IAMJ

Survey Study *International Ayurvedic Medical Journal* *ISSN:2320 5091*

IMPACT OF DIET AND LIFE STYLE IN THE MANIFESTATION OF DYSLIPIDEMIA: A SURVEY STUDY

Joshi Shivam G[1] Goyal Mandip R[2]

[1]Ph.D. Scholar, [2]Assistant professor, Department of Kayachikitsa, IPGT&RA, Jamnagar, Gujarat, India

ABSTRACT

Context: Needless to say, the challenges in curbing the burden of Cardio Vascular Disease (CVD) in India are multifaceted. Sedentary lifestyles, eating patterns, lack of regular physical activity and non-compliance to therapy when diagnosed with Dyslipidemia have led to a steep rise in the number of people suffering from CVD. Screening of serum cholesterol is need of hour to prevent cardiovascular epidemic which is emerging in present era as well as change in food and life style from early childhood is also essential. **Aim:** to assess the impact of diet and life style in Dyslipidemia patients. **Materials and Methods:** Face-to-Face survey procedure was applied specially on willing 471 individuals with abnormal lipid profile on basis of survey-questionnaire proforma. **Observation and conclusion:** The obtained data reveals that, faulty diet and life style pattern of Dyslipidemia patients are responsible in manifestation of Dyslipidemia. From present survey study, it can be concluded that awareness of avoiding of *Gramya Ahara* and *Vihara* (faulty diet and life style) from early childhood is essential for prevention of non-communicable diseases. Screening of cholesterol is Gold effect for prevention of cardiovascular disease and hence screening procedures should be adopted in routine medical checkup of citizens of India after the age of 30 years.

Key words: Diet, Dyslipidemia, *Gramya Ahara Vihara*, Life style

INTRODUCTION

Non communicable diseases (NCDs) estimated to have accounted for 60% of deaths in India in 2014. Raised cholesterol is among four key metabolic or physiological changes in NCDs. Heart diseases, diabetes, cancers, and chronic respiratory diseases now affect younger and younger people. Prevalence of Dyslipidemia in younger to adult is due to disturbed diet and life style. Needless to say, the challenges in curbing the burden of cardiovascular disease **(**CVD) in India are multifaceted. Sedentary lifestyles, eating patterns, lack of regular physical activity and non-compliance to therapy when diagnosed with Dyslipidemia have led to a steep rise in the number of people suffering from CVD. Screening of serum cholesterol is need of hour to prevent cardiovascular epidemic which is emerging in present era as well as awareness related diet and life style from early childhood is also essential.

Classics have mentioned that *Bala* (*Sharira* and *Manasa*), *Arogya* and *Ayu*

are depending on *Prana* and *Agni*.[1]*Deha* depends on *Ahara*.[2] Proper diet (*Annapana*) is essential for maitaining *Agni* where *Anna* works as fuel (*Indhana*) to stimulate as well as to maintain (*Pradipta* and *Jwalana*) *Agni*. *Dhatu Samyata* through *Sama Agni* is mandatory to maintain healthy state. *Prana*, *Tejasa* and *Ojas* are depending on *Agni*.[3]*Vata* is directly related with *Prana*, *Pitta* is directly related with *Teja* and *Ojas* is directly related with *Kapha*. *Agni* and *Prana* (*Vayu*) are responsible for all activities of microcosm and macrocosm organism as well as *Prakriti* and *Vikriti*. *Annapana Vidhi*, *Dinacharya* and *Ritucharya* are indicated on basis of *Samyaka Gati* of *Vayu* and *Agni*. For healthy and unhealthy status, diet and lifestyle play major role which depends on status of *Agni* and *Vayu* of individual also. Practice of*Gramya Ahara* and *Vihara* leads to *Sama Sleshma* and *Sama Meda Dhatu* status and ultimately *Dhatu Shaithilya*. Recent literature has identified that lipids have a pivotal role in the activation of inflammatory pathways, increasing the production of inflammatory cytokines, mainly tumor necrosis factor alpha, interleukin 6 and 1. Dyslipidemia and inflammation are frequently found in some diseases, such as obesity, type 2 diabetes mellitus and cancer cachexia. On the other hand, cytokines can promote disruption of lipid metabolism, in special cholesterol reverse transport, which is linked to development of atherosclerosis. Inflammation leads to changes in lipid metabolism aimed at decreasing the toxicity of a variety of harmful agents and tissue repair by redistributing nutrients to cells involved in host defense. Acute phase response, mediated by cytokines, preserves the host from acute injury. When this inflammation becomes chronic, it might lead to chronic disorders as atherosclerosis and the metabolic syndrome.[4]Here again, *Ama- Shotha Avastha* plays vital role in inflammatory pathological condition due to *Ajirna* state either of faulty diet or life style. As mentioned earlier, there is higher prevalence of Dyslipidemia even in developing countries like India. There is also scarcity of resources and high risk of complication like CVD etc. Therefore along with the clinical research, the policies of *Ayurveda* researches should also include the surveillance and screening of etiological factors (*Hetu*), signs and symptoms (*Lakshana*), diet and life style of individual from *Ayurveda* perspective. More importantly, a healthy lifestyle should be inculcated right from childhood stage to prevent this epidemic. That's why; a survey study was conducted to screen and assess the impact of diet and life style pattern in Dyslipidemia patients.

