



VALIDATION OF YOGA CAPSULE ON HYPERLIPIDEMIA

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ABSTRACT

Background: -Prelude with the statement of health, is a state in which one is sound with physical, mental, social, and spiritual and absence any of above will be taken as unhealthy. There are a lot of factors which hamper the condition of health. Furthermore, hyperlipidemia is one of the conditions which leads one for disease and unhealthy. When Lipids increases in the blood or high level of fat is dissolved and flow through blood in circulatory system and this deposit in blood vessel's inner layer which creates blockages and hinder the smooth blood flow. Which is the risk factor for cardiovascular system, heart failure and high blood pressure. Hyperlipidemia also hamper the overall quality of life. Moreover, Yoga nowadays is being used as alternative medicine for the healthy lifestyle. The present study was conducted to validate and determine the effect of yogic practices on hyperlipidemia. **Methods:** -According to the inclusion and exclusion criteria forty-eight pre-adult (18-24) & Adult (25-30) were selected for the study with the age range of 18 to 30 years (mean =26), selected biochemical dependent variables such as Total cholesterol (TC), Triglyceride (TG), High-density Lipoprotein (HDL), Non-High-density Lipoprotein (NHDL) and Low-density Lipoprotein (LDL) were measured Before and after intervention for each participant. Yoga capsules were intervened for 30 days. The pretest and posttest data were taken, saved, and tabulated to assess the efficacy of Yogic interventions. The simple random sampling technique was opted as selection procedure as per elimination standard (10%). **Results:** -After a four weeks Yoga intervention the Yoga capsule (Selected yogic practice) on day 30th posttest data were taken and assessed. The mean TC was 162.44 and 149.00 before and after the intervention respectively (P=2.495). The mean TG was 82.83 and 88.96 before and after the intervention respectively (P=0.074). The mean HDL was 48.37 and 43.57 before and after the intervention respectively (P=0.000859). The mean NHDL was 114.09 and 105.16 before and after the intervention respectively (P=2.5). The mean LDL was 97.52 and 84.51 before and after the intervention respectively (P=1.39). **Conclusion:** -So, based on obtained results and evidence, it can be clearly seen that there was a significant change in the term of Total cholesterol, triglyceride, HDL, NHDL, LDL. We can say that the selective yogic practices significantly effect the TC, TG, HDL, NHDL, LDL.

KEYWORDS : Yoga, Yog capsule, Hyperlipidemia, Cholesterol, Triglycerides, HDL, NHDL LDL

INTRODUCTION

Embark upon the term hyperlipidemia, it referred as imbalance of fat in blood specifically elevated levels of fatty substance in blood serum. Fat breaks down in total cholesterol, triglycerides, low- and high-density lipoprotein. When LDL increases and HDL decrease this become the cause of hyperlipidemia. In other words, abnormal elevation in the level of lipids is known as hyperlipidemia. Though, aim of the allopathy and modern science is to retain and enhance the human health so yog do. Yog is the holistic health approach which is cost effective and there are no such side effects as allopathy have, yet it is suggested that proper knowledge and study of yogic concepts should take into consideration. Conceptual clarification for Yog capsule is yogic practices which are being taken as health capsule as medicine used in allopathy. Furthermore, hyperlipidemia is a condition which causes by imbalance of Agni and increase of Kapha and Meda Dhatu according to the ayurveda. In addition, hypothyroidism, obesity and not to eat nutritious food become the causes for hyperlipidemia. one is more tend to be sick with hyperlipidemia if having sedentary lifestyle. Researcher has found significant effects of yogic practices on hyperlipidemia. As per the Srimadabagvadgita⁽¹¹⁾ condition of hyperlipidemia comes in human life when there is no Yuktahar (Diet) and Vihar (Lifestyle). The inactive lifestyle become the main cause for the condition of hyperlipidemia. What is more, Rasaratna Samuchchayah of Acharyah Shree Vagbhat⁽³⁴⁾ explains about the condition of Amlapitaa which affect the property of blood and imbalance the ph level of blood from slightly alkaline to acidic, due to this change lipid profile also gets imbalance. This causes the heart disease and inflammatory condition occurred in heart. In addition, Food and nutrition⁽³⁵⁾ by Dr. Anita singh discussed about a term called Atherosclerosis, in this condition inner layer of arteries which known as Intima gets hard. The hard condition of this layer cause coagulation of fatty substance into the arteries,

