OriginalResearchArticle

NutritionalStatus ofadolescentsintheKamrup-MetropolitandistrictofAssam,India:AComparativeStudybetweenRuralandUrban

Abstract:

Adolescentsserveasthefoundationalresourcesandfuturecitizensofthenation.Indiaboasts thehighestnumberofadolescentsglobally,withastaggeringcountof253millionindividuals fallingbetweentheagerangeof10to19years,whileAssamisrankedthirteenthamongthe manystatesandUnionterritoriesinIndia,withatotaladolescentpopulationof65,60,308. Duringthe stage ofadolescence,there isa notable surgeingrowth.Withthisbackground,the presentstudywascarriedouttostudyandcomparethenutritionalstatusofruralandurban adolescentsoftheKamrup-metropolitandistrictofAssam.Basedonthepurposivesampling technique,atotalof200adolescentswereselected.Astandardisedpre-testedquestionnairewas developedtocollectinformationonsomaticstatusanddietaryintake.Findingsrevealedthat themajorityofindividualsinbothUrbanandRuralareashaveaBMIoflessthan18.5,butthe prevalencewasslightlyhigherintheruralgroup(56.0%)comparedtotheUrbangroup(53.0%). Urbanrespondents(25.4cm,11.28mm)hadaslightlyhighermeanMUACandTSFthanrural respondents(23.7cm,11.19mm).Thereisanotabledifferenceintheamountofnutrients consumedbyadolescentscomparedtotheRecommendedDietaryAllowance(RDA).Energy intakeisbelowtherecommendedlevels,withadequacypercentagesvaryingfrom78.6%to 82.4%,indicatingacriticalareaofconcern.Conversely,VisiblefatintakeisaboveRDA, rangingfrom110.8%to118.2%,highlightingpotentialoverconsumptioninthiscategory. Adolescentswereobservedtohavedeficienciesinvitamins A,C,andfolicacidcomparedto theRecommendedDietaryAllowance(RDA).

Keywords: Health,Well-being,BMI,MUAC,TSF,Adolescents,physiological,adolescentpopulation

Introduction:

According to the World Health Organization (WHO), adolescence is delineated as thephase of human maturation and advancement that transpires after childhood and precedesadulthood,encompassingtheagerangeof10to19years(WHO.,2016).Globally,adolescentsconstituteone-fifthofthetotalglobalpopulation(WHO.,2021andUNICEF.,2012).Approximately 87% of adolescents are in developing nations, with India hosting the biggestadolescentpopulation,accountingfor21%ofthetotalIndianpopulation(MHFW.,2014).

Therefore,theconcernofadolescenthealthisofparticularsignificanceduetotheconsiderablepopulationof youngindividuals,particularlyinIndia.

Thephaseofadolescence,whichencompassesthetransitionfromchildhoodtoadulthood,ischaracterisedbyaquickandprofounddevelopmentinphysiological,psychological, and sexual aspects (WHO., 2020). Additionally, this period is characterised bygrowth spurts and heightened levels of physical activity (Soliman et al., 2014 and Christian etal.,2018).Consequently,teenagersrequireagreaterquantityofessentialnutrientsincomparisontoadults.Insufficientdietaryintakecanresultindelayedonsetofsexualmaturation and decelerated linear growth (WHO., 2018 and Jacob et al., 2012). They reach 50per cent of their adult body weight, the final 20 per cent of their adult height, and accumulateup to 40 per cent of their adult skeletal mass during this time (Indian Academy of Pediatrics,Nutrition of Adolescents; 2021). The monitoring of nutritional indicators has played a crucialrole in both the Millennium Development Goals and the Sustainable Development Goals.However,theirprimaryconcentrationhasbeenonchildrenundertheageoffive(UNMillennium DevelopmentGoals 1and2., 2015).Despitethe undeniable significanceofnutrition to the growth and development of adolescents (10-19 years old), they are oftenoverlookedinnutritionsurveys (Aigaetal.,2019,BestCetal., 2010andWorldBank., 2017).The National Family Health Surveys (NFHS) in India apply adult cut-offs of nutritional statusfortheestimationofundernutrition/overweightinthe 15–19-year-oldagegroup.ThestatisticsfromNFHS-5(2019-2020)indicatedifferencesintheprevalenceofunderweightandoverweight/obeseindividualsbetweenurbanandruralpopulationsandbetweengendersinthecountry and Assam. Urban areas tend to have higher rates of overweight and obesity, whilerural areas have a higher percentage of individuals with a BMI below normal. Among females,both urban and rural areas have a high prevalence of individuals with a high-risk waist-to-hipratio(≥0.85),withruralareasslightlyhigherthanurbanareas.Amongmales,urbanareashaveahig

