NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN OF A PRIVATE SCHOOL IN HANOI, 2024Y

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ABSTRACT

Objective: To assess the nutritional status of primary school children, a private school NS. Hoang Mai district, in Hanoi city at the beginning of the 2024-2025 school year. **Subject & Methods:** A cross-sectional study was conducted among 1675 school children aged 6-10yrs old (928 boys and 747 girls), from grade 1 to 5. The weight and height were measured according to the standardised methods, then nutritional status was assessed by using WHO 2007 standards. **Results:** The global prevalence of overweight and obesity (Over/Obes) was 62.9% (obesity 18.9%; overweight 44%), this rate was significantly higher ($p<0.001$) in boys (78.2% /26.9%) than that in girls (44%/9.1%). The rate of stunting was 0,5%, and wasting was 2,1%. **Conclusion:** The prevalence of Over/Obes among primary school children, private NS. Hoang Mai school, urban Hanoi city is belong to very high levels. Future studies should be expanded to more private schools, and focus on risk factors to provide appropriate methods to control the obesity in this population.

Keywords: *Primary school children, private school, overweight, obesity, Hanoi city*

I. INTRODUCTION

Primary school age (6-11ys old) is a very important stage in the human s' life cycle. At this stage, children develop rapidly physically and mentally, then preparing for puberty, and are also susceptible to myopia, scoliosis, stunting, overweight and obesity... The WHO's data (2022) show that the obesity rate in children aged 5-19 is increasing rapidly at an alarming prevalence, averaging 19% in girls and 21% in boys, mainly in low- and middle-income countries [1,2].

In Vietnam, childhood obesity has been rapidly increasing in the big cities. In Hanoi [3,4], Ho Chi Minh City [5], the rate of Over/Obes is up to 35-40%, of which obesity is about 10-15%, fluctuating by age group and gender. In rural areas, the Over/Obes rate is lower than those of urban but still at a worrying level [6,7]. Children with Over/Obes are not only affected in their ability to acquire knowledge scores, but are also at risk of Over/Obes when they grow up, increasing the risk of chronic non-communicable diseases such as diabetes, dyslipidaemia, cardiovascular disease... affecting personal health, reducing working capacity and increasing medical costs [1,2].

In developing countries with economic transition, the risk factors related to Over/Obes of school children such as disponible processed foods rich in energy, sugar, salt and fat, poor in micronutrients, backward social customs, little physical activity... have received much attention investigated [1,2].

Vietnam is also in a period of nutritional transition, although there is quite a lot of data

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on Over/Obes of school children in different regions across the country, but data from private schools, witch subgroups considered as favourite economic conditions, still not yet researched. Is the rate of Over/Obes of private school children is different from the general community? What are the at-risk factors involved... are questions that need to be further understood.

For these reasons, the study was conducted to assess the nutritional status of primary school children at a private school, in urban Hanoi city, at the beginning of the 2024-2025 school year.

II. SUBJECT AND METHODS

2.1. Study design: Descriptive cross-sectional study. Data collection period from 15-30 September, year 2024.

2.2. Subjects: Primary school children: grades 1, 2, 3, 4, 5 (ages 6 to 10 olds), belong to NS. Private School, Hoang Mai District, urban Hanoi City, participating to 2024-2025 school years.

Selection criteria: Not suffering from genetic diseases or congenital malformations, or no acute illnesses at the data collection time; have the consent of the parents agreed to participate in the study.

Sample selection: Purposive sampling, all primary school children of the school, eligible to be selected for the study.

2.3. Data collection:

The weight and height of children were measured using the TANITA scale (Japan) with an accuracy of 0.1 kg, and a stand ruler with an accuracy of 0.1cm respectively. The measurements were taken twice from each child by trained staff according to standardised procedures. The time to collect weight and height data was in the morning before class, or during break after the first class. The list and date of birth of children were taken from the school registration form.

Nutritional status were assessed by WHO Anthro software, using reference for children 5-19 year olds, based on the Z-score - BMI index (BAZ): <-2 is wasting; from -2 to <-1: normal; >1: overweight; >2: obese; Z-score height/age (HAZ) <-2: stunting, from -2 to +2SD: normal [2].