MATERIAL AND METHOD

Aim: To assess the impact of diet and life style in Dyslipidemia patients

Methodology: The present cross-sectional survey study was conducted between February 20, 2014 and June 1, 2015 at O.P.D and I.P.D. of *Kayachikitsa* department of I.P.G.T. and R.A, Gujarat Ayurved University, Jamnagar. For this purpose either diagnosed cases of Dyslipidemia or persons presenting with obesity, complaining of lethargy, morning stiffness, shortness of breath, confusion, numbness, pain in

the neck, jaw, upper abdomen or back, heartburn etc. were subjected to lipid profile investigations. If their lipid profile was abnormal, they were selected for this survey study. Face-to-Face survey procedure was applied specially on willing 471 individuals on basis of survey-questionnaire proforma which was prepared for present survey study. Consent from the patient was also taken from these patients who were explained the importance of this survey.

Inclusion criteria:

- Patients with age 25 to 60 years
- Elevated levels of serum cholesterol (201 mg/dl or more) and/or elevated serum triglycerides (S. TGs) (151 mg/dl or more) and/or, elevated serum low density lipoprotein (S. LDL) (131 mg/dl or more) and/or elevated serum very low density lipoprotein (S. VLDL) (41 mg/dl or more) and/or decreased S. HDL-C (Male < 40 mg/dl, female < 50 mg/dl).

OBSERVATION AND DISCUSSION

Status of Fasting blood sugar and lipid Profile of 471 patients of survey - 27.35% of patients reported with fasting blood sugar more than 108 mg/dl in present survey study. 39.28% of patients were having high level of cholesterol. 37.58% of patients were having LDL more than 130 mg/dl in present study. 40.34% and 42.25% of patients were having raised S. Triglyceride (>150 mg/dl) and VLDL (>30 mg/dl) in present survey study. Low HDL-C was the most common lipid abnormality. 31.05% of male and 48.41 % of female patients was observed low HDL levels in the present study subjects. 37 (16.89%) male and 59 (23.41%) female patients were reported with hypertriglyceridemia and low level of S. HDL i.e., atherogenic dyslipidemia in the present survey study.

Status of *Agni*- Major study populace was reported to have *Vishamagni* (54.99%) and *Mandagni* (37.58%) which were related to *Vata* and *Kapha* respectively. *Agnidushti* lead to *Aprakrita* or *Sama Medodhatu* ultimately resultant of Dyslipidemia. This indicates that persons with disturbed *Agni* status are prone to Dyslipidemia. (Table-1)

***Abhyavaharana* and *JaranaShakti* -** Maximum numbers of patients 394 (83.65%) were taking 3 times meal per day with *Madhyama Jarana Shakti* (84.08%). Both the appetite and digestive capacity remained relatively medium in a good number of the patients. It is now established that to maintain required energy level of the fat stores obese persons eat more than average. The total daily energy expenditure is higher in obese than lean individuals.[5](Table-1)

Table 1: Status of *Agni, Koshtha* and *Aharagrahana Shakti* in 471 surveyed cases of Dyslipidemia

Diet	Categories	No. of patients	% of patients
Agni	*Vishamagni*	259	54.99%
	Mandagni	177	37.58%
	Tikshnagni	18	3.82%
	Samagni	17	3.61%
Abhyavaharana	Breakfast	394	83.65%

***Shakti* meal per day**	Lunch	471	100%
	Dinner	466	98.94%
Jarana Shakti	*Pravara*	14	2.97%
	Madhyama	396	84.08%
	Avara	61	12.95%

Type of diet- The major part of the present study populace was following strict vegetarian diet (76.65%) against the mixed diet followers which comprises of only 23.35%. Among them 90% and 89.09% were taking Chicken and eggs respectively. In regard to the consumption of meat; intake of large quantities of meat no matter whether it is white or red is beyond doubt having unfavorable effects like that of high blood cholesterol, obesity, heart disease etc. *Gramya-Anoopa Pishita*, *Matsya* and other *Viruddha Ahara* lead to *Shonita-Abhishyandana* and *Dhamani Pratichaya*.[6](Table-2)

