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EFFECTS OF ESCITALOPRAM IN COMBINATION WITH VITAMIN C, VITAMIN E AND LEVOSULPRIDE IN THE MANAGEMENT OF DYSLIPIDEMIA IN PATIENTS WITH DEPRESSION.

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ABSTRACT

BACKGROUND: The purpose of this study is to provide light on the possible effects of antidepressants, especially Escitalopram, on the lipid profiles of persons suffering from depression, both as a solo treatment and in conjunction with adjuvant medicines such as Vitamin C, Vitamin E, and levosulpiride. **METHODOLOGY:** Study consist of four groups Escitalopram alone (Group A), Escitalopram + Vitamin C, Vitamin C + Vitamin E and Vitamin C+ levosulpride given to patients with dyslipidemia and depression. The findings were analyzed on lipid profile levels after two months of intervention **RESULTS:** In comparison to control group the levels of lipid profile including total cholesterol levels, LDL levels, Triglyceride levels, and Very low density lipoprotein levels were significantly reduced ($p<0.05$) in the treatment group whereas levels of High density lipoprotein were found to be significantly increase ($p<0.05$) in the treatment group in comparing to control group **CONCLUSION:** This study explores the manner in which alternative Escitalopram therapies and dietary supplements (Vitamin C, Vitamin E, and Levosulpride) affect the lipid profiles of depressed individuals.

KEYWORDS: Depression, Lipid Profile, Total Cholesterol, Low density lipoprotein

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INTRODUCTION

Dyslipidemia is a common chronic illness that affects millions of people worldwide. More than 100 million persons in the United States are expected to have increased total cholesterol levels (200 mg/dL or above), with 31 million having even higher levels (240 mg/dL or higher)[1]. Similarly, a 2015 research in South Korea discovered that 19.5% of adults had dyslipidemia[2]. As evidences suggested that dyslipidemia is a leading risk of developing cardiovascular diseases it is crucial to identify the varying treatment approaches in the management of dyslipidemia among mental disorder patients[3]. Sedentary lifestyles, poor diets, and the use of antipsychotic drugs all contribute to the strong link between mental disorders and dyslipidemia[4]. A comprehensive meta-analysis revealed that people with severe mental disorders (SMI) have considerably higher chances of hypertriglyceridemia and low levels of heart-protective HDL cholesterol[5]. These patients with mental illnesses are not only dealing with their psychiatric ailments, but they are also at a much increased risk of cardiovascular diseases (CVDs)[6]. This increased risk is especially noticeable in people suffering from diseases such as schizophrenia, bipolar disorder, and major depressive disorder[7]. Interestingly, recent study in several

parts of China has indicated a broad range of dyslipidemia prevalence among patients with mental problems, ranging from 10% to a stunning 50%[8]. This variation in prevalence emphasizes the significance of customized, region-specific therapies for managing both mental illness and dyslipidemia simultaneously. Depression, is generally treated with a mix of psychological counselling and pharmaceutical therapies[9-10]. Particularly in cases of moderate to severe depression, where they are used to treat mood and behavioral symptoms, antidepressants play a crucial role among these pharmaceutical options.[11]. Selective serotonin reuptake inhibitors (SSRIs), which include medications like fluoxetine, paroxetine, escitalopram, and sertraline, are one of the most often prescribed groups of antidepressants[12]. Serotonin-norepinephrine reuptake inhibitors (SNRIs) such as venlafaxine, desvenlafaxine, and duloxetine, as well as tricyclic antidepressants (TCAs) such as imipramine, clomipramine, and desipramine, are also often used[13]. However, while these antidepressants are useful in treating depressed symptoms, they can have considerable effects on lipid and glucose metabolism[14]. This might result in unpleasant side effects such as weight gain and dyslipidemia, which have been cited as key causes for antidepressant therapy termination. Given the significance of both mental and physical health, there is an urgent need to better understand how antidepressant drugs affect lipid profiles[15]. As a result, the purpose of this study is to provide light on the possible effects of antidepressants, especially Escitalopram, on the lipid profiles of persons suffering from depression, both as a solo treatment and in conjunction with adjuvant medicines such as Vitamin C, Vitamin E, and levosulpiride. We anticipate that by investigating the complex interaction between antidepressant drugs and lipid metabolism, we might reveal insights that help influence treatment options, improve medication adherence, and ultimately contribute to the overall well-being of those suffering from depression. This study is an important step towards better managing depression, addressing its complex effects, and enhancing the quality of life for individuals affected by this common mental health illness.

