ORIGINAL ARTICLE

Awareness and Association of Obesity-risk reduction factors among Junior high school students of South India

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Abstract

Background: Obesity epidemic has been on rise and this has been attributed to unhealthy practices including physical inactivity and unhealthy diet. Adolescence has been a critical period for development of obesity due to changes in body composition and behaviour. **Objectives**: To assess knowledge, attitude and practices (KAP) regarding obesity-risk reduction factors and its association with obesity-risk among Junior high school students. **Methods**: Study conducted among 397 Junior high school students from 12 randomly selected English medium schools from pool of eligible schools in Udupi District using pretested and validated questionnaire to assess their KAP regarding Physical activity and diet. Standardized equipments were used for measuring anthropometry and Total body fat (%). Data entered and analyzed on SPSS 15. **Results**: 51.4% of the participants were recruited from private funded schools and boys accounting 51.6%. Statistically significant difference in proportions was observed between boys and girls in Physical activity, dietary and overall KAP scores and Total body fat (%). Correlation between Total body fat (%) and overall KAP score showed decline in Total body fat (%) with increase in overall KAP score (r=-0.120; p=0.017). **Conclusions**: Male gender and public funded schools were protective against obesity-risk. Interventions are required to increase awareness regarding obesity-risk reduction factors among school children.

Keywords

Obesity; KAP; BMI; Adolescent; School Children

Introduction

Childhood obesity is regarded by World Health Organization (WHO) as a serious public health problem of 21st century worldwide. (1) The problem is not only confined to high-income countries but also low and middle-income countries. In 2010, number of overweight children below five years were estimated to be over 42 million globally of which developing nations accounted 35 million. (2) Global estimates for prevalence of overweight and obesity among school children were first made in 2004 and it was concluded that approximately 10% were overweight. Average prevalence of overweight

in Africa and Asia was below 5% and in Americas and Europe above 20%. Overweight children were at greater risk for health problems and more likely to become obese adults compared with their normal-weight counterparts. (3)

Unhealthy processed food has been much more accessible in Indian market recently due to continued integration in global food markets. (4) Obesity-risk in adolescents could be attributed to behavioural changes in diet, physical activity and psychological health. (5,6) In prevalence studies done in South India, overweight and obesity among students aged 13-15 years ranged from 13-15%. (7,8) With this background in mind, present study targeted one of the vulnerable groups of school children in south India.

Aims & Objectives

1. To assess the knowledge, attitude and practice (KAP) regarding obesity-risk reduction factors.
2. To assess the association between KAP and obesity-risk among Junior high school students.

Material & Methods

Study Type: A school based cross sectional study.

Study Population: 8th standard students in English Medium schools.

Study Area: Udupi district in Karnataka state of south India.

Study Duration: December 2016-March 2017.

Sample Size: The sample size was estimated by using the formula 4pq/d2 X (CE), where prevalence of awareness regarding obesity-risk factors was taken as 63% with 95% confidence level and the required precision of the estimate "d" was set as 7% and the cluster effect (CE) of 2. (9) Hence, the sample size was estimated to be 380. The participants were recruited in the study from both public and private funded schools as shown in the (Figure 1).

Inclusion criteria: The schools with strength of students between 30-40 in 8th standard were considered eligible to participate in the study.

Exclusion criteria: Parents not consenting and students not assenting to participate in study were excluded.

Ethical approval: Ethical Committee approval was obtained from Institutional Ethics Committee (IEC), Kasturba Hospital, Manipal vide letter no. 631/2016 before commencement of study. Permission from School Principals and regulatory bodies like Deputy Director of public instruction (DDPI) were also obtained.