Behavior towards Diet pattern - 44.16% patients reported to take breakfast in the morning without natural urges. As per Ayurveda, morning diet should not take until previous diet was fully digested. In *Ratri* (night), *Hridaya Mlana*, *Sroto-Mukha Sanvrit*, *Kleda Avastha* of *Anna* are reasons for *Klinna* and *Apakva Rasa Dhatu*. If person is taking morning diet without digestion of previous diet, *Rasa Dhatu* becomes more *Vidagdha* which may cause *Kleda*, *Shonita Abhishyanda* and *Medo Vidaha*.[7] 29.72% patients gave history of taking too late dinner. Eating a large meal late at night means going to bed with a large amount of undigested food and acid in the stomach, and this increases the risk for acid reflux.[8] Too late dinner can be taken as *Akala Bhojana* which is causes of *Agnidushti* and *Sama Rasa Dhatu*[9]. (Table-2)

Dominance of *Rasa* – 99.79% patients were having *Madhura Rasa Priti* in diet. *Ati Madhura Rasa Sevana*[10] leads to *Gaurava*, *Abhishyanda*, *Shopha*, *Alasya*, *Sthaulya*, *Dhamaniupalepa* which are also associated with Dyslipidemia. The 92.36% patients were also taking *Katu Rasa* dominant diet which was *Shonita Dushtikara Rasa*. *Lavana Rasa* intake was found in 69.43% and *Amla Rasa* intake was found in 64.97% of the patients which are *Kledakara*, *Raktadushtikara*, *Dhatu Shaithilyakara* and *Shonita Abhishyandakara*.(Table-2)

Dominant *Guna* - Dominance of *Guru Guna* (food articles and dishes that are heavy in quality) was noticed in the ordinary diet of 98.30% of patients, followed by *Ushna Guna* (naturally hot articles) by 90.45%. *Snigdha Guna* (oily and fatty) was taken by 96.39% of subjects. Food stuff with *Sheeta Guna* (cool by nature) was in routine use by 96.39% of the patients who were surveyed. *Guru*, *Snigdha*, *Amla*, *LavanaRasa Sevana* are also reason for *Sleshma*, *Pitta*, *Meda* and *Mamsa Abhivardhana*.[11]*Snigdha-Ushna* and *Guru-Sheeta* dominant *Aharaja Hetu* are cause of *Vidaha* and *Abhishyanda* respectively which may further lead to *Medodosha*. (Table-2)

Dietary habit - Faulty dietary habits like *Samashana* (mixing of wholesome and unwholesome items) was found in 52.65 % of the patients, eating beyond ones digestive capacity or taking food

prior to the digestion of previous meal (*Adhyashana*) in was found in 29.94 % of the patients. On the other hand, irregular diet pattern was in practice of 51.59%, *Viruddhahara* and *Ajirnashana* in 34.82% and 30.36% of the patients respectively. Faulty methods followed in food intake are equally responsible culprit for the improper digestion and impaired assimilation of the food. (Table-2)

Table 2: Type of diet and dietetic history reported in 471 surveyed cases of Dyslipidemia

Diet	Categories	No. of patients	% of patients
Type of diet	Vegetarian	361	76.65%
	Mix	110	23.35%
Behavior towards diet pattern	Too late dinner	140	29.72%
	Intake of breakfast without natural urges	208	44.16%
Dominant *Rasa*	*Madhura*	470	99.79%
	Amla	306	64.97%
	Lavana	327	69.43%
	Katu	435	92.36%
	Tikta	05	1.06%
	Kashaya	00	00
Dominant *Guna*	*Guru*	463	98.30%
	Laghu	51	10.83%
	Sheeta	454	96.39%
	Ushna	426	90.45%
	Snigdha	454	96.39%
	Ruksha	136	28.87%
Dietary habit	*Samashana*	248	52.65%
	Adhyashana	141	29.94%
	Vishamashana	243	51.59%
	Ajirnashana	143	30.36%
	Viruddhahara	164	34.82%

Staple food - Wheat and rice were the staple food in the locality and also in the study public. 80.25% patients were taking *Urada Dala* at least once a week. Nearly 3 decades of research have shown that black gram fibers possess hypolipidemic and hypoglycemic activity[12] but *Masha* is *Meda, Pitta, Kaphaprada* and also *Kapha-Pittakara* like *Dadhi*.[13] If *Agni* is not proper, it may lead to *Sama Kapha, Pitta* and *Medo Dhatu* ultimately lead to *Shonita Abhishyanda* and Dyslipidemia. 74.95% patients were taking bread products at least once a week. *Pishtanna Ati Sevana* like bread products is considered as *Guru* and there are more chances of production of *Ama* by affecting the *Pachaka Agni* as a result the *Dhatwagni* especially *Medo Dhatwagni* becomes *Manda* and there may be accumulation of *Ama* in *Medodhatu*.(Table-3)