2.4. Data analysis: weight, height, age, and gender data were entered twice into WHO Anthro software, then the BAZ and HAZ values were transferred to SPSS V.20 software for statistical calculations. Compare the difference in average weight and height between age and gender groups using independent t-test, the difference between the percentages of the groups using $\chi 2$ test or Fisher-test with $n<5$; $p<0.05$ is considered a statistically significant difference.

2.5. Ethics: The study was conducted with the consent of school leaders, teachers, and participation of school s' medical staff. The invitations to participate with information about the research objectives were sent to children s' parents. The nutritional status of children was informed to the teacher and parent individually. Children with Over/Obes or malnutrition are recommended for specialized nutrition examination. Children's personal information is kept confidential and is only used for research purposes.

III. RESULTS

A total of 1675 eligible subjects, including 928 boys and 747 girls children, were included in the study. The height and weight data are shown in the following table:

Table 1*: Average weight and height (X±SD) of children by age/gender group (n=1675)*

Ages groups	Boys (n = 928)			Girls (n = 747)		
	n	Height (cm)	Weight (kg)	n	Height(cm)	Weight (kg)
6 olds/grade 1	191	118.3±5.5	23.1±4.7	158	116.9±4.8^{+}	21.9±4.2^{+}
7 olds/grade 2	207	124.5±4.7	27.1±6.0	149	123.4±4.9^{+}	25.6±5.0^{+}
8 olds/grade 3	197	130.8±5.5	31.5±7.0	145	129.9±5.8	28.7±5.7^{+++}
9 olds/grade 4	173	136.0±5.9	35.9±8.7	152	136±5.6	33.4±6.5^{++}
10olds/grade 5	160	142.4±6.3	40.7±8.7	143	142.8±6.8	37.7±7.7^{++}

$^{+}$p<0.05; $^{++}$p<0.01; $^{+++}$p<0.001 vs. boys, same age group, t-test.

Table 1 shows that for most age groups, boy children have significantly greater weight (p<0.05) than girls children, the difference is most obvious in the 8-10 year old group (p<0.01). For height: in the 6 and 7 year old groups, boy children are taller than girls children (p<0.05), then the height of the two sexes is similar in the 8-10 year old group.

Table 2: ***Rate (%) of overweight and obesity by age group and gender***

Ages (years), grade	Sex (number of children)	Overweight		Obesity		Global Over/Obes	
		n	%	n	%	n	%
6 olds, Grade 1	Boys (191)	70	36.6	33	17.3	103	53.9
	Girls (158)	37	23.4	17	10.8	54	34.2^{+}
	Average(349)	***107***	***30.7***	***50***	***14.3***	***157***	***45.0***
7 olds Grade 2	Boys (207)	96	46.4	49	23.7	145	70.0^{+}
	Girls (149)	62	41.6	15	10.1	77	51.7
	Average (356)	***158***	***44.4****	***64***	***18.0***	***222***	***62.4*****
8 olds, Grade 3	Boys (187)	109	55.3	55	27.9	164	87.7
	Girls (145)	44	30.3^{+}	7	4.8	51	35.2^{+++}
	Average(342)	***153***	***44.7****	***62***	***18.1***	***215***	***62.9*****
9 olds, grade 4	Boys (173)	103	59.5	65	37.6	168	97.1^{+++}
	Girls (152)	66	43.4	14	9.2	80	52.6
	Average(325)	***169***	***52.0*****	***79***	***24.3***	***248***	***76.3*****
10olds, grade 5	Boys (160)	98	61.2	48	30.0	146	91.3
	Girls (143)	52	36.4^{++}	15	10.5	67	46.9^{+++}
	Average (303)	***150***	***49.5*****	***63***	***20.8***	***213***	***70.3*****
Average 6-10 olds	Boys (928)	476	51,3	250	26,9	726	78,2
	Girls (747)	261	34,9^{+++}	68	9,1^{++}	329	44,0^{+++}
	Average(1675)	***737***	***44,0***	***318***	***19,0***	***1055***	***63,0***

