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Importance of Physical Activity to Maintain Lipid Profile in College Students (Girls)

Manjusha Pouranik
Associate Professor,
Dept. of Zoology,
Mata Gujri Mahila Mahavidyalaya
Jabalpur, Madhya Pradesh, India

Ayesha Siddiqua
Assistant Professor,
Dept. of Zoology,
Mata Gujri Mahila Mahavidyalaya
Jabalpur, Madhya Pradesh, India

Mahima Tripathi
Associate Professor,
Dept. of Zoology,
Mata Gujri Mahila Mahavidyalaya
Jabalpur, Madhya Pradesh, India

Sangeeta Sarkhel
Assistant Professor,
Dept. of Zoology,
Mata Gujri Mahila Mahavidyalaya
Jabalpur, Madhya Pradesh, India

Rajni Gupta
Assistant Professor,
Dept. of Zoology,
Mata Gujri Mahila Mahavidyalaya
Jabalpur, Madhya Pradesh, India

Abstract

The objective of this study was to estimate lipid profile of the girl students of Mata Gujri College, Jabalpur. In the present study Lipid profiles as; total cholesterol (TC), triglyceride and high density lipoprotein (HDL-C)) were measured using Rapid Diagnostic Automatic Analyzer. Thereafter LDL cholesterol values were calculated according to the formula: LDL-C = TC-HDL-TG/5. The mean HDL was 41.071mg/dl (p<). The Cholesterol/HDL ratio in majority of students was found to be 4.3 which were slightly higher from the desirable range. The Triglyceride/HDL ratio of the students was 2.32 which come under optimal range. The majority of students were under the normal range of Total cholesterol and the mean value of it was 178.868 mg/dl. Whereas, LDL showed a slightly higher side of the desirable range and its mean value was 118.717 mg/dl. Borderline level of HDL as 41.071mg/ dl was observed in 100% of the cases. Various studies have shown that dyslipidemia in college students, especially borderline level of HDL and slightly elevated level of LDL may become a health issue. In our study it was observed that obesity is not the prime cause of imbalanced lipid profile instead physical activity is the key factor to maintain good lipid status and to reduce CVD (Cardio Vascular Diseases) in elders. Thus it becomes necessary and very important to evaluate the lifestyle of young adults so that preventive measures can be taken as early as possible.

Keywords: Lipid profile, TC, LDL, HDL, BMI, Dyslipidemia, Physical Activity, Life Style

Introduction

In the current scenario, changing patterns of lifestyle especially in the young population, increasing economic growth, reducing physical work, high intake of junk food, and varying family patterns are frequently seen in India. In the urban areas the stage of rapid transformation can easily be seen and is the prime cause of higher prevalence of dyslipidemia. Hyperlipidemia or Dyslipidemia attributed to bad lifestyle and absence of physical activities in youngsters is now considered as one of the prime factors in developing the cardiovascular diseases in adult life (Bays,et al.2013, Klop 2013, J. Steinberger,2003, G. Plourde2002,, Campaigne, et.al. 1993). Indian subcontinent has 20 % of the world population and may be one of the prime regions of highest CVD health burden. High serum cholesterol is generally regarded as being one of the most important causes of coronary atherosclerosis (Bays,et al.2013). A number of authors (Tell et.al. 1986, Brandão et.al. 2011, LaPorte,et.al. 1980, Roger et.al. 2012) have reported that most children and adolescents who have risk factors for heart disease are more likely to have heart disease as adults. Increase in serum lipids above a certain level carries the risk of cardiovascular diseases. (Mondal and Mukhopadhyay 2018) The same risk factors and predictors of heart disease commonly associated with adulthood are now being discovered in youth. The National Cholesterol Education Program (NCEP) has recommended that screening for high cholesterol should begin at the age of twenty (NCEP report 2002). The NCEP also suggests additional screening and physician referral following an abnormal lipid screening. Many factors such as lifestyle smoking, alcohol consumption and physical activity have a significant impact on blood lipid levels (Brandão et.al. 2011, LaPorte, et.al. 1980). However,

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elevated blood lipids can be reduced by healthy lifestyle and rational medical intervention. There is also a large amount of evidence to support screening for hypertension, blood glucose and lipid abnormalities in young women. Many women die each year due to CVDs than from all types of cancers combined (Ingelsson 2007). However, of those sudden cardiac deaths among women, approximately two-thirds (64%) have no previous symptoms (Ingelsson 2007). High total cholesterol (TC) and low density lipoprotein cholesterol (LDL-C), and low values of high density lipoprotein cholesterol (HDL-C), are associated with vascular death (Lewington, et.al 2007) and high level of triglyceride (TG) is an important and independent predictor of cardiovascular disease (Lewington et.al. 2007, Hokanson, J.E. and M.A. Austin 1996, Patel, 2004) It has been reported by Shabana et.al.(2020) that owing to the recent modernization of lifestyle in Pakistan many lipid/lipoprotein abnormalities are prevalent in obesity and heart problems, as dyslipidemia, Though some studies have been reported internationally in young students but in central India no such type of studies was reported in young female students.. Thus, taking into account that dyslipidemia is present in the young population and that studies involving this population are scarce, especially in central India, the objective of this investigation was to study the lipid profile in a population of college female students.