Intake of Deep fried Food/Fermented food/Junk food – 89.60% patients were taking deep fried food in diet which is highly atherogenic. Dyslipidemia is a major fast food obesity related disease, which results be-

cause of abnormally high triglyceride and LDL cholesterol levels. Dyslipidemia eventually leads to obesity or heart disease. 57.96% and 37.79% patients were taking fermented food and junk food respectively. Intake of deep fried food, fermented food and junk food can be taken as *Viruddha Ahara* which if taken regularly could induce inflammation at a molecular level, disturbing the eicosanoid pathway creating more arachidonic acid leading to increased prostaglandin-2 and thromboxane. This inflammatory effect is an important effect as these are all the basic pathologies that create *Agnimandya*, *Ama*, and a number of metabolic disorders.[14](Table-3)

Cooking oils - *Mahisha Ghrita*, cotton seed oil, ground nut oil and vegetable ghee were favorites of kitchen of the study populace. All vegetable oils contain 100% fat, and most of them have saturated fats. So though oils are having beneficiary effects on health promotion, regular and excess intake will produce harmful effects rather than the profits. 63.07% patients used cotton seed oil as cooking oil. After all cotton is not coming under the category of food crops ; so the use cotton seed oil in a wide range for cooking purpose is also dubious. 91.72% patients were taking *Mahisha Ghrita* which is *Guru Paki* and *Abhishyandakara*. (Table-3)

The Indian society is primarily "food centric" with food being one of the most important elements of any celebration. Most of them involve extensive use of different types of saturated fats, trans-fatty acids and sugars. North India extensively uses saturated fats like ghee and butter whereas the southern part traditionally uses coconut oil as the predominant cooking medium. Both have been shown to be highly atherogenic through their impact on lipid levels. Also, reheating of oils for deep frying foods is a common practice. This increases the levels of trans-fatty acids in the food which have incremental harmful effect on lipid levels. Sweets consumed in large quantities during celebrations and social gathering are also rich in dairy fats. The harmful effects of these unhealthy eating practices are further reinforced by the lack of physical activity among Indians, which is becoming increasingly common as a result of urbanization and growing affluence.[15]

Fruit items – 88.11% of patients were taking banana. According to Linus Pauling Institute, Bananas are low on the glycemic index and release their energy into the bloodstream slowly.[16] Research on banana reported that it was beneficiary to lower sugar and cholesterol.[17] However, *Kadali Phala* is *Madhura*, *Sheeta*, *Guru*, *Snigdha*, *Visthambhi*, *Kaphakrita*. If status of *Agni* is not proper, it may lead to *Abhishyanda* and causes Dyslipidemia.[18] (Table-3)

Milk and milk products - Most of the patients were regular users of milk or milk products in which above 50 % took curd and butter milk daily. 25.48% of patients were taking *Dadhi* in Dinner (*Ratri*) which is contra-indicated.[19] Curd is also *Amla Paki* and *Snigdha-Ushna* which lead to *Vidaha* and *Shonita* and *Medo Dushti*. Dairy fat contains a high concentration of SFA and since dairy products are a considerable part of habitual diets, they have also generally been a target for restriction advice in

order to reduce intake of saturated fat. Intake of saturated fat with chain length C12–C16 and transe fatty acids (*t*FA) increases plasma LDL which is an independent risk factor for CVD. The presence of *t*FA in dairy fat increases the LDL/HDL linearly with dose and theoretically, by lowering the *t*FA intake by 0.5% of energy, this might reduce the cardiovascular risk by 1.5–6%. Palmitic acid is the predominant fatty acid in milk fat and increases the LDL: HDL ratio more than lauric and myristic acids do. It can be calculated how much a change in saturated fatty acids (SFA) intake will affect the LDL cholesterol and the risk of developing CVD.[20](Table-3)

Table 3: Type of diet articles used by 471 surveyed cases of Dyslipidemia

Diet	Categories	No. of patients	% of patients
Staple food	Rice	466	98.94%
	Wheat	468	99.36%
	Bread Products	353	74.95%
	Munga Dala	427	90.66%
	Urada Dala	378	80.25%
	Tuvara Dala	323	68.58%
	Chanaka	79	16.77%
Intake of deep fried food/fermented food/junk food	Fermented food	273	57.96%
	Deep fried food	422	89.60%
	Junk food	178	37.79%
Cooking oils	Cotton Seed	297	63.07%
	Ground Nut	155	32.91%
	Sunflower	19	4.03%
	Vegetable Ghee	76	16.14%
	Go Ghrita	32	6.79%
	Mahisha Ghrita	432	91.72%
Fruits	Banana	415	88.11%
	Apple	131	27.81%
	Chikku	129	27.39%
	Grape	13	2.76%
Non veg items (n=110)	Chicken	99	90%
	Mutton	68	61.82%
	Sea Foods	73	66.36%
	Eggs	98	89.09%
Milk and milk products	Cow milk	28	5.94%
	Buffalo milk	351	74.52%
	Curd-breakfast	133	28.24%
	Curd- lunch	209	44.37%
	Curd-dinner	120	25.48%
	Butter milk-lunch	380	80.68%
	Butter milk-dinner	219	46.50%
	Butter	94	19.96%
	Cheese	37	7.86%
	Ice cream	143	30.36%

	Sweets	208	44.16%

Life styles habits and mental factors

Awareness and diet-life style instruction - 131 (28.42%) patients were having awareness regarding diet-lifestyle intervention for Dyslipidemia but majority of the patients (85.90%) was not following instruction for diet modification and life style changes.

