N=12)	60 (N=1)
All	289	10.6 (10.0)	0 (N=19)	60 (N=1)

About one-fifth of the interviewees reported that their TV was on all day, and interviewees of the low SES households were twice likely to report this than the high SES households (24.6% *vs* 12.1%; p=0.007). This practice differed by maternal education as well, with 26.4% of the low maternal education interviewees reporting their TV was on all day, as compared to only 14.4% of their high maternal education counterparts (p=0.014). For households which reported that they switched on the TV only several hours per day, the mean duration of the TV turned on was 287 mins per day, but the range varied from 0 (N=2) to 750 mins (12.5 hours) per day. The mean time of the TV being on (for those not leaving the TV on all day) was different by SES group, with 335±162 mins for the low SES, and 256±125 mins for the high SES

group (p<0.001). Interviewees in the low maternal education group were more likely to report longer durations of the TV being on, as compared to their high maternal education counterparts (330±147 mins *vs* 271±141 mins; p=0.004), and a similar pattern was also seen in the housewives *vs* working mothers group (p=0.033), with 309±148 mins and 268±138 mins durations of TV being on for the housewives and working mothers, respectively.

Table 3.18 shows the time spent on various daily activities of the preschoolers per day. Although the duration of eating, napping, reading (including drawing and doing homework), TV watching and computer playing were not significantly different by SES group, sleeping time differed, and a trend was seen in the duration of active playing. Preschoolers from the low SES families slept longer than the high SES preschoolers (588±74 mins *vs* 568±64 mins; p=0.020). However, about 21% of interviewees from low SES families reported that their child did not have regular sleeping hours, while only 12.7% of their high SES counterparts said so (p=0.057).

Table 3.18 Time spent on various daily activities by SES group

Time spent per day (mins)	SES group			Sig. p
	Low Mean (SD)	High Mean (SD)	All Mean (SD)	
Eating	109 (59)	114 (48)	111 (52)	0.495
Daytime napping	75 (63)	80 (54)	79 (58)	0.474
Sleeping	588 (74)	568 (64)	577 (68)	0.020
Reading	48 (37)	51 (34)	49 (35)	0.459
TV watching	77 (69)	74 (58)	75 (63)	0.702
Computer playing	10 (18)	10 (18)	10 (18)	0.892
Active playing	84 (62)	71 (66)	75 (64)	0.092
All	994	968	908	-

About one-fifth of the preschoolers did not nap at all during daytime but the maximum duration of napping was 240 mins (4 hours). The number of napping hours

was found to be negatively associated with sleeping hours ($p<0.001$, $r=-0.331$). After summing the napping time and sleeping time for each child, only 4.5% of the preschoolers had reduced sleep (sleep less than the nine hours per day recommended) and there was no significant difference by SES group.

The total screen time was calculated by adding TV watching and computer playing time together, and was subsequently grouped into hour intervals, ranging from "less than an hour" to "4 hours or more" (Figure 3.12). Twenty-nine percent of the preschoolers watched TV for more than 2 hours a day, but no association was found by SES group.

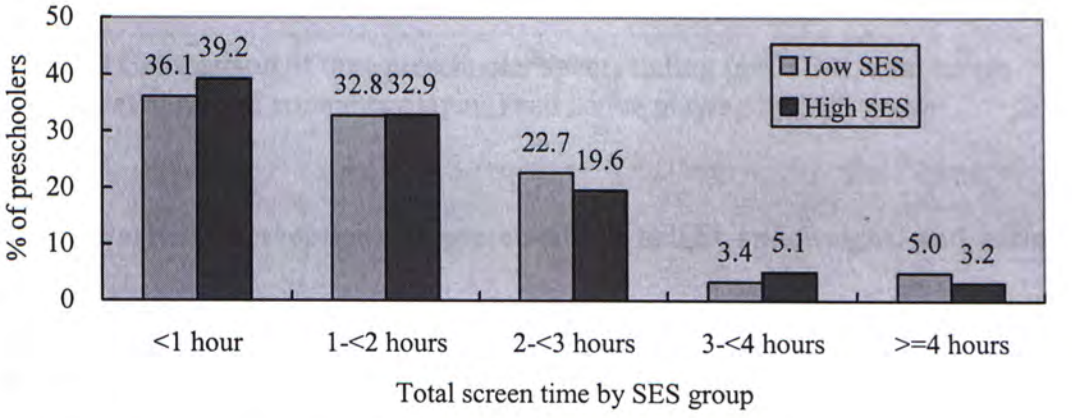


Figure 3.12 Total screen time of preschoolers by SES group ($p=0.820$)

By categorizing the duration of reading, total screen time and active playing into (1) <30 mins, (2) 30-<120 mins, and (3) ≥120 mins, it was found that the time spent in reading was significantly different by SES group ($p=0.034$) as well as maternal education group ($p=0.017$). Significantly greater proportions of preschoolers from high SES group and those in high maternal education group spent longer durations in reading. As shown in Figure 3.13, preschoolers spent relatively more time on

sedentary activities including reading, TV watching and computer playing, rather than on active playing daily.

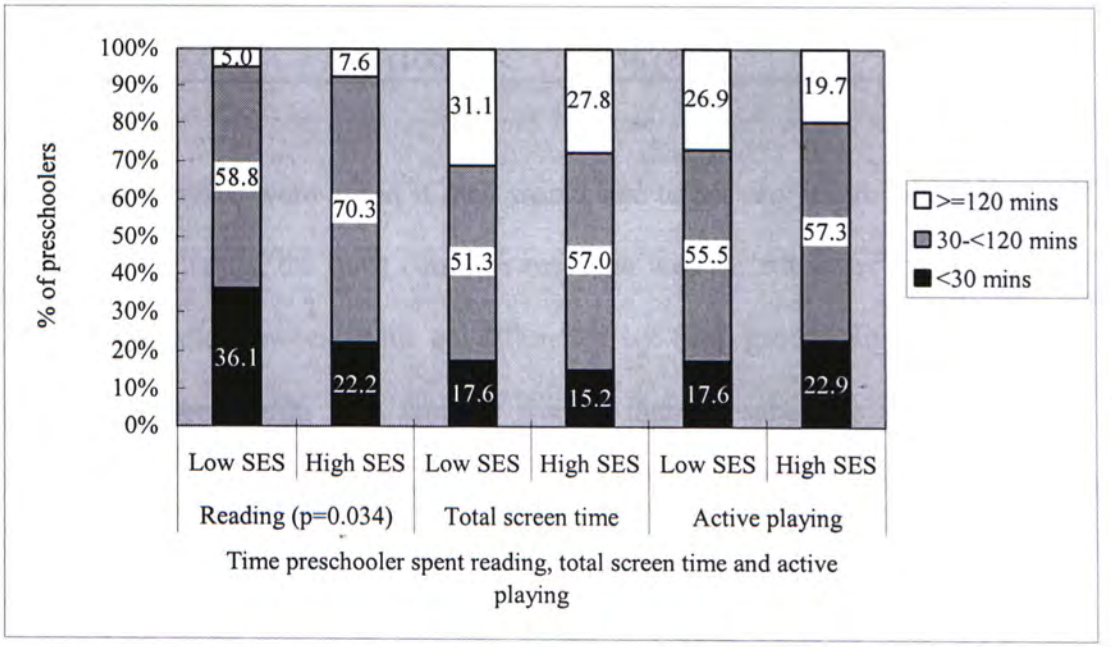


Figure 3.13 Comparison of time preschooler spent reading (p=0.034), total screen time (TV watching and computer playing) and active playing by SES group

3.9 Parental perceptions of preschooler's height and weight, and eating habits

Over 60% of the interviewees thought that their child's height and weight were "normal". Among the 11% of the perceived heavier children, 6% of them were actually of a healthier weight, while 20 of the 36 overweight or obese children were seen as "normal" or even "slimmer" than normal (Table 3.19). When comparing the mean height of the preschoolers by perceived height group (taller, normal and shorter), preschoolers who were perceived as shorter than average had the lowest mean value for height. There was no significant difference by SES group with the perception of height and weight of preschoolers.

Table 3.19 Perceived weight by preschoolers' weight status (p<0.001)

Perceived weight	Preschoolers' weight status		
	Healthier weight N (%)	Overweight/obese N (%)	All N (%)
Heavier	15 (5.9)	16 (44.4)	31 (10.7)
Normal	174 (68.8)	18 (50.0)	192 (66.4)
Slimmer	64 (25.3)	2 (5.6)	66 (22.8)
All	253 (100)	36 (100)	289 (100)

When interviewees were asked if they would like to see any improvements in their child's eating habits, the most common response was to "eat faster" as reported by 21% of the interviewees, with no difference by SES group. Significantly more interviewees from high SES families wanted their preschoolers to "avoid picky eating" (p=0.026), "concentrate during meals" (p=0.045), and "eat without assistance" (p=0.011) than their low SES counterparts. However, while 19% of the interviewees from low SES families would like their child to "eat more rice" (p<0.001), only two interviewees (1%) of high SES families reported this (Table 3.20). There was no significant difference by maternal education level or employment status of mothers in the frequency of desired improvements.

Table 3.20 Top 10 list of "preschoolers' improvement in eating habits" by SES group

Improvements	SES group			Sig. p
	Low N (%)	High N (%)	All N (%)	
Eat faster	28 (23.5)	31 (19.6)	59 (21.3)	0.431
Avoid picky eating	10 (8.4)	28 (17.7)	38 (13.7)	0.026
Eat vegetables/ eat more vegetables	14 (11.8)	16 (10.1)	30 (10.8)	0.644
Concentrate during meals	6 (5.0)	19 (12.0)	25 (9.0)	0.045
Eat more/ have better appetite	14 (11.8)	10 (6.3)	24 (8.7)	0.111
Eat without assistance (eat by himself)	2 (1.7)	14 (8.9)	16 (5.8)	0.011
Eat more fruits	4 (3.4)	11 (7.0)	15 (5.4)	0.190
Eat more rice	13 (10.9)	2 (1.30)	15 (5.4)	<0.001
Eat fewer candies	5 (4.2)	6 (3.8)	11 (4.0)	0.865
Eat fewer snack foods	5 (4.2)	5 (3.2)	10 (3.6)	0.647

3.10 Nutrient intakes of the preschoolers

As described in Chapter 2, the nutrient and dietary intake data were derived from the three dietary intake recalls, with two weekdays and one weekend day. The intake data was then averaged to a daily amount, and the variations in energy and various nutrient intakes by SES group were examined. These mean nutrient intakes were then compared to the Recommended Dietary Allowance (RDA) of the People's Republic of China (PRC) Chinese Nutrition Society in 2000, the WHO recommendation in 2003 and the dietary guidance for dietary fiber from the Institute of Medicine (IOM) in 2004. The main contributors of the main nutrients were also shown in this section.

Table 3.21 presents the mean energy and various nutrient intakes by SES group. Preschoolers from high SES families had a mean daily energy intake of 1350 kcal, which was significantly higher than that of preschoolers from low SES families, with a mean of 1277 kcal (p=0.033). Although there was no significant difference between the mean carbohydrate intakes by the SES group, a trend was seen that the percent energy from carbohydrate was slightly higher in low SES preschoolers than in high SES preschoolers (p=0.066). Protein, fat, calcium and vitamin C intakes were all significantly higher in preschoolers from high *vs* low SES families.

Table 3.21 Mean (SD) intakes of energy and various nutrients by SES group

Nutrient intake Mean (SD)	SES group			
	Low	High	All	Sig. *p*
Energy (kcal)	1277 (287)	1350 (281)	1317 (285)	0.033
Carbohydrate (g)	165 (34)	171 (34)	168 (34)	0.181
Protein (g)	52 (17)	56 (17)	54 (17)	0.046
Fat (g)	45 (15)	49 (15)	47 (15)	0.031
% energy CHO	52 (6.7)	51 (5.7)	52 (6.3)	0.066
% energy protein	16 (2.9)	16 (3.1)	16 (3.0)	0.207
% energy fat	32 (5.3)	33 (4. 9)	32 (5.2)	0.127
SFA (g)	14 (5.0)	15 (4.7)	15 (4.8)	0.121
% energy SFA	10 (2.2)	10 (2.0)	10 (2.0)	0.692
Cholesterol (mg)	209 (99)	212 (94)	209 (96)	0.785
Fiber (g)	7.1 (2.5)	7.6 (3.1)	7.4 (2.9)	0.124
Calcium (mg)	429 (191)	516 (193)	476 (195)	<0.001
Vitamin C (mg)	64 (32)	99 (80)	86 (72)	<0.001

For preschoolers from both high and low SES groups, the range of energy intakes was large, ranging from 688 kcal to 2223 kcal for high SES preschoolers and 671 kcal to 1894 kcal for low SES preschoolers. The mean energy intakes, as measured in this survey, were below the RDAs recommended by the PRC Chinese Nutrition Society in 2000; for example, the mean energy intake for girls aged 3 was 1271 kcal and the RNI recommended for the sample group was 1300 kcal, the difference was 30 kcal. Nearly 60% of preschoolers from both SES groups had energy intakes slightly below the RDAs for each age and gender sub-group. Although the data showed that more high SES preschoolers reached the recommendation than their low SES counterparts, the difference was not statistically significant (Table 3.22).

There was no RDA recommendation by the PRC Chinese Nutrition Society for carbohydrate intake, but according to the population nutrient intake goals proposed by the WHO in 2003, the percent of energy intake for carbohydrate should be between 55% and 75% of total calories. As shown in Table 3.22, the majority (74%) of the surveyed preschoolers did not reach the recommended range for this

macronutrient, particularly the preschoolers from high SES families (p=0.012).

The protein RDAs are 45 g for children aged 3 and 50 g for children aged 4, as recommended by the PRC Chinese Nutrition Society. Over 40% of the surveyed preschoolers failed to reach the recommendation, with a higher proportion of high SES preschoolers meeting the recommended value than their low SES counterparts (p=0.030). However, nearly all preschoolers reached the WHO recommended value for the percent energy from protein (i.e. 10-15%), and 64.3% of them even exceeded the recommended range, with a higher proportion of high SES preschoolers exceeding the recommendation than low SES preschoolers (refer to Table 3.22).

The mean fat intake for all preschoolers was 47 g. The mean intake was higher for preschoolers from high SES households than their low SES counterparts (49 g *vs* 45 g; p=0.031). The overall mean value of the percent energy intake from fat for both groups, 31.9%, exceeded the recommended level by the WHO (i.e. <30%), and nearly two-thirds of the preschoolers consumed over 30% energy from fat. There was no significant difference by SES group, however.

The mean saturated fatty acid (SFA) intake was 14.8 g and about 10% of the energy intake came from SFA. More than 45% of the preschoolers exceeded the WHO recommended level, but no significant difference was found by SES group. The upper limit for cholesterol intake of the WHO was 300 mg daily, and was exceeded by about 17% of the surveyed preschoolers, with the proportions from both high and low SES groups similar.

Most (70%) of the preschoolers were consuming less than the "age + 5" American

Health Foundation recommendation for fiber (Table 3.23) and none met the adequate intake for mean fiber consumption per 1000 kcal daily recommended by the IOM (IOM, 2004), i.e. 19 g for children. Similar proportions of high and low SES preschooler reached the "age + 5" recommendation.

The mean intake of calcium of the surveyed preschoolers was 476 g, and the vast majority (85.8%) of the preschoolers did not meet the recommended intakes of calcium of the PRC Chinese Nutrition Society, which was 600 mg for children aged 3 and 800 mg for children aged 4. Although a somewhat higher proportion of preschoolers from high SES families than from the low SES families reached the calcium recommendation, there was no significant difference by SES group. High SES preschoolers were more likely to meet the vitamin C recommendation of the PRC Chinese Nutrition Society than low SES preschoolers (66.5% *vs* 43.7%; $p<0.001$).

Table 3.22 Proportions (%) of the surveyed preschoolers meeting the RDA for energy and various nutrients by SES group

Energy or nutrients	SES group			Sig. *p*
	Low N (%)	High N (%)	All N (%)	
Energy (kcal)*				
<1,300 or1,400	75 (63.0)	85 (53.8)	160 (57.8)	0.124
≥1,300 or 1,400	44 (37.0)	73 (46.2)	117 (42.2)	
% energy CHO**				
<55%	79 (66.4)	126 (79.7)	205 (74.0)	0.012
55% - 75%	40 (33.6)	32 (20.3)	72 (26.0)	
Protein (g)*				
<45 g	56 (47.1)	54 (34.2)	110 (39.7)	0.030
≥45 g	63 (52.9)	104 (65.8)	167 (60.3)	
% energy protein**				
<10%	4 (3.4)	0 (0)	4 (1.4)	
10% - 15%	46 (38.7)	49 (31.0)	95 (34.3)	0.021
>15%	69 (58.0)	109 (69.0)	178 (64.3)	

Table 3.22 Proportions (%) of the surveyed preschoolers meeting the RDA for energy and various nutrients by SES group (continued)

Energy or nutrients	SES group			Sig. *p*
	Low N (%)	High N (%)	All N (%)	
% energy fat**				
<30%	47 (39.5)	50 (31.6)	97 (35.0)	0.175
≥30%	72 (60.5)	108 (68.4)	180 (65.0)	
% energy SFA**				
<10%	64 (53.8)	83 (52.5)	147 (53.1)	0.837
≥10%	55 (46.2)	75 (47.5)	130 (46.9)	
Cholesterol (mg)**				
≤300	97 (81.5)	132 (83.5)	229 (82.7)	0.658
>300	22 (18.5)	26 (16.5)	48 (17.3)	
Fiber (g)***				
<8 or 9	86 (72.3)	108 (68.4)	194 (70.0)	0.481
≥8 or 9	33 (27.7)	50 (31.6)	83 (30.0)	
Calcium (mg)*				
<600 or 800	106 (89.1)	131 (82.9)	237 (85.6)	0.149
≥600 or 800	13 (10.9)	27 (17.1)	40 (14.4)	
Vitamin C (mg)*				
<60 or 70	67 (56.3)	53 (33.5)	120 (43.3)	<0.001
≥60 or 70	52 (43.7)	105 (66.5)	157 (56.7)	

*The PRC Chinese Nutrition Society, 2000 recommendations
**The WHO, 2003 recommendations
***American Health Foundation, 1995 recommendation

Table 3.23 Mean (SD) fiber consumption per 1000 kcal daily by SES group (p=0.836)

SES group	N	Mean (SD)	Min.	Max.
Low	119	5.6 (1.8)	1.2	11.2
High	158	5.6 (2.0)	1.55	13.0

3.11 Food consumption patterns of the preschoolers

The gram quantities of five main food groups, i.e. grains, vegetables, fruits, meats and milks, consumed by the preschoolers during the three days' dietary recalls were calculated. The mean intakes of each food group by SES group are shown in Table 3.24. Throughout the three days' recalls, nearly 8% (N=22) of the preschoolers had no fruits at all, while nearly 3% (N=8) of them consumed neither any vegetables nor milks. The proportions of preschoolers from high and low SES families who did not

consume these food groups were similar. Preschoolers from high SES families were, however, more likely to consume more vegetables (p=0.023) and milks (p<0.001) than their low SES counterparts. However, preschoolers in the low maternal education group consumed a significantly more vegetables (85 g *vs* 63 g; p=0.001) than their counterparts with more highly educated mothers.

Follow-up formula was the most common source of milk in preschoolers' diets and roughly 80% of the preschoolers consumed some formula daily, with more preschoolers from high SES families than from low SES families doing so (72% *vs* 87%; p=0.003), and therefore, the total amount of formula consumption was higher in high SES preschoolers than their low SES counterparts as well (334±223 ml *vs* 223±236 ml; p<0.001). Preschoolers in high maternal education group also drank more milk than those in low maternal education group (313±233 ml *vs* 236±238 ml; p=0.011).