this one also responsible for the hyperlipidemia. Nowadays, this problem is booming in society, more and more people are getting affected with the condition of hyperlipidemia. Quality of life and general health also decrease if a person is suffering from hyperlipidemia, also financial crises occurred in the life of sufferer as he has to spend a lot for the cure of the disease. In this scenario yogic practices can be seen as good solution for cure or prevention for hyperlipidemia.

METHODOLOGY:-

Variables:-

Independent variables:-

There are some SYP which have been taken for study as independent variables and the name of those practices are Sutra Neti, Jal Neti, Kapalbhathi, Yogic Suksam Vyayam (Specific), Surya namaskar.

Dependent variables:-

Lipid profile has been taken as dependent variables for the research study, from lipid profile there are some specific dependent variables have been considered in this research study which are as follows:

1. Total cholesterol (TC)
2. Triglyceride (TG)
3. High Density Lipoprotein (HDL)
4. Non-High Density Lipoprotein (NHDL)
5. Low Density Lipoprotein (LDL)

Duration of Intervention:-

Yoga capsule has been given to the subjects for a period of 30 days and for 60 min./day excluding Sunday's.

Research Design:-

Paired Group Pretest-Posttest research design has been opted for the study. Perhaps this study is an invasive study so, the ethical clearance has been taken from the competent

authority of the university. On 0th day pretest data was taken and SYP intervention has been started on the day one, which consist of selective cleansing practices, Micro Yogic exercise (shuksma vyayam by Dhirendra Brahmachari Ji) and Sun Salutation (Suryanamskar). These practices intervened for a period of 30 day and 60 minutes for each day. On 30th day, the posttest data was taken and Tabulated. Paired sample T-test has been applied to analyze the data and get the result to validate the Yoga capsule.

METHODS:-

Forty-eight adult subjects age ranging between 18 to 30 years (mean =23) have been selected through Purposive sampling technique, the informed consents have been circulated to the subjects via google forms. On the 0th day of intervention their pretest sample data was taken and sent for the assessment to the bio-chemical lab as the lab tests results came the data were saved and tabulated for further assessment.

The intervention was scheduled for a period of 30 days have been given to the subjects as mentioned in the intervention schedule.

After the intervention posttest sample data were collected and sent for the evaluation through the same lab where the pretest data were assessed. N=48 have been taken for the study Moreover, independent variable has been intervened from 10th march till 12th April 2022 this specific month has been opted because as per the Hatha Yogic texts Spring (Basant Ritu) could be the best time to start the Yogic practice. The average temperature in the northern part of India at the time of study was 37^o C and these practices were intervened Monday to Saturday from 9 am to 10 am.

Sampling:-

The subjects for the study were 48 adults (Both male and female) from the different demographical locations as per the inclusion and exclusion criteria. The collection of blood sample was taken after over-night fasting of the participants. Analysis of these blood sample was done in a reputed pathology lab by a certified pathologist. Participants were asked to sit comfortably on a chair. About 5 ml fasting blood was collected from the right arm and stored in a vacutainer. Blood samples were collected by a pathologist from the Fine Path Lab, Delhi. Laboratory tests were done in Fine Path Lab. The report details of total cholesterol, triglyceride, HDL, NHDL, LDL were taken for the study.

Inclusion and exclusion criteria:-

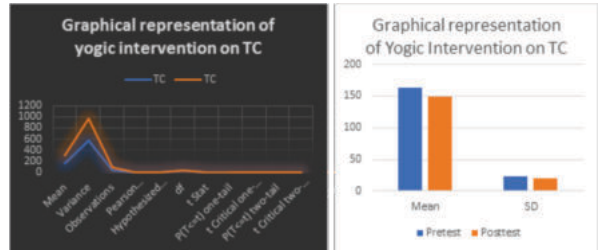
1. Adults form the age range between 18 to 30 years were taken.
2. With the different demographical locations i.e. urban, semi urban and rural had been taken for the study.
3. Those who were suffering from any chronic disease, smokers, alcoholic have been excluded.
4. Diagnosed cardiac disease and hypertension as well as under medications for chronic disease have been excluded from the study.

