

Original Research Article

Nutritional Status and School Performance among Upper Primary Children in Selected Public Schools in Nairobi County, Kenya

Githinji Phrashiah¹, Chege Peter², Githinji Scolastica³

¹Lecturer-Department of Community Nutrition, Kenya Medical Training College.

²Lecturer-Department of Food, Nutrition and Dietetics, Kenyatta University.

³Senior Lecturer-Department of Education, Daystar University.

Corresponding Author: Githinji Phrashiah

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ABSTRACT

Background/Aim: School-age is a critical period during which adequate nutrition is considered an important factor that affects learning capabilities. There is an emergence of the dual burden of malnutrition among children in urban setups like Nairobi and yet there is limited information on the effect of these on school performance. Research has shown that nutritional status affects children's development. The purpose of this study was to investigate the relationship between nutritional status on school performance among children in upper primary in selected public schools in Nairobi County, Kenya.

Methods: This was a cross-sectional analytical study. The study comprised of randomly selected 256 children from public schools within Nairobi County.

Results: The study confirmed that there is concurrent dual burden of malnutrition among adolescent school children in Nairobi County; (8.6% were overweight while 9% were undernourished). Children with higher Z-scores/ BMI were found to be more likely to be inactive during field games and they preferred sitting in the field during physical activities ($P \leq 0.05$). Children within normal weight for their age showed higher chances of performing well in classroom activities such as completion of assignments ($P \leq 0.05$). However, the study showed no correlation between nutritional status and attendance.

Conclusion: Children's nutritional status influences their school performance in extra-curriculum activities namely; field games and school clubs as well as completion of homework assignments.

Keywords: Nutritional status, school performance, extra-curriculum activities, classroom activities, attendance.

INTRODUCTION

Good childhood nutrition is an important component of health and development. [1,2] This is so because nutrition has been shown to have a critical role in growth and development. [3] Many children do not fully benefit from school experiences. They have low level activity, concentrate less in class and do not perform optimally in school. [4] Moreover, the children are poorly prepared for schooling,

have little motivation and poor learning capabilities. Nutrition is one of the many factors that potentially influence a child's development besides genetic, socio-economic, environmental and behavioural factors. [5] Under-nourished children are vulnerable to diseases while overweight and obese children are at risk of serious health consequences such heart disease. [3] These nutritional inadequacies influence children's health and put them at a higher risk of

contracting chronic diseases in adulthood. [6] Dietary practices that influence the nutritional status of school-aged children are more likely to impact on their school performance. [7] Studies conducted in most developing countries reveal that malnutrition (underweight, overweight) is common among school going children. [1,2,8,9] Nonetheless, majority of these studies have focused primarily on nutritional status of school-children as general surveys without correlating the findings to children's school performance. [10-12] At the same time, most studies in this field have mainly focused on underweight children while ignoring overweight/ obese children and the emergence of dual malnutrition among the urban population. [2,3,11] Additionally, the studies have mainly focused on academic achievement (measured mostly by examinations) while ignoring other aspects of performance such as school attendance and involvement in extra-curriculum activities which are equally important. [13] This study was therefore conducted to assess the relationship between nutritional status and children's school performance in Nairobi County.

MATERIALS AND METHODS

This was a non-experimental cross-sectional analytical study that used both quantitative and qualitative methods of data collection.

Study Population

The study population comprised of 256 children in public upper primary schools within Nairobi County. These children are at a period of rapid growth where nutritional needs increase due to heightened growth rate and changes in body composition associated with puberty. [14] Upper primary in Kenya consists of pupils from class 4 to class 8 aged between 11-15 years. [15] At this age, the children have attained formal operational abilities and may be able to comprehend the research. [16] Respondents were identified and recruited at the different schools within the county. A

mixed study design was used consisting of both structured and semi structured questionnaires

Nutritional Status

The height and weight of each pupil was measured and anthropometric measurements BMI for age and Z-scores were used to assess the children's nutritional status.

School Performance

School performance was measured in three main categories which included; involvement in classroom activities (completion of class assignments, participation in class and volunteering to take up class activities), involvement in extra-curriculum activities; (games, school clubs and field activities) and school attendance (punctuality when reporting to school, absenteeism, punishment as a result of being late). This information was generated using a researcher designed 5-point likert questionnaire.