Table 3.24 Mean (SD) consumption of five main food groups by SES group

Food groups	SES group			Sig. p
	Low Mean (SD)	High Mean (SD)	All Mean (SD)	
Grains (g)	267 (82)	280 (94)	274 (89)	0.220
Fruits (g)	120 (87)	120 (94)	120 (91)	0.988
Vegetables (g)	60 (47)	85 (63)	78 (57)	0.023
Meats (g)	129 (71)	134 (70)	132 (70)	0.606
Milks (ml)	327 (229)	435 (209)	389 (224)	<0.001

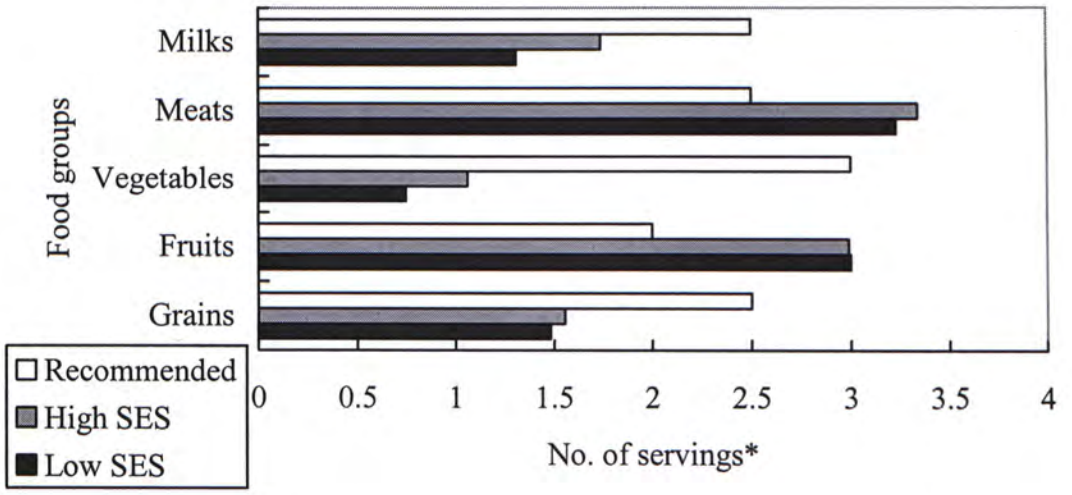
Surprisingly, only 8.7% (N=24) interviewees reached adequate intake levels for both fruits and vegetables daily (Appendix J9). Preschoolers whose interviewee reported adequate intakes in both vegetables and fruits were more likely to have higher mean intakes of vegetables (108 g *vs* 75 g; p=0.004) and fruits (167 g *vs* 117 g; p=0.010), as compared to those preschoolers whose interviewees reported having vegetables

and fruits less frequently. Such a relationship was also found for total fiber intake of the preschoolers (Table 3.25). Moreover, preschoolers whose interviewees had frequent whole grain foods intake had significantly higher daily fiber intakes than those interviewees who seldom had whole grain foods (7.8 g *vs* 7.1 g; p=0.040).

Table 3.25 Preschoolers' mean intakes of fruits, vegetables and fiber by interviewee's fruit and vegetable adequacy

Preschooler's intake (g) Mean (SD)	Interviewee's fruits and vegetables intakes		
	Adequate (N=27)	Inadequate (N=262)	Sig. p
Fruits	167.0 (115.86)	117.3 (91.78)	0.010
Vegetables	108.1 (67.56)	75.3 (55.13)	0.004
Fiber	9.4 (4.26)	7.2 (2.62)	0.015

Serving sizes of each food group were then calculated according to the recommended levels for children aged 3 to 6 by the Department of Health of the HKSAR, and then compared by SES group, Figure 3.14 shows that both high and low SES preschoolers had imbalanced diets. The number of meat group servings (3.2 and 3.3 for low and high SES group, respectively) exceeded the recommended serving by about 0.7 serving and the number of servings (3 for both groups) from the fruit group exceeded the recommendation by one serving, while the mean number of servings from the grain, vegetable and milk groups did not meet the recommendations. When correlating the meat intake with the milk intake of the preschoolers, it was found that they were inversely correlated (p=0.027, r=-0.130).



*HKSAR serving sizes: milk=250ml, meat=40g, vegetable=80g, fruit=40g and grain=180g

Figure 3.14 Mean number of servings from each food groups by SES group, with significant difference in milk and vegetable consumptions (p=0.023 and p<0.001, respectively)

Table 3.26 shows the proportion of preschoolers taking dietary supplements during the three days' dietary recalls by SES group. The practice of taking dietary supplements was not very common, with only about 20% of them reporting as taking some kinds, mainly multi-vitamins and calcium. A significantly higher proportion of high SES preschoolers took supplements than their low SES counterparts (26.6% *vs* 10.9%; p=0.001). Though not significant, a trend was seen in which more preschoolers in high maternal education group took supplements than those in low maternal education group (22.8% vs 13.2%; p=0.056).

Table 3.26 Proportions of preschoolers taking dietary supplements by SES group (p=0.001)

Taking supplements	SES group		
	Low N (%)	High N (%)	All N (%)
No	106 (89.1)	116 (73.4)	222 (80.1)
Yes	13 (10.9)	42 (26.6)	55 (19.9)
All	119 (100)	158 (100)	277 (100)

3.12 Meal and snack patterns of the preschoolers

Interviewees were asked to provide the time of each eating occasion and whether they considered it to be a breakfast, lunch, dinner or snack during the 24-hour dietary recalls. The mean energy and nutrient intakes of each eating occasion were calculated from these data and compared by SES group.

Regardless of SES group, the mean number of daily eating occasions was six. About 1% (N=5) of the interviewees reported that their child did not consume any breakfast throughout the three days dietary recalls. The same number of the interviewees (N=5) reported that their child did not have any lunches during the three days, but all had dinner and at least one snack.

The percentages of daily food energy provided by breakfast, lunch, dinner and snacks by SES group are shown in Table 3.27. The snacks for both SES groups provided about 30% of their daily energy intake, which was higher than for any main meal. Preschoolers from high SES families had a significantly higher percentage of energy from lunch than their low SES counterparts.

Table 3.27 Percents of total energy from each eating occasion by SES group

Eating occasion	SES group			
	Low (%) (N =119)	High (%) (N=158)	All (%) (N=277)	Sig. *p*
Breakfast	16.5	16.1	16.3	0.618
Lunch	22.8	25.4	24.3	0.010
Dinner	28.1	26.7	27.3	0.164
Snacks	30.4	31.2	30.9	0.544

As shown in Table 3.28 and as expected, carbohydrate contributed about half of the energy of each meal eating occasion, and more for snacks. Breakfasts tended to be

higher in fat than other meals, while snacks, also higher in fat than lunches and dinners, were higher in carbohydrate but lower in protein than the three meals. The percents energy from fat in breakfast ($p<0.003$) and snacks ($p<0.042$) and the percent energy from protein ($p<0.009$) in lunch were significantly higher for preschoolers from high SES families than for their low SES counterparts.

Calcium density (milligrams of calcium intake per 1000 kcal food energy) of each eating occasion was compared. Breakfasts showed the highest calcium density among the meals and was significantly higher for high SES preschoolers than for their low SES counterparts ($p<0.001$). Though not significant, trends of higher calcium intake in high SES preschoolers than that of low SES preschoolers were also seen for other eating occasions (Figure 3.15).

Table 3.28 Percents of energy from carbohydrate, protein and fat of each eating occasion by SES group

Eating occasion	SES group			Sig. *p*
	Low (%) (N =119)	High (%) (N=158)	All (%) (N=277)	
Breakfast				
Carbohydrate	48.1	47.6	47.8	0.766
Protein	12.1	11.6	11.8	0.338
Fat	36.0	40.1	38.4	0.003
Lunch				
Carbohydrate	49.9	50.5	50.3	0.693
Protein	17.1	19.1	18.2	0.009
Fat	27.5	29.4	28.6	0.123
Dinner				
Carbohydrate	46.6	45.6	46.0	0.507
Protein	22.3	23.5	23.0	0.087
Fat	29.6	29.5	29.6	0.942
Snacks				
Carbohydrate	61.6	59.2	60.2	0.067
Protein	10.6	10.2	10.4	0.430
Fat	29.9	32.0	31.1	0.042

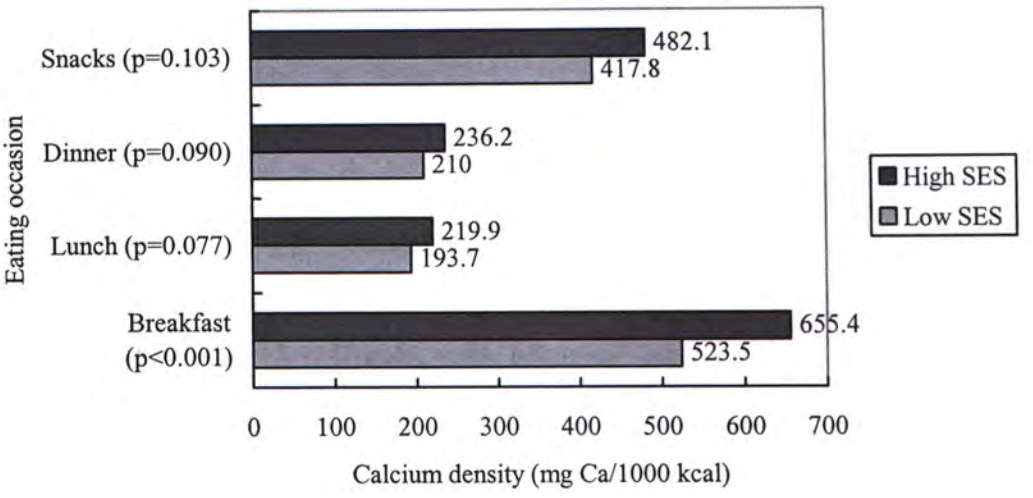


Figure 3.15 Calcium density of each eating occasion by SES group (p<0.001 for breakfast)

3.13 Main contributions of food sub-groups to energy and various nutrient intakes of the preschoolers

Table 3.29a shows the main contributions of the food sub-groups to food energy and various nutrient intakes for the preschoolers, while Table 3.29b shows the main contributors by SES group. The main source of energy, carbohydrate, protein, fat, SFA and calcium was follow-up formula, with significantly greater proportions of these nutrients provided by this food in the high than the low SES group. Pasta and rice were the main contributors to energy intake for the children, providing 23% of the overall mean daily intake. Follow-up formula was the next largest contributor to energy intake, providing 17% of energy for high SES children, and 12% for low SES children (p=0.001). The contributions of fiber from both pasta and rice and follow-up formula were greater for high SES preschoolers than for their low SES counterparts (22% *vs* 19%; p=0.087 and 21% *vs* 17%; p=0.008, respectively), but low SES preschoolers obtained significantly more fiber from soups than did their high SES counterparts. The proportion of calcium derived from pasta and rice for low SES preschoolers was somewhat greater than that derived from pasta and rice for high

SES preschoolers (p=0.030).

Table 3.29a Contributions in % of food sub-groups to food energy and various nutrient intakes

Energy or nutrient	Contributing food sub-group	% contributed
Energy (kcal)	Pasta and rice	23.2
	Follow-up formula	14.7
	Pork	8.7
	Breads, rolls, biscuits	6.8
	Poultry	4.4
Carbohydrate (g)	Pasta and rice	36.1
	Follow-up formula	12.4
	Breads, rolls, biscuits	9.1
	Fruits, fresh and unsweetened	5.4
	Cakes	4.1
Protein (g)	Pork	18.5
	Pasta and rice	13.0
	Fish and fish roe	11.0
	Poultry	10.5
	Follow-up formula	5.9
Fat (g)	Follow-up formula	22.1
	Pork	14.7
	Poultry	7.5
	Pasta and rice	6.0
	Cakes	3.8
SFA (g)	Follow-up formula	24.3
	Pork	16.0
	Poultry	6.7
	Milk	5.3
	Cakes	4.2
Cholesterol (mg)	Pork	19.7
	Egg recipes	19.0
	Fish and fish roe	10.3
	Poultry	9.7
	Eggs	6.6
Fiber (g)	Pasta and rice	20.7
	Cooked vegetables, fresh, frozen or canned	18.9
	fruits, fresh and unsweetened	15.5
	Breads, rolls, biscuits	9.8
	Soups	4.8

Table 3.29a Contributions in % of food sub-groups to food energy and various nutrient intakes (continued)

Energy or nutrient	Contributing food sub-group	% contributed
Calcium (mg)	Follow-up formula	31.6
	Milk	9.2
	Cooked vegetables, fresh, frozen or canned	8.2
	Breads, rolls, biscuits	6.4
	Pasta and rice	5.7

Table 3.29b Contributions in % of food sub-groups to food energy and various nutrient intakes by SES group

Energy or nutrient	Contributing food sub-group	SES group		
		Low SES (%)	High SES (%)	Sig. *p*
Energy (kcal)	Pasta and rice	23.0	23.3	NS
	Follow-up formula	12.0	16.7	0.001
	Pork	9.2	8.4	NS
	Breads, rolls, biscuits	8.4	7.4	NS
	Poultry	4.4	4.4	NS
Carbohydrate (g)	Pasta and rice	35.5	36.6	NS
	Follow-up formula	10.1	14.1	0.002
	Breads, rolls, biscuits	11.4	10.0	NS
	Fruits, fresh and unsweetened	6.5	6.5	NS
	Cakes	4.3	3.7	NS
Protein (g)	Pork	19.0	18.1	NS
	Pasta and rice	13.1	12.9	NS
	Fish and fish roe	10.5	11.4	NS
	Poultry	10.3	10.7	NS
	Follow-up formula	5.0	6.6	0.012
Fat (g)	Follow-up formula	8.0	25.1	0.001
	Pork	15.7	14.0	NS
	Poultry	7.7	7.4	NS
	Pasta and rice	5.6	6.3	NS
	Cakes	3.8	3.8	NS
SFA (g)	Follow-up formula	19.6	27.9	0.001
	Pork	16.8	15.2	NS
	Poultry	6.8	6.6	NS
	Milk	6.0	5.0	NS
	Cakes	4.4	4.1	NS

Table 3.29b Contributions of food sub-groups to food energy and various nutrient intakes by SES group (continued)

Energy or nutrient	Contributing food sub-group	SES group Low SES (%)	SES group High SES (%)	Sig. *p*
Cholesterol (mg)	Pork	20.9	18.8	NS
	Egg recipes	18.3	19.6	NS
	Fish and fish roe	9.0	11.2	0.096
	Poultry	9.2	10.0	NS
	Eggs	6.9	6.5	NS
Fiber (g)	Pasta and rice	19.3	21.8	0.087
	Cooked vegetables, fresh, frozen or canned	16.8	20.5	0.008
	Fruits, fresh and unsweetened	18.5	18.9	NS
	Breads, rolls, biscuits	12.3	10.6	NS
	Soups	6.2	3.8	0.009
Calcium (mg)	Follow-up formula	26.4	35.4	0.002
	Milk	11.0	8.1	NS
	Cooked vegetables, fresh, frozen or canned	8.0	8.2	NS
	Breads, rolls, biscuits	7.4	5.7	0.016
	Pasta and rice	6.2	5.3	0.030

3.14 Intakes of energy and various nutrients from foods eaten at home and outside home

The data presented in the previous sections examined the energy and other nutrient intakes by the preschoolers from all foods consumed both at home and outside home contributed. However, in this section, the main nutrient intakes were compared by the eating location with SES group. Eating away from home was defined as any eating occasions when the foods were eaten outside home, and this included eating in restaurants, fast food shops, parties and schools. Takeaway items bought from food shops that were eaten at home were therefore not counted as eating outside home. Six preschoolers (around 2%) did not eat away from home at all during the three-day dietary record period and therefore, so they had no energy and nutrient intakes from

foods eaten outside home.

The percentages of daily energy provided by eating at home and outside home are presented in Table 3.30. A higher proportion of energy intake eaten outside home was found among preschoolers from high SES families than from their low SES counterparts (23.7% *vs* 20.1%; p=0.040). As the number of eating occasions spending outside home was not significantly different by SES group (N=4 for both groups), it implied that high SES preschoolers consumed a higher energy intake in each eating out occasion than the low SES preschoolers.

Table 3.30 Percentages of energy from eating at home and outside by SES group

Eating location	SES group		
	Low (%)	High (%)	Sig. p
Eating at home	79.9	76.3	0.040
Eating outside home	20.1	23.7	0.040

Preschoolers from high SES families had a significantly higher percent energy from fat at home than their low SES counterparts, as well as a trend for a higher percent energy from SFA, as shown in Table 3.31. However, the low SES preschoolers showed a trend (p=0.052) to eat a higher proportion of energy from carbohydrate at home. The mean intakes of cholesterol, fiber density and sodium density at home and outside home did not differ by SES group (data not shown).

Table 3.31 Means (SD) of energy and percentages of energy from each macronutrient eating at home and outside home by SES group

Nutrient intake	SES group			
Mean (SD)	Low	High	All	Sig. *p*
Energy (kcal)				
At home	1016 (297)	1030 (294)	1024 (295)	0.699
Outside home	265 (211)	329 (197)	295 (208)	0.011
% energy CHO				
At home	52 (8.0)	50 (6.8)	52 (6.3)	0.052
Outside home	56 (12.9)	54 (10.7)	55 (11.7)	0.160
% energy protein				
At home	16 (3.1)	16 (3.8)	16 (3.5)	0.476
Outside home	14 (5.9)	15 (4.9)	15 (5.4)	0.106
% energy fat				
At home	31 (6.6)	33 (5.9)	32 (6.3)	0.041
Outside home	30 (9.4)	31 (9.5)	31 (9.4)	0.715
% energy SFA				
At home	10 (2.6)	11 (2.5)	10 (2.6)	0.098
Outside home	10 (4.2)	9 (4.0)	9 (4.0)	0.326

The frequency of eating out in fast food shops was queried in the lifestyle questionnaire, and it was found that the fiber intake per 1000 kcal (p=0.002), the percents energy intake from carbohydrate (p=0.008) and SFA (p=0.030) all varied with the reported frequency of eating out in fast food shops when analyzed by independent 2-tailed t-test. Interestingly, preschoolers who reported more often eating out in fast food shops had a lower fiber/1000 kcal consumption and percent of energy from carbohydrate, but a higher percent of energy from SFA (Table 3.32).

Table 3.32 Nutrient intake variations with the reported frequency of eating out in fast food shops

Nutrient intake	Frequency of eating out in fast food shops	N	Mean (SD)	Sig. *p*
Fiber/1000 kcal	2-3 times/mth or less	201	5.8 (2.0)	
	1-3 times/wk	81	5.3 (1.7)	0.002
	4 times/wk or daily	7	3.7 (0.6)	
% energy CHO	2-3 times/mth or less	201	52 (6.3)	
	1-3 times/wk	81	52 (6.2)	0.008
	4 times/wk or daily	7	45 (5.2)	
% energy SFA	2-3 times/mth or less	201	15 (4.8)	
	1-3 times/wk	81	15 (4.4)	0.007
	4 times/wk or daily	7	20 (6.4)	

3.15 Associations of parental feeding practices, preschoolers' nutrient intakes and physical activity patterns with childhood overweight and obesity

According to the findings in Section 3.3, the overweight/obesity rate of surveyed preschoolers by IOTF references was 12.5% (N=36). In order to identify the factors associated with obesity, chi-square and independent *t*-test methods were performed for all the factors discussed in the earlier sections, including the feeding practices, activity, dietary and nutrient intakes of the preschoolers. The preschoolers were divided into two groups, one with those of healthier weight status (N=253) and another of those overweight or obese preschoolers (N=36). The mean BMI of the preschoolers was also tested for correlations with some of the factors.

Parental feeding practices and attitudes towards healthy eating by preschoolers' weight status

The interviewees who reported consuming less than one bowl of vegetables per day were more likely to have an overweight/obese child, as compared with their more vegetable-consuming counterparts (Table 3.33). There were no significant associations in the interviewees' reported frequency of consumption of fruits, whole grain foods, pre-prepared foods or snack food intakes with their preschoolers' weight status, however.

Table 3.33 Interviewees' vegetable intake frequency by preschoolers' weight status (p=0.039)

Interviewees' vegetable intake frequency	Preschoolers' weight status		
	Healthier weight N (%)	Overweight/ obese N (%)	All N (%)
≤4-6 times/wk	76 (30.0)	17 (47.2)	93 (32.2)
Daily or more	177 (70.0)	19 (52.8)	196 (67.8)
All	253 (100)	36 (100)	289 (100)

Family meal frequency and location were not associated with preschoolers' weight status. The breakfast-skipping rate and the snacking pattern were not associated with the weight status of the preschoolers as well. Although somewhat fewer overweight/obese preschoolers helped in selecting foods for the family than their healthier weight counterparts, no significant difference was found (Table 3.34). The type of eating utensils used was not associated with the weight status of preschoolers.

Table 3.34 Frequency of preschooler selecting foods for family by preschooler's weight status (p=0.218)

Frequency of selecting foods for family	Preschoolers' weight status		
	Healthier weight N (%)	Overweight/obese N (%)	All N (%)
Seldom or never	98 (38.9)	19 (52.8)	117 (40.6)
Sometimes	103 (40.9)	13 (36.1)	116 (40.3)
Often	51 (20.2)	4 (11.1)	55 (19.1)
All	252 (100)	36 (100)	289 (100)

Among the food and eating rules imposed by interviewees, a trend was seen only for interviewees who required their child to finish the food served. More normal weight preschoolers were required to finish their food often than were the overweight/obese children (p=0.083). There were no other significant associations between other restrictions such as limiting access to sweets and high-foods and keeping snack-foods out of reach. Although TV viewing during meal times did not differ by weight status of the preschoolers, those who often watched TV during dinner had significantly lower daily vegetable (68 g *vs* 88 g; p=0.003) and fiber intakes (7.1 g *vs* 7.8 g; p=0.037), when compared with those who did not.

