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A Study of Fasting, Postprandial Lipid Profile and Its Correlation with Different Parameters Amongststaffs of Regional Institute of Medical Sciences (RIMS)

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Abstract
BACKGROUND*:Hyperlipidemia is next to hypertension among the list of common chronic conditions that were seen, so the assessment of lipid profile bares immense importance in the disease progression and preventive strategies.[1]This study is taken up to assess the variation in lipid profile both fasting and post prandial and its association between ethnicity, diet exercise.*
MATERIALS AND METHOD:*This is an experimentalstudies conducted among 60 health workers of Regional Institute of Medical Sciences (RIMS),Imphal.Clinical parametersincluding personal history and measurement of serum lipid both fasting and post prandial done in each subject.Individual with diabetes, dyslipidemia, h/olipid lowering agent were excluded from the study.*
RESULTS: *Serum triglyceride levels increased significantly from fasting to postprandial, whereas change in total cholesterol, LDL cholesterol, HDL cholesterol are minimal and non- significant. Vegetarian diet, moderate physical activity had favourable lipid profile in the form of low total cholesterol, triglyceride, LDL, and high HDL levels. No specific pattern was found in terms of ethnicity. No significant variation was found in postprandial lipid profile according to life style variables.*
Key words:*Hyperlipidemia, Cardiovascular disease, hypertension*

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I. Introduction

Diagnosing and managing hyperlipidemia is a way to prevent cardiovascular disease (CVD). Hyperlipidemia is second to hypertension in the list of the 10 most common chronic conditions that were seen, so the assessment of lipid profile bares immense importance in the disease progression and preventive strategies.[1]

Serum lipidusually donein fasting state, Fasting specimen is preferred if cardiovascular risk assessment is based on total cholesterol, LDL cholesterol or non-HDL cholesterol.[3]

There are advantages of non-fastingrather than fasting samples for measuring the lipid profile.[2-6] Since 2009, non-fasting lipid testing has become the clinical standard in Denmark.[6] Furthermore, the UK NICE guidelines have endorsed non fasting lipid testing in the primary prevention setting since 2014.[7]

II. Study Design

This is an experimental study.Sixty RIMS staffs including doctors, nurses, attendents were selectedafter excluding those taking lipid modifying drugs. Data including personal details, medical history, diet, exercise were collected. Blood samples were collected for fasting and postprandial 2 hours after breakfast on the same day. No specific instruction about breakfast was given. Samples were tested for lipid profile in RIMS biochemistry lab using RaniboxXimola auto analyser. Lipid profile included total cholesterol, triglyceride, LDL and HDL. The data collected was entered to SPSS (Statistical Package for Social Sciences) Data Document. Then after thorough scrutiny and checking of the data, statistical analysis was performed by using IBM: SPSS Statistics Version 21and MINITAB Release 11.12, 32 Bit. Numerical/continuous variables

that follow normality and equality of variances are presented as Mean±SD (standard deviation) and qualitative/categorical variables are again described as number of cases and percentages.

The variation of mean lipid profiles between fasting and postprandial (after breakfast) is tested by *paired t-test* while *independent t-test* isused to test the variation of mean lipid profiles between two types of diet and exercise. Besides, *Karl Pearson correlation coefficient "r"* is also used to establish association between fasting and postprandial within each type of lipid profile.

All comparisons are two-sided and the P-values of < 0.05, < 0.01 and < 0.001 are taken as the cut off values for significance, highly significance and very highly significance respectively. Pie, multiple bar diagrams and divided bar diagrams are used to highlight more clarity of the findings that are shown just below the respective tables.

Prior permission taken from the Research Ethics Board RIMS, Imphal before the study was conducted. Informed consent of the participants of the study was taken as per ethical committee guidelines.

III. Results & Observations

There are four sub-sections like Participants' profile, Personal history and history of illness, Comparison of lipid profile and Association of lipid profile.