Statistical Analysis

Data was entered and verified. BMI was calculated as kg/m^2 . Then, BMI-for-Age (Z-scores) was calculated using WHO Anthropometric Plus which is a gender specific analytical tool for measuring BMI-for-age Z-scores (BAZ) for children aged 5-19 years. Furthermore, all data on nutritional status and school performance was entered into the software SPSS version 20 and analyzed. After statistical testing, the relationship between the pupil's nutritional status and school performance was determined using Pearson's product moment correlation while chi square was used to compare differences. [17-19]

Ethical Consideration

Authority to conduct the research was obtained from the National Council for Science Technology and Innovation (NACOSTI) and from the Nairobi City Council Education Department. Ethical clearance was also obtained from the Ethical Review Committee of Kenyatta University. Moreover, informed consent was obtained from children's parents through a permission slip before data was collected.

The respondents were also reassured of their confidentiality and anonymity.

RESULTS

Socio-Demographic and Economic Characteristics of the Respondents

Of the study population, 55.5% were male while 44.5% female. The survey data of this study revealed that most of the children's parents had secondary education (34%), while very few never went to school (2%). Moreover, a vast majority of the respondents (92%) lived in houses whose wall material was made of stone, 6% whose wall material was iron sheets while 1% of the respondents lived in grass thatched houses. The majority of respondents said they lived in 2 roomed houses (43.4%), while 23% revealed that they resided in more than 4 roomed houses and (19%) lived in one-room house. This study considered six assets as a measure of socio-economic position (Fridge, television, radio, computer, mobile phone and vehicle). The scale used was classified into quintiles based on percentage of assets owned. Ownership of 24% was classified as lower socio-economic

class, 25% to 49% as lower upper, 50% as middle, 51 to 74% as upper lower and 75 to 100% as upper class. [20] The highest numbers of assets were considered as upper socio-economic status. [21] It was noted that the number of assets decreased with socio-economic status. Majority of the children's households were either lower upper or middle class.

Children's Nutritional Status

Nutritional status was based on BMI for age which was computed for each child and compared against the WHO reference standards for girls and boys. [19] The survey data revealed that majority (84%) of the children were of normal BMI (Z-score of between -1 to 1 SD) with a higher proportion (88%) of male children in this category than female (80%). The findings also showed that 9% of the children were under-nourished with approximately 2% being severely underweight (Table 1). Regarding over nutrition, more girls (13.2%) were overweight (Z-score of $\geq 2SD$) than (4.9%) boys. The mean BMI for age was higher for girls (18.2 ± 2.8) than boys (17.7 ± 2.3) (Table 2).

Table 1: Nutritional status of children by sex

Nutrition status	Male (n=142)	Female (n=114)	Total (n=256)
Severely underweight (SD<= -3.0)	4	1	5
	2.8%	0.9%	2.0%
Underweight (SD<= -2.0)	10	8	18
	7.0%	7.0%	7.0%
Normal (SD -1.0 - 1.0)	125	91	216
	88.0%	79.8%	84.4%
Overweight (SD>=2.0)	7	15	22
	4.9%	13.2%	8.6%

Table 2: The mean BMI for Age and Z-scores for children

Sex	BMI for Age	Z-scores
Male (n=142)	17.7 ± 2.3	-0.042 ± 1.06
Female (n=114)	18.2 ± 2.8	0.132 ± 1.17
Total (n=256)	17.9 ± 2.6	0.035 ± 1.11

Children's School Performance

For children's school performance, a 5-point likert scale questionnaire was used to capture pupil's responses. The responses were scored based on whether they were positive or negative in terms of involvement. 63% of the pupils were considered to be highly involved in extra-curricular activities and participation in after school games (46%) (Table 3) A few

children (25%) reported that they loved sitting in the field during games. However, approximately 31% reported that they hate involvement in field activities.