Strategy for collection: Schools were approached telephonically and a suitable day for data collection was fixed. A pretested and validated questionnaire adapted from Physical activity Questionnaire for adolescents (PAQ-A) (10) and European Journal of clinical nutrition (EJCN)(11) was used to assess knowledge, attitude and practice regarding physical activity and diet. Anthropometric measurements such as height and weight were recorded to the nearest 0.5 centimeter using standard equipments. BMI and total body fat (%) were recorded to the nearest 0.1 units using a validated body fat analyzer kept on a firm horizontal surface. The analyzer required initial inputs of age, gender and height for each participant before measuring weight, BMI and total body fat (%). Revised IAP guidelines were used to classify participants as overweight and obese. According to this guideline participants with BMI >23 - <27 kg/m2(≥ eighty-fifth percentile) were considered overweight while those having BMI >27 kg/m2(≥ ninety-fifth percentile) were considered obese. (12) Similarly, based on their Total body fat (%), participants with total body fat (%) between 25-30% were classified as overweight while those with >30% as obesity. (13)

Working definition: Based on the responses of students on the pretested and validated questionnaire on Physical activity and diet, scores were assigned as "1" for favorable/correct response (Low risk) and "0" for unfavorable/incorrect response (High risk). Score for physical activity ranged from 0-37, dietary score ranged from 0-38 and overall KAP score ranged from 0-75. Furthermore, 50% of the maximum score from each domain i.e. Physical activity, diet and overall KAP was taken as cut-off to categorize participants as high or low obesity-risk. Therefore, Physical activity KAP score ≥18, Dietary KAP score ≥19 and Overall KAP score ≥37 were considered low obesity-risk.

Data analysis: Data was entered and analyzed in Statistical Package for Social Sciences (SPSS version 15.0). Data was summarized using percentage with confidence interval of 95 percent. Chi-square test and Fisher's exact test were applied to compare the difference in proportions between two groups. Independent samples t-test was applied to compare the mean for Physical activity, dietary and Overall KAP scores as well as BMI and Total body fat (%) between the two groups. Correlation coefficients were calculated and compared for significance in

case of quantitative variables. Multivariate analysis was used to find associated obesity-risk factors.

Results

Study findings showed that 51.4% of the participants were recruited from private funded schools and 51.6% of the total participants were boys. Majority of the fathers (81.1%) and mothers (77.6%) had studied below graduate level. Unskilled occupation (36.8%) was more common among fathers while most mothers of the participants were homemakers (73.3%) as shown in (Table 1).

As depicted in (Table 2), statistically significant difference in proportions was observed between boys and girls with respect to all the characteristics [Physical activity KAP, Dietary KAP & Overall KAP scores, BMI (≥23Kg/m2) and Total Body fat (≥25%)] except for proportion of overweight and obese participants as per BMI cut off. Further, there was statistically significant difference in means between boys and girls with regards to all the characteristics except Dietary KAP score.

As shown in (Table 3), statistically significant difference in proportions was observed between Public and Private funded school participants with respect to all the characteristics except Dietary KAP score and prevalence of overweight and obese participants as per total body fat (%) cut off. Moreover, there was statistically significant difference in means between public and private funded school participants in all the characteristics except Dietary KAP score.

As shown in (Figure 2A), (Figure 2B) and (Figure 2C), a weak correlation between BMI and Physical activity KAP(r=0.005; p=0.274) as well as BMI and overall KAP score(r=0.007; p=0.895) was observed. Correlation between BMI and Dietary KAP score (r=-0.017; p=0.729) suggested decrease in BMI with increase in score although it was not statistically significant.

As depicted in (Figure 3A) and (Figure 3B), a decline in Total body fat % was observed with increase in Physical activity (r=-0.080, p=0.112) and Dietary KAP scores (r=0.008,p=0.875) ; although , it was not statistically significant. Correlation between Total body fat % and overall KAP score (r=-0.120; p=0.017) suggested that as the overall KAP increased, there was decline in Total body fat % although it was weak but statistically significant as shown in (Figure 3C).

(Table 4) describes various factors associated with the obesity-risk (BMI ≥23 kg/m2). On univariate analysis, higher odds of obesity-risk were found among girls, private funded schools, fathers and mothers with ≥graduate qualification as well as those with high risk Dietary KAP score and out of these, type of school was found to be significantly associated with obesity-risk. However, on multivariate analysis, only type of school and physical activity KAP were found to be significantly associated with obesity-risk. The odds of obesity-risk were 3.0 times more likely in private funded schools as compared to public funded schools.

