(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 4, Page No: 470-477
July-August 2021

IJMSCR

Life style factors associated with overweight and obesity in students of age group 5-19 years in Chittoor town, Andhra Pradesh, India- A cross sectional study

Dr. Mansi Jadhav[1], Dr. T. Naveen Sagar[2], Dr. K. R. John[3] , Dr. R. Amarnath Trivedi[4] *

1.Junior Resident, Department of Community Medicine, Apollo Institute of Medical Sciences and Research,Chittoor, Andhra Pradesh, 2.Assistant Professor, Department of Anatomy, Apollo Institute of Medical Sciences and Research, Chittoor, Andhra Pradesh, 3. Professor, Department of Community Medicine, Apollo Institute of Medical Sciences and Research, Chittoor, Andhra Pradesh, 4.Scientist-B, Department of Community Medicine, Apollo Institute of Medical Sciences and Research, Chittoor, Andhra Pradesh

***Corresponding Author:**
Dr. R. Amarnath Trivedi
Department of Community Medicine, Apollo Institute of Medical Sciences and Research, Chittoor, Andhra Pradesh

Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Background: Unhealthy eating habits and lack of physical activities during adolescence terminated in early onset and increased burden of atherosclerotic cardiovascular diseases (CVDs) globally. Prevalence of these risk factors of CVD appears to be high, but data regarding their pattern and predictors appears to be very minimal. As an effort to generate data regarding this aspect a survey was conducted among urban adolescent school and college students in Chittoor, Andhra Pradesh, India.

Methods:

During September 2018, 329 students of 5-19 years were recruited through cluster (schools and colleges) random sampling. Information on socio-demographics, CVD-related knowledge and perception along with eating and exercise patterns were collected with an internally validated structured questionnaire. Descriptive and regression analyses were performed on SPSS v21.

Results:

Among 329 participants mean age of students was 15.42 ± 3.643 years. Mean height of students was 153.02 ± 17.053 cms. Mean Basal Metabolic Rate (BMI) was 20.582 ± 4.08. Mean waist circumference was 75.72 ± 12.078 cms. Among 329 students 4.6 %(n=15) were found to be obese and 18.2 %(n=60) students were found to be overweight.

Conclusion:

Risk factors and the underlying behavior of cardiovascular disease should be addressed by considering the age and developmental stage of the children and adolescents.

Keywords: Obesity, Basal Metabolic Rate, Physical activity, Dietary habits, Coronary heart disease, Adolescents

INTRODUCTION

Cardiovascular diseases(CVDs), globally the most common cause of NCD-related deaths[1] attributed for about 17.5 million deaths in 2012[2].About 75% of these CVD deaths were from low-and middle-income countries [2]. Compared to Western populations, in South Asian countries, higher prevalence and a decade earlier onset of CVDs were experienced owing to unique genetic predisposition and earlier exposure to risk factors [3]. Ischemic heart disease (IHD) continued to be the most common cause of mortality among

working adults (15–69 years) in Asian countries [4]. Among all major ethnic groups in South Asia, Indians were found to be at highest risk for CVDs, especially premature coronary heart diseases [3,5,6]. Interplay of unhealthy diet (added high sugar and refined grains), vitamin-D deficiency, tobacco use and physical inactivity contributed to this elevated risk for CVDs among Indians, especially in urban areas. In addition, the rising epidemic of type-2 diabetes mellitus further increased the vulnerability of Asian Indians to IHD [7,8]. Thus a clear understanding of the potential predictors of CVDs appeared to be crucial for appropriate designing and timely (before the initiation of atherosclerosis) implementation of preventive interventions to control the rising tide of CVDs [9,10].

Clustering of cardiovascular risk factors and initiation (appearance of fatty streaks) of atherosclerotic CVDs start in the second decade of life and get influenced by genetic and environmental exposures (serum lipid concentrations/ smoking/obesity/hyperglycemia) during lifetime [11–13].Furthermore, sustained high blood pressure was observed to accelerate atherosclerosis in the third decade of life [11].Rapid urbanization probably exposed individuals to these life-threatening yet modifiable/reversible risk factors quite early in life [10].For example, worldwide, among school-aged children, 10% were overweight [14] and >3% children and adolescents were hypertensive [15]. In addition, inadequate knowledge regarding CVDs coupled with low-risk perceptions among adolescents further heightened their susceptibility for CVDs [16]. Alike Western countries, South Asian children were also at high risk of developing CVDs in their future life, mostly because of deleterious life-styles and behaviors [17].