With regard to involvement in classroom activities, about 67.6% of the pupils reported that they volunteered to undertake classroom activities while (23%) reported that they rarely or never volunteered in class (Table 3). Most pupils (66%) reported that they responded to questions in class while (18.4%) answered that they rarely or never participated in responding to questions in class. Majority

(68.4%) of the pupils reported that they completed assignments in time with (65.7%) agreeing that their class performance was good. Less than half (48.8%) of the pupils stated that they enjoyed undertaking class

work while a few (21.5%) were moderately involved as they only enjoyed undertaking class work sometimes. 29.7% of the pupils stated that they rarely or never enjoyed class work.

Table 3: Pupils responses to questions on school performance

School Performance	Always	Often	Sometimes	Rarely	Never	Totals
Involvement in extra-curricular activities						
I'm involved in extra-curricular activities	15.2%	48.4%	13.4%	23.0%	0.0%	100%
I participate in after school games/clubs	9.8%	36.3%	14.5%	37.9%	1.6%	100%
I hate involvement in field activities	8.2%	22.7%	11.7%	42.2%	15.2%	100%
I love sitting in the field during games	9.0%	16.4%	9.0%	39.1%	26.6%	100%
Involvement in classroom activities						
I volunteer to take activities in class	36.7%	30.9%	9.4%	15.2%	7.8%	100%
I respond to questions in class	29.7%	36.3%	15.6%	13.7%	4.7%	100%
I complete assignments in time	28.9%	39.5%	18.0%	9.8%	3.9%	100%
I have good class performance	13.7%	52.0%	19.9%	7.4%	7.0%	100%
I enjoy undertaking class work	23.0%	25.8%	21.5%	18.8%	10.9%	100%
School attendance						
I'm punctual to school	30.1%	43.0%	14.5%	7.0%	5.5%	100%
I always remain in school till end of day	37.1%	34.8%	7.4%	12.1%	8.6%	100%
I'm regularly punished for absenteeism	5.5%	10.2%	8.6%	35.2%	40.6%	100%
I'm regularly punished for running away from school	7.0%	4.3%	6.3%	28.9%	53.5%	100%

Relationship between Nutritional Status and School Performance of Children

The relationship between nutrition status in terms of BMI for Age and Z-scores and school performance was determined using Pearsons. The BMI-for-age was positively correlated ($r_s=0.196$) with completion of assignments in time among boys (Table 4). This implies that boys with higher BMI-for-age were more likely to complete their assignments in time. A weak inverse correlation ($r_s=-0.194$) was observed

between the overall involvement in extra-curricular activities and the nutrition status of girls. Girls who were never late for school had lower z-scores and BMI-for-age; being never late to school was negatively correlated ($r_s=-0.193$ and -0.198) with the nutrition status based on z-score and BMI-for-age respectively. The overall class attendance of children was directly correlated ($r_s=0.189$, $p=0.002$) with good class performance.

Table 4: Relationship between Nutritional Status and School Performance of children

	Boys (N=142)				Girls (n=114)			
	Z-scores		BMI-for-Age		Z-scores		BMI-for-Age	
	r_s	P value	r_s	P value	r_s	P value	r_s	P value
Involvement in extra-curricular activities	-0.017	0.841	0.065	0.44	0.016	0.867	0.074	0.433
Participation in after school games	0.01	0.906	0.067	0.428	-0.12	0.203	-0.093	0.323
Hate involvement in field activities	0.11	0.191	-0.043	0.611	0.077	0.415	0.125	0.184
Love sitting in the field during games and avoid involvement	0.124	0.14	0.035	0.684	0.174	0.065	0.174	0.064
Volunteer to take activities in class	0.059	0.486	0.028	0.738	0.024	0.802	-0.064	0.5
Respond to questions in class	0.111	0.189	0.142	0.091	-0.05	0.601	-0.043	0.652
Complete assignments in time	0.162	0.055	.196*	0.02	0.061	0.516	0.048	0.614
Good class performance	-0.046	0.59	-0.104	0.22	-0.104	0.269	-0.086	0.364
Enjoy undertaking my class work	0.038	0.657	0.018	0.836	-0.081	0.394	-0.045	0.634
Attend school every day	-0.098	0.244	-0.029	0.735	-0.034	0.717	0.115	0.224
Never late to school	0.019	0.823	-0.028	0.743	-.193*	0.04	-.198*	0.034
Always remain in school till end of day	-0.047	0.581	-0.064	0.446	0.008	0.932	0.051	0.592
Have been punished for absenteeism	0.062	0.462	0.007	0.93	0.015	0.878	0.001	0.99
Punished for running away from school	0.025	0.769	0.034	0.686	-0.054	0.567	-0.064	0.502
Overall involvement in extracurricular activities	-0.113	0.181	0.026	0.756	-.194*	0.039	-0.174	0.065
Overall class performance	0.111	0.187	0.11	0.191	-0.042	0.659	-0.045	0.637
Overall class attendance	-0.039	0.645	-0.032	0.708	-0.048	0.613	0.036	0.707
Overall school performance	0.007	0.936	0.072	0.398	-0.139	0.141	-0.096	0.31