herprevalenceofindividualswithahigh-riskwaist-to-hipratio(≥0.90)comparedtorural

areas, indicating that urban males are at a higher risk of this health condition. (NFHS-5, 2019-2020).

TheBodyMassIndex(BMI)isacommonlyemployeddiagnosticmeasureforassessingthenutritionalhealthofapopulation.Thebodymassindex(BMI)isawidelyusedmethodforassessing an individual's weight status based on their age and gender (18). The assessment ofnutritionalstatusfurnishestherequisiteinformationforinvestigatingtheimpactofnutritiononhealth and disease, identifying essential nutrients in a particular population, and determiningthesubgroupswithinthispopulationthataresusceptibletodeficiencies.Furthermore,it aids

in the formulation of efficacious public health strategies aimed at preventing and treatingnutrition-related ailments (19). In this context the present study was undertaken to assess andcomparethenutritionalstatusofadolescentsintheKamrup-MetropolitandistrictofAssamfromruraland urban areas.

MaterialsandMethods:

Study design and selection of locale: A cross-sectional comparative study was carried out inschools purposively selected in rural and urban areas of the Kamrup metropolitan district ofAssam. The two rural schools selected for the study were 1) Swahid Kushal Konwar HighSchool, Panikhaiti and 2) Chandrapur High School, Chandrapur. The two Urban schoolsselectedforthestudywere1)PubGuwahatiHighSchool,Bamunimaidanand2)St.Vivekanand English Academy, Maligaon. A total of 200 adolescents (100 from rural and100fromurban)intheagegroupof13-18yearsstudyingin7th-12thstandardwererandomlyselected. Outof200 adolescents, 87 weremales,and113werefemales.

Data collection tool: The quantitative data were collected using a pre-tested semi-structuredquestionnaire. The questionnaire was developed to collect the information on socio economicstatus, somatic status, dietary intake and food behaviors. The anthropometric measurements,includingHeight (Ht),Weight(wt),Mid-UpperArmCircumference(MUAC)andTricepsskinfoldthickness(TSF)weremeasuredasperstandardprocedures.Subsequently,indicessuchasbody mass index (BMI), height for age, and weight for age were computed and comparedagainsttheestablishedstandards.Dataondietaryintakewascollectedby24-hourrecallmethodon3 alternative days.

Analysis:Datawasanalyzedusingsuitablestatisticaltests.

ResultsandDiscussions:

Table1

Classificationofrespondents bySomaticStatusandBMI(Residencewise)

Characteristics	Group	Urban (n=100)		Rural(n=100)		Total(n=200)		$\chi 2$ Test
		N	%	N	%	N	%	
Height(cm)	132-150	21	21.0	38	38.0	59	29.5	12.35 *
	151-159	34	34.0	39	39.0	73	36.5	

	160+	45	45.0	23	23.0	68	34.0	
Weight (kg)	28-40	28	28.0	44	44.0	72	36.0	16.98
	41-49	27	27.0	38	38.0	65	32.5	*
	50+	45	45.0	18	18.0	63	31.5	
BMI(kg/m^2)	Underweight(<18.5)	53	53.0	56	56.0	109	54.5	10.21
	Normal(18.5-24.9)	35	35.0	43	43.0	78	39.0	*
	Overweight(25-29)	12	12.0	1	1.0	13	6.5	

Somaticstatusof urbanandruralrespondents:

In Table 1 the data indicated that individuals in the "160+" cm height category were moreprevalent in the urban group (45.0%) compared to the rural group (23.0%). In contrast, the"132-150" cm height category was more common in the rural group (38.0%) than in the urbangroup (21.0%).The data subjected for statistical tests revealed the difference in height of therespondents found to be significant ($\chi 2 = 12.35$*). The results showed that the majority ofrespondents were 160+ cm in height in urban areas when compared to rural areas. Similar tothe findings of the present study was reported by Sen and Lakhawat (2018) in the Assessmentof the nutritional status of rural and urban adolescent girls in the Udaipur district where themean height of rural respondents was less when compared to urban respondents. Urban girlswere significantly taller than rural girls. Similar results were also observed by Zanvar *et al.*(2007). The underlying cause for this result remains unclear; nonetheless, it is plausible thaturbangirls placed greaterfocuson consumingpulsesandprotein-rich diets.