Life style Habits – Life style habits are the prime causative factor for non-communicable diseases like Dyslipidemia. Waking too late in morning (20.81%), oversleeping more than 8-10 hrs (2.76%), late night awaking (10.40%) and change in daily routine (12.74%) were observed in study subjects. All these life style habits can convert into irregular diet pattern, digestion and sleep. Eating and sleep are vital physiological processes that are linked via complicated network of hormonal pathways, and losing the homeostasis of one process exerts deleterious effects on the other during both the short and the long term. The link between over and under-sleeping and glucose dysregulation is a very serious breakthrough in understating of metabolic syndrome pathophysiology like Dyslipidemia, obesity, diabetes mellitus. It is observed that there is significant interaction between sleep, metabolic, endocrinal and the immune system.[21]*Triupastambha* viz., *Ahara*, *Nidra* and *Brahmacharya* which are as important as *Tridosha* helps to regulate homeostasis of individual. Irregular life style leads to disturbance in *Prakrita Dosha Avastha* and causes disease like obesity, diabetes and Dyslipidemia. (Table-4)

Occupation - Out of 252 female patients, 224 patients were house wives by their occupation, shaping the principal category for the current study leaving behind the patients engaged in the other professions. Patients engaged in office related works (15.29%) and business (7.22%) formulate the further two important class in this division. The deskbound living pattern among housewives can endorse the abnormality of pathophysiological factors of Dyslipidemia. Classics consider inactive life style as a risk factor for the development of many illnesses caused by *Kapha* and *Meda*. 12.10% and 2.97% patients were doing of labour work and farming respectively. Research suggests that heat exposure by occupation may disturb lipid profile.[22]

Type of Profession – 35.03% and 51.38% of patients were having sedentary and moderate profession. Research evidenced, higher social classes with highly or moderate sedentary profession and stressful life, Dyslipidemia may have greater CHD risks.[23](Table-4)

Pattern of *Vyayama* – *Avyayama* or irregular *Vyayama* was observed in maximum of patients. 77.50% patients were observed having *Madhyama Vyayama Shakti*. Chronic diseases are major killers in the modern era. Physical inactivity is a primary cause of most chronic diseases and metabolic condition including Dyslipidemia.[24](Table-4)

Mental exertion - *Chintyanam Ati Chintanat* (63.06%), *Krodha* (51.38%), *Bhaya* (22.93%), *Shoka* (26.54%), *Lobha* (4.03%) were found in survey study populance. It is clearly evident that psychiatric disorders are associated

with significantly higher levels of lipids (constituents of lipid profile) and risk factors for coronary heart disease.[25] *Chintyanam Ati Chintanat* is *Hetu* for *Rasavaha Sroto Dushti*. *Bhaya* and *Shoka* is related *Vata*, *Krodha* is related with *Pitta*, *Lobha* is related with *Kapha*. *Matrayukta* and *Pathya Bhojama* can not be digested properly due to *Chinta*, *Shoka*, *Bhaya*, *Krodha*, and *Dukhasayya*.[26] All these varieties of mental exertion hamper *Snehana* in *Sharira* (body). *Snehana* is *PrakritaKarma* of *Medo Dhatu*. Due to *Krodhadi Manasa Bhava*, *Prakrita Snehana* in body alters which ultimately disturbs *Agni* and *Dhatu* status and causes Dyslipidemia. *Kshama*, *Dhriti* and *Alobha* are *Prakrita Karma* of *Kapha*[27] as well as *Mamsa Dhatu Sarata Lakshana*.[28] Due to Dyslipidemia, *Prakrita* function of *Kapha* and *Sarata* of *Dhatu* gets disturbed and this may ultimately lead to *Bhaya*, *Shoka*, *Krodha*, and *Lobha* which are interlinked. (Table-4)

Holems Rahe Stress Scale – 74.73%, 22.29% and 2.97% of patients were having slight risk, moderate risk and risk of illness respectively according to Holems and rahe stress scale[29] in present study. Previous studies suggest that stress can be a cause for increased cholesterol and manipulate lipid profile.[30,31](Table-4)

Table 4: Life style habits and mental factors involved in 471 surveyed cases of Dyslipidemia

Life style findings	Categories	No. of patients	% of patients
Awareness regarding Diet-life-style intervention for Dyslipidemia	Yes	131	28.42%
	No	340	73.75%
Instruction for diet-life style modification	Following	75	16.27%
	Not-following	396	85.90%
Life style habits	Waking too late after 6 am in morning	98	20.81%
	Oversleeping more than 8-10 hrs	13	2.76%
	Late night and late awakening	49	10.40%
	Shift duties and changes in sleep or daily routine	60	12.74%
Occupation	House wife	224	47.56%
	Bussiness	34	7.22%
	Labour work	57	12.10%
	Retired	26	5.52%
	Docter	11	2.34%
	Student	08	1.70%
	Teacher	25	5.31%
	Farmer	14	2.97%
	Service	72	15.29%
	Sedentary	165	35.03%