Discussion

The present study showed significantly higher proportion of overweight and obese participants in private funded schools as compared to public funded schools (p=0.005) which was similar to a study conducted by Jagadesan S et al(p<0.001).(14) In studies conducted by Kalasker PS et al (15) and Bhargava M et al (16), the prevalence of overweight and obesity was significantly associated with private schools, higher educational and occupational status of father as well as higher educational status of mother. Similarly, in our study, on univariate analysis higher odds of obesity-risk were found among girls, private funded schools, fathers and mother's educational status ≥graduate level although only type of school was found to be significantly associated. The multivariate analysis revealed higher odds of overweight and obesity among adolescents attending private schools compared to public school students (AOR = 3.0, 95% CI: 1.3, 6.9) which was similar to a study conducted by Mekonnen T et al (17) in which higher odds of overweight/obesity were noted among children attending private schools compared to public school students (AOR = 2.21, 95% CI: 1.09, 4.49).Further, on multivariate analysis, the current study showed no significant association between gender and BMI status (≥23kg/m2) which was similar to a study conducted by Kotabal R et al (18) in Shivamoga among 13 to 16 years high school children but contrary to a study done in Greece by Despoina F et al (19) in which multivariate analysis identified that boys were more overweight/obese than girls.

Conclusion

Higher awareness about obesity-risk was found among boys and students in public funded schools. Significantly higher proportion of participants were found to be overweight among private funded schools. Obesity being a serious health issue, need to be prevented at the primordial level. Interventions

are required to increase awareness regarding obesity-risk reduction factors among school children.

Recommendation

Further similar kind of studies including wider representation of adolescent children from all the schools irrespective of medium and type in different districts need to be carried out to confirm and generalize the findings. Follow up pre-post test study with intervention in terms of health education can also be performed periodically among school children to increase awareness as well as reduce the risk of obesity and its consequences.

Limitation of the study

The study was exclusively conducted among Junior high school students of 8th standard in English Medium schools, so the findings cannot be generalized to all adolescents. Also, the socio-economic status in terms of income of the parents could not be elicited which might have played a significant role in obesity.

Relevance of the study

The study adds to the existing KAP among children regarding Physical activity and diet. The study also suggests for inclusion of different age groups of children to confirm and generalize the findings so that in future awareness programmes can be planned.

Authors Contribution

All the authors had made substantial contributions to conception, design, data collection, analysis and interpretation of data; drafting the article, revising it critically for important intellectual content; and final approval of the version to be published.

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Tables

TABLE 1 DISTRIBUTION OF SOCIO-DEMOGRAPHIC DETAILS OF STUDY PARTICIPANTS (N=397)

Socio-demographic features		Frequency n (%)
Type of school	Public funded	193(48.6)
	Private funded	204(51.4)
Gender	Boys	205(51.6)
	Girls	192(48.4)
Father's education	No formal education	29(7.3)
	<Graduate	322(81.1)
	≥Graduate	46(11.6)
Father's occupation	Service	47(11.8)
	Business	79(19.9)
	Skilled	125(31.5)
	Unskilled	146(36.8)
Mother's education	No formal education	40(10.1)
	<Graduate	308(77.6)
	≥Graduate	49(12.3)
Mother's occupation	Homemaker	291(73.3)
	Working mother	106(26.7)

TABLE 2 GENDER WISE DISTRIBUTION OF KAP SCORES, BMI AND TOTAL BODY FAT % AMONG STUDY PARTICIPANTS (N=397)

Characteristics	Boys (n=205) n(%)	Girls (n=192) n(%)	p-value	Boys (n=205) Mean±SD	Girls (n=192) Mean±SD	p-value
Physical Activity KAP score (Score≥18)	96(46.8)	34(17.7)	<0.001	16.82±4.52	13.77±3.94	<0.001
Dietary KAP score (Score≥19)	105(51.2)	79(41.1)	0.044	18.13±4.19	17.52±4.23	0.153
Overall KAP score (Score≥37)	89(43.4)	46(24.0)	<0.001	34.95±6.59	31.30±6.56	<0.001
BMI (≥23kg/m^2)	19(9.3)	21(10.9)	0.581	18.06±3.46	18.91±3.52	0.016
Total Body fat (≥25%)	31(15.1)	54(28.1)	0.002	18.63±5.39	22.77±4.05	<0.001

TABLE 3 SCHOOL WISE DISTRIBUTION OF KAP SCORES, BMI AND TOTAL BODY FAT % AMONG STUDY PARTICIPANTS (N=397)