I.**Participant's profile:**

Participants' profile consists of six parameters – sex, age, religion, marital status, occupation and state/ ethnicity – and their respective numbers along with percentages in the present sample are shown in table 1.

Table-1: Distribution of employees according to socio-demographic & ethnicity

Parameters		No. of employees	Percentage (%)
Sex	Male	30	50.0
	Female	30	50.0
Age	20 - 30 yr	21	35.0
	31 - 40 yr	27	45.0
	41 - 50 yr	11	18.3
	51 - 60 yr	1	1.7
Religion	Hindu	37	61.7
	Christian	17	28.3
	Muslim	5	8.3
	Other	1	1.7
Marital Status	Unmarried	28	46.7
	Married	32	53.3
Occupation	Doctor	32	53.3
	Nurse	19	31.7
	Other	9	15.0
State	Manipur	31	51.7
	Meghalaya	5	8.3
	Nagaland	3	5.0
	Mizoram	1	1.7
	Arunachal Pradesh	3	5.0
	Tripura	4	6.7
	Sikkim	2	3.3
	Kerala	6	10.0
	Tamilnadu	3	5.0
	Karnataka	2	3.3
Total		60	100.0

Table-1 shows same percent of sexes i.e., 50% each, while highest percentage of employees are having within the age range of 31 - 40 years which is followed by 20 - 30 years, 41 - 50 years and lowest pertains to 51 - 60 years .53.3% of the sample was doctors as against 31.7% nurses, 15% others employees other than doctor and nurse.

Fig.-1: Showing comparison of percentage of employees according to socio-demographic data

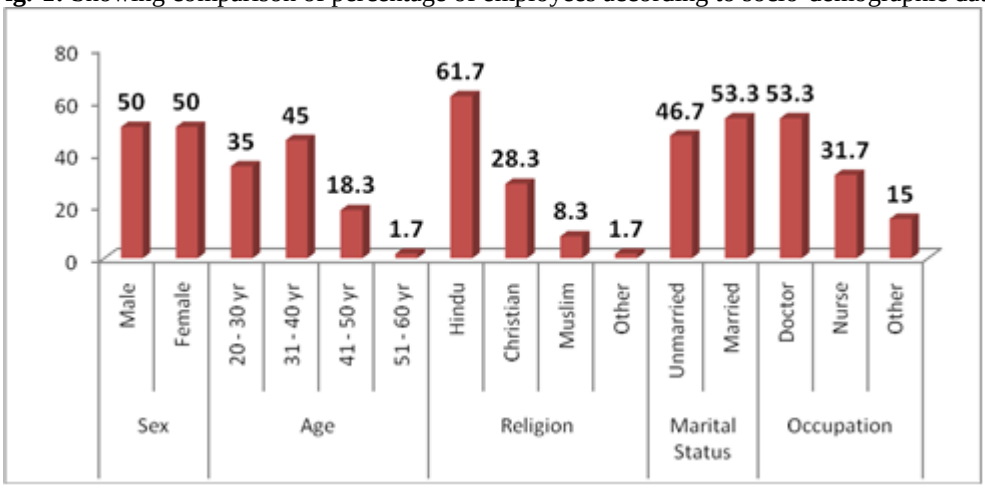
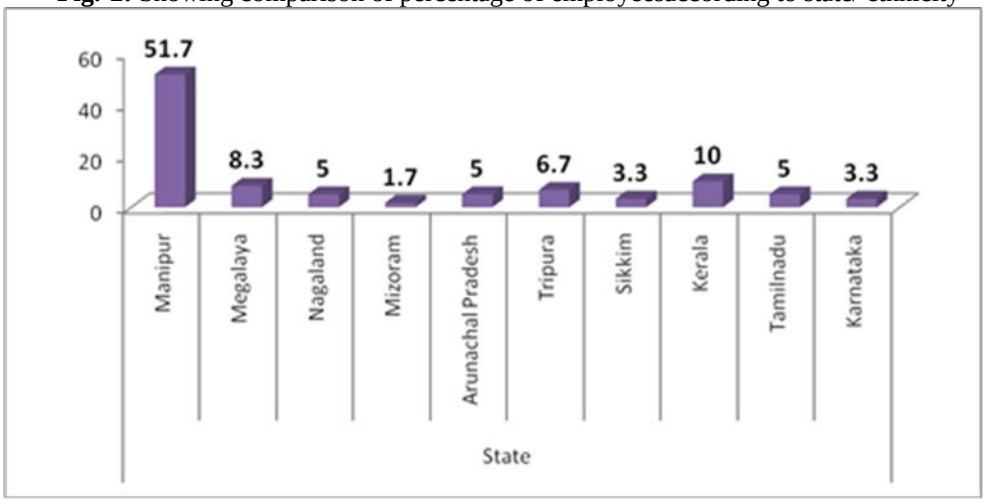