Type of Profession	Moderate	242	51.38%
	Heavy	64	13.59%
Pattern of *Vyayama*	No	347	73.67%
	Regularly	05	1.06%
	Irregularly	119	25.27%
Vyayama Shakti	*Pravara*	01	0.21%
	Madhyama	365	77.50%
	Avara	105	22.29%
Mental factors	*ChintyanamAtiChintanat*	297	63.06%
	Bhaya	108	22.93%
	Shoka	125	26.54%
	Krodha	242	51.38%
	Lobha	19	4.03%
Holems Rahe scale	0-149	352	74.73%
	150-299	105	22.29%
	>299	14	2.97%

Beverages - The habit of frequent and continuous intake of drinks like tea, coffee or cold drinks are not beneficial for health and will certainly hamper the normal state of *Agni*. The most common effect of alcohol on plasma lipid levels is to increase plasma triglyceride.

Addictions - Habit of tobacco chewing, tobacco-smoking and alcohol were noticed in about 21.87%, 9.13% and 6.37% people respectively in study subjects. Smoking leads to increase in triglyceride levels and reduction in HDL cholesterol by increasing sympathetic activity. Smoking causes higher fasting plasma cortisol concentrations, resulting in an increase in visceral adipose tissue. Studies assessing the impact of smokeless tobacco use on lipid profile have come up with contradictory findings. While higher blood cholesterol, higher triglyceride and lower high-density lipoprotein levels have been reported in some studies, others have failed to find such associations.[32]Alcohol consumptions may be a risk factor for Dyslipidemia patients. Chronic alcohol abuse primarily affects almost every organ system resulting in serious illness such as neurological problems, liver disease, impaired heart function, and inflammation of the pancreas. Moreover, alcohol induces severe hypertriglyceridemia alone or in combination with other defects such as a genetic disturbance in lipid metabolism.[33] The qualities of *Madya* are quite contradictory to *Ojas* and for the same reason habitual usage leads to diminution in *Dhatu* level. (Table-5)

Pattern of *Nidra* - *Ahara*, *Nidra* and *Brahmacharya*, three pillar of life, are directly related with *Pitta*, *Kapha* and *Vata* respectively. *Asamyaka Nidra* was observed in 41.40% of study while *Khandita Nidra* was reported in 180 (38.22%) patients. It may be due to *Vidagdha Avastha* of *Rasadhatu* in *Rasavaha Srotasa* and *Sama Medo Dhatu* which leads to *Khandita Nidra* in Dyslipidemia subjects. (Table-5)

Day-sleep – 73.04% of patients were having habit of Day sleep. *Diwaswapna* is *Snigdha* by nature and it is also contraindicated in *Kapha* and *Meda Vyadhi* like Dyslipidemia.[34] (Table-5)

Type of *Koshtha* and Bowel movement – 93.63% of patients were observed to have *Madhyama Koshtha* which is *Kaphotkarsha* by nature and causes *Vibandha*. Irregular bowel movement and constipation was found in 75.37% and 73.67 % patients respectively. Function of *Purisha* is *Vayu* and *Agni Dharana* i.e. *Avasthambha*. *Guru, Snigdha, Abhishyandi Ahara* (*Prithvi* and *Apa Mahabhuta Pradhanya*) leads *Agni* and *Vayu Dushti* ultimately hampers *Purisha* and causes *Mala Vibandha*.This finding also support that proper digestion followed by timely excretion of *Mala* is very important in maintaining *Agni* and thus digestion and metabolism. (Table-5)

***Mutra Pravritti* -** *Asamyaka Mutra* was found in 36.52% patients. The main function of *Mutra* is *Kledavahanam* i.e., to drive out the excess *Kleda* from the body. The abnormal accumulation of *Kapha* and *Meda* is nothing but the *Kledavriddhi*. Excessive *Kleda* in *Basti* lead to *Mutravaha Srotasa Dushti* and complaints like *Avila Mutra*, *Sadaha Mutra*, and *Vaivarnya* etc. (Table-5)