Characteristics	Public funded (n=193) n (%)	Private funded (n=204) n(%)	p-value	Public funded (n=193) Mean±SD	Private funded (n=204) Mean±SD	p-value
Physical Activity KAP score (Score≥18)	78(40.4)	52(25.5)	**0.002**	16.44±4.23	14.31±4.53	**<0.001**
Dietary KAP score (Score≥19)	89(46.1)	95(46.6)	0.928	17.88±3.79	17.79±4.58	0.829
Overall KAP score (Score≥37)	76(39.4)	59(28.9)	**0.028**	34.32±6.05	32.11±7.32	**0.001**
BMI (≥23kg/m^2)	11(5.7)	29(14.2)	**0.005**	17.68±2.92	19.23±3.84	**<0.001**
Total Body fat (≥25%)	35(18.1)	50(24.5)	0.122	19.98±5.11	21.25±5.24	**0.014**

TABLE 4 FACTORS ASSOCIATED WITH OBESITY-RISK AMONG STUDY PARTICIPANTS (N=397)

Characteristics		BMI status		p-value	Crude OR (95% CI)	Adjusted OR (95% CI)	p-value
		<23kg/m^2 n(%) N=357	≥23kg/m^2 n(%) N=40				
Gender	Boys	186(52.1)	19(47.5)	0.581	1		NS*
	Girls	171(47.9)	21(52.5)		1.2(0.6-2.3)		
Type of school	Public funded	182(51.0)	11(27.5)	0.005	1	1	0.009
	Private funded	175(49.0)	29(72.5)		2.7(1.3-5.6)	3.0(1.3-6.9)	
Father's education	No formal education	28(7.8)	1(2.5)	0.452	1		NS
	<Graduate	289(81.0)	33(82.5)		3.2(0.4-24.3)		
	≥Graduate	40(11.2)	6(15.0)		4.2(0.5-36.8)		
Mother's education	No formal education	39(10.9)	1(2.5)	0.258	1		NS
	<Graduate	274(76.8)	34(85.0)		4.8(0.6-36.4)		
	≥Graduate	44(12.3)	5(12.5)		4.4(0.5-39.5)		
Physical activity KAP	High risk score (Score<18)	245(68.6)	22(55.0)	0.082	0.6(0.2-1.1)	0.3(0.1-0.6)	0.004
	Low risk score (Score≥18)	112(31.4)	18(45.0)		1	1	
Dietary KAP	High risk score (Score<18)	190(53.2)	23(57.5)	0.607	1.2(0.6-2.3)		NS
	Low risk score (Score≥18)	167(46.8)	17(42.5)		1		
Overall KAP	High risk score (Score<18)	237(66.4)	25(62.5)	0.623	0.8(0.4-1.7)		NS
	Low risk score (Score≥18)	120(33.6)	15(37.5)		1		

