

The Daily Activity of 11- to 18-year-old School Children:

The Hong Kong Study

香港 11 至 18 歲學童的日常起居活動

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摘要

本研究目的是觀察 11 至 18 歲學童的日常起居活動。這項研究利用問卷調查了二百一十七名香港的中學生 (男生=109人; 女生=108人)。資料的分析方法是採用「二因子變異數分析法」去比較性別及年齡對各項活動的影響。以「F 比值」去試探三組不同年齡學童的顯著差異。在性別與年齡沒有交互作用情況下, 進一步以「單因子變異數分析法」及「薛費法」去進行事後比較測試年齡組別的顯著分別。研究結果顯示, 以性別而言, 體育活動在上學的日子與假期有顯著差異, 但睡眠則只在上學的日子有顯著差異。總括而言, 女學生的活動水平比男學生為低, 而且是隨年齡而遞減的。

Abstract

The purpose of the study was to examine the daily activity of the 11- to 18-year-old Hong Kong secondary school children. Two hundred and seventeen Hong Kong secondary school children (males = 109; females = 108) were surveyed. The physical activity questionnaire was employed as the survey tool to assess the daily activity. Two-way ANOVA was carried out to compare the effects of gender and age in the mean of each daily activity. F-ratios were calculated for detecting significant differences between groups ($p < 0.05$). One-way ANOVA was used followed by Scheffe posthoc tests to distinguish the age groups which were significantly different. The results indicated that in relation to gender, sports activities were significantly

different both during school days and holiday, and study activities were significantly different during school days. In relation to age groups, study activities were significantly different between age groups both during school days and holidays, and sleeping was significantly different between age groups during school days only. The findings suggest that activity levels tend to be lower in girls than in boys and tend to decrease with age.

Introduction

Activity declines with age in childhood (Rowland, 1990). In western societies, it was found that physically active people of all ages were healthier than their sedentary counterparts (Saris, 1986). Physical inactivity has been identified as one of the causes of coronary heart disease (CHD) (Fletcher et al., 1992) and CHD has been widely accepted that it has its origins in childhood (Berenson, 1980; McGill, 1984; Newman et al., 1986). In Hong Kong, with the advance of modern technology, children are spending more of their time in television viewing and computer games and become quite sedentary (Ng, 1996). In order to study the relationship between daily activity and health-related outcomes, it is therefore important to investigate the daily activity of the adolescents. Because of the low cost and administration convenience, physical activity questionnaire has been widely used in many studies to assess the activity pattern of the adolescents (Aaron et al., 1993; Aaron et al., 1995). The aim of the present investigation was to use physical activity questionnaire to obtain information on the daily activity pattern of 11- to 18- year-old children in Hong Kong.

Subjects

The subjects of this study were 217 Form 1 to Form 5 Hong Kong secondary school children (109 males and 108 females) between the ages of 11 and 18. Subjects' ages were computed with reference to the date of the data collection. The body size (weight and height) was

recorded for all subjects. The weight (Wt) and height (Ht) of the subjects were measured respectively to the nearest 0.5 kg and 0.5 cm. Since body mass index (BMI) provides an estimate of obesity (Smalley et. al., 1990), it was possible for the BMI of the subjects in this study to be calculated. The formula used was Wt/Ht^2 (Wang et al., 1994). The physical characteristics for all the subjects are presented by gender in Table 1.

Table 1 Physical Characteristics of the Subjects (N=217)

	Male(n=109)		Female(n=108)		Total(N=217)	
	Mean	SD	Mean	SD	Mean	SD
Age	14.04	1.48	14.11	1.48	14.07	1.48
Weight(kg)	51.76	10.67	46.43	9.78	49.11	10.42
Height(m)	1.64	0.09	1.56	0.06	1.60	0.09
BMI(kg/m ²)	19.04	3.08	18.90	3.14	18.97	3.10

Methods

Physical Activity Questionnaire

Physical activity includes not only the sports activities but also activities that require energy expenditures e.g. leisure activities (Shephard, 1995). Recall questionnaire was found to be a valid and useful tool for data collection (Caspersen, 1989). The questionnaire used for this study was modified from the one originally developed by Lee & Hung (1993). It was written in Chinese and contained two parts. Part I requested subjects to recall their competitive and recreational activity patterns for the past one month. The 5-point Likert scale for each of the physical activity items was used and the scaled items (from "frequently" to "never") were categorized by the number of hours involved in the specified activity. Subjects were told to add any other items that they had participated but which did not appear on the list at the blank spaces provided.