A higher proportion (32%) of boys was highly involved in extra-curricular activities as compared to girls (25%). This difference was statistically significant (X^2 (2, n=256) =9.453 P=0.009). The percentage

of pupils who had a good class attendance and performance was higher among girls than boys; however the difference was not significant (Table 5).

Table 5: Comparison of overall performance of girls and boys

Performance aspect		Boys (n=142)		Girls (n=114)		Chi-Square Test		
		n	%	n	%	X ²	df	P value
Overall involvement in extracurricular activities	High	46	32.4	28	24.6	9.453**	2	0.009
	Average	74	52.1	50	43.9			
	Low	22	15.5	36	31.6			
Overall class attendance	Good	43	30.3	41	36.0	1.089	2	0.580
	Average	68	47.9	48	42.1			
	Poor	31	21.8	25	21.9			
Overall performance in class	Good	28	19.7	33	28.9	4.157	2	0.125
	Average	92	64.8	60	52.6			
	Poor	22	15.5	21	18.4			
Overall school performance	Good	23	16.2	18	15.8	0.187	2	0.911
	Average	71	50.0	60	52.6			
	Poor	48	33.8	36	31.6			

Involvement in extra-curricular activities was significantly associated with nutrition status of pupils (X^2 (4, n=256) =9.11.235,P=0.024).

Table 6: Association between performance and nutrition status of pupils

		Nutrition Status						Chi-square		
		Underweight (< -2)SD		Normal (-1 - 1 SD)		Overweight (S≥2SD)		X ²	df	P value
		N	%	n	%	n	%			
Overall involvement in extracurricular activities	High	10	13.5	59	79.7	5	6.8	11.235*	4	0.024
	Average	5	4.0	111	89.5	8	6.5			
	Low	3	5.2	46	79.3	9	15.5			
Overall class attendance	Good	9	10.7	67	79.8	8	9.5	2.958	4	0.565
	Average	6	5.2	100	86.2	10	8.6			
	Poor	3	5.4	49	87.5	4	7.1			
Overall performance in class	Good	2	3.3	51	83.6	8	13.1	6.779	4	0.148
	Average	13	8.6	131	86.2	8	5.3			
	Poor	3	7.0	34	79.1	6	14.0			
Overall school performance	Good	3	7.3	35	85.4	3	7.3	2.819	4	0.631
	Average	12	9.2	108	82.4	11	8.4			
	Poor	3	3.6	73	86.9	8	9.5			

Note: *Significant at P<0.05

Normal weight range was associated with better performance in all the three variables of school performance (Table 6).Overweight and underweight children had poor overall performance based on poor performance in class room activities, extra-curriculum activities and school attendance.

DISCUSSIONS

Nutritional status is an important factor in the performance of school going children. Numerous studies have shown the effect that malnutrition has on the cognitive development. Chronic under nutrition results in low performance levels, especially for school going children. In order to achieve the full educational potential, optimal nutrition and good health are

required [22]. Nutrition affects the learning ability and intellectual development of children. Researchers have reported a significant correlation between the nutritional status of the school going children and their school performance and cognitive tests. [20,21] Regarding nutritional status of children, these findings concur to some extent with national findings which indicate that underweight prevalence in urban children is at 7% while overweight among children is at 5.7% and rising. [1] Similarly, the study found that the double burden of malnutrition which comprises of under and over nutrition occurring simultaneously was a reality in Nairobi County as other studies have also found. [10,11]

The mean BMI for age was higher for girls (18.2 ± 2.8) than boys (17.7 ± 2.3) (Table 2). The WHO Z-scores also showed that the mean for boys was lower than for girls but still within the recommended median range. The findings are relatable to a study on overweight and obesity among public and private primary school children in Nairobi. The study found that the prevalence of overweight and obesity was higher among girls (19%) than boys (16%), which was indicative of a public health problem. [10] Both studies show a trend of increasing overweight/obesity within Nairobi County.