Among urban Indians, exposure to multiple risk factors of CVD was evidenced during adolescence and dramatically increased by 30–39 years of age [18]. Among Indian school children, high prevalence of overweight (14.4%), obesity (2.8%), and sustained high blood

pressure [19,20], coupled with maternal and fetal under-nutrition were suspected to increase the future risk of CVDs [13]. Quality data regarding exercise and eating habits along with related knowledge, perceptions and consequent practices related to the risk of future CVDs in this target population were limited in India. The aim of this study was to assess association between obesity and life style factors including physical activity and dietary habits among adolescent students in Chittoor town, Andhra Pradesh.

Methods:

A cross-sectional study was conducted among adolescent school students of Chittoor between August and September 2018. Students aged 5–19 years were selected as the study population group in Chittoor town, Andhra Pradesh

Sample size and sampling strategy:

Cluster random sampling strategy was used for the study using schools as the clusters. The rate of homogeneity (roh) between clusters was assumed to be equal to the intra-cluster correlations owing to the single-stage sampling method. 10 schools were selected randomly among 50 schools in Chittoor town.

Study population:

All students present on the day of data collection in the selected schools, were recruited for the study and their legally authorized representative (Head masters) provided written informed consents and assents were taken from recruited students. Students with any medical or psychiatric illnesses preventing normal communications were excluded from the study.

Data collection and measures:

Information was collected through a self-administered, structured questionnaire, which was pre-tested for internal consistency and internally validated in a sample of 35 students (approximately 10% of the total sample size) of same grade, recruited from two randomly selected schools of the study area. Collected socio-demographic information included: age, gender and SES of the students (based on family income).

Based on guideline of World Health Organization (WHO) for adolescent health moderate to vigorous activity for at least 60 min/day on average was considered as adequate exercise.

On the other hand, to elicit the eating habit and related behavior, frequency of major meals/day (1–2/3 />3 times), frequency of snacking (≤3/4/>4 times), history of skipping meals (never/sometimes/often) and history of eating outside home (never/sometimes/often) were recorded.

Results:

Volume 4, Issue 4; July-August 2021; Page No 470-477

Among 329 participants recruited in the study the mean age of students was 15.42 ± 3.643 years. Mean height of students was 153.02 ± 17.053 cms. Mean Basal Metabolic Rate (BMI) was 20.582 ± 4.08. Mean waist circumference was 75.72 ± 12.078 cms.

Among 329 students 4.6 %(n=15) were found to be obese and 18.2 %(n=60) students were found to be overweight. Out of 15 students found to be obese 10 were females and out of 60 students who were found to be overweight 41 students were females.

Mean frequency of vegetable intake per month among students was found to be 21.37 days.66.9% of students consumed potatoes predominantly. 1.2% of students consumed more than 4 servings of soft drinks per week. 83.9% of students take at least one glass of milk per day. 67.5% of students eat their breakfast daily. 85.4% of students eat their lunch daily. 5.5% students buy lunch outside their schools daily. 26.1% students buy snacks outside the school daily.

16.7% students watch television for more than 3 hours daily. 16.4% of students play video games on mobiles and laptops for more than 3 hours a day. 15.5% of students engage themselves in physical activities daily. 75.4% of students do not engage in physical activity at least once in a week.

Discussion:

Current distribution reveals that adolescents under 11-19 years are at higher risk of obesity.[20] Adolescence is considered as the period of vulnerability as well as the optimum opportunity to modify health-related risk behaviours[21]. On the contrary, young adults are always considered to be healthy and global health planners mostly neglect their health needs. Although some standardized health indicators are available for young in Western countries, such indicators are almost non-existent in developing world. Moreover, adolescents' risk perceptions in relation to health-related behaviors appears to be crucial in determining long-term health consequences [22]. Thus, educating adolescents regarding negative impacts of risk taking and encouraging them to take responsibility of their own health seemed crucial in controlling adolescent health situation in countries like India.