Fig.-2: Showing comparison of percentage of employeesaccording to state/ ethnicity



II.Personal history and history of illness:

Table-2: Distribution of employees according to personal history

Parameters		No. of employees	Percentage (%)
Personal history (Diet)	Vegetarian	6	10.0
	Non-vegetarian	54	90.0
Personal history (Smoking)	Yes	7	11.7
	No	53	88.3
Personal history (Alcohol)	Yes	14	23.3
	No	46	76.7
Total		60	100.0

90% of employees of RIMS who are included in the present sample are non-vegetarian while the remaining 10%, vegetarian. Only 11.7% of them are using cigarette smoking while 23.3% using alcohol.

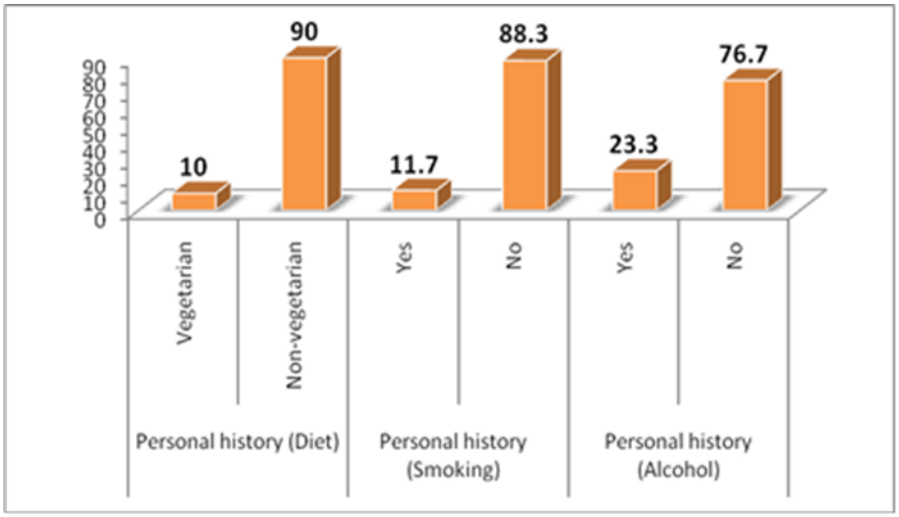


Fig.-3: Showing comparison of percentage of employeesaccording to personal history

Table-3: Distribution of employees according to past history of illness

Parameters		No. of employees	Percentage (%)
Past history (hypertension)	Yes	4	6.7
	No	56	93.3
Past history (type 2 DM)	Yes	4	6.7
	No	56	93.3
Past history (dyslipidemia)	No	60	100.0
Past history (heart disease)	No	60	100.0
Drug history (dyslipidemia)	No	60	100.0
Drug history (hypertension)	Yes	4	6.7
	No	56	93.3
Drug history (type 2 DM)	Yes	4	6.7
	No	56	93.3
Total		60	100.0

The number of samples along with corresponding percentage of past history of illness and drug history are set forth in the **table-3**.