Part II requested subjects to present the number of hours of their daily activity pattern during school days and holidays. Some standard activity items were listed. Once again, blank spaces were provided for the subjects to append new items. The survey was conducted during regular physical education lessons and the data collection was completed within 2 consecutive weeks in Autumn.

Data Analysis

Lotus 2.4 spreadsheet was used to store the questionnaire data and SPSS/PC+ (version 5.0) was used to analyze the data. Data consist of the followings: demographic data of sex, age, weight, height; ratings for competitive activities; ratings for recreational activities; and time spent on daily activities during school days and holidays. Subjects were grouped into 3 groups similar to the age groupings in different levels in secondary school (i.e. junior, middle, and senior). The number of subjects in each group is presented in Table 2.

Table 2 Number of Subjects by Age and Gender in Each Group

	Age	Male	Female
Group 1	11-13	42	39
Group 2	14-15	45	48
Group 3	16-18	22	21

Means, standard deviations (SD) and modes were calculated where appropriate. For the purpose of comparing effect of gender and age in the mean of each physical activity, two-way ANOVA was carried out. F-ratios were calculated for detecting significance between groups. Differences were regarded as significant when a value of $p < 0.05$ was obtained. Contingent to significant differences found among age groups, one-way ANOVA was used followed by Scheffe posthoc tests to distinguish the age groups which were significantly different.

Results and Discussion

The present study investigated the time spent on daily activities on school days and holiday of different age groupings and genders.

Tables 3 and 4 show the modes, means and standard deviations of the measures of time spent on daily activities during school days and holidays respectively (N= 217).

Both means and modes revealed that during school days, attending school and sleeping occupied most of the time; during holidays, sleeping occupied most of the time. The means showed that the subjects participated in leisure activities more often than sports activities both during school days and holidays. In general, the modes told us

that most students spent 2 hrs. on leisure activities and 1 hr. on sports activities daily during school days and 6 hrs. on leisure activities and 3 hrs. on sports activities during holidays. The comparable length of time spent in study activities during school days and holidays, and the relatively longer time spent in leisure activities during holidays showed that homework load of the subjects did not seem to have much influence on the participation of leisure activities beyond school hours. Judging from the large standard deviation comparable with the mean in sports activities, it was evident that some students did not participate actively in sports activities. There exists a need for the physical education teachers, parents and school administrators to explore the sports potential of the students.

Time spent on transportation during school days was lower than time spent on transportation during holiday. Since the Hong Kong Education Department has a policy to place the students as near to their home address as possible, it is not surprising to find that on the average, students spend little time on transportation during school days.

The modes also indicated that during the holidays, the time saved by not doing the school activities for most students was mainly taken up by leisure activities, sports activities and sleep.

Table 3 Modes, Means and Standard Deviations (SD) of Daily Physical Activities DurinSchool days

	School days (hours)			
	Total (N=217)		Male (n=109)	Female (n=108)
Activity	Mode	Mean (SD)	Mean (SD)	Mean (SD)
Leisure Activities	2	2.85(1.52)	2.95(1.52)	2.75(1.51)
School	8	7.92(0.73)	7.95(0.71)	7.92(0.76)
Sleeping	8	7.65(1.20)	7.67(1.19)	7.62(1.21)
Sports Activities	1	1.22(1.12)	1.48(1.24)	0.95(0.93)
Study	2	2.37(1.56)	2.01(1.30)	2.73(1.72)
Transportation	1	0.83(0.53)	0.83(0.51)	0.83(0.56)
Others	2	1.94(1.25)	2.44(1.36)	1.70(1.15)

Note: Others denote the following activities: church, computer, housework, piano, musical instrument, reading, scout activity, and tutorial.