Aim of the Study

The present study was undertaken to estimate lipid profile of the girl students of Mata Gujri College, Jabalpur.

Material and Methods

Studies were performed by taking prior permission through Ethical Society of Mata Gujri College Jabalpur.

Subjects and Methods

Participants

A college based cross-sectional study was preceded in students who were admitted in community health certificate course in 2017. This study contains a total of 100 subjects aged 20 to 28. All information was gathered by a self-administered questionnaire, which used a theoretical framework appropriate to each of the subjects.

A sample of students (N=100) from Community Health Certificate classes at Mata Gujri College were selected to participate. All students were non-health related majors. All participants were females. Females averaged 23.03 (SD±1.26) years of age. Participants height, weight, BMI and lipid profile parameters were observed and analyzed.

Weight

It was measured with the student barefoot, wearing light clothing and without accessories. For this purpose, we used an electronic anthropometric scale for adults, with 200 kg capacity.

Height

It was measured by inelastic anthropometric tape.

Body Mass Index (BMI)

It is defined and calculated as the ratio of the weight (kg) by the square of the height (m2). BMI values were then analyzed, taking into account the criteria of the World Health Organization (17), i.e., considered as low if BMI <18.5 kg/m^2; normal if ≥18.5 and <25.0, overweight if values between 25.0 and 29.9 kg/m^2, and obese if BMI ≥30 kg/m^2;

Lipid profiles as; total cholesterol (TC), triglyceride and high density lipoprotein (HDL-C)) were measured using Rapid diagnostic automatic analyzer. Thereafter LDL cholesterol values were calculated according to the formula: LDL-C = TC-HDL-TG/5. The levels of blood lipid were classified according to the Third Report of the National Cholesterol Education Program Expert Panel.(NCEP 2002) As given in the table below-

Table 1

	DESIRABLE	BORDERLINE	HIGH RISK
Cholesterol	< 200 mg/dl	200-239 mg/dl	240 mg/dl
Triglycerides	< 150 mg/dl	150-199 mg/dl	200-499 mg/dl
HDL-Cholesterol	60 mg/dl	35-45 mg/dl	< 35 mg/dl
LDL-Cholesterol	60-130 mg/dl	130-159 mg/dl	160-189 mg/dl
Cholesterol/HDL Ratio	4.0	5.0	6.0
Triglyceride/HDL Ratio	< 3	3.1 - 3.8	> 3.8

Results

All female participants selected for the study were non-health related majors with average age of 23.03 (SD±1.26) years. Female participants averaged 55.55kg (SD±7.51) for weight, 5.26m (SD±0.25) for height with BMI averaging 21.45 (SD±1.98).

Averaged Lipid profile values of the participants were 178.86 mg/dL (SD±4.79 mg/dL) for total cholesterol, 118.72 mg/dL (4.95 mg/dL) for LDL, 41.07 mg/dL (1.05 mg/dL) for HDL, 4.3 (0.056) for TC/HDL ratio, and 95.4 mg/dL (2.92 mg/dL) for triglycerides. Findings are displayed in Table 1, 2 and 3

Table-1 Age, Anthropometric Measurements and Lipid Profile of Studied Subjects

Characteristics	Mean	Standard Deviation	Variance
Age (years)	23.03	1.268	1.609
Height (cm)	5.268	0.258	0.066
Weight (Kg)	55.55	7.519	56.547
BMI (W/H in m^2)	21.458	1.980	3.923
Total Cholesterol	178.868	4.796	23.011

HDL (mg/dl)	41.071	1.055	1.113
LDL (mg/dl)	118.717	4.954	24.544
Triglycerides (mg/dl)	95.4	2.928	8.579
VLDL (mg/dl)	19.073	0.597	0.357
Cholesterol/HDL ratio	4.355	0.056	-
Triglyceride/HDL ratio	95.4	2.92	-

Table-2 Distribution of Lipid Profiles among Individuals

	Triglyceride	Cholesterol	HDL	LDL	VLDL
Number	100	100	100	100	100
Median	96	178.6	41.1	119.2	19.1
Range	10.4	8.9	4.1	17.5	2.3
Minimum	89.1	170.4	39.1	110.5	17.6
Maximum	99.5	189.3	43.2	127.8	19.9

Table - 3 BMI and Lipid Profile

BMI	No. Of Patients	Total Cholesterol (mg/dL)	HDL(mg/dL)	LDL(mg/dL)	Triglyceride	VLDL
16-18	2	178.1	42	117.5	96.1	18.6
18-20	26	180.2	41.3	116.9	94.8	19.01
20-22	25	180.6	40.8	118.8	95.3	19.22
22-24	41	177.27	41.1	119.8	93.1	19.07
24-26	4	180.7	41.2	123	96.6	19.31
26-28	2	171.4	40.1	111.9	97.1	19.4

Discussion

The elevated lipid profile is an important risk factor for cardiovascular diseases in adults and there are only few studies showing this among the young population. The NCEP recommends lipid screening beginning at age twenty and continuing every five years, with normal levels, and more frequently with abnormal levels throughout adulthood (NCEP report 2002). This research provides information regarding the serum lipid levels among college students. A number of students were identified as high risk based on lipid profile values.