Nature of menstrual periods, Age of menopause, and *Prasava Vrittanta* - The year of attaining first menstruation was between 10-15 yrs in patients. 28.57% female patients were having irregular menstruation. *Artava* is considered as the *Upadhatu* of *Rasa*. Major parts of study populace were suffering with *Medodushti*. Both *Rasa* and *Rasavaha Srotasa* are involved in the pathogenesis of *Medodushti*. So the affliction of *Artava* in pathogenesis of *Medodushti* is also common in such patients. 40.08% female patients gave history of miscarriage. Low level of estrogen or inflammation may be cause for miscarriage many times. Both are close to lipid metabolism. More than half of female patients (51.19%) have attained menopause in present survey. Estrogen plays an important role in women's reproductive life but also influence lipid metabolism in a significant way. As the age advances the level of estrogen deceases and significantly decreases after menopause, this causes increase in the total cholesterol, LDL-C, but decrease in HDL-C. The risk of CVD increases exponentially for women as they enter menopause and estrogen levels decline.[35] (Table-5)

Type 5: Personal history related with life style habits as reported in 471 surveyed cases of Dyslipidemia

Life style findings	Categories	No. of patients	% of patients
Beverages	Tea	465	98.73%
	Coffee	34	7.22%
	Cold drinks	206	43.74%
Habits	Tobaco chewing	103	21.87%
	Tobaco smoking	43	9.13%
	Alcohol	30	6.37%
Pattern of *Nidra*	*Samyaka*	276	58.60%
	Asamyaka	195	41.40%
	Alpa	100	21.23%
	Prabhuta	13	2.76%

	Khandita	180	38.22%
Day sleep	Yes	344	73.04%
	No	127	26.96%
Koshtha	*Mridu*	03	0.64%
	Madhyama	441	93.63%
	Krura	27	5.73%
Tendency towards bowel movement	Regular	116	24.63%
	Irregular	355	75.37
	Constipation	347	73.67%
	Piles	45	9.55%
	Fissure	33	7.01%
Mutra Pravritti	*Samyaka*	291	61.78%
	Asamyaka	172	36.52%
	Krichhra	76	16.14%
	Vaivarnya	122	25.90%
	Daha	145	30.79%
	Prabhuta	31	6.58%
	Avila	22	4.67%
Age of menarche	Between 10-12 yrs	41	16.27%
	Between 13-15 yrs	211	83.73%
Age of Menopause	Before 35 yrs	02	0.79%
	Between 35-45 yrs	20	7.94%
	Between 46-55 yrs	107	42.46%
	Not yet attained	122	48.41%
Nature of menses	Regular	51	20.24%
	Irregular	72	28.57%
	Painful	51	20.24%
	Painless	60	23.81%
	Heavy	12	4.76%
	Scanty	44	17.46%
	Moderate	61	24.21%
Prasava Vrittanta	History of Abortion	26	10.32%
	History of miscarriage	101	40.08%
	Infertility	08	3.17%
	Hystectomy	16	6.35%

CONCLUSION

- *Meda Dhatu* is directly related with *Swasthya Avastha*. *Gramya Ahara* and *Vihara* leads to *Rakta Dhatu Vidaha* and *Meda Dhatu Vishyandata* causing *Dhatushaithilya*. After *Margavarana* and involvement of *Marma*, it ends with *Dhatupaka Avastha* and *Trimarmiya Vyadhi* of *Shira*, *Hridaya* and *Basti*. Dyslipidemia is connecting cause between *Swasthya Avastha*, *Dhatu Shaithilya* and *Dhatu Paka Avastha*.
- HDL is a powerful lipid predictor of cardiovascular disease. As per *Ayurveda*, HDL can be considered as *Shariradhatu Samanya*, *Anabhishyandi* and *Brihmana Sharira Bhava*. In the present survey study, low

HDL was found as the most common lipid abnormality which suggests *Dhatu Shaithilya*. This finding of present survey study suggests poor status of *Agni* due to faulty diet and life style prevailing in the society and warning towards alarming rise in metabolic disorders. Findings of present study also reveal that poor status of *Agni* is the major risk factor for Dyslipidemia especially when this condition is associated with heavy diet. Moreover, poor life style like not maintaining daily routine, in practice of breakfast without answering natural calls, remaining constipated for long, habitual to day sleep or waking up late in the morning can be considered as contributory factor of Dyslipidemia.

- From present survey study, it can be suggested that awareness of avoiding of *Gramya Ahara* and *Vihara* (faulty diet and life style) from early childhood is essential for prevention of non-communicable diseases. Screening of cholesterol is Gold effect for cardiovascular disease prevention and hence screening procedures should be adopted in routine medical checkup of citizens of India after the age of 30 years.

REFERENCES

1. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Sutra Sthana* 27/342, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.173.
2. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Sutra Sthana* 28/45, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.181.
3. Agnivesha, Charaka, Dridhabala,*Charaka Samhita, Chikitsa Sthana* 15/3, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.512.
4. http://www.ncbi.nlm.nih.gov/pubmed/25418583 assessed on 01-06-2015.
5. Jeffrey S. Flier /Eleftheria Maratos-Flier.Obesity. In Kasper, Braunwald, Fauci et al Harrison's Principles of Internal medicine, 16th edition, McGraw-Hill Medical publishing division; New York, 2005; p.422.
6. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Sutra Sthana* 26/84, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.150.
7. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Chikitsa Sthana* 15/241-243, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.525-526.
8. http://www.westbriton.co.uk/Does-Eating-Late-Night-Upset-Digestive-IBS/story-17994801-detail/story.html, assessed on 03.10.2015.
9. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Vimana Sthana* 5/12, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.251.
10. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Sutra Sthana* 26/42-1, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.244.