Study limitations:

There were some major limitations in the present study. Like any other observational study associations observed here, should not be interpreted as causal owing to the potentials for residual confounding and other systematic errors. Because of the cross-sectional design, potentials for temporal ambiguity should also be kept in mind. Thus, efforts for extrapolation of results beyond the study sample to all adolescent urban students in the study area need some caution. But we still believe that the observations were quite generalizable, owing to the robust sampling strategy and good response rate. Self-reported history of dietary pattern and exercise habits were also likely to suffer from some social desirability bias and issues of recall, although we considered them to be non-differential. Moreover, to minimize the chances of information bias, we urged the subjects to recall for only a short period of 1 week.

Despite these limitations, by virtue of large sample size, robust methodology and advanced statistical analyses, we believe that the results of this research will be useful in understanding the scenario pertaining to CVD related knowledge, perceptions regarding related risk, exercise habit, dietary practices and interplays thereof among adolescents of Chittoor, Andhra Pradesh.

Conclusions:

Eating and exercise habits were found to be quite poor among large proportion of adolescent school-students of Chittoor. It is clear that certain modifiable risk factors for cardiovascular disease have their beginnings in childhood and adolescence. Risk factors such as unhealthy diet, physical inactivity, smoking/exposure to environmental tobacco smoke, childhood obesity, high blood pressure, adverse lipid profile may all contribute to the development of cardiovascular diseases in adulthood. It is evident from the current literature that risk factors develop during childhood and adolescence is likely to track overtime.

Tracking coupled with adverse health behaviors may maintain a high risk status throughout life. Identifying children and adolescents, who are at high risk is the first step in modifying or preventing these risk factors. Each risk factor and the underlying behavior of cardiovascular disease should be addressed by considering the age and developmental stage of the children and adolescents.

Acknowledgment:

Volume 4, Issue 4; July-August 2021; Page No 470-477

We would like to acknowledge Indian Council of Medical Research (ICMR) for supporting this Short term Studentship Project (STS Reference ID: 2018-02472). We would like to acknowledge all the study participants.

Bibliography:

1. Liu, M. B. Cardiovascular diseases. Chinese Medical Journal vol. 127 6–7 (2014).
2. Mendis, S. et al. Global status report on noncommunicable diseases 2014. World Health Organization. World Health (2014) doi: ISBN 9789241564854.
3. Gupta, R., Joshi, P., Mohan, V., Reddy, K. S. & Yusuf, S. Epidemiology and causation of coronary heart disease and stroke in India. Heart vol. 94 16–26 (2008).
4. Engelgau, M. M. et al. Capitalizing on the Demographic Transition Tackling Noncommunicable Diseases in South Asia Human Development.
5. Ajay, V. S. & Prabhakaran, D. Coronary heart disease in Indians: Implications of the INTERHEART study. Indian Journal of Medical Research vol. 132 561–566 (2010).
6. Sasayama, S. Heart disease in Asia. Circulation 118, 2669–71 (2008).
7. O'Keefe, E. L., DiNicolantonio, J. J., Patil, H., Helzberg, J. H. & Lavie, C. J. Lifestyle Choices Fuel Epidemics of Diabetes and Cardiovascular Disease Among Asian Indians. Prog. Cardiovasc. Dis. 58, 505–513 (2016).
8. Yeo, K. K. et al. Ethnicity modifies the association between diabetes mellitus and ischemic heart disease in Chinese, Malays and Asian Indians living in Singapore. Diabetologia 49, 2866–2873 (2006).
9. Frostegård, J. Immunity, atherosclerosis and cardiovascular disease. BMC Med. 11, 117 (2013).
10. Crowther, M. A. Pathogenesis of atherosclerosis. Hematology Am. Soc. Hematol. Educ. Program 436–441 (2005) doi:10.1182/asheducation-2005.1.436.
11. Huang, R. C. et al. Perinatal and childhood origins of cardiovascular disease. Int. J. Obes. 31, 236–244 (2007).
12. Berenson, G. S. et al. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. N. Engl. J. Med. 338, 1650–1656 (1998).
13. Praveen, P. A., Roy, A. & Prabhakaran, D. Cardiovascular disease risk factors: a childhood perspective. Indian journal of pediatrics vol. 80 Suppl 1 (2013).
14. World Heart Federation. Risk factors - World Heart Federation - World Heart Federation. World Heart Federation 318 (2017).
15. Falkner, B. Hypertension in children and adolescents: Epidemiology and natural history. Pediatric Nephrology vol. 25 1219–1224 (2010).
16. Vanhecke, T. E., Miller, W. M., Franklin, B. A., Weber, J. E. & Mccullough, P. A. Awareness, knowledge, and perception of heart disease among adolescents. Eur. J. Prev. Cardiol. 13, 718–723 (2006).
17. Prasad, D., Dash, A., Kabir, Z. & Das, B. Childhood cardiovascular risk factors in South Asians: A cause of concern for adult cardiovascular disease epidemic. Ann. Pediatr. Cardiol. 4, 166 (2011).
18. Gupta, R. et al. Younger age of escalation of cardiovascular risk factors in Asian Indian subjects. BMC Cardiovasc. Disord. 9, (2009).
19. Misra, A. et al. The high burden of obesity and abdominal obesity in urban Indian schoolchildren: A multicentric study of 38,296 children. Ann. Nutr. Metab. 58, 203–211 (2011).
20. Patil, T., Patil, S. & Patil, A. Evaluation of sustained blood pressure elevation in children. Indian Heart Journal vol. 66 559 (2014).
21. Juonala, M. et al. Influence of age on associations between childhood risk factors and carotid intima-media thickness in adulthood: The cardiovascular risk in young finns study, the childhood determinants of adult health study, the bogalusa heart study,