Intervention's schedule:-

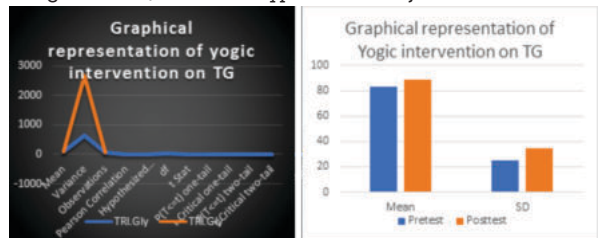
Sr. No.	Name of Independent variable	Time	Rest Time	Total Round	Total Time
1.	Kunjjal	5 Min.	1 Min.	1	6 Min.
2.	Sutra Neti	5 Min.	1 Min.	1	6 Min.
3.	Jal Neti	5 Min.	1 Min.	1	6 Min.
4.	Uccharan Sthal तथा vishuddhi chakra shudhi kriya	1 Min.	30 Sec.	3	4.5 Min.
5.	Medha Shakti Vikashak Kriya	1 Min.	30 Sec.	3	4.5 Min.
6.	Skand तथा Bahumool shakti vikashak kriya	1 Min.	30 Sec.	3	4.5 Min.

7.	Purna Bhujha Shakti Vikashak Kriya	1 Min.	30 Sec.	3	4.5 Min.
8.	Vaksha Sthal Shakti Vikashak kriya part 1	1 Min.	30 Sec.	3	4.5 Min.
9.	Vaksha sthal shakti vikashak kriya part 2	1 Min.	30 Sec.	3	4.5 Min.
10.	Surya Namaskar	4 Min	1	3	15 Min.
Total Time					60 Min.

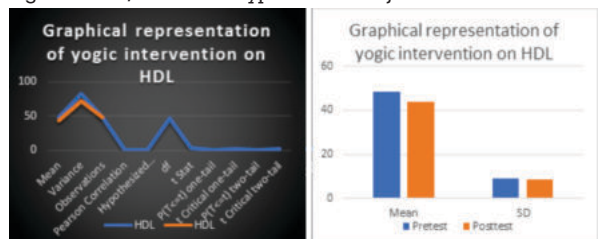
RESULT:-



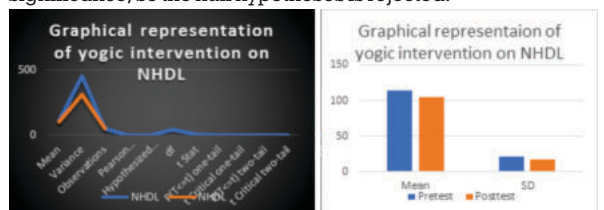
After the intervention of the Yoga capsule (Selected yogic practice) on day 30th posttest data was taken and assessed. The pretest and posttest mean for TC is 162.44 and 149.00 respectively, the mean difference is 13.43958, the assessed correlation is 0.804, obtained t value is 6.482. The P value for df=47 is P=2.390 is significant at 0.01 level of confidence. The obtained t value is greater than tabulated p value at 0.01 level of significance, so the null hypotheses is rejected.



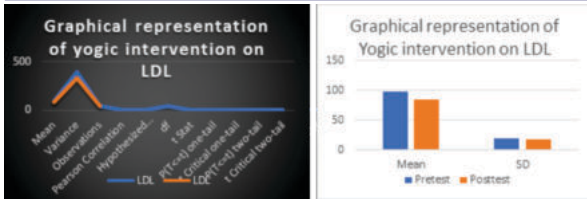
The pretest and posttest mean for TG is 82.83 and 88.96 respectively, the mean difference is -6.12292, the assessed correlation is 0.566, obtained t value is 1.470. The P value for df=47 is P=1.296 at 0.1 level of significance. The obtained t value is greater than tabulated p value at 0.1 level of significance, so the null hypotheses is rejected.