Figures

FIGURE 1 SAMPLING STRATEGY FOR ENROLMENT OF JUNIOR HIGH SCHOOL STUDENTS

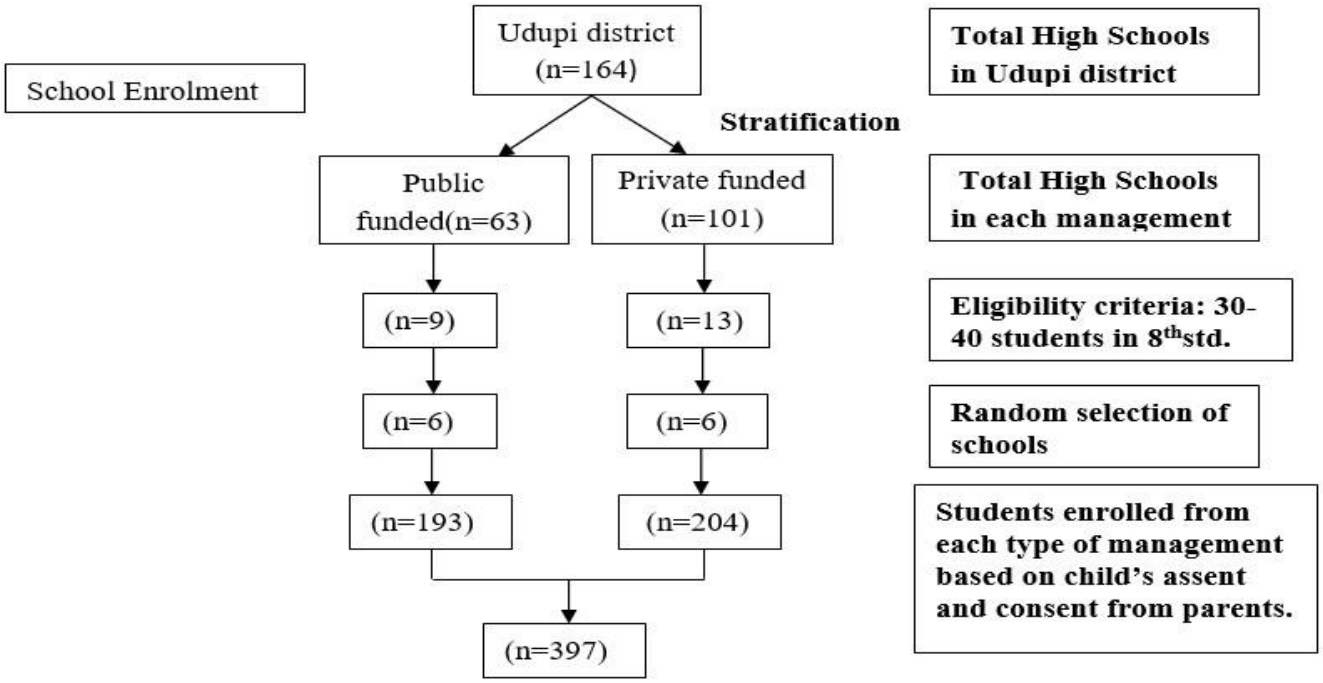

FIGURE 2A CORRELATION BETWEEN BMI AND PHYSICAL ACTIVITY KAP SCORE

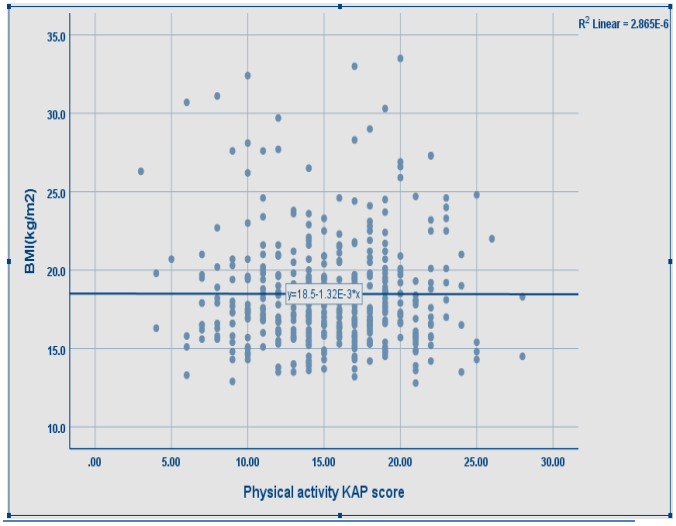

FIGURE 2B CORRELATION BETWEEN BMI AND DIETARY KAP SCORE

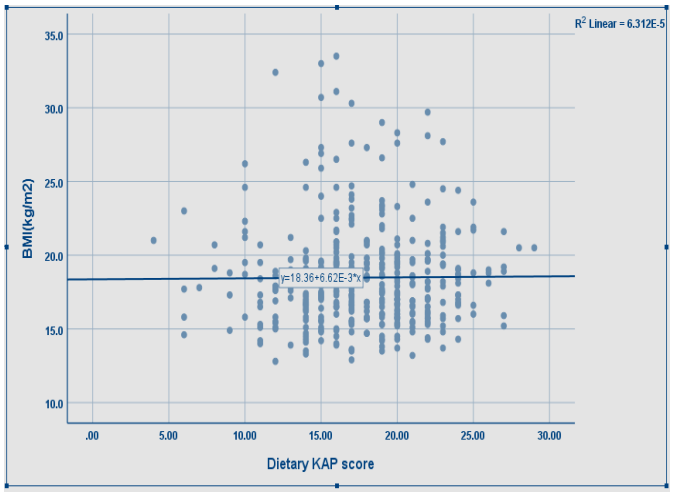

FIGURE 2C CORRELATION BETWEEN BMI AND OVERALL KAP SCORE