Table 4 Modes, Means and Standard Deviations (SD) of Daily Physical Activities During Holidays

	Holidays (hours)			
	Total (N=217)		Male (n=109)	Female (n=108)
Activity	Mode	Mean (SD)	Mean (SD)	Mean (SD)
Leisure Activities	6	5.50(2.64)	5.81(2.76)	5.18(2.48)
School	0	0.32(0.94)	0.19(0.69)	0.45(1.11)
Sleeping	10	9.23(1.56)	9.10(1.66)	9.35(1.45)
Sports Activities	3	2.71(1.88)	3.39(1.91)	2.03(1.58)
Study	2	3.10(2.21)	2.84(2.19)	3.36(2.21)
Transportation	0	1.23(1.12)	1.13(1.04)	1.33(1.19)
Others	3	2.92(2.20)	3.55(2.67)	2.61(1.93)

Note: Others denote the following activities : church, computer, housework, piano, musical instrument, reading, scout activity, and tutorial.

Table 5 summarizes the two-way ANOVA results of daily activities during school days by sex and by age ($p < 0.05$). Similarly, Table 6 shows the two-way ANOVA results of daily activities during holidays by sex and by age ($p < 0.05$). Both sex and age show significant differences in some activities during school days and holidays.

In relation to sex, time involved in sports activities was significantly different both during school days and holidays, and time for study activities was significantly different during school days. As there are just 2 levels in sex, there is no need for further posthoc test here. The mean (SD) of the sports activities for males during school days was 1.48 (1.24) and for females was 0.95 (0.93) hrs.; while the mean for sports activities for males during holidays was 3.39 (1.91) and for female 2.03 (1.58) hrs. (Table 3). These imply that males were significantly more sporty than females both during school days and holidays. This is similar to the results obtained by Janz et al. (1995). The mean (SD) of male study time during school days was 2.01 (1.30) hrs. and female study time was 2.73 (1.72) hrs. which implied that females spent more time during school days for study. From the results obtained, one can interpret that there may be more opportunities for the males to participate in sports activities and/or that the males are by nature more active. On the other hand, the females may not have as many opportunities as the males, so that they resort to devote more of their time in study, and/or they are by nature more diligent. Further study will be needed in these areas.

In relation to age groups (Table 2), time for study activities was significantly different between age groups both during school days and holidays, and sleeping time was significantly different between age groups during school days. As there were 3 levels of age groupings, a one-way ANOVA followed by Scheffe post-hoc test ($p < 0.05$) was performed to identify the exact age groups which were significantly different (Table 7). The results of the time spent on study for school days and holidays show that Group 1 (11-13 years old) spends significantly less time than Group 3 (16-18 years old) in study activities. There is a general increase in study time with age. The differences between mean study time during holidays and school days also increase with age. Perhaps it is because the senior students have to prepare for the public examinations, therefore they have to devote more time on study both during school days and holidays. The one-way posthoc test also shows that the mean sleeping hours decrease with age. Group 1 (11-13 years old) spends significantly less time in sleep than Group 2 (14-15 years old) and Group 3 (16-18 years old). This may be related to greater expenditure of energy of younger students or the senior subjects actually spent more time on less energy-consuming study activities and therefore would need lesser time on sleeping. Here is another area deserving further research.

However, no significant interaction ($p < 0.05$) was observed between age and gender on all daily activities during school days and holidays.

Table 5 Two-way ANOVA of Daily Activities During School days by Sex and by Age (N=217)

Activity	School days (hour)		
	Sex (F ratio)	Age (F ratio)	Sex x Age (F ratio)
Leisure Activities	1.27	2.34	0.66
School	0.52	0.25	1.10
Sleeping	0.10	5.91*	0.07
Sports Activities	12.79*	1.53	0.52
Study	12.42*	4.43*	0.01
Transportation	0.00	0.47	1.69
Others	1.36	0.18	1.96

* $p < 0.05$ (Males = 109, Females = 108)

Note : Others denote the following activities: church, computer, housework, piano, musical instrument, reading, scout activity, and tutorial.