The pretest and posttest mean for HDL is 48.37 and 43.57 respectively, the mean difference is 4.806667, the assessed correlation is 0.352, obtained t value is 3.325. The P value for df=47 is P=2.390 at 0.01 level of significance. The obtained t value is greater than tabulated p value at 0.01 level of significance, so the null hypotheses is rejected.



The pretest and posttest mean for NHDL is 114.09 and 105.16 respectively, the mean difference is 8.93292, the assessed correlation is 0.763, obtained t value is 4.465. The P value for df=47 is P=2.390 at 0.01 level of significance. The obtained t value is greater than tabulated p value at 0.01 level of significance, so the null hypotheses is rejected.



The pretest and posttest mean for LDL is 97.52 and 84.51 respectively, the mean difference is 13.01458, the assessed correlation is 0.610, obtained t value is 5.323. The P value for $df=47$ is $P=2.390$ at 0.01 level of significance. The obtained t value is greater than tabulated p value at 0.01 level of significance, so the null hypotheses is rejected.

DATA ANALYSIS & DISCUSSION:-

For the assessment of pretest and posttest data analysis paired sample t-test was done with the help of SPSS software. Furthermore, there were some research studies done earlier on yoga and lipid profile and showed similar significant results. As per the Gheranda Samhita⁽¹²⁾ if one does Bhastrika kumbhaka (Pranayama in general) there will be no disease and health will increase day by day and the sudarshan kriya also involve Bhastrika breathing in this reference there was a study done by Mungal Shreechakradhar U. et. al.⁽¹¹⁾ and has found significant improvement in hyperlipidemia through the practice of sudarshan kriya. Moreover, in the text Ayurveda and yoga therapy⁽¹³⁾ the use of arjuna, guggulu, pippali and some herbs play vital role to cure circulatory disorders in addition with Shavasana and udhriya swashan (abdominal breathing). Furthermore, in the commentary of Gheranda Samhita⁽¹⁴⁾ and the Hathayogapridipika⁽¹⁵⁾ practice of Mrtasana (shavasana, the corpse posture) is significant to destroys fatigue and quiets the agitation of the mind. Hathayogapridipika⁽¹⁶⁾ describe the efficacy of Nadi Shodhana (Anuloma Viloma is basic part of Nadi Sodhana) it increase the digestive fire and the practice also opens the blockages of Nadis (Arteries, Veins, capillaries and nerves etc.). Gheranda Samhita⁽¹⁷⁾ also explain that the practice of Nadi Sodhana removes the blockage from the Nadis. furthermore, Shiva Samhita⁽¹⁸⁾ states that all sort of morbidities will be removed with the practice of Nadi Sodhana, to know the efficacy Karunaratne HKBMS and Perera KC⁽²⁾ did a research study and found moderately effect of Shavasana and Anuloma Viloma combined with Musta Powder on hyperlipidemia patients at swasthavritta clinic at Ayurveda Teaching Hospital, Borella Sri Lanka; similarly Rashmi Vyas, Kanti V. Raval and Nirupama Dikshit⁽³⁾ has found the significant effects of Raja Yoga meditation on the lipid profile of post-menopausal women, on (N=49) subjects serum cholesterol and LDL were significantly lower after intervene the independent variables. According to Gheranda Samhita⁽¹⁹⁾ Bhastrika Pranayama improve the blood circulation, increase the metabolic rate and remove all three dosha (Vata, Pitta and Kafa), it also increases the mental peace. Hathayogapradipika⁽²⁰⁾ Bhastrika balances the tri dosha (Vata, Pitta and Kafa) and increase the digestive fire, Jadhav RH⁽⁴⁾ has made a single arm clinical study to check the efficacy of Bhastrika Pranayama in medhovidhi which he correlate with the hyperlipidemia, for the study he randomly selected 20 patients of hyperlipidemia, researcher intervened the independent variable (Bhastrika Pranayama which is known as Kumbhaka as per hathayogapradipika) for 60 days (15 days training phase and 45 days to perform at home). After analysis of data result showed mild decrease in Cholesterol, triglycerides, LDL and increase in HDL which is known as symbol of good health. Accordingly Hatharatnavali⁽²¹⁾ describes about the efficacy of Kapalabastrika (also known as Kapalabhati) on phlegmatic and bilious disorders. Furthermore, Hathayogapradipika⁽²²⁾ elaborate about the benefits of Asanas that the practice of asanas makes one healthy, calm and relaxed, when a person will be calm, relaxed and free from phlegmatic and bilious disorders there