Activity patterns of the preschoolers by weight status

As shown in Table 3.35, overweight/obese preschoolers were more likely to spend significantly less time eating per day than their healthier weight counterparts (93

mins *vs* 114 mins; p=0.025). Moreover, they had significantly longer total daily screen time (TV viewing and computer playing) than the normal weight preschoolers. Also, overweight/obese preschoolers were more likely to have two hours or more total screen time, when compared with the normal weight preschoolers (Table 3.36). Finally, they had fewer total sleeping hours, and were more likely to have inadequate sleep (less than nine hours for total sleeping hours, including the daytime napping hours) than their normal weight counterparts (14% *vs* 3%; p=0.004).

Table 3.35 Time spent on various activities by preschoolers' weight status

Time spent on various activities Mean (SD) mins.	Preschoolers' weight status		Sig. p
	Healthier weight (N=253)	Overweight/obese (N=36)	
Eating	114 (53)	93 (41)	0.025
Total sleeping	657 (70)	645 (95)	NS
Daytime napping	79 (58)	83 (59)	NS
Sleeping	579 (67)	562 (78)	NS
Reading	49 (34)	49 (36)	NS
Total screen time	82 (63)	107 (73)	0.036
TV watching	73 (62)	93 (63)	0.064
Computer playing	10 (17)	13 (22)	NS
Active playing	73 (63)	87 (68)	NS

Table 3.36 Total screen time per day by preschooler's weight status (p=0.009)

Total screen time/day	Preschoolers' weight status		
	Healthier weight (N=253)	Overweight/obese (N=36)	All (N=289)
<2 hours	187 (73.9)	19 (52.8)	206 (71.3)
≥2 hours	66 (26.1)	17 (47.2)	83 (28.7)

Energy and various nutrient intakes of the preschoolers by weight status

As shown in Table 3.37, the only statistically significant association with weight status was the fiber intake of the preschoolers. Overweight/obese children consumed significantly less fiber daily, when compared with their healthier weight counterparts (6.3 g *vs* 7.6 g; p=0.014), and they had a lower fiber density in grams per 1000 kcal (5.8 g *vs* 7.4 g; p=0.001). Moreover, preschoolers of healthier weight were more

likely to reach the "age + 5" recommendation for fiber intake than those overweight/obese children (p=0.007). Though not significant, trends were seen in the SFA intake, in which overweight/obese children had both higher intake of SFA and percent of energy from SFA than the healthier weight children (p=0.068 and p=0.076, respectively). Furthermore, the correlation coefficients for the percent energy from carbohydrate and protein with BMI of the preschoolers were low but statistically significant (Table 3.38).

Table 3.37 Energy, macronutrients and percents energy from macronutrients intakes by preschooler's weight status

Nutrient intake Mean (SD)	Preschooler's weight status		
	Healthier weight (N=253)	Overweight/ obese (N=36)	Sig. p
Energy (kcal)	1311 (287)	1361 (273)	NS
Carbohydrate (g)	168 (34)	170 (36)	NS
Protein (g)	53 (17)	56 (15)	NS
Fat (g)	47 (15)	50 (13)	NS
SFA (g)	15 (5)	16 (5)	0.068
Cholesterol (mg)	207 (95)	222 (99)	NS
Fiber (g)	7.6 (2.9)	6.3 (2.3)	0.014
% energy CHO	52 (6)	50 (6)	0.092
% energy protein	16 (3)	17 (3)	NS
% energy fat	32 (5)	33 (5)	NS
% energy SFA	10 (2)	11 (2)	0.076
Fiber/1000 kcal	5.8 (1.9)	4.7 (1.6)	0.001

Table 3.38 Correlation coefficient for BMI with nutrient intakes

Preschoolers' BMI	Energy intake	Percents energy from		
		Carbohydrate	Protein	fat
	0.150 (p=0.011)	-0.138 (p=0.019)	0.128 (p=0.030)	0.086 (p=0.147)

Consistent with the findings of lower fiber intake, the daily vegetable intakes of the overweight/obese preschoolers was lower than that of the healthier weight preschoolers (Table 3.39).

Table 3.39 Intakes of main food group by preschoolers' weight status

Food intakes Mean (SD)	Preschoolers' weight status		Sig. *p*
	Normal weight (N=253)	Overweight/ obese (N=36)	
Grain (g)	276 (87)	270 (107)	0.771
Vegetable (g)	81 (58)	60 (50)	0.033
Fruit (g)	122 (95)	124 (95)	0.886
Meat (g)	129 (71)	140 (57)	0.379
Milk (g)	373 (224)	424 (57)	0.220

Chapter Four: Discussion

The identification of environmental factors associated with childhood obesity is necessary for the design of interventions and health education programmes to prevent childhood obesity. In this study, the interviewees and their preschool children were recruited from different socioeconomic backgrounds in order to assess the differences between their environmental characteristics, child-feeding practices, eating habits, key nutrient intakes and also, the childhood obesity rates between high and low SES preschoolers.

4.1 Childhood obesity rate by SES group

Totally 36 (12.5%) of the preschoolers aged three and four years were overweight or obese according to the IOTF references, with the obesity rate higher in boys than girls, which is in line with the findings revealed in the 1993 HK Growth Survey (Leung *et al.*, 1996), and the obesity rate having increased from 4.8% since 1993. When comparing the prevalence of overweight/obesity in our study, while the proportions of girls in low SES group and boys in high SES group had a higher overweight/obesity rate at age 4 than at age 3, boys in the low SES group had a lower rate at age 4 than their age 3 counterparts. One study showed that the prevalence of preschool childhood obesity in Beijing was also higher in boys than girls (Iwata *et al.*, 2003). The increasing body stature of our surveyed children compared to the earlier data (Leung *et al.*, 1996) may represent a continuing positive secular change of HK children as a result of economic development and adequate nutrient intakes than previous generations (Simsek *et al.*, 2001, Castilho *et al.*, 2001).

Although no association was found in the prevalence of childhood obesity by SES group, this study reveals that the family food environments, feeding practices, activity patterns and nutrient intakes of preschoolers from high and low SES households were different. No

consistently protective or obesogenic differences were found in either SES group, however, which may have led to the similar prevalence of obesity by SES group in HK.

4.2 Characteristics of the preschoolers and the households

Monthly household income was used as main indicator of SES in this study, and children from both low and high SES groups were recruited from two main types of kindergartens distinguished by a twofold difference in tuition. In the resulting sample, a high correlation between the SES and caregivers, parental educational level, parental occupation type and housing type was found. The differences between the socio-demographic characteristics by SES group were further associated with differences in family food environments and feeding practices of the preschoolers (Table 4.1). Differences between the environmental characteristics by maternal education level and mother's employment status were also found and are listed in Tables 4.2 and 4.3, respectively.

Table 4.1 Protective or obesogenic behaviors in family food environments and feeding practices of the preschoolers by SES group

Family food environments	SES group	
	Low	High
Ever breastfed		√
Duration of breastfeeding	√	
Home food purchasing		
Food shopping frequency/wk	√	
Family meal frequency and location		
Dine together with family daily	√	
Eating out in non-Chinese and Chinese restaurants		×
Eating out in fast food restaurants	×	×
Breakfast-skipping	×	
Fixed snack times		√
Formula as snack beverages	?	?

Keys: × An obesogenic practice that may increase risk of childhood obesity
√ A protective practice that may decrease risk of childhood obesity
? A practice that remains unknown in its effect on childhood obesity

Table 4.1 Protective or obesogenic behaviors in family food environments and feeding practices of the preschoolers by SES group (continued)

Preschoolers' meal preparation activities		
Going food shopping with interviewee		√
Using infant bottle as utensils	×	×
Food and eating rules and mealtime activities		
Limiting access of high-fat foods		?
Giving food rewards	×	
TV viewing during meals and snacks	×	
Reading during dinner		×
Child's sedentary activities patterns		
Frequency preschooler brought to park or playground	×	×
TV on all day	×	
TV on duration (if not all day)	×	
Duration of active playing	×	×
Less than 9 hrs sleeping		×
Duration of reading		√
Total screen time in group		√
Nutrient or food intakes		
% energy CHO	√	
% energy protein	?	?
Vitamin C		√
Milk intakes		√
Vegetable intakes		√
Total energy from lunch		√

Keys: × An obesogenic practice that may increase risk of childhood obesity
√ A protective practice that may decrease risk of childhood obesity
? A practice that remains unknown in its effect on childhood obesity

Table 4.2 Protective or obesogenic behaviors in family food environments and feeding practices of the preschoolers by maternal education level

Family food environments	Maternal education level	
	Low	High
Breastfed duration		√
Home food purchasing guided by		
Preferences of other family members for pre-prepared foods	×	
Preferences of other family members for snack foods	×	

Keys: × An obesogenic practice that may increase risk of childhood obesity
√ A protective practice that may decrease risk of childhood obesity
? A practice that remains unknown in its effect on childhood obesity

Table 4.2 Protective or obesogenic behaviors in family food environments and feeding practices of the preschoolers by maternal education level (continued)

Family meal frequency and location		
Dine together with family daily	√	
Eating out in non-Chinese and Chinese restaurants		×
Eating out in stalls	×	
Fixed snack times		√
Preschoolers' meal preparation activities		
Preparing meals for the family	√	
Selecting their own snack foods	×/√ (depends)	
Food and eating rules and mealtime activities		
Limiting access of high-fat foods		?
TV viewing during meals and snacks	×	
Child's sedentary activities patterns		
Duration of active playing		×
Duration of reading		√
Nutrient or food intakes		
% energy CHO	√	
% energy protein	?	?
Vitamin C		√
Calcium		√
Milk intakes		√
Vegetable intakes	√	
Grain intakes	√	
Formula intakes		√

Keys: × An obesogenic practice that may increase risk of childhood obesity
√ A protective practice that may decrease risk of childhood obesity
? A practice that remains unknown in its effect on childhood obesity

Table 4.3 Protective or obesogenic behaviors in family food environments and feeding practices of the preschoolers by mother's employment status

Family food environments	Mother's employment status	
	Housewives	Working mothers
Home food purchasing		
Availability of fruits		×
Availability of vegetables		×
Preferences of other family members for pre-prepared foods	×	
Preferences of other family members for snack foods	×	
Interviewee's own preferences for fruits	?	?
Interviewee's own preferences for vegetables	?	?
Family meal frequency and location		
Dine together with family daily	√	
Eating out in Chinese restaurants		×
Eating out in fast food shops	×	
Breakfast-skipping		√
Fixed snack times		√
Formula as snack beverages		√
Preschoolers' meal preparation activities		
Going food shopping with interviewee	√	
Child's sedentary activities patterns		
TV on duration (if not all day)	×	
Shorter sleeping hours		×
Nutrient or food intakes		
Milks intake		√
Calcium intake		√

Keys: × An obesogenic practice that may increase risk of childhood obesity
√ A protective practice that may decrease risk of childhood obesity
? A practice that remains unknown in its effect on childhood obesity

4.3 High SES families dined together less frequently than their low SES counterparts

Interviewees from the high SES families were more likely to report that their family dined together less frequently than the low SES interviewees, which suggested that their child may have less chance to learn the good eating attitude and behaviors from other family

members. A study by Gillman *et al.* (2000) showed that children aged 9 to 14 years had higher consumption of fruits, vegetables and various nutrients such as fiber and iron, but lower consumption of SFA and fried foods, with more frequent family dinners. Gillman *et al.* (2000) results suggested the power of good parental modeling among children in food intakes and the importance of having frequent family meals. Also, families eating together may place more emphasis on the healthfulness or social roles of meals. In this survey, it was found that the fruit, vegetable and fiber intakes of the preschoolers whose interviewees had adequate daily fruit and vegetable intakes were higher than those who failed to do so.

Eating out in non-Chinese restaurants and Chinese restaurants was associated with SES of the families but no differences were found with eating out in fast food shops and stalls. Preschoolers from the high SES families were more likely to eat out in these restaurants than their low SES counterparts, suggesting that high SES families were more willing to spend money in these relatively expensive restaurants than the low SES group. However, housewives, who were more common in the low SES households, were more likely to report eating out in fast food shops with their child than the working mothers.

Fast food shops maybe a more convenient choice than restaurants. According to the Census and Statistics Department of the HKSAR, fast food shops account for nearly 20% of HK's total dining outside home market (Hong Kong, Census and Statistics Department, 2002) and in 2003, while the total number of restaurants of different types decreased, the total number of fast food shops increased and reached 600. This increase in number of fast food shops may imply the increasing popularity and penetration in HK residential areas. Housewives may see eating out in fast food shops as a chance to eat out or escape from home. Moreover, the reasonable price of the fast food meals, and the constant introduction of new menus and advertising campaigns of these fast food shops were found to be the key drivers of the

popularity of fast food shops (ACNeilsen, 2004). The finding that more housewives than working mothers took their children to fast food shops is opposite to what Anderson *et al.* found in 2003, which suggested that working mothers in the US were more likely to bring their child to fast food chains such as McDonald's and KFC or purchase take-away meals due to their lack of time in food preparation. In HK, while children with working mothers were often cared for by domestic helpers, the consumption of fast foods was less likely to be related to fewer hours for food preparation of working mothers. Consistent with the findings by Bowman *et al.* (2004), the more frequently the preschoolers went to the fast food shops, the lower their fiber density and percent energy from carbohydrate, but the higher the percent energy from SFA, which may be harmful to their heart health in the long term while also setting up a lifelong preference for fast foods.

4.4 Preferences of family members as an influential factor in purchasing fruits and vegetables

Unlike the situation in Australia and New York (Campbell *et al.*, 2002; Dennison *et al.*, 1998), no significant differences were found in cost when considering the purchases of fruits and vegetables by SES group. In Hong Kong, markets and supermarkets are easily accessible (as evidenced by over 50% of the interviewees reporting going food shopping daily). With reasonably priced fruits and vegetables for sale in these food outlets, the quality and availability were not determining factors of purchasing fruits and vegetables, rather, the preferences of the family members and the interviewees themselves were more influential. From the data, fewer less low educated mothers and housewives may have been consistently more likely to consider the preferences of other family members in pre-prepared foods and snack foods. It is speculated that, although they may not have wanted these foods for themselves, they would try to satisfy the desires of their family members. They may have had less confidence to refuse their children, or other family

members, such as their husband, because they were generally less nutritionally educated or had less power in the home. Hart *et al.* (2003) found that less low educated mothers were more likely to admit to gaps in their nutrition knowledge, and they were more likely to give in more flexibly to the in food choices of their children, such as by offering the carbonated drinks and crisps. In contrast, working mothers in this sample were more likely to consider availability as an influential factor in buying fruits and vegetables than the housewives, as they had less time for preparing the food for the family.

4.5 Encouraging healthy food shopping practices with the preschoolers

Quite a lot of interviewees went food shopping with their children. In this study, a vast majority (78%) of the preschoolers, especially the low SES preschoolers, went food shopping with their family sometimes, although only 60% of them were actually involved in selecting foods for the family. Together with the preferences of family members that might affect the purchases of fruits and vegetables, it is plausible that children could influence food selection. As suggested by Baranowski *et al.* (1993), nutrition education programmes with children could target their influence in the food selection process. By training them to ask for more healthy foods, and select more healthful foods during food shopping, the food purchases of these foods would hopefully increase their consumption by the whole family. Moreover, asking children to select foods for the family (i.e. fruits and vegetables) may positively associate with the number of servings of these foods consumed by the preschoolers (Stanek *et al.*, 1990). However, in our study, no such relationship was found, probably due to the preschoolers' limited exposure to nutrition education programmes.

4.6 Food and eating rules imposed by parents may influence preschooler's eating habits and nutrient intakes

Eating rules imposed on children may shape their eating habits and influence their relationship with food later in life. For example, young adults who urge their children to finish all foods on their plate and who use food as rewards may be embracing these practices as a result of the same feeding practices reportedly used by their parents during their childhood (Branen L *et al.*, 1999). Parents usually limited their child's consumption of the food perceived to be unhealthy (Stanek *et al.*, 1990), but used food rewards, including sweets and foods at fast food shops, to encourage certain behavior or as a bribe to elicit favorable actions (Reed, 1996).

In this study, interviewees from high SES families were more likely to limit preschoolers' access to high-fat foods as hypothesized, whereas those from low SES families were more likely to use food as rewards, such as taking them to McDonald's, than the higher SES group. However, these repeated practices, perhaps only infrequent, were not associated with childhood overweight/obesity in this study. Apart from the results suggested by other studies showing that the BMI of children was negatively correlated with the instruction to finish the food on their plate (Birch and Fisher, 2000; Fisher and Birch, 1999), a trend was seen in this study in which the more healthy weight preschoolers were instructed to finish their food than the overweight/obese preschoolers. Other eating rules and controls not examined by this study may also be put into effect in these households, however.

Preschoolers from low SES families were more likely to watch TV during lunch, dinner and snacks than their high SES counterparts. Although no association was found between the TV viewing during meals with the weight status of preschoolers, the daily vegetable and fiber intakes of these preschoolers were significantly lower than children who did not watch

TV during meals, which is consistent with previous findings (Coon *et al.* 2001). Some research suggests that watching TV during meals may hinder the chance of chatting and interacting with other family members, and in turn, lower the opportunities for the children to learn health related knowledge and eating behaviors from others during mealtimes (Gillman *et al.*, 2000; Lau *et al.*, 1990; Sallis *et al.*, 1988; Taras *et al.*, 1998). Without TV as a distraction, parents may be able to structure the mealtime and eating behaviors more successfully.

4.7 Preschoolers' sedentary activity patterns

Overweight/obese preschoolers were more likely to spend less time per day eating and sleeping, but longer hours in total screen time, which included TV viewing and computer playing, than the healthier weight preschoolers. It was believed that children who ate their meals quickly were less responsive to their own satiety cues (Johnson and Birch, 1993), and therefore they could not control the internal signals of hunger and fullness so that over-consumption may occur.

Currently there is little information explaining the relationship of short sleeping hours with childhood obesity. Moreover, from the point of view of energy expenditure (Sekine *et al.*, 2002), short sleepers might be expected to spend more energy than those long sleepers as they stayed awake longer hours and therefore using more energy reserves. A plausible explanation may refer to the changes of growth hormone (GH) secretion in the absence of sleep (Sheen *et al.*, 1996). As GH is responsible for growth, those who have lower GH blood concentration (i.e. the short sleepers) were more likely to have weight gain (Sheen *et al.*, 1996), which was further confirmed by the fact that obese children had a lower blood concentration of GH than normal weight children (Radetti *et al.*, 1998). The even shorter sleeping hours in high SES preschoolers may lead to more weight gain over long term than

their low SES counterparts.

No relationship was found between the duration of computer playing and the preschoolers' weight status. This was probably because the preschoolers in this study spent relatively little time (ie. under 10 minutes) using computers daily. However, when summing up the computer playing and TV viewing duration, the total daily screen time became associated with childhood obesity, which is consistent with the findings of previous studies (Hernandez *et al.*, 1999; Sekine *et al.*, 2002). Total screen time might lead to reduction in time spent in physical activity and an increase in dietary intake (snacking during TV watching), suggested by Hernandez *et al.* (1999). In this study, over 60% of the preschoolers consumed snacks during TV time. However, no items queried if the preschoolers' snacking habits were related to the food advertisements of high-fat and high-energy foods, such as the advertisements of the fast food shops and chips. Furthermore, no association was found between the consumption of snack foods and the childhood overweight/obesity. Although the percentage of energy obtained from snacks was higher than that for any meal, this may not necessarily be related to their TV viewing.

Based on our findings, the influence of inactivity (total screen time) seemed to be stronger than that of activity. The duration of active playing was not associated with the childhood overweight/ obesity in our study, which is consistent with the results of other studies (Danielzik *et al.*, 2004; Krassas *et al.*, 2001). However, a trend was seen that the high SES preschoolers spent even less time in active play than the low SES preschoolers. Interestingly, Tremblay *et al.* (2003) found that art and dance (low-activity forms of leisure) involvements were negatively associated with childhood obesity. They speculate that these light activities may prevent children from performing more sedentary behaviors such as TV watching. However, the duration of reading, drawing and doing homework in our study did not show

association with the weight status of the preschoolers. The proportion of time devoted to sedentary activities and active playing was similar in our study, regardless of SES group, while a study by Lindstrom *et al.* (2001) showed that low SES children had a lower quartile of leisure-time physical activity and Sallis *et al.* (1988) showed that low SES preschoolers spent 58% of their leisure time in sedentary activities but only 11% in vigorous physical activities. Nevertheless, it should be noted that reducing screen time, while promoting outdoor playing should always a strategy to choose to tackle the childhood obesity problem (Danielzik *et al.*, 2004).