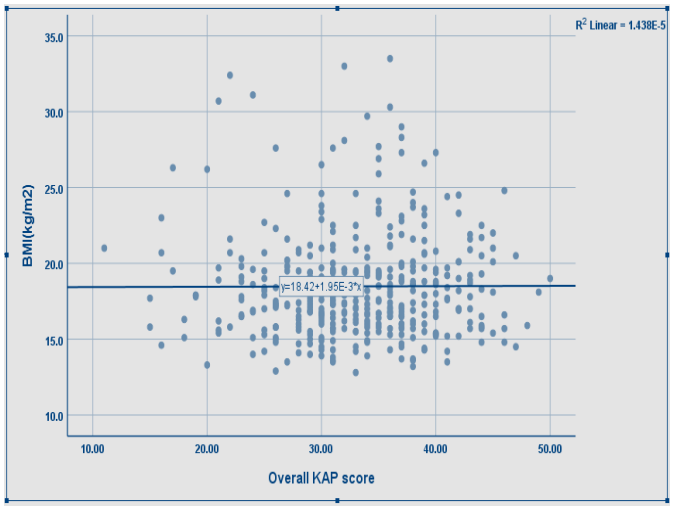

FIGURE 3A CORRELATION BETWEEN TOTAL BODY FAT % AND PHYSICAL ACTIVITY KAP SCORE

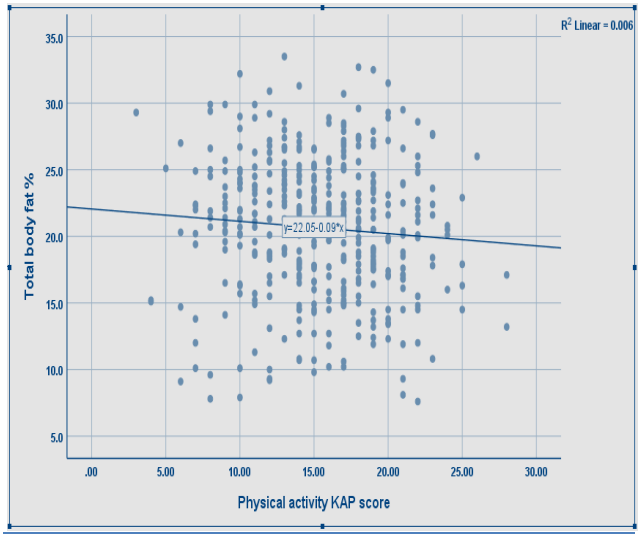

FIGURE 3B CORRELATION BETWEEN TOTAL BODY FAT % AND DIETARY KAP SCORE

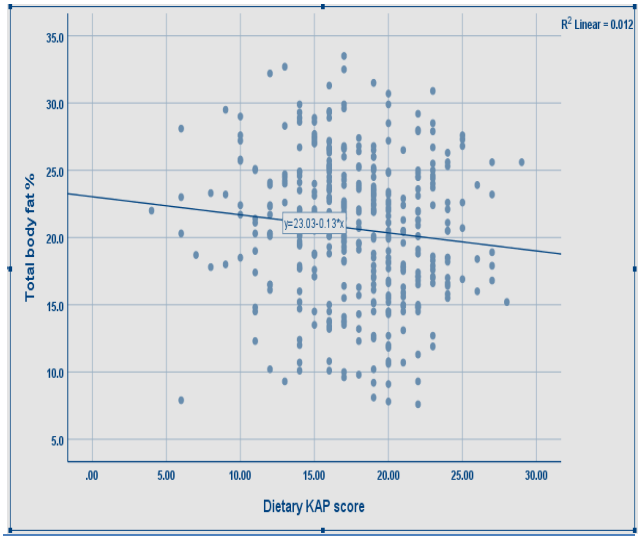

FIGURE 3C CORRELATION BETWEEN TOTAL BODY FAT % AND OVERALL KAP SCORE