COMPARISION AND ASSESSMENT OF POST STROKE ANXIETY, POST STROKE DEPRESSION, RFM, ABDOMINAL OBESITY AND LIPID PROFILE LEVELS IN STROKE PATIENTS

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ABSTRACT

PSA & PSD is a common psychological response. The excessive fat in the abdomen is called abdominal obesity. RFM is a newly developed metric total body fat. Among 205 patients 88, 65 patients were affected with PSA & PSD respectively.119 patients were suffering with abdominal obesity and in these 48 patients suffering with PSA and 42 patients suffering with PSD. 57 females and 105 males were affected with increased RFM and in this18 females and 42 males were suffering with PSA and 10 females and 33 males were affected with PSD. Total cholesterol & Serum chloride were high in PSA and PSD patients than normal patients. The mean averages of PSA & PSD are 31.01 ± 2.121& 28.03± 2.27 respectively. Our study findings conclude that the increase in RFM levels has significant risk of developing anxiety and depression in stroke patients.

Keywords: Hamilton anxiety rating scale-14; Hamilton depression rating scale-17; Hemorrhagic Stroke; Ischemic stroke.

Word count: 4493

Grant support: None of the Authors received any financial support for the research.

INTRODUCTION

Stroke

Stroke is the second leading cause of death above age of 60 years, and the 5th leading cause in people aged 15 to 59 years old worldwide and is the major cause of morbidity, particularly in the middle aged and elderly population. Stroke, according to WHO definition is a 'a clinical syndrome consisting of rapidly developing clinical signs of focal disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin [1].

The fifth most common cause of mortality in the US is stroke. Almost 8, 00,000 people suffer a stroke every year [2].

Epidemiology of stroke

India experiences about 1, 85,000 strokes annually, with one stroke fatality occurring every four minutes and a stroke occurring roughly every forty seconds [3].

Types of Strokes [4]

Ischemic Stroke
Hemorrhagic Stroke
Intracerebral Hemorrhagic Stroke
Subarachnoid Hemorrhagic Stroke

Signs and Symptoms of Stroke

1. Weakness or numbness in the arm, leg, or face, especially on one side of the body
2. Disorientation, difficulty understanding or communicating
3. Difficulty with one or both eyesight
4. Dizziness, imbalance, or lack of coordination when walking
5. Severe headache without apparent cause.

Post Stroke Anxiety

Anxiety that often follows a stroke is known as post-stroke anxiety (PSA) [5].

Although there are various ways to define anxiety, fear and panic in reaction to particular everyday activities or events are frequently its hallmarks.

Signs and Symptoms of Anxiety

1. Being agitated
2. Weary
3. Inability to focus Concentration issues
4. Sleep issues
5. Accelerated heart rate
6. Recurring ideas [6].

Types of Anxiety: [7].

1. Anxiety problem in general
2. Anxiety disorders related to social interactions
3. Particular phobia
4. Anxiety upon separation
5. Panic attack

Epidemiology of PSA

Over a year, prevalence ranges from 18% to 34 % [8].

Causes of anxiety [9].

1. DNA
2. Mental chemistry
3. Stress in the environment
4. Withdrawal from or abuse of drugs

Pathophysiology of anxiety

Nor epinephrine, serotonin, dopamine, and gamma-amino butyric acid (GABA) are considered to be the major mediators of anxiety in the central nervous system. A majority of the symptoms are mediated by the autonomic nervous system, specifically the sympathetic nervous system.

The amygdala is a key component in regulating anxiety and fear. It has been discovered that the amygdale's reactivity to anxiety stimuli is elevated in patients with anxiety disorders. Prefrontal-limbic activation imbalances can be corrected with psychological or pharmacological therapies, as the amygdala and limbic system structures are linked to prefrontal cortex regions [10].

Post Stroke Depression

One common psychological response among stroke victims is post-stroke depression. Depression following a stroke is common. It results from alterations in brain chemistry.

Signs and Symptoms of Depression

1. Chronic melancholy, trepidation, or emptiness
2. Agitation and restlessness
3. Feelings of worthlessness, helplessness, remorse, pessimism, or hopelessness
4. Loss of enthusiasm for pastimes and pursuits, such as sexual activity
5. Diminished vitality, exhaustion, and a sense of slowness
6. Difficulty focusing, recalling details, and making decisions
7. Oversleeping or early morning wakeup due to insomnia
8. Thoughts of ending one's life, attempting suicide, or both [11].

Epidemiology of PSD

In the 61 cohorts including 25,488 patients, the most recent meta-analysis found that 31% of patients experienced depression at any point up to five years after their stroke [12].

Types of depression

Depression following childbirth

1. Seasonal depression
2. Disorders of persistent depression
3. Disorder of premenstrual dysphoria
4. Depressive psychosis
5. Manic episodes
6. Unusual forms of depression
7. Major depressive illness

Causes of depression:

1. Ancestry and genetics
2. Social shifts
3. Past trauma, abuse, or confrontation
4. A few drugs
5. Age
6. Surroundings
7. Medical conditions
8. Intenseness [13].

Pathophysiology of PSD

The intricate Pathophysiology of PSD is attributed to its distinct neurobiological mechanisms, which encompass the interplay of neuroanatomical, neuronal, and biochemical variables along with neurogenesis. The Pathophysiology of PSD has also been explained by a number of theories, including lesion site, biogenic amines, cytokine inflammation, and gene polymorphism. Large lesions in brain regions like the left frontal lobe and basal ganglia can disrupt important networks that regulate mood, which can result in depression, according to a number of studies. The lesion location theory suggests that the degree of depression related to the left frontal lobe is more pronounced in the initial half-year

following a stroke. Thus, accumulation of quiet cerebral injuries can also change how numerous neurotransmitter pathways, including the monoamine system, function normally and healthily. It thus results in signs of depression. Nevertheless, a few studies indicate that behavioral and social factors may also play a role in its development. Lai and McCullough contend that due to the intricacy of PSD's etiology, doctors and family members frequently fail to recognize, misdiagnose, or underestimate the severity of the condition's symptoms. The neuroendocrine stress system is regulated by inflammatory cytokines that are elevated in the brain following severe strokes. The brain's neurotrophic factors may be suppressed by impacted inflammatory cytokines, impairing mood.