METHODOLOGY

Study Setting

The Baluchistan Institute of Psychiatry and Behavioral Sciences (BIPS) and the Department of Pharmacology in Quetta collaborated in this study.

Study Design

A prospective case-control research design.

Sample Size

The sample size was carefully calculated, taking into account a 44.4% prevalence rate of depression according to a study conducted in Pakistan[16], a 95% confidence range, and a 5% error margin. The outcome was an enormous example size of 380 people, which guaranteed factual dependability.

Sampling Technique

In the study, a purposeful sampling method was used.

Inclusion/Exclusion Criteria

Members in this study were chosen from people as of now getting treatment for despondency at the Baluchistan Foundation of Psychiatry and Conduct Sciences (BIPS) in Quetta. Males and females of all ages participated in the diverse group, which ranged in age from 20 to 70. Control people were painstakingly decided to match the exploration bunch with regards to orientation, age, and financial level to areas of strength for ensure substantial examinations. People who would not take an interest were excluded from the examination test, as their nonappearance would have impacted the discoveries. Due to the possibility that their particular health situation would have made it more difficult to achieve the goals of the study, people with severe general medical disorders were also excluded from the research. Moreover, on account of the review's novel accentuation, people over the age of 70 were deliberately eliminated from the example, as per the exploration's laid out guidelines. These very much considered consideration and prohibition standards were basic in safeguarding the review's quality and importance.

Treatment Protocol

Group 1: Escitalopram Control Group Treatment:

This group received daily doses of 10 to 20 mg of Escitalopram and underwent two months of monitoring.

Group 2 Treatment Group: Escitalopram with Ascorbic Acid (Vitamin C)

People in this gathering were given every day Escitalopram doses going from 10 to 20 mg.

Notwithstanding Escitalopram, they were given 500-1000 mg of Ascorbic Corrosive (L-ascorbic acid) every day. For a very long time, this mediation bunch was thoroughly noticed.

Group 3 Treatment group: Escitalopram with Vitamin E

Patients in this gathering were given everyday measurements of Escitalopram going from 10 to 20 mg. They were likewise given 400 mg of Vitamin E day to day, notwithstanding Escitalopram. The course of treatment lasted for two months.

Group 4 Treatment group: Escitalopram with Levosulpride

Members in this gathering were given a day to day dose of Escitalopram going from 10 to 20 mg. They were given 50 mg of Levosulpride two times every day notwithstanding Escitalopram. Quite, members in this gathering were allowed to keep involving their antipsychotic prescription notwithstanding the review treatment. Like the others, this intervention group was watched for two months.

Outcome Measure

All study participants went through a comprehensive lipid profile assessment after the two-month intervention period ended. This assessment measured important lipid parameters like total cholesterol, triglycerides, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL). The results were compared between groups to determine how well depression patients' lipid profiles were affected by treatment.

Ethical Consideration

This study focused on the prosperity and privileges of members while sticking to moral standards. With care, informed consent was obtained that emphasized voluntary participation, the study's goals, potential risks and benefits, and anonymity. As a result of the trial's strict data privacy and patient confidentiality procedures, ethical standards were strengthened.

RESULTS

A total of n=380 people participated in the study, which was then broken up into four groups with n=95 people in each group. The average age of participants were 42.08±8.49. Age wise distribution revealed that n=97 participants were in the age group of 20 to 30 years, n=155 were in the age group of 31 to 40 years, n=76 were in between 41 to 50 years, n=32 were in between 51 to 60 years of age and n=30 were in the age group of 61 to 70 years. (Table 1)

Table 1: Demographic Description of Participants

Variables	**Mean value**	**Standard Deviation**
Age in years	42.08	8.49
Age wise Distribution		
Age ranges	**Number of participants**	**Percentage**
20–30 years	97	25.5%
31-40 years	155	40.7%
41-50 years	76	20.2%
51-60 years	32	8.4%
61-70 years	20	5.2%
Total	380	100