Respondents in the "28-40" kg weight category were more common in the rural group(44.0%) compared to the urban group (28.0%). The weight category of "50+" kg exhibited ahigher prevalence in the urban group (45.0%) compared to the rural group (18.0%). The datasubjected for statistical tests revealed the difference in weight of the respondents found to bestatistically significant ($\chi 2 = 16.98$ *). More of the respondents from rural weighed between28-40 kg whereas more number of respondents weighed 50+kg. Observation recorded in thepresentstudyissimilartothefindingsreportedbySenandLakhawat(2018)intheAssessmentof the nutritional status of rural and urban adolescent girls in the Udaipur district where themean weight of urban respondents was higher than the mean weight of rural respondents.Similarly, a study by Pavithran and Bant (2018) revealed that approximately 14.9 per cent ofadolescentfemalesresidinginruralareasexhibitedabodyweightthatwasbelowtherecommended rangefortheir respectiveagegroups.

The majority of individuals in both Urban and Rural areas have a BMI less than 18.5,buttheprevalencewasslightlyhigherintheruralgroup(56.0%)comparedtotheUrbangroup(53.0%).The"18.5-24.9"BMIcategoryismorecommonintheRuralgroup(43.0%)comparedto the urban group (35.0%). The "25-29" BMI category was very low in both rural (1.0%) andin the urban group (12.0%). Underweight was more prevalent in rural adolescents. This is inline with the findings reported by Joshi *et al.* (2014) in a study of the nutritional status ofadolescentgirlsinruralareasoftheBhopaldistrict,whereasignificantproportionofadolescentgirlsresiding inruralareaswere undernourished.

This study revealed that overweight was more in urban. However, the percentage ofoverweightwaslesscomparedtounderweightandnormal.Thisisbecausechildrenareusuallymore active at this age group, play in school and work at home. Obesity is not so commonamong adolescents in Assam. Also, after examining the causes of a higher incidence of obesityandoverweightadolescentsinurbanpopulations,itwasobservedthathigherhouseholdwealth,frequentuseofrestaurantandschoolcafeteriafood,andless frequentparticipationinphysicalactivity were the main contributing factors. A higher prevalence of overweight in the upperclassmaybebecauseadolescentsfromupperSEclasseshaveabetterdietaryintakethanthosefrom lower SE classes. Adolescents from urban background might have better dietary intakeand have easier access to junk food than those from rural areas, making them more prone tooverweightandobesity.Relatively,Pathak*etal.*(2018)reportedthatonly2.2percentofruralchildren were obese and that 8.9 per cent of them were either obese or overweight, while 31.3per cent of urban adolescents were obese and 63.6 per cent were either obese or overweight.Similarly, Chaturvedi and Katare (2014) studied the overall prevalence of overweight wasfound to be 5.4 per cent and 3.9 per cent among urban and rural school-going adolescents,respectively. Thomas *et al.* (2021) also reported that the incidence of obesity and overweightamongschool-agechildrenisratherelevated.Accordingtotheauthors,theprimarydeterminants of obesity status among school children were found to be higher householdincome,dietary patterns,parentalhistory ofobesityanddiabetes,andurbanresidency.