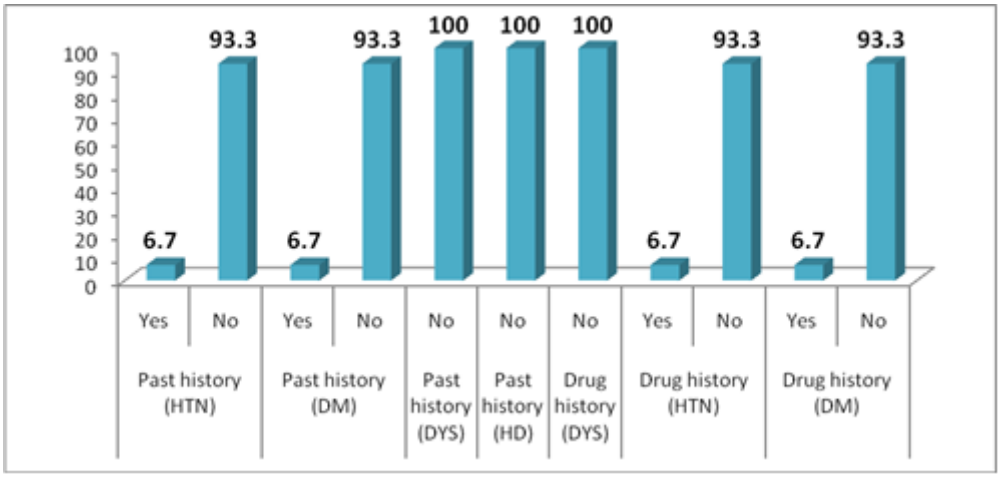


Fig.-4: Showing comparison of percentage of employeesaccording to past history of illness

Table-4: Distribution of employees according to work pattern & exercise

Parameters		No. of employees	Percentage (%)
Work pattern	Sedentary	10	16.7
	Dynamic	50	83.3
Exercise	< 150 mm/ week	42	70.0
	> 150 mm/ week	18	30.0
Total		60	100.0

Maximum number of employees (83.3%) is found to have dynamic working pattern as against 16.7% of sedentary working pattern. 30% perform exercise above 150 minutes per week.

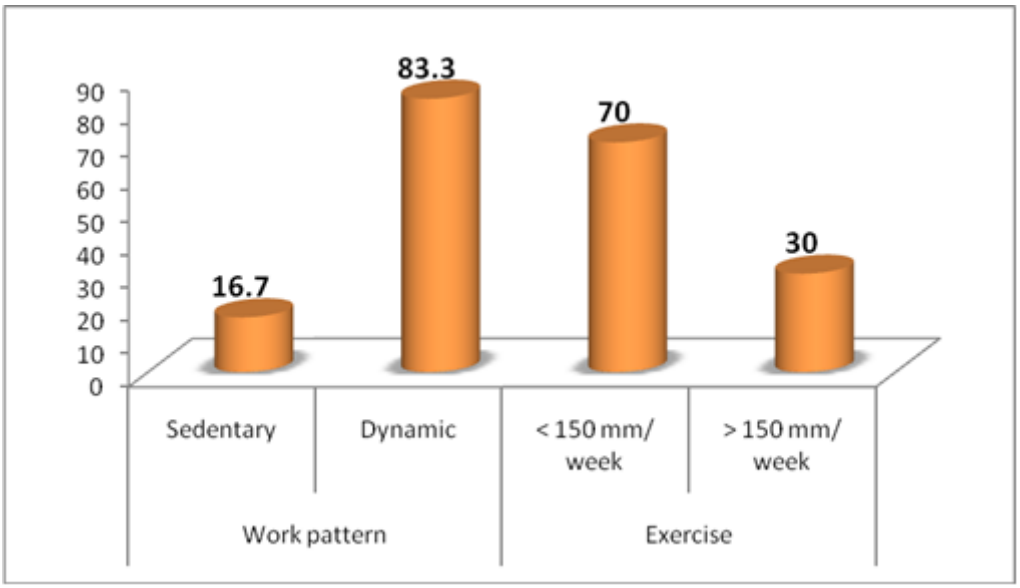


Fig.-5: Showing comparison of percentage of employeesaccording to work pattern & exercise