Analyses of the findings had revealed that total cholesterol levels were significantly $p<0.05$ reduced in group given intervention based on Escitalopram + Vitamin E in comparison to control group to whom only Escitalopram was given. Total Cholesterol levels were however found to be high in Escitalopram +Levosulpride in comparison to control group although the difference was not significant $p>0.05$. The levels of triglyceride were significantly reduced ($p<0.05$) in all the intervention group in comparison to controlled group where the vales were 151.32±27.62 in control group, 142.35±22.08 in Escitalopram + Vitamin C group, 140.62±22.98 in Escitalopram + Vitamin E group and 142.91±20.37 in Escitalopram + Levosulpride group. On High density lipoprotein all intervention group had shown significant improvement $p<0.05$ in the level of HDL with greater number of improvement was observed in Escitalopram +Levosulpride group in which the average value was 54.47±4.67mg/dl. (Table 2)

Table 2: Effects of Intervention strategies on Total Cholesterol levels, TGA and HDL levels ((mg/dl)

Total Cholesterol Levels			
Variables	Mean values ±SD	df	Level of Significance
Group 1: Control Escitalopram	163.17±13.4	5	<0.05
Group 2: Escitalopram + Vitamin C	159.53±12.5		
Group 3:	157.06±12.2		

Escitalopram + Vitamin E			
Group 4: Escitalopram+Levosulpride	165.9±13.21		
Total TGA Levels			
Group 1: Control Escitalopram	151.32±27.62	5	<0.05
Group 2: Escitalopram + Vitamin C	142.35±22.08		
Group 3: Escitalopram + Vitamin E	140.62±22.98		
Group 4: Escitalopram+Levosulpride	142.91±20.37		
Total HDL levels			
Group 1: Control Escitalopram	50.38±4.27	5	<0.05
Group 2: Escitalopram + Vitamin C	53.43±4.31		
Group 3: Escitalopram + Vitamin E	53.48±4.41		
Group 4: Escitalopram+Levosulpride	54.47±4.67		

The effects of interventions were also analyzed on the levels of low density lipoprotein (LDL) and very low density lipoprotein (VLDL). The findings had revealed that the levels of LDL were found to be significantly reduced in all three groups, however the effects of Escitalopram + Vitamin E was found to be more significantly effective $p<0.05$ than other treatment groups (table 3). Furthermore the levels of VLDL were also significantly reduced ($p<0.005$) in all groups in comparison to control group and likely the effects of intervention as observed on LDL levels, Escitalopram + Vitamin E effect was better than other treatment groups in lowering the levels of VLDL (table 3)

Table 3: Effects of Intervention strategies on LDL and VLDL levels (mg/dl)

LDL			
Variables	Mean values ±SD	df	Level of Significance
Group 1: Control Escitalopram	137.28±6.65	5	<0.05
Group 2: Escitalopram + Vitamin C	133.07±5.49		
Group 3: Escitalopram + Vitamin E	131.37±5.70		
Group 4: Escitalopram+Levosulpride	133.23±6.02		
VLDL			
Group 1: Control Escitalopram	26.37±4.03	5	<0.05
Group 2: Escitalopram + Vitamin C	22.31±3.43		
Group 3: Escitalopram + Vitamin E	21.56±2.90		
Group 4: Escitalopram+Levosulpride	22.32±2.69		