Table2

Classificationbyheightandweightincomparisonwithstandardsamong Malerespondents

Age (years)	Sample	Height (cm)			't' Test	Weight (kg)			t-Test
		Std	Mean±SD	%		Std	Mean±SD	%	
13	14	137.0	153.0±5.2	112	11.51*	26.8	38.8 ±9.7	145	4.63*
14	22	142.2	158.3±8.2	111	9.21*	29.9	42.5±10.2	142	5.79*

15	21	146.9	165.6±10.2	113	8.40*	33.6	52.9 ±11.9	157	7.43*
16	12	150.9	159.6±13.2	106	2.28*	36.8	46.6 ±8.7	127	3.90*
17	10	154.2	162.4±8.6	105	3.02*	39.3	51.9 ±8.5	132	4.69*
18	8	157.4	168.2±5.0	107	6.11*	41.3	66.9 ±14.4	162	5.03*

Comparison of height and weight of Male respondents: The mean height of all the malerespondents found to be higher among all age groups in comparison with IAP (2015)standards(Table2),whichwasstatisticallysignificant.($p<0.05$).Theaverageweightofmale participantswasshowntobesignificantlygreateracross allagecategorieswhencomparedtothe standards set by IAP (2015). Similar studies were reported by Mondal and Terangpi(2014), in a study of undernutrition among tribal adolescents of Karbi Anglong district ofAssam, where overall mean height and weight were higher among boys. The findings arecontradictory to that reported by Nagi et al. (2021), in a study on physical growth andnutritional status of Mising adolescent boys: a cross-sectional study from northeast India,where the prevalence of stunting was found to be considerably higher ($p<0.05$) among olderadolescents comparedtotheir younger counterparts.

Table3:

Classificationbyheightandweightincomparisonwithstandardsamong Femalerespondents

Age (years)	**Sample**	**Height(cm)**			**'t' Test**	**Weight (kg)**			**t-Test**
		Std	**Mean±SD**	**%**		**Std**	**Mean±SD**	**%**	
13	26	137.3	150.2 ±6.0	109	10.96*	28.3	39.0 ±8.7	138	6.27*
14	26	140.6	153.8 ±8.1	109	8.31*	30.8	44.8 ±6.9	145	10.35*
15	30	142.9	154.4 ±8.9	108	7.08*	32.7	45.9 ±8.5	140	8.51*
16	24	144.4	152.5 ±5.6	106	7.09*	34.4	46.3 ±6.1	135	9.56*
17	3	145.5	160.2 ±2.5	110	16.97*	35.9	40.0 ±2.9	114	12.85*
18	4	146.4	158.3 ±3.5	108	7.60*	37.3	52.3 ±10.6	140	3.16*

Comparison of height and weight of Female respondents: The mean height of all the femalerespondentswasfoundtobesignificantly($p<0.05$)higheramongallagegroupsincomparison withIAP(2015) standardsinTable3.

Theaverageweightoffemaleparticipantswasalsoshowntobesignificantlygreateracrossallage categories when compared to the standards set by IAP (2015). The height and weight ofadolescentsgirlsincreasedgraduallyastheyage.Thefindingsofanationalsurveyonchildren,

jointly undertaken by the Government of India and UNICEF during the year of 2013-2014,indicatedasubstantialdecreaseintheprevalenceofstuntingamongchildreninmanystatesonIndia. The findings is contradictory to the study reported by Adams et al. (2021), Goyal andTalwar(2020),andSantraetal.(2023)wheremajoritywerestuntedinlateadolescentsgroup.Prevalence of thinness, stunting, protein-energy malnutrition, and inadequate consumption ofessential dietary groups was observed among teenage girls in the tea community, Assam(Konwar etal., 2019).

Table4:

Characteristic-wisemeanMUACamongrespondents

Characteristics	Group	Sample	MUAC(cm)		Students't' Test
			Mean	SD	
Residence	Urban	100	25.4	3.3	4.23 *
	Rural	100	23.7	2.3	
Age (years)	13-15	139	24.0	2.7	3.62 *
	16-18	61	25.7	3.2	
Gender	Male	87	25.0	3.6	2.03 *
	Female	113	24.1	2.3	