4.8 Incorrect parental perceptions of preschooler's weight

The incorrectly perceived weight status of the preschoolers' caregivers might also relate to the generally high obesity rate in HK preschoolers. Among the 36 overweight/obese preschoolers, half of them were perceived as having "normal" weight. Traditional Chinese parents thought that fat kids were cute and fat was a sign of health, status and affluence (Hindustantimes.com, 2005). However, in HK nowadays, this perception evidently persisted among our interviewees, perhaps to the detriment of their child's health.

4.9 Nutrient intakes of the preschoolers overall

While the mean daily energy intakes of the preschoolers were below the RDAs recommended by the PRC Chinese Nutrition Society in 2000, the percent energy from fat exceeded the recommended level. Correspondingly, the percents energy from carbohydrate and protein were lower, and over 70% and 40% of the preschoolers failed to acquire the recommendations, respectively. The percent energy from carbohydrate of the high SES preschoolers was even lower than that of their low SES counterparts. Traditionally, Chinese diets, dominated by a starchy staple, consisted of mostly carbohydrate energy but much lower proportion of fat (Du *et al.*, 2004). However, due to the westernization of the diets

among HK people, the fat intakes have increased gradually and reached 32% of total energy in this group, which may be excessive and signify the establishment of an unhealthy dietary pattern.

Although some of the surveyed preschoolers did not reach the protein recommendation (i.e. 45 g) of the PRC Chinese Nutrition Society, nearly all of them reached or even exceeded the WHO recommendation (i.e. 10-15% of total energy). The differences in proportion of children reaching adequate level of protein were due to the different nutrient intake goals set by the two authorities, with a much higher recommended level established by the PRC authorities than the WHO. It was found that the higher the protein consumption per day, the high the BMI for the surveyed preschoolers (data not shown). This might have been due to the higher consumption of the main contributors of protein, i.e. pork and follow-up formula, which also contributed mainly in fat intake of the preschoolers.

Over 80% of the surveyed preschoolers consumed some formula daily. However, a vast majority of the children did not meet the recommendation for calcium intake, with a mean of only 476 mg per day, which is far below the calcium intakes of children in comparable age in Canada (Evers and Hooper, 1996). Even though the mean calcium intake of high SES preschoolers was 100 mg higher than that of the low SES preschoolers, they too failed to reach the recommendation. Calcium, the most abundant mineral in our body, is essential for skeletal growth and bone mineralization, and failure to meet the recommended level of calcium in preschool age may lead to a risk in developing osteoporosis later in life (Matkovic and Ilick, 1993).

A majority of the surveyed preschoolers failed to meet the recommended fiber intakes, i.e. "age + 5" recommendation by the American Health Foundation and surprisingly, none of

them reached the recommendations of the IOM, with no difference by SES group. Also, the overweight/obese preschoolers had significantly lower intakes of vegetables and fiber than the healthier weight children. Daily consumption of a wide variety of vegetables and fruits is a cornerstone of a healthy diet (Fox *et al.*, 2004; Center for Nutrition Policy and Promotion, 1996; Center for Nutrition Policy and Promotion, 1999), and as dietary fiber helps in preventing constipation (Hillemeier C, 1995), and maintaining normal rectal tone and preventing colon cancer (McClung *et al.*, 1995), and promotes satiation and satiety which protect against excessive weight gain (Bowman *et al.*, 2004; Ludwig *et al.*, 1999; Pereira *et al.*, 2001), HK children should strive to acquire adequate daily fiber intake. The consumption of adequate servings of fruits and vegetables, and higher intakes of whole grain foods are keys to enhancing the fiber intakes among both children and adults in HK.

4.10 Comparing the nutrient intakes of the preschoolers with another study carried out in 2000

There are few contemporary studies of the nutrition and diets among preschoolers in Hong Kong that allow comparisons with this study. One source of the data is from a longitudinal study of 125 healthy children living in Hong Kong (Leung *et al.*, 2000). The study was carried out from 1993 to 2000, with the children followed from birth until age 7 years. The mean energy and mean carbohydrate intakes in grams for children aged three and four years in that longitudinal study were lower than the estimates found in this study, but the mean protein intake was similar. All the percent energy from carbohydrate, protein and fat estimates in this study were comparable to the findings of that longitudinal study. However, our results for the calcium intakes were lower intakes than those earlier estimates, with similar vitamin C intakes in both studies. In summary, the energy intakes of preschoolers aged three and four may have increased in these few years, but the macronutrient patterns were more or less the same when comparing our results with those of the longitudinal study.

Both studies revealed imbalanced diets.

4.11 Parental/preschooler association in fruit and vegetable consumption

The majority of both interviewees and preschoolers in our study did not consume an adequate number of servings of fruits and vegetables as recommended by the Department of Health of the HKSAR. Although no differences were found in interviewee's intakes of fruits and vegetables by SES group, the amount of vegetables consumed by high SES preschoolers was significantly greater than that of their low SES counterparts, which was consistent with previous studies among children (Cooke *et al.*, 2003; Gibson *et al.*, 1998; Krebs-Smith *et al.*, 1996; Wyatt *et al.*, 2000).

Associations of interviewees' fruit and vegetable intakes with preschoolers' consumption of these foods were found in this study. Preschoolers with interviewees who had adequate consumption of both fruits and vegetables were more likely to have higher fruit, vegetable and fiber intakes. Previous research suggested that parents and main carers are the primary food role models for preschoolers (Nicklas *et al.*, 2001; Fisher *et al.*, 2002). Preschoolers' accessibility and the exposure to fruits and vegetables are therefore greatly enhanced when caregivers consume more of these foods. In our study, only 30% of the preschoolers reached the American Health Foundation recommendation for fiber intake. Because the habit of eating a lot of fruits and vegetables during childhood does not change significantly between ages two and eight years (Briefel RR *et al.*, 2004; Skinner JD *et al.*, 1997), and the food preferences even persists into adulthood (Krebs-Smith *et al.*, 1995), parents and main carers of the children should play a role in emphasizing the importance of, and more importantly modeling adequate consumption of fruits and vegetables.

4.12 Main contributors of food sub-groups to energy and various nutrient intakes for the preschoolers by SES group

The higher consumption of follow-up formula by the high SES preschoolers than their low SES counterparts may have led to the differences in daily energy, protein, fat and calcium intakes by SES group. Follow-up formula was consumed by nearly 90% of the high SES preschoolers, but only 70% of the low SES preschoolers, and their amounts of formula consumed were significantly different (334±223 ml *vs* 223±236 ml; $p<0.001$). Therefore, the contribution of follow-up formula to energy, macro- and micronutrients also differed by the SES group. Moreover, while follow-up formula was the main contributor of fat intake in high SES preschoolers, pork ranked the first for the low SES preschoolers. The high percent energy intake from fat in breakfast and snacks may also have been due to the consumption of formula during these eating occasions.

Interestingly, the main contributor of fiber was pasta and rice in these preschoolers instead of fruits and vegetables. This might be due to the larger intakes of rice than vegetables in Chinese diets. However, the proportion of fiber contribution from soup was significantly different by SES group. This may suggest that carers or cooks in the high SES group, i.e. domestic helpers, were less likely to prepare soup for the family, though soups traditionally accompanied most Cantonese Chinese meals.

4.13 Differences in family food environments, feeding practices, eating habits and nutrient intakes of preschoolers by maternal education level and mother's employment status

Maternal education level is also commonly used as an SES indicator for it is closely related to the attitudes and knowledge towards eating habits of her child (Molarious, 2003; Birch and Davison, 2001), whereas mother's employment status is seen as a complement of

household income group. In the current survey, the feeding practices imposed by the more highly educated mothers and working mothers were comparable to those of the high SES families, mainly because these three variables were highly correlated. Interviewees in the high maternal education group were less likely to eat out in or buy take-away meals from stalls with their children than their less educated counterparts, as they may be more concerned about the hygienic problems of the food stalls. A higher proportion of preschoolers in the working mother group went food shopping with interviewees frequently. As mentioned in Section 4.5, food shopping with children may enhance their intakes in consuming those foods, and therefore, educators could disseminate awareness of this advantage in order to increase children's consumption of vegetables, fruits and whole grain foods. Preschoolers with mothers in the high maternal education group and working mothers' group consumed a significantly greater amount of milk compared with their counterparts with less educated mothers and housewives, respectively. The former may have been more nutritionally literate and realized the needs of preschoolers in milk or formula intakes.

Although in the current study, average household income was used as the major indicator for SES of the family, it was found that maternal education level and occupational status also matter. Children's health status is a complicated issue which may be affected by different factors through complex multiple pathways. Further studies are therefore needed to give a clearer explanation in of the relationship between SES and children's health in Hong Kong.

4.14 Strengths and limitations of the study

The differences between the family food environments, feeding practices, as well as the activity patterns of the preschoolers aged three and four years by SES group were revealed

in this study by means of a lifestyle questionnaire, while the detailed dietary recalls helped in the investigation the nutrient intakes of the children. This dietary information was useful in examining the energy balance of the local children.

However, although nearly half of the participants in this study were from households having monthly household income lower than the median household income in Hong Kong, many of them were just below the cut-off. This may have limited the ability of this study to identify clearer SES differences or generalize findings to households with relatively low monthly income, i.e. the families in poverty, as the deviation of the study subjects in terms of monthly income was not as wide as it could have been. According to Chow *et al.* (2002), the proportion of children living below poverty line was 25% in year 2001/2002.

Activity patterns of the preschoolers, but not their activity levels, were queried in this study. The proportion of time the preschoolers spent in moderate or vigorous activities were not examined and therefore only general patterns of physical activity could be investigated in this study.

Many common HK foods and children's snack foods were not listed in the nutrient database of the nutrient composition software. Much time was spent in constructing a list of missing foods, making user recipes and obtaining nutrient information from the 2002 Chinese Food composition and the Food Composition Table produced by the Department of Health of Taiwan. Nevertheless, this is a problem for all diet studies conducted in Asia.

Another problem associated with the dietary recall was that inconsistent definitions might occur in eating occasions designated by the interviewees. During the 24-hour dietary recalls, the interviewees were asked to define each eating occasion as breakfast, lunch, dinner or

snacks, so that these eating occasions were not solely designated by the time of eating. This might result in inconsistent categorization within the data set as interviewee might categorize an eating occasion as a breakfast while another interviewee might treat the same occasion as a snack. This problem might hinder the comparisons of the nutrient distributions between individuals or among studies. Criteria should be established for later use, such as categorizing breakfast only when the total energy intake of this meal is greater than 100 kcal (De Henauw *et al.*, 1997), or defining breakfast as any eating occasion that occurred between 5 am to 10 am weekdays or between 5 am and 11 am during weekend days (Affenito *et al.*, 2005).

Only the nutrient distributions but not the foods consumed by eating occasion were shown in this report due to the limitation of the nutrient composition software. Lists of commonly consumed snack foods and beverages, therefore, relied only on reports of the interviewees but not the detailed dietary information obtained by the 24-hour dietary recalls. Thus, information derived by eating occasion was limited.

Finally, as causality cannot be examined by a cross-sectional study, it was difficult to establish whether the risk factors identified preceded or followed the childhood obesity. Therefore, further longitudinal studies will be needed in order to explain how the risk factors lead to childhood obesity by SES group. However, this limitation is rather minor, as it is much more likely that SES difference of the households does lead to differences in feeding practices and eating habits than the reverse.

Chapter Five: Conclusions and Recommendations

The prevalence of childhood obesity increased rapidly in recent decades in HK and throughout the world. Apart from the genetic predisposition, environmental factors also influence the problem. Unlike adults, preschoolers do not earn an income and have not finished their educations, and therefore, parental feeding practices or family-based environments would be the main influential factors contributing to the prevalence of overweight/obesity in children. Previous reports showed that households in different socioeconomic status group have different child feeding practices, which could shape the eating habits of children and in turn, may last for the entire life. In this study, monthly household income was used as the main indicator to distinguish the socio-economic differences in the households.

Although no consistent difference was found by SES group, the family food environments, feeding practices, eating habits and dietary intakes of the preschoolers from different SES group families were significantly different. By further investigating the variables with maternal education and mother's employment status, more consistent findings were found. In light of these findings and those of other recent studies available from other countries, measures to promote healthier eating environments for children are warranted for the caregivers. Moreover, tailor made health and nutrition promotion programmes targeting these sub-groups may be even more appropriate and therefore better help to support behavioral improvements for children and families in households of different SES in Hong Kong.

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Address of recipient

Appendix A1

Date

Dear _____,

Study of Preschoolers' Health and Growth in Hong Kong

My Master of Philosophy student, Ms. Tracy Lo and I, would like to invite your kindergarten to participate in the final wave of our study of the lifestyle of preschoolers aged 3 and 4. The information obtained from the study is to understand the current diet patterns of kindergarten age children so as to improve their future life and that of all Hong Kong children. Diet habits established when young are very important for children's current and future health. The time requested for your participation in this study is very short. The 6 kindergartens who have already participated gave us very positive feedback and found it very useful.

It's our great honor to invite your students to be participants. Attached are the details of the short study for your information and reference. If you have any enquiries to the study, please feel free to contact Ms Lo at 2603 5830 (office).

Ms. Lo shall contact you again by telephone in a week's time. Your kind consideration is most appreciated! Thank you in advance.

Best regards,

Professor GS Guldan
(Food and Nutritional Sciences Programme,
Department of Biochemistry, CUHK)

Tracy Lo (MPhil student)

_____ _____

Encl. Details and procedures of the study.doc

Study of Preschoolers' Lifestyle and Growth in Hong Kong

Purpose of study

A month-long study to examine the dietary and lifestyle patterns of preschoolers aged 3 and 4.

Procedures

The procedure includes height and weight measurements of children who participate in this study, a face-to-face interview with their parents/guardians as well as two additional 15-min telephone diet interviews about their children's diet.

- Consent:

  After obtaining your consent, we will invite your students and parents to join the study.

- Height and weight measurements:

  The simple measurements of the consenting children will be taken during half day in your kindergarten at your convenience. **Researchers will bring their own set of instruments and collect the data themselves.**

- Face-to-face interview:

  Parents/Guardians will be interviewed in their homes or any other places preferred with a questionnaire about their children's diet and health. This short interview will take about 20 minutes.

- Telephone interviews:

  Parents/Guardians will be interviewed at their convenience by the same interviewer by telephone twice within a week of their first interview. Your kindergarten or teachers will not be involved in these interviews or calls.

Important Benefits

- Your kindergarten will reconfirm your positive image to parents in caring about students' health and development.
- Each participating child's parents/guardian will receive an individual health report for their child after all the interviews are complete. This report will inform parents about their own child's findings and about how to further improve his/her health and quality of life.
- Souvenirs will be given to the children when their heights and weights are measured.
- The information obtained from the study will be used to help all children in Hong Kong to establish better lifelong health.

Enquiries

If you have any enquires, please feel free to contact Miss Tracy Lo at 2603 5830 (office) or 9638 4231 (mobile).

Outline of the short 4-step plan (for 60 students joining the program):

Step	Week	Activity
1	1	Briefing sessions for the Principal and teachers
2	2	Invitation and consent forms sent to parents/guardians
3	3	Height and height measurements of students (only half a day is needed)
4	4-6	Interview parents/guardians. Interviews will take place in their home or in kindergarten* if they prefer

***Resources to be provided by kindergarten (only when parents prefer to be interviewed in kindergarten):**

1. A quiet common room/ corner for interview/reception area
2. 2 tables
3. 4 chairs

Appendix A2

致____校長：

新一年　健康新開始！

本人及勞穎詩（本系之研究生）誠意邀請　貴校於來年參與最後階段的「香港幼童健康及成長研究」計劃。所謂「三歲定八十」，幼兒從小培養的飲食習慣，會直接影響他們未來的健康及成長，因此我們期望透過此研究獲得的資料，了解剛入讀幼稚園之三、四歲幼童現時的飲食及生活習慣，並從而改善他們及全香港幼童日後的生活素質。是項計劃不會影響　貴校的上課時間，因爲我們只需約半天便能完成有關學童身高體重量度的步驟。過去半年，沙田及大埔區共有7間學校參與並完成此計劃，而他們對計劃均有正面的評價，且非常認同此計劃的成效。

隨函附上有關詳情以供參考。如有任何疑問或想更深入了解本計劃，歡迎致電勞小姐（辦公室：2603 5830）。我們承諾參加者所提供的私人資料將會絕對保密，並祇用於是次的研究中。

爲使本計劃能順利進行，勞小姐將會於未來一星期致電　貴校，希望屆時能與您商討合作的可能性及其餘的細節。希望　貴校能仔細考慮本計劃。謝謝！

喬治婭・戈登副教授
（香港中文大學生物化學系
食品及營養科學課程）

勞穎詩小姐（研究生）

_____　　_____

附件：「香港幼童健康及成長研究」計劃之詳情及程序

香港幼童健康及成長研究詳情

研究目的

一個只需時半天，主要研究 3 及 4 歲幼童飲食和生活習慣的問卷調查。

研究程序

在得到　貴校的同意後，我們會進一步邀請　貴校的幼兒班學生及其家長參與此項研究。此研究共分爲以下三部份：

- 量度身高體重：
  由於研究人員需要替所有受訪幼童量度身高、體重及計算體重指標，因此這部份需要在校內進行。我們的研究人員將自備量度工具，而確實的日期、時間及地點等安排會因應　貴校情況再作決定。
- 問卷訪問：
  研究人員將會預約參加此研究的家長/監護人進行一個大約三十分鐘的問卷訪問，而內容會圍繞幼童的飲食及健康。訪問地點則設定於學校進行，或視乎家長的意願而決定 (家中或其他地方)。
- 電話訪問：
  爲更了解幼童的飲食習慣，研究人員將會於問卷訪問之後的一星期內致電給家長/監護人進行兩次簡短的電話訪問，詢問有關幼童前一天的飲食情況。由於是次的電話訪問並不需要學校老師的協助，因此將不會影響到老師的日常工作。

參與此研究的得益

- 參加此研究計劃將有助提高　貴校關懷幼童健康及發展的正面形象。
- 當此研究結束後，　貴校將會獲得一些有關均衡飲食及運動的電腦教材。研究人員亦會就　貴校提供給學童的小食提供建議，希望能協助找出既方便又合乎經濟效益的健康小食。
- 每位參加研究的幼童將會在完成量度身高及體重之後，獲派發紀念品。而完成所有訪問後，每位家長均會收到一份其孩子的健康報告。
- 最重要的是，是次研究所得的資料將有助全港的幼童健康成長。

查詢

如有任何查詢或疑問，歡迎致電聯絡勞小姐（辦公室：2603 5830）。

研究計劃之簡介及程序 (以六十名參加者作計算)

星期	活動	備註
1	向校長及老師解釋本計劃的細節 （大概３０－４５分鐘）	
2	向家長派發參加此計劃的同意書	同意書將由研究人員準備
3	爲參加此計劃的幼童量度身高及體重 (將於半天內完成)	研究人員將自備量度工具
4 - 6	與參加此計劃的家長進行問卷訪問	訪問地點視乎家長意願而決定

*若大多數的家長均希望在校內接受問卷訪問，我們希望　貴校能提供以下物資：

1. 一個適合進行訪問 (較不受騷擾) 的房間/ 角落
2. 一張桌子
3. 兩張椅子

而問卷訪問的進行時間將因應學校及家長的情況決定。

	Low Tuition					High Tuition		
School	**Sch. 1**	**Sch. 2**	**Sch. 3**	**Sch. 4**	**Sch. 5**	**Sch. 1**	**Sch. 2**	**Sch. 3**
Type	KSS joined	KSS joined	KSS joined	KSS joined	KSS joined	Private	Private	Private
Monthly tuition fee ($)	951	1037	973	1114	859	2098	2280	2376
Tuition fee group	low	low	low	low	low	high	high	high
School location	Taipo, NT	Taipo, NT	Taipo, NT	Shatin, NT	Chaiwan, HK	Shatin, NT	Taipo, NT	Taikoo, HK
Snack arrangement								
No. of session/day	1	1	1	1	1	1	1	1
Duration	20 mins	15 mins	15 mins	15 mins	20 mins	30 mins	15 mins	15-20 mins
Food rewards	Common (crackers, kelps, candies, chips)	Not common	Common (candies)	Common (crackers)	Common (candies, crackers, kelps)	Not common	Common (Marshmallows, crackers, raisins)	Common (raisins)
Party food	Sausages, fish-balls, juices, Ovaltine, Horlicks	Cake, crackers, chips, candies, carbonated drinks, Yakuat, Vitasoy	Steamed cake, Yakuat	Cake, crackers, chips, water	Steamed cake, sausages, *siu mai*, fish-balls, chicken wings, water	Steamed cake	Cake, water, Chinese tea	Steamed cake
PE lesson								
No. of session/wk	2	5	4-5	5	5	2	2	2
Duration	25 mins	21 mins	25-30 mins	25 mins	20 mins	30 mins	20-25 mins	30 mins

Appendix C1

Study of Preschoolers Health and Growth in Hong Kong

Purpose of study

We invite you and your child to be part of a study examining the health patterns of preschoolers aged 3 and 4. Health practices are very important to children for their lifelong growth and development. Children in Hong Kong now face increased risk in later childhood and adult life for nutrition-related diseases, so it is therefore be valuable to have more information about this age group to allow us to better promote children's lifelong health. Your child's kindergarten's principal has already invited us to work in your child's school.