will no imbalance of lipids. To validate these references BK Acharya, AK Upadhyay, Ruchita T Upadhyay¹ and A Kumar⁽²⁵⁾ did a study on football player of Mohun Bagan Athletic club, 20 male subjects with the average age 15 years (14.65 ± 0.58) were selected for the study with no evidence of smoking and alcohol consumption. Furthermore, subjects were selected with no prior yogic experience. Pranayama (Voluntary regulated breathing) and Yogasana (Yoga posture) intervened as independent variable to know the efficacy on lipid profile. Significant reduction observed in the level of serum cholesterol, Low-density lipoprotein (LDL) cholesterol, serum triglycerides, and very-low-density lipoprotein (VLDL) cholesterol at the end of the yoga session.

Gheranda Samhita⁽²³⁾ explain about the benefits of postures (asanas) it creates stability and strength which increase the immunity. The practice of asanas works upon the psychosomatic conditions as well which helps for the better health. Secondly, breathing practice (Pranayama) decrease the obesity according to the Gheranda Samhita. Furthermore, meditation (Dhyana) is the process for self-realization or to know own self, this is the psychological process which works as cognitive behavioral therapy and helps to change the beliefs, to sum up, all above practices collectively improve the overall health including lipid profiles, for validation of these facts Azami M, Hafezi Ahmadi MR, YektaKooshali MH, Qavam S⁽⁶⁾ did a study in Ilam university of medical sciences Iran to know the efficacy of Hatha Yogic practices (postures, breathing techniques, meditation which know as Asana, Pranayama & Dhyana according to Hatha Yogic Texts). Researchers intervened Hatha Yogic practice as independent variable for 26 weeks, 3 times a week on dependent variables which were total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), triglyceride (TG), and C-reactive protein (CRP). 60 non-pregnant female subjects were taken for the study after assessing the inclusion and exclusion criteria and 26 week follow up only 24 subjects had necessary criteria to be included for the study. After analysis of data with help of SPSS ver. 16, results showed that yoga reduced TC and LDL-C significantly but had no significant effect on TG, HDL-C and CRP. Gheranda Samhita⁽²⁴⁾ explain about the benefits of postures (asanas) it creates stability and strength which increase the immunity. The practice of asanas works upon the psycho-somatic conditions as well which helps for the better health. Secondly, breathing practice (Pranayama) decrease the obesity.

Moreover, Hatharatnavali⁽²⁵⁾ narrated about the practice of asanas alleviates the diseases and contributes to stability, health and efficient body, to substantiate the above narrations Jayaram Gadham, Srikanth Sajja, V. Rooha⁽⁷⁾ did a study to know the effect of some pranayama and asanas for 1 hour (30 minutes pranayama and 30 minutes asanas but name of the yogic interventions was not cleared) on obesity, hypertension and lipid profile. 50 male subjects age group 30 to 55 years were randomly selected based on inclusion and exclusion criteria and pretest-posttest method was adopted for the study. Yogic interventions were intervened for 3 months and result found significant decrease in total cholesterol, VLDL and triglycerides and increase in HDL. Diabetes Yoga Protocol (By ministry of AYUSH, India) is a combination of various yogic practices from different yogic texts. For instance, Hathayogapradipika⁽²⁶⁾ elaborate about the efficacy of Paschimatanasan and Matsyendrasana, both the practices enhance the gastric fire, reduces the belly fat and helpful like a weapon against hosts of severe diseases. Moreover, Gheranda Samhita⁽²⁷⁾ narrate about the Paschimatanasan and Matsyendrasana, these two does welfare human and can be used as a therapy for diabetes and lipid profile. Furthermore, Hatharatnavali⁽²⁸⁾ outline the facts about Paschimatanasan and Matsyendrasana, both the practices increase the gastric fire, decrease the belly fat and works like