Volume 4, Issue 4; July-August 2021; Page No 470-477

and the muscatine study for the international childhood cardiovascular cohort (i3C) consortium. Circulation 122, 2514–2520 (2010).

22. JS, H. et al. Effects of a school-based intervention to reduce cardiovascular disease risk factors in elementary-school children: the Cardiovascular Health in Children (CHIC) study. J. Pediatr. 128, 797–805 (1996).

Figure 1: Sex distribution of study participants

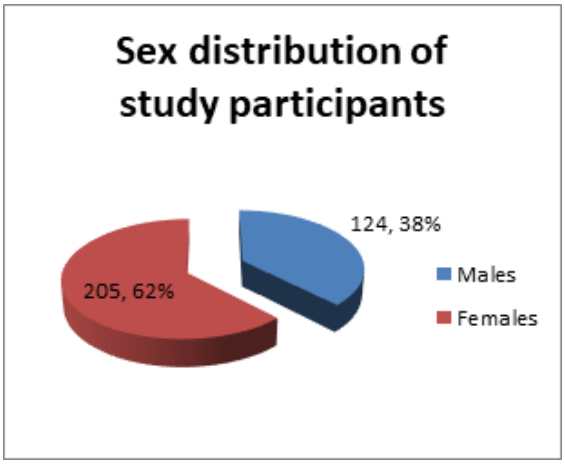


Figure 2: Age distribution of study participants

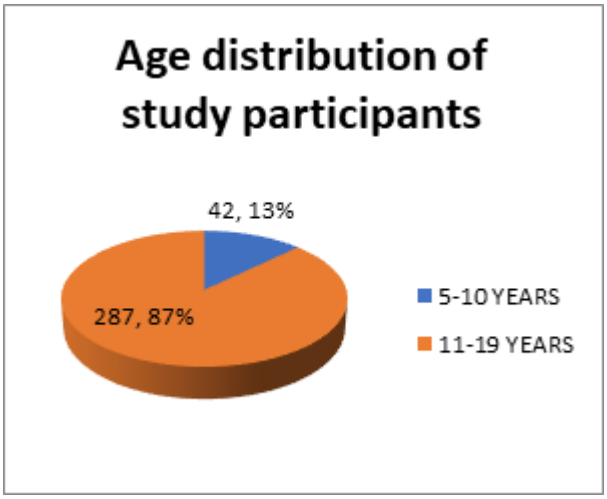


Figure 3: BMI status of study participants

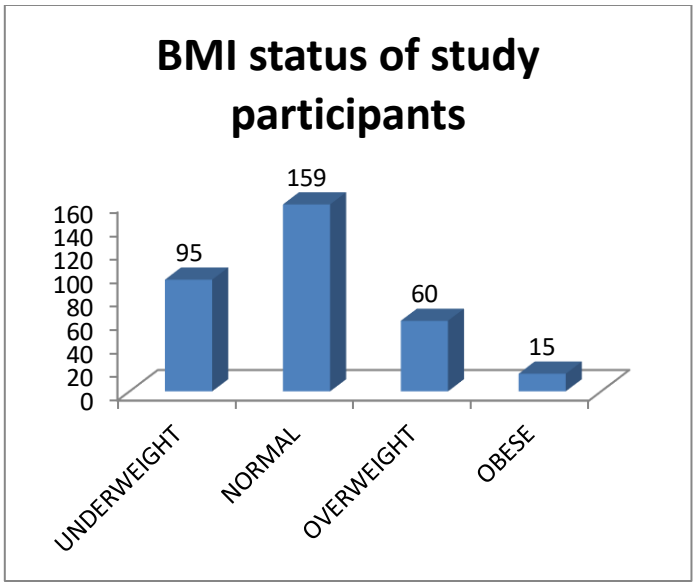


Figure 4: BMI status across different age groups