Table 6 Two-way ANOVA of Daily Activities During Holidays by Sex and by Age (N=217)

Activity	Holidays (hour)		
	Sex (F ratio)	Age (F ratio)	Sex x Age (F ratio)
Leisure Activities	3.01	0.53	1.75
School	3.36	0.16	0.63
Sleeping	1.16	2.13	1.52
Sports Activities	31.67*	1.36	0.55
Study	3.25	4.94*	2.37
Transportation	1.63	0.47	2.01
Others	2.27	0.42	1.09

* $p < 0.05$ (Males = 109, Females = 108)

Note : Others denote the following activities: church, computer, housework, piano, musical instrument, reading, scout activity, and tutorial.

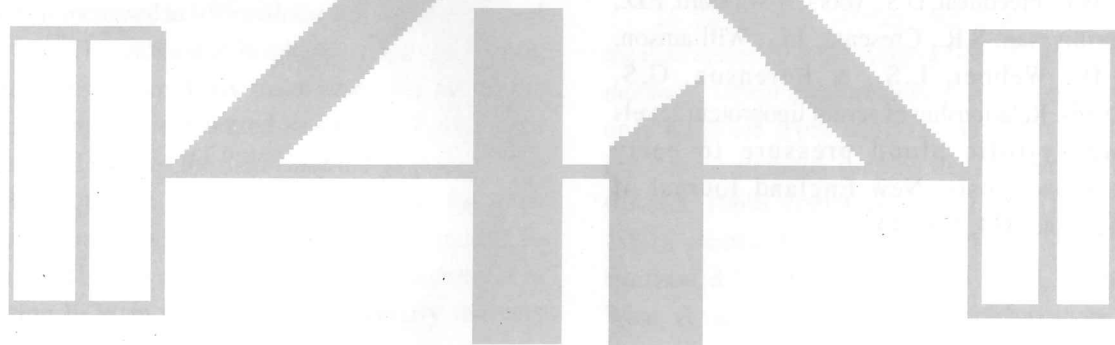
Table 7 Means (SD) and Results of Scheffe Posthoc Test ($p < 0.05$) on Age Groupings After ONE-WAY ANOVA

	Age group 1 (aged 11-13) (n=81) Mean (SD)	Age group 2 (aged 14-15) (n=93) Mean (SD)	Age group 3 (aged 16-18) (n=43) Mean (SD)	Significant difference found by Scheffe Posthoc Test between groups
Study hours during school days	2.15 (1.27)	2.28 (1.63)	2.97 (1.79)	Group 3 > Group 1
Study hours during holidays	2.67 (1.90)	3.08 (2.14)	3.94 (2.66)	Group 3 > Group 1
Additional study hours during holidays	0.52	0.80	0.97	
Sleeping hours during school days	8.17 (1.00)	7.50 (1.22)	7.01 (1.10)	Group 1 > Group 2 Group 1 > Group 3
Sleeping hours during holiday	9.38 (1.59)	9.29 (1.67)	8.80 (1.16)	No significant difference among age groups
Additional sleeping hours during holidays	1.21	1.79	1.79	

Conclusions

With the methodological limitations, the principal conclusion of this study is that the Hong Kong secondary school children are quite sedentary. This is consistent with the previous findings obtained by Part I of the same questionnaire (Ng, 1996). It is apparent that age and gender are two main factors that affect the participation of sports activities of the secondary school

children. The current results indicate that activity levels tend to be lower in girls than in boys and tend to decrease with age. This might have an implication that many Hong Kong secondary school children are at risk of becoming sedentary adults, especially those female students. The paper has also indicated possible explanations for significant differences between sexes and among age groups and identified possible research areas for future studies.



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