Mean MUAC among respondents: The results in the Table 4, indicated that a slightly higherMUAC was noticed in urban (25.4 cm) as compared to rural (23.7 cm). The mean MUAC ofthe age group 16-18 years was slightly higher (25.7 cm) as compared to 13-15 years of age(24.0 cm). Regarding gender, the results indicated that males (25.0 cm) had a higher MUACthan females (24.1 cm).The difference betweenresidence,ageand gender foundto besignificant at 5% level. In the present study the mean MUAC of all the respondents fell underthe normal category, as recommended by Nutrition Assessment, Counselling, and Support(NACS) guidelines. Similar, study was reported by Jaswant and Nitish (2014), where theauthorsassessedage-sex-specificupper-armcompositionandnutritionalstatusamongadolescents in Assam. The results stated that MUAC was gradually increased with age. Age-specificmeandifferencesbetweenagesinupper-arm compositionvariableswere foundstatistically significant in both gender. From the present study, it was also observed that themeanMUACofmaleswereslightlyhigherthanfemalesmaybebecausethatgenderdifferencesin growth and development during adolescence can also play a role. Males generally have ahigher percentage of lean muscle mass compared to females (Bredella ., 2017). The presentstudycontradictstothestudyreportedbyDe(2016),across-sectionalstudyon10-19yearsofadolescentgirlsofruralareastoassesstheNutritionalstatusofAdolescentGirlsbyMid-

Upper

Arm Circumferences where, as per MUAC, 40 per cent and 24 per cent based on BMI wereundernourished.MUACandBMIshowedasignificantregressionrelation.Similarly,Dasgupta et al. (2010) found out the magnitude of malnutrition among the adolescents of an urban slumofKolkatastudy population,where60.30%as perMUACweremalnourished.

Table5:

Characteristic-wisemean TSFamongrespondents

Characteristics	**Category**	**Sample**	**TSF(mm)**		**Student 't'test**
			Mean	**SD**	
Residence	Urban	100	11.28	2.4	0.29^{NS}
	Rural	100	11.19	1.9	
Gender	Male	87	11.25	2.6	0.09^{NS}
	Female	113	11.28	1.8	
Age (years)	13-15	139	10.73	1.8	4.65 *
	16-18	61	12.38	2.5	
Combined		200	11.24	2.1	

Mean TSF among respondents*:* The results indicated that a slightly higher TSF was noticedin urban (11.28 mm) as compared to rural (11.19 mm). The mean TSF of the age group 16-18years is slightly higher (12.38 mm) as compared to 13-15 years of age (10.73 mm). Regardinggender the results indicated that females (11.28 mm) had higher response of TSF than males(11.25 mm). However, the data subjected for statistical test (t-test) to measure the differencebetween residence, and gender found to be non- significant ($p>0.05$) while age is found to bestatisticallysignificant.($p<0.05$).Tricepsskinfoldthickness(TSF)measuresareanon-invasivemethodthatcanbeusedasindependentpredictorsofhypertensioninchildrenandadolescents(Moseretal.,2013).Theoptimalcut-offpercentileyieldingmaximalsensitivityandspecificityforpredictinghighBPwasthe70thTSFpercentileinboysandgirls(IAP,2015).Inthepresentstudy,themeanTSFofthefemalerespondentswasupto25thpercentile(9.9mm-12.4mmfor11-17.5 years., IAP) and the male respondents was above 50th percentile (10.8mm-13.7 mmfor 11-17.5 years., IAP). This depicts that the respondents of Assam had TSF below the Cut-offValueof70thpercentileofTSFforhypertensionrisk.FemalemeanTSFwasslightlyhigherthan male and this finding is in line with a study by Tang et al. (2020) on Triceps andsubscapular skinfold thickness percentiles of a school-based sample of adolescents in Ho

ChiMinhCity,Vietnam,whereTriceps,subscapularskinfolds,andTSF+SSSFweresignificantly

higher in girls than in boys. The present study however, contradicted a study by Khadilkar etal.(2015),wherethefindingsrevealedthatIndianchildrenexhibitedTSFvaluesuptothe50thcentilein malesandup to the75th centilein girls.