11. Agnivesha, Charaka, Dridhabala, *Charaka Samhita*, *Sutra Sthana* 17/78, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.103.
12. M.Indira, P.A.Kurup. Black gram (*Vigna mungo*) – A hypolipidemic pulse. Natural product radiance september-october 2003; 2 (5): 240-242.
13. Bhavamishra, *Bhavaprakash Nighantu*, *Dhanya Varga-Masha*-42-44, edited by Pandit ramteja pandey, 3rd edition, Chaukhambha Surbharati Prakashana; Varanasi, 2003; p.247.
14. Mukund Sabnis. *Viruddha Ahara*: A critical view. Ayu 2012 Jul-Sep; 33 (3): 332–336.
15. K. Sarat Chandra et al. Consensus statement on management of dyslipidemia in Indian subjects. Indian Heart J. Dec 2014; 66 (3): S1–S51.
16. http://www.livestrong.com/article/254976-the-glycemic-index-of-bananas/ assessed on 03.10.2015.
17. Ratchada cressery et al. Daily consumption of Banana marginally improves blood glucose and lipid profile in hypercholesterolemic subjects and increases serum adiponectine in type-2 diabetic patients. Indian Journal of experimental biology December 2014; 52: 1173-1181.
18. Bapalal Vaidya, *Nighantu Adarsha* (*Utarardha*), *Kadal Phala*, reprint, Chaukhambha bharati akadami; Varanasi, 2009; p.588.
19. Agnivesha, Charaka, Dridhabala, *Charaka Samhita*, *Sutra Sthana* 7/61, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p.54.
20. Lena Ohlsson. Dairy products and plasma cholesterol levels. Food Nutr Res 2010; 54.
21. Laila AlDabal and Ahmed S Ba-Hammam. Metabolic, Endocrine, and Immune Consequences of Sleep Deprivation. Open Respir Med J 2011; 5: 31–43.
22. Katia Vangelova, Christo Deyanov, Michaela lvanova. Dyslipidemia in industrial workers in hot environments. Cent Eur J Publ Health 2006; 14 (1): 15–17.
23. Trushna Shah, Geetanjali purohit, R M Shah, J M Harsoda. Prevalence of Coronary Heart Disease in different socioeconomic status: Is Dyslipidemia a future threat. International Journal of Biomedical and Advance Research 2015; 6 (2): 120-123.
24. Frank W. Booth, Christian K. Roberts, and Matthew J. Laye. Lack of exercise is a major cause of chronic diseases. Compr Physiol Apr 2012; 2 (2): 1143–1211.
25. Amita Gupta, S B Petkar, A.A. Jadhav, Vaibhav Dubey. Study of Lipid Derangement in Pyschiatric Disorder. Indian Medical Gazette July 2013; 253-256.
26. Agnivesha, Charaka, Dridhabala, *Charaka Samhita*, *Vimana Sthana* 2/9, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p. 238.
27. Agnivesha, Charaka, Dridhabala, *Charaka Samhita*, *Sutra Sthana* 18/51, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p. 109.
28. Agnivesha, Charaka, Dridhabala, *Charaka Samhita*, *Vimana Sthana* 8/105, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p. 278.

29. http://www.stress.org/holmes-rahe-stress-inventory/ assessed on 03-10-2015.
30. http://www.ncbi.nlm.nih.gov/pmc/articles/PMD3347824/ assessed on 03-10-2015.
31. http://www.medpagetoday.com/cardiology/Dyslipidemia/2204 assessed on 03-10-2015.
32. Yatan Pal Singh Balhara. Tobacco and metabolic syndrome. Indian J Endocrinol Metab Jan-Feb 2012; 16 (1): 81–87.
33. http://link.springer.com/chapter/10.1007/978-1-62703-047-2_26 accessed on 03.10.2015.
34. Agnivesha, Charaka, Dridhabala, *Charaka Samhita, Sutra Sthana* 21/44-50, edited by Vaidya Jadavaji Trikamji Acharya, reprint edition, Chaukhambha Surbharati Prakashana, Varanasi, 2009; p. 118-119.
35. Deepti G.I, Sukanya Shetty, Ashalata Rao, Sarfraz Ahmad. Age related difference in the lipid profile in normal healthy women. NUJHS June 2014; 4 (2): 94-97.

CORRESPONDING AUTHOR

Dr. Shivam Joshi

Department of Kayachikitsa,
IPGT&RA, Jamanagar, Gujarat, India
Email: ayuholistichealth@gmail.com

Source of support: Nil
Conflict of interest: None Declared