Procedures

The procedure includes a face-to-face interview in your home or at your child's kindergarten at your convenience (booking in advance) as well as two additional telephone interviews at your convenience within a week's time about your child's diet. Your child will also have height and weight measurements taken in school with all other participants on _____ (date).

- Face-to-face interview:

  You will be interviewed in your home (or any designated place preferred, e.g. kindergarten) by our researcher with a questionnaire about your child's diet and lifestyle, which will take about 20 minutes.

- Telephone interviews:

  In order to fully understand your child's diet, you will be telephoned twice within a week's time for two additional shorter interviews about your child's diet on the previous day.

Risks

There will be no risks from the interviews. All your personal information provided will be kept confidential and will not be disclosed to anyone not involved in the study.

Benefits

An individual health report about your child will be issued to you after all the interviews are complete. Information obtained from the study can help you and your child and all Hong Kong children benefit from adopting a healthier lifestyle in the future.

Enquiries

If you have any enquires, please feel free to contact Miss Lo at 2603 5830 (office) or 9638 4231 (mobile).

CONSENT FORM

If you sign this form, you are willing to join the one-week study described to you on the other side of this page. You may ask the researcher questions during the interview or at any time if you do not understand something that is being done. The researcher will share with you any new findings that may develop while you are participating in this study. The records from this research study will be kept confidential and will not be given to anyone who is not helping on the study, unless you agree to have the records given out.

Please sign your name and return the slip to the class teacher on or before _____ (date). You will be contacted soon by Miss Lo for the booking of the face-to-face interview. Thank you for your cooperation.

==========

Ref No.: _____ (Official Use)

I _____ (parent/guardian) have read and understood the aim of the study, and I * **would like/ would not like** my child _____ (child's name) of * am/ pm class _____ to join this study.

*Please circle the appropriate.

Signature of parent/guardian: _____

Date: _____

Contact No.: _____

Appendix C2

《香港幼童健康及成長研究》計劃

香港中文大學生物化學系食品及營養科學課程　策劃

致　貴家長：

本校應邀參與由香港中文大學生物化學系食品及營養科學課程研究生主辦的《香港幼童健康及成長研究》計劃，現將詳情列出如下，誠邀　貴家長及　貴子弟踴躍參加，使計劃能順利進行。本計劃旨在了解現今幼童的飲食及生活習慣，希望日後能將研究結果貢獻社會，使全港家長能更了解如何協助子女達致終身健康。

計劃詳情

1. 量度身高體重

日期：_____年___月_____日（星期_____）
時間：上課時間內
地點：學校_____課室
對象：就讀半日制班別，於_____年___月_____日至_____年___月_____日出生期間出生的學生
備註：由研究人員替參加者量度身高、體重

2. 問卷訪問及電話訪問

日期：_____年___月中旬開始
時間：按家長的意願安排（爲時３０分鐘）
地點：學校_____課室（或按家長的意願安排）
對象：家長（或照顧者如祖父母、工人）

3. 備註

- 參加此計劃乃屬自願性質。
- 凡應邀參加者必須爲學生及家長（或照顧者）聯同一起參加。
- 凡應邀參加的學生可獲派發紀念品及由營養學家填寫的健康報告。
- 參加者所提供的資料及所有紀錄將會絕對保密，並祇用於是次的研究中。
- 查詢電話：研究生勞小姐 2603 5830
- 茲爲統計人數，所有家長（無論參加與否）請填妥同意書並於___月_____日（星期___）或之前交回班主任。

同意書

本人已知悉有關由香港中文大學生物化學系食品及營養科學課程研究生主辦的《香港幼童健康及成長研究》計劃詳情，並了解本人所提供的資料及所有紀錄均會絕對保密及祇用於是次的研究中。

編號：_____（研究人員專用）

我 （家長／監護人姓名）_____ *同意／不同意我的子女

（學童姓名）_____（性別）_____（出生日期）_____

（班別）_____ 參加此研究計劃。

*請圈出適用者。

家長／監護人簽署：_____ 日期：_____

日間聯絡電話：_____

參加者需填寫下於最適合您的問卷訪問時間旁加上✔號（請儘量填寫所有合適時間）：

日期	時間		日期	時間
☐15/3（二）	☐09:00	☐13:30	☐14/3（一）	☐13:30
☐16/3（三）	☐09:45	☐14:15	☐18/3（五）	☐14:15
☐17/3（四）	☐10:30	☐15:00		☐15:00
	☐11:15	☐15:45		☐15:45

如上述日期、時間均不適合，請將合適的資料填寫在橫線上。

其他日期： _____	其他時間： 上午／下午 _____	其他地點：_____

研究人員將儘量安排參加計劃的家長（或照顧者）於所選的時間接受訪問。

Appendix D


識飲識食金字塔
靜態活動，如看電視、玩遊戲機、坐定超過30分鐘
做最少
閒暇活動、輕度及柔軟度運動
做適量
帶氧運動及康體活動
做多些
行樓梯、走路上學、到公園玩耍、做家務
天天做

Appendix E

香港中文大學
生物化學系　食品及營養科學課程
〈香港幼童飲食及健康研究〉

幼童健康報告

學校名稱： «name»
學童名稱： «name» («id»)

謝謝您參與了是次研究計劃！以下是孩子的身高、體重及飲食情況的結果：

	孩子的結果	意見
身高	«height»（厘米）	不適用
體重	«weight»（公斤）	不適用
體重指標	«BMI»	標準
一星期平均進食早餐的次數	«breakfast»	對了！每天吃早餐能使孩子精力充沛地上課。
是否有特定的小食時間？	是	在午餐及晚餐之間設定健康小食時間，是很好的習慣呢！
平均每天進食的脂肪百分比	«p_fat»（巴仙/%） **標準爲<30%**	請減少孩子進食油膩食物的機會，煮食方法應以蒸、烤、白灼爲主。
平均每天纖維素的攝入量	«fiber»（克） **標準爲 8-9 克**	纖維素對孩子的腸胃健康非常重要，所以你要鼓勵他多吃蔬果呀！
平均每天的攝水量	«water»（毫升） **標準爲最少 «lower»毫升**	如果水喝得不夠，孩子容易便秘。所以家長應鼓勵孩子多喝水、流質飲料，及吃多些含豐富水份的生果、瓜菜。
平均每天做運動／活躍地玩耍的時間	«activity»（分鐘）	日日運動身體好！請繼續努力！
平均每天看電視及玩電腦的時間	«tv»（分鐘）	請維持孩子每天不要看超過兩小時電視

其實培養小朋友良好的飲食習慣，是應該從小開始的！
如果您想孩子有一個更好的成長環境，請翻到下一頁 ☞

飲食建議：

□ 您的孩子應多吃蔬菜和水果：

三至五歲的小孩應每天進食至少一碗蔬菜及一個中型水果（如一個普通大小的橙、蘋果），而進食的份量應隨著他們的成長而增加。

□ 您的孩子應多喝水：

水份對孩子的腸道健康很重要。要知道孩子的攝水量足夠與否，只要將孩子的體重（公斤）乘 100-150（毫升）就可以。如一個體重爲 20 公斤的孩子，他每天就需要喝 1500-2250 毫升的水，即至少六杯水。

□ 您的孩子應每天定時吃早餐：

有研究指出，早餐對學業成績有正面影響。吃早餐的學童在上課時較能集中精神及留心聆聽，閱讀能力、記憶力亦較不吃早餐者爲佳。早餐亦能提供身體成長所需的營養素，幫助發育。每天吃早餐也是一個良好的習慣呢！

其他建議：

□ 您的孩子應多做運動（每天至少三十分鐘）：

到公園散步、跑步或追逐、到遊樂場玩耍、踏三輪車、跳繩等是一些既有益身心又能增進家長與小孩之間感情的活動。

□ 您的孩子應減少每天看電視的時間：

根據研究顯示，幼童應避免每天看電視／玩電腦超過兩小時。看電視過量，除了增加痴肥的機會，也會影響孩子的學業成績呢！

如果您想…

- …孩子的胃口好些或希望他進食多些不同種類的食物：

與孩子一同參與準備晚餐 – 烹調時，可讓孩子參與一些安全簡單的工序，如摘豆芽、加醬料等，不但能提高孩子對食物的興趣，更能令孩子覺得自己製作的食物是特別好吃的呢！

定時吃小食 – 小食不應該在正餐兩小時前進食，以免影響孩子的食慾。因此，我們應安排一個特定時間，如下午四時，提供一些好吃又有營養的小食給孩子。但小食的次數不宜太多，每天最多兩次便足夠了！

避免邊吃邊看電視 – 很多時候孩子都會被精彩的電視節目內容弄致分心，不能專心進食。家長不妨先關掉電視，營造良好的進食氣氛，讓孩子吃得專注，並享受與家人同桌的溫馨時刻！

- …孩子吃多些蔬菜和水果：

多元化的食物選擇 – 和大人一樣，小孩子也會有個人喜好，他們或許不喜歡吃橙和蘋果，家長不妨嘗試一些賣相特別、價錢廉宜，但營養價值同樣豐富的水果，如奇異果、沙田柚、蕃石榴、火龍果等，以吸引孩子進食。至於蔬菜方面，家長可以變換食物的顏色和形狀，使孩子較易接受以往不喜歡的食物。如將菜及青椒切成小粒，或將南瓜粒蒸熟，再弄成蓉跟飯混合來吃。

- …孩子少吃糖果或較不健康的小食：

選購健康有益的小食 - 選購食物時，可考慮一些既美味又較健康的小食，如以豆腐花、酸乳酪代替雪糕，純味餅乾條代替曲奇餅，以提子乾、甜粟米來代替糖果和蝦條等。

Survey of Preschoolers' Health & Growth in Hong Kong

Preschooler's name: _____

Parent's name: _____

Contact number: _____

Date of anthropometric measurement	☐☐☐☐/☐☐/☐☐ (yyyy1/mm1/dd1)
Preschooler's height (mean)	☐☐☐.☐(cm)
Preschooler's weight (mean)	☐☐☐.☐☐(kg)
Remarks	

Survey of Preschoolers'

Health & Growth in Hong Kong

☐☐☐☐[yyyy2] ☐☐[mm2] ☐☐[dd2]

I would like to know your experience feeding and caring for *(child's name)*. Please answer my questions according to your own situation. There is no right or wrong answer to any question because many families do things in many different ways. *(Circle or tick the appropriate)*

Part 1 – GENERAL INFORMATION ABOUT YOUR CHILD & FAMILY

First, I would like to ask some background information about your child and your family.

Study ID	☐☐☐	[id]
Name	_____ Sex:☐ (Female=0, Male=1)	[gender]
Date of Birth	☐☐-☐☐[yyyy3] ☐☐[mm3] ☐☐[dd3]	
Nationality of *(name)*	_____	[nation]☐
Birth Place	_____ if not in HK, how long has ***(name)*** been in HK? ☐☐months	[chorigin]☐☐ [chmonth]
Birth Order	(1) 1st child (2) 2nd child (3) ≥3rd child (9) Unknown	[border]☐
***(name)*'s birth weight**	☐☐.☐☐kg	[bwt]
Was *(name)* ever breastfed? **(If yes,) how long?**	(000) No Yes, ☐☐☐ days	[ebdays]☐☐☐
Interviewee	(1) Mother (2) Father (3) Other _____	[int]
Interviewee's birth place	_____ if not in HK, how long have you been in HK? ☐☐☐months	[porigin]☐☐ [pmonth]
Parents' marital status	(1) Married (2) Cohabiting (3) Single (4) Separated (5) Divorced (6) Widowed (7) Others _____	[marital]☐
Parents' education levels	(0) None/Kindergarten Father☐ // Mother☐ (1) Primary (2) Secondary (F1-3) (3) Matriculation (F4-5) (4) Post-secondary (incl. Technical/vocational) (5) Degree or above	[fedu] [medu]
Parents' ages	Father ☐☐(years) [fage] Mother ☐☐(years) [mage]	
Parents' heights and weights	Father ☐.☐☐ (m) or ☐ft ☐☐in ☐☐☐.☐ (kg) or ☐☐☐ (lb)	[fht] [fwt]
	Mother ☐.☐☐ (m) or ☐ft ☐☐in ☐☐☐.☐ (kg) or ☐☐☐ (lb)	[mht] [mwt]

Does *(name)* live with both parents?	(1) Yes (2) No, only with mother (3) No, only with father (4) No, not with any parents: _____		[custody] ☐
Household size	☐☐ people		[member]
Who is the main caregiver?	(1) Mother (2) Father (3) Grandmother (4) Domestic helper (5) Baby-sister (6) Other _____		[caregiv] ☐
At home, who usually feeds *(name)*?	(1) Mother (2) Father (3) Grandmother (4) Domestic helper (5) Baby-sitter (6) Other _____		[feed] ☐
At home, who usually eats with *(name)*? (can choose more than one answer)	(0) self-feed (1) Mother (2) Father (3) Grandmother (4) Domestic helper (5) Baby-sitter (6) Sisters/ brothers (7)Other _____	[eatw1] ☐ [eatw2] ☐ [eatw3] ☐ [eatw4] ☐	[eatw5] ☐ [eatw6] ☐ [eatw7] ☐

Part 2 – HOME FOOD PURCHASING AND ITS DETERMINANTS

Now I would like to ask about the foods you usually have at home.

	Never	≤ once a month	2-3 times/mo	1-3 times/wk	4 – 6 times/wk	daily	≥Twice a day	Official Use
1. How often do **you** buy foods for your family?	☐	☐	☐	☐	☐	☐	☐	2.1 ☐
2. Is there any person at home helping buying foods for your family?	(1) Yes, _____ (2) No							2.2.1 ☐
If yes, how often?	☐	☐	☐	☐	☐	☐	☐	2.2.2 ☐
3. How often do **you** eat fruits (the size of a med apple)?	☐	☐	☐	☐	☐	☐	☐	2.3 ☐
4. How often do **you** eat (a med rice bowl of)vegetables?	☐	☐	☐	☐	☐	☐	☐	2.4 ☐
5. How often do **you** eat whole grain foods (e.g. brown rice/ whole grain bread/ oatmeal)?	☐	☐	☐	☐	☐	☐	☐	2.5 ☐
6. How often do **you** eat pre-prepared dishes (e.g. microwave foods, instant foods such as cup noodles) examples: _____	☐	☐	☐	☐	☐	☐	☐	2.6 ☐
7. How often do **you** eat snacks, such as chips, sweets and cookies?	☐	☐	☐	☐	☐	☐	☐	2.7 ☐

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Official Use
8. What factors do(es) *[the one who usually buys foods]* consider when you/he/she buy **fruits**?						
(1) cost	☐	☐	☐	☐	☐	2.8.1 ☐
(2) availability in areas I live/ usually buy foods	☐	☐	☐	☐	☐	2.8.2 ☐
(3) freshness	☐	☐	☐	☐	☐	2.8.3 ☐
(4) family members like it	☐	☐	☐	☐	☐	2.8.4 ☐
(5) I like it	☐	☐	☐	☐	☐	2.8.5 ☐
(6) Others _____	☐	☐	☐	☐	☐	2.8.6 ☐
9. What factors do(es) *[the one who usually buys foods]* consider when you/he/she buy **vegetables**?						
(1) cost	☐	☐	☐	☐	☐	2.9.1 ☐
(2) availability in areas I live/ usually buy foods	☐	☐	☐	☐	☐	2.9.2 ☐
(3) freshness	☐	☐	☐	☐	☐	2.9.3 ☐
(4) family members like it	☐	☐	☐	☐	☐	2.9.4 ☐
(5) I like it	☐	☐	☐	☐	☐	2.9.5 ☐
(6) Others _____	☐	☐	☐	☐	☐	2.9.6 ☐
10. What factors do(es) *[the one who usually buys foods]* consider when you/he/she buy **whole grain foods** (e.g. brown rice/ whole grain bread/ oatmeal)?						
(1) cost	☐	☐	☐	☐	☐	2.10.1 ☐
(2) availability in areas I live/ usually buy foods	☐	☐	☐	☐	☐	2.10.2 ☐
(3) tastiness	☐	☐	☐	☐	☐	2.10.3 ☐
(4) family members like it	☐	☐	☐	☐	☐	2.10.4 ☐
(5) I like it	☐	☐	☐	☐	☐	2.10.5 ☐
(6) Others _____	☐	☐	☐	☐	☐	2.10.6 ☐
11. What factors do(es) *[the one who usually buys foods]* consider when you/he/she buy **pre-prepared foods** (e.g. microwave foods, instant foods such as cup noodles)?						
(1) cost	☐	☐	☐	☐	☐	2.11.1 ☐
(2) availability in areas I live/ usually buy foods	☐	☐	☐	☐	☐	2.11.2 ☐
(3) tastiness	☐	☐	☐	☐	☐	2.11.3 ☐
(4) family members like it	☐	☐	☐	☐	☐	2.11.4 ☐
(5) I like it	☐	☐	☐	☐	☐	2.11.5 ☐
(4) Others _____	☐	☐	☐	☐	☐	2.11.6 ☐

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Official Use
12. What factors do(es) *[the one who usually buys foods]* consider when you/he/she buy **snacks**?						
(1) cost	☐	☐	☐	☐	☐	2.12.1 ☐
(2) availability in areas I live/ usually buy foods	☐	☐	☐	☐	☐	2.12.2 ☐
(3) tastiness	☐	☐	☐	☐	☐	2.12.3 ☐
(4) family members like it	☐	☐	☐	☐	☐	2.12.4 ☐
(5) I like it	☐	☐	☐	☐	☐	2.12.5 ☐
(6) Others _____	☐	☐	☐	☐	☐	2.12.6 ☐

Part 3 – FAMILY AND PRESCHOOLER MEAL FREQEUNCY AND LOCATION

Now I would like to ask you about where your family eats.

	Never	≤ once a month	2-3 times/mo	1-3 times/wk	4 – 6 times/wk	daily	Official Use
1. How often does your whole family eat together?	☐	☐	☐	☐	☐	☐	3.1.1 ☐
2. How often does your family eat out in/take away from:							
(1)Restaurant (e.g. Spaghetti House, Ruby Tuesday)?_____	☐	☐	☐	☐	☐	☐	3.2.1 ☐
(2) Chinese restaurant?	☐	☐	☐	☐	☐	☐	3.2.2 ☐
(3) Fast-food Shop (e.g. McDonald's, Café de Coral)?	☐	☐	☐	☐	☐	☐	3.2.3 ☐
(4) Stalls? (selling fish balls, or other foods)	☐	☐	☐	☐	☐	☐	3.2.4 ☐
3. How many days per week does *(name)* eat breakfast?	☐ times per week						3.3 ☐
4. Would you say *(name)* can have snacks at anytime, or at fixed times? If fixed time, what are those times?	(1) Anytime (2) Fixed time, at _____						3.4.1 ☐ [3.4.2]
	Never	Very little	Sometimes	Very often	All the time		Official Use
5. Does *(name)* have (1) breakfast, (2) lunch or (3) dinner **while watching TV?**	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐		3.5.1 ☐ 3.5.2 ☐ 3.5.3 ☐
6. Does *(name)* ever snack on foods or beverages while watching TV (except meal?)?	☐	☐	☐	☐	☐		3.6.1 ☐
(If yes,) what are the most common/usual snack or food or drink eaten while watching TV?	(1) snack: _____ (1 item only) (2) drink: _____ (1 item only)						3.6.2 ☐☐ 3.6.3 ☐☐

Part 4 – MEAL PREPARATION ACTIVTIES

Now I would like to ask if *(name)* ever helps in preparing meals for your family.