DISCUSSION

Analyses of the data indicated that total cholesterol levels were considerably $p0.05$ lower in the group that received the intervention based on Escitalopram + Vitamin E compared to the control group that received only Escitalopram. Total cholesterol levels were observed to be higher in the Escitalopram +Levosulpride group compared to the control group, while the difference was not statistically significant ($p>0.05$). Triglyceride levels were significantly lower ($p<0.05$) in all intervention groups compared to the control group, with values of 151.32±27.62 in the control group, 142.35±22.08 in the Escitalopram + Vitamin C group, 140.62±22.98 in the Escitalopram + Vitamin E group, and 142.91±20.37 in the Escitalopram + Levosulpride group. On high density lipoprotein, all intervention groups showed a significant improvement $p<0.05$ in HDL levels, with the Escitalopram +Levosulpride group showing the greatest improvement, with an average value of 54.47±4.67mg/dl. The effect of medicines on low thickness lipoprotein (LDL) and extremely low thickness lipoprotein (VLDL) levels were likewise considered. The information showed that LDL levels were impressively brought down in every one of the three gatherings, albeit the advantages of Escitalopram + Vitamin E were all the more altogether successful ($p<0.05$) than other treatment gatherings. Moreover, VLDL levels were altogether lower ($p<0.005$) in all gatherings when contrasted with the benchmark group, demonstrating that the mediation's consequences for LDL levels, Escitalopram + Vitamin E impact was better than other treatment bunches in bringing down VLDL levels. In the forthcoming review looking at the effect of escitalopram on different metabolic boundaries, for example, body weight, midsection periphery, neuropeptide levels explicitly proopiomelanocortin (POMC) and neuropeptide-Y (NPY), and lipid profiles, it was found that following 12 weeks of treatment, patients encountered a huge expansion in body weight, while midriff perimeter expanded and the abdomen hip proportion diminished essentially[16]. Notably, neuropeptide levels, notably in POMC, decreased significantly. Although lipid parameters remained largely unchanged, implying that escitalopram use did not

significantly increase the risk of metabolic syndrome or cardiovascular disease during the short study period, the decrease in POMC levels raised concerns about its potential impact on eating behavior modulation and subsequent weight gain. More study is needed to understand the underlying processes and long-term ramifications of the findings[16]. In another study the purpose was to look at the effects of vitamin C, either alone or in conjunction with vitamin E, as an adjuvant therapy on different biomarkers in type 2 diabetes mellitus patients, like erythrocyte sedimentation rate ESR, malondialdehyde (MDA), C - reactive protein high sensitivity (hs-CRP), and total cholesterol levels[17]. A total of 117 diabetic patients were separated into three groups: a control group that only received metformin, a group that received vitamin C (1000 mg) alongside metformin, and a group that received both vitamin C (1000 mg) and vitamin E (400 mg) alongside metformin. The study found substantial decreases in MDA, hs-CRP, and cholesterol levels among patients taking vitamin C alone and the combination of vitamin C and E after three months of treatment when compared to the control group. MDA decrease was greater in the group that received both vitamins, although cholesterol reduction was equivalent in both vitamin-treated groups. ESR levels, then again, didn't improve much17. These discoveries suggest that cell reinforcements like L-ascorbic acid and E might have the option to decrease oxidative pressure, lower provocative markers, and improve complete cholesterol levels in diabetic patients, underlining their possible importance in controlling the ailment and its going with problems17. In another such proof, specialists played dissected the part of vitamin E in the treatment of significant burdensome problem (MDD) by looking at its job in decreasing aggravation, oxidative, and nitrosative pressure, which are all embroiled in the pathophysiology of MDD18. Low levels of vitamin E have been linked to MDD symptoms in clinical studies. Vitamin E has the ability to improve oxidative and inflammatory states, which may help in the treatment of depression.[18]. The antidepressant-like effects of vitamin E have also been shown by preclinical research, with the mechanisms focusing on the management of oxidative stress and neuro-inflammation. These results demonstrate the potential of vitamin E as an adjuvant in the treatment of MDD, but further research is required to determine its value in reducing depressive symptoms[18]. The study has various strength and limitations that were: the research was first of its type conducted in Pakistan in which the effects of combining antidepressant with other supplements were identified on lipid profile levels of diagnosed dyslipidemia depression patients, secondly study employed prospective experiment design and third it had opened a door for future researches in which combine treatment approaches can be investigated in the manage of depression along with its associated comorbidities. The weakness lies in its duration no long term follow-up effects was monitored hence it was suggested that future studies must incorporate long term follow-up effects on intervention on outcome measure.

CONCLUSION

In conclusion, this study investigates alternate Escitalopram therapy and dietary supplements (Vitamin C, Vitamin E, and Levosulpride) impact the lipid profiles of depressed patients. The findings show that, when compared to the control group receiving only escitalopram, escitalopram combined with vitamin E had a significant positive effect on lipid parameters, namely lowering total cholesterol, LDL and VLDL levels and increasing HDL levels.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared

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