Association between PSD and PSA

A noteworthy association was discovered by Schottke and Giabbiconi between the prevalence of PSD and PSA. The sensations and aftermath of the stroke itself are principally linked to the two illnesses. According to a different study by Fang et al, roughly 25% of stroke survivor's exhibit indicators of anxiety and about 30% have depressive symptoms. Even though PSD and PSA are closely related, there are some differences in the illnesses' diagnoses and predictions. Since its main predictors are lifelong anxiety disorders, such as obsessive-compulsive disorder (OCD) and agoraphobia without panic disorder, PSA is less linked to stroke than PSD. However, lifelong depression is not a reliable indicator of PSD. Because PSD is related to stroke, it is therefore less predictable as a post-stroke affective illness than PSA. If psychological therapies are not carried out promptly, PSD and PSA can both lead to detrimental neurological and functional problems. The easiest way to elucidate the association between PSD and PSA is to examine the rehabilitation treatments offered to patients with the illnesses, in addition to common diagnoses, comorbidity, severity, origin, and risk factors [14].

Hamilton Depression Rating Scale (HDRS)

The most popular depression assessment measure used by clinicians is the Hamilton Depression Rating measure (HDRS, commonly called the Ham-D). The original edition of the HDRS has 17 items (HDRS17) related to depressive symptoms experienced in the previous week. Even though the scale was intended to be completed following an unstructured clinical interview, semi-structured interview guides are already accessible. The focus on melancholy and physical symptoms of depression stems from the HDRS's initial development for hospital inpatients. In a subsequent 21-item version known as HDRS21, four items that were meant to categorize depression are instead, erroneously, used to score its severity. One of the limitations of the HDRS is that it does not evaluate atypical symptoms of depression, such as hypersomnia and hyperphagia [15].

Hamilton Anxiety Rating Scale (HARS)

One of the first rating scales created to gauge the intensity of anxiety symptoms was the HAM-A, which is currently in heavy use in research and clinical contexts. The 14-item scale assesses both somatic anxiety (physical problems associated with anxiety) and psychic anxiety (mental agitation and psychological distress). Each item on the scale is defined by a set of symptoms. Despite its widespread usage as an outcome measure in clinical studies, the HAM-A has faced criticism due to its occasionally weak capacity to distinguish between somatic anxiety and somatic side effects, as well as between anxiolytic and antidepressant effects. Standardized probe questions are not included on the HAM-A. The scale's reported levels of inter-rater reliability seem to be adequate in spite of this [16].

Abdominal Obesity

The excessive buildup of fat in the abdomen is known as abdominal obesity.

Raised waist circumference is used to measure it, and it is unaffected by BMI. For men ≥90cm and for women ≥80cm [17].

Relative Fat Mass

Based on the patient's height, gender, and waist circumference, relative fat mass is a newly developed metric for estimating total body fat.

Formula for Calculating the Relative Fat Mass

64 - [20(Height (cm)/waist circumference (cm)] +12 Biological sex

For men coded with 0 and female coded with [18].

Mechanism

Increased levels of interleukin and other inflammatory factors are present in obese people, and these variables may have a substantial impact on neurotransmission and the regulation of brain circuits, ultimately leading to emotional responses. Furthermore, obesity and visceral fat accumulation are known to result from hyperactivity of the hypothalamic pituitary adrenal (HPA) axis, which has been identified as one of the fundamental molecular mechanisms underpinning emotional disorders. The cytoplasmic glucocorticoid receptor (GR) levels in the prefrontal cortex (PFC) and hippocampus were considerably altered, changes that were linked to the pathophysiology of emotional disorders, as the feedback inhibition of glucocorticoid (GC) on the HPA axis signal diminished. Though more precise pathophysiological connections between fat and anxiety are still unknown, emotional disorders include sadness and anxiety. Overburdening senescent cells could be the reason for anxiety-like behavior in obese people. Restoring neurogenesis and reducing anxiety-related behavior was achieved by removing senescent cells from obese mice who were fed a high fat diet or had low leptin receptor levels [19].

Methodology

Aim of the Study

To study the correlation between RFM (Relative fat mass) and abdominal obesity in post stroke anxiety and post stroke depression patients.

Hypothesis

- There exists a significant correlation between RFM and abdominal obesity with post stroke anxiety. Our study aims to evaluate the outcomes associated with increased RFM and abdominal obesity in post stroke anxiety and depression patients.

Study Site

- Patients with stroke attending at inpatient department of neurology Ekashilaa hospital in Hanamkonda.

Study Design

- This is the prospective, observational study. It will be conducted to find out the prevalence of post stroke anxiety and depression in stroke patients.

Study Population and Duration

- The study was proposed to conduct in 200 in patients with stroke in 6 months of duration of time and these subjects were investigated based on below laboratory parameters.

Demographics of the Patient

Name, Age, Gender, Weight, Height, Social habits (alcohol, smoking, appetite, sleep), Family history, previous occurrence of stroke, past medical history (hypertension, diabetes, hyperlipidemia)

Inclusion Criteria

- ✓ Patients with ischemic Stroke
- ✓ Patients with Hemorrhagic Stroke
- ✓ Patients of either gender
- ✓ Patients with age group between 18 to 80 years.

Exclusion Criteria

- ✓ Patients with aphasia
- ✓ Patients with dysarthria
- ✓ Patients with deafness after stroke
- ✓ Patients with previous history of anxiety, depression (or) mental illness
- ✓ Patients with brain trauma.

RESULTS

TABLE 1 GENDER WISE DISTRIBUTION OF STROKE PATIENTS

S.NO	GENDER	NO. OF PATIENTS
1	Females	77
2	Males	128
3	Total	205

Among the total 205 stroke patients, the majority of people affected are males.

TABLE 2 DISTRIBUTION OF DIAGNOSIS ACCORDING TO STROKE

S.NO	DIAGNOSIS	NO. OF PATIENTS
1	AIS	181
2	AIS+HTN	2
3	AIS+DCMP	1
4	AHS	20
5	AHS+HTN	1
6	Total	205

Among the 205 members, 181 members were diagnosed as AIS, 2 members were diagnosed as AIS+HTN and 1 member was diagnosed as AIS+DCMP. The populations of 20 members were diagnosed as AHS and 1 member was diagnosed as AHS+HTN respectively.