a cannon against hosts of severe diseases, Raghuram Nagarathna, et. al. ⁽⁸⁾ did a stratified trial to know the efficacy of Yoga based life-style program with type 2 diabetes on rural and urban population from all India Zone N=17,012 (Adults>20 years male and female both). Lipid profile and sugar level were screened for the study. Diabetes yoga protocol (DYP) designed by the Delphi technique and intervened for 3 months after 9 days teaching camp. Results concluded that evidence proves the significance of DYP on cholesterol, TG, LDL and VLDL. Gheranda Samhita ⁽²⁹⁾ if one does Bhastrika kumbhaka (Pranayama in general) there will be no disease and health increase day by day. Secondly, Hathayogpradipika ⁽³¹⁾ elaborate about the benefits of Asanas that the practice of asanas makes one healthy, calm and relaxed, when a person will be calm, relaxed and free from phlegmatic and bilious disorders there will no imbalance of lipids in this reference there was a study done by Prasad KVV et. al. ⁽⁹⁾ did a study to evaluate the impact of Pranayama and yoga asanas (selected) on Lipid profile of normal healthy volunteers. 41 male and 23 female subjects aged between 18 to 30 years were selected for the study with inclusion and exclusion criteria. Simple paired t-test and ANOVA used as statistical tools. Result found significance of yogic intervention on lipid profile. Sudarshan Kriya Yoga (SKY) consist of some breathing practice and meditation like as Ujjayi and Bhastrika kumbhaka (Pranayama). As per the Hatharatnavali ⁽³²⁾ Ujjayi Kumbhaka cures the phlegmatic disorders of throat, increase the bodily fire, removes the morbidities of the network of the nadis, stomach and bodily constituents (dhatus). In the regard of Bhastrika Hathayogpradipika ⁽³³⁾ states it balances the tri dosha (Vata, Pitta and Kafa) and increase the digestive fire. To validate these facts, Anjum Sayyed et. al. ⁽¹⁰⁾ were intended to study the efficacy of Sudarshan Kriya Yoga (SKY) on Lipid Profile, Pulmonary Function and Hemoglobin concentration. 55 subjects aged 18 to 50 years (male and female both) were selected for the study after inclusion and exclusion criteria. Intervened SKY for a week and assessed the data (pretest and posttest methods applied). Result showed TC (P<0.05) and LDL-C (P<0.001) was significantly decreased, whereas HDL-C (P< 0.001) was significantly increased after SKY training when compared to before SKY training.

Based on above-mentioned pieces of evidence, the researcher prepared a group of practices. To prepare a more authentic and valid capsule to control the high level of lipid profile. The result has recorded a significant decrease in the level of TC, HDL, NHDL, LDL. While a significant increase has been observed in TG.

CONCLUSION:-

The result showed that Yoga capsule reduced TC very significantly, HDL significantly, NHDL and LDL very significantly and significant increase observed in TG. The study concluded that Yoga capsule is helpful to balance the lipid profile. This capsule may recommend keeping the cardiac system healthy for long time and is useful for cardiovascular system as well as for healthy and long life.

Consent And Ethical Clearance:-

Informed consents have been taken from the participants through google form and permission taken from the departmental ethical committee of Yoga department of Shri Lal Bahadur Shastri National Sanskrit University, Delhi to conduct the research work on human subjects.

Limitation:-

Diet and lifestyle also influence the condition of hyperlipidemia which could be considered as the limitation for the study. Eating habit and lifestyle of the participants was not in control. This might influence the result of the study positively in the replica study. This study was restricted to only one city of north central part of India. This study was also

restricted to adults only. Data size was limited to 48 subjects.

Suggestions:-

The age of the human subjects can be different to evaluate the efficacy of selective yogic package, also the diet or weather may affect the result of the SYP.

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Conflicts Of Interest:-

There is no conflict of interest.

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