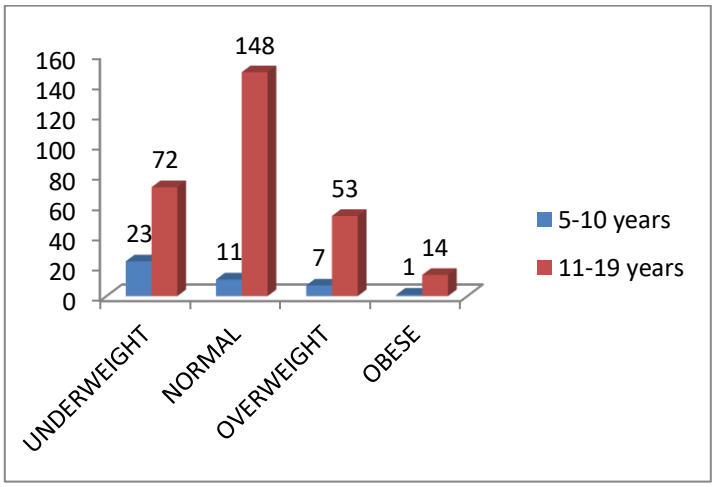
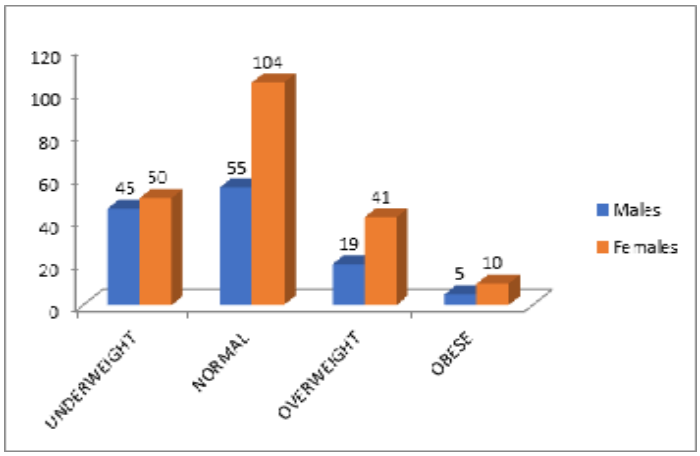


Figure 5: BMI status among boys and girls



Volume 4, Issue 4; July-August 2021; Page No 470-477

Table 1: Sex distribution of study participants

Sex	Frequency	Percent
Males	124	37.7
Females	205	62.3
Total	329	100

Table 2: Age distribution of study participants

Age range	Frequency	Percent
5-10 YEARS	42	12.8
11-19 YEARS	287	87.2
Total	329	100

Table 3: BMI status of study participants

BMI	Frequency	Percent
UNDERWEIGHT	95	28.9
NORMAL	159	48.3
OVERWEIGHT	60	18.2
OBESE	15	4.6
Total	329	100

Table 4: BMI status across different age groups

BMI	5-10 years	11-19 years	Total
UNDERWEIGHT	23	72	95
NORMAL	11	148	159
OVERWEIGHT	7	53	60
OBESE	1	14	15
Total	42	287	329