TABLE 3 AGE WISE DISTRIBUTION OF STROKE

S.NO	AGE	AIS	AHS	TOTAL
1	11 - 20	0	1	1
2	21 - 30	0	0	0
3	31 - 40	9	1	10
4	41 - 50	29	2	31
5	51 - 60	46	7	53
6	61 - 70	47	7	54
7	71 - 80	53	3	56

Among the age groups most affected age group is 71-80, 61-70and 51-60 respectively.

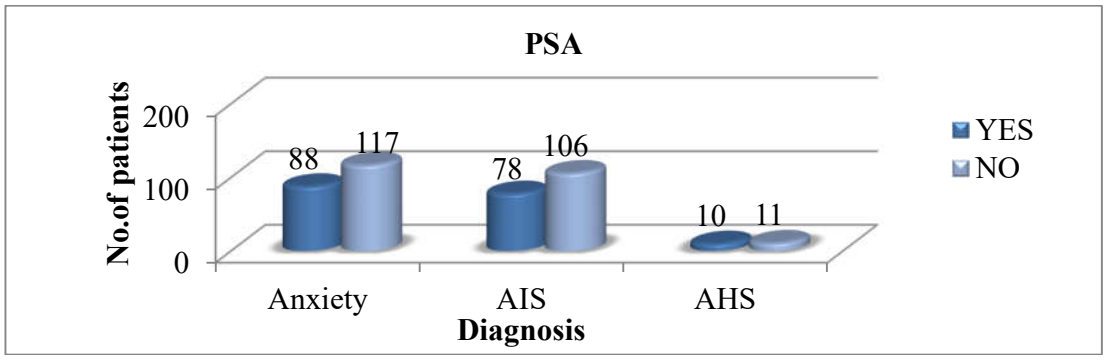

FIGURE 1 DISTRIBUTION OF PSA ACCORDING TO STROKE

Among the total population of stroke patients 88 patients were suffering with post stroke anxiety and in that population 78 patients were diagnosed as AIS and 10 patients were diagnosed as AHS.

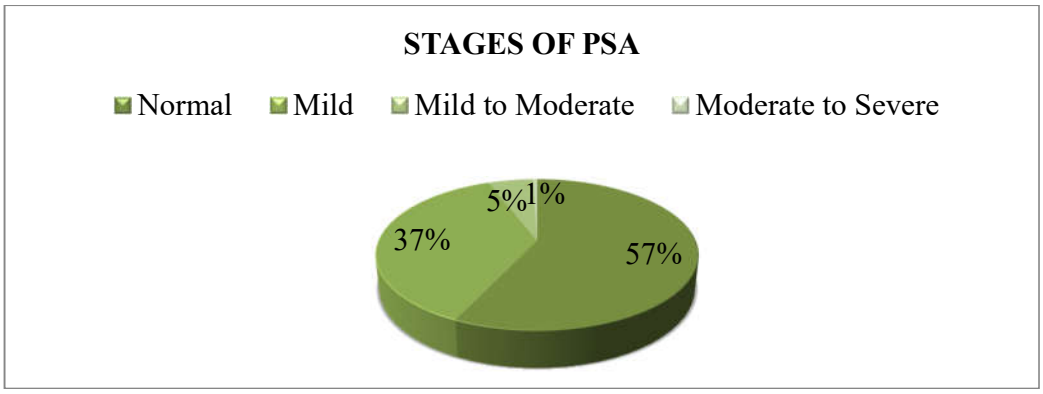

FIGURE 2 DISTRIBUTION OF PSA ACCORDING TO STAGES

Out of 205 patients, highest population are diagnosed as normal PSA i.e.117 members, second majority of population i.e.76 members are diagnosed as mild PSA and followed by mild to moderate PSA i.e.11 members and least i.e.1 member was diagnosed as moderate to severe PSA.

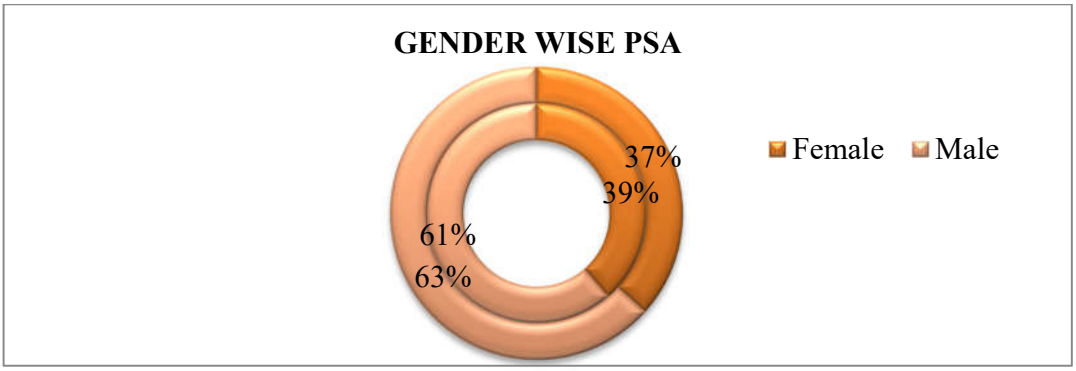

FIGURE 3 DISTRIBUTION OF PSA ACCORDING TO GENDER

Among total stroke patients, 34 females and 54 males were diagnosed with Post Stroke Anxiety and 43 females and 74 males were not diagnosed with Post Stroke Anxiety.

TABLE 4 DISTRIBUTION OF PSA ACCORDING TO AGE

S.NO	AGE	WITH PSA	WITHOUT PSA	TOTAL
1	11-20	0	1	1
2	21-30	0	0	0
3	31-40	5	5	10
4	41-50	11	20	31
5	51-60	24	29	53
6	61-70	21	33	54
7	71-80	27	29	56

Among the total population of stroke patients, patients were divided according to their age. Highest prevalence with PSA was observed in age group of 71-80 years and followed by 51-60, 61-70, 41-50, and 31-40 years respectively. Highest prevalence without PSA was observed in age group of 61-70 years and followed by 51-60 and 71-80, 41-50, 31-40, 11-20 respectively.