*p<0.05; **p<0.01; ***p<0.001 vs. 6 olds group, χ^2 test

$^{+}$p<0.05; $^{++}$p<0.01; $^{+++}$p<0.001 vs. boys group, same age group, χ^2 test

Table 2 shows that the overall prevalence of overweight (6-10 years old) is 63.0%, of which 44% are overweight and 19% are obese. The global rate of Over/Obes were gradually increased (p<0.01) from 45% in the grade 1 to the highest of 76.3% in the grade 4. The significantly increase trend (p<0.05) of overweight from grade 1 to grade 5 group was observed, while the rate of obesity slightly increased but not statistically significant. The overweight and obese rate in boys was significantly higher (1.5 to 3 time, p<0.01) compared to those of girls.

Table 3: ***Rate (%) of wasted and stunted malnutrition***

Age/ grade	Wasting (BAZ<-2) NS		Stunting (HAZ<-2) NS	
	n	%	n	%
6 old/grade 1	10	2.9	2	0.6
7 old/grade 2	8	2.2	0	0
8 old/grade 3	6	1.8	2	0.6
9 old/grade 4	7	2.2	0	0
10old/grade 5	4	1.3	0	0
Average 6-10 olds	35	2.1	4	0.2

NS: p>0.05between age groups, Fisher- test

Table 3 shows that the rate of wasting SDD (BAZ<-2) exists at a low level of 2.1%, the rate of stunting SDD (HAZ<-2) is also rare: there are 4 children (0.2%) at the stunting level.

IV. DISCUSSIONS

Our study shows that the rate of Over/Obes in children in private primary schools NS. Quynh Mai, Hanoi in 2024 is higher than the research results in Hanoi, Ho Chi Minh City, and some other cities investigated in public schools during recent years.

Indeed, in 2021 NTH. Yen & cs [3], the investigation in grade 5 of 30 primary schools in Hanoi showed that the general Over/Obes was at 37.8%, obesity was 14.7%, in the inner-city school area Over/Obes (45.3%) obesity (17.5%), in suburban schools in order was (35.4%) and 13.8%. In 2018 NT. Nhu & cs.[4] A survey at a primary school in Long Bien district - Hanoi showed that the rate of Over/Obes was 36.3% (boy 48%, girls 24.8%), 8.6% were obese. In Ho Chi Minh City, NK Pham & cs. [5] conducted a 2016 survey in 8 districts and found that the rate of Over/Obes in boy children was 24.7%, twice as high as that of girls children 12.3%. Thus, the results of our study showed an increasing trend the rate of Over/Obes with ages.

In some other cities and rural areas, the rate of Over/Obes in primary school children is also notable, but still at a lower level than Hanoi and Ho Chi Minh City. In 2021, a study by CM. Duc & cs. [6], investigated in primary school children in An Duong, Hai Phong, the rate of overweight was 15.09%, obesity was 9.43%, Over/Obes was highest in 9-year-old children (32.05%), boy Over/Obes was 33.49%, 2.12 times higher than girls Over/Obes 15.81%. Ngan HTD & cs. [8] conducted in Hai Phong City in 2012 showed that the rate of overweight, obesity, and abdominal obesity in primary school children was 11.2%, 10.1% and 19.9%. Another study by author Hoang N & cs. [7] in 2016, in 8 primary schools in 2 districts of Thuy Nguyen and An Lao, Hai Phong, the rate of Over/Obes was 22.1%, abdominal obesity was 31%; underweight SDD was 8%, stunted SDD was 5.1% and wasting SDD was. The study also showed that children of mothers with high education level had a higher risk of Over/Obes than mothers with low education level. In 2020 in Duc Thanh - Hai Duong, PT. Diep & cs. investigated at 3 primary schools, showing that the rate of Over/Obes was 21.3%, highest in the 7-year-old group at 27.7% [9]. In Thanh Hoa city, investigated in 2021 by Le GB & Dinh DX [10], showed that the rate of Over/Obes was 35.9% (overweight 21.6%, obesity 14.3%); obesity in boy children was 4 times higher than that in girls children (23.9% vs. 5.6%, p<0.001). The difference in Over/Obes rate in rural areas compared to urban areas, and to big cities were due to differences in socio-economic conditions, the at- risk factors of

the transitional economic period in Vietnam during recent years.