Moreover, the findings of this study showed that the percentage of underweight children (7%) is similar to that by another study [1] which reported a comparable figure for children in an urban area like Nairobi. This shows concern that the nutritional status of the school going children still requires concerted efforts.

Further, the study explored the effect of under-nutrition and over-nutrition on the performance of school going children. There was correlation between BMI for Age and classroom performance in particular pupils' completion of school assignment in time (Table 3). This implies that the higher the BMI for Age, the higher the chances of a pupil completing assignments in time. There was also a correlation between BMI for Age with inactivity during field games. The children/pupils who reported that they loved sitting in the field during games had higher Z-scores (meaning that their nutrition status was inclining towards overweight and this was observed especially for girls as they were found to be more prone to being overweight.). This can be attributed to the growth of the fast-food industry and busy lifestyles whereby children are consuming more empty calories on a daily basis. [22,23] Children who are overweight perform less well compared to those with normal weight in relation to physical performance as well as overall school performance. [23,24]

Limitation of the study

Confounding factors of this study such as intelligence quotient (IQ) and physical disabilities/handicaps were considered as limitations as they were not examined in the study yet they may affect children's performance.

CONCLUSION

The findings showed that malnutrition (under and over nutrition) co-exist among school going children within Nairobi County. They also showed that children's nutritional status influenced their school performance (involvement in class activities, involvement in extra-curriculum activities and school attendance). The study further revealed that boys with higher BMI-for-age were more likely to complete their assignments in time. Additionally, low involvement in extra-curricular activities was associated with overweight among pupils. Particularly, girls who did not participate in extra-curricular activities were at risk of being overweight. Both underweight and overweight children are more likely to have poor school performance. Based on this, public awareness campaigns are paramount and nutrition education to create sensitization on the need to maintain children's nutritional status within normal ranges for purposes of their well being as well as their overall school performance. Information on the link between nutritional status and school performance should therefore be used as a strategy to improve dietary practices among school-children.

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REFERENCES

1. KDHS. Kenya Demographic and Health Survey [Internet]. 2014 [cited 2016 May 30]. Available from: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiHxsuqiIL>