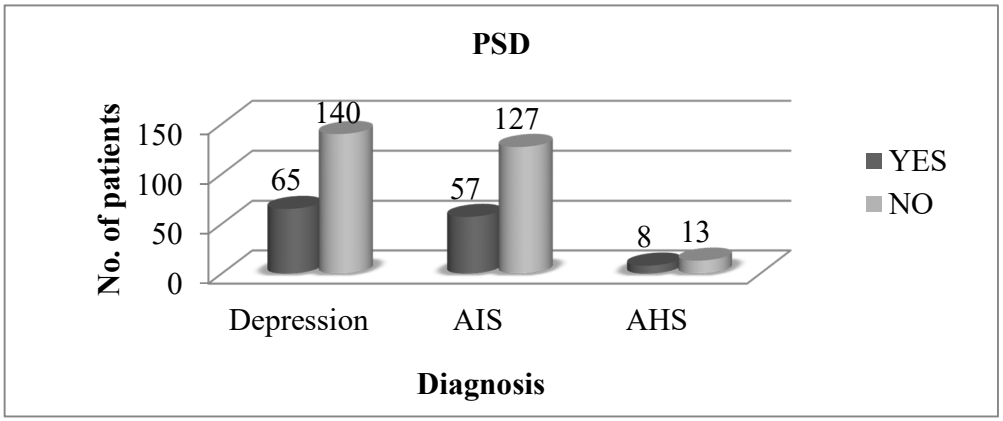

FIGURE 4 DISTRIBUTION OF PSD ACCORDING TO STROKE

Among the total population of stroke patients 65 patients were suffering with post stroke depression and in that population 57 patients were diagnosed as AIS and 8 patients were diagnosed as AHS.

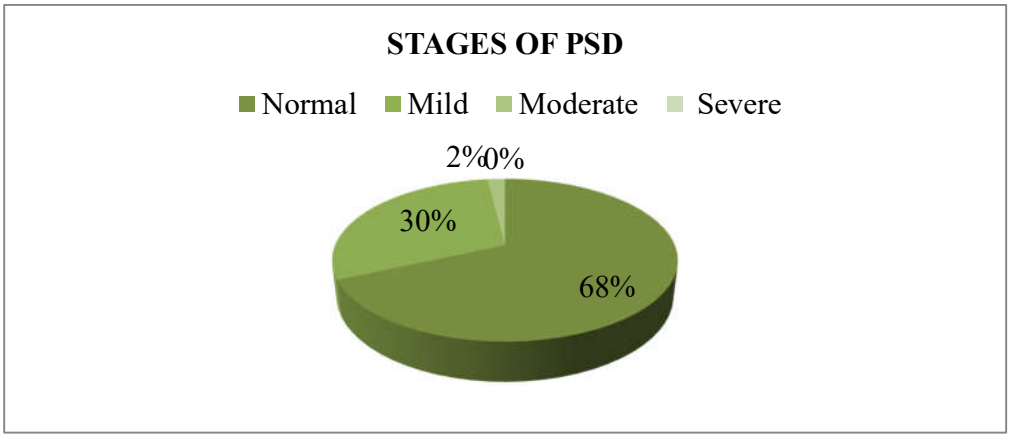

FIGURE 5 DISTRIBUTION OF PSD ACCORDING TO STAGES

Among total population of stroke patients, patients were divided according to the stages of post stroke depression. 140 members were diagnosed with normal; 61 members were diagnosed with mild; 4 members were diagnosed with moderate and 0 members with severe post stroke depression.

TABLE 5 DISTRIBUTION OF PSD ACCORDING TO GENDER

S.NO	GENDER	WITH PSD	WITHOUT PSD
1	Female	27	50
2	Male	38	90
3	Total	65	140

TABLE 6 DISTRIBUTION OF PSD ACCORDING TO AGE

S.NO	AGE	WITH PSD	WITHOUT PSD	TOTAL
1	11-20	0	1	1
2	21-30	0	0	0
3	31-40	1	9	10
4	41-50	9	22	31
5	51-60	15	38	53
6	61-70	13	41	54
7	71-80	27	29	56

Out of total patients, highest prevalence of age group with PSD was 71-80 years followed by 51-60, 61-70, 41-50 and 31-40 years respectively.
Secondly, highest prevalence of age group without PSD was 61-70 years followed by 51-60, 71-80, 41-50, 31-40 and 11-20 years respectively.

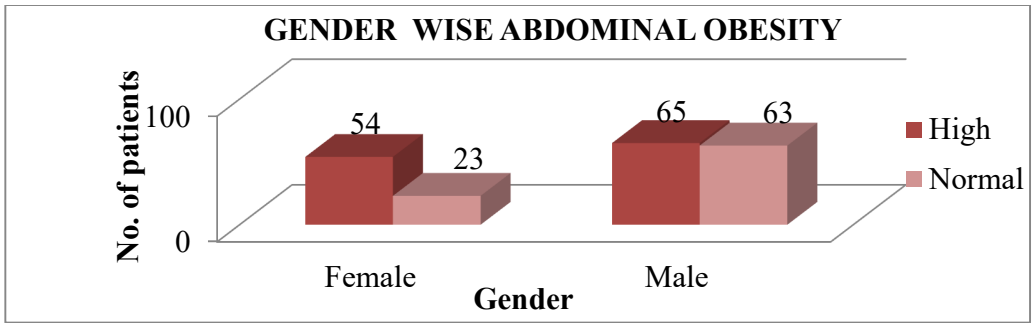

FIGURE 6 GENDER WISE DISTRIBUTION OF ABDOMINAL OBESITY IN STROKE PATIENTS

Out of total 205 patients, 54 females and 65 males were observed with high abdominal obesity and 23 females and 63 males were observed with normal abdominal obesity.