Table6:

MajorNutrients intake incomparisonwithRDAandadequacy(%)

Nutrients	**Contents**	**ResponsebyAge andGender**			
		13-15(years)		**16-18(years)**	
		Male	**Female**	**Male**	**Female**
Energy(k cal/day)	RDA	2860	2400	3320	2500
	Mean	2302	1886	2736	2023
	Adequacy(%)	80.5	78.6	82.4	80.9
	t- Test	**36.55 ***	**38.18 ***	**25.26 ***	**21.81 ***
Protein(g/day)	RDA	45	43	55	46
	Mean	66.9	65.1	84.0	70.7
	Adequacy(%)	148.6	151.4	152.7	153.8
	t- Test	**19.19 ***	**21.75 ***	**16.03 ***	**13.50 ***
Visible Fat(g/day)	RDA	45	40	50	35
	Mean	49.86	45.56	58.4	41.37
	Adequacy(%)	110.8	113.9	116.8	118.2
	t- Test	**3.08 ***	**5.78 ***	**5.41 ***	**3.69 ***
CHO (g/day)	RDA	115	115	115	115
	Mean	178.9	174.6	185.5	184.5
	Adequacy(%)	155.6	151.8	161.3	160.4
	t-Test	**20.79 ***	**18.17 ***	**12.70 ***	**13.53 ***

Dietary intake: Energy was slightly less than the RDA as per ICMR guidelines in all agegroups. A similar study was reported by Sinha and Singh et al. (2016). In all three age groups,the daily average intake of energy was less than the RDA as per ICMR guidelines in all agegroups in both urban and rural school girls. In the age group 10-13 years, the calorie deficitwas9.5percentand 18.3percentinbothurbanandruralschoolgirls,respectively. However,about 18.3 per cent and 30.2 per cent calorie deficit were noticed in the age group 14-16 yearsofboth urban and ruralschoolgirls, respectively.

Protein,fat,andcarbohydrateintakesaregenerallyabovetheRDAs,indicatingthatadolescentswere consuming more than the recommended levels of these nutrients. Protein and fat intakewerehigheramongrespondentsasAssamexhibitsadiverseculinaryheritagethatencompasses a wide array of non-vegetarian delicacies, encompassing an assortment of fish, poultry, andmeat-based preparations. Animal protein sources, such as fish curry (*Masor Tenga*), chickencurry (*Murgir Mangxo*), and pork dishes (Pork Curry), are commonly found in traditionalAssamese cuisine. These cultural practices have a significant impact on daily dietary habits.Rice is a staple in Assamese cuisine and is commonly served with various non-vegetariandishes. The combination of rice and meat or fish results with higher carbohydrate, protein andfat content. However, a contradicting study was reported by Sinha and Singh et al. (2016)regardingthedailyaverageintake ofprotein,waslessthanRDAasperICMR guidelinesinallagegroups.

A study conducted by Kenmogne-Domguia et al. (2016) examined the protein-energy intakesofasampleof770teenagersresidinginBaham,Cameroon.Thestudy'sfindings indicatedthatthere was no statistically significant difference in the daily consumption of protein and energy($p \leq 0.05$)among teenagersaged10-13, regardlessof gender.

Table7:

MineralsandVitaminsintakein comparisonwith RDAandadequacy (%)

Nutrients	**Contents**	**ResponsebyAge andGender**			
		13-15(years)		**16-18(years)**	
		Male	**Female**	**Male**	**Female**
VitA (µg/day)	RDA	930	890	1000	860
	Mean	806.31	784.09	875	764.54
	Adequacy(%)	86.7	88.1	87.5	88.9
	t- Test	**8.10 ***	**8.75 ***	**6.28 ***	**5.10 ***
VitC(mg/day)	RDA	70	65	85	70
	Mean	34.79	32.89	40.63	35.84
	Adequacy(%)	49.7	50.6	47.8	51.2
	t- Test	**14.60 ***	**16.24 ***	**11.41 ***	**9.75 ***
Folicacid (µg/day)	RDA	285	245	340	270
	Mean	144.21	125.44	169.32	138.51

	Adequacy(%)	50.6	51.2	49.8	51.3
	t- Test	**10.65 ***	**11.15 ***	**9.35 ***	**7.51 ***
Calcium(mg/day)	RDA	1000	1000	1050	1050
	Mean	446	417	474.6	442.05
	Adequacy(%)	44.6	41.7	45.2	42.1
	t- Test	**45.61 ***	**58.72 ***	**28.21 ***	**35.07 ***
Iron(mg/ day)	RDA	22	30	26	32
	Mean	10.71	14.79	12.974	16.064
	Adequacy(%)	48.7	49.3	49.9	50.2
	t- Test	**17.38 ***	**15.83 ***	**8.39 ***	**6.52 ***
Zinc (mg/day)	RDA	14.3	12.8	17.6	14.2
	Mean	5.734	4.940	7.163	5.552
	Adequacy(%)	40.1	38.6	40.7	39.1
	t- Test	**13.19 ***	**17.35 ***	**11.43 ***	**10.24 ***