A study in Switzerland by Vasiljevic & CS. conducted in 2019 on primary school children showed that the rate of Over/Obes was 28% (15% overweight, 13% obese), boy children had a higher rate of Over/Obes than girls children, this rate is at the average level of European countries [11]. In China, Zhang & cs. [12], a study of 66,072 school children in Henan province, China, showed that the rate of Over/Obes was 26.69%, obesity was 10.75%, boys had a Over/Obes ratio of 36.08% / 15.52%, higher ($p<0.001$) than girls with a corresponding rate of 23.30%/6%, this rate is tending to decrease slowly in recent years. A study in Bangkok - Thailand 2019 [13], showed that the obesity rate in primary school children has been decreasing significantly each year from 21% in 2012 to 20.5% in 2014, 16.9% in 2016, 15.9% in 2018, and 15.6% in 2019, thanks to the effectiveness of the program with synchronous intervention measures. Thus the gradual decrease in Over/Obes data in these countries also proves the opinion that in developed countries, and with appropriate synchronous intervention measures, this situation can be completely controlled; the trend of gradually lowering Over/Obes in children in Bangkok and Henan in recent years is worth referring to for Vietnam.

The results are quite consistent between studies on obesity rates in boy children being 2-3 times higher than in girls children. Explaining this, many studies show that socio-economic factors are involved: in Asian countries, boys are often given priority over girls (more priority in eating, less housework) [1, 2, 7, 14]; boy secondary school children are not as aware of maintaining their figure as girls children [15]. The very high rate of overweight and obesity in our study population is also consistent with the assessment of WHO on changes in nutritional status during the transition period. In developing countries, children of the high-income class have access to energy-rich processed foods, while the nutritional knowledge and practices of children and parents are not good, and the idea that the fatter the child, the better, and that food priority for boys is still common, so children of these families have a high rate of overweight and obesity. Meanwhile, in developed, high-income countries, the rate of Over/Obes is only high among low- and middle-income groups [1, 14,15].

In Vietnam, some risk factors associated with Over/Obes have also been proven: for example obese children like to eat processed foods, fried foods, soft drinks every day, pizza-sandwiches, chips, potato fries, play games >2 hours/daily, little or no exercise [4]. Obese children with little physical activity, mothers with high education level and income are factors that increase the risk of Over/Obes [6, 7]; The children with little physical activity, children go to school with their parents' car or bus have a higher rate of Over/Obes than children who walk or ride a bicycle; children whose mothers are officials have a higher risk of Over/Obes than those worker mothers; families with income > 30 million VND have a higher risk of Over/Obes than families with income < 8 million VND/month [10]. Overview study by Liberali R & cs. [15], shows that in addition to the consuming processed foods rich in energy, spend lot of time sitting in front of the screen, and short sleep time are also risk factors related to Over/Obes in children. These risk factors regarding eating habits, physical activity, and socio-economic factors are quite similar to the conditions of NS private schools, and need to be considered in future intervention measures.

Our study also has some limitations: the study was conducted only in 01 private school in the inner Hanoi city, which is

considered to have more favourable socio-economic conditions than public schools; therefore, the study initially assessed the rate of Over/Obes in this school. Further studies need to be expanded to more private schools, along with research on related risk factors to have a clearer picture of Over/Obes, as a basis for proposing appropriate interventions in this community.

V. CONCLUSION:

The global rate of Over/Obes among primary children at NS private school, Hanoi in 2024 was 62.9%, of which obesity was 19% and overweight was 44%. The Over/Obes rate among school boys was higher than that of school girls, and tends to increase with age group. More research is needed to expand to more private schools, along with the risk-factors related to obesity, in order to provide appropriate interventions for controlling the situation.

CONFLICTS OF INTEREST:

There are no conflicts of interest.

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