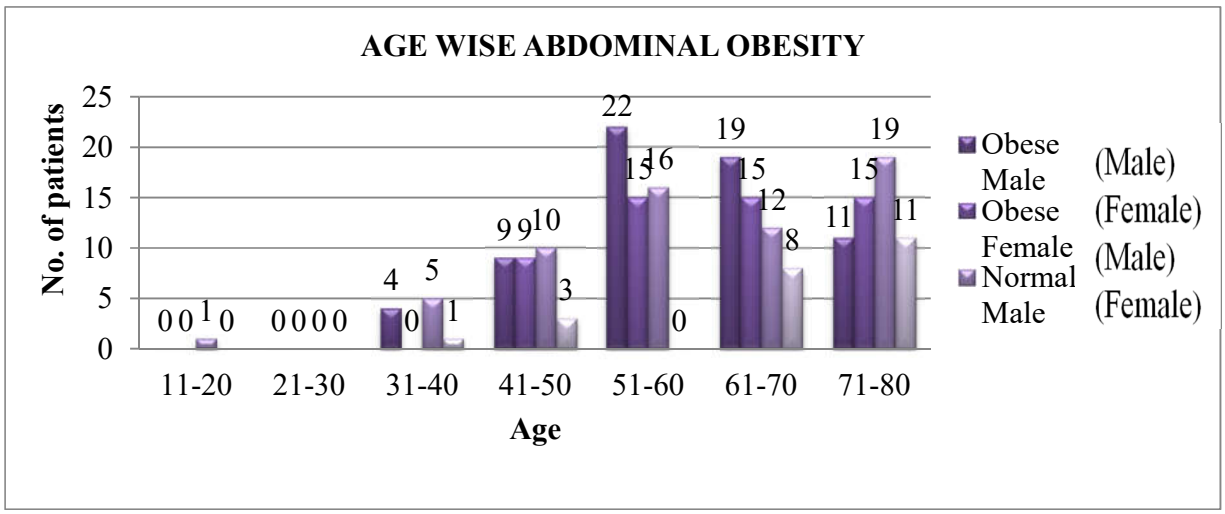

FIGURE 7 AGE WISE DISTRIBUTION OF ABDOMINAL OBESITY IN STROKE PATIENTS

Among total population, patients were divided according to their age group, most obese males are of age group 51-60 years followed by 61-70, 71-80, 41-50, 31-40 years and obese females are of age group 51-60, 61-70, 71-80 followed by 41-50 years respectively. Most normal males of age group 71-80 years followed by 51-60, 61-70, 41-50, 31-40, 11-20 years and most normal females of age group 71-80 years followed by 61-70, 41-50, 31-40 respectively.

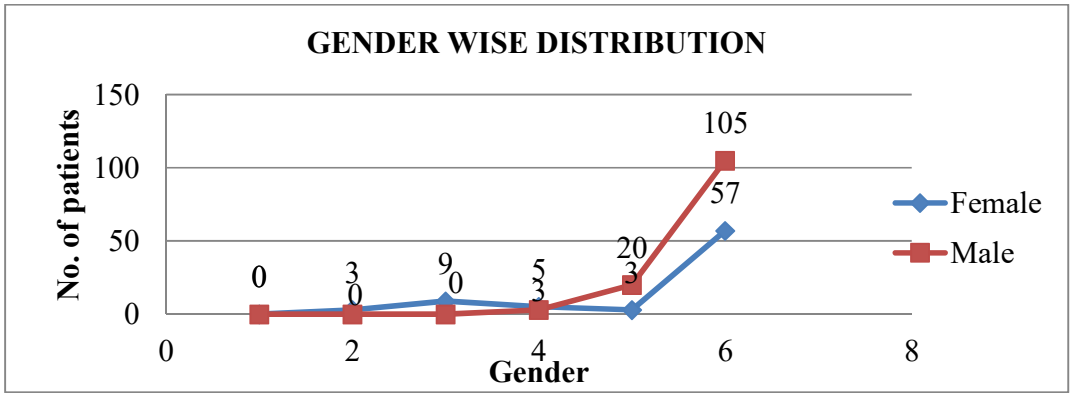

FIGURE 8 GENDER WISE DISTRIBUTION OF RELATIVE FAT MASS IN STROKE PATIENTS

Out of 205 stroke patients, in females most patients are obese i.e.57 patients followed by 9 patients are athletes, 5 patients have fitness, 3 patients have essential fat, 3 patients are average, and 0 patients have extremely low level of fat. In males, most patients are obese i.e.105 patients, 20patients are average, 3 patients have fitness, 0 patients are athletes and 0 patients have extremely low level of fat and essential fat.

TABLE 7 AGE WISE DISTRIBUTION OF RELATIVE FAT MASS IN STROKE PATIENTS

S.NO	AGE	OBESE	NORMAL
1	11-20	1	0
2	21-30	0	0
3	31-40	8	2
4	41-50	29	2
5	51-60	41	12
6	61-70	45	9
7	71-80	38	18

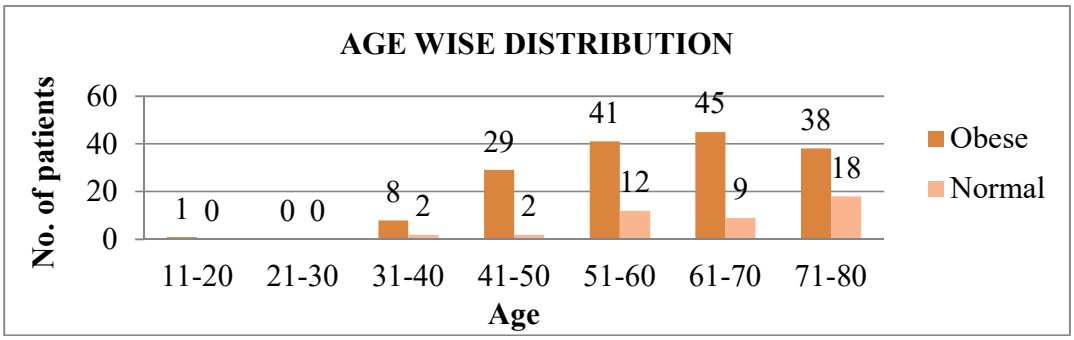

FIGURE 9: AGE WISE DISTRIBUTION OF RELATIVE FAT MASS IN STROKE PATIENTS

Among 205 patients, high prevalence of obese is seen in patients of age group 61-70 years followed by 51-60, 71-80, 41-50, 31-40, 11-20 years and prevalence of normal is seen in age group of 71-80 years followed by 51-60, 61-70, 31-40,41-50 years respectively.