In the present study, we evaluated 100 students of Mata Gujri College. The population was predominantly young females with a mean age of 23.03 years averaged age of 23.03 (SD±1.268) years, averaged 55.55 kg (SD± 7.519) for weight, average 5.268m for height with BMI averaging 21.45 (1.98). Total cholesterol was found in a desirable range among all the participants. Similarly LDL-Chl was also under desirable range. The HDL-Chl values were surprisingly just in the border line of desirable range with highest value of 42 mg/dl which was mainly due to physical inactivity. Varo JJ *et. al.* 2003 and some other studies also corroborate with our findings that sedentary lifestyle was observed in approximately 80% of the students and is responsible for dyslipidemia.

Lack of exercise is a well-known contributing factor to a number of health problems affecting people worldwide, such as diabetes, obesity and heart disease. Our results confirm the estimates published in The World Health Report that physical activity declines with age, starting in adolescence (WHO 2009). Girls and women are physically more inactive than men. Regarding the influence of gender on the level of physical activity, a longitudinal study conducted in the Netherlands showed that, in general, physical activity decreased sharply from adolescent and moderately extend between the age of 13 and 27 years (Hokanson, J.E. and M.A. Austin 1996). This was confirmed in our study also.

Dyslipidemia is one of the main risk factors of Coronary heart disease (CHD), though it is partially modifiable (Bittner 2005) As shown in the present study, the fact that the participants were enrolled in higher education did not result in a lower proportion of dyslipidemia.These students showed a trend in increasing levels of TC and LDL-C during the transition from high school to university.

The impact of dyslipidaemia on cardiac function and its economic consequences makes it a major public health concern worldwide. As far as our knowledge is concerned, this study was the first time to investigate the prevalence of blood lipids in college students in Madhya Pradesh (M.P). This study finds that the high levels of LDL and low levels of HDL are highly prevalent. The prevalence of borderline HDL in college students is more than people in other positions such as workers (Bittner, V. 2005) & farmers (Lingtai et.al 2000). These elevated TC and LDL values (5.91% and 3.57%) indicate that college students are surrounded by many risks and they are in the border line. They are likely to turn into hyperlipidemia without any measures being taken for them. The mean TC level (160.77 mg/dL.) was similar with a study conducted in 1993 by Swai et. al. 2009 and Brando et. al .2011 Wei Liang et.al. 2015.

There are lots of factors that affect the level of TC. Generally, the young college female students are protected by estrogen, so they would have a relatively low risk of cardiovascular diseases. However, previous studies demonstrated that the female advantage is decreased in women when other

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risk factors including high blood glucose and hyperlipidemia are presented Wei Liang et.al. 2015. (Ingelsson 2007 and Bittner V 2005). Values of triglycerides have also been associated with obesity and alcoholism in Singapore with multi-ethnic populations (Lewington 2007, Hokanson, J.E. and M.A. Austin 1996). Thus, the level of TC has a significant effect on the health of students. But in contrast to this study our subjects have not been affected by unhealthy lifestyles and hence TC level is within the limit. Apparently healthy individuals should get their lipid profiling done once or twice a year and follow appropriate lifestyle changes so as to prevent the onset of metabolic disorders. The recent westernized lifestyle in youth combined with the inherent tendency of fat deposition in the abdominal area has increased risk of obesity and its sequelae. Overall, the relationships between life styles, environments, social economics, and blood lipid profiles should be taken into consideration in developing prevention strategies for dyslipidemia.

In these situations, a simple lipid profile test can help manage the dyslipidemia before the onset of disease. Subjects with sedentary lifestyle, with no regular exercise and higher TC, TG levels and low HDL-C levels were at high risk of cardiovascular diseases (Mondal and Mukhopadhyay 2018). Government and related authorities should pay more attention to youngster's health, so that CVD risks can be reduced in adults.

The incidence of risk factors for cardiovascular diseases in young adults especially for college students must be given importance. Several studies indicate that obesity is the main factor of dyslipidemia which is one of the most important etiological initiator for cardiovascular diseases and hypertension (Klop, et.al. 2013 and NCEP report 2002). Our study contradicts this statement as obesity is uncommon among students, and prime cause of dyslipidemia is lack of physical activity.

Conclusion

The study shows that the lipid profile in female college students, especially reduced levels of HDL and high LDL has become a critical health issue. Relevant departments of school and government should pay more attention to students' physical activity. Despite the limitations, the results of this study can be used to advance lipid profile research and intervention development on college campuses. Institutions of higher education have the unique opportunity to promote positive health behaviors and improve lipid profiles among young adults who have greater risk for CVD than previously believed. Health professionals in university can provide suitable and effective health education programs that address diet, exercise, and other important factors that influence lipid levels (Ingelsson 2007). A rigorously designed long-range research and health promotion effort that incorporates these factors and their interrelationships could significantly advance nationwide efforts to impact the health and well being of college students.

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