	Never	Very little	Sometimes	Very often	All the time	Official Use
1. How often do you ask *(name)* to select meal/ family foods (except snacks)?	☐	☐	☐	☐	☐	4.1 ☐
2. How often does *(name)* select his/her own snacks?	☐	☐	☐	☐	☐	4.2 ☐
3. How often does *(name)* go food shopping with you?	☐	☐	☐	☐	☐	4.3 ☐
4. How often does *(name)* participate or help prepare family meals?	☐	☐	☐	☐	☐	4.4 ☐
5. What kinds of utensils are used to feed *(name)*? **(can choose more than one answer)**	(1) ☐ Spoon (2) ☐ Fork (3) ☐ Bowl/ Cup (4) ☐ Infant feeding bottle (5) ☐ Chopsticks (6) ☐ Straw (7) ☐ Others: _____					4.5.1 ☐ 4.5.2 ☐ 4.5.3 ☐ 4.5.4 ☐ 4.5.5 ☐ 4.5.6 ☐ 4.5.7 ☐

Part 5 – FOOD & EATING RULES

I would now like to ask about your general practices in feeding *(name)*.

	Never	Very little	Sometimes	Very often	All the time	Official Use
1. How often do you try to make *(name)* finish the food served to him/her?	☐	☐	☐	☐	☐	5.1 ☐
2. How often do you limit *(name)* in eating too many sweets (e.g. candies, ice cream, cookies, chicken wings)?	☐	☐	☐	☐	☐	5.2 ☐
3. How often do you limit *(name)* in eating too many high-fat foods (e.g. instant noodle, potato chips) ?	☐	☐	☐	☐	☐	5.3 ☐
4. How often do you keep the snacks out of reach? If never buy snacks, tick ☐	☐	☐	☐	☐	☐	5.4 ☐
5. How often do you use foods (e.g. sweets, chips) to reward *(name)*? example: _____	☐	☐	☐	☐	☐	5.5 ☐

6. What does *(name)* usually do during dinner? **(can choose more than one answer)** [If more than one activity, ask] the main one and give a "2", and the others checked "1".	(1) ☐ chat with other family members (2) ☐ watch TV (3) ☐ Read (4) ☐ Play/ run around (5) ☐ Others: _____	5.6.1 ☐ 5.6.2 ☐ 5.6.3 ☐ 5.6.4 ☐ 5.6.5 ☐

Part 6 – CHILD'S SEDENTARY ACTIVITIES PATTERNS

In this part, I would like to ask about how *(name)* spends his/her time every day.

1. Do you think *(name)* is active enough when compared with other same age children?	(1) yes, similar to other children (2) more active (3) less active	[6.1] ☐
2. How many hours per day is *(name)* in kindergarten?	(1) ☐.☐ days per week and (2) ☐.☐ hours per day	[6.2.1] [6.2.2]
3. How many hours per day do you stay with *(name)*? (not include sleeping time)	(1) ☐☐.☐ hours per weekday (2) ☐☐.☐ hours per weekend day	[6.3.1] [6.3.2]
4. How many hours per day does your wife/husband stay with *(name)*? (not include sleeping time)	(1) ☐☐.☐ hours per weekday (2) ☐☐.☐ hours per weekend day	[6.4.1] [6.4.2]
5. How often do you (or other caregivers, e.g. grandmothers, domestic helper) bring *(name)* outside to park or playground?	(1) ☐ times per day (2) ☐☐ days per week	[6.5.1] [6.5.2]
6. Would you say your TV is on all day? If not, how many hours of the day?	(1) Yes (2) No, _____ hours	[6.6.1] [6.6.2] ☐☐☐
7. On *weekdays*, how much time does *(name)* usually spend on the following activities? *(not include in playgroup or nursery or kindergarten)*		
(1) Eating	_____ (min) _____ (hr)	[eatd] ☐☐☐
(2) Daytime napping	_____ (min) _____ (hr)	[napd] ☐☐☐
(3) *Sleeping (regular or irregular?)	_____ (min) _____ (hr)	[sleepd] ☐☐☐
(4) Reading/ homework/ studying	_____ (min) _____ (hr)	[readd] ☐☐☐
(5) Watching TV/video (except during meal time) – only count when sit there paying attention	_____ (min) _____ (hr)	[tvd] ☐☐☐
(6) Playing TV games/computer	_____ (min) _____ (hr)	[compd] ☐☐☐

(7) Active playing/exercise	_____ (min) _____ (hr)	[playd] ☐☐☐
8. On *weekend days*, how much time does *(name)* usually spend on the following activities?		
(1) Eating	_____ (min) _____ (hr)	[eatn] ☐☐☐
(2) Daytime napping	_____ (min) _____ (hr)	[napn] ☐☐☐
(3) *Sleeping (regular or irregular?)	_____ (min) _____ (hr)	[sleepn] ☐☐☐
(4) Reading/ homework/ studying	_____ (min) _____ (hr)	[readn] ☐☐☐
(5) Watching TV/video (except during meal time) – only count when sit paying attention	_____ (min) _____ (hr)	[tvn] ☐☐☐
(6) Playing TV games/computer	_____ (min) _____ (hr)	[compn] ☐☐☐
(7) Active playing/exercise	_____ (min) _____ (hr)	[playn] ☐☐☐

Part 7 – Parental Perceptions

Lastly, I would like to ask if you have any opinions on *(name)*'s diet practices.

1. Is there any area of *(name)*'s diet that you think would be good to change?	(1)_____ (2)_____ (3)_____	[improv1] ☐ [improv2] ☐ [improv3] ☐
2. Do you think *(name)* 's weight is normal?	(1) Yes, normal (2) No, too heavy (3) No, too slim	[pweight] ☐
3. Do you think *(name)* 's height is normal?	(1) Yes, normal (2) No, too tall (3) No, too short	[pheight] ☐
4. Do you have both a working burner/stove and refrigerator where you live?	(1) Yes (2) No, working burner/stove only (3) No, refrigerator only (4) Neither	[stove] ☐
5. Were there any days last month when your family didn't have enough food to eat or money to buy food?	(0) No (1) Yes	[enough] ☐
6. Does any current smoker live together with *(name)*? (If yes), how many and who?	(0) No (1) Yes, ☐☐ people _____	8.6.1 ☐ 8.6.2.1 ☐ 8.6.2.2 ☐

Parents' occupations	(1) Managers and administrators (2) Professionals (3) Associate professionals (4) Clerks (5) Service/ sales workers (6) Craft workers (7) Plant and machine operators and assemblers (8) Elementary occupations (9) Retired (10) Unemployed (11) Househusband/housewife	☐☐ [fjob] ☐☐ [mjob]
Parents' working hours/week	Father ☐☐(hours) Mother ☐☐(hours)	[fhourw] [mhourw]
Average monthly household income range	(0) <$2,000 (1) $2,000-5,999 (2) $6,000-9,999 (3) $10,000-14,999 (4) $15,000-19,999 (5) $20,000-24,999 (6) $25,000-29,999 (7) $30,000-39,999 (8) ≥$40,000 (9) Unknown	[incgrp] ☐
Does your family receive the Comprehensive Social Security Assistance (CSSA)?	(1) Yes (2) No	[cssa] ☐
Did you apply the Kindergarten Fee Remission Scheme (KFRS) for *(name)*?	(1) Yes (2) No	[kfrs] ☐
Type of housing	(1) Public rental housing (2) Subsidized sale flats (3) Private permanent housing (4) Temporary housing (5) Non-domestic housing (6) Others _____	[housing] ☐

The End. Thank you!

Appendix F2

香港幼童健康及成長研究問卷

學童姓名: _____

家長/監護人姓名: _____

聯絡電話（日間/夜間）: _____

量度身高體重日期	□□□□／□□／□□ （yyyy1／mm1／dd1）
學童平均身高	□□□.□(厘米)
學童平均體重	□□.□ (公斤) or □□.□(磅)
備註	

香港幼童健康及成長研究問卷

□□□□[yyyy2] □□[mm2] □□[dd2]

我地希望了解你照顧（*學童名字*）既經驗，請以你既個人情況及經驗回答下列問題。請注意，由於每個家庭既習慣均不同，因此依 D 問題係冇絕對既答案既。（請圈出或剔出最適合既答案）

第一部份 – 關於你既小朋友及家庭之基本資料

首先，我會詢問關於你既小朋友同家庭既基本資料。

個案編號	□□□	[id]
學童姓名	_____ 性別:□ (女=0, 男=1)	[gender]
學童出生日期	□□□□[yyyy3] □□[mm3] □□[dd3]	
學童的國籍	_____	[nation]
學童的出生地點	_____ （若非香港）小朋友黎左香港幾耐呢？□□月	[chorigin] □□ [chmonth]
學童於家中的排名	(1) 長子/女 (2) 次子/女 (3) 排第三名或以上	[border]
學童出生時的體重	□□.□□ 公斤	[bwt]
（*學童名字*）有冇曾經接受母乳餵哺？（如有）有幾耐？	(000) 冇 (1) 有，□□□日	[ebdays] □□□
受訪者與學童的關係	(1) 媽媽 (2) 爸爸 (3) 其他 _____	[int]
你（受訪者）係唔係響香港出世架？（如果唔係）咁你黎左香港幾耐呀？	(1) 由出世到依家都響香港 (2) 以前響_____住，但已經黎左香港□□□月	[porigin] □□ [pmonth]
父母的婚姻狀況	(1) 已婚 (2) 同居 (3) 從未結婚 (4) 分居 (5) 離婚 (6) 喪偶 (7) 其他 _____	[marital]
父母的教育程度	(0) 未受教育／幼稚園 父□ // 母□ (1) 小學 (2) 初中（中一至中三） (3) 高中（中四至中五） (4) 預科 (包括工業及職業教育) (4) 專上教育或以上	[fedu] [medu]
父母的年齡	父 □□(歲) [fage] Mother □□(歲) [mage]	
父母的身高及體重	父 □.□□ (米) 或 □尺□□寸 □□□.□ (公斤) 或 □□□ (磅)	[fht] [fwt]
	母 □.□□ (米) 或 □尺□□寸 □□□.□ (公斤) 或 □□□ (磅)	[mht] [mwt]

*(名字)*係唔係同父母同住架？	(1) 是 (2) 否，只與母親同住 (3) 否，只與父親同住 (4) 否，與 _____ 同住	[custody] ☐
家庭成員的數目	☐☐ 人	[member]
響屋企，邊個花最多時間照顧*(名字)*呢？	(1) 母親 (2) 父親 (3) 外祖母/祖母 (4) 家務助理 (5) 保母 (6) 其他 _____	[caregiv] ☐
響屋企，通常係邊個負責餵*(名字)*食野或煮「食送」呢？	(1) 母親 (2) 父親 (3) 外祖母/祖母 (4) 家務助理 (5) 保母 (6) 其他 _____	[feed] ☐
響屋企，*(名字)*通常同邊個一齊食野呢？（可選擇多於一個答案）	(0) 學童自己一個 (1) 母親 (2) 父親 (3) 外祖母/祖母 (4) 家務助理 (5) 保母 (6) 兄弟姊妹 (7) 其他 _____	[eatw1] ☐ [eatw2] ☐ [eatw3] ☐ [eatw4] ☐ [eatw5] ☐ [eatw6] ☐ [eatw7] ☐

第二部份 – 家中可獲得的食物

而家我想問你平時響屋企通常會食既野。

	從不	（少於或）一個月一次	一個月兩至三次	每星期一至三次	每星期四至六次	每日一次	每日多於一次	調查員用
1. 你會唔會經常幫屋企人買「食送」呢？	☐	☐	☐	☐	☐	☐	☐	2.1 ☐
2. 除左你之外，仲會唔會有人去買「食送」呢？如有，會有幾經常呢？	(1) 有，_____ (2)冇							2.2.1 ☐
	☐	☐	☐	☐	☐	☐	☐	2.2.2 ☐
3. 你會唔會經常食生果(一個中蘋果大小）？	☐	☐	☐	☐	☐	☐	☐	2.3 ☐
4. 你會唔會經常食蔬菜(一碗中型碗大小）？	☐	☐	☐	☐	☐	☐	☐	2.4 ☐
5. 你會唔會經常食全麥既食物（例如紅米飯／全麥麵包／麥皮等）？	☐	☐	☐	☐	☐	☐	☐	2.5 ☐
6. 你會唔會經常食現成煮好既食物（如微波爐食物／即食食物如杯麵等）？ 例子：_____	☐	☐	☐	☐	☐	☐	☐	2.6 ☐
7. 你會唔會經常食薯片、糖或曲奇餅等既零食？	☐	☐	☐	☐	☐	☐	☐	2.7 ☐

	不同意	較不同意	沒意見	較爲同意	同意	調查員用
8. 響買生果既時候，你（或主要負責買「食送」既人）會考慮以下邊個因素呢？						
(1) 價錢	☐	☐	☐	☐	☐	2.8.1 ☐
(2) 響我居住或買「食送」既地方有冇得賣	☐	☐	☐	☐	☐	2.8.2 ☐

	不同意	較不同意	沒意見	較爲同意	同意	調查員用
(3) 係唔係新鮮	☐	☐	☐	☐	☐	2.8.3 ☐
(4) 家庭成員鍾唔鍾意食	☐	☐	☐	☐	☐	2.8.4 ☐
(5) 我自己鍾唔鍾意食	☐	☐	☐	☐	☐	2.8.5 ☐
(6) 其他 _____	☐	☐	☐	☐	☐	2.8.6 ☐
9. 響買蔬菜既時候，你（或主要負責買「食送」既人）會考慮以下邊個因素呢？						
(1) 價錢	☐	☐	☐	☐	☐	2.9.1 ☐
(2) 響我居住或買「食送」既地方有冇得賣	☐	☐	☐	☐	☐	2.9.2 ☐
(3) 係唔係新鮮	☐	☐	☐	☐	☐	2.9.3 ☐
(4) 家庭成員鍾唔鍾意食	☐	☐	☐	☐	☐	2.9.4 ☐
(5) 我自己鍾唔鍾意食	☐	☐	☐	☐	☐	2.9.5 ☐
(6) 其他 _____	☐	☐	☐	☐	☐	2.9.6 ☐
10. 響買全麥食物（如紅米飯／全麥麵包／麥皮等）既時候，你會考慮以下邊個因素呢？						
(1) 價錢	☐	☐	☐	☐	☐	2.10.1 ☐
(2) 響我居住或買「食送」既地方有冇得賣	☐	☐	☐	☐	☐	2.10.2 ☐
(3) 好唔好食	☐	☐	☐	☐	☐	2.10.3 ☐
(4) 家庭成員鍾唔鍾意食	☐	☐	☐	☐	☐	2.10.4 ☐
(5) 我自己鍾唔鍾意食	☐	☐	☐	☐	☐	2.10.5 ☐
(6) 其他 _____	☐	☐	☐	☐	☐	2.10.6 ☐
11. 響買現成煮好既食物（如微波爐食物／即食食物如杯麵等）既時候，你會考慮以下邊個因素呢？						
(1) 價錢	☐	☐	☐	☐	☐	2.11.1 ☐
(2) 響我居住或買「食送」既地方有冇得賣	☐	☐	☐	☐	☐	2.11.2 ☐
(3) 好唔好食	☐	☐	☐	☐	☐	2.11.3 ☐
(4) 家庭成員鍾唔鍾意食	☐	☐	☐	☐	☐	2.11.4 ☐
(5) 我自己鍾唔鍾意食	☐	☐	☐	☐	☐	2.11.5 ☐
(6) 其他 _____	☐	☐	☐	☐	☐	2.11.6 ☐
12. 響買薯片、糖或曲奇餅等零食既時候，你（或主要負責買「食送」既人）會考慮以下邊個因素呢？						
(1) 價錢	☐	☐	☐	☐	☐	2.12.1 ☐
(2) 響我居住或買「食送」既地方有冇得賣	☐	☐	☐	☐	☐	2.12.2 ☐
(3) 好唔好食	☐	☐	☐	☐	☐	2.12.3 ☐
(4) 家庭成員鍾唔鍾意食	☐	☐	☐	☐	☐	2.12.4 ☐
(5) 我自己鍾唔鍾意食	☐	☐	☐	☐	☐	2.12.5 ☐
(6) 其他 _____	☐	☐	☐	☐	☐	2.12.6 ☐

第三部份 – 家庭的飲食習慣

而家我會問下你通常會響邊度食野。

	從不	（少於或）一個月一次	一個月兩至三次	一星期一至三次	一星期四至六次	一日一次	調查員用
1. 你同你既家人會唔會經常一齊食晚餐？	☐	☐	☐	☐	☐	☐	3.1.1 ☐
2. 你同你既家人會唔會經常響以下地點食或者外賣？							
(1) 餐廳（如意粉屋、壽司店）？例子：_____	☐	☐	☐	☐	☐	☐	3.2.1 ☐
(2) 中式酒家？	☐	☐	☐	☐	☐	☐	3.2.2 ☐
(3) 快餐店（如麥當勞、大家樂）？	☐	☐	☐	☐	☐	☐	3.2.3 ☐
(4) 小食店或小販（如魚蛋檔）？	☐	☐	☐	☐	☐	☐	3.2.4 ☐
3. *（名字）*每星期會食幾多次早餐？	每星期☐次						3.3 ☐
4. *（名字）*會唔會有一個特定既食零食時間？如果有，會係幾時？	(1) 冇特定時間 (2) 有特定時間，響 _____						3.4.1 ☐ [3.4.2]
	從不	甚少	間中	經常	每次/差不多每次皆會		調查員用
5. *（名字）*會唔會響以下既時間睇電視？							
(1) 食早餐既時候	☐	☐	☐	☐	☐		3.5.1 ☐
(2) 食午餐既時候	☐	☐	☐	☐	☐		3.5.2 ☐
(3) 食晚餐既時候	☐	☐	☐	☐	☐		3.5.3 ☐
6. 咁*（名字）*會唔會一邊睇電視一邊食野呢（除正餐外）？	☐	☐	☐	☐	☐		3.6.1 ☐
（如果會）佢最常食既零食／小食或者飲品（響睇電視既時候）會係咩呢？	(1) 零食／小食：_____（只選一項） (2) 飲品：_____（只選一項）						3.6.2 ☐☐ 3.6.3 ☐☐

第四部份 – 預備食物既習慣

而家我想問下*（名字）*會唔會幫你手一齊爲成家人準備食物。

	從不	甚少	間中	經常	每次/差不多每次皆會	調查員用
1. 你會唔會經常叫*（名字）*幫手諗下食咩（除零食）？	☐	☐	☐	☐	☐	4.1 ☐
2. *（名字）*會唔會經常自己揀零食？	☐	☐	☐	☐	☐	4.2 ☐
3. *（名字）*會唔會經常同你一齊去買「食送」或者去超市？	☐	☐	☐	☐	☐	4.3 ☐

	從不	甚少	間中	經常	每次/差不多每次皆會	調查員用
4. *(名字)*會唔會經常幫手或者參與一齊煮或預備成家人既食物架？	☐	☐	☐	☐	☐	4.4 ☐
5. *(名字)*會用邊種食具食野？可選擇多於一個答案。	(1) 匙 (2) 叉 (3) 碗/杯 (4) 奶樽 (5) 筷子 (6) 飲筒 (7) 其他:_____					4.5.1 ☐ 4.5.2 ☐ 4.5.3 ☐ 4.5.4 ☐ 4.5.5 ☐ 4.5.6 ☐ 4.5.7 ☐

第五部份– 飲食規則

而家我會問下你響照顧*(名字)*飲食時既習慣。

	從不	甚少	間中	經常	每次/差不多每次皆會	調查員用
1. 你會唔會經常要求*(名字)*食哂你俾佢食既野？	☐	☐	☐	☐	☐	5.1 ☐
2. 你會唔會經常限制*(名字)*唔可以食太多甜食 (例如：糖，雪糕，曲奇餅)？	☐	☐	☐	☐	☐	5.2 ☐
3. 你會唔會經常限制*(名字)*唔可以食太多高脂既野 (例如：公仔麵、薯片、雞翼)？	☐	☐	☐	☐	☐	5.3 ☐
4. 你會唔會經常收埋D零食或者將佢地放響*(名字)*拎唔到既地方？	*完全冇買零食 ☐ ☐	☐	☐	☐	☐	5.4 ☐
5. 你會唔會用零食／小食黎獎勵*(名字)*？（如糖、薯片） 例子：_____	☐	☐	☐	☐	☐	5.5 ☐
6. *(名字)*響食飯既時候專唔專心架？（如果唔專心）咁佢仲會做D咩？ **(可以選擇多於一項)** 註：如多於一項，請剔所有適用活動，然後再圈起最主要活動	(1) ☐ 同其他家庭成員傾計 (2) ☐ 睇電視 (3) ☐ 睇書 (4) ☐ 玩/周圍走 (5) ☐ 其他 _____					5.6.1 ☐ 5.6.2 ☐ 5.6.3 ☐ 5.6.4 ☐ 5.6.5 ☐