TABLE 8 DISTRIBUTION OF LIPID PROFILE IN POST STROKE ANXIETY

S.NO	CATEGORY	NO. OF PATIENTS
1	CHOLESTEROL	
	Normal	69
	High	19
2	TRIGLYCERIDES	
	Normal	58
	High	30
3	HDL	
	Normal	40
	Low	48
4	LDL	
	Normal	46
	High	42
5	VLDL	
	Normal	54
	High	34

Among the population of stroke patients with PSA, cholesterol levels are normal in 69 and high in 19 patients, triglyceride levels are normal in 58 and high in 30 patients, HDL levels are normal in 40 and

low in 48 patients, LDL levels are normal in 46 and high in 42 patients, VLDL levels are normal in 54 and high in 34 patients.

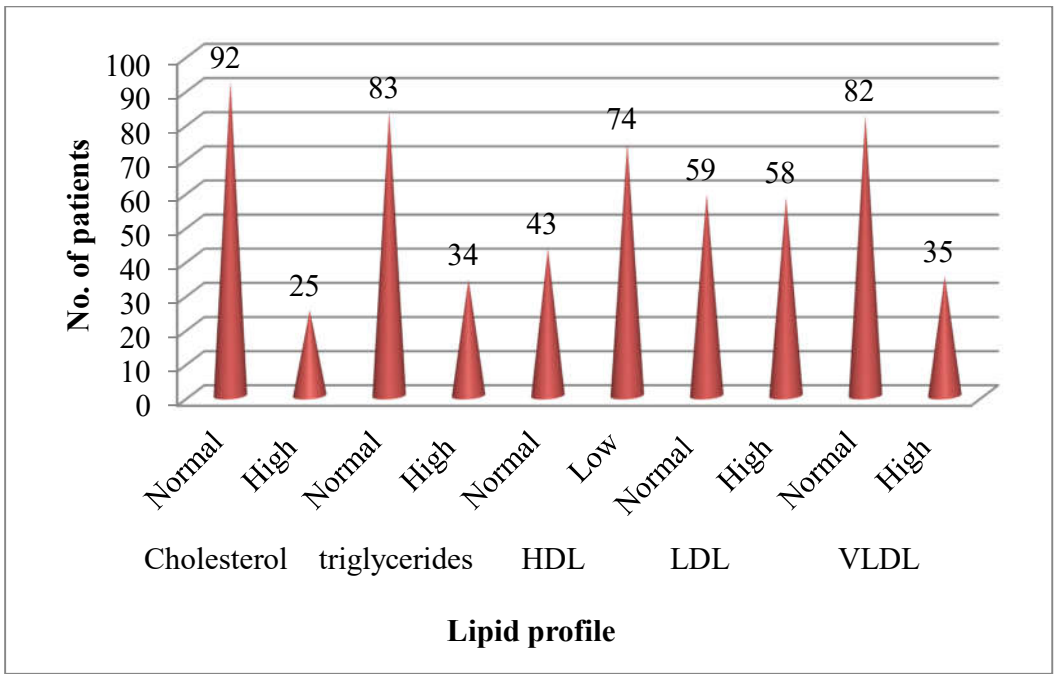

FIGURE 10 DISTRIBUTION OF LIPID PROFILE IN WIHOUT POST STROKE ANXIETY

Among the population of stroke patients without PSA, cholesterol levels are normal in 92 and high in 25 patients, triglyceride levels are normal in 83 and high in 34 patients, HDL levels are normal in 43 and low in 74 patients, LDL levels are normal in 59 and high in 58 patients, VLDL levels are normal in 82 and high in 35 patients.

TABLE 9 DISTRIBUTION OF LIPID PROFILE IN POST STROKE DEPRESSION

S.NO	CATEGORY	NO. OF PATIENTS
1	CHOLESTEROL	
	Normal	50
	High	15
2	TRIGLYCERIDES	
	Normal	45
	High	20
3	HDL	
	Normal	33
	Low	32
4	LDL	
	Normal	33
	High	32
5	VLDL	
	Normal	44
	High	21

Among the population of stroke patients with PSD, cholesterol levels are normal in 50 and high in 15 patients, triglyceride levels are normal in 45 and high in 20 patients, HDL levels are normal in 33 and low in 32 patients, LDL levels are normal in 33 and high in 32 patients, VLDL levels are normal in 44 and high in 21 patients.

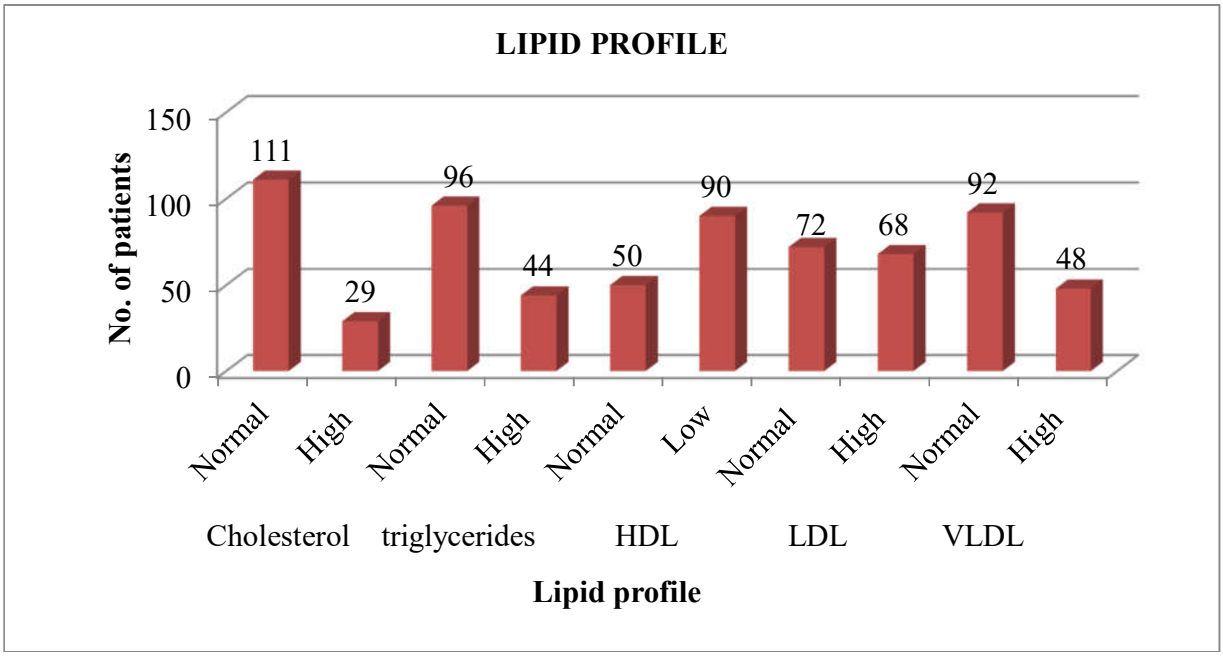

FIGURE 11 DISTRIBUTION OF LIPID PROFILE IN WITHOUT POST STROKE DEPRESSION

Among the population of stroke patients without PSD, cholesterol levels are normal in 111 and high in 29 patients, triglyceride levels are normal in 96 and high in 44 patients, HDL levels are normal in 50 and low in 90 patients, LDL levels are normal in 72 and high in 68 patients, VLDL levels are normal in 92 and high in 48 patients.