III.Comparison oflipid profile:

Table-5: Comparison ofMean±SD of lipid profile between fasting and postprandial

Parameters	**Fasting (mg/dl)**	**Postprandial (mg/dl)**	**r-value**	**Paired t-value**	**df**	**P-value**
	Mean±SD	Mean±SD				
Cholesterol	164.43±39.51	162.17±40.92	.875 **	1..519	59	.062
Triglyceride	126.72±74.94	174.12±82.18	.879**	9.362	59	<.001
LDL	105.93±27.98	103.58±28.03	.943**	1.932	59	.058
HDL	41.72±7.20	42.20±7.42	.927**	1.334	59	.187

*SD: standard deviation; ** very highly significant; r: correlation coefficient; Paired t-value: Paired t-test; df: degree of freedom; P-value: probability due to chance factor.*

Table-5 highlights that there is a positive correlation between lipid profile level of fasting and lipid profile level of postprandial in case of triglyceride and HDL as the former is lesser than that of the latter. In case of cholesterol and LDL mean level showed decrease in postprandial state. This statement is supported by positive and highly significant r-values. At the same time, the variation of mean between fasting and postprandial for each type of lipid profile is further tested by paired t-test. The findings suggest that there is a great variation of mean triglyceride between fasting and postprandial as evident by the corresponding P- values (<.001).

IV.Association of lipid profile:

Association between diet, exercise with serum lipid profile.is shown in table 6 and 7. In cases of variation between two means, independent sample t-test is applied whereas the variation among more than two means is tested by F- test.

Table-6: Association ofMean±SD of lipid profile between types of diet

Lipid profile	Personal history (Diet)	N	Mean±SD	t-value	df	P-value
Cholesterol Fasting	Vegetarian	6	135.50±23.28	1.934	58	.258
	Non-vegetarian	54	167.65±39.77			
Cholesterol Postprandial	Vegetarian	6	139.33±22.54	2.133	58	.537
	Non-vegetarian	54	170.81±41.00			
Triglyceride Fasting	Vegetarian	6	107.50±34.09	.659	58	.513
	Non-vegetarian	54	128.85±78.08			
Triglyceride Postprandial	Vegetarian	6	139.33±33.21	1.095	58	.278
	Non-vegetarian	54	177.98±85.21			
LDL Fasting	Vegetarian	6	100.67±29.92	.483	58	.631
	Non-vegetarian	54	106.52±27.99			
LDL Postprandial	Vegetarian	6	98.83±27.25	.435	58	.666
	Non-vegetarian	54	104.11±28.31			
HDL Fasting	Vegetarian	6	43.17±2.85	.516	58	.608
	Non-vegetarian	54	41.56±7.53			
HDL Postprandial	Vegetarian	6	41.50±3.20	.241	58	.810
	Non-vegetarian	54	42.28±7.77			

SD: standard deviation; t-value: independent sample t-test;
df: degree of freedom; P-value: probability due to chance factor

It is worthwhile to mention that cholesterol, triglyceride, LDL values in both fasting and postprandial, non-vegetarian has higher level than that of vegetarian. On the contrary, in the case of HDL fasting, vegetarian has a little bit higher than that of non-vegetarian. Further test values suggest that these visible mean differences are not significant enough statistically to produce a significant change from fasting to postprandial.