Table 5: BMI status among boys and girls

BMI	Males	Females	Total
UNDERWEIGHT	45	50	95
NORMAL	55	104	159
OVERWEIGHT	19	41	60
OBESE	5	10	15
Total	124	205	329

Table 6: Frequency of fruits consumption

Fruits	Consumed(frequency)	Not Consumed(frequency)
APPLE	319 (97%)	10 (3%)
BANANA	238 (72.3%)	91 (27.7%)
MANGO	227(69%)	102(31%)
ORANGE	3 (0.9%)	326 (99.1%)
GRAPES	2 (0.6%)	327 (99.4%)
GUAVA	1 (0.3%)	328 (99.7%)

Table 7: Frequency of vegetable consumption

VEGETABLES	Consumed(frequency)	Not Consumed(frequency)
BRINJAL	125 (38%)	204 (62%)
CABBAGE	49 (14.9%)	280 (94.8%)
CAULIFLOWER	17 (5.2%)	312 (94.8%)
DRUMSTICK	70 (21.3%)	259 (78.7%)
PEAS	11 (3.3%)	318 (96.7%)
POTATO	220 (66.9%)	109 (33.1%)
CARROT	200 (60.8%)	129 (39.2%)
LEAFY VEGETABLES	137 (41.6%)	192(58.4%)
TOMATO	146 (44.4%)	183 (55.6%)
LADIES FINGER	128 (38.9%)	201(61.1%)
BOTTLEGOURD	14 (4.3%)	315 (95.7%)

Volume 4, Issue 4; July-August 2021; Page No 470-477

BITTERGOURD	4 (1.2%)	325 (98.8%)
CAPSICUM	2(0.6%)	327 (99.4%)
BEETROOT	70 (21.3%)	259 (78.7%)
EGG	40 (12.2%)	289 (87.8%)
CHICKEN	37 (11.2%)	292(88.8%)
MUTTON	7 (2.1%)	322 (97.9%)
BEANS	82 (24.9%)	247 (75.1%)

Table 8: Frequency of soft drinks intake per week

Servings	FREQUENCY	PERCENT
<4/week	325	98.8%
≥4/week	4	1.2%

Table 9: Frequency of milk consumption per day

Servings	FREQUENCY	PERCENT
≤1 GLASS /DAY	276	83.9%
≥2 GLASSES/DAY	53	16.1%

Table 10: Frequency of having breakfast per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	27	8.2%
4-6 DAYS/WEEK	80	24.3%
DAILY(7 DAYS/WEEK)	222	67.5%

Table 11: Frequency of having lunch per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	11	3.3%
4-6 DAYS/WEEK	37	11.2%
DAILY(7 DAYS/WEEK)	281	85.4%

Table 12: Frequency of buying lunch per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	291	88.4%
4-6 DAYS/WEEK	20	6.0%
DAILY(7 DAYS/WEEK)	18	5.5%

Table 13: Frequency of eating food outside per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	305	92.7%
4-6 DAYS/WEEK	19	5.7%
DAILY(7 DAYS/WEEK)	5	1.5%

Table 14: Frequency of buying snacks outside per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	190	57.7%
4-6 DAYS/WEEK	53	16.1%
DAILY(7 DAYS/WEEK)	86	26.1%

Table 15: Frequency of buying soft drinks outside per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	282	85.6%
4-6 DAYS/WEEK	34	14.4%
DAILY(7 DAYS/WEEK)	13	4.0%

Table 16: Frequency of eating fast foods per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	291	88.5%
4-6 DAYS/WEEK	25	7.6%
DAILY(7 DAYS/WEEK)	13	4.0%

Volume 4, Issue 4; July-August 2021; Page No 470-477

Table 17: Frequency of watching TV per day

	FREQUENCY	PERCENT
≤3 HRS/DAY	274	83.3%
>3 HRS/DAY	55	16.7%

Table 18: Frequency of playing video games using phone and computer per day

	FREQUENCY	PERCENT
≤3 HRS/DAY	275	83.6%
>3 HRS/DAY	54	16.4%

Table 19: Frequency of playing and physical activity per week

	FREQUENCY	PERCENT
0-3 DAYS/WEEK	248	75.4%
4-6 DAYS/WEEK	30	9.1%
DAILY(7 DAYS/WEEK)	51	15.5%

Volume 4, Issue 4; July-August 2021; Page No 470-477