TABLE 10 DISTRIBUTION OF ELECTROLYTES IN STROKE PATIENTS

S.NO	CATEGORY	SODIUM	POTASSIUM	CHLORIDE
1	High	33	3	110
2	Normal	160	154	89
3	Low	12	48	6

STATISTICAL ANALYSIS

TABLE 11 RELATIVE FAT MASS AND STATISZTICAL SIGNIFICANCE IN STROKE PATIENTS

S.NO	PARAMETERS	MEAN ± SEM		P-VALUE		SIGNIFICANCE	
		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1	ANXIETY	28.67 ± 0.7355	31.01 ± 2.121	0.1824	0.0006	NO	YES
2	NON-ANXIETY	30.1 ± 0.7349	39.24 ± 1.174				
3	DEPRESSION	29.96 ± 0.9316	28.03 ± 2.27	0.5677	<0.0001	NO	YES
4	NON-DEPRESSION	29.3 ± 0.6416	39.7 ± 1.073				

FIGURE 12 RELATIVE FAT MASS IN MALES IN DEPRESSION

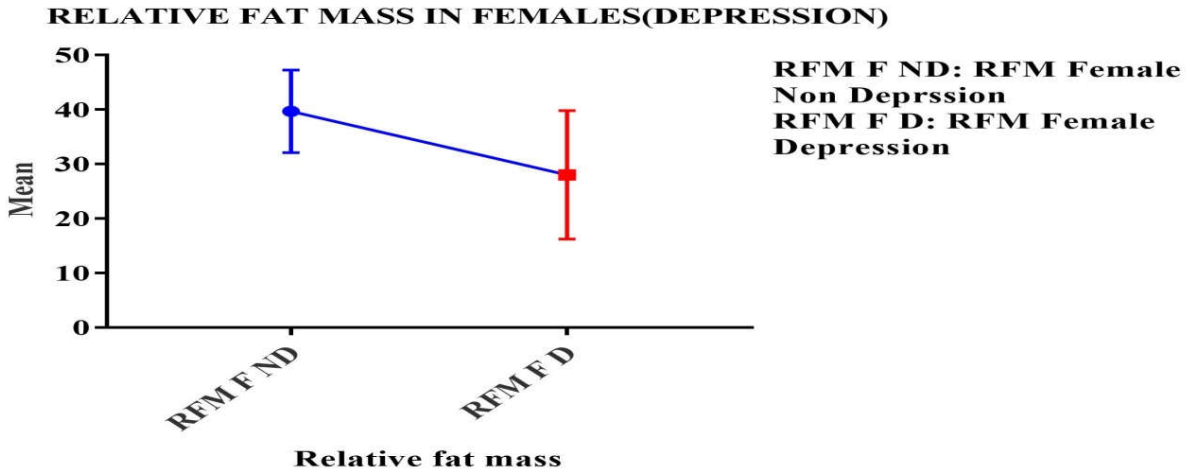

FIGURE 13 RELATIVE FAT MASS IN FEMALES IN DEPRESSION

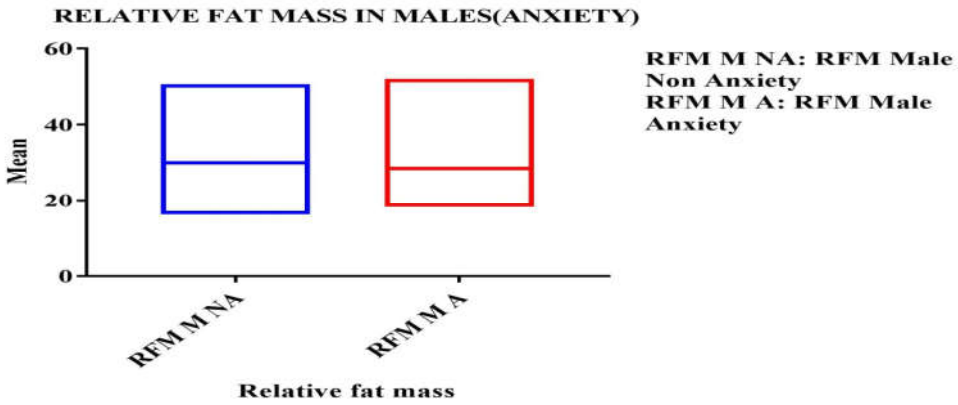

FIGURE 14 RELATIVE FAT MASS IN MALES IN ANXIETY

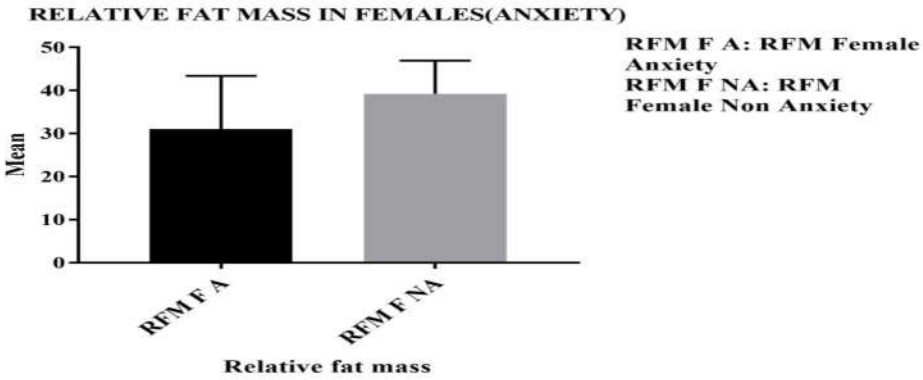

FIGURE 15 RELATIVE FAT MASS IN FEMALES (ANXIETY)