TheadequacyonVitaminAconsumptioninboththeagegroupand genderswasfoundtorangebetween(86.7 – 88.9%).TheadequacyofVitaminCwasfoundtobehigherinfemalesinbothage group ranging between (50.6 - 51.2%). The study revealed that the level of folic acidadequacy was found to be higher in females which ranged between (51.2-51.3%) in both theage group. The adequacy of zinc ranged between (38.6- 40.7 %) in both age groups. Thepercentage of males meeting the recommended calcium intake was found to be greater thanthatoffemalerespondentsinbothagegroups (41.7-45.2%).Thestudyrevealedthatthelevelsof iron adequacy varied within the ranged of 48.7% to 50.2% across different age groups andgenders.

Adolescents in both age groups and both genders are generally not meeting the recommendeddaily allowances (RDAs) for calcium, and iron intake. Adequacy percentages are below 100.0per cent for calcium, and iron, indicating inadequacies in these nutrients intake. This may bebecauseconsumptionofmilkandmilkproductswasfoundtobeverylowamongtherespondents.Tr aditionalAssamesecuisine,forexample,mayfocusmoreonrice,fish,andleafyvegetables.

Adolescents and their families may have limitedawareness of the nutritionalimportanceofcalciumandiron,andtheirdietarychoicesmaynotbeguidedbyspecificnutri entrecommendations.However,thepercentageadequacyofironwashigheramongfemaleresponde nts, which may be due to the distribution of iron and folic acid tablets in schools. toprovideironandfolicacidtabletstoschool-goingadolescentgirlsinthestate,underthe

"Weekly Iron and Folic Acid Supplementation (WIFS) Program", centrally sponsored by theNationalHealthMission,GovernmentofIndia,whereironandfolicacidtabletsaredistributedto adolescent girls in government and government-aided schools. These tablets are typicallyprovided on a weekly basis to address iron deficiency anaemia and improve the overall healthandnutritionalstatusof adolescentgirls.

Adolescents belonging to both age groups and encompassing both genders failed to meet therecommended daily intakes (RDAs) for vitamins and minerals. This could be attributed to thepredominantdietarypatterninAssam,whichprimarilyconsistsof rice,poultry/fish, andeggs.Relianceonalimitedrangeoffoods may haveresultedindeficiencies inmicronutrients.

The study is in line with the findings of Awasthi et al. (2021) where the authors found thatmicronutrientdeficienciesarefoundinalmostone-halfofschoolchildreninurbanareasacrossIndia.InastudyconductedbyRathiandRani(2016),theresearchersfoundthemeanintakeofnutrients intheagegroupof13-15years,encompassingbothgenders,inbothgovernmentandprivate schools, were significantly lower than the RDAs. Moreover, it was observed that thenutrient intake of male participants and private schools was substantially better compared totheir female and government schools. The authors reported the discrepancy might be due tohigher consumption among boys . According to Doustmohammadian (2013) the intake ofenergyandsomemicronutrientswhencomparedwithDRIamongadolescentgirlswassignificantly lowerthanthenormalrange($p<0.0001$).

Conclusion:

Thefindingsofthestudydepictedthattheoverallsomaticstatuswhereunderweightwasmoreprevalent in rural compared to urban, whereas obesity was more prevalent among urbanrespondents. The dietary intake of macronutrients was good in both urban and rural whereasthe micronutrients were found to be deficient in both rural and urban. This unequivocallydemonstratedthenecessityofimplementinganutritionalstatussurveyanddietarycounsellingintervention for adolescents. It is recommended to provide encouragement for individuals toenhance their consumption of macro and micronutrients, namely by incorporating a greatervariety of foods, viz., fruits and vegetables, into their diet. Conducting a nutritional statussurvey in both urban and rural areas of Assam for adolescents is a vital step in improving thehealth and well-being of this age group. It provides essential data for informed decision-making,targetedinterventions,andtheoverallimprovementofpublichealthoutcomes.

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