第六部份 – 小朋友既運動習慣

響依一部份，我會詢問有關於*(名字)*平日既時間係點分配既。

1. 相比起其他同齡既小朋友，你覺得*(名字)*係唔係活躍架呢？	(1) 差唔多 (2) 比其他小朋友更活躍 (3) 冇咁活躍	6.1 ☐

2. *(名字)*每日有幾多時間響幼稚園？	(1) 每星期 □.□ 日 及 (2) 每日 □□.□ 小時	[6.2.1] [6.2.2]
3. 你每一日會有幾多時間同*(名字)*一齊呢？（唔計訓覺既時間）	(1) 平日 □□.□ 小時 (2) 假日 □□.□ 小時	[6.3.1] [6.3.2]
4. 你既太太/丈夫每一日會有幾多時間同*(名字)*一齊呢？（唔計訓覺既時間）	(1) 平日 □□.□ 小時 (2) 假日 □□.□ 小時	[6.4.1] [6.4.2]
5. 你（或者其他照顧小朋友既人，如麻麻、家務助理）會唔會帶*(名字)*去公園或者遊樂場玩？	(1) 每日 □ 次 (2) 每星期 □□ 次	[6.5.1] [6.5.2]
6. 你屋企既電視係唔係全日都開住架？如果唔係，咁一日開幾耐呢？（就算有冇人睇緊都計）	(1) 係全日開住 (2) 一日_____ 小時	[6.6.1] [6.6.2] □□□
7. 響*平日*，*(名字)*平均每日花幾多時間響以下既活動上？**(唔包括響幼稚園既時間)**		
(1) 食野	_____(分鐘) _____(小時)	[eatd] □□□
(2) 訓晏覺	_____(分鐘) _____(小時)	[napd] □□□
(3) *訓覺（定時／唔定時）- 唔計晏覺	_____(分鐘) _____(小時)	[sleepd] □□□
(4) 讀書／做功課／溫習	_____(分鐘) _____(小時)	[readd] □□□
(5) 睇電視／錄影帶（除進餐時間外）- 剩係計佢坐定定咁睇	_____(分鐘) _____(小時)	[tvd] □□□
(6) 玩電腦／電視遊戲	_____(分鐘) _____(小時)	[compd] □□□
(7) 運動／好活躍咁玩（以流哂汗爲準）	_____(分鐘) _____(小時)	[playd] □□□
8. 響*假日*（星期六及日），*(名字)*平均每日花幾多時間響以下的活動上？		
(1) 食野	_____(分鐘) _____(小時)	[eatn] □□□
(2) 訓晏覺	_____(分鐘) _____(小時)	[napn] □□□
(3) *訓覺（定時／唔定時）- 唔計晏覺	_____(分鐘) _____(小時)	[sleepn] □□□
(4) 讀書／做功課／溫習	_____(分鐘) _____(小時)	[readn] □□□
(5) 睇電視／錄影帶（除進餐時間外）- 剩係計佢坐定定咁睇	_____(分鐘) _____(小時)	[tvn] □□□
(6) 玩電腦／電視遊戲	_____(分鐘) _____(小時)	[compn] □□□
(7) 運動／好活躍咁玩（以流哂汗爲準）	_____(分鐘) _____(小時)	[playn] □□□

第七部份 – 父母對子女既感覺

最後，我想問下你覺得*(名字)*既飲食習慣有冇要改善既地方。

1. 你覺得*(名字)*既飲食習慣有冇要改善既地方？	(1) _____ (2) _____ (3) _____	[improv1] ☐ [improv2] ☐ [improv3] ☐
2. 你覺得*(名字)*既體重係唔係正常？	(1) 正常 (2) 比正常重 (3) 比正常輕	[pweight] ☐
3. 你覺得*(名字)*既身高係唔係正常？	(1) 正常 (2) 比正常高 (3) 比正常矮	[pheight] ☐
4. 你屋企係唔係同時有煤氣／石油氣／火爐同雪櫃呢？	(1) 兩樣都有 (2) 剩係得煤氣／石油氣／火爐 (3) 剩係得雪櫃 (4)兩樣都冇	[stove] ☐
5. 上個月你屋企有冇試過冇足夠既食物或者唔夠錢買野俾*(名字)*食呢？	(1) 有 (2) 冇	[enough] ☐
6. 你同住既屋企人入面，有冇人食煙架呢？如果有，佢同*(名字)*有咩關係？	(1) 冇 (2) 有，☐☐個，_____	8.6.1 ☐ 8.6.2.1 ☐ 8.6.2.2 ☐

父母的職業	(1) 經理及行政人員 (2) 專業人員 (3) 輔助專業人員 (4) 文員 (5) 服務工作及商店銷售人員 (6) 工藝及有關人員 (7) 機台及機器操作員及裝配員 (8) 非技術工人 (9) 已退休 (10) 失業 (11) 家庭主夫/婦	[fjob] ☐☐ [mjob] ☐☐
父母每星期的工作時間	父 ☐☐(小時) 母 ☐☐(小時)	[fhourw] [mhourw]
家庭每月的平均收入	(0) <$2,000 (1) $2,000-5,999 (2) $6,000-9,999 (3) $10,000-14,999 (4) $15,000-19,999 (5) $20,000-24,999 (6) $25,000-29,999 (7) $30,000-39,999 (8) ≥$40,000 (9) 不清楚	[incgrp] ☐
你屋企有冇領取綜合社會保障援助（綜援）架？	(1) 有 (2) 冇	[cssa] ☐
你有冇幫*(名字)*申請幼稚園學費減免？	(1) 有 (2) 冇	[kfrs] ☐
住宅類型	(1) 公營租住房屋 (2) 資助出售單位 (居屋) (3) 私人永久性房屋 (4) 臨時房屋 (5) 非住宅用房屋 (6) 其他 _____	[housing] ☐

*請圈出合適的答案

問卷完！多謝合作！

24-hour Dietary Intake Questionnaire

1. I'd like you to tell me everything [Child Name (NAME)] had to eat and drink all day yesterday, from when he/she woke up yesterday until when he/she woke up this morning. Include everything NAME ate and drank at home and away -- even snacks. [Show the individual intake form] I want you tell me "when", "which occasion", "what", "how much" and "where" NAME ate and drank all his/her foods yesterday. For mixed dishes, casseroles and stews, please describe the ingredients. For example, if he/she ate "ham macaroni", you should tell me all the ingredients in it, including the ham, macaroni and the mixed vegetable pieces and the amounts of each of them. Do you have any questions? If not, please start from the first occasion after NAME woke up [Do not interrupt respondent].

Step 1	Column 1	Ask about the eating time and occasion:
	(a)	About what time did NAME begin to (eat/drink) at the first occasion after waking up yesterday? What would you call this occasion?
	(b)	About what time did he/she begin to eat his/her next occasion? What would you call this occasion?
Step 2	Column 2	Query about the food eaten: What did NAME have at (Time) with his/her (OCCASION)? Probe for the ingredients of the foods eaten, to request food labels if possible when respondent cannot answer the ingredients. What was the (Food) NAME (ate/drank) made of? What food ingredients were in the (meal or dish)? Did it have any other ingredients? [If yes] what were they?
Step 3	Column 3	Ask about amounts: How much did NAME eat (each of them)? You can use these food pictures for the size or weight of foods (if at respondent's home) Please use any of your own cups, mugs, or bowls to estimate the amount of food NAME ate or drank at home yesterday, or check any package labels that may be helpful.
Step 4	Column 4	Ask about the eating place: Where did NAME (eat /drink) the (food)?
Step 5		Repeat the step 2and 3, querying about next food/drink. [When respondent stops, ask:] Anything else?
Step 6		Back to step 1(b) to query about next occasion

2. **Food break and review**: Now let's see what NAME ate between occasions and if I have everything:

2a. What was the first food or drink NAME had after waking up yesterday? (Time?) (First occasion?)

2b. Now at (Time) for (This occasion) NAME had (Foods), did he/she have anything else?

2c. Did NAME have anything to eat or drink between his/her (Time) (This occasion) and (Time) when he/she had (Next occasion)? Such as snacks, deserts, fruits or drinks?

Repeat 2b and 2c for each occasion except last occasion. For last occasion, go to 2d

2d. Now at (Time) for (Last occasion) NAME had (Foods), did NAME have anything else?

2e. Did NAME have anything to eat or drink after his/her (Time) (Last occasion) but before midnight last night?

2f. Did NAME have anything to eat or drink between midnight last night and waking up today?

I'd like you to try to remember anything else NAME ate or drank yesterday, that you haven't already told me about, including anything NAME ate or drank while you were preparing a meal or while he/she waiting to eat.

(Cooking Methods include: fried, baked or microwaved, broiled or grilled, steamed, stewed or boiled, stir fried...)

[Continue on Question 3]

Food intake yesterday

6 am yesterday	12 pm	6 pm	Midnight	6 am today
Morning	**Afternoon**	**Evening**	**Night/early dawn**	

*Subject's Name:*_____

Tel:_____ ID: ☐☐☐ Day: M T W Th F Sat Sun

Interviewer's Name:_____ ID: ☐☐☐

Interview Date: ☐☐☐☐☐☐ *(YYMMDD)*

Time Started:_____ Time Ended:

Total Time: T☐☐ min

Individual Intake Form no. 1

Column 1		Column 2		Column 3	Column 4	Coder use only
Time	Occasion	Food/Drink	Description of Food/Drink and Ingredient (include: cooking method, salt amount)	How much of this (FOOD) did NAME actually (eat/drink)?	Where did NAME (eat/drink) the (food)?	Amount
Oil used at home						

Occasion: 1.Breakfast 2. Brunch 3.Lunch 4.Dinner/Supper 5.Mid-night feast
6. Food and/or beverage break, snack or other beverage 7. Other (Specify) :_____

Place: 1.Home 2.Store/Street vender 3.Restaurant 4.School 5. Fast food shop 6.Other (Specify) :_____

Subject's Name:_____

Interview Date:☐☐☐☐☐☐(YYMMDD)

Tel:_____ ID: ☐☐☐ Day: M T W Th F Sat Sun

Time Started:_____ Time Ended:

Interviewer's Name:_____ ID: ☐☐☐

Individual Intake Form no. 2

Total Time: T☐☐ min

Column 1		Column 2		Column 3	Column 4	Coder use only
Time	Occasion	Food/Drink	Description of Food/Drink and Ingredient (include: cooking method, oil used, salt amount)	How much of this (FOOD) did ICN actually (eat/drink)?	Where did ICN (eat/drink) the (food)?	Amount
Oil used at home						

Occasion: 1.Breakfast 2. Brunch 3.Lunch 4.Dinner/Supper 5.Mid-night feast
6. Food and/or beverage break, snack or other beverage 7. Other (Specify) :_____

Place: 1.Home 2.Store/Street vender 3.Restaurant 4.School 5. Fast food shop 6.Other (Specify) :_____

3. Was the amount of food that ICN ate yesterday about usual, less than usual, or more than usual?

(1) Usual (Q11)

(2) Less than usual (Q9)

4. What is the main reason the amount ICN ate yesterday was less than usual?

(1) Sickness
(2) Short of money
(3) Traveling
(4) At a social function, special meal or on a special day
(5) On vacation
(6) Too busy
(7) Not hungry
(8) Dieting
(9) Fasting
(10) Bored
(11) Stressed
(12) Other reason_____

(3) More than usual (Q10)

5. What is the main reason the amount ICN ate yesterday was more than usual?

(1) Traveling
(2) At a social function, special meal, or on a special day,
(3) On vacation or day off
(4) Very hungry
(5) Bored or stressed
(6) Some other reason

_____

Now I'd like you to think about all of the plain drinking water that ICN had yesterday, regardless of where he/she drank it. By plain drinking water, I mean tap water or any bottled water that is not carbonated, with nothing added to it, not even lemon.

6. How many milliliters did ICN drink? ☐☐☐☐ (ml)

6a. Did ICN drink distilled water yesterday?

(0) No
(1) Yes, [ask]: How many milliliters? ☐☐☐☐ (ml)

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THANKS FOR YOUR COOPERATION

Interviewer Observation Form

[Do not read these questions to the respondent.]

1. Did you or the respondent have difficulty with this intake interview?

   (0) No

   (1) Yes

   1a. What was the reason for this difficulty?

_____

_____

_____

_____

_____

For home office use only	
Date received:	Data entry: Yes No
Complete Questionnaire: Yes No	Editor's ID:
Missing data make up: Yes No	Re-entry: Yes No
Verified by:	Editor's ID:

二十四小時飲食問卷

1. 請問你由 [學童名字] 尋日朝早六點後至今日朝早六點之前，[學童名字] 尋日全日食過D乜野呢？包括所有 [學童名字] 響屋企同響街度食過同飲過既食物同飲品，同埋小食。[展示"個人進食問卷"] 我想你話俾我知尋日[學童名字] "幾時"、"乜野餐次"，響"邊度" 食過同飲過d乜，仲有"份量幾多"。如果響一樣食物入面有幾種材料，請你話俾我知有D乜野材料響入面。 例如：如果佢食過 "火腿通粉"，你就要話俾我知"火腿通粉"所有既材料，包括火腿、通心粉同雜菜粒，仲有佢地既份量。
你有無乜野問題想問？如果無，請你由[學童名字]起身第一餐開始[不要打斷受訪者]。

步驟 1	欄 1	問有關進食嘅時間和餐次： (a) [學童名字] 尋日起身第一餐係響幾時食野或飲野既呢？你叫哩一餐做乜野呢？ (b) 佢第二餐係響幾時食野或飲野既呢？你又叫哩一餐做乜野呢？
步驟 2	欄 2	問有關進食過嘅食物及飲品： [學童名字]響（ＸＸＸ點）食同飲乜野做（ＸＸＸ餐）呢？ ***引導被訪者講出進食左既食物／飲品既成份，如果被訪者未能講出食物／飲品既成份，盡量向被訪者索取"食品標籤"。 （ＸＸＸ食物／飲品）裡面有乜嘢野料呢？仲有無其他材料呢？[如有]係乜野？
步驟 3	欄 3	問有關份量： [學童名字]食／飲左幾多（ＸＸＸ食物／飲品）呢？ ***每樣食物／飲品都要問。你可以用食物圖片去衡量食物既大細同重量（如在被訪者的家）：你可以用你屋企既杯，或碗去估計[學童名字]尋日響屋企食／飲左既份量，亦都可以去睇睇對你有幫助既包裝標籤。
步驟 4	欄 4	問有關進食既地點： [學童名字]響邊度食／飲（ＸＸＸ）？
步驟 5		重複步驟２和３，問有關第二樣食物或飲品。[當被訪者停下來時，問：]重有無其他？
步驟 6		返回步驟1(b)問有關接著既餐段。

Appendix G2

2. 小息時間及重溫：而家等我地睇下[學童名字]響每餐之間食左D乜野，同埋睇下我係唔係有齊所有資料先：

2a. [學童名字]尋日起身之後食左同飲左D乜野？（響乜野時間？）（係唔係第一餐？）

2b. 響（ＸＸＸ點）既（ＸＸＸＸ餐） [學童名字] 食左（ＸＸ、ＸＸ食物／飲品），佢仲有無食其他野？

2c. [學童名字]響（ＸＸＸ點）既（ＸＸＸＸ餐）同（ＸＸＸ點）既（ＸＸＸＸ餐）之間有無食／飲野呢？例如零食，甜品，水果或飲品？

除最後那次，每餐都要重複 2b 及 2c 到最後嗰餐，去 2d

2d. 響（ＸＸＸ點）既（ＸＸＸＸ餐） [學童名字] 食左（ＸＸ、ＸＸ食物／飲品），佢仲有無食其他野？

2e. 尋晚午夜之前，（ＸＸＸ點）（ＸＸＸＸ餐**最後）後，[學童名字]有無食過或者飲過任何食物或飲品呢？

2f. 尋晚午夜之後，[學童名字]今日起身之前有無食過或者飲過任何食物或飲品呢？

我想你話俾我知尋日 [學童名字] 仲有無食過或者飲過任何食物或飲品，而你又未話俾我知既，包括所有 [學童名字] 響你煮緊飯，或者當[學童名字]等緊食野時食或飲既野。

（烹調法的例子：煎、炒、炸、白灼、蒸、生食、焓、燉、炆、滾…）

[接第3條]

昨日之飲食紀錄

昨天 6 am	12 pm	6 pm	午夜 12:00	今日 6 am
早上	下午	晚上	凌晨/黎明	

對象姓名:_____

電話號碼:_____ ID : □□□

問卷調查員姓名:_____ ID: □□□

日期：□□□□□□(年月日)

星期: 一 二 三 四 五 六 日

開始時間：_____ 完成時間：_____

總時間：□□分鐘

個人進食問卷 I

欄 1		欄 2		欄 3	欄 4	Coder use only
時間	餐次	食物/飲品	食物/飲品的成份 (請列明: 烹調方法、食油種類、鹽份)	[學童名字] 食/飲左幾多?	[學童名字] 喺邊度食/飲?	份量
家中食用油						

餐次: 1.早餐 2. 早午餐 3午餐. 4. 晚餐 5. 消夜
6.小息時間，小食，酒精飲料 或 其他飲料 7. 其他 (請列明): _____

地點: 1.家中 2.小食亭/街邊小販 3.餐廳/酒樓 4.學校 5.快餐店 6. 其他 (請列明): _____

對象姓名:_____

電話號碼:_____ ID：□□□

問卷調查員姓名:_____ ID: □□□

日期：□□□□□□(年月日)

星期: 一 二 三 四 五 六 日

開始時間：_____ 完成時間：_____

總時間：□□分鐘

個人進食問卷 II

欄 1		欄 2		欄 3	欄 4	Coder use only
時間	餐次	食物/飲品	食物/飲品的成份 (請列明: 烹調方法、食油種類、鹽份)	[學童名字] 食/飲左幾多?	[學童名字] 喺邊度食/飲?	份量
家中食用油						

餐次: 1.早餐 2. 早午餐 3午餐. 4. 晚餐 5. 消夜
6.小息時間，小食，酒精飲料 或 其他飲料 7. 其他 (請列明): _____

地點: 1.家中 2.小食亭/街邊小販 3.餐廳/酒樓 4.學校 5.快餐店 6. 其他 (請列明): _____

3. [學童名字] 尋日進食既份量同平日比較，有無多左，或者少左，定係差唔多？

(1) 同平日差唔多 (Q11)

(2) 比平日少 (Q9)

4. [學童名字]尋日食得比平日少左，主要係因爲乜嘢原因？

(1) 病
(2) 沒有足夠金錢
(3) 旅行
(4) 進行社交活動，特別餐或特別日子
(5) 放假
(6) 太忙
(7) 不肚餓
(8) 節食
(9) 禁食
(10) 悶
(11) 有壓力
(12) 其他原因_____

(3) 比平日多 (Q10)

5. [學童名字]尋日食得比平日多左，主要係因爲乜嘢原因？

(1) 旅行
(2) 進行社交活動，特別餐或特別日子
(3) 放假
(4) 非常肚餓
(5) 悶或有壓力
(6) 其他原因

_____

而家我想你諗番[學童名字]尋日飲左幾多清水，唔理佢究竟響邊度飲。清水既意思係凍滾水或無氣樽裝水，無任何添加既野，連加左檸檬既都唔計。

6. [學童名字]飲左幾多毫升水？ □□□□ (ml)

6a. [學童名字]尋日有無飲蒸餾水？

(0) 無
(1) 有，[問]：飲左幾多毫升？ □□□□ (ml)

多謝您嘅合作!

Interviewer Observation Form

[Do not read these questions to the respondent.]

1. Did you or the respondent have difficulty with this intake interview?

   (0) No

   (1) Yes

1a. What was the reason for this difficulty?