- NAhVCDsAKHX5EDwkQFggcMAA&url=https%3A%2F%2Fdhspprogram.com%2Fpubs%2Fpdf%2FFR308%2FFR308.pdf&usg=AFQjCNF55SaP-W8DuSRPlmCwJbDUBFoIIw&sig2=u6E9y_600rJ9t2LeD4Rx6A&bvm=bv.123325700,d.d24
- Jomaa LH, McDonnell E, Probart C. School feeding programs in developing countries: impacts on children's health and educational outcomes. *Nutr Rev.* 2011; 69(2):83-98.
 - Vohra R, Bhardwaj P, Srivastava JP, Srivastava S, Vohra A, others. Overweight and obesity among school-going children of Lucknow city. *J Fam Community Med.* 2011; 18(2):59.
 - Ministry of Education. National Education Sector Plan [Internet]. [cited 2016 May 13]. Available from: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiitPrY-dbMAhWGOiYKHQ4vABMQFggjMAE&url=http%3A%2F%2Fwww.education.go.ke%2Fhome%2Findex.php%2Fdownloads%2Fcategory%2F6-policy-doc%3Fdownload%3D183%3Anational-education-sector-plan-volume-one-basic-education-programme-rationale-and-approach&usg=AFQjCNGVKPturAjJSz6keycMedhh1j6TMg&sig2=AUkg0cNaJQ2Jv9Ow3yMB9A&bvm=bv.122129774,d.d2s>
 - Mitchell MK, others. Nutrition across the life span. WB Saunders; 2003.
 - UNICEF. The state of the world's children 2007: Women and children: The double dividend of gender equality [Internet]. Vol. 7. Unicef; 2006 [cited 2016 Sep 30]. Available from: [https://books.google.com/books?hl=en&lr=&id=HiIZr4QFkOMC&oi=fnd&pg=PR6&dq=UNICEF+\(2006\),+&ots=15O1Lb2Nap&sig=MG-7BfjSCxt9snAgSPTu7Yfuz5s](https://books.google.com/books?hl=en&lr=&id=HiIZr4QFkOMC&oi=fnd&pg=PR6&dq=UNICEF+(2006),+&ots=15O1Lb2Nap&sig=MG-7BfjSCxt9snAgSPTu7Yfuz5s)
 - Kubik MY, Lytle LA, Hannan PJ, Perry CL, Story M. The association of the school food environment with dietary behaviors of young adolescents. *Am J Public Health.* 2003; 93(7):1168-1173.
 - Malik A. World Bank. Constructing Knowledge Societies: New Challenges for Tertiary Education. *Pak Dev Rev.* 2002; 41(2):204-207.
 - Mwaniki EW, Makokha AN. Nutrition status and associated factors among children in public primary schools in Dagoretti, Nairobi, Kenya. *Afr Health Sci.* 2013; 13(1):38-46.
 - Mwangi AM, Kyallo F, Makokha A. Overweight and obesity among public and private primary school children in Nairobi, Kenya. 2013 [cited 2016 Aug 5]; Available from: <http://erepository.uonbi.ac.ke/handle/11295/80959>
 - Kimani E. Double Burden of Malnutrition in Urban Poor Settings in Nairobi, Kenya. In: The 20th IEA World Congress of Epidemiology (17-21 August 2014, Anchorage, AK) [Internet]. WCE; 2014 [cited 2016 Aug 5]. Available from: <https://wce.confex.com/wce/2014/webprogram/Paper2789.html>
 - Story M, Stang J. Nutrition needs of adolescents. *Guidel Adolesc Nutr Serv Minneap MN Cent Leadersh Educ Train Matern Child Nutr Div Epidemiol Community Health Sch Public Health Univ Minn.* 2005;21-34.
 - Florence MD, Asbridge M, Veugelers PJ. Diet quality and academic performance. *J Sch Health.* 2008; 78(4): 209-215.
 - Barooh P. Adolescents' Nutrition, Attitudes and Practices. *IJCAES Spec Issue Basic Appl Soc Sci.* 2012; 2:308-1.
 - Nairobi City Council. Taskforce on improvement of performance of public primary schools and transition rate from primary to secondary education in the Nairobi City County. Nairobi; 2014.
 - Kuhn D, Franklin S. The second decade: What develops (and how) [Internet]. Wiley Online Library; 2006 [cited 2016 Aug 5]. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/9780470147658.chpsy0222/full>
 - Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. *Health Policy Plan.* 2006; 21(6):459-468.

18. Kuppuswamy B. Manual of socioeconomic status scale (urban). Delhi Manasayan. 1981;
19. WHO | BMI-for-age (5-19 years) [Internet]. WHO. [Cited 2016 Oct 10]. Available from: http://www.who.int/growthref/who2007_bmi_for_age/en/
20. Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B, et al. Developmental potential in the first 5 years for children in developing countries. *The lancet*. 2007; 369(9555): 60–70.
21. Pollitt E. Developmental sequel from early nutritional deficiencies: conclusive and probability judgements. *J Nutr*. 2000; 130(2):350S–353S.
22. Tobin KJ. Fast-food consumption and educational test scores in the USA. *Child Care Health Dev*. 2013; 39(1): 118-124.
23. Bowman AW, Azzalini A. Applied smoothing techniques for data analysis [Internet]. Clarendon Press; 2004 [cited 2016 May 13]. Available from: <http://cda.cern.ch/record/1035331>
24. Shore SM, Sachs ML, Lidicker JR, Brett SN, Wright AR, Libonati JR. Decreased scholastic achievement in overweight middle school students. *Obesity*. 2008; 16(7):1535–1538.

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