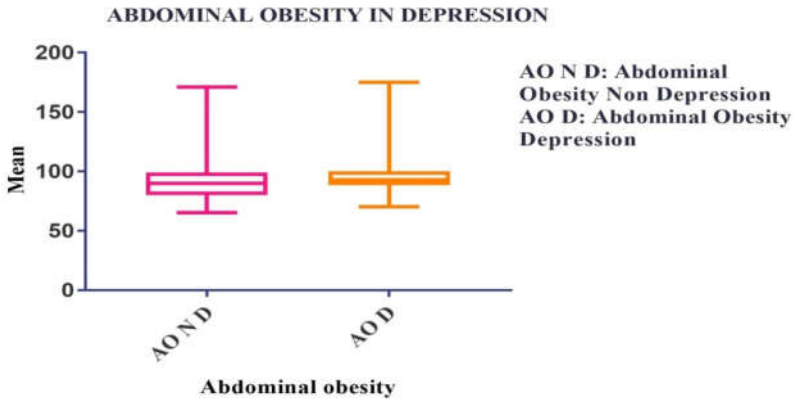

FIGURE 16 ABDOMINAL OBESITY IN DEPRESSION

By analyzing results, the relative fat mass in males were not statistically significant and relative fat mass in females were statistically significant ($p<0.05$).

TABLE 12 ABDOMINAL OBESITY AND STATISTICAL SIGNIFICANCE IN STROKE PATIENTS

S.NO	PARAMETERS	MEAN ± SEM	P-VALUE	SIGNIFICANCE
1	ANXIETY	91.49 ± 1.532	0.6425	NO
2	NON-ANXIETY	92.53 ± 1.564		
3	DEPRESSION	94.49 ± 2.004	0.1383	NO
4	NON-DEPRESSION	90.96 ± 1.321		

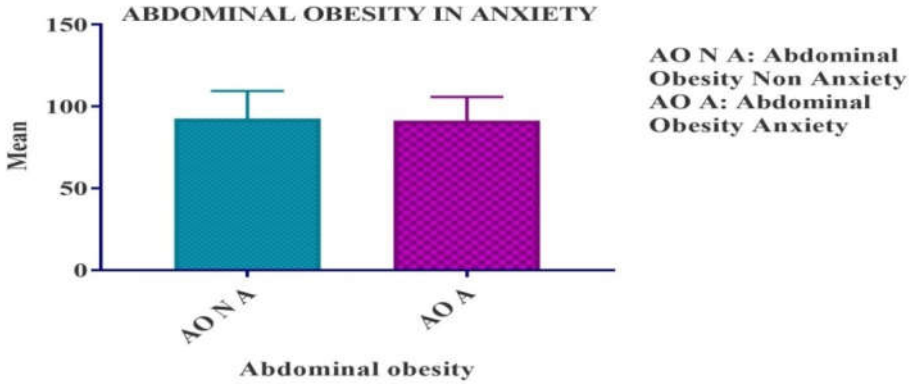

FIGURE 16 ABDOMINAL OBESITY IN ANXIETY

By analyzing results, the abdominal obesity was not statistically significant.

Discussion

The study was conducted in 205 stroke patients. The data was obtained from the patient's laboratory reports and through questionnaires. The data collection form includes patient demographics details, Lipid profile, Serum electrolytes, abdominal obesity, Relative fat mass, final diagnosis, Hamilton anxiety rating scale-14, Hamilton depression rating scale-17.

The study was conducted with the purpose to evaluate the co-relation between the abdominal obesity and relative fat mass in post stroke anxiety and depression patients.
Our study finding showed statistically significant correlation between the relative fat mass in females in post stroke anxiety and depression patients.

We have calculated mean average for females of relative fat mass post stroke anxiety and depression patients. The mean averages of post stroke anxiety in females are found to be 31.01 ± 2.121 and the mean average of post stroke depression in female are found to be 28.03± 2.27.
Earlier studies have shown that elevated abdominal obesity and relative fat mass has significance with post stroke anxiety. In our study the relative fat mass was increased in females in post stroke anxiety and depression patients.

The relative fat mass in females has shown statistical significance and the values in post stroke anxiety and depression patients in females are 0.0006 & <0.0001 respectively.
In our study among 205 patients' prevalence of stroke is high in 71-80 years age group and Prevalence of stroke is high in males (128) compared to females (77).

Among 205 patients 88 patients are affected with post stroke anxiety and in this male are mostly affected and most of the patients in 71-80 years age group patients are suffering with anxiety.
Out of 205 patients 65 patients are affected with post stroke depression and in this male are mostly affected and most of the patients in 71-80 years age group patients are suffering with depression.
In our study among 205 patients 119 patients were suffering with abdominal obesity and mostly males were suffering with abdominal obesity and 51-60 years age group patients mostly affected with abdominal obesity and in these 48 patients suffering with post stroke anxiety and 42 patients suffering with post stroke depression.

Out of 205 patients 57 females and 105 males were affected with increased relative fat mass and 61-70 age group patients mostly affected with relative fat mass and in these 18 females and 42 males were suffering with post stroke anxiety and 10 females and 33 males were affected with post stroke depression.

In our study among out of 205 stroke patients 44 patients had high cholesterol levels and 64 patients had high triglyceride levels and 122 patients had low HDL levels and 100 patients had high LDL levels and 69 patients had high VLDL levels and among all lipid profile markers total cholesterol levels were found to be high in post stroke anxiety and depression patients.
On comparison of serum electrolyte parameters in stroke, post stroke anxiety and depression patients, Serum chloride values were significantly high than others.

Conclusion

Our study findings conclude that the increased relative fat mass in females has statistical significance with post stroke anxiety and depression. Upon increase in relative fat mass levels the risk of developing anxiety and depression in stroke patients is increased.

Acknowledgements

Authors thank the Ekashilaa hospitals for their support and contribution through the entire research.

Funding

None of the authors received any funding including finance.

Conflict of Interest

The authors declare no conflict of interest related to this study.

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