_____

_____

For home office use only					
Date received:			Data entry:	Yes	No
Complete Questionnaire:	Yes	No	Editor's ID:		
Missing data make up:	Yes	No	Re-entry:	Yes	No
Verified by:			Editor's ID:		

Appendix H

Food Portion Booklet (for young child)

幼童食物份量圖冊

香港中文大學
食品及營養科學課程
The Chinese University of Hong Kong
Food and Nutritional Sciences Programme

23 厘米碟
23 cm Plate

250 毫升奶瓶
250 ml Feeding Bottle

4 安士奶瓶
4oz Feeding Bottle

2 安士奶瓶
2oz Feeding Bottl

175 毫升杯
175 ml Cup

250 毫升 杯
250 ml Cup

150 180 220 230 250 毫升杯
150 180 220 230 250 ml Cu

250 290 330 450 毫升 碗
250 290 330 450 ml Bowls

240 毫升 碗
240 ml Bowl

1.5 9 5 9 12 17 毫升 匙
1.5 9 5 9 12 17 ml Spoons

奶粉 10 克
Milk Powder 10

盒裝飲品 375 毫升
Carton Box Drink 375 ml

維他奶 250 毫升
Vitasoy 250 ml

Q 版豆奶 125 毫升
Q-ban Soy Bean Milk 125 n

益力多 100 毫升
Yakult 100ml

屈臣氏蒸餾水 430 毫升
(最細：280ml)

道地綠茶（樽裝）500 毫
Green Tea (bottle) 500 ml

果汁先生（包裝）
(細) 180 毫升 (大) 300 毫升

Qoo 果汁 345 毫升
Qoo Juice 345 ml

利賓納（包裝）330 毫升
Ribena Blackcurrant dr 300 r

罐裝飲品 355 毫升
Can Drink 355 ml

安兒寶
Enfagrow

惠氏健兒樂
Progress

牛欄牌寶貝力
Step-up

安兒健
Enfakid

學兒樂
Promise

美素高
Frisogrow

全脂奶粉
Whole Fat Milk Powder

雀巢助長
Neslac Growing Up Milk

鮮牛奶 220 毫升
Fresh Milk 220 ml

鮮牛奶 235 毫升
Fresh Milk 235 ml

朱古力奶 500 毫升
Chocolate Milk 500 ml

鮮牛奶 236 毫升
Fresh Milk 236 mL

乳酪飲品 220 毫升
Yoghurt Drink 220 ml

鮮乳酪 150 毫升
Yoghurt 150 ml

奇異果 110 克
Kiwi Fruit 110 g

Mango (no seed) 180 g

Grapes 100 g

西瓜 100 克
Watermelon 100 g

西瓜 100 克
Watermelon 100 g

梨 180 克
Chinese Pear 180 g

蘋果 150 克
Apple 150 g

蘋果 10 克
Apple 10 g

橙 140 克
Orange 140 g

橙 (4 片) 25 克
Orange 25 g

香蕉 200 克
Banana 200 g

去皮香蕉 (半條) 20 克
Banana (Peel removed) 20 g

黃芽白 100 克
Celery Cabbage

菜心 100 克
Choi Sum 100 g

菜心 (4 條) 50 克
Choi Sum 50 g

西蘭花 50 克
Broccoli 50 g

生菜 (4 片) 60 克
Lettuce 60 g

芥蘭 100 克
Chinese Kale 100 g

豆角 50 克
Long Bean 50 g

菠菜 80 克
Spinach 80 g

白菜仔 50 克
Bak Choi 50 g

椰菜 100 克
Cabbage 100 g

椰菜 50 克
Cabbage 50 g

青通菜 60 克
Water Spinach 140 g

絲瓜 100 克
Angled Loofah 100 g

青瓜 140 克
Cucumber 140 g

苦瓜 50 克
Bitter melon 50 g

節瓜 100 克
Hairy Cucumber 100 g

冬瓜 100 克
Wintermelon 100 g

榨菜 10 克
Pickled Radish 10 g

紅蘿蔔 50 克
Carrot 50 g

紅蘿蔔 50 克
Carrot 50 g

青豆 15 克
Peas 15 g

荷蘭豆 100 克
Holland Bean 100 g

蕃茄 100 克
Tomato 100 g

蕃茄 100 克
Tomato 100 g

切粒熟薯仔 100 克
Cooked Potato Cubes 100 g

切絲冬菇 (2 隻) 40 克
Shredded Mushroom 40 g

蘑菇 (4 粒) 30 克
Button Mushroom 30 g

通心粉 100 克
Cooked Macaroni 100 g

意大利粉 100 克
Cooked Spaghetti 100 g

烏冬 230 克
Cooked Udon 230 g

河粉 200 克
Flattened Rice Noodle 200 g

蛋麵 50 克
Egg Noodle 50 g

米粉 100 克
Rice Vermicelli 100 g

米飯 (3/4 碗) 150 克
Cooked Rice 150 g

粥 200 克
Rice Congee 200 g

熟燕麥片 (一碗) 200 克
Oatmeal 200 g

白方包 50 克
Bread 50 g

切邊白方包 50 克
Bread 50 g

全麥方包 40 克
Whole Wheat Bread 40 g

雞尾包 50 克
Cocktail Bread 50 g

咸飽 50 克
Plain Roll 50 g

菠蘿飽 70 克
Sweet Roll 70 g

甜飽 110 克
Sweet Roll 100 g

嘉頓雪芳蛋糕 65 克
Chiffon Spongy Cake 65 g

牛油蛋糕 80 克
Madeira Cake 80 g

合桃蛋糕 55 克
Walnut Cake 55 g

忌廉蛋糕 50 克
Fresh Cream Cake 50 g

嘉頓瑞士卷 56 克
Garden Swiss Roll 56 g

卷蛋糕 40 克
Cake Roll 40 g

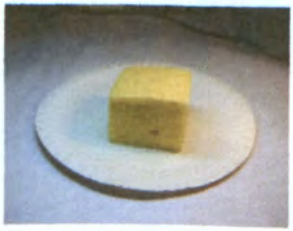
意大利薄餅 55 克
Pizza 55 g

蛋撻 60 克
Egg Tart 60 g

饅頭 50 克
Mann-Tau 50 g

蓮蓉包 145 克
Lotus Seed Bun 145 g

糯米卷 55 克
Glutinous Rice Roll 55 g



馬拉糕 100 克
Chinese Butter Spongy Cake 100 g

叉燒包 140 克
Steamed BBQ Pork Bun 140 g

雞包仔 130 克
Steamed Chicken Bun 130 g

小籠包 (4 隻) 140 克
Steamed Pork Bun 140 g

雲吞 (5 粒) 145 克
Wonton 145 g

水餃 (3 粒) 150 克
Shui Jiao 150 g

燒賣 (4 粒) 110 克
Pork Dumpling 110 g

蝦餃 (4 粒) 50 克
Prawn Dumpling 50 g

布包豆腐 300 克
Soft Tofu 300 g

硬豆腐 50 克
Hard Tofu 50 g

硬豆腐 50 克
Hard Tofu 50 g

豆腐泡 50 克
Tofu-Pop 50 g

油炸豆腐 120 克
Fried Tofu 120 g

熟雞蛋 50 克
Boiled Egg 50 g

炒蛋 50 克
Scrambled Egg 50 g

午餐肉 50 克
Luncheon Meat 50 g

腸仔 50 克
Sausage 50 g

火腿 50 克
Ham 50 g

燒鴨 80 克
Roasted Duck 80 g

半肥瘦燒肉 50 克
Roasted 24 % Fat Pork Loin 50 g

半肥瘦叉燒 50 克
Roast Barbecue Pork 50 g

雞脾 100 克
Chicken Leg 100 g

雞中翼 65 克
Chicken Mid-wings 65 g

全雞翼 80 克
Chicken Wing Quarter 80 g

雞絲 40 克
Shredded Chicken 40 g

牛肉 50 克
Beef 50 g

豬扒 100 克
Pork Chop 100 g

免治豬肉 20 克
Minced Pork 20 g

瘦豬肉 50 克
Lean Pork 50 g

半肥瘦排骨 50 克
Cooked Mid-fat Sparerib 50 g

鯪魚球 50 克
Mud Carp Ball 50 g

魚蛋 100 克
Fish Ball 100 g

吞拿魚 50 克
Tuna Fish 50 g

沙甸魚 50 克
Sardines 50 g

豆豉鯪魚 50 克
Fried Dace 50 g

紅衫魚 200 克
Golden Thread 200 g

鱸魚 200 克
Bass 200 g

鯇魚 200 克
Raw Grass Fish 200 g

熟魚肉 (4 片) 40 克
Cooked Fish 40 g

熟魚肉 (一匙) 20 克
Cooked Fish 20g

大蝦 50 克
Prawns 50 g

細蝦 25 克
Shrimps 25 g

芝士 20 克
Cheese 20 g

花生 20 克
Peanut 20 g

鮑合桃 10 克
Walnut 10 g

Kit Kat 35 克
Kit Kat 35 g

麥提莎 40 克
Maltesers 40 g

朱古力 (一格) 8 克
Milk Chocolate 8 g

健達繽紛樂（6 條裝）100 克
Kinder Chocolate 100g

威化餅 (小) (6 條) 20 克
Wafer 20 g

曲奇餅 (3 塊) 10 克
Cookies 10 g

手指餅 (5 條) 10 克
Finger Biscuits 10 g

熊仔餅 (5 粒) 7.5 克

百力滋 (7 條) 10 克
一小包 30 條 一盒 78g

夾心餅 (3 塊) 25 克
Sandwich Biscuits 25g

獸形餅 (10 粒) 10 克
Animal Biscuits 10g

旺仔小饅頭 (10 粒) 5 克
Hot-kid Ball Cake 5g

淮鹽梳打餅 (2 片) 20 克
Saltine Crackers 20g

肚臍/花尖餅 (10 粒) 17 克
Iced-gem Biscuits 17 g

腸粉 100 克
Cheung Fun 100 g

珍珍薯片 (細) 25g (大) 110g
Calbee Potato Chips
(S) 25g (L) 110g

日本肝油丸維他命 AD 鈣
Kawai Kanyu Drop (Vitamin
A,D&Calcium)

日本肝油丸維他命 AD
Kawai Kanyu Drop (Vitami
A&D)

日本肝油丸維他命 ACD

Households receiving social benefits by paternal occupations ($p<0.001$)

Receiving social benefits	Unemployed/ retired N (%)	Manual N (%)	Non-manual N (%)	Public servant N (%)	Self-employed N (%)	All N (%)
Not receiving	3 (20.0)	18 (22.8)	108 (77.7)	14 (87.5)	31 (86.1)	174 (61.1)
Either CSSA or KFRS	6 (40.0)	56 (70.9)	29 (20.9)	2 (12.5)	5 (13.9)	94 (34.4)
Receiving both benefits	6 (40.0)	5 (6.3)	2 (1.4)	0 (0)	0 (0)	13 (4.6)
All	15 (100)	79 (100)	139 (100)	16 (100)	36 (100)	285 (100)

Appendix I2

Summaries some of the characteristics of the surveyed preschoolers by gender and altogether

Characteristics and sig. *p* value	Gender		
	Girls N (%)	Boys N (%)	All N (%)
Age of child (p=0.228)			
3 years	71 (55.9)	79 (48.8)	150 (51.9)
4 years	56 (44.1)	83 (51.2)	139 (48.1)
Child's birth place (p=0.043)			
Hong Kong	114 (90.5)	156 (96.3)	270 (93.8)
Other places*	12 (9.5)	6 (3.7)	18 (6.3)
Child's birth order (p=0.302)			
Only child/First	67 (53.2)	89 (54.9)	156 (54.2)
Second	48 (38.1)	51 (31.5)	99 (34.4)
Third or above	11 (8.7)	22 (13.6)	33 (11.5)
Ever breastfed (p=0.237)			
Yes	79 (62.2)	89 (55.3)	168 (58.3)
No	48 (37.8)	72 (44.7)	120 (41.7)
Child's weight status by IOTF references (p=0.037)			
Healthier weight	117 (92.1)	136 (84.0)	253 (87.5)
Overweight/obese	10 (7.9)	26 (16.0)	36 (12.5)
Overweight	8 (5.8)	18 (11.1)	26 (9.0)
Obese	2 (1.5)	8 (4.9)	10 (3.5)
Maternal weight status (p=0.870)			
Underweight	20 (16.1)	24 (14.9)	44 (15.4)
Normal weight	68 (54.8)	96 (59.6)	164 (57.5)
Overweight	32 (25.8)	37 (23.0)	69 (24.2)
Obese	4 (3.2)	4 (2.5)	8 (2.8)
Mother's birth place (p=0.996)			
HK	76 (59.8)	97 (59.9)	173 (59.9)
China	45 (35.4)	57 (35.2)	102 (35.3)
Other places**	6 (4.7)	8 (4.9)	14 (4.8)
Smokers at home (p=0.478)			
Yes	45 (35.4)	64 (39.5)	109 (37.7)
No	82 (64.6)	98 (60.5)	180 (62.3)

*other places included China, United States, Canada, Malaysia, and Macau

**places included Indonesia, Thailand, Macau, Australia, and Parkistan

Appendix I3a

Preschooler's parents' age

Age	Mother	Father
Mean	35 (4.7)	39 (5.6)
Min.	22	27
Max.	45	60

Appendix I3b

Parents' age by SES

Parental age	SES group		
Mean (SD)	Low	High	Sig. *p*
Father's age	40±6.5	39±4.6	0.502
Mother's age	33±4.8	36±4.2	<0.001

Appendix I4

Factors considered by interviewees when buying food items

	Yes N (%)	Neutral N (%)	No N (%)	All N (%)
Fruits				
Cost	151 (52.4)	9 (3.1)	128 (44.3)	288 (100)
Availability	168 (58.3)	24 (8.3)	96 (33.3)	288 (100)
Freshness	285 (99.3)	0 (0)	2 (0.7)	287 (100)
Preference of family members	264 (91.3)	12 (4.2)	13 (4.5)	288 (100)
Preference of interviewee	213 (74.2)	32 (11.1)	42 (14.6)	287 (100)
Vegetables				
Cost	130 (45.1)	9 (3.1)	149 (51.7)	288 (100)
Availability	176 (61.3)	30 (10.5)	81 (28.2)	287 (100)
Freshness	284 (98.6)	2 (0.7)	2 (0.7)	288 (100)
Preference of family members	242 (84.0)	22 (7.6)	24 (8.3)	288 (100)
Preference of interviewee	196 (68.3)	43 (15.0)	48 (16.7)	287 (100)
Whole grain foods				
Cost	76 (26.3)	56 (19.6)	154 (53.8)	286 (100)
Availability	119 (41.8)	84 (29.5)	82 (28.8)	285 (100)
Freshness	180 (63.6)	46 (16.3)	57 (20.1)	283 (100)
Preference of family members	200 (69.9)	28 (9.8)	58 (20.3)	286 (100)
Preference of interviewee	180 (62.9)	39 (13.6)	67 (23.4)	286 (100)
Pre-prepared foods (e.g. cup noodles, microwave foods)				
Cost	129 (44.8)	61 (21.2)	98 (34.0)	288 (100)
Availability	128 (44.9)	101 (35.4)	56 (19.6)	285 (100)
Freshness	124 (43.1)	96 (33.3)	68 (23.6)	288 (100)
Preference of family members	156 (54.4)	57 (19.9)	74 (25.8)	287 (100)
Preference of interviewee	127 (44.1)	82 (28.5)	79 (27.4)	288 (100)
Snack foods				
Cost	125 (43.3)	57 (19.7)	107 (37.0)	289 (100)
Availability	153 (52.9)	86 (29.8)	50 (17.3)	289 (100)
Tastiness	197 (68.2)	65 (22.5)	27 (9.3)	289 (100)
Preference of family members	225 (77.9)	26 (9.0)	38 (13.1)	289 (100)
Preference of interviewee	143 (49.5)	70 (24.2)	76 (26.3)	289 (100)

Appendix I5

Cost as a factor of buying queried food items by SES income group

Cost as factor of buying		SES group			Sig. *p*
		Low N (%)	High N (%)	All N (%)	
Fruits	Agree	69 (58.0)	75 (47.8)	123 (44.6)	0.223
	Neutral	4 (3.4)	5 (3.2)	9 (3.3)	
	Disagree	69 (58.0)	75 (47.8)	144 (52.2)	
	All	119 (100)	157 (100)	276 (100)	
Vegetables	Agree	61 (51.7)	64 (40.5)	125 (43.5)	0.175
	Neutral	3 (2.5)	4 (2.5)	7 (2.5)	
	Disagree	54 (45.8)	90 (57.0)	144 (52.2)	
	All	118 (100)	158 (100)	276 (100)	
Whole grain foods	Agree	30 (25.4)	43 (27.6)	73 (26.6)	0.871
	Neutral	23 (19.5)	32 (20.5)	55 (20.1)	
	Disagree	65 (55.1)	81 (51.9)	146 (53.3)	
	All	118 (100)	156 (100)	274 (100)	
Pre-prepared foods	Agree	59 (49.6)	66 (42.0)	125 (45.3)	0.108
	Neutral	18 (15.1)	40 (25.5)	58 (21.0)	
	Disagree	42 (35.3)	51 (32.5)	93 (33.7)	
	All	119 (100)	157 (100)	276 (100)	
Snacks	Agree	57 (47.9)	65 (41.1)	122 (44.0)	0.156
	Neutral	17 (14.3)	37 (23.4)	54 (19.5)	
	Disagree	45 (37.8)	56 (35.4)	101 (36.5)	
	All	119 (100)	158 (100)	277 (100)	

Appendix I6

Frequencies of eating out or having takeaway meals in/from different types of caterers by SES group

Frequencies of eating out or having takeaway meals in	SES group		
	Low N (%)	High N (%)	All N (%)
Foreign restaurants (p=0.007)			
2-3 times a month or less	85 (71.4)	84 (53.8)	169 (61.5)
1-3 times a week	30 (25.2)	68 (43.6)	98 (35.6)
4-6 times a week or more	4 (3.4)	4 (2.6)	8 (2.9)
Chinese restaurants (p=0.021)			
2-3 times a month or less	80 (67.2)	97 (61.4)	177 (63.9)
1-3 times a week	33 (27.7)	60 (38.0)	93 (33.6)
4-6 times a week or more	6 (5.0)	1 (0.5)	7 (2.5)
Fast food shops (p=0.127)			
2-3 times a month or less	75 (63.0)	117 (74.1)	192 (69.3)
1-3 times a week	41 (34.5)	37 (23.4)	78 (28.2)
4-6 times a week or more	3 (2.5)	4 (2.5)	7 (2.5)
Stalls (p=0.132)			
2-3 times a month or less	98 (82.4)	143 (90.5)	241 (87.0)
1-3 times a week	20 (16.8)	14 (8.9)	34 (12.3)
4-6 times a week or more	1 (0.8)	1 (0.6)	2 (0.7)

Appendix I7

Type of utensils used to feed the preschoolers by SES group

Type of utensils used	SES group			Sig. *p*
	Low N (%)	High N (%)	All N (%)	
Spoon	112 (94.9)	154 (97.5)	266 (96.4)	0.261
Fork	52 (44.1)	109 (69.0)	161 (58.3)	<0.001
Bowl/cup	116 (98.3)	158 (100)	274 (99.3)	0.101
Infant bottle	61 (51.7)	82 (51.9)	143 (51.8)	0.748
Chopstick	96 (81.4)	109 (69.0)	205 (74.3)	0.020
straw	73 (61.9)	111 (70.3)	184 (66.7)	0.144

Appendix I8

Preschoolers' activities during dinner by SES group

Activities during dinner	SES group		
	Low N (%)	High N (%)	All N (%)
Chatting with other family members (p=0.683)			
Seldom or never	70 (59.3)	87 (55.1)	157 (56.9)
Sometimes	28 (23.7)	38 (24.1)	66 (23.9)
Often	20 (16.9)	33 (20.9)	53 (19.2)
TV watching (p=0.027)			
Seldom or never	68 (57.6)	100 (63.3)	168 (60.9)
Sometimes	19 (16.1)	36 (22.8)	55 (19.9)
Often	31 (26.3)	22 (13.9)	53 (19.2)
Reading (p=0.079)			
Seldom or never	116 (98.3)	146 (92.4)	262 (94.9)
Sometimes	2 (1.7)	10 (6.3)	12 (4.3)
Often	0 (0)	2 (1.3)	2 (0.7)
Running around (p=0.546)			
Seldom or never	51 (43.2)	63 (39.9)	114 (41.3)
Sometimes	26 (22.0)	30 (19.0)	56 (20.3)
Often	41 (34.7)	65 (41.1)	106 (38.4)

Appendix I9

Proportion of interviewees with adequate fruit, vegetable, and both fruit and vegetable intakes per day by SES group

Fruit, vegetable intakes of interviewees	SES group			Sig. p
	Low N (%)	High N (%)	All N (%)	
Fruit	18 (15.1)	30 (19.0)	48 (17.3)	0.401
Vegetable	31 (26.1)	38 (24.1)	69 (24.9)	0.703
Fruit and vegetable	9 (7.6)	15 (9.5)	24 (8.7)	0.572