Table-7: Association ofMean±SD of lipid profile between types of exercise hours

Lipid profile	Exercise	N	Mean±SD	t-value	df	P-value
Cholesterol Fasting	< 150 mm/ week	42	169.40±40.30	1.504	58	.138
	> 150 mm/ week	18	152.83±36.04			
Cholesterol Postprandial	< 150 mm/ week	42	176.95±39.92	1.395	58	.168
	> 150 mm/ week	18	161.00±42.19			
Triglyceride Fasting	< 150 mm/ week	42	139.10±83.70	2.003	58	.050
	> 150 mm/ week	18	97.83±36.54			
Triglyceride Postprandial	< 150 mm/ week	42	178.24±87.88	.590	58	.557
	> 150 mm/ week	18	164.50±68.36			
LDL Fasting	< 150 mm/ week	42	108.74±28.72	1.190	58	.239
	> 150 mm/ week	18	99.39±25.75			
LDL Postprandial	< 150 mm/ week	42	107.17±27.09	1.530	58	.132
	> 150 mm/ week	18	95.22±29.17			
HDL Fasting	< 150 mm/ week	42	41.57±6.93	-.236	58	.814
	> 150 mm/ week	18	42.06±8.00			
HDL Postprandial	< 150 mm/ week	42	41.81±7.47	-.619	58	.539
	> 150 mm/ week	18	43.11±7.45			

SD: standard deviation; t-value: independent sample t-test;
df: degree of freedom; P-value: probability due to chance factor

None of the variation of mean lipid profiles between those who exercises below 150 min per week and those who exercises above 150 min per week was noticed in the present study. The pattern is found true in all the types of lipid profiles considered as well as in both fasting and postprandial. This statement is sustained by the corresponding P-values which are greater than 0.05, the significant level adopted for the purposed. Nonetheless, it is interesting to note that those who exercises above 150 min per week has less lipid profile level than those who exercises below 150 min per week which is pertinent in cases of cholesterol fasting and postprandial both, triglyceride fasting and postprandial both, and LDL fasting and postprandial both. But in cases of HDL fasting and postprandial both the pattern is quite reversed.

IV. Discussion

Out of 60 participants 30 where males.Maximum number of participants where in the age group of 30 to 40 years.Religion wise Hindu 37 (67.7%), Christian 17 (28.3%) and Muslim 5 (8.3%). Among the 60 participants 32 (53.3%) of the participants were married. Doctors where maximum in number 32 (53.3), followed by nurses 19 (31.7%) and others 9 (15%). Since RIMS is a central institute participants from 10 different states where included in study out of which Manipur was maximum 31 (51.7%) followed by Kerala 6 (10%) and Meghalaya 5 (8.3%). Non-vegetarian food habits where followed by 54 (90%), use of alcohol found to be more prevalent then smoking. 4 participants each where having history of type 2 DM and hypertension, all

were on regular medication. Most of the participants where having a dynamic work pattern 50(83.3%) but regular exercise of more than 150 min/week was done by 18 (30%). Moderate to severe stress mainly experienced by those working in critical care units.

Important focus of the study was to compare the fasting and postprandial lipid profile values in terms of total cholesterol, triglyceride, LDL and HDL. Out of which only triglyceride level increased significantly in postprandial.

Our study supports the upcoming view of non-fasting lipid profile as a standard for screening population for cardiovascular risk assessment.[2,3,4,5,10] Patients should be informed to avoid high fatty food and excess water intake on the day of blood sampling to minimize the variation in triglyceride and LDL levels.[10]

In assessment of association between diet, exercise, stress and ethnicity with serum lipid profile. There was no significant difference in fasting and postprandial lipid profile in vegetarian and non-vegetarian groups. There was a favourable lipid profile with low total cholesterol, triglyceride, LDL and high HDL among individual who perform moderate exercise and high in both fasting and postprandial state in people with stress.

V. Conclusion

Serum triglyceride levels increased significantly from fasting to postprandial, whereas change in total cholesterol, LDL cholesterol, HDL cholesterol were minimal and non significant. Vegetarian diet, moderate physical activity more than 150 min per week, mild stress level had favourable lipid profile in the form of low total cholesterol, triglyceride, LDL, and high HDL levels. No specific pattern was found in terms of ethnicity.

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